



भारत सरकार / Government of India  
विद्युत मंत्रालय / Ministry of Power  
केन्द्रीय विद्युत प्राधिकरण / Central Electricity Authority  
विद्युत प्रणाली योजना एवं परियोजना मूल्यांकन प्रभाग - I  
Power System Planning & Project Appraisal Division-I  
सेवा भवन आरण केण पुरम नई दिल्ली-110066



Sewa Bhawan, R. K. Puram, New Delhi-110066  
वेबसाइट / Website: www.cea.nic.in

[ISO: 9001:2008]

क. सं. : 26/10/2016- वि प्र. यो. प. मू./269-282

दिनांक: 21 जून, 2016

24.06.2016

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

विषय :- पश्चिमी क्षेत्र विद्युत प्रणाली योजना की स्थाई समिति की 40 वीं बैठक का कार्यवृत्त ।

### महोदय / महोदया,

पश्चिमी क्षेत्र विद्युत प्रणाली योजना की स्थाई समिति की 39वीं 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  
केकेआर  
के के अर्या  
मुख्य अभियंता



भारत सरकार / Government of India  
विद्युत मंत्रालय / Ministry of Power  
केन्द्रीय विद्युत प्राधिकरण / Central Electricity Authority  
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No. 26/10/PSP&PA-I/2016/ 269-282

Date: 21.06.2016

24.06.2016

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

**Sub:** Minutes of the 40<sup>th</sup> Standing Committee meeting on Power System Planning of Western Region

**Sir / Madam,**

The minutes of the 40<sup>th</sup> Standing Committee meeting on Power System Planning of Western Region held on 01.06.2016 at New Delhi, is available on CEA website ([www.cea.nic.in](http://www.cea.nic.in)) at the following link: <http://www.cea.nic.in/compsplanning.html> (i.e. Home page-Wings-Power Systems-PSP&PA-I - Standing Committee on Power System Planning-Western Region).

Yours faithfully,



(K K Arya)  
Chief Engineer

## Minutes of the 40<sup>th</sup> Meeting of Standing Committee on Power System Planning in Western Region held on 01.06.2016 at NRPC, Katwaria Sarai, New Delhi

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Member (Power System), CEA welcomed all the participants to the 40<sup>th</sup> meeting of Standing Committee on Power System Planning in Western Region. He informed that the SCM of NR was held on 30.05.2016 and the SCM of ER is scheduled to be held in the 2<sup>nd</sup> week of June 2016. The agreed schemes in the SCM would be put to Empowered Committee on Transmission for their implementation. The list of participants is enclosed at Annexure – 1.

Chief Engineer (PSP&PA - I), CEA welcoming the participants requested members to be specific in their deliberation so that decision could be arrived at. He requested Director (PSP&PA-I), CEA to take up agenda items.

### 1. **Confirmation of the minutes of 39<sup>th</sup> meeting of the Standing Committee on Power System Planning in Western Region (SCPSPWR) held on 30<sup>th</sup> November 2015 at NRPC, Katwaria Sarai, New Delhi.**

1.1. The minutes of the 39<sup>th</sup> SCPSPWR were issued vide CEA letter No.26/10/2015-PSP&PA-I/ 1- 15 dated 28<sup>th</sup> December 2015.

1.2. WRLDC sought clarification about the no. of circuits to be bypassed at Sasan switchyard. It was clarified that initially LILO of both ckts of Vindhyachal – Jabalpur 400 kV D/C line was done at Sasan. LILO of one ckt. of Vindhyachal – Jabalpur 400 kV D/C line at Sasan was bypassed and the two nos. of 400 kV bays vacated was used for termination of Vindhyachal Pool - Sasan 400 kV D/C line. LILO of other ckt. of Vindhyachal – Jabalpur 400 kV D/C line was to be retained at Sasan with suitable switching arrangements at Sasan 400 kV switchyard to meet its starting power requirements in future subsequent to development of 765 kV system from Sasan. Now the 765 kV system at Sasan has been implemented, the LILO at Sasan has to be bypassed with suitable switching arrangement. Normally it would be Vindhyachal – Jabalpur 400 kV D/c line, and in case grid requirements it could be converted into LILO of one ckt. of Vindhyachal – Jabalpur 400 kV D/C line at Sasan, with the switching arrangement.

1.3. With the above clarifications the minutes of the 39<sup>th</sup> SCPSPWR circulated CEA letter No.26/10/2015-PSP&PA-I/ 1- 15 dated 28<sup>th</sup> December 2015 were confirmed.

### 2. **Review of Progress on Earlier Agreed Transmission Schemes.**

2.1. The status of implementation of transmission projects under tariff based competitive bidding in Western Region are enclosed at **Annexure-2**. The status of transmission schemes under implementation by POWERGRID in Western Region is enclosed at **Annexure-3**.

- 2.2. Director (PSP&PA-I), CEA stated that a request has been received from GETCO vide letter no. STU/CEA/DGEN/511/593 dated 30.04.2015 for expediting the commissioning of Navsari (PG) – Bhestan (Popada-GETCO) 220 kV D/C line, as the existing Navsari (PG) - Navsari (GETCO) 220 kV line are getting critically loaded in real time grid operation with injection of power from DGEN TPS at Navsari (PG). This line is part of the scheme “Transmission System associated with DGEN TPS (1200 MW) of Torrent Power Ltd.” being implemented by M/s Instalaciones Inabensa. The implementation schedule of the scheme is 38 months i.e. May, 2018. Implementation of 2 nos. of 220 kV bays at Navsari (PG) is under the scope of M/s POWERGRID and implementation of 2 nos. of 220kV bays at Bhestan (Popada) is under the scope of GETCO. So, for expediting the commissioning of 220 kV Navsari (PG) – Bhestan (Popada) line, all the three elements viz. 220 kV line, 2 nos. of 220kV line bays at Navsari (PG) and 2 nos. of 220kV line bays at Bhestan (Popada), which are being implemented by three different agencies, needs to be expedited.
- 2.3. GETCO stated that the two nos. of 220 kV line bays at Bhestan (Popada) has already been completed. POWERGRID informed that the commissioning of 220 kV bays at Navsari will be done in the matching timeframe of the 220 kV D/C line i.e. May 2018.
- 2.4. The issue was further deliberated. The high loading of more than 220MW on Navsari (PG) – Navsari (GETCO) 220 kV D/C line has also been reported in the operation feedback of NLDC for the period January – March 2016. Therefore, early commissioning of the Navsari (PG) – Bhestan (Popada) 220 kV D/C line was required to take care of the high loading being observed on the existing Navsari (PG) – Navsari (GETCO) 220 kV D/C line feeding loads of south Gujarat. It was agreed that CEA would coordinate with all the three implementing agencies namely, M/s Instalaciones Inabensa, GETCO and POWERGRID for early commissioning of the Navsari (PG) – Bhestan (Popada) 220 kV D/C line.

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

- 3.1. Director (PSP&PA-I), CEA stated that in the 25<sup>th</sup> SCM of WR held on 30.09.2006 the following scope of works were agreed, which are being implemented by PGCIL as Western Regional system strengthening scheme (WRSS –V):
  - (i) 400kV Vapi – Navi Mumbai D/C line.
  - (ii) LILO of 400kV Lonikhand/Pune – Kalwa line at Navi Mumbai.
  - (iii) Establishment of 400/220kV 2X315MVA new (GIS) at Navi Mumbai.
  - (iv) 220kV Vapi – Khadoli D/C line.

The 220 kV transmission lines from Navi Mumbai 400/220 kV substation namely , LILO of Apta – Kalwa 220kV S/C line and Kandalgaon– Kharghar 220kV S/C line at Navi Mumbai, was to be implemented by MSETCL.

Further, in 27<sup>th</sup> SCM of WR held on 30.07.2007, Pune (PG) – Navi Mumbai (PG) 400kV D/C line was agreed as a regional system strengthening scheme in Western Region to be implemented in time frame of Krishnapatnam UMPP, but subsequently, the scheme was dropped in the 32<sup>nd</sup> SCM of WR held on 13.05.2011 due to severe RoW constraints envisaged during implementation. In the 35<sup>th</sup> SCM of WR held on 03.01.2013, the following were agreed:

- (i) LILO of Kharghar – Padghe section of Lonikhand – Kalwa line-1 at Navi Mumbai instead of LILO of Lonikhand/ Pune – Kalwa 400kV S/C line-2 as agreed under WRSSS – V. It was also agreed for laying of 1.5km of 400kV underground cable near gantry of Navi Mumbai sub station with an estimated cost of Rs 55 crores to expedite the implementation of LILO arrangement which was held up due to severe RoW issues.
  - (ii) In view of severe RoW problem termination of 400kV Vapi – Navi Mumbai D/C line at Kudus S/s of MSETCL was agreed and PGCIL was to continue their efforts for completing the balance portion of the Vapi – Navi Mumbai 400kV D/C line.
- 3.2. He further stated that, in view of the above developments, MSETCL in the 38<sup>th</sup> SCM of WR held on 17.07.2015 had suggested to shift the Navi Mumbai 400 kV substation to some other suitable location as there was no direct ISTS source to feed Navi Mumbai and the LILO of Kharghar – Padghe 400 kV line at Navi Mumbai, which is presently under implementation would only recirculate the power from intrastate network of MSETCL.

In the 38<sup>th</sup> SCM of WR it was agreed that CEA, CTU and MSETCL would carry out joint study for exploring effective utilization of Navi Mumbai 400 kV substation and put a proposal in the next standing committee meeting. Accordingly, based on the system studies, the following system is proposed for providing an ISTS feed and effective utilization of Navi Mumbai:

- (i) Padghe (765/400kV) – Navi Mumbai 400kV D/c (Quad) line
- (ii) 1x500MVA, 400/220kV 3<sup>rd</sup> ICT at Navi Mumbai S/s
- (iii) Installation of 220/33kV Transformer at Navi Mumbai substation and planning of 33kV outlets from Navi Mumbai substation in coordination with DISCOM / MSEDCL.

The study shows that power flow on Navi Mumbai – Kharghar 400 kV S/C line (approximately 20 km in length), formed after LILO of Padghe – Kharghar 400kV S/C line at Navi Mumbai, is about 1025 MW. This loading may be reduced with shifting of load from Kharghar and Kalwa area to Navi Mumbai. The same needs to be identified and carried out by MSETCL.

MSETCL comments/ feedback was requested on the study report for utilization of Navi Mumbai so that the same could be incorporated in the proposal but no comments have been received from MSETCL.

- 3.3. MSETCL representative stated that the study shows high loading on the Navi Mumbai – Kharghar line 400 kV S/C line. Therefore the proposal needs to be reviewed. In Mumbai area the main issue is severe ROW problem for laying of the transmission lines and the proposed Padghe (PG) – Navi Mumbai 400kV D/c (quad) line shall also encounter severe ROW problems and it may be very difficult to construct the line. Even for laying of the 220 kV lines there is no RoW available.
- 3.4. CTU clarified that the high loading on Navi Mumbai – Kharghar 400 kV S/C line observed in the studies may be reduced with shifting of load from Kharghar and Kalwa area to Navi Mumbai. Also load distribution in Mumbai area in the power flow file needs to be fine-tuned in consultation with MSETCL.

- 3.5. Director (PSP&PA-I), CEA stated the studies shows that the Kalwa and Kharghar 400 kV substations are loaded to their limit and the Navi Mumbai 400 kV substation along with 400 kV feed from Phadge (PG) relieves the loading on Kalwa and Kharghar 400 kV substations. Navi Mumbai 400 kV substation has been created right at the load centre and the above proposal providing ISTS feed from Phadge(PG) would be implemented through tariff based competitive bidding route. The proposal needs to be supported by all for early finalization and implementation of the project.
- 3.6. POSOCO representative stated that the focus should be on completion of LILO of Kharghar – Padghe 400 kV line at Navi Mumbai, which is under implementation and the 220kV connectivity from Navi Mumbai. The 220 kV connectivity lines need not be linked with implementation of proposed 400 kV ISTS feed to Navi Mumbai substation (Padghe (PG)) and it needs to be taken up on priority by MSETCL.CEA stated that the implementation of 220 kV outlets from Navi Mumbai 400/220 kV substation is yet to be taken up by MSETCL due to RoW issues and without the 220 kV outlets, the 400/220 ICTs at Navi Mumbai substation would not be utilized.
- 3.7. COO (CTU) stated that the 400 kV ISTS feed through Phadge (PG) will take some years but till then, the already completed assets (transformers at Navi Mumbai along with 220 kV bays) at Navi-Mumbai S/s should be used by MSETCL and it would relieve the over loading of Kharghar and Kalwa s/s of MSETCL. She added that the Navi-Mumbai S/s has been created after the consent of western region constituents including Maharashtra and MSETCL needs to put its efforts for completing the 220 kV outlets from Navi Mumbai.
- 3.8. After further deliberation, it was agreed that CEA, CTU and MSETCL would carry out joint studies to examine and finalise the scheme proposed within 15 days. The finalized proposal would be then taken up for further discussion at management level in CEA, CTU & MSETCL.

#### 4. **Interconnection between CGPL UMPP and Adani Mundra STPS in Gujarat.**

- 4.1. Director (PSP&PA-I), CEA stated that the issue of interconnection between CGPL UMPP and Adani Mundra STPS was discussed in 38<sup>th</sup> SCM of WR held on 17.07.2015 wherein it was decided that the issue would be studied jointly by CEA, CTU and GETCO. Subsequently, in the meeting held in CEA on 09.10.2015, it was observed that CGPL UMPP and Adani Mundra STPS were already interconnected through the Adani Mundra STPS – Versana – Bachau – CGPL UMPP 400 kV link which was about 200 km long, however need was felt for a direct interconnection between the two plants, which are adjacent to each other and it was agreed to hold a meeting at Adani Mundra STPS / CGPL UMPP so that physical feasibility of the possible interconnection may also be examined.

Accordingly, a meeting was held on 17.02.2016 at Adani Mundra STPS Gujarat. The possible interconnections identified are as given below:

- (i) Provision of 400/220 kV,315 or 500 MVA transformer along with one no. of 400 kV bay and one no. of 220 kV bay at M/S CGPL 400 kV / 220 kV switchyard.

The space for provision of transformer and bays are available at CGPL switchyard. The transformer would be normally kept disconnected either at 400 kV side or 220 kV side. In case of emergency start up power could be extended from Nanikhakar 220 kV substation to 400 kV CGPL bus.

- (ii) LILO of Adani Mundra STPS -Varsana 400 kV S/C line -1 at CGPL UMPP 400 kV switchyard. Implementation of this alternative would require one or two nos. of 400 kV bays at CGPL switchyard. The LILO line has to cross two nos. of 220 kV D/C lines emanating from Adani Mundra switchyard and three nos. of 400 kV D/C lines emanating from CGPL switchyard.
- (iii) A direct 400 kV interconnection between CGPL UMPP and Adani Mundra STPS.

For implementation of this 400 kV S/C line, one 400 kV line bay each at Adani Mundra STPS and CGPL UMPP is required. Space for bays are available at both the switchyard but there are constraints in taking out the line from the Adani Mundra STPS 400 kV switchyard. This line has to cross Mundra - Mahendragarh HVDC line, Adani Mundra STPS to Earth electrode station line, three nos. of 400 kV D/C lines, two nos. of 220 kV lines emanating from Adani Mundra switchyard and three nos. of 400 kV D/C lines emanating from CGPL switchyard.

He requested members to finalize one of the above three alternatives as interconnection between CGPL UMPP – APL Mundra TPS.

- 4.2. CTU enquired whether another interconnection between CGPL UMPP and Adani Mundra STPS is required as they are already connected through Adani Mundra STPS – Varsana – Bhachau – CGPL UMPP 400 kV link. POSOCO stated that startup power to CGPL Mundra could be provided from Bachau 400 kV substation which is around 100 kms from the CGPL but for that the adequacy of the reactors available at Bachau needs to be checked.
- 4.3. Member Secretary, WRPC clarified that the issue is that although CGPL UMPP and Adani Mundra STPS are physically adjacent to each other, they are not directly connected with each other (Adani Mundra STPS – Varsana – Bhachau – CGPL UMPP 400 kV link is about 200 km in length). Therefore there is a need for direct link that could interconnect both the plants whenever required, say for extending start up power.
- 4.4. After deliberations, members agreed on option (i) i.e. provision of 400/220 kV, 315 or 500 MVA transformer along with one no. of 400 kV ICT bay and one no. of 220 kV ICT bay at M/S CGPL 400 kV/220 kV switchyard. The direct interconnection between Adani Mundra STPS and CGPL UMPP would be normally open and would be used whenever required. Further, members agreed that the implementation modalities for the scheme may be finalized in the WRPC.

## 5. **Transmission System for Banaskantha (Radhanesda) Ultra Mega Solar Power Park in dist. Banaskanta, Gujarat (700 MW)**

- 5.1. CEA stated that Government of India has taken initiative for development of Ultra Mega Solar parks in various parts of the country. As part of above initiative,

setting up of ultra-mega solar park of 700 MW capacity has been envisaged by M/s Gujarat Power Corporation Limited (GPCL) at Radhanesda, district Banaskantha in Gujarat. A meeting was held on 02.02.16 under the chairmanship of Member (PS), CEA for evolution of transmission schemes for solar parks in Madhya Pradesh and Gujarat in Western Region. Regarding the evacuation of power from Banaskantha solar park in Gujarat, it was suggested in the meeting that if step up voltage of 400 kV was made available at solar park, then a 400 kV D/C line from Banaskantha 765/400/220 kV substation to the solar park could be planned subject to the approval by SCM of WR. Otherwise, Banaskantha solar park needs to get connected with Banaskantha 765/400/220 kV substation through 220 kV lines or 400 kV lines for evacuation of power Banaskantha Solar Power Park in Gujarat. Subsequently M/s GPCL vide letter dated 18.02.16 has conveyed their acceptance to step up at 400kV level at pooling station to set up within solar park.

- 5.2. Accordingly, the following transmission system is proposed for Banaskantha (Radhanesda) Ultra Mega Solar Park (700MW) as a part of ISTS:

**Transmission system for Banaskantha (Radhanesda) Ultra Mega Solar Park (700MW)**

- (i) Banaskantha (Radhanesda) Pooling Station – Banaskantha (PG) 400 kV D/c
- (ii) 2 nos. 400 kV line bays at Bansakantha (PG) S/S

Estimated Cost – Rs 155 Cr

*Note: 400kV Banaskantha (Radhanesda) Pooling station shall be under the scope of the SPPD along with 2 nos. 400 kV line bays for interconnection of ISTS line*

From the studies, it was observed that under its line contingency, loading on Banaskantha – Sankhari 400kV D/c line is critical. However, with bypassing of LILO of Vadavi (Ranchodpura) - Zerda (Kansari) line at 400/220kV Sankhari (GETCO) substation, loading is in order.

- 5.3. POWERGRID informed that they have received the connectivity and LTA application from M/s Gujarat Power Corporation Limited (GPCL) for its Radhanesda Solar Park in Banaskantha dist (700 MW) with target beneficiary as WR including Gujarat (GUVNL).
- 5.4. GETCO representative stated that proposed bypassing of LILO for Vadavi (Ranchodpura) - Zerda (Kansari) line (at 400/220kV Sankhari (GETCO) substation) to control the loading on Banaskantha – Sankhari 400kV D/c line would result in overloading of the 220 kV networks in Sankhari area.
- 5.5. POWERGRID informed that a meeting was convened by Principal Secretary, Energy & Petrochem dept, Govt of Gujarat on 19.05.2016 regarding 700 MW Banaskantha Solar park wherein NTPC had raised the issues of development of main pooling station (220/400kV) within Solar park by PGCIL. CMD, GPCL vide their letter dated 20.05.16 to MNRE had requested for construction of 220/400kV pooling station right next to Solar park and related connectivity line by PGCIL as it would substantially reduce the cost of solar park and thus tariff of solar power generated from this project.



- 5.6. CEA stated that for Renewable Energy Generation projects in WR, Bhuj Pooling Station – Banaskantha – Chittorgarh 765 kV D/C line along with 765/400/220kV (765/400 kV-2x1500 MVA & 400/220kV-2x500MVA) sub-station each at Bhuj Pool and Banaskantha has been planned as ISTS and are already under implementation. Three (3) voltage levels (765kV, 400 kV and 220 kV) have been provided at Banaskantha to enable Renewable Energy Generation projects to inject the power at 400 kV or 220 kV voltage level depending upon their quantum of injection. Therefore, Banaskantha solar park also needs to get connected with Banaskantha 765/400/220 kV substation through 220 kV or 400 kV lines. POWERGRID only has to take up the implementation of 400 kV bays (in case GPCL injects at 400 kV voltage level) / 220 kV bays along with 400/220 kV ICTs (in case GPCL injects at 220 kV voltage level) for termination of the lines from the Radhanesda solar park at Banaskantha (PG) PS. However, in the meeting held on 02.02.16, to facilitate GPCL it was suggested that if step up voltage of 400 kV was made available at solar park, then a 400 kV D/C line from Banaskantha 765/400/220 kV to the solar park could be planned subject to the approval by SCM of WR. Further M/s GPCL agreeing for step up voltage of 400 kV level, the above scheme has been proposed for approval of the WR constituents, otherwise, the solar park has to get connected to the Banaskantha pooling station (PG) and POWERGRID has only to implement the required ICTs / bays.
- 5.7. After further deliberations members agreed with the scheme proposed at 5.2 for Banaskantha (Radhanesda) Ultra Mega Solar Park (700MW) in Gujarat. Ministry of Power (MoP) has assigned POWERGRID to implement transmission system for Banaskantha UMSP (700 MW) in Gujarat on compressed time schedule basis.
- 5.8. Regarding the issue of bypassing of LILO of Vadavi (Ranchodpura) - Zerda (Kansari) line at 400/220kV Sankhari (GETCO) substation to control the loading on Banaskantha – Sankhari 400kV D/c line, it was decided that a separate meeting will be held for joint studies amongst GETCO, PGCIL and CEA within a fortnight.
6. **Agenda for Transmission System for Solar Power Parks in Madhya Pradesh (2250 MW)**
- 6.1. CEA stated that Government of India has taken initiative for development of Ultra Mega Solar parks in various parts of the country including Madhya Pradesh. As part of above initiative, Solar Power parks of 2000 MW capacity are being proposed to be developed by M/s Rewa ultra Mega Solar (RUMS) in Neemuch (500 MW), Mandasaur (250 MW), Shajapur (250 MW), Rajgarh (250 MW), Chatarpur (250 MW), Morena (250 MW) and Agar (250 MW) districts of MP. Power from above project is envisaged to be transferred to its various beneficiaries including MP. A meeting was held on 02.02.16 under the chairmanship of Member(PS), CEA for evolution of transmission schemes for solar parks in Madhya Pradesh and Gujarat in Western Region. Regarding the solar parks in Madhya Pradesh it was observed that Intra state Transmission System Strengthening for evacuation of power from RE projects in Madhya Pradesh of about 5850 MW capacity has already been approved in 38<sup>th</sup> WR standing committee held in 17.07.15. The transmission system strengthening scheme for above RE capacity was proposed in two phases i.e. Phase –I (Rs. 2100 Crores) and Phase-II (Rs. 1475 Crores). The transmission system

strengthening scheme for renewable energy sources under Phase-I has already been included in GEC-I through KFW funding which is under various stages of implementation.

- 6.2. Accordingly, for evolving the transmission system for solar park in Madhya Pradesh, system studies considering the transmission system already planned by MPPTCL was carried out and the following transmission system for Solar Parks (2250 MW) in Madhya Pradesh is proposed:

S. No.	Solar Park	Capacity (MW)	Proposed Transmission System
1	Suwasara Distt Mandsaur	250	<p><b><u>Intra-State Scheme</u></b>  <b>MPPTCL scope</b> (already under implementation by MPPTCL under Green Energy Corridor Phase-I):</p> <ul style="list-style-type: none"> <li>(i) 400/220kV Sitamau (Mandsaur) substation</li> <li>(ii) Mandsaur - Nagda 400kV D/c line (100km)</li> </ul> <p><b>SPPD scope:</b></p> <p><b>Interim Arrangement</b> (Required due to mismatch in the Implementation schedule of 400/220kV Sitamau S/s (2018-19) and Suwasara Solar park (Mar 2017))</p> <ul style="list-style-type: none"> <li>(i) 220kV D/c line from Solar Park Pooling station to crossing point of Bhanpura- Badod 220kV line – 13 km</li> </ul> <p><b>Connectivity System</b></p> <ul style="list-style-type: none"> <li>(i) Extension of 220kV D/c line from crossing point of Bhanpura- Badod 220kV line upto Sitamau(Mandsaur) – 37 km</li> <li>(ii) Associated 220kV line bays</li> </ul>
2	Neemuch Solar Park  Comprises of three solar parks:  (i) Rampura Solar Park (150 MW) (ii) Singoli Solar Park (200 MW) (iii) Jeeran Solar Park (150 MW).	500	<p><b><u>Intra-State Scheme</u></b>  <b>MPPTCL scope:</b></p> <p>Already under implementation by MPPTCL under Green Energy Corridor Phase-I</p> <ul style="list-style-type: none"> <li>(i) 400/220kV Sitamau (Mandsaur) substation</li> <li>(ii) Mandsaur - Nagda 400kV D/c line (100km)</li> <li>(iii) 220 kV Ratangarh Pooling station</li> </ul> <p>Additional system (may be reviewed by MPPTCL)</p> <ul style="list-style-type: none"> <li>(iv) Establishment of 1x500 MVA (3<sup>rd</sup>), 400/220 kV transformer at Sitamau (Mandsaur)</li> </ul> <p><b>Connectivity System - SPPD Scope</b></p> <ul style="list-style-type: none"> <li>(i) Rampura SP – Sitamau (Mandsaur) 220 kV D/c line - 60 km</li> <li>(ii) Jeeran SP - Sitamau (Mandsaur) 220 kV D/C line - 60 km</li> <li>(iii) Singoli SP – Ratangarh 220 kV D/C line – 30 km</li> </ul>

3	<p><b>Agar</b> (250 MW), <b>Rajgarh</b> (250 MW) and <b>Shajapur</b> (Moman Badodiya 250 MW) solar parks</p> <p><b>Agar</b> comprises of two solar parks:  (i) Agar Solar Park (125 MW)  (ii) Susner Solar Park (125 MW)</p> <p><b>Rajgarh</b> comprises of two solar parks:  (i) Jeerapur Solar Park (125 MW)  (ii) Khilchipur Solar Park (125 MW)</p>	750	<p><b><u>Inter-state transmission system</u></b></p> <p><b>TBCB/ POWERGRID scope:</b></p> <ul style="list-style-type: none"> <li>(i) Establishment of 2x500 MVA, 400/220 kV Pooling station at/near Jeerapur</li> <li>(ii) LILO of both circuits of RAPP –Shujalpur 400 kV D/c at Jeerapur Pooling station</li> <li>(iii) 1X125 Mvar, 420 kV Bus Reactor at Jeerapur Pooling station</li> <li>(iv) 220kV line bays (10 nos) for solar park interconnections</li> </ul> <p><b>MPPTCL scope:</b></p> <ul style="list-style-type: none"> <li>(i) Shujalpur (PG) -Shujalpur (MP) 2<sup>nd</sup> 220 kV D/C line or another 220kV outlet from Shujalpur (PG) towards Ashta/other load center</li> </ul> <p><b>Connectivity System – SPPD scope</b></p> <ul style="list-style-type: none"> <li>(i) Agar SP – Jeerapur Pooling station 220 kV D/c – 35 km</li> <li>(ii) Susner SP – Jeerapur Pooling station 220 kV D/c – 20 km</li> <li>(iii) Jeerapur SP – Jeerapur Pooling station 220 kV D/c</li> <li>(iv) Khilchipur SP– Jeerapur Pooling station 220 kV D/c – 20 km</li> <li>(v) Moman Badodiya SP – Jeerapur Pooling station 220 kV D/c – 45 km</li> </ul>
4	<p>Chattarpur Solar park</p> <p>As informed by MoP/MNRE the capacity of the solar park is 250 MW.</p> <p>However, as per the information given by Madhya Pradesh the solar park has potential for 500 MW capacity.</p> <p>Therefore, for evacuation purpose 500 MW capacity has been considered.</p>	500	<p><b><u>Inter-state transmission system</u></b></p> <p><b>TBCB scope:</b></p> <p><b>Inter State Transmission system strengthening in Chhatarpur area in Madhya Pradesh</b></p> <ul style="list-style-type: none"> <li>(i) Establishment of 2x500 MVA, 400/220 kV substation at Bijawar*</li> <li>(ii) LILO of Satna – Bina 400kV (1st) D/c line at Bijawar. (There are four 400kV circuits between Satna and Bina out of which one is proposed to be LILOed at Sagar (MPPTCL) Substation. This LILO is on one D/c out of the above three remaining 400kV circuits between Satna and Bina).</li> <li>(iii) 1X125 Mvar, 420 kV Bus Reactor at Bijawar pooling station.</li> <li>(iv) 4 nos. 220kV line bays for termination of LILO of both ckts of Tikamgarh - Chattarpur 220 kV D/c line.</li> <li>(v) Space for 4 nos. of 220kV line bays for solar park interconnections</li> </ul> <p>*SPPD shall provide land contiguous to solar park for establishment of 400/220kV Bijawar substation</p>

			<p><b>Intra State Transmission system strengthening in Chhatarpur area in Madhya Pradesh</b></p> <p>(i) 2<sup>nd</sup> circuit stringing of 220kV Tikamgarh – Chhatarpur line.  (ii) LILO of Tikamgarh - Chhatarpur 220 kV D/c line (both circuits) at Bijawar PS (60 km)</p> <p><b>Connectivity System – SPPD Scope</b></p> <p>(i) Solar park to Bijawar 400/220 kV substation 220 kV lines along with the 220 kV bays.</p>
5	Morena	250	<p><b><u>Intra-State Scheme</u></b></p> <p><b>Connectivity System – SPPD Scope</b></p> <p><b>Alternative I</b></p> <p>(i) 220kV Morena SP - Morena S/s (MPPTCL) D/c line – 22 km</p> <p><b>Alternative II</b></p> <p>(i) 220kV Morena SP – Morena 400/220 substation (ISTS) D/c line – 35 km  (ii) Two nos. of 220 kV bays at Morena 400/220 substation (ISTS)</p>

6.3. CEA clarified that above transmission system has been evolved based on the information made available by MNRE, MPPTCL and Govt. of Madhya Pradesh. These systems may undergo slight modification or additional system may be planned based on LTA/ connectivity application received from the Solar Park Project Developers.

6.4. Regarding the transmission system for Chhatrapur solar park CEA stated that in 39<sup>th</sup> SCM of WR/ 22<sup>nd</sup> LTA meeting of WR held on 30.11.2015, MPPTCL had requested for a new 400/220 kV substation in the Chhatarpur / Khajuraho area along with Barethi TPS. Further, MPPTCL vide letter dated 12.02.2016 had suggested creation of 400kV substation at Chhatarpur associated with Barethi TPS, which shall be able to cater the load of around 400-500MW of this area. At present the loads in this area is being catered through Tikamgarh (getting feed from Damoh) and Chhatrapur (getting feed from Satna) 220 kV substations. At present, the implementation time schedule of Chhatarpur solar park as well as the Barethi TPS is not certain. However, establishment of Bijawar 400/220 kV as system strengthening scheme would serve the purpose of evacuation of power from solar park as well as to cater the present and future power dispersal requirements in Chhatarpur area. Therefore, establishment of Bijawar 400/220 kV along with the 400 kV line could be taken up as system strengthening scheme.

6.5. After further discussion, the following transmission system strengthening scheme was agreed by the members:

**Inter State Transmission system strengthening in Chhatarpur area in Madhya Pradesh**

- (i) Establishment of 2x500 MVA, 400/220 kV substation at Bijawar\*
- (ii) LILO of Satna – Bina 400kV (1st) D/c line at Bijawar. (There are four 400kV circuits between Satna and Bina out of which one is proposed to be

LIL0ed at Sagar (MPPTCL) Substation. This LIL0 is on one D/c out of the above three remaining 400kV circuits between Satna and Bina).

- (iii) 1 X 125 Mvar, 420 kV Bus Reactor at Bijawar pooling station.
- (iv) 4 nos. 220kV line bays for termination of LIL0 of both ckts of Tikamgarh - Chatarpur 220 kV D/c line.
- (v) Space for 4 nos. of 220kV line bays for solar park interconnections

\*SPPD shall provide land contiguous to Chhatarpur solar park for establishment of 400/220kV Bijawar substation.

### **Intra State Transmission system strengthening in Chhatarpur area in Madhya Pradesh**

- (i) 2<sup>nd</sup> circuit stringing of 220kV Tikamgarh – Chhatarpur line.
- (ii) LIL0 of Tikamgarh - Chhatarpur 220 kV D/c line (both circuits) at Bijawar 400/220 kV substation (60 km)

6.6. Regarding transmission system for Agar, Rajgarh and Shajapur, CTU stated that LIL0 of both circuits of RAPP – Shujalpur 400kV D/c line at Jeerapur substation may interfere with the evacuation system of RAPP, which is a nuclear power station and hence possibility of evacuation of power from solar projects getting pooled at Jeerapur PS directly to Shujalpur substation through 400kV D/c line may be explored. It was deliberated that RAPP has other evacuation lines, and also the distance between Jeerapur substation and LIL0 point of RAPP-Shujalpur line is much less than the distance between Jeerapur substation and Shujalpur substation. Further studies show the power flow towards shujalpur and the Jeerapur- RAPP line is almost floating. Accordingly, it was decided to retain with the LIL0 of both circuits of RAPP – Shujalpur 400kV D/c line at Jeerapur substation.

6.7. POSOCO stated that instead of pooling power at higher voltage levels (400kV) and then distributing it to 220kV level through 400/220kV transformers, it would be preferable to connect solar/wind projects directly to 220kV level so that transformation capacity enhancement is not required.

6.8. CEA stated that the same philosophy had been followed while evolving transmission system for above solar parks and wherever possible, the solar parks have directly been connected to state's 220kV network.

6.9. The following transmission system was agreed by the members for solar parks in Madhya Pradesh, which has been planned in advance in view of the short gestation periods of solar park, based on the information made available by MNRE, MPPTCL and Govt. of Madhya Pradesh:

<b>S. No.</b>	<b>Solar Park</b>	<b>Capacity (MW)</b>	<b>Proposed Transmission System</b>
1	Suwasara Distt Mandsaur considering	250	<p><b>Intra-State Scheme</b>  <b>MPPTCL scope</b> (already under implementation by MPPTCL under Green Energy Corridor Phase-I):</p> <ul style="list-style-type: none"> <li>(i) 400/220kV Sitamau (Mandsaur) substation</li> <li>(ii) Mandsaur - Nagda 400kV D/c line (100km)</li> </ul>

			<p><b>SPPD scope:</b></p> <p><b>Interim Arrangement</b> (Required due to mismatch in the Implementation schedule of 400/220kV Sitamau S/s (2018-19) and Suwasara Solar park (Mar 2017))</p> <p>(i) 220kV D/c line from Solar Park Pooling station to crossing point of Bhanpura- Badod 220kV line – 13 km</p> <p><b>Connectivity System</b></p> <p>(i) Extension of 220kV D/c line from crossing point of Bhanpura- Badod 220kV line upto Sitamau(Mandsaur) – 37 km</p> <p>(ii) Associated 220kV line bays</p>
2	<p>Neemuch Solar Park</p> <p>Comprises of three solar parks:</p> <p>(i) Rampura Solar Park (150 MW)</p> <p>(ii) Singoli Solar Park (200 MW)</p> <p>(iii) Jeeran Solar Park (150 MW).</p>	500	<p><b>Intra-State Scheme</b></p> <p><b>MPPTCL scope:</b></p> <p>Already under implementation by MPPTCL under Green Energy Corridor Phase-I</p> <p>(i) 400/220kV Sitamau (Mandsaur) substation</p> <p>(ii) Mandsaur - Nagda 400kV D/c line (100km)</p> <p>(iii) 220 kV Ratangarh Pooling station</p> <p>Additional system (may be reviewed by MPPTCL)</p> <p>(iv) Establishment of 1x500 MVA (3<sup>rd</sup>), 400/220 kV transformer at Sitamau (Mandsaur)</p> <p><b>Connectivity System - SPPD Scope</b></p> <p>(i) Rampura SP – Sitamau (Mandsaur) 220 kV D/c line - 60 km</p> <p>(ii) Jeeran SP - Sitamau (Mandsaur) 220 kV D/C line - 60 km</p> <p>(iii) Singoli SP – Ratangarh 220 kV D/C line – 30 km</p>
3	<p><b>Agar</b> (250 MW), <b>Rajgarh</b> (250 MW) and <b>Shajapur</b> (Moman Badodiya 250 MW) solar parks</p> <p><b>Agar</b> comprises of two solar parks:</p> <p>(i) Agar Solar Park (125 MW)</p> <p>(ii) Susner Solar Park (125 MW)</p> <p><b>Rajgarh</b> comprises of two solar parks:</p> <p>(i) Jeerapur Solar Park (125 MW)</p>	750	<p><b>Inter-state transmission system</b></p> <p><b>TBCB/ POWERGRID scope:</b></p> <p>(i) Establishment of 2x500 MVA, 400/220 kV Pooling station at/near Jeerapur</p> <p>(ii) LILO of both circuits of RAPP –Shujalpur 400 kV D/c at Jeerapur Pooling station</p> <p>(iii) 1X125 Mvar, 420 kV Bus Reactor at Jeerapur Pooling station</p> <p>(iv) 220kV line bays (10 nos) for solar park interconnections</p> <p><b>MPPTCL scope:</b></p> <p>(i) Shujalpur (PG) -Shujalpur (MP) 2<sup>nd</sup> 220 kV D/C line or another 220kV outlet from Shujalpur (PG) towards Ashta/other load center</p> <p><b>Connectivity System – SPPD scope</b></p> <p>(i) Agar SP – Jeerapur Pooling station 220 kV D/c</p>

	(ii) Khilchipur Solar Park (125 MW)		<ul style="list-style-type: none"> <li>– 35 km</li> <li>(ii) Susner SP – Jeerapur Pooling station 220 kV D/c – 20 km</li> <li>(iii) Jeerapur SP – Jeerapur Pooling station 220 kV D/c</li> <li>(iv) Khilchipur SP– Jeerapur Pooling station 220 kV D/c – 20 km</li> <li>(v) Moman Badodiya SP – Jeerapur Pooling station 220 kV D/c – 45 km</li> </ul>
4	<p>Chattarpur Solar park</p> <p>As informed by MoP/MNRE the capacity of the solar park is 250 MW.</p> <p>However, as per the information given by Madhya Pradesh the solar park has potential for 500 MW capacity.</p> <p>Therefore, for evacuation purpose 500 MW capacity has been considered.</p>	500	<p><b>Intra State Transmission system strengthening in Chhatarpur area in Madhya Pradesh</b></p> <ul style="list-style-type: none"> <li>(i) 2<sup>nd</sup> circuit stringing of 220kV Tikamgarh – Chhatarpur line.</li> <li>(ii) LILO of Tikamgarh - Chhatarpur 220 kV D/c line (both circuits) at Bijawar PS (60 km)</li> </ul> <p><b>Connectivity System – SPPD Scope</b></p> <ul style="list-style-type: none"> <li>(i) Solar park to Bijawar 400/220 kV substation 220 kV lines along with the 220 kV bays.</li> </ul>
5	Morena	250	<p><b><u>Intra-State Scheme</u></b></p> <p><b>Connectivity System – SPPD Scope</b></p> <p><b>Alternative I</b></p> <ul style="list-style-type: none"> <li>(i) 220kV Morena SP - Morena S/s (MPPTCL) D/c line – 22 km</li> </ul> <p><b>Alternative II</b></p> <ul style="list-style-type: none"> <li>(i) 220kV Morena SP – Morena 400/220 substation (ISTS) D/c line – 35 km</li> <li>(ii) Two nos. of 220 kV bays at Morena 400/220 substation (ISTS)</li> </ul>

6.10. It was informed that as on date no connectivity / LTA applications have been received for the above solar park. Govt. of Madhya Pradesh/ M/s RUMS (SPPD) were requested to provide the time frame of the development of solar parks in Madhya Pradesh as well as apply connectivity / LTA at the earliest.

**7. Provision of 3<sup>rd</sup> 315MVA 400/220kV ICT at Satna Substation as an interim arrangement**

7.1. CEA stated that installation of additional transformer (3<sup>rd</sup>) 500 MVA, 400/220kV ICT at Satna (PGCIL) S/s with provision of 2 Nos. 220kV feeder was agreed in

the 38<sup>th</sup> Standing Committee meeting on power system planning in WR held on 17<sup>th</sup> July, 2015 to maintain the reliability of supply in Satna area. This scheme is being implemented by POWERGRID as a part of Western Region System Strengthening Scheme – XVI. The prior approval of the Government under section 68 has been issued by CEA vide their letter dated 06.04.2016. The existing transformation capacity available at Satna Substation is 400/220kV, 2x315MVA. On the request of MPPTCL, POWERGRID had devised scheme for putting 315MVA Spare ICT in parallel to the existing 315MVA ICT # 2 at POWERGRID Satna substation as a contingency arrangement to take care of the heavy loading in existing ICTs till the commissioning of new 3rd ICT. The scheme is as given below:

Contingency arrangement at Satna 2X315 MVA, 400/220 kV substation to take care of the heavy loading in existing ICTs:

- (i) Installation of 3rd 315MVA, 400/220kV ICT in parallel with existing 315MVA 400/220kV ICT under contingency plan at Satna S/s.

- 7.2. The above proposal has already been discussed and agreed in the 31<sup>st</sup> meeting of WRPC held on 31 March, 2016.
- 7.3. POWERGRID informed that the interim arrangement would be completed by July 2016 and the 500 MVA ICT would be commissioned by July 2018.

Members noted the same

#### 8. **2<sup>nd</sup> ICT at Bina (PG) 400/220 kV substation.**

- 8.1. CEA stated that at Bina (PG) 400/220 kV substation there was only 1X315 MVA ICT and to meet n-1 criteria 2<sup>nd</sup> 315 MVA ICT was required but there was no space available for provision of the 2<sup>nd</sup> ICT at Bina (PG). In the 39<sup>th</sup> SCM of WR, it was decided that the effect of outage of 1X315 MVA ICT at Bina (PG) on 220 kV lines emanating from Bina (MPPTCL) needs to be studied to ascertain the requirement of additional ICT at Bina (PG). MPPTCL has already planned 4<sup>th</sup> 1X315 MVA ICT at Bina (MPPTCL) 400/220 kV substation. The studies considering the 4<sup>th</sup> ICT at Bina (MPPTCL) shows there is no overloading on the 400/220 ICTs and 220 kV lines in case of outage 315 MVA ICT at Bina (PG) 400/220 kV substation.
- 8.2. In the meeting MPPTCL confirmed that with implementation of the 4<sup>th</sup> 1X315 MVA ICT at Bina (MPPTCL) 400/220 kV substation, there would be no overloading in case of outage of 1X315 MVA ICT at Bina (PG).
- 8.3. In view of space constraint at Bina (PG) and the implementation of 4<sup>th</sup> 315 MVA ICT at Bina (MPPTCL) already been done by MPPTCL, the proposal of 2<sup>nd</sup> 315 MVA ICT at Bina (PG) 400/220 kV substation was dropped.

#### 9. **Connectivity of 2x 660 MW Generation Project of M/s Lanco Vidarbha Thermal Power Ltd. (M/s LVTPL).**

- 9.1. CEA stated that the connectivity arrangement (LILO of Seoni - Wardha 765 kV S/C line at LVTPL TPS) for M/s LVTPL 2x660 MW generation project was



agreed in the 12<sup>th</sup> meeting of WR Constituents regarding Connectivity / Open Access Applications held on 08-07-2010. The connectivity was revised to LVTPPL TPS Switchyard – Warora Pool 765kV D/c line, in the 21<sup>st</sup> Meeting of WR constituents regarding Connectivity / Open Access Applications held on 17.07.2015. M/s LVTPPL vide their letter dated 27<sup>th</sup> August, 2015 has requested for continuation of the earlier connectivity granted i.e. LILO of Seoni – Wardha 765kV S/c line at LVTPPL TPS and subsequently a meeting was held in CEA on 2.9.2015 wherein M/s LVTPPL was requested to confirm the commissioning schedule of the generation project, sign agreements and furnish Bank Guarantee for the connectivity line (LVTPPL TPS – Warora Pool 765kV D/c line) so that it could be included in the agenda for Empowered Committee for implementation of the scheme through TBCB route.

The issue was deliberated in the 39<sup>th</sup> SCM of WR wherein it was agreed that connectivity to M/s LVTPPL may be granted through LVTPPL TPS Switchyard – Warora Pool 765kV D/c line and M/s LVTPPL would be required to sign requisite agreements for taking up the transmission scheme under Tariff Based Competitive Bidding route. The revised intimation for grant of connectivity was issued by CTU to M/s LVTPPL vide their letter dated 27.01.2016.

M/s LVTPPL vide their letter dated 15.02.2016 had conveyed their acceptance of the connectivity line (LVTPPL Switchyard – Warora 765 D/C line) and its implementation through TBCB. But for the purpose of start-up and commissioning activities, M/s LVTPPL had requested for LILO of Seoni – Wardha 765 kV S/C at LVTPPL as an interim arrangement. On request of M/s LVTPPL a meeting was held in CEA on 18.03.2016 wherein it was agreed that the connectivity line would be put as an agenda in the next Empowered Committee meeting after signing of the necessary agreement and submission of requisite bank guarantee by M/s LVTPPL and the requirement of the interim arrangement would be assessed after confirmation of firm schedule/requirement of start-up power by M/s LVTPPL.

- 9.2. In the meeting CTU informed that M/s LVTPPL has already signed the Transmission Agreement on 31.03.2016, Transmission Service Agreement on 19.04.2016 and had submitted the Bank Guarantee of 42.53 crores on 31.05.2016. M/s LVTPPL has given an undertaking that the balance amount of Bank Guarantee (total 66 crores) would be submitted within 10 days' time.
- 9.3. As per the agreements, the generating units are scheduled to be commissioned by December 2017. Thus, the startup power requirement would be by June 2017. Considering the fact that the award of the scheme (LVTPPL Switchyard – Warora 765 D/C line) through tariff based competitive bidding process by the BPC would take substantial time and its implementation would not be possible by June 2017 (for providing start power). Therefore, an interim arrangement for provision of startup power for the generation project is required.
- 9.4. After deliberations, the following connectivity system for M/s LVTPPL 2x660 MW generation project at Vidarbha was agreed:

**Connectivity system for M/s LVTPPL 1320 MW plant at Vidarbha**

- (i) LVTPPL TPS Switchyard – Warora Pool 765kV D/c line (ISTS line to be implemented through Tariff Base Competitive Bidding route) – already agreed by WR constituents.

**Interim arrangement (to be implemented through M/s LVTPL)**

- (i) LILO of Seoni - Wardha 765 kV S/C line at LVTPL TPS (Interim arrangement to be implemented by M/s LVTPL which shall be bypassed/dismantled by M/s LVTPL at their own cost after completion of the connectivity line)

**10. Operational feedback by NLDC for the quarter October 2015 to March 2016.**

10.1. The operational feedback by NLDC on Transmission constraints in Western Region for the period October 2015 to March 2016 was discussed by the members and summary of the deliberations on Transmission line constraints and ICT constraints are as given below:

**Transmission Line Constraints**

Sl. No	Corridor	Constraint	Deliberation in the 40 <sup>th</sup> SCM
1.	<p><b>Constraints in 400 kV Khandwa – Dhule - Bableshwar-Padghe corridor</b></p> <p><b>Antecedent Conditions</b> 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>	<p>400 kV Khandwa-Dhule - Bableshwar- Padghe corridors carrying more than 500 MW in each ckt. The corridor is N-1 non-compliant.</p>	<p>MSETCL: Commissioning Status of 400 kV Bableshwar-Kudus D/C and Kudus Sub-station:</p> <p>1) Upto Naneghat: Foundation – 418/482, Erection - 71/482, Stringing - 172.7/297.4 Ckm</p> <p>2) From Naneghat to Kudus: Foundation - 129/226, Erection - 109/226, Stringing - 0/150 Ckm</p> <p>Expected Commissioning: March 2017</p> <p>The work of interconnection of 400KV Dhule (M) to Dhule (BDTCL) Is completed on 15.01.2016. This has helped in relieving the loading on this corridor.</p>
2	<p><b>765/400 kV ICT at Tirora and 765/400 kV ICT at Akola II</b></p> <p><b>Antecedent Conditions</b> When generation at Tirora is 1800-2400 MW.</p>	<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 oscillations in the grid.</p>	<p><b>MSETCL:</b> MEGPTCL has filed a petition with MERC for amendment of Transmission license to include additional 1 x 1500 MVA, 765/400kV ICT at Akola &amp; Tiroda S/s. After regulatory approval is obtained, the same should be commissioned in about six to nine months.</p> <p>Expected Commissioning: March 2017</p>

Sl. No	Corridor	Constraint	Deliberation in the 40 <sup>th</sup> SCM
3	<b>Transmission system for Koradi 2 Generation</b>	<p>3 X 660 MW Generation is coming at Koradi 2 station, however transmission line for evacuation at present are LILO of 400 kV Wardha-Warora one ckt (interim arrangement as per SCM) and 765/400 kV Koradi2 ICT which will feed eventually into Akola2 ICT through 765 kV Koradi2-Akola2 D/C line.</p> <p>The present system will result in overloading of 400 kV Koradi2-Warora and 400 kV Koradi2-Wardha circuit. In case of Contingency of 400 kV Wardha-Koadri2 line, power will further increase on the 765 kV Koradi3-Akola2 D/C which is already N-1 non-compliant at present due to single 765/400 kV ICT at Akola2 and Tirora2.</p>	<p><b>MSETCL:</b> 765/400 kV Ektuni substation commissioned on 31/03/2016 and the second ICT charged on 04.04.2016.</p> <p>2<sup>nd</sup> 1 x 1500 MVA, 765/400kV ICT at Akola &amp; Tiroda S/s would be commissioned in about six to nine months after regulatory approval from MERC.</p> <p><b>Network adequacy with N-1 criteria.</b> The STU study to be reviewed during the joint studies with MSETCL for high fault level at Wardha and Navi Mumbai utilization.</p>
4	<b>Korba- Sipat 400 kV S/C line</b>  <b>Antecedent Conditions</b> When Sipat generation is below 2300MW	Heavy loading in the range of 650-720MW observed when Sipat generation is less. Interim arrangement at Balco of Korba Birsighpur also is causing constraint with power flowing towards Korba.	Discussed at item no. 13
5	<b>220kV Navsari(PG) - Navsari(Guj) D/C line</b>  <b>Antecedent Conditions</b> With generation at DGEN, UKAI,JHANOR	High loading observed more than 220MW and N-1 noncompliant	<p>Early commissioning of Navsari-Bhestan (Popada) 220 kV D/C line being implemented under TBCB.</p> <p>Interim arrangement to be suggested by WRLDC.</p>

### ICT Constraints

Sl. No	ICT	Constraint	Deliberations in the 40 <sup>th</sup> SCM
1.	<p>2 x 315 +1 x 500 MVA Bableshtar ICTs</p> <p><b>Antecedent Conditions</b> With Maharashtra demand above 18500 MW</p>	It is observed that the Bableshtar ICTs are fully loaded and system is n-1 non-compliant. MSETCL has implemented load trimming scheme to take care of overloading.	<p><b>MSETCL-</b> New 1X500 MVA, 400/220 ICT at Bableshtar - LOA issued on 04.02.2016, civil work-in progress.</p> <p>Expected Commissioning: August 2016</p>

Sl. No	ICT	Constraint	Deliberations in the 40 <sup>th</sup> SCM
2.	2 X 315 MVA Chakan ICTs  <b>Antecedent Conditions</b> Maharashtra meeting high demand of above 18500 MW	It is observed that the loading on ICTs at Chakan (2x315MVA) are above 200 MW and additional ICT has to be proposed	<b>MSETCL-</b> Additional ICT at Chakan under approval.  Expected Commissioning: March 2017
3.	3 X 315 MVA Lonikhand ICTs  <b>Antecedent Conditions</b> Maharashtra meeting high demand of above 18500 MW	It is observed that the loading on ICTs at Lonikhand (3 x 315 MVA) are above 200 MW and additional ICT has to be proposed or 2 x 500 MVA ICTs at Lonikhand-II are underutilized and the 220 kV lines from Lonikhand II and Pune(PG) to be expedited.	<b>MSETCL:</b> The 220KV Kathapur line which was connected to Lonikand I S/s is now shifted on 400/220KV Lonikand II substation on 07.01.2016. This has relieved the loading on Lonikand I substation ICTs by approximately 200MW.
4.	3 X 315 MVA + 600 MVA Padghe ICTs  <b>Antecedent Conditions</b> 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.	MSECTL: Status Kudus 400/220 kV substation Civil work-65% & Electrical work-20% Expected Commissioning: March 2017
5.	<b>2 x 315 +1 x 500 MVA Parli ICTs</b>  <b>Antecedent Conditions</b> Maharashtra meeting high demand of above 18500 MW	It is observed that loading on these ICTs are N-1 non-compliant	MSETCL: Nanded 400/220 kV substation commissioned on 11.02.2016 by LILO of Chandrapur II-Parli (MSETCL) 400 kV line and the load on Nanded substation was taken on 06.03.2016 by charging 220KV Wagahla ckt I and II. This has shifted load of approx. 300MW from Parli ICTs to Nanded ICT.  The construction work of 220KV Solapur (PG) to 220KV Bale Line in progress. Completion of this line will further relieve the loading on Parli ICTs  The status of 220kV lines associated with 400/220kV Parli(PG) ICT: Survey completed and Estimate preparation is in progress

Sl. No	ICT	Constraint	Deliberations in the 40 <sup>th</sup> SCM
			<b>POWERGRID:</b> ICTs and bays at Parli(PG) commissioning schedule is July 2018.
6.	2 X 315 MVA Satna ICT  <b>Antecedent Conditions</b> 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.	Installation of 3 <sup>rd</sup> 315 MVA ICT in parallel with existing 315 MVA ICTs at Satna as an interim arrangement till the 500 MVA, 400/220kV ICT at Satna (PGCIL) S/s along with 2 Nos. 220kV bays are commissioned by POWERGRID in July 2018.
7.	3 X 315 MVA Bhopal ICTs  <b>Antecedent Conditions</b> Madhya Pradesh meeting high demand of above 9000 MW	It is observed that the loading on ICTs at Bhopal (3x315MVA) are above 200 MW and additional ICT has to be proposed	<b>MPPTCL:</b> 1X315 MVA, 400/220 kV ICT (4 <sup>th</sup> ) at Bhopal is under implementation by MPPTCL and was expected to be completed by December 2016.
8.	2 X 315 MVA ICTs at Shujalpur  <b>Antecedent Conditions</b> Madhya Pradesh meeting high demand of above 9000 MW	It is observed that the loading on ICTs at Shujalpur (2 x 315 MVA) are above 200 MW and additional ICT has to be proposed	<b>MPPTCL:</b> In near future the ICT loading may not be a concern. Lot of renewable generation project coming up in Shujalpur area. In future, if sustained overloading of the ICT is observed, then augmentation may be taken up.
9	315 MVA Itarsi ICT  <b>Antecedent Conditions</b> Madhya Pradesh meeting high demand of above 9000 MW	Single ICT with loading above 200 MW for more than 20 % of the time.	<b>POWERGRID:</b> 1X500 MVA 400/220 kV ICT along with two nos. of 220 kV bays at Itarsi (PG) would be commissioned by July 2018

Sl. No	ICT	Constraint	Deliberations in the 40 <sup>th</sup> SCM
10.	<b>2 X 315 MVA Dehgam ICTs</b>  <b>Antecedent Conditions</b> 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	<b>POWERGRID:</b> 1x500MVA, 400/220kV ICT commissioning schedule is March 2019.
11.	<b>2 X 315 MVA ICTs at Bhachau</b>  <b>Antecedent Conditions</b> Gujarat meeting high demand	It is observed that the loading on ICTs at Bhachau (2 x 315 MVA) are above 190 MW and additional ICT has to be proposed	Loading on Bhachau ICTs expected to be reduced after commissioning of on-going and planned transmission schemes in the 2018-19 timeframe.

10.2. **Nodes Experiencing High Voltage:** CEA stated that in the operational feedback NLDC has reported high voltage at 400 kV Nodes (Bhadrawati, Lonikhand, Koradi, Karad, Kolhapur, Nagothane, GPEC, Korba West, RGPL, Birsinghpur, Katni, Dhule, SSP and Wanakbori) and 765 kV Nodes (Wardha, Aurangabad, Dharamjaigad, Durg, Champa, Raigarh Tamnar PS, Vadodara, Jabalpur PS and Solapur).

10.2.1. CTU informed that they have carried out the preliminary off-peak studies (high voltage studies) for 2018-19 time-frame and they have found that with all existing/planned reactive compensation in WR, voltages at all 400kV and 765kV buses were found to be well within limits and additional reactive compensation may not be required in 2018-19 timeframe.

10.2.2. POSOCO made a presentation highlighting that a large no. of lines have been planned with IPP generation projects in Chhattisgarh and many of these generation projects are not coming up/ struck up. The lines are planned for peak load conditions. During off-peak hours high voltage prevails in the grid and to control the high voltage many lines are kept open. Further bus splitting proposals (with planned generations), keeping some of the lines in normally open condition to control high short circuit level and the lines kept open to control high voltage during off-peak conditions reduces the grid reliability. He requested CTU to share the off-peak studies (high voltage studies) for 2018-19 time-frame.

10.2.3. CTU clarified that all the IPP generation projects in Chhattisgarh considered in the studies for controlling high short circuit level would come up, may be with some delay. CTU agreed to share the off-peak studies (high voltage studies) for 2018-19 time-frame.

11. **Provision of 4 nos. of 220kV feeder bays at 750MW Rewa Ultra Mega Solar Project (UMSP) Pooling Station – proposal by MPPTCL.**
- 11.1. CEA stated that the following transmission system has been agreed by WR constituents for 750 MW Rewa Ultra Mega Solar Project (RUMSP) in Madhya Pradesh:
- (i) Establishment of 400/220kV, 3x500 MVA Pooling station at Rewa.
  - (ii) LILO of Vindhyachal – Jabalpur 400kV 2<sup>nd</sup> D/c line (circuit-3&4) at Rewa Pooling Station – 59KM (2x27=54KM D/c portion + 5KM M/c portion).
  - (iii) 1x125 MVAr bus reactor at Rewa Pooling Station
  - (iv) 6 Nos. 220kV Line bays at Rewa Pooling station (for its interconnection with solar park)

In the 39<sup>th</sup> SCM of WR, MPPTCL has requested for provision of 4nos. of 220kV feeder bays at the proposed 400/220kV Rewa pooling station as intra state strengthening scheme for termination of two nos. of 220 kV D/C lines (one to Rewa and other to Sidhi 220 kV substation) to feed loads of Rewa and Sidhi area. The proposal was agreed with MPPTCL making the necessary arrangements at Rewa (existing) 220 kV substation (load segregation or radialisation) to restrict the loading on the proposed Rewa PS- Rewa 220 kV D/C line. The provision of 220 kV bus sectionaliser at Rewa PS was also agreed to take care of overloading on the proposed 220 kV lines.

MPPTCL vide their letter dated 12.02.2016 has stated that Rewa 400/220 kV pooling station is being constructed with double main and transfer bus scheme, therefore any of the feeder or transformer can be connected on both bus separately and there shall not be any requirement of separate sectionaliser at this substation. Further to reduce the overloading on Rewa 400/220 – Rewa 220 kV D/C line, MPPTCL has proposed 220 kV bus splitting at existing Rewa 220 kV substation. With bus splitting, the load of Rewa 220 kV substation would be fed from the supply received from Rewa UMSP and other loads being fed from Rewa 220 kV substation in this area would be fed from the supply received from Satna 220 kV substation. They would also resort to opening of 132kV lines such as Bansagar – Amarpatan 132kV S/c and Rewa 1 – Rampur BG 132kV S/c lines in case of any overloading. With the above measures in place, loading on Rewa (MPPTCL) – Rewa Pool 220kV D/c line falls to about 90MW/ckt with Bansagar hydro support and about 140MW/ckt without Bansagar Hydro support. Further Rewa UMSP- Rewa 220 kV D/C line is to be constructed using low loss conductor which is capable of carrying maximum current of 583 amps at design temperature of 75 degree centigrade and 45 degree ambient temperature.

- 11.2. In view of the measures proposed by MPPTCL such as (Rewa (MPPTCL) bus splitting / 132kV feeder opening) to control loading on Rewa (MPPTCL) - Rewa Pool 220kV D/c line provisions made by MPPTCL, bus sectionalisation at 220kV level of Rewa Pool substation was not required.
- 11.3. Members agreed with MPPTCL measures to control the 220 kV line loadings. The four nos. of 220 kV bays at Rewa UMSP 400/ 220 kV pooling station would be implemented by MPPTCL. POWERGRID would provide the space for these bays.

**12. Provision of 2 nos of 220kV bays at Raipur (PG) substation for LILO of Khedamara (CSPTCL) – Borjhara S/c line at 220kV Raipur (PG) substation.**

12.1. CEA stated that the construction of 2 nos. 220kV line bays by POWERGRID at its Raipur 400/220kV substation for termination of LILO of Khedamara (CSPTCL) – Borjhara S/c line of CSPTCL was agreed in 38<sup>th</sup> Meeting of Standing Committee on Power System Planning in Western Region held on 17.07.2015. Further, POWERGRID has already constructed 2 nos. 220kV line bays along with installation of additional 315 MVA, 400/220 kV ICT at Raipur 400/220kV substation as part of WRSS-6 (approved in the 25<sup>th</sup> Meeting of Standing Committee on Power System Planning in Western Region held on 30-09-2006). These 220kV line bays are still unutilized. POWERGRID has requested CSPTCL to confirm whether these 2 nos. 220 kV line bays shall be utilized by them for termination of 220 kV D/c line from DOMA (CSPTCL) or the same can be utilized for LILO of Khedamara (CSPTCL) - Borjhara 220 kV S/c line.

In 39<sup>th</sup> SCM of WR, CSPTCL had confirmed that the two no. of unutilized 220 kV bays at Raipur (PG) would be used for termination of 220 kV D/C line from DOMA which was likely to be implemented in 9 months' time. Regarding implementation LILO of Khademara – Borjhara S/c line at Raipur (PG), CSPTCL had informed that they were facing RoW problems in its implementation. In the meeting CSPTCL was advised to explore the option of laying cables for implementation of LILO of Khademara – Borjhara S/c line at Raipur (PG).

12.2. CSPTCL representative informed that they are examining the feasibility of laying cables to overcome the RoW issue and would intimate the same to CEA. POWERGRID informed that they are not taking up implementation of any new 220 kV bays at Raipur (PG) 400/220 kV substation.

**13. Measures to control High fault levels observed in Korba STPS (3x200MW + 4x500MW)**

13.1. CEA stated that NLDC in their operational feedback report for the quarter July to September 2015 has reported large fault current of 45 kA at Korba STPS switchyard end for a Y phase to earth fault occurred on Korba STPS - Raipur 400kV line 3. As per their offline studies, NLDC has reported a 3-phase fault current of 53 kA.

In the 39<sup>th</sup> SCM of WR, the issue of high fault level in Vindhyachal generation complex was discussed. In the meeting it was agreed that few interconnections with Vindhyachal generation complex (as given below), which has already been agreed in previous SCMs of WR, needs to be normally kept in open condition to contain the high fault levels:

- (i) LILO of Vindhyachal STPS – Jabalpur 400kV S/c line at Sasan UMPP has been agreed to be delinked at Sasan UMPP in order to reduce SC levels in Sasan UMPP and Vindhyachal STPS (agreed in 29<sup>th</sup> WR SCM held on 10.09.2009)
- (ii) Vindhyachal STPS I, II, III – Vindhyachal STPS IV, V interconnection was agreed as an interim arrangement till the commissioning of Vindhyachal



STPS IV Transmission System (agreed in the 33<sup>rd</sup> WR SCM held on 21.10.2011)

Even with opening of above interconnections in short circuit studies, no significant effect was found on fault levels at Korba STPS switchyard. Therefore, further studies were carried out for reducing fault level at Korba STPS switchyard. The revised fault level study results are tabulated below:

Sl. No.	Case Description	3-ph Fault Level (kA)		
		Korba STPS	Korba West	Sipat STPS
1	Korba STPS - Korba West (Normally Open)	43	18	40
2	Case 1 + Korba STPS - Sipat (Normally Open)	37	18	33
3	Case 1 + Korba STPS - Sipat STPS- Raipur (bypassing Sipat STPS) (217.77KM)	38	18	30
4	Korba West - Korba STPS - Sipat STPS (bypassing Korba STPS) (82.65KM)	37	24	39
5	Korba West - Korba STPS - Sipat STPS -Raipur (bypassing both Korba STPS & Sipat STPS) (231.77KM)	36	20	30

From the above studies the option 3 is found to be the most suitable alternative amongst all studied options.

- 13.2. After deliberations option 3, as given below, was agreed by the members for reducing high short circuit level at Korba STPS:

**Scheme for reducing high short circuit level at Korba STPS:**

- (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). The bypassing arrangement at Sipat STPS already exists.
- 13.3. Regarding the status of opening of LILO of one ckt of Vindhychal STPS – Jabalpur 400kV D/c line at Sasan UMPP, WRLDC informed that it would be bypassed after availability of alternative communication arrangement for Sasan UMPP. Regarding the opening of the Vindhychal STPS I, II, III – Vindhychal STPS IV, V 400kV interconnection, WRLDC informed that they have already written a letter in this regard to CTU.
- 13.4. CTU stated that they have studied POSOCO's observations regarding measures to control fault level in Chhattisgarh/Vindhychal complex and shall be sending a reply shortly.

#### 14. **Measure to control fault level at Wardha Substation**

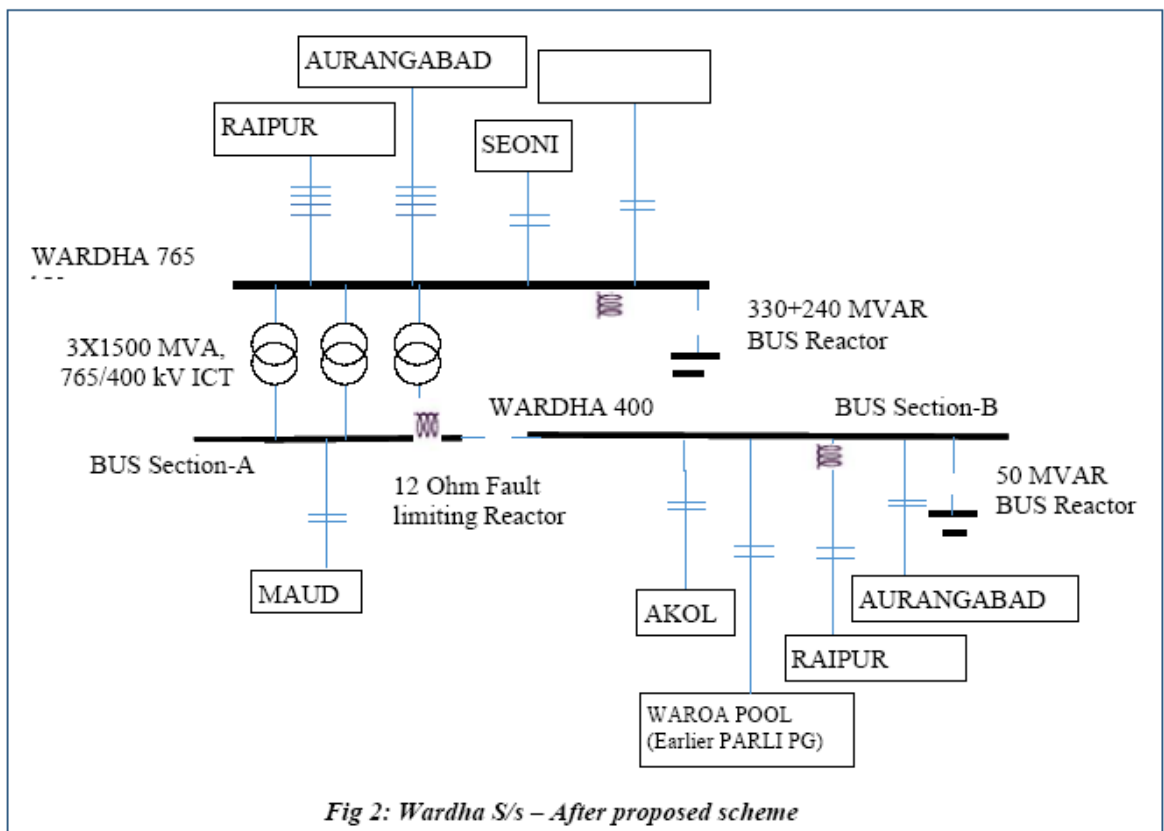
- 14.1. CEA stated that the issue of high fault level at Wardha 765/400 kV has been under deliberation in the previous SCMs of WR discussed. The control measures such as bus splitting at Dharamjaygarh, Raigarh pool (Kotra) and Champa pool in Chhattisgarh and re-arrangement proposals (bypassing of Mauda-Wardha 400 kV D/C line and Koradi- Wardha 400 kV S/C line from Wardha and connecting to Warora pool and Warora respectively) could not contain the high fault levels at Wardha (PG). The fault level observed at Koradi I & II and Chandrapur I & II 400 kV substations of MSETCL are above design ratings. In the 39<sup>th</sup> SCM of WR it was decided that additional measures to contain the fault levels needs to be further studied by CEA, CTU and MSETCL and proposal would be put in the next SCM of WR.

Keeping in view the fact that Koradi II and Warora(MSETCL) feeders are the major SC Fault contributory at Wardha S/s, step by step study has been carried out with following arrangements.

- (i) Splitting of 400 kV Wardha substation into two sections, Section –A and Section-B.
- (ii) Disconnection of Koradi-II –Wardha 400kV (Quad) line from wardha end and connecting it to Warora – Wardha 400 kV (Quad) line at outskirts of Wardha substation. This arrangement will result in Warora – Koradi II 400 kV (Quad) line
- (iii) 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 400kV bays of Warora and Koradi II 400 kV (Quad) lines at Wardha 400kV BUS Section B.
- (iv) Joining of Wardha 400 kV BUS Section –A with BUS Section –B through BUS Fault limiting reactor.

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.

The single line diagram of Wardha substation after the above arrangement is shown below:



Accordingly, study results for the time frame of 2018-19 to control high fault level of Wardha S/s with above mentioned arrangements is as given below:

**Study results for Wardha S/s:**

	Connectivity at Wardha 400kV BUS	Symmetrical SC Fault level / power flow					
		As per Existing / planned	After 400 kV BUS Split only	Case-B + Connecting Koradi-II and Warora line outside Wardha S/s	Case-C + terminating Warora Pool – Wardha 400kV (Quad) line in Warora and Koradi-II Bays at Wardha S/s	Case-D + Shifting Aurangabad – Wardha 400kV (1200kV charged at 400kV) line in BUS Section A from BUS Section B.	Considering 12ohm fault limiting reactor Between BUS Section - A & Section - B on 'Case-D'
		Case-A	Case-B	Case-C	Case-D	Case-E	Case F
400 kV BUS Section A	3X1500 MVA, 765/400 kV ICTs	25/ 970	28/ 585	28/ 605	29/ 810	29/ 267	28/ 630
	Muada – Wardha 400kV D/C (Quad) line	7/ -760	7/ -820	7/ -833	8/ -808	7/ -878	7/ -830
	Warora Pool – Wardha 400kV D/C (Quad) line	15/ 442	16/ 236	16/ 228	–	Aurangabad: 3/ 604	–
	<b>Total SC Fault Current</b>	–	<b>51</b>	<b>51</b>	<b>37</b>	<b>39</b>	Through Bus fault limiting reactor - 11.4 / 202 <b>Total – 47</b>

400 kV BUS Section B	Raipur Pool – Wardha 400kV D/C FSC line	4/ -866	5/ -780	5/ -996	5/ -996	5/ -922	5/ -974
	Warora – Wardha 400kV (Quad) line	9/ -429	10/ -299	–	Warora Pool – Wardha 400kV (Quad) D/C line: 17/ 46	Warora Pool – Wardha 400kV (Quad) D/C line: 17/305	Warora Pool – Wardha 400kV (Quad) D/C line: 17/60
	Koradi-II – Wardha 400kV line	20/ -91	21/ -648	–			
	Akola – Wardha 400kV D/C line	5/ 477	5/ 560	6/ 208	6/ 226	6/ 346	6/600
	Aurangabad – Wardha 400kV D/C [1200kV charged at 400kV] line	3/ 706	4/ 780	4/ 574	4/ 594	–	4/ 618
	2X315 MVA, 400/220 kV ICTs	2/ 364	2/ 390	3/ 210	3/ 222	3/ 272	3/236
	<b>Total SC Fault Current</b>	<b>90</b>	<b>46</b>	<b>17</b>	<b>35</b>	<b>31</b>	Through Bus fault limiting reactor - <b>12/-202</b> <b>Total -45</b>

Symmetrical SC Fault level of Wardha and surrounding substations with consideration of above proposal (as in Case 'F') are tabulated below:

Case	Wardha 765kV	Wardha 400 kV (Section A)	Wardha 400kV (Section B)	Warora MSET CL	Warora Pool	Koradi - II
<b>Base Case</b> [All interconnectors and lines connected as per existing/planned]	46	90*	-	43	55	74
After Study Case F	40	47	46	38	43	56

\*No split of Wardha 400 kV BUS in Base Case

#### Observation:

From the table it is clear that with considering all measures as in tabulated above (Case F), symmetrical fault level of Wardha (765kV and 400 kV), Warora Pool (400 kV) and Warora (400kV) reduced to less than design fault level of the BUSes /substations. Further symmetrical fault level of Koradi II 400 kV BUS reduced to 56 kA from 74 kA.

- 14.2. POWERGRID informed that Wardha 765/400 substation was designed for 40 kA symmetrical SC fault current for 1 sec but all the 765 kV equipment and 400 kV CBs for 50 kA designed fault level. The CTs are also designed for 50 kA except for few which needs to be checked (whether designed for 40 kA or 50 kA) and if required 40kA CTs can be replaced with 50 kA CTs. It was also informed that presently 2x63MVAR line reactors are available at Wardha end of Wardha – Parli(PG) 400kV D/c (quad) line (being LILOed at Warora Pool). LILO of this line at Warora PS would lead to over compensation. Accordingly, it was proposed that the line reactors of Wardha – Warora Pool 400kV D/c (quad) line at Wardha end may be used as bus reactors at Wardha S/s 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.

14.3. The overall proposal to control high symmetrical fault level of Wardha substation may be summarized as follows:

- (i) Split of 400 kV Wardha substation into two sections, Section –A and Section-B as per Fig.2, 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 400kV 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) 2x63MVAR 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.

With above proposal over all connectivity (Existing and planned) at Wardha may be summarized as:

**Wardha 765/400 kV S/s:**

**For 765kV side:**

- (i) Raipur Pool – Wardha 765 kV 2XD/C line.
- (ii) Seoni – Wardha 765 kV D/C line.
- (iii) Wardha – Aurangabad PG 765 kV 2XD/C line.
- (iv) Wardha – Nizamabad 765 kV D/C line.
- (v) 1x330 + 1X240 MVAR BUS Reactors.
- (vi) 3X1500 MVA, 765/400 kV ICTs.

**For 400 kV side:**

12 Ohm Fault Limiting Reactor to join 400 kV BUS Section A and BUS Section B.

**400 kV Section A:**

- (i) Mauda – Wardha 400 kV D/C (Quad) line.
- (ii) 3X1500 MVA, 765/400 kV ICTs.

**400 kV Section B:**

- (i) Raipur – Wardha 400 kV D/C line.
- (ii) Warora Pool – Wardha 400 kV D/C (Quad) line.
- (iii) Wardha – Akola 400 kV D/C line.
- (iv) Wardha – Aurangabad PG 400 kV D/C line (1200 kV charged at 400 kV).
- (v) 1x50 MVAR BUS Reactor.

- 14.4. MSETCL informed that the progress was slow at Koradi generation (1980 MW) project and in case the entire capacity generation project is not realized, then the short circuit contribution from Koradi may be less. CEA and CTU pointed out that the studies show a short circuit level of 74 kA at Koradi in base case and with the above proposal it reduces to 56 kA which still higher than the design limit of 40kA. Therefore, additional measures needs to be planned by MSETCL for controlling the high fault level at Koradi.
- 14.5. After deliberations, the above proposal for controlling high short circuit level at Wardha was agreed in principle by the members. Further, joint studies would be carried out by CEA, CTU and MSETCL for limiting the high fault level in Koradi complex.
- 14.6. Regarding the cost implication of the scheme, POWERGRID informed that it could be of the order of Rs. 50 to 60 crores but the actual cost estimate would be available after preparation of the DPR for the scheme

**15. Additional 400kV feed to Goa – Reactive Compensation**

- 15.1. CEA stated that the following Transmission system strengthening was agreed for providing second 400kV feed to Goa in the 39<sup>th</sup> SCM of WR held on 30.11.2015:
- (i) Establishment of 2X500MVA, 400/200kV substation at Xeldem. The interconnection between the existing 220 kV Xeldem substation and the proposed 400/220kV Xeldem substation could be through bus extension or through 220kV interconnecting lines, as the case may be.
  - (ii) LILO of one circuit of Narendra (existing) – Narendra (new) 400 kV D/C quad line at Xeldem.
  - (iii) 400kV (Quad) connectivity between the new substation at Xeldem and Mapusa to take care of any N-1-1 contingencies involving outage of any one 400kV infeed to Goa.

The above scheme has also been agreed in the 39th meeting of the Standing Committee on Power System Planning of Southern Region was held on 28th - 29th December, 2015.

The detailed scope of the transmission system along with reactive compensation is as given below:

Sl. No.	Scope of the Transmission Scheme	Capacity (MVA/KM)
<b>A</b>	<b>Additional 400kV Feed to Goa</b>	
	(i) LILO of one ckt. of Narendra (existing) – Narendra (New) 400kV D/c quad line at Xeldem	120KM
	(ii) Xeldem – Mapusa 400kV D/c (quad) line	40KM
	(iii) Establishment of 2x500MVA, 400/220kV substation at Xeldem	1000MVA
	<u>400kV</u>	
	<ul style="list-style-type: none"> <li>• ICTs : 2x500MVA, 400/220kV</li> <li>• ICT bays: 2 nos.</li> <li>• Line bays: 4 nos (2 no. for Xeldem – Mapusa 400kV</li> </ul>	

	<p>D/c (quad) line &amp; 2 nos for LILO of one ckt of Narendra (existing) – Narendra (New) 400kV D/c quad line at Xeldem)</p> <ul style="list-style-type: none"> <li>• Bus Reactor: 1x125MVAR</li> <li>• Bus Reactor Bay: 1 no</li> <li>• Space for 2x500MVA, 400/220kV ICTs (future)</li> <li>• Space for ICT bays (future): 2 nos</li> <li>• Space for Line bays along with Line Reactors (future): 4 nos</li> <li>• 1x63MVAR switchable line reactor along with 500 Ohms NGR and its auxiliaries (for Narendra (existing) – Xeldem 400kV line formed after LILO of one ckt of Narendra (existing) – Narendra (New) 400kV D/c quad line at Xeldem)</li> <li>• 1x80MVAR switchable line reactor along with 500 Ohms NGR and its auxiliaries (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)</li> </ul> <p><u>220kV</u></p> <ul style="list-style-type: none"> <li>• 220kV Bus Extension of Xeldem (existing) substation</li> <li>• ICT bays: 2 nos</li> <li>• Line bays: 6 nos</li> <li>• Space for ICT bays (future): 2 nos</li> <li>• Space for Line bays (future): 6 nos</li> </ul> <p>(iv) 2 nos of 400kV line bays at Mapusa s/s (for Xeldem – Mapusa 400kV D/c (quad) line)</p> <p>(v) 1x80MVAR switchable line reactor along with 500 Ohms NGR and its auxiliaries 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)</p>	
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Note:

- a. *The line lengths mentioned above are approximate as the exact length shall be obtained after the detailed survey.*
- b. *Narendra (existing) – Narendra (New) 400kV D/c (quad) line: 178KM is without Line Reactor at both ends. After LILO of this line at Xeldem S/s (considering LILO length as 120KM), the length of modified sections i.e. Narendra (existing) - Xeldem 400kV (quad) line: 120KM (approx.) and Narendra (New) – Xeldem 400kV (quad) line: 298KM (approx.)*
- c. *It is understood that land for 400/220kV Xeldem S/s is available (adjacent to 220 kV Xeldem sub-station of GED) with GED. The same may be provided by GED to the Bidder at cost.*

Members noted the same.

15.2. CEA further stated that the interconnection between the existing 220 kV Xeldem substation and the proposed 400/220kV Xeldem substation needs to be finalized. If the interconnection was through bus extension then there is no issue, but if it is through two nos. of 220 kV D/C line or one no. of high capacity 220 kV D/C line then the corresponding 220 kV bays needs to be built at the existing Xeldem 220 kV substation of Goa. As there was no representative from Goa was present in the meeting, it was decided that CEA/CTU would take up the issue with Goa.

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

16.1. CTU stated that CERC vide some of its recent orders has strongly commented against assets mismatch noticed at the time of declaration of DOCO & has advised the following:

*"In case of cost plus, the mismatch between Generation / Downstream network / Upstream network, Transmission licensee will not burden the consumers and the charges would be compensated through the IA between the parties".*

CERC has not included such assets in PoC and in cases of declaration of DOCO, it has been directed to recover transmission charges from concerned Generator / STU / Discoms.

Further, following has been mentioned in the CERC (IEGC) (Fourth Amendment) Regulations, 2016, dated 6/4/16 under 5.4. Proviso (iii):

*"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."*

16.2. Keeping above in view, STUs are requested to ensure utilization of the 220kV line bays at following new / under implementation ISTS substations planned under various transmission schemes:

**Status of unutilised 220kV line bays at Existing Substations in WR**

SI	ISTS Substation	Voltage ratio in use	Status of Bays	220kV Lines emanating from Substation	No of ckt	Status of 220kV lines
1	Raipur (PG)	3x315MVA, 400/220kV	2no Bays ready since 01.07.2011 (WRSS-6)	Raipur (PG) – Doma 220kV D/c	2	UC - By Sep'16
2	Mapusa (PG)	3x315MVA, 400/220kV	2 nos Bays ready since : 01.11.2013	Mapusa – Cuncolin 220kV D/c	2	UC
3	Pirana	2x315MVA, 400/220kV	2nos Bays ready since 19.03.15 (WRSS-6)	Pirana – Barjadi 220kV D/c	2	UC



4	Boisar	2x315 +500MVA, 400/220kV	1 no Bays ready since 30.05.15	Boisar – STU line S/c	1	UC
5	Magarwada	2x315MVA, 400/220kV	2nos Bays ready since 03/11/14	Magarwada – Ringarwada 220kV D/c	2	UC - By end of 2016 (Being built by POWERGRID under consultancy)
6	Wardha	2x315MVA, 400/220kV	2 nos Bays ready since 01.02.2011 & 2 nos Bays ready since 01.01.2012	Wardha – Pusad220kV S/c	1	Planned
				Wardha – Bhugaon 220kV S/c	1	Planned
				220kV 2 circuits	2	To be planned by MSETCL
7	Solapur	2x315 +1x500MVA, 400/220kV	2 nos Bays ready since 01.04.2011 & 2 nos Bays ready since 02.11.2015	Solapur – Bhale (MS) 220kV D/c	2	UC
				Solapur – Bhalwane (MS) 220kV D/c	2	UC

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

Sl	ISTS Substation	Proposed Bays	Commissioning Schedule	220kV Lines emanating from Substation	No of ckt	Status of 220kV lines	Remarks
1	Betul GIS 2x315MVA, 400/220kV	4	Sep'16 (Mauda-II)	STU line	2	UC	
				STU line	2	UC	
2	Morena (TBCB) 2x315, 400/220kV	4	May'18 (Chhattisgarh & WR SS)	STU line	4	Planned	
3	Navi Mumbai 2x315, 400/220kV	4	Bays ready since Mar'14 (WRSS-V)	STU line	4	Planned	
4	Indore (PG) 2x500MVA, 400/220kV	6	Jul'18 (WRSS-14)	Indore(PG) - Indore(MP) 220kV D/c	2	UC	
				Indore(PG) - Ujjain(MP) 220kV D/c	2	UC	
				Future	2	To be planned by MP	
5	Itarsi (PG) 1x500MVA, 400/220kV	2	Jul'18 (WRSS-14)	Future	2	To be planned by MP	
6	Navsari 2x315 +1x500MVA , 400/220kV	2	May'18	Navsari - Bhestan 220kV D/c	2	UC - By May'18	
7	Parli (PG) 2x500MVA, 400/220kV	6	Jun/Jul'18 (WRSS-16)	Parli(PG) - Harngul D/c 220kV D/c	2	UC	Yet to be awarded, IA to be signed by Maharashtra
				Parli(PG) - Parli (MS) 220kV D/c	2	UC	
				Parli(PG) - Parli (MS) 220kV S/c	1	UC	
				Parli(PG) - Osmanabad (MS) 220kV S/c	1	UC	

8	Mapusa (PG) 3X315MVA, 400/220	2	Jun/Jul'18 (WRSS-16)	Mapusa - Tuem 220kV D/c	2	UC	Yet to be awarded, IA to be signed by Goa
9	Satna (PG) 1x500MVA, 400/220kV	2	Jun/Jul'18 (WRSS-16)	Future	2	To be planned by MP	Yet to be awarded, IA to be signed by M.P.
10	Damoh 1x500MVA 400/220kV	2	July'16	STU line	2	To be planned by MP	?
11	Vadodara GIS 2x500MVA 400/220kV	4	July'16	220kV Venkatpura-Vadodara D/C Line 220KV Jambua – Vadodara D/C Line	4	Lines planned by GETCO	Implementation of 220 kV lines yet to commence

- 16.3. The issue was deliberated and the constituents were requested to expedite the commissioning of the 220 kV lines where bays have already been implemented by POWERGRID and are lying unutilized. At substations where the 220 bays are under construction, constituents were requested to complete the 220 kV lines in matching time frame of the 220 kV bays.
- 16.4. Regarding the Implementation Agreement, it was agreed that it would be signed by the constituents for the schemes which were yet to be awarded. The 220 kV bays at Parli, Mapusa and Satna were yet to be awarded by POWERGRID, therefore MSETCL, Goa and Madhya Pradesh would sign the Implementation agreement with POWERGRID for Parli, Mapusa and Satna 220 kV bays respectively. Further, Implementation agreement for 2 nos. 400kV line bays at Indore (PG) S/s by POWERGRID for termination of Indore-Ujjain 400kV D/c line (to be constructed by MPPTCL) also needs to be signed between POWERGRID and MPPTCL.
17. **Progress of dedicated line under construction by Generation Developers who are connected through interim arrangement**
- 17.1. CEA stated that the transmission system for IPPs generation projects coming up in Raigarh and Champa generation complex of Chhattisgarh was finalized the 30<sup>th</sup> Standing Committee on Power System Planning in WR held on 8<sup>th</sup> July 2010. The transmission system included dedicated transmission system up to pooling stations at Champa, Raigarh (Kotra), Raigarh (Tamnar) under the scope of project developer and HIGH CAPACITY TRANSMISSION CORRIDOR – V associated with Chhattisgarh IPPs under the scope of POWERGRID and M/s BDTCL (Bhopal Dhule Transmission Company Limited). Interim arrangement for connectivity of some of the generation projects coming prior to availability of transmission system was also agreed. The interim arrangement agreed was purely a temporary transmission arrangement to be carried out by the respective IPP. The LILO was to be removed and the line was to be restored in its original configuration by the respective developer, after interconnection of the generation project at the identified Pooling Station. Subsequently, the pooling station for M/s BALCO and M/s Vandan Vidhyut Limited was changed from Champa to Dharamjaygarh without any change in the interim arrangement.

The six IPPs (5 nos IPPs in Chhattisgarh and one IPP in Madhya Pradesh) in Western Region who have been granted interim arrangement are- RKM

Powergen Pvt. Ltd. (RKMPPL) (4x360MW), Korba West Power Co. Ltd. (KWPCCL) (1x600MW), KSK Mahanadi Power Co. Ltd. (KMPCL) (6x600MW), Bharat Aluminium Co. Ltd. (BALCO) (4x300MW), Vandana Vidyut Ltd. (VVL) (2x135+270MW) and Essar Power M.P. Ltd (EPMPL) (2x600MW). In spite of considerable time, the dedicated transmission line is yet to be completed by Generation Developer and they are still connected through interim arrangement.

Bilaspur pooling station along with its associated transmission system, where M/s Essar Power MP Limited dedicated line has to be terminated, has already been commissioned. Most of the transmission elements of the HIGH CAPACITY TRANSMISSION CORRIDOR – V associated with Chhattisgarh IPPs including the pooling stations where dedicated lines of the IPPs are to be terminated, have been commissioned. The balance system would also be commissioned by March 2017.

Recently, Hon'ble CERC in Petition No.112/TT/13 (Tariff order w.r.t. Orissa High Capacity Corridor-I) has passed the order dated 07.10.15 wherein the following direction has been given in para 65 and para 66 of the order:

Para 65

*"The associated transmission lines were to be constructed by the generation developer matching with the transmission system to be developed by the petitioner and the LILOs constructed by generation developers which were temporary arrangement were to be replaced by the associated transmission system. It is noticed that some of the generation developers have not commissioned the dedicated lines and are continuing to evacuate power through the temporary LILO arrangements. We direct the petitioner to discuss the issue in the Standing Committee Meeting on Transmission and finalize the timeline for replacement of the LILOs of generation developer by dedicated transmission lines within a period of six months from the date of connection of LILO of the petitioner."*

Para 66

"Since the generation developers have failed to construct the dedicated transmission lines due to which assets created by the petitioner covered under the present petition are not serving the intended purpose, we are of the view, that the tariff for these assets shall be borne by the generators till operationalisation of their LTA as required under Regulation 8(5) of the 2010 Sharing Regulations as stated in para 60 herein. Till such time, the tariff for the assets shall be excluded from PoC pool."

In view of the above, the agenda has been taken up for discussion in the SCM of WR. POWERGRID vide their letter date 26.02.2016 has already written letters to the generation developer requesting them to expedite the construction of dedicated connectivity line and also provide the monthly progress of construction of dedicated connectivity line to CEA and CTU as per format circulated with the letter.

- 17.2. In the meeting, the progress of 5 nos. of IPPs (no representative from M/s VVL) was reviewed with their representatives.
- 17.3. BALCO representative stated that their dedicated line would be ready by 15.06.2016 and the interim connectivity arrangement would be disconnected. He

further stated that there is single point of connectivity with the ISTS system (BALCO- Dharamjaygarh 400 kV D/C line) and any exigencies with the dedicated line shall lead to black out at BALCO and non-availability of power from BALCO to the beneficiary states. For having redundancy, the process for second dedicated line has already been started but it would take long time for implementation as there is large forest area involved. Till the completion of the 2<sup>nd</sup> dedicated line, BALCO requested that the existing interim connectivity arrangement (LILO of 2<sup>nd</sup> 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.

17.4. CEA stated that BALCO vide their letter dated 07.03.2016 to CEA and CTU has also made a request for retaining the existing interim connectivity arrangement. 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.

17.5. Essar Power MP Ltd. (EPMPL) representative stated that out of 942 tower foundations, 938 have been completed. Further, 909 tower erections have been finished and stringing of about 197km has been finished out of 336km. It would take another 5 to 6 months' time for completion of the line i.e., December 2016.

CTU stated that month-wise progress of the dedicated line may be furnished by the M/s EPMPL and completion of the line by Dec'16 may be strictly adhered to.

17.6. RKM Powergen Pvt. Ltd. (RKMPPL) representative stated that only 6 km of OPGW is pending and the dedicated line will be ready by 15<sup>th</sup> June 2016.

17.7. Korba West Power Co. Ltd. (KWPCCL) representative stated that the dedicated line has already been commissioned.

17.8. KSK Mahanadi Power Co. Ltd. (KMPCL) representative stated that one 400 kV D/C line shall be completed by Jun'2016 and the other 400 kV D/C would be ready by December 2016.

17.9. There was no representation from M/s VVL. POSOCO informed that M/s VVL has not been paying the deviation charges and other charges, for which they have filed petition in CERC. CERC has directed M/s VVL to clear the outstanding dues and has directed WRLDC to invoke the provision 25A of the Open Access in inter-State Transmission, Regulations. As per the provisions of 25A, M/s VVL cannot apply for short term open access. However, M/s VVL has not cleared their outstanding dues till date. M/s VVL is intermittently drawing power through the LILO connectivity provided and is not paying any charges for the same. CTU informed that M/s VVL has not been attending the Joint Coordination Committee meetings wherein the progress of the IPPS are reviewed and they have not submitted any progress report for the generation project.

The issue was discussed and the committee decided that, in view of no progress report available for dedicated transmission line of M/s VVL, the interim connectivity provided to M/s VVL being used by them for intermittently drawing

power and non-payment of the deviation charges and other charges by M/s VVL, the interim connectivity provided to M/s VVL be opened. CTU to give notice to M/s VVL and apprise CERC regarding the case of M/s VVL.

17.10. The status of the dedicated transmission line of the six IPPs in Western Region who have been granted interim arrangement is summarized below:

Sl. No.	Name of IPP/ Ownership	Dedicated Connectivity line	Interim Connectivity Arrangement	On interim since	Target Completion of dedicated line (as informed by developer)
1	RKM Powergen Pvt. Ltd. (RKMPPPL) (4x360MW) M/s RKMPPPL	RKMPPPL- Raigarh PS (Near Kotra) 400kV D/c (Quad) line	LILO of 3 <sup>rd</sup> ckt of Raigarh - Raipur 400kV 2 <sup>nd</sup> D/c line (Presently Raigarh-RKM-KMPCL- Raipur)	Sep'14	15.06.2016
2	Korba West Power Co. Ltd. (KWPCCL) (1x600MW) M/s Avantha Power & Infrastructure Ltd.	KWPCCL - Raigarh PS (near Kotra) 400kV D/c line	LILO of 2 <sup>nd</sup> ckt of Raigarh - Raipur 400kV 1 <sup>st</sup> D/c line (Presently Raigarh -KWPCCL- Raipur)	Feb'13	Already commissioned in Apr'16
3	KSK Mahanadi Power Co. Ltd. (KMPCL) (6x600MW) M/s KMPCL	KMPCL - Champa PS 2xD/c (Quad) line	LILO of Raigarh - Raipur 400kV 2 <sup>nd</sup> D/c line	Aug'12	30.06.2016 (1 <sup>st</sup> D/c); 31.12.2016 (2 <sup>nd</sup> D/c)
4	Bharat Aluminium Co. Ltd. (BALCO) (4x300MW) M/s Vedanta	BALCO - Dharamjaygarh PS 400kV D/c (Triple / Quad) line	LILO of 2 <sup>nd</sup> ckt of Korba - Birsinghpur 400kV D/c line	Oct'11	15.06.2016
5	Vandana Vidyut Ltd. (VVL) (2x135+270MW) M/s VVL	VVL - Dharamjaygarh PS 400kV D/c line	LILO of 1 <sup>st</sup> ckt of Korba - Birsinghpur 400kV D/c line	July'12	Not present. As informed by M/s BALCO, work on dedicated line has not yet started.
6	Essar Power M.P. Ltd. (EPMPPL) (2x600MW) M/s Essar Power Ltd.	EPMPPL - Bilaspur PS 400kV D/c (triple) line	LILO of 1 <sup>st</sup> ckt of Korba STPS - Vindhyachal STPS 400kV D/c line	Dec'11	Dec'16 (5 - 6 months)

18. **Requirement of new substation near Vapi / Ambethi area and Kosamba-Vapi 400 kV D/C line.**

18.1. CEA stated that in the 38<sup>th</sup> WR SCM held on 17.07.2015 it was decided that the proposal of 400 kV Kosamba – Vapi D/C needs to be reviewed through joint studies of CEA, CTU & GETCO after considering the augmentation of 400kV network in southern Gujarat to be implemented by GETCO. Further in the 39<sup>th</sup> WR SCM, it was suggested that instead of augmenting transformation capacity at both the substations (Kala and Vapi), a new substation may be proposed near

Vapi / Ambethi area to cater to the demand of DNH and Daman & Diu as there is no space available for putting additional transformers at existing Vapi 400/220 kV substation.

A meeting notice was issued for joint system studies (by CEA, CTU and GETCO) on 28-29<sup>th</sup> April 2016 by CEA, for transmission proposals in Gujarat (Kosamba-Vapi 400 kV D/C line, New substation in Vapi area and utilization of Essar-Bachau 400 kV D/C line). In reply to the meeting notice, GETCO instead of participating in the joint studies had given their views and had requested to evolve the proposal and put up for further deliberations in the standing committee meeting. The studies were done considering Chikhli and Vav substations of GETCO in Southern Gujarat & new substation near Vapi / Ambethi and the report was included in the agenda. The studies show power flow of about 150 MVA per circuit on Kosamba – Vapi 400kV D/c line.

POWERGRID had carried out comprehensive transmission system studies, as a part of consultancy, for UT of Dadra and Nagar Haveli (DNH) as well as Daman and Diu (D&D) for 2021-22 time- frame. For providing adequate transformation capacity at ISTS level for power drawl by UT of DNH, the following transmission system has been proposed by POWERGRID:

- (i) Establishment of a New 2x500MVA, 400/220kV Substation near Vapi / Ambethi
- (ii) LILO of KAPP – Vapi 400kV D/c line at Vapi / Ambethi (New) Substation
- (iii) Vapi / Ambethi (New) – Sayali (DNH) 220kV D/c line (high capacity)
- (iv) Vapi / Ambethi (New) – New Kharadpada (DHN) 220kV D/c line (high capacity)

- 18.2. GETCO representative stated that due to limited inlets at Vapi(PG) substation, many time power is flowing from Vapi(GETCO) to Vapi(PG) 220 kV line which results in further loading of the GETCO network in the area, therefore Kosamba-Vapi corridor will reduce the loading of 220 kV network in this area. The studies show import of around 1100-1300 MW to Gujarat but in operation very less import of power from Maharashtra to Gujarat takes place and many times power is exported to Maharashtra system. Further, the maximum combined generation of SUGEN, DGEN and UNOSUGEN is 1000-1200 MW but in the studies maximum dispatch from these stations has been taken. Also no 220 kV outlets have been proposed for Gujarat from the new 400 kV substation near Vapi / Ambethi. In view of these observations, the study needs to be revised.
- 18.3. CEA clarified that with commissioning of Padghe 765/400 kV substation the studies shows import of power from Maharashtra to Gujarat and the import quantum would increase if the dispatch from SUGEN, DGEN and UNOSUGEN is reduced. Regarding the 220 kV outlets from the proposed 400 kV substation near Vapi / Ambethi, the requirement has to come from GETCO for inclusion in the proposal.
- 18.4. In view of the observations made by Gujarat, it was agreed that a revised study would be jointly carried out CEA, CTU and GETCO and the proposal would be put up for approval in the next standing committee meeting.

19. **Alternative utilization of Essar Power Gujarat Ltd. (EPGL) - Bhachau 400kV D/c (Triple) line of POWERGRID**

- 19.1. Director (PSP&PA-I), CEA stated that M/s EPGL had planned to develop coal based power plant at Salaya, Gujarat in three phases (2x600+4x660MW+4x150MW). Presently, first phase of generation i.e. 2x600MW has already been commissioned and is connected to the GETCO network through EPGL Phase-I – Rajkot 400kV D/c line. The second evacuation line (EPGL Phase-I – Amreli 400kV D/c line) is currently under implementation by GETCO. From the second and third phase of generation at M/s EPGL i.e. out of 3040MW (after auxiliary consumption), PPA for 800MW was signed with Gujarat, for which GETCO had planned EPGL – Halvad 400kV D/c line and for remaining capacity of 2240MW, M/s EPGL had applied for connectivity and same was granted through EPGL – Bhachau 400kV D/c (Triple) line. The second and third phase of EPGL project is yet to take off. The EPGL – Halvad 400kV D/c line, which GETCO had planned with 2<sup>nd</sup> and 3<sup>rd</sup> phase of EPGL has not been taken up for implementation by GETCO. However, EPGL – Bhachau 400kV D/c (Triple) line is almost completed by POWERGRID and balance 9 nos tower foundation, 10 nos tower erection and 3.5KM stringing is held up due to non-finalization of gantry by M/s EPGL. In absence of 2<sup>nd</sup> and 3<sup>rd</sup> phase of the EPGL, the EPGL – Bhachau 400kV D/c (Triple) line shall remain unutilized. In this regard, M/s EPGL has forwarded a proposal to CEA, POWERGRID and GETCO for utilization of EPGL - Bhachau 400kV D/c (Triple) line involving interconnection of this line with Bhogat S/s and Kalvad S/s of GETCO.

Based on the proposal made by M/s EPGL and other discussions between CTU and CEA, the following is proposed in order to facilitate utilization of EPGL – Bhachau 400kV D/c (Triple) line:

**Stage - 1:**

Currently, 2x600MW power from phase 1 of the generation project is being evacuated only through single 400kV D/c line to Rajkot (Hadala) and the second evacuation line i.e. EPGL Phase-I – Amreli 400kV D/c line is under execution by GETCO. Hence, in order to enhance reliability of power supply, the EPGL – Bhachau 400kV D/c (Triple) line may be extended upto phase 1 of the generation project in order to form EPGL Phase-I – Bhachau 400kV D/c (Triple) line.

**Stage - 2:**

It is understood that GETCO has planned for construction of 400 kV Bhogat S/S and Kalavad S/S along with associated 220 kV network in Saurashtra region to tap the power available at 400 kV level (from Mundra UMPP, Adani and EPGL generations). Location of Bhogat is about 60km from EPGL site. As per the report mentioned above, Bhogat sub-station is to be utilized for stepping up power during peak wind generation season and to cater the demand during off peak wind season.

In order to utilize EPGL - Bhachau 400kV D/c line, following arrangement is proposed:

- (i) LILO of EPGL – Bhachau 400kV D/c (triple) line at Halvad substation of GETCO
- (ii) Extension of EPGL – Halvad - Bhachau 400kV D/c (triple) line from EPGL end to Bhogat S/s after disconnection from EPGL Phase-I generation project

The above arrangement shall ensure utilization of EPGL – Bhachau 400kV D/c (Triple) line and would also provide additional source of power to Bhogat and Kalavad substations.

- 19.2. GETCO representative stated that the EPGL Phase-I – Amreli 400kV D/c line is already under implementation and it would be completed in 6 to 8 months' time. The main issue involved in any kind of proposal for utilization of the Essar – Bachau 400 kV D/C line was the financial implication of the line on GETCO.
- 19.3. CTU stated that the issue of the EPGL- Bhachau 400kV D/c (triple) line is already pending in CERC and commercial aspects shall be dealt in line with outcome of CERC order.
- 19.4. CEA & CTU re-iterated that leaving apart the commercial implications, the present proposal has been made for optimal utilization of the EPGL – Bhachau 400kV D/c (triple) line. M/s EPGL had made a proposal for utilization of the line. The proposal made above is another option. There could be better options for utilization of the EPGL – Bhachau 400kV D/c (triple) line, for which necessary studies have to be carried out.
- 19.5. CEA informed that GETCO has already planned 400 kV substation at Bhogat and Kalavad along with Bhogat – Kalavad 400 kV D/C line and implementation activities for the same would also commence shortly, therefore joint studies for utilization Essar – Bhachau 400kV D/c line may be done at the earliest.
- 19.6. After further deliberations it was decided that joint technical studies could be carried out within 15 days of this meeting amongst CEA, CTU, POSOCO and GETCO so as to finalize the proposal in regard to utilization of EPGL – Bhachau 400kV D/c (triple) line.

## 20. **Open Access Meeting.**

- 20.1. The detailed minutes of the 23<sup>rd</sup> meeting of WR constituents regarding connectivity/ open access applications is being separately issued by POWERGRID. The summary of the schemes agreed in the open access meeting is enclosed at Annexure-4.



**Annexure – 1**

**List of Participants during the 40<sup>th</sup> Meeting of Standing Committee on Power System Planning in Western Region held on 01.06.2016 at NRPC, Katwaria Sarai, New Delhi.**

S.No	Name	Designation	Contact No.	e-mail
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1.	S.D.Dubey	Chairperson (I/C)	011-26732303	
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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)  <b>Milestones :</b> (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.  <b>Work Yet to start.</b>
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)  <b>Milestones:</b> (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	<b>Commissioned on 30.6.2014</b>
3	System strengthening common for WR and NR Estimated Cost 1720 cr	PFC JTCL(Sterlite Grid)  <b>Milestones:</b> (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	<b>Line commissioned in 09/15</b>
			(ii) Jabalpur-Bina 765 kV S/C line	<b>Line commissioned in 06/15</b>
4	System strengthening for WR Estimated Cost 2900 cr	PFC BDTCL(Sterlite Grid)  <b>Milestones:</b> (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	<b>Line commissioned in 06/15</b>
			(ii) Bhopal-Indore 765 kV S/C line	<b>Line commissioned in 10/14</b>

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	(iii) 2x1500 MVA 765/400 kV substation at Bhopal (iv) Bhopal-Bhopal (MPPTCL) 400 kV D/c quad line. (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	Commissioned in 7/2014 Commissioned in 7/2014 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 <b>Milestones:</b> (i) Lol issued on 19.05.2014 (ii) <b>Approval under section 68 on 30.01.2014.</b> (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) <b>Milestones:</b> (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) <b>Milestones:</b> (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) <b>Milestones:</b> (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	PFC Chhattisgarh-WR Transmission Ltd. (A subsidiary of Adani Power Limited)	(i) Gwalior 765/400 kV – Morena 400 kV D/C line 400 kV D/C Length- 50 km (ii) Establishment of substation at	SPV transferred on 23.11.2015

S.N.	Name of the Project	BPC / Implementing Agency / Milestones	Scope of works	Current Status
	other generation projects in Western Region	<p><b>Milestones:</b></p> <p>(i) MoP vide letter dated 15.01.2014 trans dated 15-07-2014 &amp; Gazette Notification dated 09.07.14 appointed PFCCL as BPC.</p> <p>(ii) SPV incorporated on 24.12.2014</p> <p>(iii) RFQ notice published on 29.12.2015.</p> <p>(iv) Lol issued to the successful bidder Adani Power Ltd on 28.07.2015.</p>	<p>Morena 400/ 220 kV 2X315 MVA</p> <p>(iii) Vindhyachal-IV &amp; V STPP – Vindhyachal Pool 400 kV D/C (Quad) 2nd line 400 kV D/C Length-15 km</p> <p>(iv) Sasan UMPP – Vindhyachal Pooling station 765 kV S/C line 765 KV S/C Length-8 km</p> <p>(v) LILO of one circuit of Aurangabad – Padghe 765 kV D/C line at Pune 765 kV D/C Length-50 km</p>	
10	Additional System Strengthening for Sipat STPS	<p>PFC</p> <p>Sipat Transmission Ltd (A subsidiary of Adani Power Limited)</p> <p><b>Milestones:</b></p> <p>(i) MoP vide letter dated 15.01.2014 trans dated 15-07-2014 &amp; Gazette Notification dated 09.07.14 appointed PFCCL as BPC.</p> <p>(ii) SPV incorporated on 23.12.2014</p> <p>(iii) RFQ issued on 01.01.2015.</p> <p>(iv) Lol issued to the successful bidder Adani Power Ltd on 28.07.2015</p>	<p>(i) Sipat – Bilaspur Pooling Station 765 kV S/C line 765 kV S/C Length-25 km</p> <p>(ii) Bilaspur Pooling Station - Rajnandgaon 765 kV D/C line 765 kV D/C Length-180 km</p>	SPV transferred on 23.11.2015
11	Additional System Strengthening Scheme for Chhattisgarh IPPs – Part B	<p>PFC</p> <p>Raipur – Rajnandgaon - Warora Transmission Ltd (A subsidiary of Adani Power Limited)</p> <p><b>Milestones:</b></p> <p>(i) MoP vide letter dated 15.01.2014 trans dated 15-07-2014 &amp; Gazette Notification dated 09.07.14 appointed PFCCL as BPC.</p> <p>(ii) SPV incorporated on 23.12.2014</p> <p>(iii) RFQ notice published on 01.01.2015.</p> <p>(iv) Lol issued to the successful bidder Adani Power Ltd on 28.07.2015</p>	<p>(i) Raipur (Pool) – Rajnandgaon 765 kV D/C line 765 KV D/C Length-60 KM</p> <p>(ii) Rajnandgaon – New Pooling station near Warora 765 kV D/C line 765 KV D/C Length- 270 KM</p> <p>(iii) Establishment of new substation near Rajnandgaon 765/400kV 2x1500 MVA</p>	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	<p>PFC</p> <p>Warora Kurnool Transmission Ltd (A subsidiary of Essel Infraprojects Limited)</p> <p><b>Milestones:</b></p> <p>(i) MoP vide Gazette Notification dated 06.02.15 appointed PFCCL as BPC.</p> <p>(ii) SPV incorporated on 20.04.2015 RFQ notice published on 23.04.2015.</p> <p>(iii) RfQ responses received and opened on 22.05.2015. RfQ evaluation completed.</p>	<p>(i) Establishment of 765/400kV substations at Warangal (New) with 2x1500 MVA transformers and 2x240 MVAR bus reactors. 765/400kV</p> <p>(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</p> <p>(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</p> <p>(iv) Warangal (New) – Warangal</p>	<p>Under Bidding process</p> <p>Lol issued</p>

S.N.	Name of the Project	BPC / Implementing Agency / Milestones	Scope of works	Current Status
		<p>(iv) The revised RfQ has been re-issued on 11.09.2015 with submission of response due on 12.10.2015.</p> <p>(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.</p>	<p>(existing) 400 kV (quad) D/c line. 400KV D/C Length-10 KM</p> <p>(v) Hyderabad – Kurnool 765 kV D/c line with 240 MVAR switchable line reactor at Kurnool end. 765 KV D/C Length- 170 KM</p> <p>(vi) Warangal (New) – Chilakaluripeta 765kV D/c line with 240 MVAR switchable line reactor at both ends.765 KV D/C Length-250</p> <p>(vii) Cuddapah – Hoodi 400kV (quad) D/c line with 63 MVAR switchable line reactor at both ends. 400 KV D/C Length-200</p>	
13	Common Transmission System for Phase-II Generation Projects in Odisha and Immediate Evacuation System for OPGC (1320 MW) Project in Odisha	<p>PFC</p> <p>Orissa Generation Phase-II Transmission Limited (A subsidiary of Sterlite Grid Limited)</p> <p><b>Milestones:</b></p> <p>(i) MoP vide Gazette Notification dated 06.02.15 appointed PFCCL as BPC.</p> <p>(ii) SPV incorporated on 17.04.2015</p> <p>(iii) RFQ notice published on 23.04.2015.</p>	<p>(i) OPGC (IB TPS) – Jharsuguda (Sundargarh) 400kV D/C line with Triple Snowbird Conductor 400 kV D/C Length- 50 KM</p> <p>(ii) Jharsuguda (Sundargarh) – Raipur Pool 765 kV D/C line 765 KV D/C Length- 350 KM</p>	<p>Under Bidding process</p> <p>Approval of MoP awaited for Transfer of SPV</p>

**Annexure- 3**

**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 SCM	Investment approval	Target date as of now	Remarks
1	<p><b>Western Region System Strengthening Scheme -II</b></p> <p>Set-A: For absorbing import in eastern and central part of WR Grid (POWERGRID)</p> <p>Set-B: For regional strengthening in Southern Maharashtra <b>(100 % private)</b></p> <p>Set-C: For regional strengthening in Gujarat <b>(100 % private)</b></p> <p>a) Rajgarh – Karamsad 400kV D/c</p> <p>b) Limdi(Chorania) – Ranchodpura 400kV D/c</p> <p>c) Ranchodpura – Zerda(Kansari) 400kV D/c</p> <p>Set-D: For regional Strengthening in Northern Madhya Pradesh <b>(POWERGRID)</b></p>	<p>5222</p> <p>1700</p> <p>1050</p> <p>600</p> <p>1050</p>	<p>20<sup>th</sup> (23.01.04 )</p>	<p>July'06</p>	<p>Commissi oned</p> <p>Commissi oned</p> <p>---</p> <p>commissi oned</p> <p>commissi oned</p> <p>commissi oned</p> <p>commissi oned</p>	<p>Implementation by Reliance</p>
2	<p><b>Western Region System Strengthening -V</b></p> <p>a) 400 kV Vapi- Kala - Kudus D/c</p> <p>b) LILO of 400 kV Lonikhand - Kalwa line at Navi Mumbai</p>	<p>722</p>	<p>25<sup>th</sup> (30.09.06 )</p>	<p>Dec'07</p>	<p>Mar'17</p> <p>Sep'16</p>	<p>Under implementation</p> <p>Vapi-Kala portion commissioned in Mar'14. Kudus S/s being implemente by MSETCL.</p> <p>Cable work in progress (2km.) Critical ROW issues</p>

	<p>c) Establishment of 400/220 kV, 2 x 315 MVA new S/s (GIS) at Navi Mumbai</p> <p>d) 220 kV Vapi- Khadoli D/c.</p>				Substation is ready and shall be commissioned matching with line Commissioned	
3	<p><b>Tr. System of Mundra Ultra Mega Power Project (4000 MW)</b></p> <p>a) Mundra – Bachchau - Ranchodpura 400 kV (Triple) D/c</p> <p>b) Mundra – Jetpur 400 kV (Triple) D/c</p> <p>c) Mundra – Limbdi 400 kV (Triple) D/c</p> <p>d) Gandhar-Navsari 400 kV D/c</p> <p>e) Navsari - Boisar 400 kV D/c</p> <p>f) LILO of both circuits of Kawas-Navsari 220 kV D/c at Navsari (PG)</p> <p>g) Wardha-Aurangabad 400 kV(Quad) D/c (with provision to upgrade at 1200 kV at later date)</p> <p>g) Aurangabad (PG) - Aurangabad I (Waluj) 400 kV(Quad)</p>	4824	26th (23.02.07)	Oct'08	<p>Commissioned</p> <p>Commissioned</p> <p>Commissioned</p> <p>Commissioned</p> <p>Sep'16</p> <p>Commissioned</p> <p>Mar'17</p> <p>Commissioned</p>	<p>Under implementation</p> <p>Severe ROW &amp; Forest issue.</p> <p>Both Contracts terminated due to unsatisfactory performance. Tender awarded for both the packages.</p>
	<p><b>Substations</b></p> <p>a) 40% Fixed Series Compensation each on Wardha - Aurangabad 400 kV D/c at Wardha end</p> <p>b) Establishment of new 400/220 kV, 2x315 MVA substation at Navsari &amp; Bachchau</p>				<p>Dec'16</p> <p>Commissioned</p>	<p>Commissioning matching with the line</p>



	c) Establishment of new 765/400 kV, 3x1500 MVA, substation at Wardha for charging of Seoni - Wardha 2xS/c lines at 765 kV level				Commissi oned	
4	<b>Transmission system associated with Krishnapatnam (5x800 MW) (WR Portion)- now delinked from Krishnapatnam UMPP</b>  a) Raichur – Solapur (PG) 765 kV S/c b) Solapur(PG) – Pune 765 kV S/c c) LILO of 400kV Aurangabad I (Waluj) - Pune (PG) D/c & Parli (PG) - Pune (PG) D/c lines at Pune(GIS) d) Establishment of new 765/400 kV substations at Pune (GIS) with 2x1500 MVA transformation capacity	1928	27 <sup>th</sup> (30.07.07 )		Commissi oned  Commissi oned  Commissi oned  Commissi oned	Under implementation
5	<b>Associated transmission system of VSTPP-IV and Rihand-III</b>  a) Rihand III- Vindhyachal Pool 765 kV D/c (initially to be op. at 400kV) b) Vindhyachal IV - Vindhyachal Pool 400kV D/c(Quad) c) Vindhyachal Pool - Satna 765 kV 2xS/c d) Satna -Gwalior 765 kV 2xS/c e) Gwalior – Jaipur(South) 765 kV S/c f) Vindhyachal Pool-Sasan 765 kV S/c g) Vindhyachal Pool-Sasan 400 kV D/c h) Establishment of 765/400kV, 2x1500 MVA substation at Vindhyachal Pool	4673	29 <sup>th</sup> (10.09.09 )	Mar'10	Ready for commissi oning  Commissi oned  Commissi oned  Commissi oned  Commissi oned  Commissi oned  Commissi oned	Under implementation  Ckt-I charged on 26.06.14. Ckt-II ready for commissioning in Aug'15
6	<b>Solapur STPP(2x660MW) transmission system</b>	63.32	30 <sup>th</sup> (08.07.10 )	Oct'13		Under implementation

	<p>a) Solapur STPP – Solapur (PG) 400kV D/c (Quad)</p> <p>b) Augmentation of 400/220kV ICT by 1x500MVA transformer (3<sup>rd</sup>) at Solapur (PG)</p>				<p>Commissioned</p> <p>Commissioned</p>	<p>Line completed in Apr'15</p>
7	<p><b>Solapur STPP (2x660MW) transmission system (Part-A)</b></p> <p>a) Solapur STPP – Solapur (PG) 400kV 2nd D/c (Quad)</p>	50.52	36 <sup>th</sup> (29.08.13)	Mar'15	<p>Mar'17</p>	<p>Award placed in May'15</p> <p>Foundation commenced from Nov'15</p>
8	<p><b>Transmission system for evacuation of Kakrapar Atomic Power Project unit 3 &amp; 4 (2x700 MW)</b></p> <p>a) Kakrapar NPP – Navsari 400kV D/c – 38 km</p> <p>b) Kakrapar NPP – Vapi 400kV D/c - 104 km</p>	378.71	31 <sup>st</sup> (27.12.10)	Feb'14	<p>Oct'16</p> <p>Oct'16</p>	<p>Under Implementation</p> <p>Stringing commenced from Mar'16</p>
9	<p><b>Transmission System associated with Mauda Stage-II (2x660 MW)</b></p> <p>a) Mauda II – Betul 400KV D/c (Quad)-210 km</p> <p>b) Betul– Khandwa 400KV D/c (Quad)-180 km</p> <p>c) Khandwa – Indore(PG) 400kV D/c -215 km</p> <p>d) Establishment of 400/220kV 2x315MVA substation at Betul</p>	1575.3	32 <sup>nd</sup> (13.05.11)	Sep'13	<p>Sep'16</p> <p>Sep'16</p> <p>Sep'16</p> <p>Sep'16</p>	<p>Under Implementation</p>
10	<p><b>Provision of 1x315MVA ICT &amp; Spare Converter Trf for reliable auxilliary power supply at HVDC back to back station at Bhadravati</b></p>	143	33 <sup>rd</sup> (21.10.11)	-	Mar'17	<p>ICT commissioned in Mar'15. Balance work under progress.</p>
11	<p><b>Establishment of Pooling Station at Champa and Raigarh (Near Tamnar) for IPP Generation Projects in Chhattisagr</b></p>	2066.85	29 <sup>th</sup> (10.09.09)	May'11		<p>Under Implementation</p>

	<p>a) Champa Pooling Station - Raipur Pooling Station 765kV D/c</p> <p>b) Raigarh Pooling Staiton (near Kotra) - Raigarh pooling (near Tamnar) 765kV D/c</p> <p>c) Champa Pooling Station - Dharamjaygarh Pooling Station 765kv S/c</p> <p>d)Raigarh Pooling Staiton (near Kotra) - Champa pooling 765kV S/c</p> <p>e) Establishment of 765/400kV 6x1500MVA Champa Pooling Station</p> <p>f)Establishment of 765/400kV 3x1500MVA Raigarh Pooling Station (near Tamnar)</p>				<p>One ckt commissioned</p> <p>Commissioned</p> <p>Commissioned by-passing Champa Pool</p> <p>Commissioned</p> <p>Jul'16</p> <p>Commissioned</p>	<p>Other ckt terminated at D'jaygarh bypassing Champa</p> <p>ICTs to be commissioned with C-K HVDC Link</p>
12	<p><b>Transmission system strengthening in Western Part of WR for IPP generation proejects in Chhattisgarh</b></p> <p>a) Aurangabad(PG) – Boisar 400kV D/c (Quad)</p> <p>b) Wardha - Aurangabad (PG) 765kV D/c</p> <p>c) Establishement of 765/400kv 2x1500MVA auraganbad (PG) S/s</p> <p>d) Augmentation of transformation capacity at Boisar by 400/220kV, 1x500MVA</p>	2127.51	29th (10.09.09)	Nov'11	<p>Dec'16</p> <p>Commissioned</p> <p>Commissioned</p> <p>Commissioned</p>	<p>Under Implemetation</p> <p>Stage-I Forest Clearance received in Aug'15</p>
13	<p><b>System strengthening in North/West part of WR for IPP Projects in Chhattisgarh</b></p> <p>a) Aurangabad (PG) – Padghe(PG) 765kV D/c</p> <p>b) Vadodara – Asoj 400kV D/c(Quad)</p>	2073.26	29th (10.09.09)	Dec'11	<p>Mar'17</p> <p>Commisisoned</p>	<p>Under Implementation</p> <p>Forest clearance awaited</p>

	c) Padghe – Kudus 400kV D/c (Quad)				Mar'17	Matching with Kudus S/s of MSETCL & A'bad-Padghe line
14	<b>System Strengthening in Raipur-Wardha Corridor for IPP projects in Chhattisgarh (DPR-6)</b>  a) Raipur Pooling station - Wardha 765kV 2nd D/c	1422.85	29th (10.09.09 )	Jan'12		Under Implementation  Stage-I Forest Clearance received in Jun'15 & Stage-II in Dec'15
15	<b>WR-NR HVDC interconnector for IPP Projects in Chhattisgarh</b>  a) A ± 800kV, 3000Mw HVDC bipole between Champa Pooling Station-Kurukshetra (NR) (provision to upgrade to 6000MW at a latter date) b) Kurukshetra(NR) - Jalandhar 400kV D/c(Quad) one ckt. via 400/220kV Nakodar c) LILO of Abdullapur – Sonapat 400kV D/c(triple) at Kurukshetra d) Establishment of 3000MW 800KV HVDC bipole terminal each at Champa Pooling station and Kurukshetra(NR) respectively: to be upgraded to 6000MW.  e) Establishment of 400/220kV 2x500 MVA S/s at Kurukshetra (GIS) 2x500MVA	9569.76	29th (10.09.09 )/30th (08.07.10 )	Mar'12		Under Implementation  Sep'16  Commissi oned  Commissi oned  Dec'16  Sep'16  400kV bays ready for commissioning in Dec'15. ICT-II under progress.
16	<b>Inter-regional system strengthening scheme for WR and NR-Part A</b>  a) Solapur - Aurangabad 765kV D/c	1315.9	35 <sup>th</sup> (29.08.13 )	Oct'13		Completed  Commissi oned
17	<b>Transmission System Associated with Lara STPS-I (2x800MW)</b>	400.47	17 <sup>th</sup> LTA (03.01.13 )	Jun'14		Under Implementation

	a) Lara STPS-I – Raigarh (Kotra) Pooling Station 400 kV D/c line – 18km b) Lara STPS-I – Champa Pooling Station 400 kV D/c (quad) line- 112km				May'16 Apr'17	Tower erection commenced in Oct'15
18	<b>Transmission System Strengthening in WR-NR Transmission Corridor for IPPs in Chattisgarh</b>  a) Up-gradation of + 800kV, 3000MW HVDC bipole between Champa Pooling Station – Kurukshetra (NR) to 6000MW b) Kurukshetra (NR) – Jind 400kV D/c (Quad)	5151.37	35 <sup>th</sup> (03.01.13 )	Jun'14	Mar'18 Mar'18	Award under progress
19	<b>Inter-regional system strengthening scheme for WR and NR-Part B</b>  (a) 765KV D/C Jabalpur Pooling Station - Orai line (b) 765KV D/C Orai - Aligarh line (c) 400KV D/C Orai - Orai line (Q) (d) LILO of one ckt of Satna-Gwalior 765KV 2x S/C line at Orai (e) LILO of Agra - Meerut 765KV S/C at Aligarh (f) LILO of Kanpur - Jhatikara 765KV S/C at Aligarh	6517.36		Dec'14	Apr'18 Apr'18 Apr'18 Apr'18 Apr'18	Award placed in Mar'15
20	<b>Wardha - Hyderabad 765kV Links</b>  (a) 765KV D/C Wardha - Hyderabad line (b) 400KV D/C Nizamabad - Dichpali line	3662.02		Jan'15	May'18 May'18	Award placed in Mar'15
21	<b>GREEN ENERGY CORRIDORS:- Inter State Transmission Scheme (ISTS) - Part B</b>  (a) 765KV D/C Banaskanta - Chittorgarh (New) line (b) 765KV D/C Chittorgarh (New) - Ajmer (New) line (c) 400KV D/C Banaskanta - Sankhari line	3705.61	36 / 37 <sup>th</sup> (29.08.13 /05.09.14 )	Apr'15	Apr'18 Apr'18 Apr'18	Award placed in July'15

	(d) Establishment of 765/400/220kV (765/400kV - 2x1500 MVA & 400/220kV - 2x500MVA) substation at Banaskanta				Apr'18	
22	<b>GREEN ENERGY CORRIDORS:- Inter State Transmission Scheme (ISTS) - Part C</b>  (a) 765KV D/C Bhuj Pool - Banaskanta line (d) Establishment of 765/400/220kV (765/400kV - 2x1500 MVA & 400/220kV - 2x500MVA) pooling station at Bhuj	2247.37	36 / 37 <sup>th</sup> (29.08.13 /05.09.14 )	July'15	July'18  July'18	Award under progress.
23	<b>Transmission System Strengthening Associated with Vindhyachal V - Part A</b>  (a) 1x1500MVA, 765/400kV ICT at Vindhyachal Pooling Station		34 <sup>th</sup> (09.05.12 )	Feb'15	July'17	Award placed in Aug'15
24	<b>Transmission System Strengthening Associated with Vindhyachal V - Part B</b>  (a) 2 nos of 765kV Line bays alongwith 2x330MVAR Line Reactor at Vindhyachal Pooling Station  (a) 2 nos of 765kV Line bays alongwith 2x330MVAR Line Reactor at Jabalpur Pooling Station		34 <sup>th</sup> (09.05.12 )		Jun'18  Jun'18	Investment Approval pending
25	<b>STATCOMs in Western Region</b>  (a) Aurangabad  (b) Gwalior  (c) Solapur  (d) Satna		36 <sup>th</sup> (29.08.13 )	Mar'15	Sep'17  Sep'17  Sep'17  Sep'17	Award placed in Jun'15  Award under progress  Award placed in Jun'15  Award placed in Jun'15
26	<b>Western Region System Strengthening Scheme XIV</b>	93.96	37 <sup>th</sup> (05.09.14 )			

	<p>(a) 2x500MVA, 400/220kV transformer alongwith six nos of 220kV bays at Indore (PG) 765/400kV Substation</p> <p>(b) 1x500MVA, 400/220kV transformer alongwith two nos of 220kV bays at Itarsi (PG) 400/220kV S/s</p>				July'18	
27	<p><b>Powergrid works associated with Part-A of Transmission system for Gadawara STPS of NTPC</b></p> <p>(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}</p>		36/37th (29.08.13 / 05.09.14)		May'17	
28	<p><b>Powergrid works associated with Part-B of Transmission system for Gadawara STPS of NTPC i.e. WRSS XV</b></p> <p>(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}</p> <p>(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)}</p>		36/37th (29.08.13 / 05.09.14)		Matching with TBCB schedule	
29	<p><b>Powergrid works associated with System Strengthening for IPPs in Chhattisgarh and other generation projects in Western Region</b></p> <p>(a) 1 no. 765 kV line bay at 765/400kV Vindhyachal Pooling Station of POWERGRID {for Sasan UMPP - Vindhyachal PS (PG) 765 kV 2nd S/c}</p> <p>(b) 2 no. 400 kV line bays at 765/400kV Vindhyachal Pooling Station of POWERGRID {for Vindhaychal (IV/V) STPP switchyard (NTPC) - Vindhyachal PS (PG) 400 kV 2nd D/c (quad)}</p>		36th (29.08.13 )		Matching with TBCB schedule	

	<p>(c) 2 no. 400 kV line bays at Gwalior Substation {for Gwalior - Morena 400 kV D/c (quad)}</p> <p>(d) 2 nos. 765 kV line bays at 765/400kV Pune (GIS) sub-station of POWERGRID {for LILO of one circuit of Aurangabad(PG) – Padghe(PG)765 kV D/c at Pune (GIS) (PG)}</p> <p>(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}</p> <p>(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}</p> <p>(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}</p>				
30	<p><b>Powergrid works associated with Additional System Strengthening Scheme Chhattisagrh IPPs Part-B</b></p> <p>(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}</p>		36/37th (29.08.13 / 05.09.14)		Matching with TBCB schedule
30	<p><b>Powergrid workds associated with Additional System Strengthening for Sipat STPS</b></p> <p>(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)</p>		36/37th (29.08.13 / 05.09.14)		Matching with TBCB schedule



	(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					
31	<b>Transmission System Strengthening associated with Mundra UMPP- Part A</b>  (a) LILO of both circuits of Mundra UMPP-Limbdi 400kV D/c (triple snowbird) line at Bachau	266.19	36th (29.08.13 )		Jun'18	
32	<b>Transmission System Strengthening associated with Mundra UMPP- Part B</b>  (a) Mundra UMPP - Bhuj Pool 400kV D/c line (triple snowbird)		36/38th (29.08.13 /17.07.20 15)		Jan'19	
33	<b>Bays for Transmission System Associated with DGEN Torrent Energy Ltd (1200MW)</b>  (a) 2nos 400kV Bays at Vadodara (GIS) (b) 2nos 220kV Bays at Navsari (GIS)		13/14th LTA (27.12.10 /13.05.20 11)		Matching with TBCB Line	
34	<b>Western Region System Strengthening -16</b>  (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		38th (17.07.15 )		July'18	

<p><b>35</b></p>	<p><b>Western Region System Strengthening -17</b></p> <p>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}.</p> <p>2. Conversion of followings Fixed Line Reactor into Switchable Line Reactors / BUS Reactor.</p> <p>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.</p> <p>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.</p> <p>c. 1x63 MVAR BUS Reactor at Bhadravati S/s: 420kV</p> <p>3. Installation of ICTs along with associated bays at following substations of POWERGRID:</p> <p>a. Khandwa 400/220kV Substation: 1x500 MVA, 400/220kV 3rd ICT.</p> <p>b. Boisar 400/220kV Substation: 1x500 MVA, 400/220kV 4th ICT.</p> <p>c. Kala 400/220kV Substation: 1x500 MVA, 400/220kV 3rd ICT.</p> <p>d. Dehgam 400/220kV Substation: 1x500 MVA, 400/220kV 3rd ICT.</p>		<p>39th (30.11.15 )</p>		<p>Mar'19</p>	
<p><b>36</b></p>	<p><b>Western Region System Strengthening -18</b></p> <p>1. Splitting of following substation along with necessary switching arrangement.</p> <p>a. Dharamjaygarh Pool 765kV BUS as fig.1 of Annexure1.</p>		<p>39th (30.11.15 )</p>		<p>Aug'19</p>	

	<p>b. Raigarh Pool (Kotra) 400kV &amp; 765kV BUS as per Fig. 2 of Annexure 1.</p> <p>c. Champa Pool 400 kV &amp; 765kV BUS as per Fig 3. of Annexure 1.</p> <p>2. Installation of Reactors:</p> <p>a. 1X125 MVAR BUS Reactor at 400kV BUS Section A of Dharamjaygarh Pool.</p> <p>b. 1X125 MVAR BUS Reactor at 400kV BUS Section A of Raigarh Pool (Kotra).</p> <p>c. 1X240 MVAR BUS Reactor at 765kV BUS Section A of Raigarh Pool (Kotra).</p> <p>d. 1X240 MVAR BUS Reactor at 765kV BUS Section A of Champa Pool.</p> <p>e. 1X330 MVAR BUS Reactor at 765kV BUS Section B of Dharamjaygarh Pool.</p>						
37	<p><b>PG Works associated with Transmission System for Khargone TPP</b></p> <p>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></p> <p>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></p> <p>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)</p>		38th & 39th (17.07.15 & 30.11.15)		Feb'18	July'19	July'19

**Summary of Connectivity/LTA agreed in the 23<sup>rd</sup> Meeting of WR  
Constituents regarding Connectivity & Long-Term Access  
applications in Western Region held on 01.06.2016**

**1. AGENDA FOR INTER - REGIONAL (IR) LTA APPLICATIONS SEEKING POWER TRANSFER FROM WR TO NR**

Presently following major inter-regional links between WR & NR are in pipeline for commissioning:

**Table-1**

<b>Sl. No.</b>	<b>Name of the link</b>	<b>Expected time frame</b>
1.	Champa – Kurukshetra phase – I	November, 2016
2.	Champa – Kurukshetra phase – II	March, 2018
3.	Jabalpur – Orai 765 kV D/c line	April, 2018

Corresponding to time frame of April, 2018, LTAs have been granted for transfer of about 17500 MW from generation projects in WR, ER & SR to NR through WR-NR Corridors and the anticipated ATC with above links is of the same order.

Recently, there have been number of cases where LTA customers have approached CERC for relinquishment of LTA on account of various reasons including alleged force majeure events. The quantum proposed to be relinquished in WR-NR corridor is about 1900 MW. The Hon'ble CERC has observed that pending decision on the various issues involved, the relinquished LTA quantum can be utilised for grant of LTA to other eligible LTA applications. Accordingly, an exercise has been carried out to re-allocate the transmission capacity relinquished in WR-NR corridor by LTA customers to applications under process seeking power transfer through WR-NR. Details of such applications is given at Table-2 below :

**Table-2**

<b>Sl. No</b>	<b>Name of the Applicant</b>	<b>Injecting Region</b>	<b>Quantum of LTA sought for NR (MW)</b>	<b>Application Month</b>	<b>LTA sought from</b>
1	<i>Satviki Energy Pvt. Ltd.</i>	SR	75	29-Nov-2013	Apr-2015
2	<i>Noida Power Co. Ltd.*</i>	WR	400	10-Dec-2013	1-Dec-2017
3	<i>MB Power (Madhya Pradesh) Limited</i>	WR	169	11-Feb-2014	1-Jun-2015
4	<i>MB Power (Madhya Pradesh) Limited</i>	WR	31	11-Feb-2014	1-Jun-2015
5	<i>KSK Mahanadi Power Company Ltd</i>	WR	1000	27-Feb-2014	30-Oct-2016
6	<i>MB Power (Madhya Pradesh) Limited</i>	WR	144	29-Dec-2014	1-Aug-2015
7	NTPC Ltd. - Barethi STPS	WR	870.87	29-Jan-2015	1-July-2021
8	Suzlon Power Infrastructure Ltd.	SR	40	30-Apr-2015	1-Apr-2018
9	Suzlon Power Infrastructure Ltd.	SR	40	30-Apr-2015	1-Oct-2018
10	Suzlon Power Infrastructure Ltd.	SR	40	30-Apr-2015	1-Apr-2019

Sl. No	Name of the Applicant	Injecting Region	Quantum of LTA sought for NR (MW)	Application Month	LTA sought from
11	SEI Sunshine Power Pvt. Ltd.	WR	180	31-Jul-2015	30-Sep-2016
12	TRN Energy Ltd	WR	240	27-Aug-2015**	30-Oct-2016
13	DB Power Chhattisgarh Ltd.	WR	75	20-Oct-2015	30-Nov-16
14	Rewa Ultra Mega Solar Ltd.	WR	300	6-Nov-2015	30-Jun-2017
15	Maruti Clean Coal & Power Ltd	WR	205	1-Mar-2016	30-Nov-2016
16	Srijan Energy System Private Limited	WR	150	6-May-2016	31-03- 2018
	<b>Total</b>		<b>3959.87 MW</b>		

\* Noida Power Company has applied LTA on Target Source Basis from WR (400 MW) and ER (100 MW).

\*\* TRN Energy was earlier requested to file fresh application on account of non submission of NoC by UP with application dated 27-Aug-2015. However as per the directions of Hon'ble CERC vide order dated 31.3.2016 in Petition No. 226/MP/2015, deemed NoC of UPPTCL is to be considered in case the same is not received by 30th Apr, 2016. In view of the no-furnishing of NoC by the said date deemed NoC is being considered for its earlier application dated 27-Aug-2015 and priority of the same is being considered accordingly.

Above mentioned relinquished capacity of about 1900MW was agreed to be allocated to LTA applications as per their priority of the month in which applications were received and summary of deliberations is given below :

- No representative of M/s Satviki Energy Pvt. Ltd. was available. CTU informed that M/s Satviki Energy Pvt. Ltd. has not been attending LTA & JCC meetings since long. Subsequently Satviki Energy Pvt. Ltd. vide letter dated 15.06.2016 have made a formal request for keeping their application in abeyance for another one year and therefore in line with the provisions of the Detailed Procedure the LTA application shall be closed.
- During the meeting, representative of Noida Power Co. Ltd. stated that Long Term PPAs have been signed with few IPPs in Western Region which have already been granted LTA by CTU with NR as target region and their position with respect to present LTA application will be clear in next 6-8 months. Accordingly, the applicant requested to keep its LTA application on hold. CTU representative clarified that as per the recent amendment by CERC to the Detailed Procedure informed earlier, applications cannot be kept on hold and under such a situation the LTA application is to be closed and BG to be returned, if applicable. The representative was requested to confirm their request through a formal letter based on which necessary action in line with the Detailed Procedure shall be taken. Subsequently NPCL vide letter dated 03.06.2016 have made a formal request for keeping their application in abeyance till one year and therefore in line with the provisions of the Detailed Procedure the LTA application shall be closed.
- Representative of Rewa Ultra Mega Solar (RUMS) Ltd. stated that on account of power sale tie up with DMRC(NR) as well as change in government policy, they now intend to change the LTA sought for NR from 300MW to 200MW. Accordingly, revised LTA sought shall be : NR: 200MW; WR: 550MW. As the change in quantum is of 100 MW that does not require filing of fresh application, therefore it was decided that the LTA application may be processed with revised quantum of target beneficiaries.

It was agreed to grant LTA to the following LTA Applicants with commissioning of Jabalpur PS – Orai 765 kV corridor and Champa – Kurukshetra HVDC Phase-II, based on priority of new LTA applications:

**Table-3**

Sl. No.	Name of the Applicant	Injecting Region	Quantum of LTA sought for NR (MW)	Application Month	LTA sought from
1.	MB Power (Madhya Pradesh) Limited	WR	169	11-Feb-2014	1-Jun-2015
2.	MB Power (Madhya Pradesh) Limited	WR	31	11-Feb-2014	1-Jun-2015
3.	KSK Mahanadi Power Company Ltd	WR	1000	27-Feb-2014	30-Oct-2016
4.	MB Power (Madhya Pradesh) Limited	WR	144	29-Dec-2014	1-Aug-2015
5.	Suzlon Power Infrastructure Ltd.	SR	40	30-Apr-2015	1-Apr-2018
6.	Suzlon Power Infrastructure Ltd.	SR	40	30-Apr-2015	1-Oct-2018
7.	Suzlon Power Infrastructure Ltd.	SR	40	30-Apr-2015	1-Apr-2019
8.	SEI Sunshine Power Pvt. Ltd.	WR	180	31-Jul-2015	30-Sep-2016
9.	TRN Energy Ltd.	WR	240	27-Aug-2015	30-Oct-2016
			<b>1884 MW</b>		

Grant of LTA to above applicants shall be subject to commissioning of Jabalpur - Orai 765 kV corridor under implementation as “Inter-Regional System Strengthening Scheme in WR and NR Part-B” and Champa – Kurukshetra HVDC Phase II under implementation as “Transmission System Strengthening in WR-NR Transmission Corridor For IPPs in Chhattisgarh”. Details of both the schemes are as given below:

**Inter-Regional System Strengthening Scheme in WR and NR Part-B**

- Jabalpur PS - Orai 765kV D/C line
- Orai - Aligarh 765kV D/C line
- Orai - Orai 400kV D/C (Quad) line
- LILO of one ckt of Satna - Gwalior 765kV 2xS/C line at Orai
- LILO of Agra - Meerut 765kV S/C at Aligarh
- LILO of Kanpur - Jhatikara 765kV S/C at Aligarh

**Transmission System Strengthening in WR-NR Transmission Corridor For IPPs in Chhattisgarh**

- Up-gradation of  $\pm$  800kV, 3000MW HVDC bipole between Champa PS – Kurukshetra (NR) to 6000MW
- Kurukshetra (NR) – Jind 400kV D/c (Quad)

Regarding Barethi STPS (NTPC Ltd.) listed at Sl. 7 of table 2 above, it was deliberated that since LTA to Barethi TPS is proposed to be granted along with its evacuation system, the generation project shall not use any WR – NR inter-regional capacity.

Additionally, M/s Dhariwal Infrastructure Ltd. vide letter dated 20.05.2016 has asked for reallocation of 20MW LTA from WR to NR pursuant to signing of long term PPA with NPCL for 170MW.

It was informed that new WR – NR inter-regional corridor i.e. Vindhyachal – Varanasi 765 kV D/c line has been agreed in the NR Standing Committee meeting held on

30.05.2016 and accordingly, it was proposed to grant the LTA to the following balance applications with the new WR-NR corridor:

**Table-4**

Sl. No	Name of the Applicant	Injecting Region	Quantum of LTA sought for NR (MW)	Application Month	LTA sought from
1.	DB Power Chhattisgarh Ltd.	WR	75	20-Oct-2015	30-Nov-16
2.	Rewa Ultra Mega Solar Ltd.	WR	200	6-Nov-2015	30-Jun-2017
3.	Maruti Clean Coal & Power Ltd.	WR	205	1-Mar-2016	30-Nov-2016
4.	Dhariwal Infrastructure Ltd.	WR	20	20-May-2016	01-Nov-2013
			<b>500 MW</b>		

It was informed that upon approval of above link, the same shall be put to Empowered Committee. After recommendation from Empowered Committee, the link is expected to be commissioned in about 49 months {40 months (CERC time schedule) + 9 months (time required for bidding process)}.

Members agreed with the above grant of LTA (Table-4) with Vindhyachal – Varanasi 765 kV D/c line.

It was further informed that Chhattisgarh State Power Trading Company Ltd. (CSPTrdCL) has applied to CERC for relinquishment of LTA quantum granted to CSPTrdCL from various generation projects. It was discussed that if appropriate direction is received from CERC in regard to reduction in the above LTA quantum of CSPTrdCL, the relinquished quantum on WR – NR corridor shall be reallocated to LTA applications in queue for power transfer to NR. However, the Vindhyachal – Varanasi 765kV D/c line shall still be required as corresponding generation projects in Chhattisgarh from which LTA had been availed by CSPTrdCL are commissioned / under implementation and power transfer requirement to NR from these projects may be required by other applicants. In such a scenario, the Vindhyachal – Varanasi 765kV D/c line shall be taken up as a system strengthening scheme as it shall also provide desired reliability in WR – NR corridor. Members agreed for the same.

Regarding LTA application of Srijan Energy System Private Ltd. at Sl. 16 of table 2, it was informed that the high capacity Green Energy Corridor starting from Bhuj PS (WR) to Moga(NR) is under implementation for evacuation and dispersal of power from renewable generations coming up in Gujarat (especially Kutch complex) and Rajasthan. Accordingly, it was agreed that LTA for power transfer to NR shall be granted on the under implementation Bhuj Pool – Banaskantha PS– Chittorgarh 765kV D/c corridor.

**2. Connectivity & LTA application for 750 MW by REWA Ultra Mega Solar (RUMS) Ltd. for development of Solar Park in Rewa, Madhya Pradesh**

Salient features of the application:

Sl.	Particulars	Application Details
1.	Capacity for connectivity	750 MW
2.	Date from which connectivity is required	31.03.2017

3.	Quantum for which LTA required	750MW
4.	Date from which LTA is required	June 30, 2017
5.	Date upto which LTA is required	June 29, 2042
6..	Location of Generating station	Rewa, Madhya Pradesh (WR)
7.	Injection of Power	400/220kV, 3x500 MVA Pooling station at Rewa
8.	Drawl of Power	WR : 550MW; NR:200MW (Earlier: WR : 450MW; NR:300MW)

After deliberations, following transmission system was proposed and agreed for connectivity and LTA for RUMS Ltd.

S. No.	Transmission system	Transmission Elements	Implementing Agency
1	Transmission System for Connectivity	<ul style="list-style-type: none"> <li>RUMS Ltd. switchyard – Rewa Pooling Station 220kV 3xD/c line along with associated bays at Solar Park</li> </ul>	M/s REWA Ultra Mega Solar (RUMS) Ltd./SPPD
		<ul style="list-style-type: none"> <li>Establishment of 400/220kV, 1x500 MVA Pooling station at Rewa</li> <li>LILO of 1st circuit of Vindhyachal STPS-Jabalpur 400kV 2nd D/c line (ckt-3&amp;4) at Rewa PS</li> <li>6 Nos. 220kV Line bays at Rewa PS (for RUMS-Rewa PS 220kV 3xD/c)</li> </ul>	POWERGRID
2	Transmission System for LTA	<ul style="list-style-type: none"> <li>Addition of 400/220kV, 2x500 MVA ICT at Rewa PS</li> <li>LILO of 2nd circuit of Vindhyachal STPS-Jabalpur 400kV 2<sup>nd</sup> D/c line (ckt-3&amp;4) at Rewa PS</li> <li>1x125 MVA, 420 kV Bus Reactor at Rewa Pooling Station</li> </ul>	POWERGRID
	Additional Transmission System for LTA from WR to NR	<p><b>New WR – NR Inter Regional Corridor</b></p> <ul style="list-style-type: none"> <li>Vindhyachal – Varanasi 765kV D/c line <i>(along-with appropriate reactive compensation)</i></li> </ul>	Through TBCB

Rewa Pooling station along-with associated transmission lines have already been awarded in Feb' 2016 and are expected to get commissioned by Mar' 2017.

### 3. Transmission system for Srijan Wind farm in Bhuj, distt. Kutch Gujarat.

Salient features of the application:



Sl.	Particulars	Application Details
1	Capacity for which connectivity is required	300 MW
2	Date from which connectivity is required	31.03.2018
3	Quantum for which LTA required	300 MW
4	Date from which LTA is required	Mar 31, 2018
5	Date upto which LTA is required	Mar 30, 2043
6	Location of Generating station	Bhuj, Distt. Kutch, Gujarat (WR)
7	Drawl of Power	NR:150MW; WR:90MW; SR:60 MW

Progressive commissioning schedule of the wind power project is as given below:

Sl. No.	Installed Capacity (MW)	Commissioning Schedule
1	20	Mar 31, 2018
2	120	Sep 30, 2018
3	120	Mar 31, 2019
4	40	May 31, 2019

765/400kV Bhuj and Banaskantha Pooling stations along with Bhuj PS - Banaskantha PS 765kV D/c line is already under implementation as part of Green Energy Corridor scheme. Further, Banaskantha PS is also being interconnected to 765 kV Chittorgarh and 400 kV Sankhari (GETCO) S/s as part of above transmission scheme. However, implementation of 400/220kV transformer alongwith 220kV switchyard at Bhuj PS was not taken up in absence of LTA applications for power injection.

After detailed deliberations, following system was agreed for grant of Connectivity and LTA to M/s SESPL:

S. No.	Transmission system	Transmission Elements	Implementing Agency
1	Transmission System for Connectivity	<ul style="list-style-type: none"> <li>• SESPL switchyard – Bhuj PS 220kV D/c line along with line bays at both ends</li> </ul>	M/s Srijan Energy System Pvt. Ltd. (SESPL)
		<ul style="list-style-type: none"> <li>• Installation of 2x500 MVA, 400/220kV ICT at Bhuj PS</li> </ul>	POWERGRID under GEC-ISTS scheme
<p>Connectivity of SESPL with the grid shall be established after the commissioning of above system and</p> <ul style="list-style-type: none"> <li>– Bhuj PS (765kV) – Banaskantha PS (765kV) – Sankhari (400kV) corridor</li> </ul> <p><b>OR</b></p> <ul style="list-style-type: none"> <li>– Bhuj PS (765kV) – Banaskantha PS (765kV) - Chittorgarh PS (765kV) - Chittorgarh (RVPN) (400kV) corridor (being implemented by POWERGRID under Green Energy Corridor-ISTS scheme and expected to be commissioned by July'18.)</li> </ul>			

2	Transmission System for LTA to NR	<ul style="list-style-type: none"> <li>Bhuj PS - Banaskantha PS 765kV D/c line</li> <li>Banaskantha PS - Chittorgarh PS 765kV D/c line</li> <li>Chittorgarh PS – Chittorgarh (RVPN) 400kV D/c (quad) line</li> </ul>	Under implementation by POWERGRID under GEC-ISTS scheme
	Transmission System for LTA to WR	<ul style="list-style-type: none"> <li>Existing / under Construction transmission system in WR</li> </ul>	
	Transmission System for LTA to SR	<p>With progressive enhancement of ATC with progressive commissioning of following links:</p> <ul style="list-style-type: none"> <li>Wardha – Nizamabad 765 kV D/c line along with Nizambad – Dichpally 400 kV D/c Line (HTLS)</li> <li>Nizamabad – Hyderabad (Maheshwaram) 765kV D/c line along with associated 400 kV Transmission System</li> </ul> <p>To be taken up for approval in meeting of Southern Region constituents.</p>	Under implementation by POWERGRID /TBCB / TSTRANSCO

#### 4. Connectivity Application of M/s Renew Power Ventures Pvt. Ltd. (4x100MW)

Salient features of the application:

Sl. No.	Description	Details as per submitted application
1	Installed Capacity of the Generating station (Wind Power Plant)	400 MW
2	Capacity for which connectivity required	400 MW
3	Commissioning Schedule	15/12/2017 : 100 MW 15/03/2018 : 100 MW 15/09/2018 : 100 MW 15/03/2019 : 100 MW
4	Date from which connectivity required	15/12/2017
5	Location of the Generating station	Bhuvad, Gandhidham, Distt.– Kutch, gujarat
6	Nearest substations	765/400/220 kV Bhuj Pooling S/s – 65 Km 400/220 kV Bhimasar (Bhachau) S/s -45 Km

After deliberations, following was agreed:

S. No.	Transmission system	Transmission Elements	Implementing Agency
1	Transmission System for Connectivity	<ul style="list-style-type: none"> <li>RPVPL switchyard – Bhachau 220kV D/c line along with associated line bays at both ends</li> <li><i>*Line bays at Bhachau end to be implemented as GIS</i></li> </ul>	M/s Renew Power Ventures Pvt. Ltd. (RPVPL)
		M/s Ostro Kutch Wind Pvt. Ltd. (discussed at Item#5) has also been granted connectivity at Bhachau S/s. In view of Right of way constraints towards the entry at Bhachau substation, it is proposed that options for utilization of multi-circuit towers (2xD/c) for the required stretch near Bhachau substation shall be explored for termination of RPVPL – Bhachau 220kV D/c and OKVPL – Bhachau 220kV D/c lines at Bhachau. The no of multi-ckt towers towards the entry at Bhachau S/s may be mutually decided by M/s OKVPL & M/s RPVPL.	

### 5. Connectivity Application of Ostro Kutch Wind Pvt. Ltd.

Salient features of the application:

S.No	Description	Details as per submitted application
1	Installed Capacity of the Generating station (Wind Power Plant)	300 MW
2	Capacity for which connectivity required	300 MW
4	Date from which connectivity required	31/03/2018
5	Location of the Generating station	Kutch, Gujarat
6	Nearest substation	400/220 kV Bhachau S/s (at distance of 5 km from Ostro Kutch Wind power plant)

Since the generation project is located very near to Bhachau sub-station of POWERGRID, following transmission system for connectivity was agreed:

S. No.	Transmission system	Transmission Elements	Implementing Agency
1	Transmission System for Connectivity	<ul style="list-style-type: none"> <li>OKWPL switchyard – Bhachau 220kV D/c line along with associated line bays at both ends</li> <li><i>*Line bays at Bhachau end to be implemented as GIS</i></li> </ul>	M/s Ostro Kutch Wind Pvt. Ltd. (OKWPL)
		M/s Renew Power Ventures Pvt. Ltd. (discussed at Item#4) has also been granted connectivity at Bhachau S/s. In view of Right of way constraints towards the entry at Bhachau substation, it is proposed that options for utilization of multi-circuit towers (2xD/c) for the required stretch near Bhachau substation shall be explored for termination of RPVPL – Bhachau 220kV D/c and OKVPL – Bhachau 220kV D/c lines at Bhachau. The no of multi-ckt towers towards the entry at Bhachau S/s may be mutually decided by M/s OKVPL & M/s RPVPL.	

**6. Connectivity & LTA application by Gujarat Power Corporation Limited (GPCL) Ltd. for Radhanesda Solar Park (700 MW) in Banaskantha, Gujarat**

Salient features of the application:

Sl.	Particulars	Application Details
1	Capacity for which connectivity is required	700 MW
2	Date from which connectivity is required	31.12.2017
3	Quantum for which LTA required	700 MW
4	Date from which LTA is required	Dec 31, 2017
5	Date upto which LTA is required	Dec 31, 2042
6	Location of Generating station	Radhanesda, distt. Banaskantha, Gujarat(WR)
7	Drawl of Power	Gujarat:140MW; WR:560MW

After deliberations, following was agreed:

S. No.	Transmission system	Transmission Elements	Implementing Agency
1	Transmission System for Connectivity	<ul style="list-style-type: none"> <li>Establishment of 400kV Banaskantha (Radhanesda) Pooling Station</li> </ul>	SPPD
		<ul style="list-style-type: none"> <li>Radhanesda PS – Banaskantha (PG) PS 400 kV D/c along with 2 nos. 400 kV line bays at Banaskantha (PG) PS</li> </ul>	POWERGRID
		<ul style="list-style-type: none"> <li>2 nos. 400 kV line bays at Radhanesda PS (for Radhanesda PS – Banaskantha (PG) PS 400 kV D/c line)</li> </ul>	SPPD
		<p>Connectivity of GPCL with the grid shall be established after the commissioning of above system and</p> <ul style="list-style-type: none"> <li>Banaskantha PS (765kV) – Sankhari (400kV) corridor</li> </ul> <p><b>OR</b></p> <ul style="list-style-type: none"> <li>Banaskantha PS (765kV) - Chittorgarh PS (765kV) - Chittorgarh (RVPN) (400kV) corridor</li> </ul> <p>(being implemented by POWERGRID under Green Energy Corridor-ISTS scheme and expected to be commissioned by Apr'18.)</p>	
2	Transmission System for LTA	Existing / Under Construction transmission system shall be adequate to enable transfer of power within WR.	

Representative from M/s GPCL requested for establishment for 400/220kV Banaskantha (Radhanesda) PS under ISTS to facilitate connectivity & transfer of power to target beneficiaries as was carried out in the case of NP Kunta Solar Power Park.

CEA stated that the matter has already been discussed in 40th Standing Committee Meeting of WR (held in forenoon) wherein it was decided that as Banaskantha PS is already under implementation under GEC-ISTS scheme and 3 voltage levels (765kV, 400kV and 220kV) have been provided at the PS to enable RE projects to inject power at 220kV or 400kV levels depending on their quantum of injection. Therefore, Banaskantha (Radhanesda) solar park has to get connected to Banaskantha Pooling Station. However, to facilitate Radhanesda Solar Park, WR constituents have agreed for 400 kV D/c from Banaskantha PS (PG) to Banaskantha (Radhanesda) Solar Park with the condition that step up voltage of 400 kV level alongwith 2 no. of 400 kV line bays at Radhanesda Solar park would be developed by SPPD.

It was further explained that in case of NP Kunta Solar Park the transmission system planning was carried out on receipt of the LTA application, however in case of Green Energy Corridor from Kutch area, the transmission system has been planned and taken-up for implementation much before the LTA application has been received. Further the said transmission system planning has been carried out on anticipation after detailed deliberations with the designated nodal agency (DNA) in respective Renewable Energy rich States. Moreover, Banaskantha (PG) PS and Banaskantha (Radhanesda) Solar Park are quite close which does not warrant establishment of one more 400kV pooling station under ISTS. GPCL representative stated that they would need to consult the SPPD i.e. NTPC Ltd. regarding the implementation of Banaskantha (Radhanesda) PS.

After deliberation, the members agreed with the above mentioned transmission system for connectivity & LTA.

#### **7. Long Term Access application of M/s Essel Saurya Urja Company of Rajasthan Ltd.**

M/s Essel Saurya Urja Company of Rajasthan Ltd. located at Phalodi & Pokharan in Rajasthan has been granted LTA in 8<sup>th</sup> Connectivity and LTA meeting of NR dated 20/01/2016 for 750 MW out of which 400 MW is to be consumed within NR and 350 MW is to be transferred from NR to WR.

It was agreed to grant LTA to M/s Essel Saurya Urja Company of Rajasthan for transfer of 350MW power to WR with the existing/planned transmission system as finalised in the NR LTA meeting.

#### **8. Connectivity Application of Adani Green Energy Ltd. (AGEL) : 300 MW**

The application was earlier discussed in the 22<sup>nd</sup> LTA & Connectivity meeting of WR constituents held on 30-11-2015 wherein connectivity was proposed at Sami (Adani) / Banaskantha (PG). M/s AGEL was requested to confirm availability of space at Sami S/s which is located nearer (15km.) to the generation project. The same was confirmed by M/s AGEL vide letter dated 02.02.2016.

After deliberations, following system for connectivity of the Solar power project with ISTS was agreed:

<b>S. No.</b>	<b>Transmission system</b>	<b>Transmission Elements</b>	<b>Implementing Agency</b>
1	Transmission System for Connectivity	<ul style="list-style-type: none"> <li>AGEL - Sami (Adani) 220 kV D/c line (along-with associated line bays at both ends)</li> <li>1x500 MVA, 400/220 kV ICT at Sami (Adani) substation</li> </ul>	M/s Adani Green Energy Ltd. (AGEL)

**9. Request for enhancement in quantum of Connectivity granted to Surguja Power Pvt. Ltd. (SPPL) for 4x150 MW power plant from 490MW to 550MW**

M/s SSPL has already been granted connectivity for 490 MW with following transmission system to be implemented by generation developer:

1. SPPL Switchyard - Dharamjaygarh 400kV D/c line
2. 1x125 MVAR 420 kV bus reactor at SPPL switchyard

The connectivity line has adequate capacity to cater to the enhanced connectivity quantum of 550MW.

**10. Closure of applications**

Closure of the following applications were agreed:

<b>S.No</b>	<b>Applicant / Date of Grant</b>	<b>Application – LTA / LTOA / Connectivity</b>	<b>Reason for closure</b>
1	Heavy Water Board Date of Grant: 19-12-2012	LTA – 17 MW from Kakrapar Atomic Power Station in Gujarat to Heavy Water Board's load at Thal in Maharashtra	Yet to sign the Long-term Access Agreement with POWERGRID and is also not attending Joint Coordination Committee meetings of WR
2	Pipavav Energy Pvt. Ltd Date of Grant: 14-09-2010	Connectivity and LTA for 1200MW	Yet to sign requisite commercial agreements. M/s PEPL is also not attending the JCC meetings and no progress has been reported till date
3	Chhattisgarh UMPP Date of Grant: 07-12-2011	LTOA – 4000 MW	LTA agreement not signed due to uncertainty in implementation of the generation project