



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 आरुण केण पुरम नई दिल्ली-110066
Sewa Bhawan, R. K. Puram, New Delhi-110066 [ISO: 9001:2008]
वेबसाइट / Website: www.cea.nic.in



क्र. सं : 26/10/2017/ वि प्र. यो. प. मू. - 1/92-106

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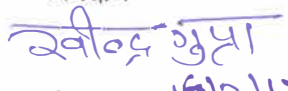
1. सदस्य (विद्युत प्रणाली), केन्द्रीय विद्युत प्राधिकरण, सेवा भवन, आर के पुरम, नई दिल्ली-110066
2. सदस्य सचिव, पश्चिमी क्षेत्रीय विद्युत समिति, एम. आई. डी. सी क्षेत्र, मेरोल, अंधेरी पूर्व, मुम्बई-400094 फैक्स सं. 022-28370193
3. निदेशक (परियोजना), पावरग्रिड कॉरपोरेशन ऑफ इंडिया लि., सौदामिनी, प्लाट सं. 2, सैक्टर-29, युडगाँव-122001 फैक्स सं. 0124-2571760
4. अध्यक्ष एवं प्रबन्ध निदेशक, एम.पी.पी.टी.सी.एल. शक्ति भवन, रामपुर, जबलपुर-482008 फैक्स सं. 0761-2664141
5. प्रबन्ध निदेशक छत्तीसगढ़ रा. वि. बोर्ड, दानगनिया, रायपुर (छत्तीसगढ़) -492013 फैक्स सं. 0771-2574246
6. प्रबन्ध निदेशक, जी.ई.ट्रां.नि.लि, सरदार पटेल विद्युत भवन, रेस कोर्स, बड़ोदा-390007 फैक्स सं. 0265-2338164
7. निदेशक (प्रचालन), महाट्रांसको, प्रकाशगड, प्लॉट संख्या-जी 9, बांद्रा-पूर्व, मुम्बई-400051 फैक्स 022-26390383 / 26595258
8. मुख्य अभियंता (पारेषण), न्यूक्लीयर पावर कॉरपोरेशन ऑफ इंडिया लि, 9एस30, वीएस भवन, अणुशक्ति नगर, मुम्बई-400094 फैक्स सं. 022-25993570
9. कार्यपालक निदेशक (अभियंत्रिकी), नेशनल थर्मल पावर कॉरपोरेशन लि, इंजीनियरिंग ऑफिस कॉम्प्लैक्स, ए-8, सैक्टर-24, नोएडा-201301 फैक्स सं. 0124-2410201
10. मुख्य अभियंता, विद्युत विभाग, गोवा सरकार, पणजी फैक्स सं. 0832-2222354
11. कार्यपालक इंजीनियर (परियोजनाएं), दादरा एवं नागर हवेली संघ शासित क्षेत्र,, विद्युत विभाग, सिलवासा, फोन नं. 0260-2642338
12. कार्यपालक इंजीनियर, विद्युत विभाग, दमन एवं दीव संघशासित क्षेत्र प्रशासन, मोती दमन, पिन-396220 फोन नं. 0260-2250889, 2254745
13. कार्यपालक निदेशक, (विशेष आम्त्रित), डब्लू आर एल डी सी, प्लॉट संख्या-एफ 3, एम आई डी सी एरिया, मेरोल, अंधेरी पूर्व, मुम्बई-400093, फैक्स संख्या-022-28235434
14. कार्यपालक निदेशक, एनएलडीसी बी-9, कुतुब इन्स्टीट्यूशनल एरिया, कटवारिया सराय, नई दिल्ली-110016 फैक्स 011-26852747
15. निदेशक ए पारेषण विद्युत मंत्रालय श्रम शक्ति भवन ए रफी मार्ग नई दिल्ली

विषय :- पश्चिमी क्षेत्र विद्युत प्रणाली योजना की स्थाई समिति की 41 वीं बैठक का कार्यवृत्त ।

महोदय / महोदया,

पश्चिमी क्षेत्र विद्युत प्रणाली योजना की स्थाई समिति की 41 वीं बैठक का कार्यवृत्त केन्द्रीय विद्युत प्राधिकरण की वेबसाइट www.cea.nic.in पर लिंक <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) पर उपलब्ध है।

संलग्न -- उपरोक्त

भवदीय

(रवींद्र गुप्ता) 16/2/17
मुख्य अभियंता



भारत सरकार / Government of India

विद्युत मंत्रालय / Ministry of Power

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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
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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).

Encl: as above

Yours faithfully,

(Ravinder Gupta)

Chief Engineer, PSP&A-I

16/2/17

Member (Power System), CEA welcomed all the participants to the 41st meeting of Standing Committee on Power System Planning in Western Region. He requested members to be specific in their deliberation so that decision could be arrived at with consensus of all the members. The list of participants is enclosed at Annexure – 1.

Chief Engineer (PSP&A-I), CEA welcomed the participants and requested Director (PSP&A-I), CEA to take up agenda items.

1. Confirmation of the minutes of 40th meeting of the Standing Committee on Power System Planning in Western Region (SCPSPWR) held on 01.06.2016 at NRPC, Katwaria Sarai, New Delhi

1.1. Director (PSPA-I), CEA informed that the minutes of the 40th SCPSPWR were issued vide CEA letter No.26/10/2016/PSP&PA-I/ 269 – 282 dated 24.06.2016. The date of 31.10.2016 mentioned in the table as target date of completion of dedicated transmission line of Essar Power M.P Ltd. in item no. 8.2 may be read as 31.12.2016.

1.2. As no comments have been received on the minutes, the minutes of the 40th meeting of SCPSPWR were confirmed by the members with above modification.

2. Review of Progress on Earlier Agreed Transmission Schemes

2.1. Director (PSPA-I), CEA informed the present (as on date) status of Transmission schemes under implementation through tariff based competitive bidding route:

- Transmission schemes commissioned – 5 no.
- Transmission schemes are under implementation – 26 no.
- Transmission schemes are under bidding process – 13 no.

2.2. The status of implementation of transmission projects under tariff based competitive bidding in Western Region are enclosed at Annexure – 2.1. The status of transmission schemes under implementation by POWERGRID in Western Region is enclosed at Annexure – 2.2.

3. Installation of 400/132 kV transformers at Champa Pooling Station as part of WR – NR HVDC Interconnector for IPP projects in Chhattisgarh.

3.1. Director (PSPA-I), CEA informed that the installation of 400/132/33 kV, 2 x 200 MVA transformers along with 2 nos. 132 kV line bays at Champa Pooling station to facilitate 33 kV auxiliary power supply to ± 800 kV, 6000 MW (initially planned to operate at 3000 MW) HVDC at Champa Pooling Station was agreed in the 32nd meeting of Standing Committee on power system planning in WR held on 13.05.2011. However, its implementation was not taken up by POWERGRID in view of availability of two

independent auxiliary supplies for HVDC system available through the tertiary of the two 1500 MVA, 765/400/33 kV transformers at Champa Pooling Station. Now POWERGRID has proposed to drop the scheme.

- 3.2. Chief Engineer, CEA stated that in CEA's "Technical Standards for Connectivity to the Grid" Regulations, 2007 Part-III clause (6) (a), it is mentioned that power supply to Sub-Stations Auxiliaries for 220 kV sub-stations shall be from two HT supply from independent sources and one of the two HT supplies shall be standby to the other. In addition, an emergency supply from diesel generating (DG) source of suitable capacity shall also be provided.
- 3.3. POWERGRID stated that it would inform about the availability of the second source of auxiliary supply at this station.
- 3.4. CSPTCL representative stated that 2 no. 132 kV bays may be dropped at Champa Pooling sub-station as these would not be utilized by CSPTCL.
- 3.5. After deliberation, members agreed for dropping of the proposal for installation 400/132/33 kV, 2 x 200 MVA transformers along with 2 nos. 132 kV line bays at Champa Pooling station, which was agreed earlier as a part of WR-NR HVDC interconnector for IPP projects in Chhattisgarh, However, POWERGRID has to ensure two different sources to auxiliaries Champa HVDC station apart from DG set as per the Regulation.

4. Connectivity System for Surguja Power Private Limited (4x150MW) at Parsa, Chhattisgarh

- 4.1. Director (PSPA-I), CEA informed that the connectivity application of Surguja Power Private Limited (SPPL) for 490 MW (600 MW Installed Capacity) was discussed in the 20th meeting of Connectivity/Open Access of WR constituents held on 17.02.2015. Subsequently, M/s SPPL has applied for revision in the connectivity quantum from 490 MW to 550 MW and the same was agreed in the 23rd meeting of Connectivity / Open Access of WR constituents held on 01.06.2016. Accordingly, CTU had issued connectivity intimations to M/s SPPL vide their letter dated 07.05.2015 and 29.07.2016, wherein the following connectivity system to be implemented by the generation developer (SPPL) was mentioned:

- (i) SPPL Switchyard – Dharamjaygarh 400kV D/C line.
- (ii) 1 x 125 MVAR, 420 kV bus reactor at SPPL switchyard

- 4.2. He said that the connectivity intimation did not mention implementing agency of the 400 kV bays at either end of the SPPL Switchyard – Dharamjaygarh 400kV D/C line. Later on, M/s SPPL has applied for prior approval of the Government under section 68 of EA, 2003, which, inter alia, included the two nos. of 400 kV bays at either end of the SPPL Switchyard – Dharamjaygarh 400kV D/C line under their scope. In this regard, clarifications were sought from CTU. Vide letter dated 21.11.2016, CTU has clarified that the connectivity system for M/s SPPL also includes the two nos. of 400

kV bays at either end of the SPPL Switchyard – Dharamjaygarh 400kV D/C line to be implemented by the generation project developer. In view of the above, the transmission system for connectivity of M/s Surguja Power Private Limited (SPPL) for 550 MW (600 MW Installed Capacity) to be implemented by M/s SPPL (generation project developer) is as given below:

- (i) SPPL Switchyard – Dharamjaygarh 400 kV D/C line.
- (ii) 1 x 125 MVAR, 420 kV bus reactor at the generation switchyard
- (iii) 2 nos. of 400 kV bays at Dharamjaygarh and generation switchyard.

4.3. Members noted the same.

5. Overloading of 400 kV Banaskantha – Sankhari D/C line

5.1. Director (PSPA-I), CEA stated that in the 40th meeting of SCSPWR held on 01.06.2016, along with the Transmission System for Ultra Mega Solar Power Park in dist. Banaskantha, Gujarat (700 MW), the issue of critical loading of Banaskantha - Sankhari 400 kV D/C under n – 1 contingency was discussed and it was decided to carry out joint system studies by GETCO, POWERGRID and CEA to address the issue. Accordingly, joint studies were carried out on 27.07.2016 & 28.07.2016 at CEA, New Delhi and various alternatives were evolved. Subsequently, the studies were carried out for other than peak demand scenario in 2018 – 19 timeframe, with solar maximized scenario, wind dispatch scenario (40%) and considering the new connectivity applications received from RE projects to be pooled at Bhuj and Bhachau. Based on the studies the following three alternatives were evolved to solve the overloading issue of Banaskantha (PG)- Sankhari 400 kV D/C line:

- (i) LILO of one circuit of 400 kV Zerda – Ranchodpura D/c line (2nd circuit) at Banaskantha (PG) PS – 30 km (Estimated Cost – Rs 55 Cr).
- (ii) LILO of 400 kV Zerda – Soja S/C line (existing) at Banaskantha (PG) PS – 35 km (Estimated Cost – Rs 60 Cr).
- (iii) Banaskantha – Vadodara 765 kV D/C line - 340 km (Estimated Cost – Rs 1400 Cr)

5.2. CTU informed that the Banaskantha – Sankhari 400 kV D/C line is being implemented as a part of the Green Energy Corridor and alternative (i) or (ii) proposed above provides an additional 400 kV outlet from Banaskantha (PG) 765/400 kV substation.

5.3. Director (PSPA-I), CEA stated that any of the three alternatives solves the overloading of Banaskantha - Sankhari 400 kV D/C line under n – 1 contingency, but alternative (iii) interlinks the Bhuj – Banaskantha – Chittorgarh - Ajmer 765 kV corridor with Vadodara, which in turn is connected with 765 kV corridors in Western Region. CTU stated that alternative (iii) i.e., Banaskantha – Vadodara 765 kV D/C line is about 350 km in length and its implementation would take 4 to 5 years, whereas the other two alternatives involves construction of 400 kV lines of about 30 km, which could be implemented in time frame 2 to 3 years.

- 5.4. GETCO stated that Banaskantha – Vadodara 765 kV D/C line is good proposal, as it links the green energy corridor with the 765 kV system in Western Region.
- 5.5. After further deliberations, LILO of one circuit of 400 kV Zerda – Ranchodpura D/C line (2nd circuit) at Banaskantha (PG) PS – 30 km (Estimated Cost – Rs 55 Cr) was agreed as a system strengthening scheme.
- 5.6. It was also agreed that interconnection of Green Energy corridor (Bhuj – Banaskantha – Chittorgarh - Ajmer 765 kV line) with 765 kV system of Western Region through Banaskantha – Vadodara 765 kV D/C line, could be taken up as system strengthening scheme in Western Region in future.

6. Progress of downstream network whose terminating bays are under construction by POWERGRID

- 6.1. Director (PSPA-I), CEA informed that CERC (IEGC) (Fourth Amendment) Regulations, 2016 dated 06.04.2016 under 5.4. (iii) states that *“Where the transmission system executed by a transmission licensee is required to be connected to the transmission system executed by any other transmission licensee and both transmission systems are executed in a manner other than through tariff based competitive bidding, the transmission licensee shall endeavor to match the commissioning of its transmission system with the transmission system of the other licensee as far as practicable and shall ensure the same through an appropriate Implementation Agreement”*

The purpose of the above provision of signing of Implementation Agreement (IA) between the parties involved is that both the upstream and downstream network may be completed in the matching timeframe to avoid any situation of transmission system remaining unutilized.

- 6.2. CTU stated in few instances, CERC has disallowed the recovery of transmission charges of ISTS assets, which has remained unutilized due to non-availability of upstream/ downstream network, through PoC mechanism and has directed to recover it from the agency implementing the upstream / downstream till it is commissioned.
- 6.3. Director (PSPA-I), CEA inquired POWERGRID about the status of signing of IA for the 220 kV line bays being implemented at their various 400/220 kV substations as a part of ISTS network with STUs. Constituents also enquired whether the IA has to be signed for all the projects.
- 6.4. CTU clarified that there are few 400/220 kV substations, where the 220 kV line bays have already been implemented and are lying un-utilised, as the 220 lines are still to be implemented by the STUs. There are few 400/220 kV substations, where the 220 kV line bays are under implementation and if the associated 220 lines are not implemented by the STUs in matching time frame, it would become idle transmission asset. There are few 400/220 kV substations where the implementation of 220 kV line bays are still to be taken up for implementation. The IA could be signed for these new

220 kV line bays, so that line bays along with the associated 220 kV lines may be commissioned in matching time frame. As far as signing of IA with STUs for 220 kV line bays are concerned, it is yet to be signed. For this first a model IA needs to be evolved in consultations with the stakeholders. But until that is finalized, the constituents can give their commitments for implementation of the 220 kV lines for the new 220 kV bays that is yet to be taken up for implementation by POWERGRID so that they could be implemented in matching time frame. For other 220 kV line bays constituents needs to implement the associated 220 kV lines at the earliest.

- 6.5. After further deliberations, it was agreed that constituents would furnish a realistic schedule for implementation of 220 kV lines associated with 220 kV bays at new 400/220 kV substations / substation augmentation, so that 220 kV bays (by POWERGRID) along with the associated 220 kV lines (by STUs) could be implemented in matching time frame.
- 6.6. MSETCL representative stated that it requires 3 nos. additional 220 kV line bays at Boisar (PG), as they have planned additional 3 no. of 220 kV outlets from the sub-station. Further, MSETCL stated that only 4 no. of 220 kV bays are required at Parli (PG) instead of 6 no. of bays agreed earlier.
- 6.7. Regarding requirement of additional 220 kV line bays at Boisar (PG) 400/220 kV substation, MSETCL was requested to submit a proposal indicating 220 kV existing as well as additional outlets planned. POWERGRID was requested to examine the availability of space for the additional 220 kV bays at Boisar. POWERGRID was also requested to revise the no. of 220 kV bays at Parli to four from six as agreed earlier. POWERGRID agreed to examine the availability of space for 220 kV additional bays at Boisar and also agreed to revise the nos. of 220 kV bays at Parli (PG) from six to four.
- 6.8. Based on the input given by the constituent states, the status of implementation 220 kV lines at existing substations (where 220 kV line bays are already implemented and are lying unutilized) and the status of under construction 220 kV line bays at new substations / substation augmentation in Western Region is given below:

Status of unutilized 220kV line bays at Existing Substations in WR

SI	ISTS Substation	Voltage ratio in use	Status of Bays		220kV Lines for unutilized bays	Status of 220kV lines
			Total	Unutilized		
1	Raipur (PG)	3x315MVA, 400/220 kV	6	2 no bays ready since 01.07.2011 (WRSS-6)	Raipur (PG) – Doma 220 kV D/c	Completion by January 2017
2	Mapusa (PG)	3x315MVA, 400/220kV	4	2 nos Bays ready since 01.11.2013	Mapusa – Cuncolin 220 kV D/c	No participation
3	Pirana	2x315MVA, 400/220kV	4	2 nos Bays ready since 19.03.15 (WRSS-6)	Pirana – Barjadi 220 kV D/c	Tender floated , completion by June 2018
4	Boisar	2x315 +500MVA, 400/220kV	6	1 no Bays ready since 30.05.15	Boisar – Borivali 220 kV line S/c	Completion by June 2017
5	Magarwada	2x315MVA, 400/220kV	4	2 nos Bays ready since 03/11/14	Magarwada – Ringanwada 220 kV D/c	No participation
6	Wardha	2x315MVA, 400/220kV	6	2 nos Bays ready since 01.02.2011	Wardha-Yavatmal 220 kV D/C line	June 2017
				2 nos Bays ready since 01.01.2012	Wardha – Bhugaon 220 kV S/c	Commissioned in August 2016
					Wardha – Pusad 220kV S/c	Commissioned in August 2016
7	Solapur	2x315 +1x500MVA, 400/220kV	6	2 nos Bays ready since 01.04.2011	Solapur – Bhale (MS) 220kV D/c	September 2017
				2 nos Bays ready since 02.11.2015	Solapur – Narangwadi 220 kV D/c line	Narangwadi 220 kV substation planned in 2019-20 time frame.
8	Damoh	1 x 500 MVA 400/220 kV	6	2 no. of bays ready since Nov – 2016	LILO of 2nd 220kV circuit of Damoh (MPPTCL) - Sagar 220kV line at Damoh (PGCIL) 400kV S/s. (1Km)	Targeted to be completed by May 2017

Status of Under Construction 220 kV line bays at New Substations / Substation Extensions in WR

S. No.	ISTS Substation	Proposed Bays	Commissioning Schedule	220kV Lines emanating from Substation	Status of 220kV lines	Remarks
1	Betul GIS 2x315 MVA, 400/220 kV	4	March – 2017 (Mauda-II)	(i) Betul (PG) - Betul D/C 220 kV line (3 Km)	targeted to complete by March 2017	
				ii) LILO of Sarni - Pandhurna 220kV line at Betul GIS(PGCIL) 400 kV S/s (41 Km).	targeted to complete by Jan 2018	
2	Morena (TBCB) 2 x 315, 400/220 kV	4	May'18 (Chhattisgarh & WR SS)	i) LILO of one circuit of Malanpur – Mehgaon 220kV line at Morena (TBCB) 400kV S/s (8Km from Loc. No.12). ii) Morena(TBCB)400 - Sabalgarh 220kV DCDS line (92Km) with LILO of one circuit of Morena(TBCB)400 - Sabalgarh 220kV line at Morena 220kV S/s of MPPTCL (0.5Km)	targeted to complete by March 2018	
3	Navi Mumbai 2 x 315, 400/220 kV	4	Bays ready since Mar'14 (WRSS-V)	STU line	Planned	Severe RoW issues are involved
4	Indore (PG) 2x500 MVA, 400/220 kV	6	Jul'18 (WRSS-14)	LILO of both circuit of Indore-II (Jaitpura) - Ujjain 220 kV line at Indore (PGCIL) 765 kV S/s. (2X4Km)	Targeted to complete by March 2018	
				(ii) Remaining 2 Nos. feeders from Indore(PGCIL) 765kV S/s shall be intimated at later stage		
5	Itarsi (PG) 1x500 MVA, 400/220 kV	2	Jul'18 (WRSS-14)	LILO of 2nd 220kV circuit of Itarsi (MPPTCL) - Hoshangabad 220 kV line at Itarsi (PGCIL) 400kV S/s (Existing)	In line with scheduled date of ICT i.e. July 2018	
6	Parli (PG) 2x500 MVA, 400/220 kV	4	Jun/Jul'18 (WRSS-16)	LILO of Parli - Harngul 220 kV S/c	UC	Dec, 2018
				LILO of Osmanabad (MS) - Parli 220 kV S/c	UC	Dec, 2018

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 UMSP – Rewa PS 220kV 3xD/c line	UC by Rewa UMSP	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.

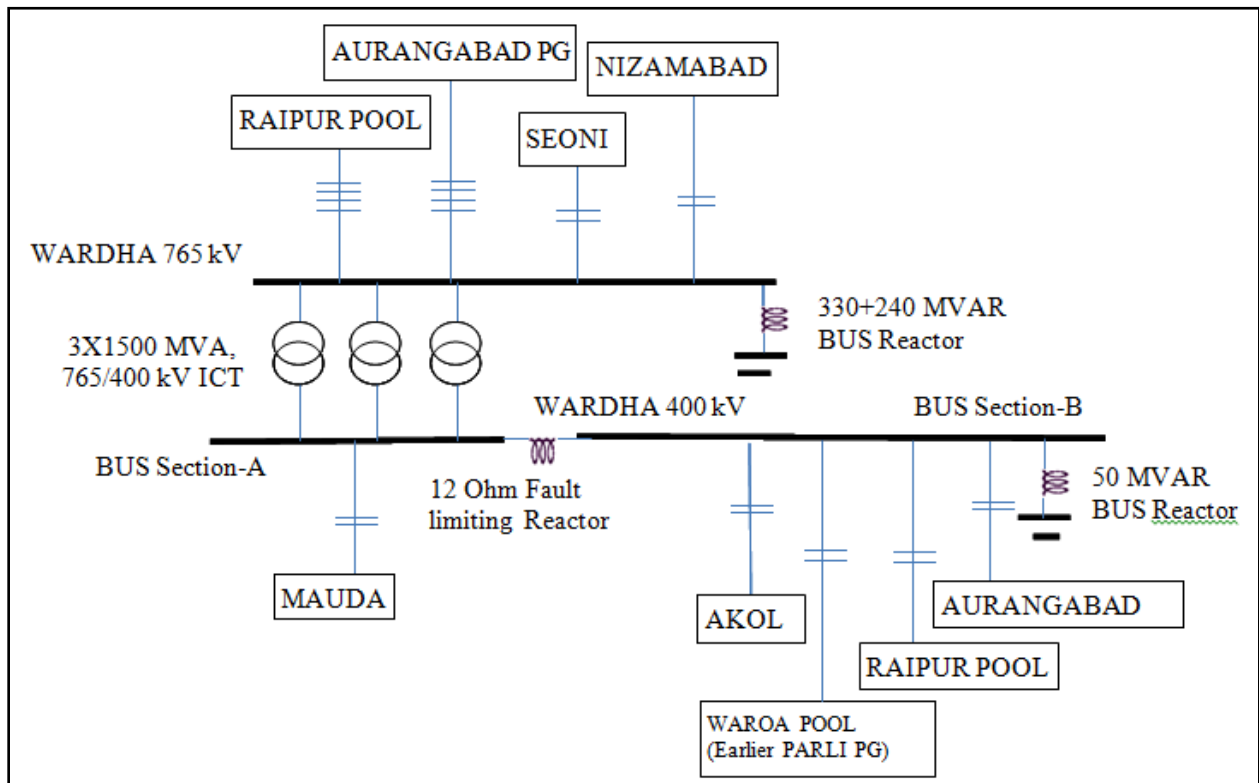
- 7.4. CEA / MSETCL observed that in the bus splitting proposal at Wardha, all the three 765/400 kV ICTs at Wardha and feeder from Mouda are connected to Bus section – A only and bus section B has more no. of outgoing feeders than the incoming feeders. Therefore, one 400 kV outgoing feeder (say, Wardha – 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 outskirts 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 SCSPWR 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

LILO and dues of around 10 crores on account of DSM, RLDC charges etc., are still pending from M/s VVL. A petition has also been filed in CERC in this regard by NLDC. WRLDC endorsed the views of NLDC.

- 8.5. CTU suggested that M/s VVL may surrender its connectivity and may apply again for connectivity after the restructuring of their loans and or after getting coal linkages for their project.
- 8.6. The issue was further deliberated and M/s EPMPPL was requested to expedite the implementation of the EPMPPL generation switchyard - Bilaspur pooling station 400 kV D/C line before monsoon as against their completion target of December 2017. Regarding M/s VVL interim connectivity, M/s VVL was suggested to surrender their connectivity with grid and they may again apply for connectivity / LTA after finalization of loan restructuring, coal linkages etc.
- 8.7. The CERC order no. 30/MP/2014 dated 28.09.2016 states that CTU shall take up all the existing cases of connectivity on interim LILO with the RPC of respective regions within a period of one month from the date of issue of this order for review and decision on disconnection of the interim arrangements through LILO. All such interim arrangements through LILO shall be disconnected within a period of three months of the issue of this order unless the RPC grants extension for continuation of LILO keeping in view of all relevant factors.
- 8.8. In view of the above, the issues regarding connectivity on interim LILO, needs to be deliberated in the RPC forum, WRPC, in this case. Members noted the same.

9. Connectivity of Railways' TSS with ISTS Network for Delhi – Bharuch route

- 9.1. Director (PSPA-I), CEA stated that Railway Board has requested for connectivity to Railways from various ISTS points to feed their TSS (Traction Sub Station). A meeting was held on 07.10.2016 in CEA to discuss the connectivity of Railways' TSS with ISTS network for two routes of Railways i.e. (i) Delhi (NR) – Bharuch (WR) route (ii) Mughal Sarai (NR) – Howrah (ER) route. In the meeting, following ISTS substations were preliminarily identified for giving connectivity to the Railways' TSS for its Delhi-Bharuch route:
(i) Ballabgarh or Tughlakabad (under construction) (ii) Agra or Bassi (Rajasthan) (iii) Kota (iv) Rajgarh (v) Dehgam / Pirana or Vadodara
- 9.2. He added that in the meeting, POWERGRID was requested to furnish the information regarding the availability of space for 2 nos. 220 kV line bays and margins in transformation capacity at each of the above substation. M/s Railways was also requested to provide information about its present connectivity (connectivity of TSS along this route) with STUs.

- 9.3. POWERGRID confirmed the availability of space for two nos. 220 kV line bays (AIS) at Rajgarh, Dehgam, Pirana, Kota & Bassi substations and GIS bays at Vadodara.
- 9.4. The margins in transformation capacity at above substations / transmission system for drawl of traction load of about 80 to 150 MW by Railways needs to be assessed after receipt of connectivity / LTA application by Railways. The details of the TSS points and their present connectivity with state utilities along the Delhi – Bharuch route and Mugal Sarai – Howrah route, as furnished by Railway Board, is enclosed at Annexure 4.
- 9.5. GETCO stated that CERC has already allowed open access to Railways in terms of connectivity regulations from generating stations or other sources to facilities and network of Indian Railways.
- 9.6. It was mentioned that as per the Railways Act, 1989, Railways can build transmission lines, maintain & operate the same for its own utilization and as per CERC petition no. 197/MP/2015 order dated 05.11.2015, Railways is an authorized to undertake transmission and distribution activities in connection with the working of railways independent of its status under the Electricity Act, 2003. i.e. it is a deemed licensee.

10. Additional 400 kV feed to Goa – Reactive Compensation

- 10.1. Director (PSPA-I), CEA stated that the establishment of 2x500 MVA 400/220 kV S/S at Xeldem by LILO of one ckt of Narendra (existing) – Narendra (New) 400kV D/c quad line at Xeldem, 1x80 MVAR, 420 kV switchable line reactor along with 500 Ohms NGR and its auxiliaries at Narendra (New) S/s was agreed in the 40th meeting of SCSPWR held on 01.06.2016.
- 10.2. He said subsequently, POWERGRID has intimated that Narendra (New) substation is being a Gas Insulated Substation, does not have sufficient space for conversion of existing “line bay module” into “line with switchable reactor bay module”. However, the sufficient space is available for installation of 1 x 80 MVAR fixed line reactor. (This fixed line reactor may not be used as bus reactor without opening the line jumper physically on line side due to layout constraints in existing GIS S/s).
- 10.3. Members agreed for the conversion of 1x 80 MVAR, 420 kV switchable line reactor at Narendra (New) S/s (*for Narendra (New) – Xeldem 400kV (quad) line formed after LILO of one ckt of Narendra (existing) – Narendra (New) 400kV D/c quad line at Xeldem*) to fixed line reactor, in view of space constraints at line bay module at Narendra (New) GIS substation.

11. Alternative utilization of Essar Power Gujarat Ltd (EPGL) - Bhachau 400 kV D/C (Triple) line of POWERGRID:

- 11.1. Director (PSPA-I), CEA stated that M/s EPGL had planned to develop coal based power plant at Salaya, Gujarat in three phases (2x 600 MW + 4 x 660 MW + 4 x 150

MW). The first phase i.e. 2 x 600 MW has been commissioned and is connected to GETCO network through EPGL Phase I – Rajkot 400 kV D/C line and its second evacuation transmission line is EPGL Phase I – Amreli 400 kV D/C, which is under implementation by GETCO. M/s EPGL (3040 MW - Phase II & III) has a PPA of 800 MW with GETCO, for which GETCO has planned EPGL – Halvad 400 kV D/C line. M/s EPGL also applied for ISTS connectivity for remaining 2240 MW, for which EPGL – Bhachau 400 kV D/C (Triple) line was planned and under implementation by POWERGRID. The phase II & III of the generation project are yet to take off. However, EPGL – Bhachau 400kV D/C (Triple) line is almost completed by POWERGRID and only 9 no tower foundation, 10 nos tower erection and 3.5 km stringing is held up due to non-finalization of gantry by EPGL.

- 11.2. He said that the issue of non-utilization of EPGL – Bhachau 400kV D/C (Triple) line was discussed in the 40th meeting of SCPSPWR held on 01.06.2016, wherein, it was decided to carry out joint technical studies by CEA, CTU, POSOCO and GETCO to finalize the proposal in regard to utilization of EPGL – Bhachau 400 kV D/C (triple) line. Accordingly, joint technical study meeting of CEA, CTU, POSOCO and GETCO was held from 28.07.2016 – 29.07.2016, wherein various alternatives with respect to utilization of above line and other proposals of Gujarat were also discussed in the meeting.
- 11.3. He added that POWERGRID has informed that a meeting between GETCO and CTU was held on 21st Sep., 2016 at Vadodara, wherein, it was discussed that the Bhachau – EPGL 400kV D/c (Triple) line section may be extended to Bhogat substation in south-west of EPGL plant, which is already connected to 400 MW wind generation at 220 kV level. As the coastal area in Gujarat is high potential site for wind power generation, therefore possibility of development of more wind power generation in vicinity of Bhogat S/s is quite high. Moreover, a 400 MW new wind generation has also been planned at Bhogat. Accordingly, GETCO has planned to develop 400kV substation at Bhogat S/s. EPGL – Bhachau 400kV D/c (Triple) line could be extended to Bhogat S/s for its utilization and evacuation of RE generation projects in Bhogat area provided the RE generation developers in the Bhogat area seek LTA from CTU. The Bhachau – Bhogat/ EPGL 400kV D/c line may be LILO at Halvad or Shapar substations of GETCO to serve the loads of Gujarat.

Further, new connectivity applications have been received from RE generation projects in vicinity of Bhachau area. Due to the severe ROW issues in the vicinity of Bhachau and space constraints in Bhachau S/s as well as high RE potential in vicinity of Bhachau, a new pooling station in Bhachau Taluka, Kutch district, Gujarat (i.e. Lakadia) has been proposed by making LILO of EPGL – Bhachau 400kV D/c line at Lakadia. Few RE generation projects near Bhuj, have applied for LTA. LILO of EPGL – Lakadia – Bhachau 400kV line at Halvad S/s (or Shapar S/s) has been proposed as part of system strengthening for providing LTA. Based on these, studies were carried out and the following transmission system strengthening in Gujarat is proposed for utilization of EPGL – Bhachau 400 kV D/C line:

- (i) The ESSAR – Bhachau 400 kV D/C (triple) line section has also been proposed to be made LILO at Lakadia Pooling Station to provide connectivity to new RE generation projects in WR.
- (ii) Extension of Bhachau (PG) – Essar(EPGL) 400 kV D/C (triple) line upto Bhogat Substation of GETCO
- (iii) LILO of Bhogat – Bhachau 400 kV D/C (triple) line (formed after i) at Halvad / Shapar Substation of GETCO.

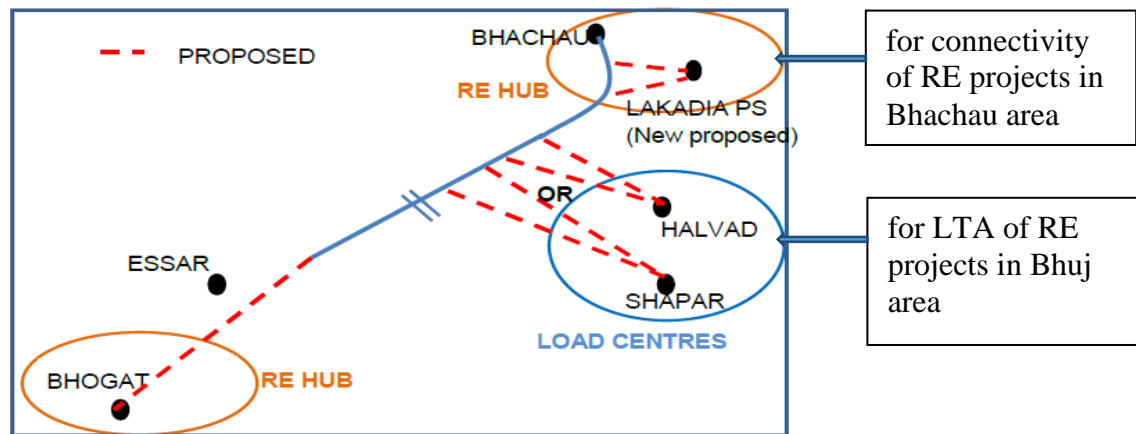


Fig-2 Proposal for Essar-Bhachau utilization

- 11.4. CEA also informed that GETCO vide its letter dated 02.11.2016 has requested CEA to include the EPGL(Essar) – Bhachau 400 kV D/C line under Green Energy Corridor, wherein cost of this line is socialized, as it would facilitate transmission of RE power from Saurashtra (Jamnagar & Porbandar) and Kutch to ISTS network.
- 11.5. GETCO representative stated that the extension of the EPGL(Essar) - Bhachau line 400 kV D/C line up to Bhogat would facilitate the evacuation of RE projects that are expected to come up in the vicinity of Bhogat S/s of GETCO. But LILO of this line at Shapar or Halvad may increase the ISTS charges of Gujarat. Already the ISTS transmission charges were almost doubled in last 2 – 3 years. MSETCL representative stated that they have also raised the issue of high ISTS charges in the WRPC meetings but there is no clarity regarding the high ISTS transmission charges. The issue was deliberated and the committee suggested to WRPC to coordinate with POWERGRID and share the information regarding the calculation of transmission charges.
- 11.6. GETCO stated that POWERGRID team has met Additional Chief Secretary, Energy & Petrochemicals Department, Gujarat on 11.08.2016, wherein, it was suggested that POWERGRID should come out with some win-win reconfiguration proposal for EPGL (Essar) – Bhachau 400 kV D/C line, which entails no loss to Gujarat, even if benefits are not envisaged immediately. It was advised that POWERGRID shall work out the

burden to be shared by GUVNL for various conditions i.e., existing case and additional burden on GUVNL with any kind of reconfiguration and power flow benefits thereof. It was also suggested that schemes may be worked out in such a manner that RE power integrated with ISTS grid disturbs State grid the least, considering the fact that State grid is already facing issues with increased RE capacity. GETCO requested POWERGRID to work out the burden to be shared by GUVNL for various alternatives of utilization/ reconfiguration of EPGL (Essar) – Bhachau 400 kV D/C line and put the same to Govt. of Gujarat (GoG) / GUVNL for their approval.

12. Operational feedback of NLDC

12.1. The operational feedback of NLDC for the period from July 2016 to September 2016 was discussed and summary of the deliberations is as given below:

12.2. Transmission line constraints

S. No	Corridor	Constraints	Remarks
1.	<p>Constraints in Bableshwar - Padghe corridor</p> <p>Antecedents With high Maharashtra Demand of the order of 18500-20000 during morning peak and no generation at Parli, low generation at RGPPL, Jaigad and SSP.</p>	400 kV Bableshwar - Padghe corridors carrying more than 500 MW in each ckt. The corridor is N-1 non-compliant.	765/400 kV Ektuni S/S commissioned along with 2 X 1500MVA ICTs and 400 kV Ektuni - Bableshwar D/C in Apr/May16. However, in real time operation, one circuit of 400 kV Ektuni - Bableshwar is kept open by MSETCL to control the loading on 400 kV Bableshwar- Padghe D/C which is generally loaded above 550 MW each. Kudus Substation is expected to be commissioned by Dec, 2017. Forest clearance is awaited for 400 kV Bableshwar - Kudus D/C.
2.	<p>765/400 kV ICT at Tirora and 765/400 kV ICT at Akola II</p> <p>Antecedents When generation at Tirora is above 2400 MW and Rattan India (3x270MW) is in service.</p>	The system is not n-1 compliant. It has been observed that tripping of 765 kV Tirora ICT or 765 Akola II ICT would cause sudden increase in the loading of Tirora - Warora lines causing oscillation in the grid.	MSETCL intimated that clearance from MERC was still awaited for 1 X 1500 MVA ICT, (4 X 500 MVA single phase units with 1 spare) at Tiroda & Akola II. These were expected to be commissioned by Dec, 2017 respectively.
3.	<p>Transmission system for Koradi St-II (3 x 660 MW) and IEPL (2 x 270 MW)</p>	The present system is N-1 non-compliant.	The generation capacities in the vicinity of Koradi are: 5 X 660 MW Tirora, 5 X 270 MW RattanIndia, 2 X

S. No	Corridor	Constraints	Remarks
	<p>Antecedents Koradi-II S/S is connected to Wardha-Warora one ckt on interim arrangement. At present 2 units of Koradi-II commissioned and Koradi –II-IEPL-Warora S/C and Koradi-II-Wardha S/C is in service.</p>		<p>500 MW Chandrapur2, 2 X 270 IEPL & 1 X 300 MW Dhariwal.</p> <p>MSETCL intimated that 400 kV Koradi II – Koradi III D/C is expected to be commissioned by March, 2017 and 220 kV Koradi-II – Kaulewada D/C line completed & charged on 02.09.2016.</p>
4.	<p>220 kV Navsari (PG) - Navsari (GETCO) D/C</p> <p>Antecedents: With generation at DGEN, UKAI, JHANOR</p>	High loading observed more than 220MW and N-1 non-compliant	Line implementation under scope of TSP through TBCB route. TSP has not started the work. Meeting scheduled with TSP in January in CEA.

12.3. ICT constraints

S. No	ICT	Description of the constraints	Remarks
1.	<p>2 x 315 +1 x 500 MVA Bableshwar ICTs</p> <p>Antecedents With Maharashtra demand above 18500 MW.</p>	It is observed that the Bableshwar ICTs are fully loaded and system is n-1 non-compliant. MSETCL has implemented load trimming scheme to take care of overloading.	MSETCL intimated that 4 th ICT 1 X 500 MVA was commissioned on 27.11.2016.
2.	<p>2 X 315 MVA Chakan ICTs</p> <p>Antecedents Maharashtra meeting high demand of above 18500 MW</p>	It is observed that the loading on ICTs at Chakan (2 x 315 MVA) are above 200 MW and additional ICT has to be proposed. MSETCL has implemented load trimming scheme to take care of overloading.	MSETCL intimated that additional ICT is under planning.
3.	<p>3 X 315 MVA Lonikhand ICTs</p> <p>Antecedents</p>	It is observed that the loading on ICTs at Lonikhand 3 x 315 MVA) are above 200 MW and additional ICT has to be	MSETCL intimated that load of around 200 MW of Kathapur (Pargaon) has been shifted from Lonikhand to Lonikhand II substation on 07.01.2016. This has

S. No	ICT	Description of the constraints	Remarks
	Maharashtra meeting high demand of above 18500 MW	proposed or 2 x 500 MVA ICTs at Lonikhand-II are under-utilized and the 220 kV lines from Lonikhand II and Pune(PG) to be expedited. MSETCL has implemented load trimming scheme to take care of overloading.	relieved the loading on Lonikhand substation ICTs and now the loading on ICTs at Lonikhand I & II is within limits.
4.	3 X 315 MVA + 600 MVA Padghe ICTs Antecedents Maharashtra meeting high demand of above 18500 MW	It is observed that the Padghe ICTs are fully loaded and system is N-1 non-compliant. MSETCL has implemented load trimming scheme to take care of overloading.	MSETCL intimated that it has planned 5 th ICT, 1 X 500 MVA at Padghe and is expected to be commissioned by March 2017. Kudus S/s is expected to commission by Dec, 2017.
5.	2 x 315 +1 x 500 MVA Parli ICTs Antecedents Maharashtra meeting high demand of above 18500 MW	It is observed that loading on these ICTs are N-1 non-compliant. MSETCL has implemented load trimming scheme to take care of overloading.	Nanded Sub-station with 2x500MVA 400/220 kV ICTs and 220 kV lines commissioned in Mar 2016 and Parli ICTs are relieved to some extent. ICTs and bays at Parli (PG) commissioning schedule by PGCIL is Dec, 2017. MSETCL stated that lines associated with this, would be implemented by Dec, 2018
6.	2 X 315 MVA Satna ICT Antecedents Madhya Pradesh meeting high demand of above 9000 MW	It is observed that the loading on ICTs at Satna (2x315MVA) are above 200 MW and additional ICT has to be proposed. MPPTCL has implemented Load trimming scheme for overloading of ICTs.	Commissioning of 500 MVA additional ICT was approved & is expected be commissioned by PGCIL is July 2018. PGCIL intimated that installation of 3 rd 1 X 315 MVA ICT in parallel with existing 315 MVA ICTs at Satna as an interim arrangement under progress & expected to be commissioned by 15.01.2017.
7.	3 X 315 MVA Bhopal ICTs Antecedents	It is observed that the loading on ICTs at Bhopal (3x315MVA) are above 200	1 X 315 MVA, 400/220 kV ICT (4th) at Bhopal is under implementation by MPPTCL. Award has been placed on 04.04.2016 and is

S. No	ICT	Description of the constraints	Remarks
	Madhya Pradesh meeting high demand of above 9000 MW	MW and additional ICT has to be proposed	expected to be completed by June 2017.
9.	315 MVA Itarsi ICT Antecedents Madhya Pradesh meeting high demand of above 9000 MW	Single ICT with loading above 200 MW for more than 20 % of the time.	1 X 500 MVA 400/220 kV ICT along with two nos. of 220 kV bays at Itarsi (PG) would be commissioned by March 2018.
10 .	2 X 315 MVA Dehgam ICTs Antecedents Gujarat meeting high demand and generation at Wanakbori being low.	It is observed that the loading on ICTs at Dehgam (2 x 315 MVA) are above 180 MW and additional ICT has to be proposed	1 X 500 MVA, 400/220 kV ICT has been planned and its expected commissioning schedule by PGCIL is March 2019.
12	2 X 315 MVA ICTs at NSPCL Antecedents With Bus split arrangement at 400 kV Raipur coupled with outage of FSC of 400 kV Raipur-Wardha D/C and evacuation of KSK and RKM generation at Raipur.	400 kV Raipur bus under bus split operation from July'15. The 2 X 315 MVA NSPCL ICTs are not n-1 compliant especially when Chhattisgarh demand is high.	KSK has shifted and connected to Champa on 05.10.2016 & dedicated line of RKM has been charged on 28.10.2016.

12.4. Lines/ICTs opened to control overloading

S. No	Transmission Element (s) opened	Overloaded corridor	Remarks
1.	400/220 kV Pune(PG) one ICT	To control loading in 220 kV Pune(PG) – Talegaon D/C lines	MSETCL intimated that Pune - Hingewadi 220 kV D/C is under implementation, however, due to urbanization it has severe RoW constraints and this line is expected to get commissioned by

S. No	Transmission Element (s) opened	Overloaded corridor	Remarks
			Dec, 2018. Further, it was stated that Talegaon - Chinchwad 200 kV D/C is under implementation & expected to get commissioned by March, 2017. There are constraints beyond Urse only.
2.	400/220 kV 2 x 315 MVA Sholapur(PG) ICTs	2 X 500 MVA Sholapur (MS) ICTs loading will reduce if loads are shifted to Sholapur PG ICTs	MSETCL intimated that about 50 MW load connected with Solapur (PG) and the around 200 MW load of Solapur (MS) would be transferred to Solapur (PG) by March 2017. Solapur – Bale 220 kV D/C would be implemented by Dec, 2017
3.	400/220 kV 2 x 315 MVA Warora ICTs	Idle charged in the absence of 220 kV downstream network.	MSETCL intimated that one ICT has been shifted to Bableswar & commissioned on 27.11.2016 & another ICT would be shifted in Jan, 2017 & would be commissioned by March, 2017.
4.	400 kV Ektuni-Bableswar one circuit	400/220 kV Bableswar ICT loading	Additional ICT at Bableswar was commissioned on 27.11.2016 and Kudus substation is expected to commission by Dec, 2017 & forest clearance is awaited for 400 kV Kudus – Bableswar D/C

12.5. Delay in transmission lines affecting grid operation adversely

S. No.	Transmission Corridor	Proposed Commissioning Date	Actual/ Likely Commissioning Date	Transmission Constraint Caused
1.	400 kV Amreli – Kasor D/C	June'13	Dec'17	GETCO representative stated that in this area, no transmission line is over loaded. However, it was stated that 60 % of the line has been completed and now the work is stranded due to RoW issues. This line expected to commission by Dec, 2017

S. No.	Transmission Corridor	Proposed Commissioning Date	Actual/ Likely Commissioning Date	Transmission Constraint Caused
2.	400 kV Essar Mahan-Bilaspur Pooling station D/C	Mar13	June, 2017	EPMPL to expedite the implementation of the Essar Mahan - Bilaspur pooling station 400 kV D/C line before monsoon as against their completion target of December 2017
3.	400 kV Kudus S/s along with 400 kV Bableshtar-Kudus D/C and associated 220 kV system	Mar'16	Dec'17	Kudus substation is expected to commission by Dec, 2017 & Kudus – Bableshtar would be commissioned along with the Kudus S/s.

Members noted the same.

13. Provision of 2 no. of 220 kV bays at Raipur (PG) substation for LILO of Khedamara (CSPTCL) – Borjaha S/C line at 220 kV Raipur (PG) Substation

- 13.1. Director (PSPA-I), CEA stated that the issue of provision of 2 no. of 220 kV line bays at Raipur (PG) S/s for LILO of Khedamara (CSPTCL) – Borjaha was discussed in 38th, 39th & 40th meetings of SCPSW. Also two no. of 220 kV line bays (agreed with installation of 1x315 additional ICT) at Raipur 400/220 kV S/s had already implemented by M/s PGCIL as part of WRSS – 6, but these 2 no. of 220 kV line bays are still not utilized by M/s CSPTCL. In 39th meeting of SCPSW, CSPTCL had confirmed that the two no. of unutilized 220 kV line bays at Raipur (PG) would be used for termination of 220 kV D/C line from DOMA, which is likely to be implemented in 9 months' time. In the meeting, CSPTCL had intimated that they are facing severe RoW problems in implementation of LILO of Khademara – Borjhara 220 kV S/c line at Raipur (PG) and are examining the feasibility of laying cables to overcome the RoW issue. The outcome would be intimate to CEA.
- 13.2. CSPTCL representative informed that implementation of LILO of Khademara – Borjhara 220 kV S/c at Raipur (PG) using cable was examined, however, the same couldn't be implemented due to severe RoW problems. Therefore, the two nos. of additional 220 kV bays was not required. The existing 2 no. of 220 kV bays at Raipur (PG) would be utilized for the termination of 220 kV D/C line from DOMA.
- 13.3. In view of above, it was agreed that PGCIL would not take up the implementation of additional 2 no. 220 kV bays at Raipur (PG) for LILO of Khademara – Borjhara 220 kV S/c at Raipur (PG).

14. High fault level at 400 kV Korba STPS (NTPC)

- 14.1. Director (PSPA-I), CEA stated that in the 40th meeting of SCPSPWR held on 01.06.2016, the following scheme was agreed to control high fault current at Korba STPS (3x200 MW+4x500 MW) of NTPC:
- (i) Korba STPS - Korba West 400 kV S/C line to be normally kept open.
 - (ii) Korba STPS- Sipat STPS 400 kV S/C line and Sipat STPS – Raipur 400 kV S/C line to be rearranged as Korba STPS- Raipur 400 kV S/C line bypassing at Sipat STPS. (bypassing arrangement at Sipat STPS already exists).
- 14.2. He said that subsequently, M/s CSPTCL vide its letter 02.09.2016 has intimated that SLDC (Chhattisgarh) had raised concern over keeping the Korba STPS - Korba West 400 kV S/C line in normally open condition, as it would cause overloading of the 400 kV and 220 kV lines emanating from Korba (West) power plant under n–1–1 contingency conditions. SLDC (Chhattisgarh) has suggested that:
- The proposal to be reexamined from contingency and stability point of view under full power generation at Marwa Power Plant (2 x500 MW).
 - To carry out contingency (n–1–1) / stability studies under outage of 400 kV lines and considering the load on 220 kV of CSPTCL network.
 - To explore the option of bus splitting at Korba STPS (NTPC) and review the recommendations.
- 14.3. CTU stated that as per their studies no overloading is observed on lines emanating from Korba (West). CTU requested CSPTCL to share their studies. CSPTCL representatives stated that above concerns have been raised by their SLDC and the same needs to be discussed. CEA requested CSPTCL to take up the issue at WRPC level and the outcome of the deliberations could be intimated to CEA/CTU.
- 14.4. After deliberations, it was decided that SLDC (Chhattisgarh) concerns / suggestion would be deliberated in joint meeting of CEA, CTU, WRPC, CSPTCL and WRLDC.

15. Status of earlier agreed transmission schemes

- 15.1. Director (PSPA-I), CEA informed that there are few transmission schemes, which has been agreed in previous standing committee meetings to be implemented by MSETCL (state transmission utility) but its implementation has not been taken up. LILO of Navsari – Navi Mumbai 400 kV D/C at Nasik was agreed in the 28th meeting of SCPSPWR held on 06.12.2008. Similarly, Aurangabad (Ektuni) – Aurangabad (PG) 765 kV D/C was agreed in the 32nd meeting of SCPSPWR held on 13.05.2011, as a part of augmentation of intra state system in Maharashtra at 400 kV & 765 kV level.
- 15.2. MSETCL informed that they are not taking up the implementation of LILO of Navsari – Navi Mumbai 400 kV D/C at Nasik as other 400 kV connectivity to Nasik has already been taken up. Nasik is connected to Sinnar, which in turn is connected with

Bableshtar though 400 kV D/C line. Therefore, the proposal agree earlier may be dropped. Regarding the Aurangabad (Ektuni) – Aurangabad (PG) 765 kV D/C line, MSETCL is not taking up its implementation in present time frame but it has been proposed to be taken up in 2021-22 time frame.

15.3. The members agreed that LILO of Navsari – Navi Mumbai 400 kV D/C at Nasik (implementation by MSETCL) agreed in the 28th meeting of SCPSPWR held on 06.12.2008 be dropped.

16. Revised proposal for 220 kV downstream interconnection with proposed Morena (TBCB) 400/220 kV substation

16.1. Director (PSPA-I), CEA stated that establishment of 400/220 kV substation at Morena and its interconnection with Gwalior (PG) through 400 kV D/C line was approved in 36th meeting of Standing Committee on Power System Planning in WR held on 29.08.2013 and MPPTCL has proposed the following 220 kV outlets from above 400/220 kV Morena S/s.

(i) Morena (TBCB) - Morena (MP) 220 kV D/C line (20 km)

(ii) Morena (TBCB) - Sabalgarh (MP) 220 kV D/C line (80 km)

16.2. He said that subsequently, MPPTCL vide letter no. 04-02/n-171/2525 dated 05.09.2016 has informed that due to change in the site location of 400/220 kV Morena (TBCB) S/s from its earlier envisaged location and severe RoW issues involved in implementation of earlier proposed downstream network from new site of 400 kV substation, the downstream 220 kV network from 400 /220 kV Morena has been revised as follows:

(i) LILO of one circuit of Malanpur–Mehgaon 220 kV line at Morena (TBCB) 400/220 kV S/s

(ii) Morena (TBCB) - Sabalgarh (MP) 220 kV DCDS line (92 km)

16.3. He added that in addition to above MPPTCL has also proposed LILO of one circuit of Morena (TBCB) – Sabalgarh 220 kV line at Morena 220 kV S/s of MPPTCL (0.5 km)

16.4. MPPTCL informed that award has already been placed for the 220 kV downstream lines from Morena 400/220 kV substation and it is targeted for completion by March 2018.

16.5. Members noted the same.

17. Incentivizing the early commissioning of transmission projects

17.1. Director (PSPA-I), CEA informed that MoP vide their order no. 15/1/2013-Trans dated 15.07.2015 has issued the policy for incentivizing early commissioning of transmission projects (transmission system strengthening schemes). The policy entitles Transmission System Provider (TSP) for transmission charges from the actual date of

Commercial Operation (COD) prior to the original schedule COD. The incentive is applicable for the transmission project(s) / elements(s) which are under implementation / yet to be bid out under TBCB / yet to be assigned to CTU (PGCIL) under compressed time schedule. Subsequently, MoP vide its OM No. 15/1/2013-Trans dated 05.10.2016 had constituted a committee to ensure smooth operationalization of the Policy for early commissioning of Transmission Projects. The copy of the policy and constitution of the committee is enclosed as Annexure- 5

- 17.2. CTU informed that that few TSPs (namely, Sipat Transmission Limited (STL), Chhattisgarh-WR Transmission Limited (CWRTL), Raipur-Rajnandgaon-Warora Transmission Limited (RRWTL), Maheshwaram Transmission Limited (MTL) and Odisha Generation Phase II Transmission Limited (OGPTL)) had made a request to PGCIL to advance the commissioning schedule of associated line bays under their scope. PGCIL had requested CEA to decide the course of action pertaining to advancement of schedules of transmission projects being implemented through TBCB route.
- 17.3. Director (PSPA-I), CEA informed that based on the request of M/s Sterlite, the first meeting of the Committee to ensure smooth operationalization of the Policy for early commissioning of Transmission Projects, was held on 26.10.2016, wherein five nos. transmission projects (namely, NRSS XXIX Transmission Limited, Maheshwaram Transmission Limited (MTL), Odisha Generation Phase II Transmission Limited (OGPTL), Gurgaon Palwal Transmission Limited (GPTL), Khargone Transmission Limited (KTL)) of M/s Sterlite, which were proposed for early commissioning, were discussed. It was found that the projects do not qualify for consideration for early commissioning as the request from the TSPs have not been received well in advance (i.e. 24 months before the scheduled date of commissioning (SCOD)). But, as these schemes were under implementation, before the constitution of the committee, it was decided that PSPM Division, CEA may hold the meetings with the TSP and the implementing agencies of the interconnecting (upstream / downstream) elements so that a mutually agreed early commissioning date (before SCOD) could be arrived at through mutual consultation.
- 17.4. He said that M/s Sterlite vide its letter dated 10.11.2016 has given a proposal for de-linking of transmission project (being implemented by Khargone Transmission Limited) from Khargone generation project and early commissioning of the Indore-Khandwa pool-Dhule 765 kV D/C line along with 765/400 kV Khandwa pooling station as a part of system strengthening. They have requested to take up the matter with Standing Committee on Power System Planning in WR and accord approval.
- 17.5. He added that M/s Adani Transmission Limited, vide their letter dated 07.12.2016 has requested for advancement of the schedules of the transmission projects under implementation by TSPs namely, Sipat Transmission Limited (STL), Chattishgarh-WR Transmission Limited (CWRTL) and Raipur-Rajnandgaon-Warora Transmission Limited (RRWTL).

- 17.6. He further informed that transmission projects being implemented by TSPs (owned by Adani Transmission Limited) namely STL, CWRTL and RRWTL are system strengthening schemes in Western Region. The transmission project being implemented by M/s KTL (owned by M/s Sterlite) consists of two parts – Part A: Connectivity system for Khargone STPP and Part B: System Strengthening in WR in time frame of Khargone STPP. M/s Sterlite has requested to delink Part B (System Strengthening in WR in time frame of Khargone STPP: Indore- Khandwa pool- Dhule 765 kV D/C line along with 765/400 kV Khandwa pooling station) from Khargone generation project and approve it for early commissioning. The Indore- Vadodara – Dhule 765 kV S/C line is existing and construction of Indore- Khandwa pool- Dhule 765 kV line would complete Indore-Vadodara-Dhule-Khandwa-Indore 765 kV ring. Therefore, it can be delinked from Khargone generation project. However, the 765/400 kV, 2x1500 MVA Khandwa pooling station is required in the time of Khargone generation project for injection of power. In the above projects, the associated elements that are required for early commissioning are mainly 400 kV / 765 kV line bays under scope of POWERGRID/ ISTS licensee. Only in case CWRTL, which includes establishment of 400/220 kV substation at Morena, downstream 220 kV lines are under scope of MPPTCL.
- 17.7. GETCO stated that many RoW issues are encountered during implementation of transmission lines and proposals for early commissioning of transmission lines needs to be supported.
- 17.8. After further deliberations, constituents agreed for early commissioning of system strengthening transmission schemes under implementation by STL, CWRTL, RRWTL and KTL (Indore- Khandwa pool- Dhule 765 kV D/C only). CEA/CTU to take up the issue of early commissioning in the Committee constituted for the purpose with the various stakeholders i.e. those implementing upstream and downstream connectivity / network, so as to arrive at mutually agreeable date for early commissioning of the transmission project.
- 18. Second 400 kV D/C transmission line for BALCO Complex – proposal by M/s BALCO**
- 18.1. Director (PSPA-I), CEA stated that in the 40th meeting of SCMPSPWR, M/s BALCO had raised the issue of single point of connectivity of BALCO with the ISTS system (through BALCO- Dharamjaygarh 400 kV D/C dedicated line) and had argued that in any contingency of the dedicated line shall lead to black out at BALCO and non-availability of power from BALCO to the beneficiary states. For having redundancy, there was a need of second line, but it would take long time for implementation, as there is large forest area involved. M/s BALCO had requested that until the completion of the 2nd line, the existing interim connectivity arrangement (LILO of 2nd ckt of Korba - Birsinghpur 400kV D/c line at BALCO switchyard), instead of dismantling, may be retained permanently for power evacuation as a redundant transmission line, in case of any exigency condition. The issue was discussed and committee was of the opinion that interim arrangement line can't be put in parallel to the dedicated line but instead

of dismantling it, it can be disconnected from the main line and kept in charged condition with a suitable bypass arrangement, which could be used in exigencies as per the instructions of the Grid Operator. M/s BALCO was requested to submit the bypassing scheme so that the same could be examined by CEA, CTU and POSOCO.

- 18.2. He said that the installed capacity of BALCO is 2010 MW (4x135 MW + 4x67.5 MW + 4x300 MW) & 5.6 LTPA Aluminium Smelter (about 430 MW load) and industrial load of 950 MW. M/s BALCO has taken LTA for 200 MW and grid connectivity for 2010 MW. M/s BALCO has proposed to segregate the total connectivity of 2010 MW into 2x300 MW Power plant and 1410 MW and has requested for grant of second grid connectivity (for 1410 MW) for the following reasons:
- Grid security for BALCO complex
 - To fulfill RPO obligation for Aluminium smelter plant
 - To fulfill Power Sale commitment
 - Import of power in case of shutdown of multiple CPP units.
- 18.3. He informed that initially M/s BALCO had obtained connectivity for 4x300 (1200) MW as IPP, which was later modified to 1335 MW (4x300 + 2x67.5) on request from BALCO. Its connectivity was finally modified to 2010 MW (4x135 + 4x67.5 + 4x300) MW. Now, it has proposed segregation of connectivity of 2010 MW into connectivity for IPP (600 MW) and CPP (1410 MW) and has requested for connectivity for the CPP.
- 18.4. CTU stated that even if segregated as CPP and IPP both the entities are injecting entity and as injecting entity they are already connected with the ISTS and there is no need for the second connectivity. From the LTA point of view, the existing connectivity line is sufficient to care of injection requirement, as BALCO has taken LTA for 200 MW only and sufficient margins are available in the existing BALCO- Dharamjaygarh 400 kV D/C line. If BALCO wants to draw power then it needs to apply for connectivity as drawing entity i.e., Bulk Consumer and for that also the existing connectivity would be sufficient.
- 18.5. WRLDC informed that at present BALCO is having connectivity as generator and to fulfill their RPO for captive / industrial load, they need to draw RE power from the grid i.e., simultaneous export and import of power. In absence of appropriate regulation simultaneous export and import is not allowed, as it would mean purchase of power by generator.
- 18.6. CTU stated that if the IPP (1200 MW) and CPP (810 MW) are separated, there is no surplus exportable power available as BALCO has/ would have captive load of about 950 MW.
- 18.7. BALCO representative stated that it has finalized its switchyard scheme to segregate its CPP (1410 generation: 4x135+4 x67.5+ 2x300 MW & Load: 950 MW) and IPP (600 MW generation) and no further modifications would be proposed, if required an

affidavit would be provided for the same. He further stated that BALCO is not seeking second connectivity for its IPP, however it is seeking connectivity for its CPP and revision in connectivity of the IPP. At the Dharamjaygarh end two nos. of 400 kV bays have already been completed (Implemented by M/s BALCO for Vandana Vidhyut Ltd., VVL has not taken up implementation of its dedicated line till date) and only transmission line was required for establishing the connectivity for the CPP. Further CPP of BALCO would fully comply with the regulations of CERC.

18.8. After further deliberations, members observed that BALCO has modified its connectivity two times and again it has made proposal for the revision of its connectivity and segregation of the connectivity of 2010 MW into connectivity of 1410 MW for CPP and 600 MW for IPP. Members opined that a separate meeting may be called by various stake holders viz. CEA, CTU, WRLDC and BALCO to further deliberate on the issue as per the regulations of CERC.

19. Requirement of New Substation near Vapi / Ambethi area and Kosamba – Vapi 400 kV D/C line

19.1. Director (PSPA-I), CEA stated that in the 38th meeting of SCPSPWR held on 17.07.2015, it was decided that the requirement of 400 kV Kosamba – Vapi D/C needs to be reviewed through joint studies by CEA, CTU & GETCO, after considering 400 kV network augmentation in Southern Gujarat to be implemented by GETCO.

19.2. He said that in the 39th meeting of SCPSPWR held on 30.11.2015, while discussing the proposal of transformation capacity augmentation at Vapi (existing) and Kala 400 kV substations, it was suggested that instead of augmenting transformation capacity at Vapi (existing), a new substation may be proposed near Vapi / Ambethi area to cater the demand of DNH and Daman & Diu, as there was no space available for putting additional transformers at existing Vapi 400/220 kV substation.

19.3. He added that in the 40th meeting of SCPSPWR held on 01.06.2016, during the deliberations on the proposal of a new 400 kV substation in Vapi/ Ambethi area, GETCO had informed that due to limited outlets at Vapi (PG), many times the power was flowing from Vapi (GETCO) to Vapi (PG), which was resulting in further loading of GETCO network and had requested for 220 kV outlets from proposed Vapi / Ambethi (new) S/s. In view of this, it was agreed to review the proposal of new 400 kV substation in Vapi/ Ambethi area during joint system studies by CEA, CTU & GETCO. Accordingly, joint system studies were carried out by CEA, CTU and GETCO from 28.07.2016 – 29.07.2016 and based on the results of the joint studies, following inter & intra transmission system is proposed:

Inter-state Transmission System Strengthening Near Vapi Area

- i. Establishment of 2 x 500 MVA, 400/220 kV S/s near Vapi / Ambethi (Vapi – II)
- ii. LILO of KAPP – Vapi 400 kV D/c line at Vapi – II

- iii. 1 x 125 MVar bus reactor at Vapi – II Substation
- iv. 220 kV connectivity from Vapi – II is as follows:
 - (a) For Gujarat (GETCO)
 - Vapi-II – Atul (GETCO) 220kV D/c line
 - LILO of Chikhli (Ambetha) – Vapi (GETCO) 220 kV S/c line at Vapi-II
 - (b) For Dadra and Nagar Haveli (DNHPDCL)
 - Vapi-II – Sayali (DNH) 220 kV D/c line (high capacity)
 - Vapi-II – New Kharadpada (DNH) 220 kV D/c line (high capacity)

Intra-state Transmission System Strengthening in DNH network at 220 kV level

- i. LILO of Vagchipa – Khadoli 2nd 220kV line at Sayali Substation
 - ii. Kala (PG) – Khadoli 220kV 2nd D/c line (New)
 - iii. Kharadpada – New Kharadpada 220kV 2nd D/c line (New)
 - iv. Conversion of New Kharadpada 220kV switching station into 2x160MVA, 220/66 kV substation
 - v. Augmentation of Transformation capacity at 220/66kV Vagchipa substation by 160 MVA (3rd ICT)
- 19.4. CTU stated that the above proposed scheme includes lines to Chikhli area, therefore, GETCO may review the proposal of establishment of new Chikhli 400/220 kV substations as a part of their network. Further, with the commissioning of Padghe (PG) – Kudus 400 kV D/C line a strong ISTS link would be available to Vapi through Vapi-Kudus 400 kV D/C line in addition to ISGS generation from KAPS unit 3&4 through KAPS- Vapi 400 kV D/C line. In view of this the proposal of Kosamba – Vapi 400 kV D/C line would not be required and the same may be dropped.
- 19.5. Director (PSPA-I), CEA stated that with the above proposal includes 220 kV lines to DNH and in the studies it is observed that the existing 220 kV links from Vapi i.e, Vapi – Karadpada 220 kV D/C line & Vapi – Khadoli 220 kV D/C line are lightly loaded. Also there are space constraints at Sayali and severe RoW in implementation of the transmission schemes proposed as a part of DNH network. Therefore, it needs to be reviewed.
- 19.6. After deliberations, members agreed with the proposal of Establishment of 2 x 500 MVA, 400/220 kV S/s near Vapi / Ambheti (Vapi – II) and dropping of the proposal of Kosamba – Vapi 400 kV D/C line. The 220 kV lines to DNH from Vapi-II and the intrastate system strengthening in DNH would be reviewed separately by CEA, DNH and POWERGRID. GETCO agreed to review their intrastate proposal of Chikali 400/220 kV substation in view of establishment of Vapi-II 400/220 kV substation under ISTS.

20. Additional ISTS feed to Navi Mumbai 400/220 kV substation of POWERGRID

20.1. Director (PSPA-I), CEA informed that the transmission scheme 'Western Regional system strengthening scheme (WRSS – V)' with following scope of work was agreed in the 25th meeting of SCPSPWR held on 30.09.2006 and the scheme was implemented by M/s PGCIL:

- (i) 400 kV Vapi – Navi Mumbai D/C line.
- (ii) LILO of 400 kV Lonikand/Pune – Kalwa line S/C – 2 at Navi Mumbai.
- (iii) Establishment of 400/220 kV 2 X 315 MVA new (GIS) at Navi Mumbai.
- (iv) 220 kV Vapi – Khadoli D/C line.

Along with the above transmission scheme, the following 220 kV downstream network was planned to be implemented by MSETCL:

- a) LILO of Apta – Kalwa 220 kV S/c line at Navi Mumbai
- b) LILO of Khandalgaon– Kharghar 220 kV S/c line at Navi Mumbai

20.2. He said that in the 35th meeting of SCPSPWR held on 03.01.2013, LILO of Kharghar – Padghe section of Lonikand – Kalwa line - 1 at Navi Mumbai was agreed instead of LILO of Lonikand / Pune – Kalwa 400 kV S/C line - 2 (which was agreed under WRSS – V). Laying of 1.5 km of 400 kV underground cable near gantry of Navi Mumbai substation at an estimated cost of Rs 55 crores was also agreed to expedite the implementation of LILO arrangement, which was held up due to severe RoW issues. Further, in view of severe RoW problems, termination of 400 kV Vapi – Navi Mumbai D/C line at Kudus S/s of MSETCL was agreed and PGCIL was requested to continue their efforts for completing the balance portion of the Vapi – Navi Mumbai 400 kV D/C line i.e. transmission line from Kudus to Navi Mumbai.

20.3. He added that in the 38th meeting of SCPSPWR held on 17.07.2015, MSETCL had stated that there is no ISTS source to Navi Mumbai and the Vapi - Navi Mumbai 400 kV D/C line is being terminated at Kudus, which is about 80 km away from Navi Mumbai. Thus, the LILO of Kharghar – Padghe 400 kV line at Navi Mumbai, presently under implementation, will only recirculate the power from intrastate network of MSETCL. In case of no ISTS network connection to Navi Mumbai 400 kV substation, MSETCL has suggested to shift Navi Mumbai 400 kV substation to some other location. In the meeting, it was agreed that CEA, CTU and MSETCL would carry out joint studies for exploring effective utilization of Navi Mumbai 400 kV substation and put a proposal in the next standing committee meeting.

20.4. He further said that in line with the decision of 38th meeting of SCPSPWR, the following scheme was studied and proposed in the 40th meeting of SCPSPWR held on 01.06.2016.

- (i) Padghe (765/400 kV) – Navi Mumbai 400kV D/c (Quad) line
- (ii) 1 X 500MVA, 400/220 kV 3rd ICT at Navi Mumbai S/s

- (iii) Installation of 220/33kV Transformer at Navi Mumbai substation and planning of 33 kV outlets from Navi Mumbai substation in coordination with DISCOM / MSEDCL.

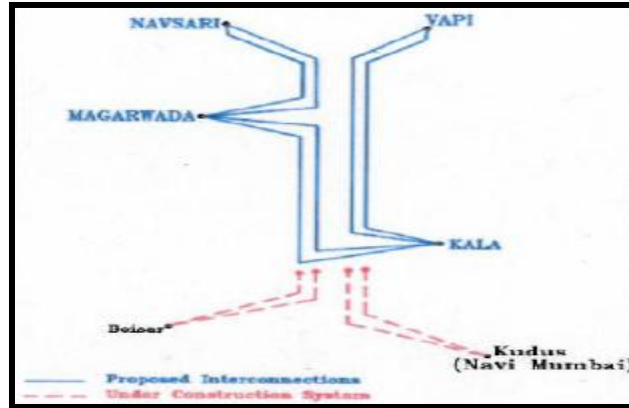
In the 40th meeting of SCPSPWR, MSETCL had requested to review the scheme, as over loading was observed on 400 kV Kharghar – Navi Mumbai S/C line and severe RoW problems involved in implementation of 400 kV Padghe – Navi Mumbai D/C line.

Accordingly, joint studies were carried out by CEA, CTU and MSETCL from 10.08.2016 to 12.08.2016, in which, several alternatives were discussed and subsequently studies were carried out with the following eight alternatives:

Sl.	Alternative	Remarks
1	Padghe (PG) – Navi Mumbai 400 kV D/c line (Quad)	High loading observed on Navi Mumbai – Kharghar 400 kV S/c
2	Padghe (PG) – Kharghar 400kV D/c line with one circuit terminating at Ghatkopar by connecting it to Kharghar – Ghatkopar 400kV line bypassing Kharghar	Circular Power flows from Padghe (PG) to Ghatkopar to Kharghar.
3	Case 2 + LILO of one circuit of Ghatkopar – Kharghar 400kV D/c line at Navi Mumbai	Circular Power flows from Padghe (PG) to Ghatkopar to Navi Mumbai & Kharghar – Navi Mumbai 400kV D/c line thus formed is seen to be floating.
4	Case 2 + LILO of one circuit of Padghe (PG) – Kharghar 400kV line at Navi Mumbai	Circular Power flows from Padghe (PG) to Ghatkopar to Kharghar. However, Kharghar – Navi Mumbai 400kV D/c line is well utilized (about 760 MW)
5	Case 2 + LILO of Padghe (PG) – Ghatkopar 400kV line at Navi Mumbai	No Circular Power flows. Balanced Flow on Padghe (PG) – Navi Mumbai and Padghe (PG) – Kharghar 400kV lines is observed.
6	Padghe (PG) – Ghatkopar 400kV D/c (Quad) line	Heavy power rush from Ghatkopar to Kharghar (about 1250MW)
7	Connecting NM - Kharghar line with Kharghar - Kalwa line so as to form NM - Kalwa 400kV S/c bypassing Kharghar S/s + Padghe PG - Kharghar 400kV D/c (Quad) line (one ckt via NM)	Balanced Flow on Padghe (PG) – Navi Mumbai and Padghe (PG) – Kharghar 400kV lines is observed.
8	Connecting NM - Kharghar line with Kharghar - Kalwa line so as to form NM - Kalwa 400kV S/c bypassing Kharghar S/s + Padghe PG - Kharghar 400kV D/c (Quad) line + Padghe PG - NM 400kV D/c (Quad) Line	All loadings are fairly balanced and this option provides long term solution for power supply to Mumbai Area. However, RoW issues in construction of 2 D/c lines in Mumbai area need to be looked into.

Out of the above eight alternatives, alternatives 5 and 7 appears to better ISTS feed as compared to other alternatives.

- 20.5. MSETCL representative stated that alternative '5' might be considered as ISTS feed to Navi Mumbai. However, there would be severe RoW issues in implementation of ISTS feed to Navi Mumbai and it would also be difficult to implement the 220 kV outlets from Navi Mumbai S/s. Therefore, the scheme of ISTS feed to Navi Mumbai as well as the 220 kV outlets from Navi Mumbai could be implemented as single scheme under ISTS.
- 20.6. After deliberations, members agreed for implementation of the 400 kV ISTS feed to Navi Mumbai along with the 220 kV outlets from Navi Mumbai as an ISTS scheme to be implanted through tariff based competitive bidding route. Some unbalanced loading on 220 kV outlets from Navi Mumbai was observed for which it was decided to further deliberate in joint meeting of CEA, CTU and MSETCL.
- 20.7. 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. In the meeting MSETCL stated that the implementation feasibility of the 220 kV outlets from Navi Mumbai (PG) need to be ascertained jointly by CEA, CTU and MSETCL, before taking up the scheme for implementation.
- 20.8. Based on the deliberation in the 41st meeting of SCPSPWR held on 21.12.2016 and deliberations held on 13.01.2017, the following transmission system was agreed as the transmission system strengthening in WR for providing ISTS feed to Navi Mumbai subject to implementation feasibility of 220 kV outlets from Navi Mumbai (PG)::
 - (i) Padghe (PG) – Kharghar 400 kV D/C quad line to be terminated into one ckt. of Kharghar – Ghatkopar 400 kV D/C line (thus forming Padghe (PG) - Kharghar 400 kV S/C quad line, Padghe (PG) - Ghatkopar 400 kV S/C quad line)
 - (ii) LILO of Padghe (PG) – Ghatkopar 400kV S/C line at Navi Mumbai (PG).
 - (iii) LILO of Taloja – Kalwa 220 kV S/C line at Navi Mumbai (PG).
 - (iv) LILO of 220 kV Apta – Kalwa S/C line at Navi Mumbai (PG).
21. **Contingency arrangements of Navsari – Boisar 400 kV D/C line (associated with Mundra UMPP System strengthening Scheme) and interconnection of Padghe (PG) (765/400 kV) – Kudus (MSETCL) (400kV) D/c line with Kala- Kudus 400 kV D/C line- agenda by POWERGRID.**
 - 21.1. Director (PSPA-I), CEA stated that in line with the decision of 37th meeting of SCPSPWR held on 05.09.2014 the contingency scheme, as shown below, is in operation.

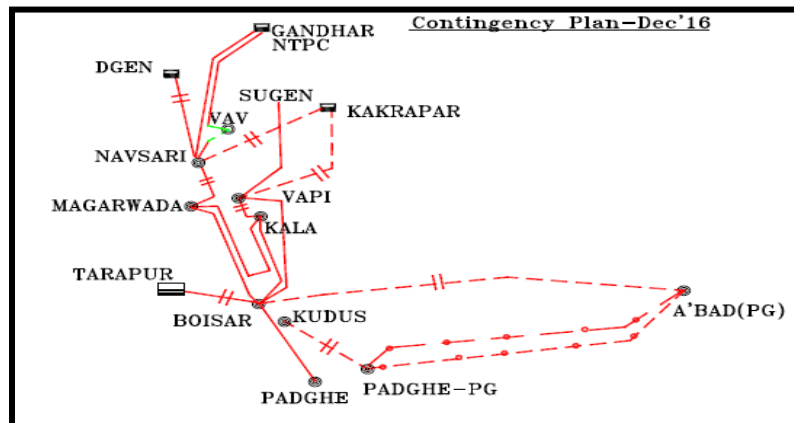


21.2. He said that POWERGRID has informed that the balance portion of Magarwada – Boisar 400 kV D/C line is expected to be completed by December 2016 and the balance section of Kala – Kudus 400 kV D/C line is expected to be completed by March 2017. The Aurangabad – Padghe 765 kV D/C and Padghe (PG) – Kudus (MSETCL) 400 kV D/C (Quad) lines are also expected to be completed by March 2017. However, Kudus S/s of MSETCL is expected to be commissioned by September 2017. POWERGRID has proposed the following phase-wise contingency arrangements:

(i) **Phase – I (December – 2016 to March – 2017):**

Disconnecting one circuit of Kala – Magarwada 400 kV D/C line and connecting it with balanced portion of Magarwada – Boisar 400 kV D/C line so as to form following 400 kV transmission lines:

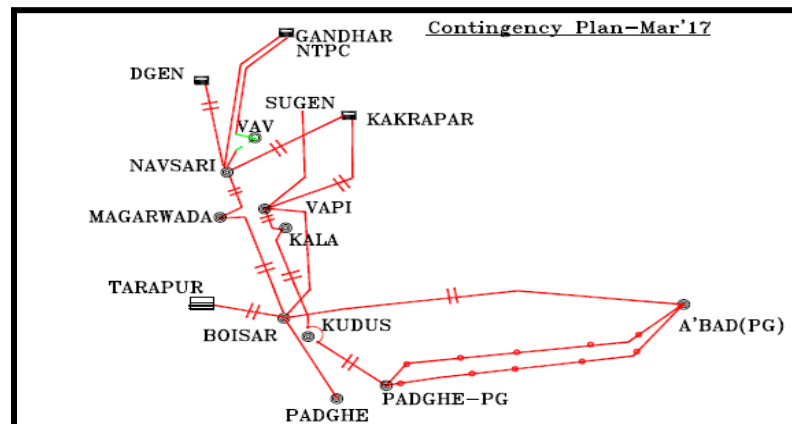
- a) Kala – Magarwada 400 kV S/C line – 53.3 km
- b) Kala – Boisar 400 kV S/C line – 62.4 km.
- c) Magarwada – Boisar 400 kV S/C line – 97.7 km



(ii) **Phase – II (March 2017 to September 2017):**

- a) Removal of all interim arrangements so as to form Magarwada - Boisar 400 kV D/C line and Kala-Kudus 400 kV D/C line.

- b) Interconnecting the Padghe – Kudus (MSETCL) 400 kV D/C line and Kala – Kudus (MSETCL) 400 kV D/C line by bypassing Kudus (MSETCL) S/s so as to form Kala-Padghe (PG) 400 kV D/C line.



21.3. MSETCL informed that their Kudus 400/220 kV is expected to be commissioned by December 2017. After deliberation members, members agreed with the above phase contingency arrangement.

22. Contingency arrangement associated with commissioning of KAPP – Vapi and KAPP – Navsari 400kV D/c lines – agenda by Powergrid

22.1. Director (PSPA-I), CEA stated that in the 31st meeting of SCMPSPWR held on 27.12.2010 Kakrapar NPP (KAPP) – Vapi 400 kV D/C and Kakrapar NPP (KAPP) – Navsari 400 kV D/C lines were agreed for evacuation of power from Kakrapar Atomic Power Project (Units 3 & 4: 2x700 MW). As informed by POWERGRID, the transmission lines are expected to be completed by March 2017, whereas, the units 3 & 4 of KAPP are expected to be commissioned by November 2017. Both Vapi and Navsari being important load centers of South Gujarat, POWERGRID has given the following contingency scheme to utilize the evacuation system (KAPP – Vapi 400 kV D/C line and KAPP – Navsari 400 kV D/C line) which are likely to be commissioned ahead of the generation project KAPP unit 3&4 and also enhancing the reliability of power supply to the South Gujarat:

- a) Connecting KAPP – Vapi 400 kV D/C line (117 km) with KAPP – Navsari 400 kV D/C line (38.5 km) by utilizing KAPP # 3&4 400 kV bus so as to form Vapi – Navsari 400 kV D/C line (155.5 km) via KAPP # 3&4 400 kV bus

22.2. GETCO stated that for interconnecting Vapi- Navsari utilizing the KAPP 3&4 generation switchyard, there may be issues related to protection, safety and security of the grid which needs to be addressed before energization of the lines.

22.3. The issue was further deliberated and it was decided to further deliberate on the contingency scheme with NPCIL Kakrapar at their generation project site.

22.4. Accordingly, joint visit was carried out by POWERGRID, GETCO and NPCIL at NPCIL Kakrapar on 12.01.2017. In the meeting, during the joint visit to the switchyard, it was

observed that charging of the Vapi – Kakrapar (KAPP) - Navsari 400 kV line would require some modification in switchyard stringing at Kakrapar(KAPP), which NPCIL would take up only after concurrence of their designer. Considering the time involved in modification, NPCIL agreed to complete the generation switchyard by 30/4/2017. In the meeting, it was agreed that charging of Vapi – Kakrapar(KAPP) - Navsari 400 kV D/C line (using Kakrapar generation switchyard) could be taken up by POWERGRID after commissioning of the lines and switchyard bays at Kakrapar. Copy of the minutes of the meeting is enclosed at Annexure- 6.

23. Contingency arrangement associated transmission lines associated with Mauda – II: agenda by POWERGRID

23.1. Director (PSPA-I), CEA stated that the transmission system associated with Mauda-II generation project of NTPC (2x660 MW) as given below is under implementation by POWERGRID:

- (i) Mauda-II – Betul 400 kV D/C (quad) line
- (ii) Betul – Khandwa 400 kV D/C (quad) line.
- (iii) Khandwa – Indore (PG) 400 kV D/C line.
- (iv) Establishment of 2x315 MVA, 400/220 kV Betul (GIS) S/s.

23.2. He said that PGCIL had intimated that Mauda II – Betul 400 kV D/C (Quad) line is getting delayed due to severe ROW constraints and is expected to be completed by March 2017. The rest of the elements of the transmission system are ready for commissioning. In view of power drawl by Madhya Pradesh from ISTS network, Khandwa and Indore 400 kV S/s of POWERGRID are very important. POWERGRID has proposed the following:

- (i) Commissioning of Khandwa – Indore (PG) 400 kV D/C line, which may increase the reliability of power supply to Indore and Khandwa.
- (ii) Commissioning of Khandwa – Betul (GIS) 400 kV D/C line along with Betul 400/220 kV substation in matching timeframe of its downstream network of the state (i.e. Betul (GIS) – Betul (MPPTCL) 220kV D/c line) or Mauda –Betul 400 kV D/C line, whichever is earlier.,

23.3. He added that Betul 220 kV substation of MPPTCL is presently fed through 765/400/220kV Seoni S/s through Seoni-Chindwara-Betul 220 kV line. With the commissioning of Khandwa – Betul (GIS) 400 kV D/C line along with downlinking system at Betul, reliability of power supply to the Betul area will improve.

23.4. MPPTCL representative stated that Betul (MP) – Betul (PG) 220 kV D/C line is expected to get ready by March 2017. He added that if 220 kV line along with Khandwa – Betul (GIS) 400 kV D/C line & Betul 400/220 kV substation are commissioned and Mauda- Betul (PG) 400 kV line or generation at Mauda-II is not commissioned, then the power might flow in reverse direction i.e. from Betul (MPPTCL) to Betul (PG) and onwards to Khandwa and Indore. In view of this, Khandwa – Betul (GIS) 400 kV D/C

line may be commissioned in the matching time frame of generation at Mauda-II / Mauda-Betul 400 kV D/C line.

- 23.5. NTPC representative stated that unit-3 (Stage II) of 660 MW is ready for commissioning, however the same couldn't be taken up for trail run (72 hours) due to 1150 MW power flow restriction by WRLDC on 400 kV Mauda-Wardha D/C line.
- 23.6. After deliberations, members agreed that Khandwa-Indore 400 kV D/C line may be commissioned as and when the line is ready for commissioning. The Betul (PG) – Khandwa 400 kV D/C line along with Betul 400/220 kV substation shall be commissioned in matching time frame of the Mauda-Betul 400 kV D/c line.

24. Request for 2 nos. 220 kV feeder bays associated with 1 x 500 MVA, 400/220 kV 3rd ICT at Khandwa (PG) substation by MPPTCL.

- 24.1. CTU stated that in the 39th meeting of SCPSPWR held on 30.11.2015, installation of 1x500 MVA 400/220 kV 3rd ICT at Khandwa (PG) substation was agreed. Now MPPTCL has requested for 2 nos. 220 kV feeder bays associated with 1 x 500 MVA, 400/220 kV 3rd ICT at Khandwa (PG) substation.
- 24.2. MPPTCL stated that they have planned Khandwa – Chamera 220 kV D/C line and for this two nos. of 220 kV line bays are required at Khandwa (PG) substation. The line is expected to get completed by 2018. MPPTCL requested POWERGRID to intimate implementation schedule of the 3rd ICT.
- 24.3. Members agreed for provision of two nos. of additional 220 kV bays at Khandwa (PG) 400 /220 kV substation under ISTS. POWERGRID informed the implementation schedule of the 3rd ICT at Khandwa as September 2019.

25. Provision of Bus Reactors at High Voltage Nodes in Western Region – by POWERGRID

- 25.1. CTU stated that NLDC in its operational feedback report for the period July 2016 to September 2016 had identified high voltage nodes and mentioned that in order to contain over voltages at these substations, lines connected at these nodes were opened regularly. Some of the lines opened during the period July 2016 to September 2016 are below:

Sl.	Line opened	High Voltage Node
1	Kolhapur(PG) – Mapusa 400kV one ckt	Kolhapur (PG), Mapusa
2	Kolhapur(PG) – Solapur(PG) 400kV one ckt	Kolhapur(PG), Solapur(PG)
3	SSP – Rajgarh(PG) 400kV one ckt	SSP, Rajgarh(PG)
4	Khandwa – Rajgarh 400kV one ckt	Khandwa, Rajgarh
5	Pune(GIS) – Solapur 765kV S/c line	Solapur
6	Wardha – Aurangabad 765kV one/both ckts	Aurangabad, Wardha

Considering the base case of 2018–19 timeframe (off peak), high voltages at the following nodes were observed in the studies:

Sl. No.	Name of the Substation	Existing Bus Reactor(s) (MVar)	Proposed Bus Reactor (MVar)	% times (avg) voltage beyond 420kV / 800kV as per operational feedback report	Voltage in 2018-19 time frame (Off peak)	
					Without proposed reactor	With proposed reactor
1	Mapusa 400kV	50	125	50	408	392
2	Solapur 765kV	240	240	20	810	800
3	Kolhapur GIS 400kV	125	125	55	415	403
4	Rajgarh 400kV	125	125	85	420	416
5	Aurangabad 765 kV	2x240	240	2	803	795

In view of the above, following bus reactors are proposed to control high voltages in Western Region:

Sl. No.	Name of the Substation	Proposed Bus Reactor (MVar)
1	Mapusa 400kV	125
2	Solapur 765kV	240
3	Kolhapur GIS 400kV	125
4	Rajgarh 400kV	125
5	Aurangabad 765kV	240

- 25.2. MSETCL representative stated it has already planned reactive compensation in high voltage area like Solapur. MSETCL was requested to furnish its planned reactive compensation in its network.
- 25.3. It was decided that the above proposal shall be reviewed after receipt of information furnished by MSETCL and other utilities, if any and would be further studied.

AGENDA ITEMS TABLED IN THE MEETING

- 26. Review of evacuation system for Banaskantha (Radhanesda) Solar Park – Agenda by GPCL**
- 26.1. GPCL stated that based on the connectivity and LTA application of GPCL for 700 MW Banaskantha (Radhanesda) Solar Park, the following transmission system for

connectivity has been agreed in the 40th meeting of SCPSPWR / 23rd LTA/connectivity meeting of WR:

- (i) Banaskantha (Radhanesda) Pooling Station –Bansakantha (PG) 400 kV D/c line along with 2 nos. 400 kV line bays at Bansakantha (PG) to be implemented by POWERGRID.
- (ii) 2 nos. 400 kV line bays at Banaskantha (Radhanesda) for Banaskantha (Radhanesda) Pooling Station –Bansakantha (PG) 400 kV D/c line to be constructed by GPCL

Accordingly, GPCL was in process of signing of LTAA, TA and TSA. GPCL has further reviewed the planning of development of Radhanesda and the following is put up for consideration of the standing committee:

- (i) The cost of setting up 33/400 kV pooling station is about 180- 200 crores as compared to 50-60 crores for setting up 33/220 kV pooling station in solar park. This makes the solar park unviable and the ultimate solar tariff exceeds the present bench mark tariff of Rs 4.00 per unit.
- (ii) GoG / GPCL is also planning another 500 MW solar park at Harshad (about 50 km away from Radhanesda) to meet its RPO obligation as well as capacity addition target given by Govt. of India for Gujarat. The land for the Harshad solar park is in possession of GPCL.
- (iii) In the 750 MW Rewa solar park in Madhya Pradesh, there are three plots of 250 MW each and from each plot power is stepped up from 33kV to 220 kV and is brought to 220/400 kV pooling station (PG). 33/220 kV pooling station and 220 kV line up to 220/400 pooling station (PG) is under the scope of SPPD and the 220/400 kV pooling station along with 400 kV lines is under the scope of PGCIL.
- (iv) GPCL has already requested Ministry of Power and MNRE vide their letter date 2.12.2016 for setting up 220/400 kV pooling station by PGCIL near the Radhanesda solar park.

In view of the above, GPCL requested standing committee to approve the following:

- a) PGCIL to set up 220/400 kV substation adjacent to existing Radhanesda solar park.
- b) The evacuation of, another proposed solar park (Harshad), shall be at 220 kV level through 220/400 kV Radhanesda (PG) pooling station.
- c) Review the above transmission scheme as another Solar Park with a capacity of 500 MW is proposed by GPCL at Harshad, which is about 50 km away from earlier proposed Banskantha Solar Park and the land has been acquired for the same. Further, it was stated that projects may not be viable if the 400/220 kV S/s will be in the scope of SPPD. It was also stated that considering the

above, i.e. Banaskantha Solar Park & Harshad Solar Park, which are around 50 km away from each other, GPCL is requesting a 400/220 kV Pooling Station in the vicinity of these solar parks.

- 26.2. It was clarified that Banaskantha 765/400/220 kV substation with 220 kV and 400 kV voltage level was planned and is under implementation for pooling power from RE projects in that area. Radhanesda solar park has come into picture after implementation of the Banaskantha 765/400/220 substation has started, otherwise it could have been located near the Radhanesda solar park. However, to facilitate GPCL standing committee has already agreed for 400 kV up to the solar park. In case of Rewa solar park, 400 kV line was passing nearby and 400/220 pooling station was established for injection of power from solar park as well as for drawal of power to feed Rewa and Siddhi area in Madhya Pradesh.
- 26.3. CTU stated that the proposed Harshad (500 MW) is not in the list of 34 solar parks, which are already identified by MNRE.
- 26.4. GETCO stated that in the evacuation system for Radhanesda solar park, the 400 kV line has been proposed with conventional ACSR Moose conductor. He informed that GETCO have adopted AL-59 conductor for all its 220kV and 400kV transmission lines, as its current carrying capacity is 30% more whereas the incremental cost is only 5 to 10 %. GETCO suggested to adopt Al-59 conductor for all the 400 kV lines being planned. GETCO indicated requirement of two nos. of 220 kV line bays at 400/220 kV pooling station near Radhanesda to feed their proposed 220 kV substation (Rah or Mithi Paldi based on the location of pooling station) in the 2020 time frame.
- 26.5. Director, CEA suggested that the proposed pooling station near Radhanesda solar park may be chosen keeping in view the geographical location of Radhanesda Solar Parks, proposed Harsad solar park, Banaskantha Pooling Station (765/400 kV) and proposed GETCO drawl point so as to optimise overall transmission system.
- 26.6. After further deliberations, it was decided that planned transmission system from Banaskantha (Radhanesda) Solar Park would be reviewed in a separate meeting among CEA, CTU, GETCO, and GPCL. M/s GPCL was also requested to send a formal communication to CEA and CTU regarding setting up Harshad solar park and take up the proposal of Harshad SP with MNRE for its inclusion in list of MNRE identified SPs, at the earliest.
- 26.7. In line with the decision of 41st meeting of SCPSPWR held on 21.12.2016, a meeting was held on 17.01.2017 amongst CEA, CTU, GPCL (SPPD) & GETCO (minutes enclosed as Annexure-7) at Gandhinagar, Gujarat in GPCL office.
- 26.8. Based on the deliberation in the 41st meeting of SCPSPWR held on 21.12.2016 and deliberations held on 17.01.2017, the following transmission system was agreed as evacuation system for Banaskantha (Radhanesda) Solar Park:

- i) Transmission system for 700 MW Banaskantha (Radhanesda) Ultra Mega Solar Park Project (UMSPP)
 - a) Establishment of 2x500MVA, 400/220kV pooling station at Banaskantha (Radhanesda) [GIS] along with 1x125MVA bus reactor
 - b) 4 nos. 220kV line bays at 400/220kV at Banaskantha (Radhanesda) pooling station for Solar Park Interconnection.
 - c) Banaskantha (Radhanesda) Pooling Station –Bansakantha SS (PG) 400 kV D/c (twin AL59) line
 - d) 2 Nos. of 400kV line bays each at Banaskantha (PG) SS & Banaskantha (Radhanesda) PS.
 - e) Provision of space for 8 nos. 220 kV bays (4 nos. for solar injection and 4 nos. of GETCO drawal)
 - f) Provision of space for future 400/220kV, 1X500 MVA ICT along with bays.
- ii) GPCL confirmed to identify the land (of about 20 acres) between Radhanesda solar park and proposed Harshad solar park for setting up the 220/400 kV pooling station in a week's time based on which decision for location of 220/400kV common pooling station shall be taken.
- iii) GPCL assured that once the modified scheme is finalised and approved by SCM, the BG will be submitted latest by 28.02.2017.
- iv) GETCO would require the two nos. of 220 kV bays at the 400/220 kV pooling station in 2020 time frame. Accordingly, provision may be kept for future but should not be covered for immediate implementation.

27. Injection of infirm power from Unit-1 of Mauda Stage-II

27.1. NTPC stated that the transmission system associated with Mauda-II generation project of NTPC (2x660 MW), as given below, is under implementation by POWERGRID:

- (i) Mauda-II – Betul 400 kV D/C (quad) line.
- (ii) Betul – Khandwa 400 kV D/C (quad) line.
- (iii) Khandwa – Indore (PG) 400 kV D/C line.
- (iv) Establishment of 2x315 MVA, 400/220 kV Betul (GIS) S/s.

27.2. NTPC informed that that Unit-1 of Mauda Stage-II (2X660 MW) was synchronized to the grid on 14.12.2016 and they were planning to commence the trial run operation of the 3rd unit prior to declaration of COD. In absence of the Mauda – Betul 400 kV D/C line (expected to be commissioned by March 2017), they have sought WRLDC permission to inject the infirm power into the grid through Mauda-Wardha 400 kV D/C (quad) line. WRLDC has restricted the quantum of power injection through Mauda-Wardha 400 kV D/C (quad) line to 1150 MW, due to which NTPC is not able to inject the infirm power from Mauda Stage-II as well as maintain full schedule from Mauda Stage-I simultaneously.

- 27.3. WRLDC stated that injection limit of 1150 MW has been specified as during N-1 condition of the Mauda- Wardha 400 kV D/C (quad) line, there would be only one circuit of 400 kV D/C line available for evacuation of power from Mauda STPS and its high loading may cause substantial voltage drop at Wardha. CTU stated that Mauda-Wardha 400 kV D/C line is a line with quad moose conductor, there may not be any issue of overloading even in N-1 condition of the line.
- 27.4. The issue was further deliberated and it was agreed that NTPC may go ahead with trial operation of unit-1 (660 MW) of Stage-II limiting the total injection from three units (unit 1&2 of Stage-I of 500 MW each and unit-1 of stage-II of 660 MW) to 1200 MW. It was also decided that system studies would be carried out CEA, CTU, POSOCO and NTPC for injection of power above 1200 MW by the three units through Mauda-Wardha 400 kV D/C (quad) line and without Mauda-Betul 400 kV D/C line. POWERGRID was requested to expedite the implementation of the Mauda- Betul 400 kV D/C line.
- 28. Startup Power for Stage-II (unit 3&4-2x660 MW) of Lanco Amarkantak Power Ltd. (LAPL) at District Korba, Chhattisgarh- interim arrangement**
- 28.1. Director (PSPA-I), CEA informed that the power generation project of M/s LAPL at Korba, Chhattisgarh consists of two stages. The Stage-I (unit-1&2, 2x300 MW) is connected to the ISTS through (LAPL) Lanco-Bilaspur pooling station 400 kV D/C dedicated line and is in operation. The stage-II (unit-3&4, 2x660 MW) power would be evacuated through its dedicated transmission line i.e. (LAPL)Lanco- Champa pooling station 400 kV D/C line, which is under construction. The power from Stage-I and Stage-II has been planned to be evacuated independently.
- 28.2. He said that M/s LAPL had earlier given a proposal to draw the startup power using the interconnection facility (normally open) between switchyard of Stage-I (Unit 1&2) and stage-II (switchyard of Unit 3&4), on interim basis in view of the delay in completion of dedicated transmission line for stage-II (Unit 3&4). The issue of provision of startup power for stage-II (unit3&4-2x660 MW) was discussed in the meeting held at CEA on 15.09.2016, wherein the following was agreed:
- (i) M/s LAPL would be allowed to draw start-up power for Stage-II (Unit 3 & 4) from the grid using the interconnection facility between switchyard of Stage-I and stage-II at 400 kV on interim basis, after review of the progress of the dedicated transmission line in 2nd week of October, 2016.
 - (ii) No injection of infirm power through the interconnection would be allowed for carrying out the commissioning activities. Any injection of firm/infirm power by stage-II (Unit 3&4) would be only through the dedicated transmission (Lanco Amarkantak – Champa pooling station 400 kV D/C (quad) line).

- (iii) M/s LAPL to provide week wise PERT chart for the progress of dedicated line.
M/s LAPL to sign the connectivity agreement for dedicated transmission line of Unit 3&4.

28.3. M/s LAPL vide their letter dated 20.12.2016 has requested to draw start up power for unit-3(stage-II) through the interim arrangement (using the interconnection facility between switchyard of Stage-I and Stage-II at 400 kV). Along with their letter they have submitted the PERT chart for construction of dedicated transmission line of unit 3&4 i.e. Lanco– Champa 400kV D/C (quad) line indicating March 2017 as the commissioning date. They have also signed the connection agreement (FORMAT CON-6) on 1st December, 2016 with POWERGRID.

28.4. The issue was deliberated and constituents agreed that M/s LAPL may be allowed to draw start-up power for stage-II (Unit 3 & 4, 2x660 MW) from the grid using the interconnection facility between switchyard of Stage-I and stage-II at 400 kV as an interim arrangement and no injection of power would be allowed through it. The injection of firm or infirm power, if any, would be through their dedicated transmission line. After completion of the dedicated transmission (Lanco Amarkantak–Champa pooling station 400 kV D/C (quad) line), the interconnection facility between switchyard of Stage-I and stage-II should be kept in normally open position.

29. Connectivity & Long Term Access 24th meeting.

29.1. The detailed minutes of the 24th meeting of WR constituents regarding connectivity/ Long Term Access applications is being separately issued by POWERGRID. The summary of the connectivity / Long Term Access meeting is enclosed at Annexure-8.

List of participants of the 41st meeting of Standing Committee on Power System Planning in Western Region held on 21.12.2016

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Status of TBCB Tr. Projects - Western Region

S.N.	Name of the Project	BPC / Implementing Agency / Milestones	Scope of works	Current Status
1	System Strengthening in NR for import of power from North Karanpura and other projects outside NR and System Strengthening in WR for import of power from North Karanpura and other projects outside Western Region and also for projects within Western Region. Estimated Cost 2700 cr.	REC NKTCL (Reliance Power Transmission Company Ltd) Milestones: (i) SPV acquired by Reliance on 20-05-2010 (Effective date) (ii) Approval u/s 164 received on 12.08.2013.	1. Sipat/Korba (Pooling) –Seoni 2. Lucknow-Bareilly 3. Bareilly-Meerut 4. Agra-Gurgaon 5. Gurgaon-Gurgaon (PG) 6. Gurgaon S/S	Matter was in CERC for revision of tariff and extension of date of commissioning. NKTCL filed an appeal in appellate tribunal challenging CERC order of 9.5.2013. Appellate Tribunal has given final judgment on 2.12.13 setting aside CERC order and allowing the appeal. NKTCL is initiating steps for implementing of order. The judgment of Appellate Tribunal accepts delay in clearance under section-164 as force majeure. According NKTCL have requested MoP to extend the validity of section 68 clearance vide their letter dtd 14.1.2014 Beneficiaries have appealed SC. Work Yet to start.
2	Transmission System Associated with Krishnapattnam UMPP- Synchronous interconnection between SR and WR (Part-B) Estimated Cost 440 cr	REC - RSTCL (Consortium of Patel-Simplex- BSTRanscomm) Milestones: (i) LOI placed on 16.12.2010 (ii) SPV acquired on 7.1.2011 Trans. license received on 24.8.2011 (iii) Approval u/s 164 received on 29.8.2011. (iv) Tariff adoption on 12.8.2011 (v) Original COD : Jan 2014	(i) Raichur-Sholapur 765 kV S/C line-1-208 ckm	Commissioned on 30.6.2014
3	System strengthening common for WR and NR Estimated Cost 1720 cr	PFC - JTCL(Sterlite Grid) Milestones: (i) LOI placed on 31.01.2011 (ii) Special Purpose Vehicle acquired on 31.03.2011 (iii) Scheduled Completion Date is 31.03.2014. (iv) Transmission License granted on 12.10.2011. (v) Tariff adoption approval on 28.10.2011 (vi) Clearance under Section 164 : received on 12.07.13	(i) Dhramjaygarh-Jabalpur 765 kV D/C 765 kV lines	Line commissioned in 09/15
			(ii) Jabalpur-Bina 765 kV S/C line	Line commissioned in 06/15
4	System strengthening for WR Estimated Cost 2900 cr	PFC BDTCL(Sterlite Grid) Milestones: (i) LOI placed on 19.1.2011 (ii) SPV acquired on 31.3.2011 (iii) Trans. license received on	(i) Jabalpur-Bhopal 765 kV S/C line	Line commissioned in 06/15
			(ii) Bhopal-Indore 765 kV S/C line	Line commissioned in 10/14
			(iii) 2x1500 MVA 765/400 kV substation at Bhopal	Commissioned in 7/2014
			(iv) Bhopal-Bhopal (MPPTCL) 400 kV D/c quad line.	Commissioned in 7/2014

S.N.	Name of the Project	BPC / Implementing Agency / Milestones	Scope of works	Current Status
		12.10.2011 (iv) Approval u/s 164 received on 29.01.2013 (v) Tariff adoption on 28.10.2011 Original COD : Mar 2014	(v) Aurangabad-Dhule 765 kV S/C line (vi) Dhule-Vadodara 765 kV S/C line (vii) 2x1500 MVA, 765/400 kV substation at Dhule (viii) Dhule - Dhule(Msetcl)400 kV D/C Line	Line commissioned in 10/14 Line ready for commissioning on 02/15 Commissioned Commissioned
5	Transmission System associated with DGEN TPS (1200 MW) of Torrent Power Ltd.	PFC M/s Instalaciones Inabensa, S.A. Spain Milestones: (i) Lol issued on 19.05.2014 (ii) Approval under section 68 on 30.01.2014. (iii) Approval under Sec 164 of EA,2003 on 24.04.2016	(i) DGEN TPS – Vadodara 400 kV D/C, Twin Moose line. (ii) Navsari – Bhestan 220 kV D/C line	Commissioning : May 2018
6	Transmission System associated with Gadawara STPS (2x800 MW) of NTPC (Part-A)	REC - Powergrid Warora Transmisson Limited (A subsidiary of PGCIL) Milestones: (i) Date of issuance of RFQ :15.08.2014 (ii) Date of RFP:14.11.2014 (iii) Date of signing of TSA: 09.02.2015	(i) Gadawara STPS-Jabalpu Pool 765 D/C line (ii) Gadawara STPS- Warora P.S. (New) 765 D/C line (iii) LILO of both Ckts. Of Wardha-Parli 400 kV D/C at Warora P.S. (2xD/C). (iv) Warora 765/400 kV P.S. (2x1500 MVA).	SPV transferred
7	Transmission System associated with Gadawara STPS (2x800 MW) of NTPC (Part-B).	REC - Powergrid Parli Transmisson Limited (A subsidiary of PGCIL) Milestones: I. Date of issuance of RFQ :07.08.2014 II. Date of RFP:14.11.2014 III. Date of signing of TSA: 09.02.2015	(i) Warora P.S.-Parli (New) 765 kV D/C line (ii) Parli(New)-Solapur 765 D/c line (iii) Parli (New)-Parli (PG) 400 kV D/C (Quad) line (iv) 765/400 kV Parli (New) Sub-station (2x1500 MVA).	SPV transferred
8	Transmission System Strengthening associated with Vindhyachal- V	REC - Powergrid Jabalpur Transmisson Limited (A subsidiary of PGCIL) Milestones: I. Date of issuance of RFQ :20.08.2014 II. Date of RFP:22.10.14 III. SPV has been acquired by the successful bidder on 26.02.2015 IV. Date of filing of petition for adaptation of tariff and grant of license : 26.02.2015	(i) Vindhyachal P. S- Jabalpur P. S. 765 kV D/C line.	Completion Target: June,2018 SPV transferred
9	System strengthening for IPPs in Chhattisgarh and other generation projects in Western Region	PFC Chhattisgarh-WR Transmission Ltd. (A subsidiary of Adani Power Limited) Milestones: (i) MoP vide letter dated 15.01.2014 trans dated 15-07-2014 & Gazette Notification dated 09.07.14 appointed PFCCL as BPC. (ii) SPV incorporated on 24.12.2014 (iii) RFQ notice published on 29.12.2015. (iv) Lol issued to the successful bidder Adani Power Ltd on 28.07.2015.	(i) Gwalior 765/400 kV – Morena 400 kV D/C line 400 kV D/C Length- 50 km (ii) Establishment of substation at Morena 400/ 220 kV 2X315 MVA (iii) Vindhyachal-IV & V STPP – Vindhyachal Pool 400 kV D/C (Quad) 2nd line 400 kV D/C Length-15 km (iv) Sasan UMPP – Vindhyachal Pooling station 765 kV S/C line 765 KV S/C Length-8 km (v) LILO of one circuit of Aurangabad – Padghe 765 kV D/C line at Pune 765 kV D/C Length-50 km	SPV transferred on 23.11.2015
10	Additional System Strengthening for Sipat STPS	PFC Sipat Transmission Ltd (A subsidiary of Adani Power Limited)	(i) Sipat – Bilaspur Pooling Station 765 kV S/C line 765 kV S/C Length-25 km (ii) Bilaspur Pooling Station -	SPV transferred on 23.11.2015

S.N.	Name of the Project	BPC / Implementing Agency / Milestones	Scope of works	Current Status
		Milestones: (i) MoP vide letter dated 15.01.2014 trans dated 15-07-2014 & Gazette Notification dated 09.07.14 appointed PFCCL as BPC. (ii) SPV incorporated on 23.12.2014 (iii) RFQ issued on 01.01.2015. (iv) Lol issued to the successful bidder Adani Power Ltd on 28.07.2015	Rajnandgaon 765 kV D/C line 765 kV D/C Length-180 km	
11	Additional System Strengthening Scheme for Chhattisgarh IPPs – Part B	PFC - Raipur – Rajnandgaon - Warora Transmission Ltd (A subsidiary of Adani Power Limited) Milestones: (i) MoP vide letter dated 15.01.2014 trans dated 15-07-2014 & Gazette Notification dated 09.07.14 appointed PFCCL as BPC. (ii) SPV incorporated on 23.12.2014 (iii) RFQ notice published on 01.01.2015. (iv) Lol issued to the successful bidder Adani Power Ltd on 28.07.2015	(i) Raipur (Pool) – Rajnandgaon 765 kV D/C line 765 KV D/C Length-60 KM (ii) Rajnandgaon – New Pooling station near Warora 765 kV D/C line 765 KV D/C Length- 270 KM (iii) Establishment of new substation near Rajnandgaon 765/400kV 2x1500 MVA	SPV transferred on 23.11.2015
12	Additional inter-Regional AC link for import into Southern Region i.e. Warora – Warangal and Chilakaluripeta - Hyderabad - Kurnool 765kV link	PFC - Warora Kurnool Transmission Ltd (A subsidiary of Essel Infraprojects Limited) Milestones: (i) MoP vide Gazette Notification dated 06.02.15 appointed PFCCL as BPC. (ii) SPV incorporated on 20.04.2015 RFQ notice published on 23.04.2015. (iii) RfQ responses received and opened on 22.05.2015. RFQ evaluation completed. (iv) The revised RfQ has been re-issued on 11.09.2015 with submission of response due on 12.10.2015. (v) 5 nos. RfQ responses received on schedule date i.e 12.10.2015 and opened on the same day. The RFQ evaluation is under progress.	(i) Establishment of 765/400kV substations at Warangal (New) with 2x1500 MVA transformers and 2x240 MVAR bus reactors. 765/400kV (ii) Warora Pool – Warangal (New) 765kV D/c line with 240 MVAR switchable line reactor at both ends. 765 KV D/C Length- 350 KM (iii) Warangal (New) –Hyderabad 765 kV D/c line with 330 MVAR switchable line reactor at Warangal end. 756 KV D/C Length- 160 KM (iv) Warangal (New) – Warangal (existing) 400 kV (quad) D/c line. 400KV D/C Length-10 KM (v) Hyderabad – Kurnool 765 kV D/c line with 240 MVAR switchable line reactor at Kurnool end. 765 KV D/C Length- 170 KM (vi) Warangal (New) – Chilakaluripeta 765kV D/c line with 240 MVAR switchable line reactor at both ends. 765 KV D/C Length-250 (vii) Cuddapah – Hoodi 400kV (quad) D/c line with 63 MVAR switchable line reactor at both ends. 400 KV D/C Length-200	Under Bidding process Lol issued
13	Common Transmission System for Phase-II Generation Projects in Odisha and Immediate Evacuation System for OPGC (1320 MW) Project in Odisha	PFC - Orissa Generation Phase-II Transmission Limited (A subsidiary of Sterlite Grid Limited) Milestones: (i) MoP vide Gazette Notification dated 06.02.15 appointed PFCCL as BPC. (ii) SPV incorporated on 17.04.2015 (iii) RFQ notice published on 23.04.2015.	(i) OPGC (IB TPS) – Jharsuguda (Sundargarh) 400kV D/C line with Triple Snowbird Conductor 400 kV D/C Length- 50 KM (ii) Jharsuguda (Sundargarh) – Raipur Pool 765 kV D/C line 765 KV D/C Length- 350 KM	Under Bidding process Approval of MoP awaited for Transfer of SPV

STATUS OF TRANSMISSION SCHEMES UNDER IMPLEMENTATION BY POWERGRID IN WESTERN REGION

Sl. No.	Description of Scheme	Estimated Cost (Rs. Cr)	Date of firming up in WR standing committee	Date of investment approval	Target date as of now	Remarks
1	Western Region System Strengthening Scheme -II	5222	20 th (23.01.04)	July'06		
	Set-A: For absorbing import in eastern and central part of WR Grid (POWERGRID)	1700			Commissioned	
	Set-B: For regional strengthening in Southern Maharashtra (100 % private)	1050			Commissioned	
	Set-C: For regional strengthening in Gujarat (100 % private)	600			---	Implementation by Reliance
	a) Rajgarh – Karamsad 400kV D/c				commissioned	
	b) Limdi(Chorania) – Ranchodpura 400kV D/c				commissioned	
	c) Ranchodpura – Zerda(Kansari) 400kV D/c				commissioned	
Set-D: For regional Strengthening in Northern Madhya Pradesh (POWERGRID)	1050			commissioned		
2	Western Region System Strengthening -V	722	25 th (30.09.06)	Dec'07		
	a) 400 kV Vapi- Kala - Kudus D/c				May'17	Vapi-Kala portion commissioned in Mar'14. Kudus S/s being implemented by MSETCL. Cable work in progress (2km.)
	b) LILO of 400 kV Lonikhand - Kalwa line at Navi Mumbai				Mar'17	Critical ROW
	c) Establishment of 400/220 kV, 2 x 315 MVA new S/s (GIS) at Navi Mumbai				Substation is ready and shall be commissioned matching with line	
d) 220 kV Vapi- Khadoli D/c.				Commissioned	Line Commissioned in Sep'10	
3	Tr. System of Mundra Ultra Mega Power Project (4000 MW)	4824	26 th (23.02.07)	Oct'08		
	a) Mundra – Bachchau -Ranchodpura 400 kV (Triple) D/c				Commissioned	
	b) Mundra – Jetpur 400 kV (Triple) D/c				Commissioned	
	c) Mundra – Limbdi 400 kV (Triple) D/c				Commissioned	
	d) Gandhar-Navsari 400 kV D/c				Commissioned	
	e) Navsari - Boisar 400 kV D/c				Commissioned	
	f) LILO of both circuits of Kawas-Navsari 220 kV D/c at Navsari (PG)				Commissioned	
	g) Wardha-Aurangabad 400 kV(Quad) D/c (with provision to upgrade at 1200 kV at later date)				Jun'17	Severe ROW being encountered.
	g) Aurangabad (PG) -Aurangabad I (Waluj) 400 kV(Quad)				Commissioned	
Substations						
a) 40% Fixed Series Compensation each on Wardha - Aurangabad 400 kV D/c at Wardha end				Jun'17	Commissioning matching with the line	
b) Establishment of new 400/220 kV, 2x315 MVA substation at Navsari & Bachchau				Commissioned		
c) Establishment of new 765/400 kV, 3x1500 MVA, substation at Wardha for charging of Seoni - Wardha 2xS/c lines at 765 kV level				Commissioned		
4	Transmission system associated with Krishnapatnam (5x800 MW) (WR Portion)- now delinked from Krishnapatnam UMPP	1928	27 th (30.07.07)			
	a) Raichur – Solapur (PG) 765 kV S/c				Commissioned	
	b) Solapur(PG) – Pune 765 kV S/c				Commissioned	
	c) LILO of 400kV Aurangabad I (Waluj) - Pune (PG) D/c & Parli (PG) - Pune (PG) D/c lines at Pune(GIS)				Commissioned	
d) Establishment of new 765/400 kV substations at Pune (GIS) with 2x1500 MVA transformation capacity				Commissioned		
5	Associated transmission system of VSTPP-IV and Rihand-III	4673	29 th (10.09.09)	Mar'10		
	a) Rihand III- Vindhyachal Pool 765 kV D/c (initially to be op. at 400kV)				Commissioned	
	b) Vindhyachal IV - Vindhyachal Pool 400kV D/c(Quad)				Commissioned	
	c) Vindhyachal Pool - Satna 765 kV 2xS/c				Commissioned	
	d) Satna -Gwalior 765 kV 2xS/c				Commissioned	
	e) Gwalior – Jaipur(South) 765 kV S/c				Commissioned	
	f) Vindhyachal Pool-Sasan 765 kV S/c				Commissioned	
g) Vindhyachal Pool-Sasan 400 kV D/c				Commissioned		

STATUS OF TRANSMISSION SCHEMES UNDER IMPLEMENTATION BY POWERGRID IN WESTERN REGION

Sl. No.	Description of Scheme	Estimated Cost (Rs. Cr)	Date of firming up in WR standing committee	Date of investment approval	Target date as of now	Remarks
	h) Establishment of 765/400kV, 2x1500 MVA substation at Vindhyachal Pool				Commissioned	
6	Solapur STPP(2x660MW) transmission system	63.32	30th (08.07.10)	Oct'13		
	a) Solapur STPP – Solapur (PG) 400kV D/c (Quad)				Commissioned	
	b) Augmentation of 400/220kV ICT by 1x500MVA transformer (3 rd) at Solapur (PG)				Commissioned	
7	Solapur STPP (2x660MW) transmission system (Part-A)	50.52	36th (29.08.13)	Mar'15		Award placed in May'15
	a) Solapur STPP – Solapur (PG) 400kV 2nd D/c (Quad)				Mar'17	Severe ROW being faced in the line.
8	Transmission system for evacuation of Kakrapar Atomic Power Project unit 3 & 4 (2x700 MW)	378.71	31 st (27.12.10)	Feb'14		
	a) Kakrapar NPP – Navsari 400kV D/c – 38 km				Feb'17	
	b) Kakrapar NPP – Vapi 400kV D/c - 104 km				Feb'17	
9	Transmission System associated with Mauda Stage-II (2x660 MW)	1575.3	32 nd (13.05.11)	Sep'13		
	a) Mauda II – Betul 400KV D/c (Quad)-210 km				Mar'17	
	b) Betul– Khandwa 400KV D/c (Quad)-180 km				Mar'17	
	c) Khandwa – Indore(PG) 400kV D/c -215 km				Commissioned	
	d) Establishment of 400/220kV 2x315MVA substation at Betul				Mar'17	
10	Provision of 1x315MVA ICT & Spare Converter Trf for reliable auxiliary power supply at HVDC back to back station at Bhadravati	143	33 rd (21.10.11)	-	Mar'17	ICT commissioned in Mar'15. Procurement of spare converter trf under progress.
11	Establishment of Pooling Station at Champa and Raigarh (Near Tamnar) for IPP Generation Projects in Chhattisagrh	2066.85	29th (10.09.09)	May'11		
	a) Champa Pooling Station - Raipur Pooling Station 765kV D/c				Commissioned	
	b) Raigarh Pooling Staiton (near Kotra) - Raigarh pooling (near Tamnar) 765kV D/c				Commissioned	
	c) Champa Pooling Station - Dharamjaygarh Pooling Station 765kv S/c				Commissioned	
	d)Raigarh Pooling Staiton (near Kotra) - Champa pooling 765kV S/c				Commissioned	
	e) Establishment of 765/400kV 6x1500MVA Champa Pooling Station				Commissioned	
	f)Establishment of 765/400kV 3x1500MVA Raigarh Pooling Station (near Tamnar)				Commissioned	
12	Transmission system strengthening in Western Part of WR for IPP generation proejcts in Chhattisgarh	2127.51	29th (10.09.09)	Nov'11		
	a) Aurangabad(PG) – Boisar 400kV D/c (Quad)				June'17	problem (involvement of grape garden). Critical
	b) Wardha - Aurangabad (PG) 765kV D/c				Commissioned	
	c) Establishement of 765/400kv 2x1500MVA auraganbad (PG) S/s				Commissioned	
	d) Augmentation of transformation capacity at Boisar by 400/220kV, 1x500MVA				Commissioned	
13	System strengthening in North/West part of WR for IPP Projects in Chhattisgarh	2073.26	29th (10.09.09)	Dec'11		
	a) Aurangabad (PG) – Padghe(PG) 765kV D/c				Jun'17	Forest clearance received. ROW being faced.
	b) Vadodara – Asoj 400kV D/c(Quad)				Commisioned	
	c) Padghe – Kudus 400kV D/c (Quad)				Jun'17	Matching with Kudus S/s of MSETCL & A'bad-Padghe line
14	System Strengthening in Raipur-Wardha Corridor for IPP projects in Chhattisgarh (DPR-6)	1422.85	29th (10.09.09)	Jan'12		Under Implementation
	a) Raipur Pooling station - Wardha 765kV 2nd D/c				Mar'17	ROW problem encountered due to addl, compensation demand by forest dwellers. Critical.
15	WR-NR HVDC interconnector for IPP Projects in Chhattisgarh	9569.76	29th (10.09.09)/30th (08.07.10)	Mar'12		Under Implementation

STATUS OF TRANSMISSION SCHEMES UNDER IMPLEMENTATION BY POWERGRID IN WESTERN REGION

Sl. No.	Description of Scheme	Estimated Cost (Rs. Cr)	Date of firming up in WR standing committee	Date of investment approval	Target date as of now	Remarks
	a) A ± 800kV, 3000Mw HVDC bipole between Champa Pooling Station-Kurukshetra (NR) (provision to upgrade to 6000MW at a latter date)				Apr'17	Erection completed, Testing under progress. Commissioning matching with readiness of HVDC terminals (1500 MW) - ant. by
	b) Kurukshetra(NR) - Jalandhar 400kV D/c(Quad) one ckt. via 400/220kV Nakodar				Commissioned	
	c) LILO of Abdullapur – Sonapat 400kV D/c(triple) at Kurukshetra				Commissioned	
	d) Establishment of 3000MW 800KV HVDC bipole terminal each at Champa Pooling station and Kurukshetra(NR) respectively: to be upgraded to 6000MW.				Apr'17	Award placed in Jun'12. Engg., supply, civil works & erection under progress. Land acquired in Apr'13. Pole-I expected by Jan'17 & Pole-II by
	e) Establishment of 400/220kV 2x500 MVA S/s at Kurukshetra (GIS) 2x500MVA				Mar'17	400kV bays ready for commissioning in Dec'15. ICT-II under progress.
16	Inter-regional system strengthening scheme for WR and NR-Part A	1315.9	36 th (29.08.13)	Oct'13		Completed
	a) Solapur - Aurangabad 765kV D/c				Commissioned	
17	Transmission System Associated with Lara STPS-I (2x800MW)	400.47	17 th LTA (03.01.13)	Jun'14		Under Implementation
	a) Lara STPS-I – Raigarh (Kotra) Pooling Station 400 kV D/c line – 18km				Commissioned	
	b) Lara STPS-I – Champa Pooling Station 400 kV D/c (quad) line.- 112km				Apr'17	commenced in Oct'15
18	Transmission System Strengthening in WR-NR Transmission Corridor for IPPs in Chattisgarh	5151.37	35 th (03.01.13)	Jun'14		
	a) Up-gradation of + 800kV, 3000MW HVDC bipole between Champa Pooling Station – Kurukshetra (NR) to 6000MW				Dec'18	
	b) Kurukshetra (NR) – Jind 400kV D/c (Quad)				Dec'18	
19	Inter-regional system strengthening scheme for WR and NR-Part B	6517.36		Dec'14		Award placed in Mar'15
	(a) 765KV D/C Jabalpur Pooling Station - Orai line				Apr'18	
	(b) 765KV D/C Orai - Aligarh line				Apr'18	
	(c) 400KV D/C Orai - Orai line (Q)				Apr'18	
	(d) LILO of one ckt of Satna-Gwalior 765KV 2x S/C line at Orai				Apr'18	
	(e) LILO of Agra - Meerut 765KV S/C at Aligarh				Apr'18	
	(f) LILO of Kanpur - Jhatikara 765KV S/C at Aligarh				Apr'18	
20	Wardha - Hyderabad 765kV Links	3662.02		Jan'15		
	(a) 765KV D/C Wardha - Hyderabad line				May'18	Wardha-Nizamabad link being expedited and efforts being made for early completion by
	(b) 400KV D/C Nizamabad - Dichpali line				Mar'17	
21	GREEN ENERGY CORRIDORS:- Inter State Transmission Scheme (ISTS) - Part B	3705.61	36 / 37 th (29.08.13/05.09.14)	Apr'15		Award placed in July'15
	(a) 765KV D/C Banaskanta - Chittorgarh (New) line				Apr'18	
	(b) 765KV D/C Chittorgarh (New) - Ajmer (New) line				Apr'18	
	(c) 400KV D/C Banaskanta - Sankhari line				Apr'18	
	(d) Establishment of 765/400/220kV (765/400kV - 2x1500 MVA & 400/220kV - 2x500MVA) substation at Banaskanta				Apr'18	
22	GREEN ENERGY CORRIDORS:- Inter State Transmission Scheme (ISTS) - Part C	2247.37	36 / 37 th (29.08.13/05.09.14)	July'15		
	(a) 765KV D/C Bhuj Pool - Banaskanta line				July'18	
	(d) Establishment of 765/400/220kV (765/400kV - 2x1500 MVA & 400/220kV - 2x500MVA) pooling station at Bhuj				July'18	
23	Transmission System Strengthening Associated with Vindhyachal V - Part A		34 th (09.05.12)	Feb'15		

STATUS OF TRANSMISSION SCHEMES UNDER IMPLEMENTATION BY POWERGRID IN WESTERN REGION

Sl. No.	Description of Scheme	Estimated Cost (Rs. Cr)	Date of firming up in WR standing committee	Date of investment approval	Target date as of now	Remarks
24	(a) 1x1500MVA, 765/400kV ICT at Vindhychal Pooling Station Transmission System Strengthening Associated with Vindhychal V - Part B		34th (09.05.12)		July'17	
	(a) 2 nos of 765kV Line bays alongwith 2x330MVAR Line Reactor at Vindhychal Pooling Station				Jun'18	
	(a) 2 nos of 765kV Line bays alongwith 2x330MVAR Line Reactor at Jabalpur Pooling Station				Jun'18	
25	STATCOMs in Western Region		36th (29.08.13)	Mar'15		
	(a) Aurangabad				Sep'17	Award placed in Jun'15
	(b) Gwalior				Dec'17	Award placed in Sep'16
	(c) Solapur				Sep'17	Award placed in Jun'15
26	Western Region System Strengthening Scheme XIV	93.96	37th (05.09.14)			
	(a)2x500MVA, 400/220kV transformer alongwith six nos of 220kV bays at Indore (PG) 765/400kV Substation (b)1x500MVA, 400/220kV transformer alongwith two nos of 220kV bays at Itarsi (PG) 400/220kV S/s				July'18	
27	Powergrid works associated with Part-A of Transmission system for Gadawara STPS of NTPC		36/37th (29.08.13 / 05.09.14)			
	(a) 2 nos. 765 kV line bays at 765/400kV Jabalpur Pooling Station of POWERGRID {for Gadawara STPS (NTPC) - Jabalpur PS 765 kV D/c}				May'17	
28	Powergrid works associated with Part-B of Transmission system for Gadawara STPS of NTPC i.e. WRSS XV		36/37th (29.08.13 / 05.09.14)		Matching with TBCB schedule	
	(a) 2 nos. 765 kV line bays at 765/400kV Solapur sub-station of POWERGRID {for Parli New (TBCB) - Solapur (PG) 765 kV D/c}				Jan'18	
	(b) 2 nos 400kV line bays at existing 400kV Parli (PG) Switching Station of POWERGRID {for Parli New (TBCB) - Parli (PG) 400kV D/c (quad)}				Jan'18	
29	Powergrid works associated with System Strengthening for IPPs in Chhattisgarh and other generation projects in Western Region		36th (29.08.13)		Matching with TBCB schedule	
	(a) 1 no. 765 kV line bay at 765/400kV Vindhychal Pooling Station of POWERGRID {for Sasan UMPP - Vindhychal PS (PG) 765 kV 2nd S/c}				Nov'18	
	(b) 2 no. 400 kV line bays at 765/400kV Vindhychal Pooling Station of POWERGRID {for Vindhychal (IV/V) STPP switchyard (NTPC) - Vindhychal PS (PG) 400 kV 2nd D/c (quad)}				Nov'19	
	(c) 2 no. 400 kV line bays at Gwalior Substation {for Gwalior - Morena 400 kV D/c (quad)}				May'18	
	(d) 2 nos. 765 kV line bays at 765/400kV Pune (GIS) sub-station of POWERGRID {for LILO of one circuit of Aurangabad(PG) - Padgha(PG)765 kV D/c at Pune (GIS) (PG)}				Mar'19	
	(e) 2 nos. 765 kV line bays at 765/400kV Champa Pooling Station of POWERGRID {1for Champa PS(PG) - Raigarh (Kotra) PS(PG) 765 kV 2nd S/c, 1 for Champa PS(PG) - Dharamjaigarh(PG) 765 kV 2nd S/c}				Nov'18	
	(f) 1 no. 765 kV line bay at 765/400kV Raigarh (Kotra) Pooling Station of POWERGRID {for Champa PS(PG) - Raigarh (Kotra) PS(PG) 765 kV 2nd S/c}				Nov'18	
	(g) 1 no. 765 kV line bay at 765/400kV Dharamjaigarh Pooling Station of POWERGRID {for Champa PS(PG) - Dharamjaigarh(PG)765 kV 2nd S/c}				Nov'18	
30	Powergrid works associated with Additional System Strengthening Scheme Chhattisgarh IPPs Part-B		36/37th (29.08.13 / 05.09.14)		Matching with TBCB schedule	
	(a) 2 nos. 765 kV line bay at 765/400kV Raipur Pooling Station of POWERGRID {for Raipur PS(PG) - Rajnandgaon (TBCB) 765 kV D/c}				Nov'18	
30	Powergrid works associated with Additional System Strengthening for Sipat STPS		36/37th (29.08.13 / 05.09.14)		Matching with TBCB schedule	

STATUS OF TRANSMISSION SCHEMES UNDER IMPLEMENTATION BY POWERGRID IN WESTERN REGION

Sl. No.	Description of Scheme	Estimated Cost (Rs. Cr)	Date of firming up in WR standing committee	Date of investment approval	Target date as of now	Remarks
	(a) 3 nos. 765 kV line bays at 765/400kV Bilaspur Pooling Station of POWERGRID (1 no. for Sipat STPS(NTPC) - Bilapur PS(PG) 3rd 765kV S/c, 2 nos. for Bilaspur PS(PG)-Rajnandgaon(TBCB) 765 kV D/c)				Nov'18-Mar'19	
	(b) 2 nos. 240 MVAR, 765 kV switchable line reactors at 765/400kV Bilaspur PS end for Bilaspur PS(PG) - Rajnandgaon(TBCB) 765 kV D/c				Mar'19	
31	Transmission System Strengthening associated with Mundra UMPP- Part A	266.19	36th (29.08.13)		Jun'18	
	(a) LILO of both circuits of Mundra UMPP-Limbdi 400kV D/c (triple snowbird) line at Bachau					
32	Transmission System Strengthening associated with Mundra UMPP- Part B		36/38th (29.08.13/17.07.2015)		Dec'18	
	(a) Mundra UMPP - Bhuj Pool 400kV D/c line (triple snowbird)					
33	Bays for Transmission System Associated with DGEN Torrent Energy Ltd (1200MW)		13/14th LTA (27.12.10/13.05.2011)		May'18	
	(a) 2nos 400kV Bays at Vadodara (GIS)					
	(b) 2nos 220kV Bays at Navsari (GIS)					
34	Western Region System Strengthening -16		35th (17.07.15)		July'18	
	(a) Installation of 2x500MVA, 400/220kV ICTs with associated bays at Parli (PG) switching station along with provision of six nos. of 220 kV bays					
	(b) Provision of two nos. of 220kV bays at Mapusa (Colvale) 400/220 kV substation					
	(c) Installation of 500MVA, 400/220kV (3rd) ICT with associated bays at Satna (PG) S/s with provision of two nos. 220kV line bays					
	(d) Provision of two nos. of 400 kV bays at 765/400kV Indore(PG) substation					
35	Western Region System Strengthening -17		(30.11.15)		Mar'19	
	1. Provision of 1x240 MVAR switchable line reactor at Pune GIS S/s end {for Aurangabad (PG) – Pune GIS 765kV S/C line, formed after LILO of one ckt of Aurangabad (PG) – Padghe (PG) 765kV D/C line at Pune GIS}.					
	2. Conversion of followings Fixed Line Reactor into Switchable Line Reactors / BUS Reactor.					
	a. Itarsi – Indore (MPPTCL) 400kV 2xS/C lines: 420kV 50 MVAR fixed line reactors at both ends of each line are to be converted into switchable line reactors.					
	b. Bina (PG) – Shujalpur 400kV D/C line: 420kV 50 MVAR fixed line reactor at Shujalpur end is to be converted into switchable line reactor. The 420kV 63 MVAR line reactor installed at Bina (PG) end is already switchable.					
	c. 1x63 MVAR BUS Reactor at Bhadravati S/s: 420kV					
	3. Installation of ICTs along with associated bays at following substations of POWERGRID:					
	a. Khandwa 400/220kV Substation: 1x500 MVA, 400/220kV 3rd ICT.					
	b. Boisar 400/220kV Substation: 1x500 MVA, 400/220kV 4th ICT.					
	c. Kala 400/220kV Substation: 1x500 MVA, 400/220kV 3rd ICT.					
	d. Dehgam 400/220kV Substation: 1x500 MVA, 400/220kV 3rd ICT.					
36	Western Region System Strengthening -18		(30.11.15)		Aug'19	
	1. Splitting of following substation along with necessary switching arrangement.					
	a. Dharamjaygarh Pool 765kV BUS					
	b. Raigarh Pool (Kotra) 400kV & 765kV BUS					
	c. Champa Pool 400 kV & 765kV BUS					
	2. Installation of Reactors:					
	a. 1X125 MVAR BUS Reactor at 400kV BUS Section A of Dharamjaygarh Pool.					
	b. 1X125 MVAR BUS Reactor at 400kV BUS Section A of Raigarh Pool (Kotra).					
	c. 1X240 MVAR BUS Reactor at 765kV BUS Section A of Raigarh Pool (Kotra).					
	d. 1X240 MVAR BUS Reactor at 765kV BUS Section A of Champa Pool.					
	e. 1X330 MVAR BUS Reactor at 765kV BUS Section B of Dharamjaygarh Pool.					

STATUS OF TRANSMISSION SCHEMES UNDER IMPLEMENTATION BY POWERGRID IN WESTERN REGION

Sl. No.	Description of Scheme	Estimated Cost (Rs. Cr)	Date of firming up in WR standing committee	Date of investment approval	Target date as of now	Remarks
37	PG Works associated with Transmission System for Khargone TPP		38th & 39th (17.07.15 & 30.11.15)			
	1. 63 MVAR switchable line reactor along with 500Ω NGR at Rajgarh(PG) end of Khargone TPS – Rajgarh (PG) 400kV line <i>{formed after LILO of one circuit of Khandwa - Rajgarh 400 kV D/C line at Khargone TPS, being implemented under TBCB}</i>				Feb'18	
	2. 2 nos. of 765 kV line bays at 765/400kV Indore Substation of POWERGRID <i>{for termination of Khandwa PS – Indore 765 kV D/C line, being implemented under TBCB }</i>				July'19	
	3. 240 MVAR Switchable Line Reactors along with 700Ω NGR at Indore (765/400kV S/s) end of each circuit of Khandwa Pool – Indore 765kV D/c line (Line being implemented under TBCB)				July'19	
38	POWERGRID Works associated with New WR - NR 765kV Inter-regional corridor		40th (01.06.2016)		Matching with TBCB Line	
	a. 2 nos. of 765kV Line Bays at Vindhychal 765/400 kV Pooling Station;					
	b. 2 nos. of 765kV Line Bays along with 765kV, 1x330 MVAR line reactor in each bay at Varanasi 765/400 kV GIS sub-station					
39	POWERGRID Works associated with Additional 400kV feed to Goa		40th (01.06.2016)		Matching with TBCB works	
	2 nos of 400kV line bays at Mapusa s/s for termination of Xeldem – Mapusa 400kV D/c (quad) line & 1x80MVAR LR at Narendra (New) S/s for Narendra(New) - Xeldam 400kV line					
40	POWERGRID Works associated with Additional System for Power Evacuation from Generation Projects pooled at Raigarh (Tamnar) Pool		40th (01.06.2016)		Matching with TBCB works	
	2 nos. of 765kV Line Bays each at Dharamjaygarh Pool and Raigarh (Tamnar) Pool					



भारत सरकार / Government of India

विद्युत मंत्रालय / Ministry of Power

केन्द्रीय विद्युत प्राधिकरण / Central Electricity Authority

विद्युत प्रणाली योजना एवं परियोजना मूल्यांकन- I प्रभाग

Power System Planning & Project Appraisal -I Division

सेवा भवन, आर.के.पुरम, नई दिल्ली - 110066

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Annexure - 3



सं/ No. 26/10/2017/PSP&PA-I/ 107(1-5)

दिनांक /Date: 14.02.2017

सेवा में / To

1. COO (CTU), PGCIL, Saudamini, Plot No. 2, Sector-29, Gurgaon - 122 001
2. CEO, POSOCO, B-9, Qutub Institutional Area, Katwaria Sarai, New Delhi - 110 016
3. Director (Operations), Mahatransco, Prakashganga, Plot No. C -19, Bandra (E), Mumbai - 400051

विषय : महाराष्ट्र पारेषण मुद्दों संबंधित सी ई ए, नई दिल्ली में 13.01.2017 को आयोजित बैठक का कार्यवृत्त - संबंध में

Sub: Minutes of the meeting held on 13.01.2017 at CEA, New Delhi regarding the transmission issues related to Maharashtra – reg.

महोदय / महोदया / Sir M adam,

Please find an enclosed minutes of the meeting held on 13.01.2017 at CEA, New Delhi regarding the transmission issues related to Maharashtra.

भवदीय / Yours faithfully,

संलग्न /Encl. - यथोपरि / as above

(अवधेश कुमार यादव / Awdhesh Kumar Yadav)

(निदेशक / Director)

प्रतिलिपि / Copy to:

1. सदस्य / Member (Power System), के वि प्रा / CEA
2. मुख्य अभियन्ता / Chief Engineer, PSP & A – I, के वि प्रा / CEA

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**Minutes of the Meeting held on 13.01.2017 at CEA, New Delhi to discuss
transmission issues related to Maharashtra**

In line with the decision of 41st meeting of SCPSP of WR held on 21.12.2016, a follow up meeting was held on 13.01.2017 with MSETCL, CTU and NLDC in CEA, New Delhi. The list of participants is enclosed as Annexure – I. During the meeting the following issues were deliberated.

1. Evacuation of Koradi generation and high fault level at Koradi complex and Measures to control fault level at Wardha Substation:

1.1. MSETCL informed that for evacuation of power from Koradi-II generation project, LILO of Akola – Koradi-I 400 kV S/C at Koradi II was done as an interim arrangement. There is a 400/220 kV ICT at Koradi II S/s and it has interconnection with Kaulewada S/s through 220 kV D/C line. The interim arrangement was disconnected after commissioning of 400 kV Koradi II – Wardha S/C and 400 kV Koradi II – Warora S/C (Termination of Koradi-II – Wardha 400 kV D/C quad line into one ckt. of Warora – Wardha 400 kV D/C line). Further, Koradi II – Koradi III 400 kV D/C quad line is under implementation by MSETCL and one circuit of the D/C line has already been commissioned & another circuit is expected to be commissioned by March, 2017.

1.2. MSETCL stated that they have done the system studies to assess the short circuit level at Koradi-II and Wardha 400 kV substations for the following scenarios:

- (i) Case 1 (Base Case): Interim arrangement (LILO of Akola – Koradi-I 400 kV S/C at Koradi II) removed and Koradi-II – Wardha 400 kV D/C quad line terminated into one ckt. of Warora – Wardha 400 kV D/C line. The power flow through lines interconnected with Koradi II is within the limits and balanced. The short circuit level observed at 400 kV Wardha (PG) and 400 kV Koradi-II is 77 kA and 35 kA respectively.
- (ii) Case 2: Considered splitting of 400 kV Wardha (PG) bus (without disconnection of 400 kV Koradi II – Wardha (PG) S/C & 400 kV Wardha (PG) – Warora lines), the power flows are balanced and within limits. However, short circuit level of 400 kV Wardha (PG) bus section 'A', 400 kV Wardha (PG) bus section 'B' and 400 kV Koradi II are 44, 63 and 34 kA respectively.
- (iii) Case 3: Considering the bus splitting at Wardha, 400 kV Koradi II - Koradi III D/C quad line, bypassing 400 kV Koradi II – Wardha (PG) S/C & Wardha (PG) – Warora at Wardha (now becomes 400 kV Koradi II – Warora D/C), the power flows are balanced and within the limits. The short circuit level of 400 kV Wardha (PG) bus section A, 400 kV Wardha (PG) bus section B & 400 kV Koradi II would be 43, 51 and 24 kA respectively.

MSETCL further stated that, bypassing of 400 kV Koradi II – Wardha (PG) D/C & 400 kV Wardha (PG) – Warora D/C lines at Wardha (PG) (so as to form Koradi-II

– Warora 400 kV D/C line), prior to the commissioning of 400 kV Koradi II – Koradi III D/C, may result in the overloading of 400 kV Koradi II – Warora D/C line and 220 kV Koradi II – Kaulewada D/C line. In view of this, MSETCL requested to consider the split bus arrangement of 400 kV Wardha (PG) after the commissioning of both the ckts. of 400 kV Koradi II – Koradi III D/C quad line.

- 1.3. CEA stated that as per the proposed bus splitting at Wardha, all the three 765/400kV ICTs at Wardha are connected to Bus Section - A and there is one 400kV D/C incoming feeder from Mauda generation project connected to Bus Section A, whereas the Bus Section B has more no. of outgoing feeders than the incoming feeders. Therefore, shifting of one 400 kV D/C line, say Wardha-Akola 400 kV D/C line, from Bus Section B to Bus Section A may be explored by CTU before finalizing the bus splitting arrangement.
- 1.4. CTU stated that in its studies done for short circuit level at Wardha 400 kV, the interim arrangement i.e. LILO of 400 kV Akola – Koradi-I S/C at Koradi II was considered, however, in line with above observations of MSETCL & CEA, system studies file was updated and results are as tabulated below:

Case ID	Case Description	Wardha 400kV Short Ckt level	Koradi II 400kV Short Ckt level	Remarks
1	Base Case w/o split bus arrangement at Wardha	73 kA	35kA	Power flow through lines interconnected with Koradi II is well within the limits & balanced
2	Splitting of 400 kV Wardha (PG) bus (without disconnection of 400 kV Koradi II – Wardha (PG) S/c & 400 kV Wardha (PG) – Warora S/c lines)	Bus A: 44 kA Bus B: 57 kA	33kA	Power flows are well balanced and within limits
3	Splitting of 400kV Wardha (PG) bus along-with bypassing 400 kV Koradi II – Wardha (PG) 400kV S/c & Wardha (PG) – Warora 400kV S/c lines at Wardha S/s (after commissioning of 400 kV Koradi II – Koradi III D/C quad line)	Bus A: 44 kA Bus B: 45.6 kA	27kA	Power flows are well balanced and within limits
4	Case ID3 + Shifting of 400kV D/c Akola I line from Bus section B to Bus section A	Bus A: 48 kA Bus B: 41 kA	27kA	Power flows are well balanced and within limits

From the studies carried out it is observed that:

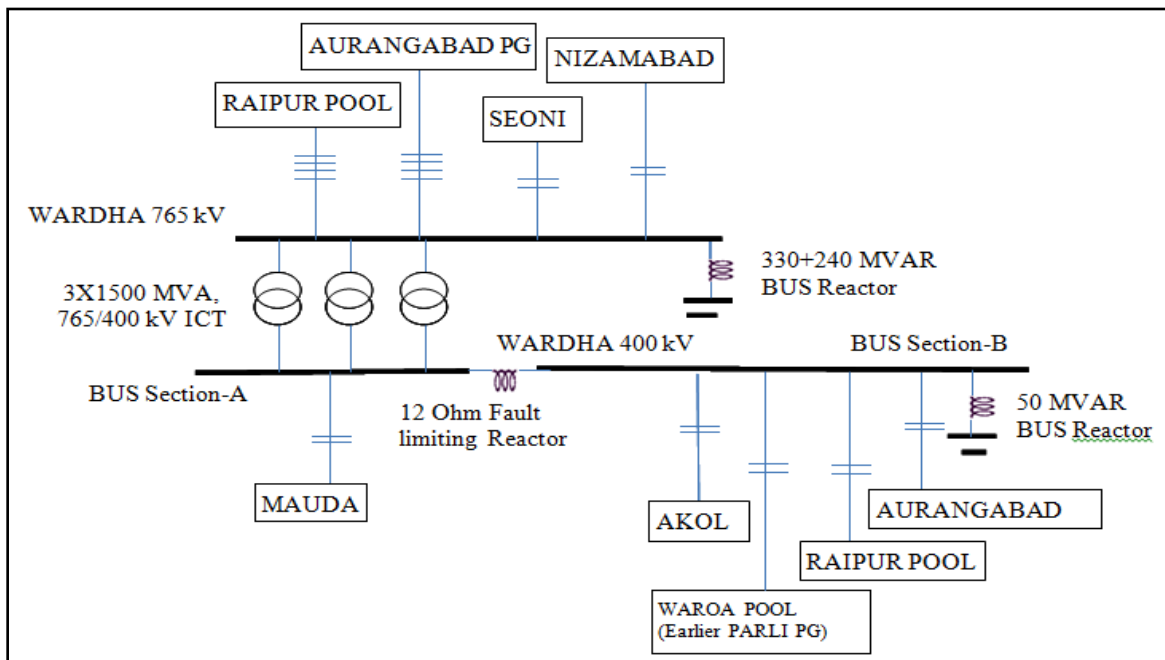
- i) The short circuit level of 400 kV Koradi II bus is less than 40 kA in all cases.
- ii) In case ID 3, fault levels at Wardha are well balanced on both sections A & B
- iii) Case ID 4 suffers from certain drawbacks such as:
 - Wardha Section A fault level reaches upto 48kA and fault levels on sections A and B are not balanced

- There are implementation constraints including several line crossings involved in this case.
- iv) Case ID 3 does not suffer from reliability issues as bus splitting is achieved through a series bus reactor between sections A and B.
- 1.5. It was observed that with removal of the interim arrangement (LILO of 400 kV Akola – Koradi-I S/C at Koradi II), the short circuit at Koradi-II is within design limits. The split bus arrangement at Wardha (Case ID 3), along with the bypass arrangements and reconfigurations, would take some time and by that time, stringing of the second ckt. of 400 kV Koradi II – Koradi III D/C quad line would also be completed by MSETCL.
- 1.6. Regarding the power evacuation system of Koradi-II generation/ Tiroda generation project, MSETCL informed they have carried out studies and the studies shows strengthening requirements beyond Warora 400 (MSETCL) substation. There are two 400 kV incoming D/C lines (Tiroda - Warora 400 kV D/C quad line and Koradi-II – Warora 400 kV D/C quad line) and only one 400 kV outgoing D/C line (Warora-Chandrapur-II – Chandrapur 400 kV D/C line). MSETCL would further carry out the studies and finalise the transmission system strengthening beyond Warora. The same would be intimated to CEA/constituents of WR.
- 1.7. After deliberations the following was agreed:

A. Scheme to control the fault level at Wardha substation (as agreed in the SCM of WR)

- (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 outskirts 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) agreed in 41st WR SCM

- 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 through 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 was 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.

2. Provision of Bus Reactors at High Voltage Nodes in Western Region

- 2.1. CEA stated that CTU has proposed following bus reactors in the 41st meeting of SCPSPWR: (i) 400 kV Mapusa S/s (125 MVAR) (ii) 400 kV Kolhapur GIS S/s (125 MVAR) (iii) 400 kV Raigarh S/s (125 MVAR) (iv) 765 kV Solapur (240 MVAR) and (v) 765 kV Aurangabad S/s (240 MVAR).
- 2.2. MSETCL representative stated that it has planned bus reactors each of 125 MVAR at following 400 kV S/s of MSETCL and these are expected to be commissioned by 2021-22.
- (i) Karad (ii) Kolhapur (iii) Solapur (iv) Nanded (v) Akola-I (vi) Bhusawal – II (Deep Nagar) (vii) Koradi – II (viii) Chandrapur – II (ix) Khaparkheda (x) Kudus (xi) Alkud (x) Lonikhand-II (xi) Dhule

2.3. MSETCL further informed that apart from above reactors, they have also proposed 25 MVAR bus reactor at Dhule (220 kV) in GEC-I, and 125 MVAR at Balsane (400kV) in GEC II.

2.4. It was decided that the revised system studies would be carried out for assessing reactors requirement in WR after considering reactors proposed by MSETCL.

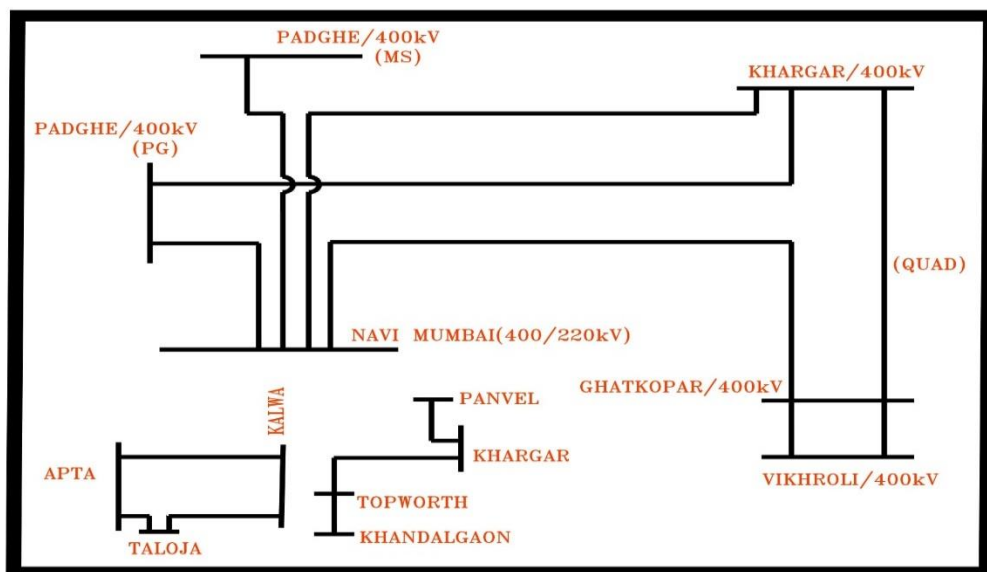
3. Additional ISTS feed to Navi Mumbai 400/220 kV substation of POWERGRID

3.1. In the 41st meeting of PSP of WR, in regards to additional ISTS feed to Navi Mumbai area, 8 no. of alternatives were proposed and MSETCL has given its consent for option '5' (as given below) subject to implementation of 220 kV outlets from Navi Mumbai 400/220 kV substation along with ISTS feed to Navi Mumbai S/s under ISTS.

- (i) Padghe (PG) – Khargar 400 kV D/c quad line connecting it with one circuit of Khargar – Ghatkopar 400 kV D/C line so as to form Padghe (PG) – Ghatkopar 400 kV S/C and Padghe (PG) - Khargar 400 kV S/C.
- (ii) LILO of Padghe (PG) – Ghatkopar 400 kV S/c line at Navi Mumbai.

At present LILO of Padghe (MSETCL) – Khargar (MSETCL) 400 kV S/C line at Navi Mumbai (PG) is under implementation and due to severe RoW problems in the vicinity of Navi Mumbai S/s, around 1.5 km stretch near to the gantry of Navi Mumbai S/s is being implemented through underground cable.

Block diagram:

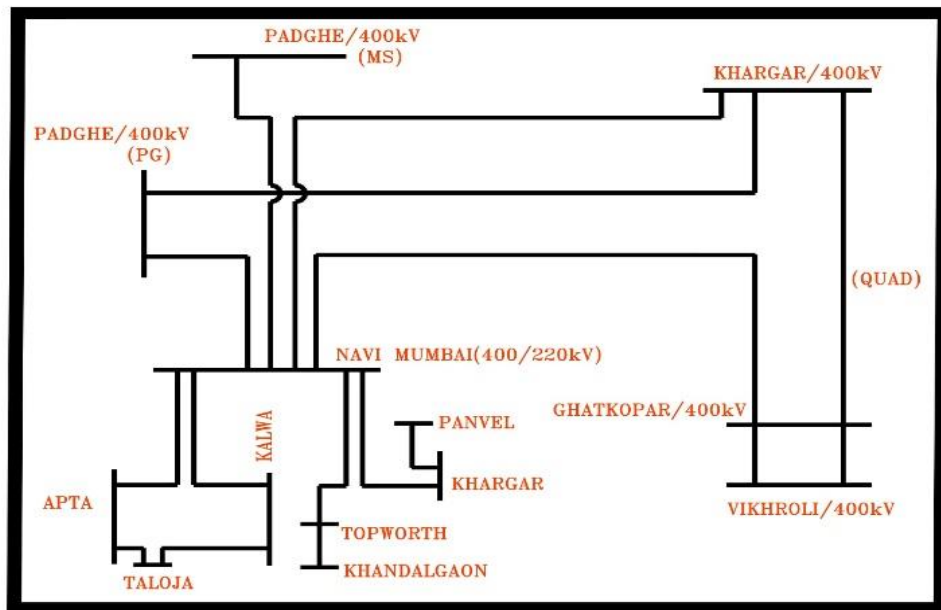


The implementation of the following 220 kV outlets, which were earlier planned by MSETCL, is yet to be taken up by MSETCL due to RoW issues:

- a) LILO of 220 kV Apta – Kalwa S/C line at Navi Mumbai.

- b) LILO of 220 kV Khandalgaon (Topworth) – Kharghar S/C line at Navi Mumbai.
- 3.2. MSETCL stated that major load centers in the vicinity of Mumbai area are 400 / 220 kV Kalwa S/s (1 X 600 + 3 X 500 MVA) & 400 / 220 kV Kharghar S/s (2 X 315 + 1 X 500 MVA). As part of intrastate system strengthening Vikhroli – Kharghar 400 kV D/C is under implementation by Tata Power (400 kV Kharghar – Ghatkopar section is an O/H line & 400 kV Ghatkopar – Vikhroli section be through underground cable). MSETCL informed that LILO of one circuit of Apta – Kalwa 220 kV D/C has already been done at Taloja and LILO of Khandalgaon – Kharghar S/C has already been done at Topworth. Further Khandalgaon is connected to Kharghar via Panvel.
- 3.3. CTU suggested termination of Padghe (PG) – Kharghar 400 kV D/C quad into one ckt. of Kharghar – Ghatkopar 400 kV D/C line (i.e. LILO of one ckt. of Kharghar-Ghatkopar 400 kV D/C line at Padghe (PG)) as it would not require one no. of 400 kV bays at Kharghar 400 kV substation.
- 3.4. Considering the above suggestion studies were carried out for 220 kV outlets from Navi Mumbai i.e., (i) LILO of 220 kV Apta – Kalwa at Navi Mumbai and (ii) LILO of 220 kV Khandalgaon – Kharghar at Navi Mumbai and the line flows observed on 220 kV network from New Mumbai are as given below:

Block diagram:



Power flows (MW):

S. No.	From	To	Base Case	Outage of Line (at S. No. 2)	Outage of Line 1 (at S. No. 1)
1	Navi Mumbai	Kalwa	215	319	out
2	Navi Mumbai	Kharghar	208	out	334
3	Navi Mumbai	Apta	67	109.7	101.4
4	Navi Mumbai	Topworth	-68	-58	-59

In view of the high loading on Navi Mumbai – Kalwa & Navi Mumbai – Kharghar 220 kV lines, following cases / alternatives were discussed and studied.

Case (i) LILO of Taloja – Kalwa 220 kV S/C at Navi Mumbai & LILO of 220 kV Topworth – Kharghar S/C at Navi Mumbai

Case (ii) LILO of Taloja – Kalwa 220 kV S/C at Navi Mumbai & LILO of 220 kV Apta – Kalwa S/C at Navi Mumbai

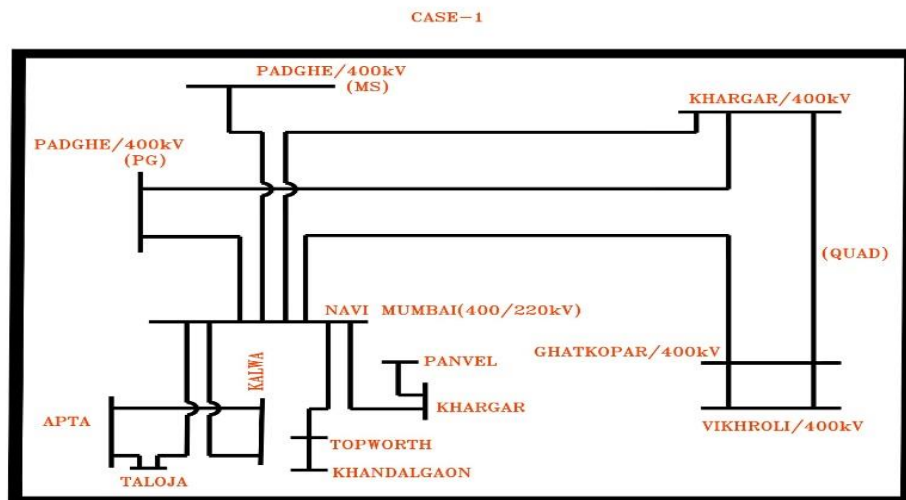
Case (iii) LILO of Taloja – Kalwa 220 kV S/C at Navi Mumbai & LILO of 220 kV Panvel – Kharghar S/C at Navi Mumbai

Case (iv) LILO of 220 kV Apta – Kalwa S/C at Navi Mumbai & interconnecting LILO portion of 220 kV Apta – Kalwa S/C at Taloja with Navi Mumbai to form Taloja – Navi Mumbai 220 kV D/C

Case (v) LILO of 220 kV Topworth – Kharghar S/C at Navi Mumbai & interconnecting LILO portion of 220 kV Apta – Kalwa S/C at Taloja with Navi Mumbai to form Taloja – Navi Mumbai 220 kV D/C

Case i:

Block Diagram:

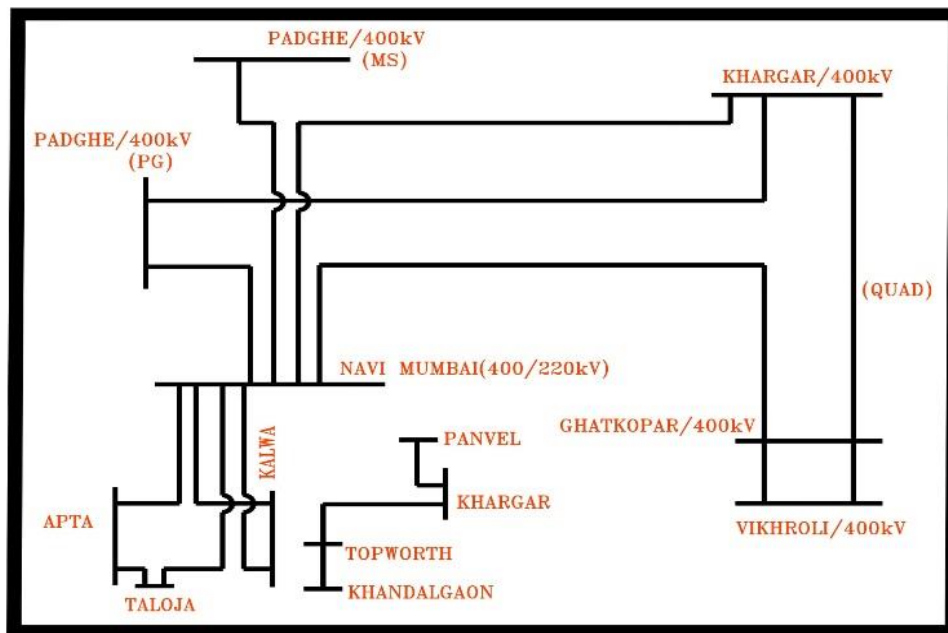


Power flows (MW):

S. No.	From	To	Base Case	Outage of line At S. No. 1	Outage of line at S. No. 2	Outage of line at S. No. 3	Outage of lines at S. No. 1 & 4
1	Navi Mumbai	Kalwa	186	Out	267	235	Out
2	Navi Mumbai	Kharghar	178	283	Out	252	247
3	Navi Mumbai	Taloja	143	175	179	Out	161
4	Navi Mumbai	Topworth	- 70	-62	-61	-63	Out

Case: ii

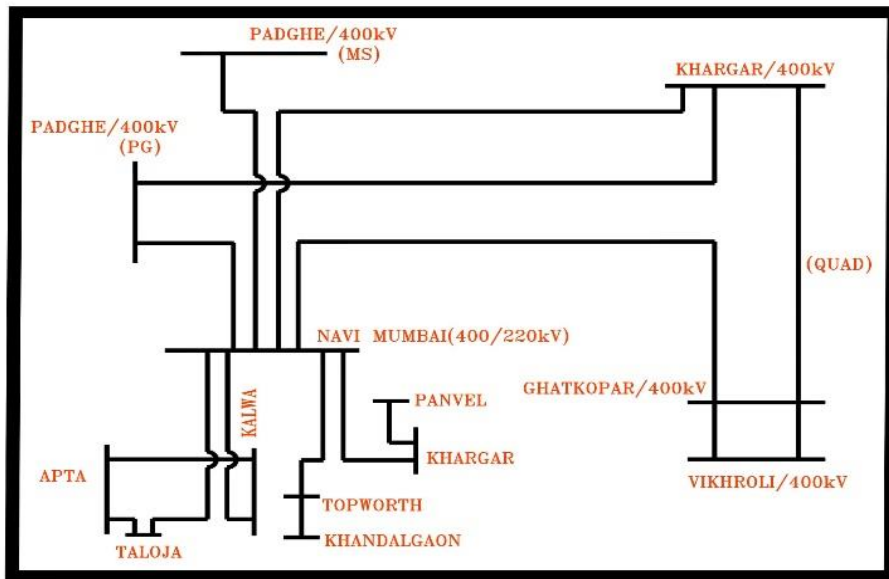
Block Diagram:



Power flows (MW):

S. No.	From	To	Base Case	Outage of one ckt. of Line at S. No. 1
1	Navi Mumbai	Kalwa	2 X 147.6	1 X 224.6 (another Circuit Out)
2	Navi Mumbai	Apta	37.3	54.2
3	Navi Mumbai	Taloja	122.2	141.3
4	Topworth	Kharghar	75.1	75

Case iii: Block Diagram:



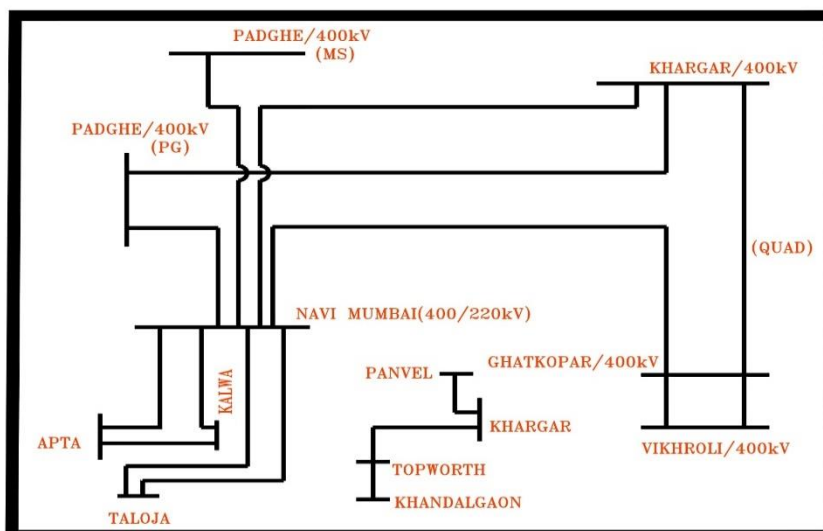
Power flows (MW):

S. No.	From	To	Base Case	Outage of line at S. No. 1	Outage of line at S. No. 2	Outage of line at S. No. 3
1	Navi Mumbai	Kalwa	177	Out	252	219
2	Navi Mumbai	Kharghar	161	253	Out	224
3	Navi Mumbai	Taloja	138	166	172	Out
4	Navi Mumbai	Panvel	-34	-22	-21	-24

Case: iv

Block Diagram:

CASE IV

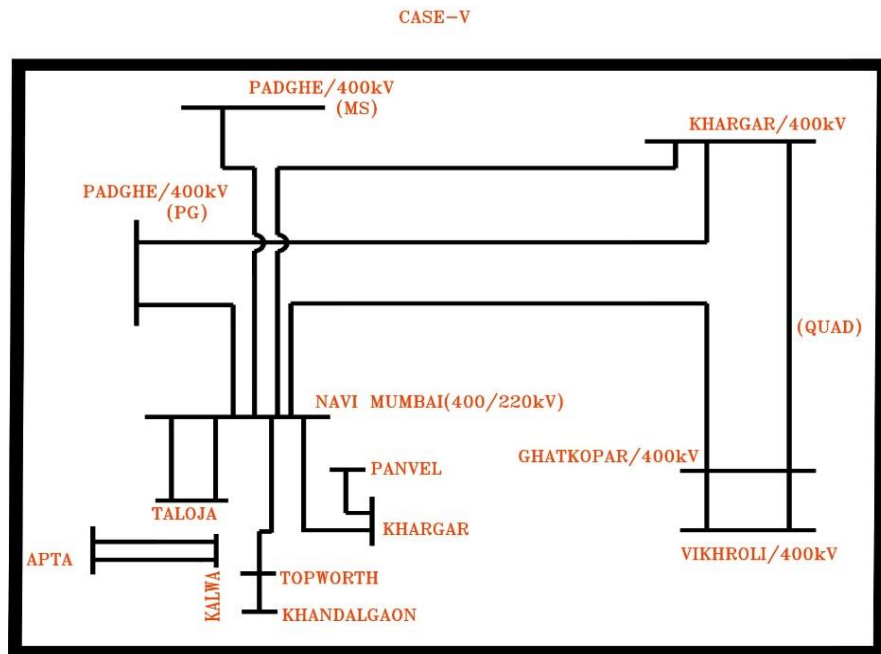


Power flows (MW):

S. No.	From	To	Base Case	Outage of Line at S. No. 1
1	Navi Mumbai	Kalwa	209.9	out
2	Navi Mumbai	Apta	53.5	130
3	Navi Mumbai	Taloja	2 X 79	2 X 90
4	Apta	Kalwa	28	52

Case v:

Block Diagram:



Power flows (MW):

S. No.	From	To	Base Case	Outage of line at S. No. 1
1	Navi Mumbai	Kharghar	287.7	out
2	Navi Mumbai	Topworth	-62.3	-29.4
3	Navi Mumbai	Taloja	2 X 82.4	2 X 102
4	Apta	Kalwa	2 X 21.6	2 X 19

3.5. Analysis of the above alternatives for 220 kV outlets from Navi Mumbai shows that the power flows are well balanced in 'alternative ii' in comparison to other alternatives evolved, thus the alternative ii was agreed as the 220 kV outlets from Navi Mumbai. It was decided that MSETCL shall examine the feasibility of LILO of Taloja – Kalwa 220 kV S/C at Navi Mumbai. MSETCL shall also provide the latitude & longitude of the proposed LILO points of 220 kV Taloja – Kalwa S/C, 220 kV Apta – Kalwa S/C and LILO point of Ghatkopar – Kharghar 400 kV S/C line.

- 3.6. MSETCL stated that the implementation feasibility of the 220 kV outlets from Navi Mumbai (PG) need to be ascertained jointly by CEA, CTU and MSETCL, before taking up the scheme for implementation.
- 3.7. The following transmission system was agreed as the transmission system strengthening in WR for providing ISTS feed to Navi Mumbai subject to implementation feasibility of 220 kV outlets from Navi Mumbai (PG):
- (i) Padghe (PG) – Kharghar 400 kV D/C quad line to be terminated into one ckt. of Kharghar – Ghatkopar 400 kV D/C line (thus forming Padghe (PG) - Kharghar 400 kV S/C quad line, Padghe (PG) - Ghatkopar 400 kV S/C quad line)
 - (ii) LILO of Padghe (PG) – Ghatkopar 400kV S/C line at Navi Mumbai (PG).
 - (iii) LILO of Taloja – Kalwa 220 kV S/C line at Navi Mumbai (PG).
 - (iv) LILO of 220 kV Apta – Kalwa S/C line at Navi Mumbai (PG).

4. Connectivity applications received in the vicinity of Kolhapur:

- 4.1. CTU stated that only one developer (BLP Vayu (Project 2) Pvt. Ltd. (BLPVPL-Bololi)), located in the vicinity of Kolhapur S/s, had applied for connectivity for 100 MW and the same was discussed in the 24th LTA meeting of WR held on 23.12.2016. In the meeting, provision of 1X500 MVA, 400/220 kV ICT at Kolhapur (PG) switching station to provide connectivity to BLPVPL was proposed. MSETCL was requested to indicate their requirement of 220 kV bays at Kolhapur (PG) switching station so that the implementation of the proposed 1X500 MVA, 400/220 kV ICT could be taken up under ISTS.
- 4.2. MSETCL stated that already there three nos. of 400/220 kV substation in vicinity of Kolhapur (Kolhapur, Karad already existing and Alkud under implementation). Therefore, there is no requirement of 220 kV bays / any 220 kV outlets by MSETCL from the proposed 1X500 MVA, 400/220 kV ICT at Kolhapur (PG) switching station for providing connectivity to M/s BLPVPL.
- 4.3. In view of above, the following transmission system was agreed for providing connectivity to M/s BLPVPL:
- (i) BLPVPL(Bololi) – Kolhapur GIS 220kV S/c line along with associated line bays at both ends
 - (ii) Installation of 1x500MVA, 400/220kV ICT at Kolhapur GIS@
@ 220kV cables shall be required for the interconnection of 400/220kV ICT to 220kV GIS module
- The above connectivity system would be under the scope project developer.

---- *** ----

Annexure - I**List of participants of the special meeting held on 13.01.2017 at CEA, New Delhi**

S. No.	Name Shri	Designation / Organization	Contact No.	Email ID
1	Ravindra Gupta	Chief Engineer / CEA	9968286184	ravindergupta_cea@nic.in
2	Awdhesh Kumar Yadav	Director / CEA	9868664087	awd.cea@gmail.com
3	Shiva Suman	Dy. Director / CEA	9013929260	shivvasumanmedak@gmail.com
4	Vikas Sachan	Assistant Director / CEA	7838263649	vikas.cea@gov.in
5	Nitin Deswal	Assistant Director / CEA	9717818349	nitindeswal@nic.in
6	Ramchandra	DGM(CTU-Plg) / CTU	9910378128	ramachand@powergridindia.com
7	Bhaskar Wagh	Sr. Engineer / CTU	9560890352	bhaskarwagh@powergridindia.com
8	Pradeep Reddy	Sr. Engineer / NLDC	8800977993	pradeepreddy.iitd@gmail.com
9	Vinay Khedekar	Sr. Engineer / MSETCL	9619850189	khedekarvg@yahoo.com

GOVERNMENT OF INDIA
MINISTRY OF RAILWAY
RAILWAY BOARD

No. 2012/Elect(G)/150/1Pt.-II

Dt. 19.10.16

To,

Chief Engineer
Central Electricity Authority
Sewa Bhawan, R. K. Puram
Sector-1, new Delhi-110066

(Kind attn: Mr. Pardeep Jindal)

Sub: Connectivity of Railways TSSs with ISTS network approval for connectivity.

Ref: This office's letter no. 2012/Elect(G)/150/1 Pt.-II dt. 09.09.16.

As desired regarding subject matter, detailed information about the connectivity of Railways TSSs with State Utilities is attached.

Encl: As above.


(Punit Agrawal)

Director Elect. Engg.(PS)
Railway Board

Copy: CEO/REMCL: For information and necessary action please.

Details of TSS along Delhi - Bharuch route

Sr. No.	Proposed ISTS Location	Location of TSS/FP	Coordinates		Existing STU point				
			Latitude	Longitude	Location	State	State Utility	Highest Voltage Level(kV)	Approx. Distance from TSS (km)
1	Bassi (PGCIL) (Raj.)/ Agra	Mathura	27.47948	77.673561	Mathura	UP	UPPCL	132	6.20
2		Bharatpur	27.236305	77.488417	Bharatpur	Raj.	JVVNL	220	1.40
3		Hindaun city	26.755726	77.03145	Hindaun	Raj.	JVVNL	220	1.50
4		Gangapurcity	26.468502	76.527469	Gangapur	Raj.	JVVNL	132	2.20
5	Kota (PGCIL) (Raj.)	Sawaimadhopur	26.019077	76.357241	Sawaimadhopur	Raj.	JVVNL	220	1.50
6		Lakheri	25.640532	76.192401	Lakheri	Raj.	JVVNL	132	1.10
7		Gurla	25.270958	75.885826	Sakatpura	Raj.	JVVNL	220	12.50
8		Ramganj Mandi	24.643331	75.939128	Morak	Raj.	JVVNL	220	8.50
9		Suwasra	24.070519	75.648657	Suwasra	MP	MPPTCL	132	1.90
10	Rajgarh (PGCIL) (MP)	Nagda	23.45578	75.412474	Nagda	MP	MPPTCL	220	1.80
11		Ratlam	23.340562	75.050409	Ratlam	MP	MPPTCL	220	3.00
12		Bamania	23.095907	74.758689	Ratlam	MP	MPPTCL	220	45.00
13		Dahod	22.844095	74.254539	Dahod	Guj.	MGVCL	132	1.54
14		Limkheda	22.835043	73.983611	Limkheda	Guj.	DGVCL	132	2.50
15	Dehgam/ Pirana (PGCIL) (Guj.)	Godhra	22.77691	73.606149	Godhara	Guj.	MGVCL	220	7.00
16		Samlaya	22.884588	73.30251	Asoj	Guj.	MGVCL	400	14.30
17		Mehamadabad	22.81935	72.752112	Mehamadabad	Guj.	MGVCL	132	3.00
18		Anand	22.561686	72.966306	Ode	Guj.	MGVCL	132	17.30
19		Makarpura	22.233282	73.175857	Jambuva	Guj.	MGVCL	400	2.20
20		Bharuch	21.704389	72.99928	Bharuch	Guj.	DGVCL	400	1.50

Details of TSS along Mughal Sarai - Howrah route

Sr. No.	Proposed ISTS Location	Location of TSS/FP	Coordinates		Existing STU point				
			Lattitude	Longitude	Location	State	State Utility	Highest Voltage Level	Approx. Distance from TSS (in KM)
1	2	4			11	12	13	14	15
1	Arah/ Patna	Zamania	25.374231	83.544083	Gajipur	U.P	UPPCL	132 KV	57
2		Dumraon	25.571685	84.142882	Dumraon	Bihar	SBPDCL	132 KV	4
3		Ara	25.550561	84.67292	Arah	Bihar	SBPDCL	132 KV	4
4		Danapur	25.582015	85.04564	Khagoul	Bihar	SBPDCL	132 KV	1
5		Jahanabad	25.186422	84.984907	Jehanabad	Bihar	SBPDCL	132 KV	0
6	Lukhisarai	Khushroopur	25.485244	85.387659	Fatuha	Bihar	SBPDCL	132 KV	15
7		Mokama	25.392106	85.91419	Hatidah	Bihar	SBPDCL	132 KV	0
8		Luckeesarai	25.173039	86.092171	Luckhisarai	Bihar	SBPDCL	132 KV	4
9		Jhajha	24.767951	86.391983	Jamui	Bihar	SBPDCL	132 KV	38
18		Shankarpur	86.6377979	24.4391859	Baidyanath Dham	jharkhand	JUSNL	132 KV	8.80
19		Jamtara	23.956994	86.812246	Jamtara	jharkhand	JUSNL	132 KV	0.90
10	Pusauli/ Gaya	Gaya	24.803242	84.999769	Bodhgaya	Bihar	BSPTCL	220kV	6
11		SonNagar	24.882665	84.230187	Sonnagar	Bihar	BSPTCL	220kV	3
12		Rafiganj	24.820701	84.636464	Kaikaf	Bihar	BSPTCL	220 KV	10
13		Paharpur	24.627119	85.204086	Bodhgaya	Bihar	SBPDCL	132 KV	35
14		Koderma	24.439814	85.517085	Koderma	jharkhand	DVC	132 KV	0.5
15	Maithon/D urgapur	Hazaribagh Rd	24.181143	85.886921	Konar	jharkhand	DVC	132 KV	35
16		Nimiaghat	23.933776	86.075386	Nimiaghat	jharkhand	DVC	132 KV	0.5
17		Pradhankhanta	23.772310	86.516885	Sindri	jharkhand	DVC	132 KV	20
20		Kumardhubi	23.747561	86.793549	Kumardhubi	jharkhand	DVC	132 KV	0.65
27		Kali Pahari	23.665212	87.016251		W.B	Under construction		
21		Waria	23.538278	87.246715	DTPS	W.B	DVC	132 KV	0.87
22	Subhashgr am	Bardhman	23.249832	87.869508	Bardhman	W.B	DVC	132 KV	1.9
23		Belmuri	22.936608	88.150029	Belmuri	W.B	DVC/WBSEB	132 KV	0.6
24		Dankuni	22.678228	88.290773	Liluah	W.B	WBSEB	132 KV	10.5
25		Bandel	22.922770	88.377676	Adisapatgram	W.B	WBSEB	132 KV	0.3
26		Belur	22.635744	88.3398	Liluah	W.B	WBSEB	132 KV	2.5

No. 15/1/2013-Trans
Government of India
Ministry of Power
Shram Shakti Bhawan, Rafi Marg,
New Delhi - 110001

Dated, 15th July, 2015

ORDER

Subject: - Policy for incentivizing early commissioning of Transmission projects.

The undersigned is directed to say that the Hon'ble Minister of State (IC) for Power has approved the Policy for incentivizing early commissioning of Transmission projects w.e.f. 12.06.2015 as given below:

1.1 For transmission system strengthening schemes under Tariff Based Competitive Bidding (TBCB) and also for such schemes awarded to PGCIL under compressed time schedule on cost plus basis, the developer shall get the following incentive for early commissioning of transmission project(s).

- (i) Entitlement of the transmission charges from the actual date of Commercial Operation (COD) prior to the original scheduled COD. However, the number of years of applicability of tariff would remain unchanged i.e. for 25/35 years, as the case may be.

Note: The above incentive will be applicable for the transmission project(s)/ element(s) which are under implementation / yet to be bid out under TBCB / yet to be assigned to CTU (PGCIL) under compressed time schedule.

2. It is requested that the aforesaid Policy may be disseminated to all the stakeholders for information and necessary action.



(S. Venkateshwarlu)
Under Secretary (Trans)
Tele.No.2332 5242
Email:transdesk-mop@nic.in

To

1. Chairperson, CEA.
2. Secretary, CERC – Also requested to make necessary changes in the Regulations of CERC, if necessary, for smooth implementation of the Policy.
3. Principal Secretary / Secretary (Energy/Power) of all States/UTs (as per list attached)
4. CMD, PGCIL, Gurgaon.
5. CEO, REC Transmission Projects Company Ltd., New Delhi.
6. CEO, PFC Consulting Limited, New Delhi.

No. 15/1/2013-Trans
Government of India
Ministry of Power
Shram Shakti Bhawan, Rafi Marg, New Delhi- 110001

Dated, 5th October, 2016

OFFICE MEMORANDUM

Subject: - Constitution of Committee to ensure smooth operationalization of the Policy for early commissioning of Transmission Projects, issued by Ministry of Power on 15.7.2015

The undersigned is directed to inform that it has been decided with the approval of Competent Authority to constitute a committee to ensure smooth operationalization of the Policy for incentivizing early commissioning of Transmission Projects, issued by Ministry of Power on 15.7.2015.

2. Composition of the Committee shall be as mentioned below:

Sl. No.	Constituent of the Committee	Capacity
1	Member (Power System), CEA	Chairperson
2	COO (CTU- Plg), PGCIL	Member
3	CEO, POSOCO	Member
4	Chief Engineer, PSPA- II, CEA	Member
5	Chief Engineer, PSPA- I, CEA	Convener & Member Secretary
6	Representatives of STUs of concerned State Utilities, LLTTC and Generation project developer (if ATS)	As invitees (as the case may be)
7	Representatives of the transmission project developer	As invitee

3. D. Committee shall look into and resolve various issues related to Policy for incentivizing early commissioning of Transmission Projects in respect of various ISTS lines, as per following mechanism:

Transmission licensee may send their request for revised early Scheduled Commercial Operation Date (SCoD) well in advance (i.e. 24 months in advance of the intended early SCOD) to the Convener & Member Secretary of the committee and communicate the same to the implementing agencies of the interconnecting (upstream/ downstream) elements.

(ii) The Committee, will discuss the early SCoD request received from transmission licensee and may take a decision on early commissioning, based on usefulness of the early commissioning for the system and mutual indemnification agreements between Transmission Licensee/ STU/ POWERGRID/ existing Transmission Licensee/ Generation developer, as the

h. Tiwari
Sh. Rajesh
open a file for
dealing with
items
6/10/16
1/11/16

case may be, whose transmission elements/assets are involved. Accordingly, the committee would state the Revised SCOD (RSCOD) and the TSA would stand modified mutatis mutandis.

- (iii) PSPM Division of CEA may convene quarterly meetings to review the progress of the transmission elements involved in the early commissioning and assess their commissioning in matching RSCOD. The deviations may be brought to the notice of the committee.
- (iv) In case of non- availability of interconnecting elements as per the agreed RSCOD, Committee may explore the alternative arrangement for utilization of Transmission element. The effected parties may seek recourse as per the Indemnification Agreements.


57x/16
(Bihari Lal)

Under Secretary to the Govt. of India

Tele-fax: 2332 5242

E-mail: transdesk-mop@nic.in

To,

1. Member (PS), Central Electricity Authority
2. Chief Engineer, PSPA- I, CEA
3. Chief Engineer, PSPA- I, CEA
- ✓ 4. Chief Engineer, PSPM, CEA
5. COO (CTU- Plg), PGCIL
6. CEO, POSOCO, New Delhi.

Copy to: PPS to Secretary(Power)/ SS(BPP)/ AS (SP)/ JS(Trans)/ Director (Trans),
MoP.

**Minutes of meeting between NPCIL, GETCO and POWERGRID held at NPCIL kakrapar on
12/01/2017**

In light of discussion held during 41st standing committee meeting of western region at New Delhi on 21st Dec'16, where it was agreed to have a joint meeting at NPCIL Kakrapar to discuss contingency scheme for interconnecting 400 kV D/C Kakrapar – Navsari and Kakrapar - Vapi lines using 400 kV bus at Kakrapar 3&4 switchyard. Members from Power Grid, GETCO and NPCIL met on 12th Jan'17 at NPCIL Kakrapar. Following were present:

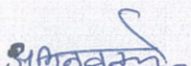
M/s PGCIL	M/s GETCO	M/s NPCIL
Sh. Rajesh Kumar , GM (Project-II)	Sh. S. A. Patel, SE, Testing	Sh. S. B Joshi, ACE (E)
Sh. Abhinav Verma, DGM (PESM)	Sh. D. N Shah, EE, Testing	Sh. M CHENTHAMARAKSHAN, MS
Smt. M Kalaimathy, DGM (Navsari)	Sh. Dipak Patel, Dy Engg.	Sh. P K Gupta, SME (E)
Sh. Sumit Khare, Manager (Engg.)	Sh. R. K Trivedi, JE, Testing	Sh. Sandeep Sarwate, ACE (Transmission)
Sh. Satyajeet Gupta, Sr. Engineer (Navsari)		Sh. Devendra Kumar, SO/F (E)
Sh. Priyam Jain, Engr (PESM)		Sh. D. A. Panjwani, TO/E (E)
Sh. Manish Chaudhari, JE (Navsari)		

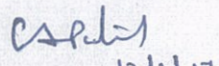
In view of standing committee direction to utilize the assets as early as possible for strengthening the Grid, Joint Switchyard visit was carried out by Power Grid, NPCIL and GETCO. It has been observed that charging of lines (Vapi – Kakrapar – Navsari line) as one element can be done by slight modification in switchyard stringing. However, NPCIL stated that modification will require designer concurrence and only after this, such modification can be taken up. In view of total time envisaged for this, they intend to complete entire switchyard scheme at the earliest.

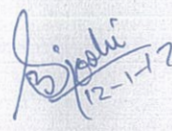
During the meeting the status of 400 kV switchyard at NPCIL Kakrapar was deliberated. Power Grid informed that no load charging of 400 kV Kakrapar – Vapi line has been done on 31/12/2016 and 06/01/2017. 400 kV D/C Navsari – Kakrapar line shall be ready for no load charging by 25th Jan'17 in view of that M/s Power Grid requested to complete the commissioning accordingly. NPCIL informed that they will make all efforts to commission the bays as early as possible and keep PGCIL informed on commissioning activity completion date.

Most of the 400 kV switchyard erection is completed and commissioning is under progress. In view of balance works at hand NPCIL informed that line bays at Kakrapar switchyard shall be ready for charging by 30/04/2017.

Once commissioning of lines and switchyard bays shall be over, power flow from Vapi to Navsari and vice versa shall be established.


PGCIL 12/1/17


GETCO 12/1/17


KAPP-3&4 Site


NPCIL Transmission Group



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 भवन, आर.के.पुरम, नई दिल्ली - 110066
 Sewa Bhawan, R. K. Puram, New Delhi-110066
 वेबसाइट / Website: www.cea.nic.in
 email: psandpa1.cea@gmail.com



सं/ No. 26/10/2017/PSP&PA-I/106 (1- 5)

दिनांक /Date: 14.02.2017

सेवा में / To

1. COO (CTU), PGCIL, Saudamini, Plot No. 2, Sector-29, Gurgaon - 122 001
2. The Managing Director, GETCO, Sardar Patel Vidyut Bhawan, Race Course, Baroda-390007 Fax 0265-2338164
3. Chief Project Officer, Gujarat Power Corporation Limited (GPCL), Block No. 6 & 8, Udyog Bhavan, Sector 11, Gandhi Nagar, Gujarat -382011

विषय: बनासकांठा सोलर पार्क के लिए ऊर्जा निकासी प्रणाली की समीक्षा के बारे में गांधी नगर, गुजरात में 17.01.2017 को आयोजित बैठक का कार्यवृत्त- संबंध में

Sub: Minutes of the meeting held on 17.01.2017 at Gandhi Nagar, Gujarat regarding the review of power evacuation system for Banaskantha Solar Park – reg.

महोदय / महोदया / Sir / Madam,

Please find an enclosed minutes of meeting on held on 17.01.17 at Gandhi Nagar to review the evacuation system for Banaskantha (Radhanesda) Solar Park.

भवदीय / Yours faithfully,

संलग्न /Encl. - यथोपरि / as above

(अवधेश कुमार यादव / Awdhesh Kumar Yadav)
 (निदेशक / Director)

(Handwritten signature and date)
 14/02/2017

प्रतिलिपि / Copy to:

1. सदस्य / Member (Power System), के वि प्रा / CEA
2. मुख्य अभियन्ता / Chief Engineer, PSP & A – I, के वि प्रा / CEA

Minutes of Meeting on Transmission system for Banaskantha (Radhanesda) Solar Park held on 17.01.17

In the 41st meeting of standing committee on Power System Planning in WR held on 21.12.16, it was decided that a meeting shall be held amongst CEA, CTU, SPPD (GPCL) & GETCO to discuss and review the transmission system for Banaskantha (Radhanesda) Solar Park. Based on the decision, a meeting was held on 17.01.17 at Gandhinagar, Gujarat in GPCL office. The List of participants are enclosed at ***Annexure-I***

1. M/s GPCL informed that the present installed capacity of solar generation projects in Gujarat is 1122 MW. As per existing regulation the renewable power purchase obligation is 1.75% of the energy consumed whereas the National Tariff Policy specifies for renewable power purchase obligation of 8% by 2021-22. For meeting this obligation additional solar generation capacity addition of 4790 MW is required. To meet this requirement GPCL, in addition to Radhanesda Solar Park (700 MW) have planned another solar Park (500 MW) at vill. Harsad in distt Banaskantha. Apart from these solar capacity addition of 150 MW and 200 MW may also come up near Radhanesda and near Harshad solar parks respectively. Govt of Gujarat has already requested MNRE for in principle approval of 500 MW Harsad Solar Park (copy of letter enclosed at ***Annex-II***).
2. GPCL, the Solar Power Park Developer, made a presentation on the developmental plan of Radhanesda (Banaskantha) Solar Park (700 MW). M/s GPCL informed the commissioning schedule of Radhanesda (Banaskantha) & Harsad Solar Parks as Dec'18 and Mar'20 respectively. GPCL requested that a 220/400kV common pooling station may be established adjacent to the Banaskantha (Radhanesda) Solar Park as part of ISTS under transmission scheme for Banaskantha (Radhanesda) Solar Park where the power from the Radhanesda and Harshad solar park could be pooled. GPCL also confirmed that 220kV connectivity line(s) emanating from 220kV Solar park pooling station upto the 220/400kV common pooling station shall be under their scope as part of its internal infrastructure. GPCL also confirmed that sufficient land is available for establishment of 400/220 kV pooling station in the land which has already been acquired for setting up the Radhaneshda solar park.
3. Director, CEA stated that in view of the relative geographical location of Radhanesda Solar Parks, proposed Harsad solar park, Banaskantha PS (765/400 kV) as well as nearby GETCO load centers like Tharad etc., it would be prudent that the 220/400kV common pooling station, as a part of evacuation system for Radhanesda solar park, is optimally located both for the Solar Parks to build their connectivity transmission line upto the pooling station as well for GETCO to build lines to their load centre from the pooling station.
4. Chief Manager, POWERGRID informed that in view of short gestation period of solar generation, GPCL/Govt of Gujarat shall have to facilitate in getting suitable land for setting up of such substation for its expeditious implementation. GPCL confirmed to explore such land availability in a week's time based on which decision for location of 220/400kV common pooling station shall be taken.

5. Further, it was decided that considering harsh/saline landscape in Banaskantha region of Gujarat, the 220/400kV pooling station should be constructed as GIS. Considering Radhanesda solar park capacity, 2x500 MVA, 220/400kV transformers should be provided. Space provision for additional 1x500 MVA transformer shall also be kept for future.
6. GETCO/GPCL informed that based on the data gathered from Charanka solar park, the maximum injection from Radhanesda solar park would be 630 MW (90% of 700 MW). CEA opined that for this injection 220 kV D/C line with AL-59 would be sufficient. GETCO stated that for normal evacuation of power, a 220 kV D/C line with AL-59 conductors would be sufficient but in case outage of one line during maintenance works may require restriction of injection from the solar park. To avoid this, one more 220 kV S/C or 220 kV D/C would be required for injection of 630 MW of power from Radhanesdasolar park. M/s GPCL indicated that they would need 4 nos. 220kV injection bays at 220/400kV common pooling station, for injection of power from Radhanesda solar Park (700 MW). In addition, space provision for additional 4 nos. 220kV line bays for future generation injection (through Harsad SP etc) may also be kept. GETCO informed that to feed nearby loads, space provision of additional 4 nos. 220kV line bays for future may also be kept. PGCIL indicated with above scope, tentatively about 18-20 acres land shall be required for 220/400kV GIS pooling station.
7. GETCO also proposed that in view of the high voltage in that area, 1x125 MVAR, 400kV Bus reactor should be provided at 220/400kV pooling station. GETCO also informed that they have adopted AL-59 conductor for all its 220kV & 400kV transmission lines as its current carrying capacity is 30% more, whereas incremental cost is only 5-10 %. Further considering upcoming Harsad SP (500 MW), 400kV D/c (twin moose) may not be sufficient and conductor should be AL-59 or higher capacity. Considering above, it was decided that conductor for 400kV Banaskantha (Radhanesda) PS- Banaskantha (PG) SS D/c (twin) line shall be AL-59.
8. CEA stated that in the 41st SCM, GETCO has indicated the requirement of two nos. of 220 kV bays at 400/220 kV pooling station to feed their proposed 220 kV substation (Rah or Mithi Paldi based on the location of pooling station) in the 2020 time frame. CEA requested GETCO to prepone the implementation of substation and the 220 kV D/C line so that the two nos. of 220 kV bays for GETCO at the pooling could be implemented in the matching time frame of Radhanesda solar park. GETCO confirmed that they would implement the Rah or Mithi Paldi 220 kV substation along with the interconnecting lines in 2020 time frame and the requirement of the two nos. 220 kV bays at the pooling station would also be in 2020 time frame. Accordingly provision may be kept for future but should not be covered for immediate implementation.
9. PGCIL informed that GPCL is yet to submit construction phase BG for Radhanesda (Banaskantha) Solar Park. GPCL assured that once the modified scheme is finalised and approved by SCM, upon receipt of approval of Scheme as agreed above, the BG will be submitted latest by 28.02.17. GPCL also agreed that scope of 220kV D/c connectivity line from Harsad Solar Park including terminating bays at both ends shall be under their scope.

10. The decisions of made in the meeting are summarised below:

- i. Transmission system for 700 MW Banaskantha (Radhanesda) Ultra Mega Solar Park Project (UMSPP)
 - a) Establishment of 2x500MVA, 400/220kV pooling station at Banaskantha (Radhanesda) [GIS] along with 1x125MVAr bus reactor
 - b) 4 nos. 220kV line bays at 400/220kV at Banaskantha (Radhanesda) pooling station for Solar Park Interconnection.
 - c) Banaskantha (Radhanesda) Pooling Station –Bansakantha SS (PG) 400 kV D/c (twin AL59) line
 - d) 2 Nos. of 400kV line bays each at Banaskantha (PG) SS & Banaskantha (Radhanesda) PS.
 - e) Provision of space for 8 nos. 220 kV bays (4 nos. for solar injection and 4 nos. of GETCO drawal)
 - f) Provision of space for future 400/220kV, 1X500 MVA ICT along with bays.
- ii. GPCL confirmed to identify the land (of about 20 acres) between Radhanesda solar park and proposed Harshad solar park for setting up the 220/400 kV pooling station in a week's time based on which decision for location of 220/400kV common pooling station shall be taken.
- iii. GPCL assured that once the modified scheme is finalised and approved by SCM, the BG will be submitted latest by 28.02.2017.
- iv. GETCO would require the two nos. of 220 kV bays at the 400/220 kV pooling station in 2020 time frame. Accordingly provision may be kept for future but should not be covered for immediate implementation.

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Annexure-I

List of participants for the meeting regarding evacuation system for 700 MW Ultra Mega Solar Park at Radhanesda & proposed 500 MW Solar Park (New) held on 17.01.2017 at 14.00 Hrs. in Gandhi Nagar.

S.NO.	Name of the Participants	Designation	Organization	Mobile No.	e-mail ID
1.	Rajendra Mistry	CPO	GPCL	9978407405	rajendramistry@gpclindia.com
2.	P.H.Rana	Director	GPCL	9879200603	rana.praful90@gmail.com
3.	Awdhesh Kumar Yadav	Director	CEA	9868664087	awd.cea@gmail.com
4.	Kashish Bhambani	CM	PGCIL	9971399117	kashish@powergridindia.com
5.	N.P.Jadav	SE(STU)	GETCO	9978934918	stu.getco@gebm ail.com
6.	Dipak. H.Patel	DE(STU)	GETCO	9925213273	desystem@gebm ail.com
7.	D.R.Ghodakiya	JE(STU)	GETCO	9687662092	jeengg2.getco@gebm ail.com

Sujit Gulati, IAS
Additional Chief Secretary



सत्यमेव जयते

Energy & Petrochemicals Department
Government of Gujarat

SLR-112016-UMSP-84-B

Date : 7-1-2017

Subject: Setting up of Ultra mega Solar Parks at Radhanesada (700 MW) and Harsad (500 MW) villages in Gujarat

Dear *Shri Kapoor*

Following the success of Gujarat Solar Park at Charanka, Gujarat has planned two more solar parks: one at Vil. Radhanesada (Ta. Vav, Dist. Banaskantha) for 700 MW UMSP and the other at Vil. Harsad, (Ta. Suigam, Dist Banaskantha) for 500 MW UMSP. We intend to establish the solar projects within these solar parks under SECI's existing NSM Phase-II, Batch-IV Scheme. The generated solar energy from these two parks will be off-take by Gujarat.

In view of the above, we seek the following from MNRE:

- 1) Approval of tariff of Rs. 3.75 per kWh and VGF of up to Rs.1 Crore/ MW for the 700 MW solar power projects to be developed at the Radhanesada Solar Park, which may be undertaken through competitive bidding managed by SECI.
- 2) 'In-principle' approval for establishing a 500 MW Solar Park at Vil. Harsad, Ta. Suigam, Dist. Banaskantha under the Solar Park Scheme of MNRE.
- 3) Approve the tariff of Rs. 3.75 per kWh with a VGF of up to Rs. 1 Crore/ MW for the proposed 500 MW Solar Park at Vil. Harsad, wherein the solar power projects may be undertaken through competitive bidding managed by SECI.
- 4) 'In-principle' approval to provide the connectivity under both the solar parks (i.e. 700 MW at Vil. Radhanesada, and 500 MW at Vil. Harsad) under the Inter State Transmission System.

A detailed proposal for the same with necessary justification is attached at Annexure I to III. We look forward to your kind consideration and approval on these matters.

With regards,

Yours

Sujit Gulati
(Sujit Gulati)

Enc: as above

To,
Shri Rajeev Kapoor, IAS
Secretary to Government of India
Ministry of New and Renewable Energy,
Block-14, CGO Complex, Lodhi Road, New Delhi-110 003, India.