



सत्यमेव जयते

भारत सरकार

Government of India

विद्युत मंत्रालय

Ministry of Power

केन्द्रीय विद्युत प्राधिकरण

Central Electricity Authority

विद्युत प्रणाली योजना एवं मूल्यांकन-I प्रभाग

Power System Planning & Appraisal-I Division

क्र. सं : 26/10/2017/ वि प्र. यो. & प. मू. -I/ 32-47

दिनांक: 10.01.2018

1. सदस्य (विद्युत प्रणाली), केन्द्रीय विद्युत प्राधिकरण, सेवा भवन, आर के पुरम, नई दिल्ली-110066
2. सदस्य सचिव, पश्चिमी क्षेत्रीय विद्युत समिति, एम. आई. डी. सी क्षेत्र, मेरोल, अंधेरी पूर्व, मुम्बई-400094 फ़ैक्स सं. 022-28370193
3. निदेशक (परियोजना), पावरग्रिड कॉरपोरेशन ऑफ़ इंडिया लि., सौदामिनी, प्लॉट सं. 2, सैक्टर-29, गुडगाँव-122001 फ़ैक्स सं. 0124-2571760
4. अध्यक्ष एवं प्रबन्ध निदेशक, एम.पी.पी.टी.सी.एल. शक्ति भवन, रामपुर, जबलपुर-482008 फ़ैक्स सं. 0761-2664141
5. प्रबन्ध निदेशक छत्तीसगढ़ रा. वि. बोर्ड, दानगनिया, रायपुर (छत्तीसगढ़) -492013 फ़ैक्स सं. 0771-2574246
6. प्रबन्ध निदेशक, जी.ई.ट्रां.नि.लि, सरदार पटेल विद्युत भवन, रेस कोर्स, बड़ोदा-390007 फ़ैक्स सं. 0265-2338164
7. निदेशक (प्रचालन), महाट्रांस्को, प्रकाशगढ़, प्लॉट संख्या-जी 9, बांद्रा-पूर्व, मुम्बई-400051 फ़ैक्स 022-26390383/26595258
8. मुख्य अभियंता (पारेषण), न्यूक्लीयर पावर कॉरपोरेशन ऑफ़ इंडिया लि, 9एस30, वीएस भवन, अणुशक्ति नगर, मुम्बई-400094 फ़ैक्स सं. 022-25991258
9. कार्यपालक निदेशक (अभियांत्रिकी), नेशनल थर्मल पावर कॉरपोरेशन लि, इंजीनियरिंग ऑफिस कॉम्प्लेक्स, ए-8, सैक्टर-24, नोएडा-201301 फ़ैक्स सं. 0124-2410201
10. मुख्य अभियंता, विद्युत विभाग, गोवा सरकार, पणजीफ़ैक्स सं. 0832-2222354
11. कार्यपालक इंजीनियर (परियोजनाएं), दादरा एवं नागर हवेली संघ शासित क्षेत्र,, विद्युत विभाग, सिलवासा, फोन नं. 0260-2642338
12. कार्यपालक इंजीनियर, विद्युत विभाग, दमन एवं दीव संघशासित क्षेत्र प्रशासन, मोती दमन, पिन-396220 फोन नं. 0260-2250889, 2254745
13. कार्यपालक निदेशक, (विशेष आमंत्रित), डब्लू आर एल डी सी, प्लॉट संख्या-एफ 3, एम आई डी सी एरिया, मेरोल, अंधेरी पूर्व, मुम्बई-400093, फ़ैक्स संख्या-022-28235434
14. कार्यपालक निदेशक, एनएलसीसी बी-9, कुतुब इन्स्टीट्यूशनल एरिया, कटवारिया सराय, नई दिल्ली-110016 फ़ैक्स 011-26852747
15. निदेशक, पारेषण, विद्युत मंत्रालय, श्रम शक्ति भवन, रफी मार्ग, नई दिल्ली

विषय :- पश्चिमी क्षेत्र विद्युत प्रणाली योजना की स्थायी समिति की 42 वीं बैठक के कार्यवृत्त ।

महोदय / महोदया ,

मुम्बई में दिनांक 17.11.2017 को आयोजित पश्चिमी क्षेत्र के विद्युत प्रणाली योजना की 42 वीं स्थायी समिति की बैठक के कार्यवृत्त, केंद्रीय विद्युत प्राधिकरण की वेबसाइट [www.cea.nic.in](http://www.cea.nic.in) के 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 हैं ।

धन्यवाद ।

संलग्न : उपरोक्त

भवदीय  
रवींद्र गुप्ता  
(रवींद्र गुप्ता)  
मुख्य अभियंता

प्रतिलिपि: निदेशक, विद्युत अभियांत्रिकी (पीएस), रेलवे बोर्ड, रेल भवन, नई दिल्ली



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Power System Planning & Appraisal-I Division

No. 26/10/2017/PSP&PA-I/ 32-47

Date: 10.01.2018

1. The Member (PS), Central Electricity Authority, Sewa Bhawan, R. K. Puram, New Delhi-110066
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3. The Director (Projects), GCIL, Saudamini, Plot No. 2, Sector-29, Gurgaon-122001 Fax 0124-2571760/2571932
4. Chairman and Managing Director, MPPTCL, Shakti Bhawan, Rampur, Jabalpur-482008 Fax 0761 2664141
5. The Managing Director, CSPTCL, Dangania, Raipur (CG)-492013 Fax 0771 2574246/ 4066566
6. The Managing Director, GETCO, Sardar Patel Vidyut Bhawan, Race Course, Baroda-390007 Fax 0265-2338164
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9. The Executive Director (Engg.), NTPC Ltd., Engg. Office Complex, A-8, Sector-24, NOIDA 201301 Fax 0120-2410201/2410211
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12. Executive Engineer, Administration of Daman & Diu (U.T.), Department of Electricity, Moti Daman-396220 Ph. 0260-2250889, 2254745
13. GM, WRLDC, Plot no F-3, MIDC Area, Marol, Andheri (East) Mumbai-400093 Fax no 022-28235434
14. CEO, POSOCO, B-9, Qutab Institutional Area, Katwaria Sarai, New Delhi-110016 Fax 011-26852747
15. Director (Trans), MoP, Shram Shakti Bhawan, Rafi Marg, New Delhi

**Sub:** Minutes of the 42<sup>nd</sup> meeting on Standing Committee on Power System Planning of Western Region

**Sir / Madam,**

The minutes of the 42<sup>nd</sup> meeting of Standing Committee on Power System Planning of Western Region held on 17.11.2017 at Mumbai 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).

Enclosures: As above

Yours faithfully,

*Ravinder Gupta*

(Ravinder Gupta)  
Chief Engineer

CC: Director, Electrical Engg. (PS), Railway Board, Rail Bhawan, New Delhi

The list of participants is enclosed at Annexure-I.

Member (Power System), CEA welcomed all the participants to the 42<sup>nd</sup> meeting of Standing Committee on Power System Planning in Western Region. He requested Chief Engineer (PSPA-I), CEA to start the proceedings of the meeting. Chief Engineer (PSPA-I), CEA welcomed the participants and requested Director (PSPA-I), CEA to take up agenda items.

**1. Confirmation of the minutes of 41<sup>st</sup> meeting of the Standing Committee on Power System Planning in Western Region (SCPSPWR) held on 21.12.2016 at NRPC, Katwaria Sarai, New Delhi.**

- 1.1. CEA stated that the minutes of the 41<sup>st</sup> meeting of SCPSPWR were issued vide CEA letter No. 26/10/2017/PSP&PA-I/ 92 – 106 dated 16.02.2017. As no comments from any of the constituents have been received on the same till date, members were requested to confirm the minutes of the meeting.
- 1.2. Members confirmed the minutes of 41<sup>st</sup> meeting of SCPSPWR.

**2. Reviewing the Progress of Earlier Agreed Transmission Schemes**

- 2.1. CEA informed that till date 37 projects have been awarded through tariff based competitive bidding route out of which 13 projects have already been commissioned and 20 projects are under implementation by various service providers. Out of balance four projects, one project has been cancelled by CERC, in one project the TSP has requested for closure and construction of two projects could not start due to litigation. Apart from these, there are six no. projects, which are presently under bidding.
- 2.2. Members noted the status of implementation of transmission projects under tariff based competitive bidding and under implementation by POWERGRID related to Western Region. The same is enclosed at Annexure-II and Annexure-III.

**3. Early commissioning of TBCB schemes of M/s Adani Transmission Ltd.**

- 3.1. CEA stated that M/s Adani Transmission Ltd. vide its dated 03.06.2017 had requested for advancement of transmission schemes 'Additional System Strengthening for Sipat STPS', 'Additional System Strengthening Scheme for Chhattisgarh IPPs – Part B' and 'System Strengthening for IPPs in Chhattisgarh & Other Generation Projects in Western Region' (under implementation through TBCB route) by M/s STL, M/s RRWTL and M/s CWRTL (owned by M/s Adani Transmission Ltd.) respectively. CEA further stated that MoP vide order no. 15/1/2013-Trans dated 15.07.2015 had issued the policy for incentivizing early commissioning of transmission projects and subsequently, MoP vide its OM No. 15/1/2013-Trans dated 05.10.2016 had constituted a committee to ensure smooth operationalization of the Policy for early commissioning of Transmission Projects.

Accordingly, on the request of M/s STL, RRWTL and CWRTL, a meeting was held on 16.06.2017 in CEA, New Delhi, under the chairmanship of Member (PS), CEA. As the request received from M/s STL, RRWTL and CWRTL was not made well in advance (i.e. less than 24 months prior to the intended early SCOD), therefore it did not fall under the purview of the committee constituted to ensure smooth operationalization of the Policy for early commissioning of Transmission

Projects . The proposals received from M/s STL, RRWTL and CWRTL were discussed scheme / element wise as per the provision in the Transmission Service Agreement (TSA) between TSP and LTTCs (which provides that COD shall not be date prior to the scheduled COD mentioned in the TSA unless mutually agreed by all parties) and the following was agreed in the meeting:

- i) The elementwise details of the three schemes along with their scheduled COD as per TSA, TSP's proposed early commissioning COD and the mutually agreed date for early commissioning. The same is enclosed at Annexure– IV.
  - ii) The TSP and the implementing agency of the upstream and downstream network would make best effort to achieve the mutually agreed date of early commissioning as given in Annexure-IV. The parties involved would coordinate with each other to ensure that there is no mismatch. In case of any anticipated mismatch, the respective transmission elements are to be completed by revised mutually agreed date or by SCOD, whichever is earlier.
  - iii) There will be no financial implication either on the TSP or on the implementing agencies of the upstream and downstream network, in case of mismatch in achieving the early commissioning date.
- 3.2. GUVNL representative enquired about the incentives the TSP would get for the early commissioning of the transmission schemes. CEA informed that as per MoP policy of incentivizing early commissioning, the TSP would become entitle for the transmission charges from the actual date of Commercial Operation (COD), which is, prior to the original scheduled COD. The number of years of applicability of tariff would remain the same. The TSP would get incentive for early commissioning only if, the transmission asset / element would be utilized. CEA also requested the STUs to ensure that LTTCs (distribution entities) attend the early commissioning meeting.
- 3.3. MS, WRPC stated that the quality of execution of transmission scheme shall not be compromised to achieve early commissioning of transmission schemes. CEA informed that CERC in its order dated 30-06-2016 on petition no. 67/TL/2016 has requested CEA to devise a mechanism for random inspection of the transmission projects being implemented through TBCB every three months to ensure that the projects is not only being executed as per the schedule, but the quality of equipment and workmanship of the project conforms to the Technical standards and Grid standards notified by CEA and IS specifications. Any non-conformance to the Grid standards / Technical standards / IS specifications is to be brought to the notice of the CERC.
- 3.4. After deliberations, members noted the early commissioning dates of the projects.

#### **4. Provision of Bus Reactors at High Voltage Nodes in Western Region – by POWERGRID**

- 4.1. CEA stated that in the 41<sup>st</sup> meeting of SCSPWR, PGCIL had proposed 5 no. of bus reactors in Western Region i.e. Mapusa (400 kV–125 MVAR), Solapur (765 kV–240 MVAR), Kolhapur GIS (400 kV–125 MVAR), Rajgarh (400 kV–125 MVAR) and Aurangabad (765 kV–240 MVAR) based on the studies carried out for 2018–19 timeframe (off peak) conditions for controlling overvoltage. In the 41<sup>st</sup> meeting, MSETCL had informed that they had also planned reactive power compensation at various nodes in their system including Solapur. In view of this, it was agreed that the reactive power compensation proposal of PGCIL would be reviewed considering the reactors proposed by MSETCL and any other utility of Western Region. CEA had requested all utilities to furnish the list of reactive compensations proposed in Western Region.

In line with the decision of 41<sup>st</sup> meeting of SCSPWR, a meeting was held on 13.01.2017, wherein MSETCL had intimated that 11 nos. bus reactors (each of 1x125 MVAR) at following 400 kV S/s of MSETCL were planned and these were expected to be commissioned by 2021-22, namely, (i) Karad (ii) Kolhapur (iii) Solapur (iv) Nanded (v) Akola-II (vi) Bhusawal – II (Deep Nagar) (vii)

Koradi-II (viii) Chandrapur-II (ix) Khaparkheda (x) Lonikhand-II (xi) Dhule. In addition, 25 MVAR bus reactor at Dhule (220 kV) in GEC-I, and 125 MVAR at Balsane (400kV) in GEC-II were also proposed. MSETCL had also proposed 125 MVAR bus reactors at new Kudus and Alkud 400 kV sub-stations. During the meeting, it was decided that the revised system studies would be carried out for assessing additional reactors requirement in WR by PGCIL, after considering the reactors proposed by MSETCL.

In the meeting on 13-01-2017, MSETCL had informed that out of 11 nos. shunt reactors planned, the work of procurement, installation and commissioning of 3 nos. reactors at Kolhapur, Karad and Solapur were under progress and for remaining 08 nos. of 1x125 MVAR shunt Bus Reactors, MSETCL had submitted proposal for 90% funding from PSDF. MSETCL had requested approval of the SCPSPWR for the 8 nos. bus reactors for getting funding under PSDF as given below:

**Phase –I:** 1) Nanded, 2) Akola-II, 3) Koradi-II, 4) Bhusawal-II,

**Phase –II:** 5) Khaparkheda, 6) Chandrapur-II, 7) Lonikand-II, 8) Dhule

- 4.2. CEA further stated that, a joint meeting amongst CEA, CTU and MSETCL was held on 7-8 Sep.17 at CEA, New Delhi, wherein the reactive compensation requirement in WR was studied after considering all the bus reactors proposed by MSETCL for 2021-22 time-frame (in off-peak scenario). After considering MSETCL reactive compensation proposal, voltage on the following nodes in WR was found to be on the higher side. Therefore, additional reactive compensation was required at these nodes.

Sl. No.	Name of the Substation	Existing Bus Reactor(s) (MVar)	Proposed Bus Reactor (MVar)	% times (avg) voltage beyond 420kV / 800kV as per operational feedback report (Apr-Jun'17)	Voltage in 2021-22 time frame (Off peak)	
					Without proposed reactor	With proposed reactor
1	Khandwa 400kV	2x125	125	8	418	414
2	Solapur 765kV	240	240	20	795	787
3	Rajgarh 400kV	125	125	27	421	416
4	Wardha 765kV	240+330	330	3	799	791
5	Aurangabad 765kV	2x240	240	1	803	795

Further the issue of high voltage at Raipur Pool (Durg) 765kV S/S was deliberated in the 498<sup>th</sup> OCC meeting of WRPC held on 22.08.2017, wherein, it was decided that the issue be referred to the standing committee on Power System Planning. In the off-peak file for 2021-22 time-frame, the voltage at Raipur PS 765kV bus is observed as 788kV and 785 kV without and with above proposed 5nos. reactors respectively. As the voltage observed at Raipur Pool (Durg) 765/400kV substation is below 790kV in the 2021-22 time frame (off-peak), no additional bus reactor has been proposed at Raipur Pooling Station.

- 4.3. MS, WRPC stated that STATCOMs were planned at Sholapur and Aurangabad sub-stations. Number of transmission lines are opened regularly on daily basis to control high voltage at various

nodes in Western Region. He suggested that while planning new transmission system, adequate reactive compensation may also be planned so that opening of transmission lines may be minimized. Option of using variable reactors to control high voltage may also be explored.

4.4. COO, CTU clarified that the above proposed reactors at various sub-stations have been planned after considering all the STATCOMs including that at Solapur and Aurangabad. It may be noted that STATCOMs are primarily for dynamic compensation and MSC (Mechanically Switched Capacitors) and MSR (Mechanically Switched Reactors) along with bus reactors are used to control high voltage under steady state. In regard to variable reactors, it was mentioned that the same would be explored after gaining more experience in installation and O&M of variable reactors.

4.5. After further deliberations, the following were agreed by the members:

i) Reactive compensation (bus reactors) under ISTS in Western Region for controlling high voltage

Sl. No.	Name of the Substation	Proposed Bus Reactor (MVAR)
1	Khandwa 400kV	1x125
2	Solapur 765kV	1x240
3	Rajgarh 400kV	1x125
4	Wardha 765kV	1x330
5	Aurangabad 765kV	1x240

ii) The requirement of bus reactor at Raipur 765 kV sub-station would be reviewed.

iii) MSETCL proposal of 1x125 MVAR, 400 kV bus reactors (eight numbers) for controlling high voltage (through PSDF funding)

Sl. No.	Name of the 400 kV Substation (of MSETCL)	Bus Reactor (MVAR)
1	Nanded	1x125
2	Akola-II	1x125
3	Koradi-II	1x125
4	Bhusawal-II	1x125
5	Khaparkheda	1x125
6	Chandrapur-II	1x125
7	Lonikand-II	1x125
8	Dhule	1x125

**5. Second 400 kV D/C transmission line for BALCO Complex and 400 kV Grid connectivity for the proposed new smelter plant of 0.51 MTPA at Balco Complex – M/s BALCO**

- 5.1. CEA stated that in the 40<sup>th</sup> meeting of SCPSPWR held on 01.06.2016, M/s BALCO had raised the issue of single point of connectivity of BALCO with the ISTS system (through BALCO-Dharamjaygarh 400 kV D/C dedicated line) and had requested second 400 kV interconnection with ISTS for redundancy. M/s BALCO had also 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. The issue was discussed in the 40<sup>th</sup> meeting of SCPSPWR and members were of the opinion that the interim LILO connectivity cannot be put in parallel to the dedicated line, but instead of dismantling it, the LILO portion 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.

Further in the 41<sup>st</sup> meeting of SCPSPWR held on 21.12.2016, M/s BALCO has proposed segregation of connectivity of 2010 MW into connectivity for IPP (600 MW) and CPP (1410 MW). It had requested for separate connectivity for the CPP for (i) Grid security for BALCO complex, (ii) to fulfill RPO obligation for Aluminium smelter plant, (iii) to fulfill Power Sale commitment and (iv) import of power in case of shutdown of multiple CPP units. In the meeting, members observed that BALCO has modified its connectivity times and again and it has now made a proposal for the revision of its connectivity and segregation of the connectivity of 2010 MW into connectivity of 1410 MW for CPP and 600 MW for IPP. In the meeting, members opined that the proposal needs a close examination. Accordingly, it was decided that a separate meeting shall be convened by CEA with CTU, WRLDC and BALCO to further deliberate on the issue as per the regulations of CERC.

In line with the decision of the 41<sup>st</sup> meeting of SCPSPWR, a meeting was held on 10.03.2017 in CEA where in the following was agreed:

- (i) Existing Connectivity with ISTS through BALCO- Dharamjaygarh 400 kV D/C line, provided for injection of power from both CPP and IPP units of BALCO, is adequate. The existing regulations do not have provision for separate connectivity for CPP and IPP units connected with ISTS system at a single point. Further, BALCO is not eligible to apply for additional connectivity for the same generation capacity for which connectivity has already been granted. In case, if BALCO still desires separate connectivity for CPP and IPP units connected with ISTS system at a single point, M/s BALCO may approach CERC for necessary direction in this regard.
- (ii) M/s BALCO is resorting to frequent change of status of its units from IPP to CPP and / or vice versa. M/s BALCO may therefore clearly identify the IPP units & CPP units and submit necessary documents to CEA, CTU and POSOCO in this regard.

- 5.2. CEA further stated that BALCO vide its letter no. BALCO / CEA/2017/01 dated 24.10.2017 has made the following submission:

- i) The installed capacity of Balco complex is 2010 MW (4x67.5+4x135+4x300) and 0.57 Metric Ton Per Annum (MTPA) Aluminium smelter (two smelters – 0.245 MTPA and 0.325 MTPA) with total load of 950 MW. Out of the existing 2010 MW installed capacity, 1410 MW (4x67.5 +4x135+2x300) is CPP and 600 MW (2x300) is IPP.

- ii) Another new Aluminium smelter plant with a capacity of 0.51 MTPA is planned in the existing BALCO complex, which may require power of around 750 MW. The process for statutory clearances / approvals and contract for finalization of smelter is advanced stage. As per project implementation schedule, the commissioning activities would start from March, 2019 and full load operation may be achieved by Oct, 2019. To meet the demand of this new smelter BALCO had made the following is proposal:
- A 400/220 kV switchyard along with 2x315 MVA ICT and 400 kV D/C transmission line for grid connectivity from 400 kV PGCIL Dharamjaygarh pooling station. Further, Unit – 2 of 300 MW and 4x67.5 MW existing CPP once upgraded to 5x75 MW unit to be connected to switchyard of this new smelter at 220 kV level. The 400 kV transmission line would facilitate import of power from under open access.
  - The existing BALCO smelter plant (0.57 MTPA) and power plant capacities of 1440 MW (4 x 135 MW + 2 x 300 MW) shall remain with existing 400 kV grid connectivity from 400 kV PGCIL Dharamjaygarh PS and shall be utilized to serve the existing power sales contract and other long term obligations.
- iii) M/s BALCO has requested for
- Connectivity for its new smelter plant of capacity 0.51 MTPA at 765/400 kV PGCIL Dharamjaygarh (Urga) Poling Station, where BALCO having additional 2 no. of 400 kV bays, which is presently unutilized and paying monthly O & M charges of bays
  - The above connectivity is requested under “Consumer Category” and considering average power import of 150 MW from the grid as per CERC (Grant of connectivity, Long Term access and Medium Term Open Access in Inter State transmission and related matters open access in inter state transmission) Regulations, 2009 and sub sequent amendments envisaged.

- 5.3. CTU stated that the information furnished by M/s BALCO to CEA and CTU is not consistent. M/s BALCO is frequently, changing status of units from CPP to IPP and vice versa. Recently, M/s BALCO has applied connectivity for 150MW as a bulk consume. The connectivity application of M/s BALCO for the CPP as Bulk Consumer pertains to a plant, which has both captive generation and captive load and the connectivity sought is for a demand of 150 MW as bulk consumer. Thus, the connectivity seeking entity is not a pure bulk consumer. Further, even if, the entity is considered as bulk consumer, as per existing regulations bulk consumer can't build transmission line and it is not clear who will build the transmission line for drawl of power from the grid. Considering the above, it is proposed to that the connectivity may be provided to this entity with existing switchyard of Balco, if required, SEM (Special Energy Meters) meters may be installed at inter connections of these both entities, for the purpose of accounting of energy consumption and production.
- 5.4. CEA stated that connectivity can be granted at ISTS point only and existing switchyard of BALCO is not an ISTS point. If connectivity is to be provided to a Bulk Consumer, the connectivity system has to be a part of ISTS as a bulk consumer cannot build a dedicated transmission line. For this the connectivity system first needs to be identified and the same needs to be agreed by the all the constituents.
- 5.5. WRLDC stated that in the existing regulations, there is no provision for simultaneous injection / export and drawl / import of power at same point. However, CTU can seek necessary clarifications from CERC regarding their proposal of providing the import and export connectivity at the same point to M/s BALCO.
- 5.6. Regarding the certification of any generating unit as CPP or IPP, it was deliberated that based on the energy generated from a unit and energy consumed for captive purpose from the same unit,



the electrical inspector of the concerned Government post – facto declares the status of any unit (CPP if more than 50% of the energy is consumed for captive purpose).

5.7. Issue was further deliberated and it was opined that CTU may process the connectivity application of M/s BALCO as per the CERC Regulations. CSPTCL vide its letter no. 02-12/SE (PL) / 1578 dated 29.11.2017 has communicated the following on BALCO request for import connectivity as bulk consumer:

- i) If BALCO makes a request to CSPDCL for sanction of power, then CSPDCL would provide 100-150 MW power to BALCO.
- ii) If BALCO avails power from other than CSPDCL within its license distribution area then as per prevailing regulation BALCO have to pay cross subsidy surcharge to CSPDCL.
- iii) BALCO has filed a writ petition before Hon'ble High Court of Chhattisgarh regarding payment of cross subsidy surcharge towards drawl of electricity in open access, which is still pending. Therefore, till final adjudication done action may not be taken in the request of BALCO.

**6. LILO of SSP–Dhule 400 kV D/C at Shivaji Nagar (Balsane) 400 kV S/s – proposal by MSETCL**

6.1. CEA stated that MSETCL has submitted a proposal under Green Energy Corridor-II (GEC–II) Part B for funding under National Clean Energy Fund (NCEF). The proposal, interalia, includes establishment of 400/220 kV pooling station at Balsane (Shivajinagar) by LILO of one ckt. of Sardar Sarovar–Dhule 400 kV D/C line at Balsane. This substation has been proposed by MSETCL for evacuation of power from 500 MW MAHAGENCO solar park, 500 MW Pragat Akshay solar park in the Balsane area and other existing and proposed RE generation projects in Sakri, Shivaji Nagar and Dondaicha area. The scope of works associated with 400 kV pooling sub-station at Balsane is given below:

- a) 400/220 kV pooling sub-station at Balsane
- b) 2x500 MVA, 400/220 kV ICTs with GIS bays.
- c) LILO of one ckt. of 400 kV Dhule–Sardar Sarovar D/C line at Balsane 400 kV Pooling station.
- d) Balsane (400 kV pooling sub-station)-Shivajinagar 220 kV D/C line
- e) LILO of 220 kV Dhule–Dondaicha S/C line at Balsane (400 kV pooling sub-station) (partially on M/C towers)
- f) 1x125 MVAR Bus Reactor at Balsane (400 kV pooling sub-station).

To discuss the proposal of MSETCL, a joint meeting was held on 7-8 Sep.2017 at CEA, New Delhi amongst CEA, CTU and MSETCL, wherein, various alternatives of the 400 kV interconnections of the proposed 400 kV Balsane pooling sub-station as given below were studied. In all the alternatives studied, the power flow was from Balsane to Dhule.

Alternative 1	(i) LILO of both ckts of SSP – Dhule 400 kV D/C at Balsane
Alternative 2	(ii) Balsane – Dhule 400 kV D/C line
Alternative 3	(i) Dhule – Nashik 400 kV D/C line (ii) LILO of both ckts of Dhule – Nashik 400 kV D/C line at Balsane.
Alternative 4	(i) LILO of one ckt of SSP – Dhule 400 kV D/C at Balsane. (ii) Balsane – Nashik 400 kV D/C line

In MSETCL proposal, it was seen that with the increased injection of RE power in Balsane area, some of 220 kV lines were getting overloaded. Therefore, MSETCL was suggested to consider Alternative-4 so that Balsane 400/220 kV could be directly connected to Nashik (load center)

through 400 kV D/C line and MSETCL may take up the implementation of the line depending upon increased RE injection in the area. Also with this alternative, Nashik would get interconnected at 400 kV, which at present is radial. The earlier proposal of LILO of Navsari–Navi Mumbai 400 kV D/C at Nasik (to be implemented by MSETCL), which was agreed in the 28<sup>th</sup> meeting of SCPSPWR held on 06.12.2008, was dropped in 41<sup>st</sup> meeting of SCPSPWR.

- 6.2. MSETCL representative stated that about 1200 MW of RE injection is anticipated at proposed Balsane sub-station. With increased RE injection, necessary strengthening at 220 kV level would be planned, if necessary. MSETCL has already planned LILO of Dhule–Bhableshtar 400 kV line at Nashik. In view of this MSETCL would prefer to implement ‘Option no. 1’ instead of option no. 4.
- 6.3. GETCO representative stated that with full generation at Sardar Sarovar HEP, SSP– Kasor 400 kV S/C line and SSP–Asoj 400 kV S/C line gets over loaded, thus, additional injection of solar power in the SSP Dhule 400 kV line may further increase loading on these lines. Therefore, the proposal may be reviewed.
- 6.4. WRLDC representative stated that there is a proposal to run the existing RBPH of SSP (6x200 MW) in Pumped Storage Plant (PSP) mode. Therefore, the studies may be carried out considering SSP as 1200 MW generating source as well as 1200 MW load.
- 6.5. CEA stated that in the alternative studied, full generation was considered at SSP and 80 % of installed capacity of solar power was considered at Balsane and the line loadings at 400 kV level were found to be within limits. Further, it was also opined that peak generation at SSP and peak generation of solar power in Balsane area will never occur simultaneous as solar generation would be maximum during noon in summer and hydro would be maximum during rainy season. However, as indicated in the studies, some of 220 kV lines of MSETCL are getting overloaded and MSETCL may take necessary measures to address the same.
- 6.6. After further deliberations, MSETCL’s proposal under GEC–II Part B for funding under NCEF for evacuation of power from large quantum of existing and proposed RE generation projects in Sakri, Shivaji Nagar and Dondaicha area, with following scope of was agreed by constituents:
  - a) 2 x 500 MVA, 400/220 kV Pooling Sub-Station at Balsane.
  - b) LILO of both ckt. of 400 kV Dhule–Sardar Sarovar D/C line at Balsane 400 kV Pooling S/s.
  - c) 220 kV D/C line from 400 kV Pooling S/s. to 220 kV Shivajinagar S/s.
  - d) LILO of 220 kV Dhule – Dondaicha S/C line partially on M/C towers at 400 kV Balsane Pooling S/s.
  - e) 1 x 125 MVAr Bus Reactor at 400 kV Pooling S/s.

The above proposal was agreed considering 500 MW MAHAGENCO solar park and 500 MW Pragat Akshay solar park in the Balsane area. With this renewable generation addition, power flow on 400 kV lines was observed towards Dhule. It was also agreed that, if additional renewable generation is planned in Balsane area, then system studies would be carried out with participation from MSETCL, CTU, CEA and GETCO to study the impact of additional pooling of renewable power at Balsane 400/220 kV substation and suggest additional transmission system strengthening, if any.

7. **Additional feed to Goa: interconnection of Xeldam (GED) and Xeldam (New) 400/220 kV sub-stations**
  - 7.1. CEA stated that the scheme to provide additional feed to Goa was discussed in 39<sup>th</sup> meeting of SCPSPWR held on 30.11.2015 and was agreed in the 40<sup>th</sup> meeting of SCPSPWR held on 01.06.2016 at NRPC, New Delhi with following scope of works:

- i) Establishment of 2x500 MVA, 400/220 kV new substation at Xeldam. The interconnection between the existing 220 kV Xeldam i.e. Xeldam (GED) substation and the proposed 400/220 kV new Xeldam substation could be through bus extension or through 220 kV interconnecting lines, as the case may be.
- ii) LILO of one circuit of Narendra (existing) – Narendra (new) 400 kV D/C quad line at Xeldam.
- iii) Xeldam (New)-Mapusa S/s 400 kV D/C (Quad) line to take care of any N-1-1 contingency involving outage of any one 400 kV infeed to Goa.

The above scheme is being implemented through TBCB route.

- 7.2. To finalize the 220 kV interconnection arrangement between new Xeldam S/s i.e. Xeldam (TBCB) and Xeldam (GED), a meeting was held on 25.04.2017 at Goa among representatives of GED, PFCCL, CTU and CEA wherein the following 220 kV interconnections with Xeldam 400/220 kV sub-station were agreed:

**Under TBCB scope**

- a) Xeldem (TBCB) – Xeldem (GED) 220 kV D/C line with HTLS conductor equivalent to twin moose conductor  
(220 kV line / interconnection is under TBCB Scope, 2 nos. 220 kV line bays at Xeldem (GED) to be constructed by GED)

**Under GED scope**

- b) New Xeldem (400 kV) – Verna (GED) 220 kV D/c line: 220 kV line and 2 nos. 220 kV line bays at Verna (GED)
- c) LILO of 2<sup>nd</sup> circuit of Ambewadi – Ponda 220 kV D/C line at Xeldem (New) 400 kV S/s.

Subsequently, Goa Electricity Department (GED) had requested for implementation of Xedam (New) – Mapusa 400 kV D/C line (under TBCB) on multi-circuit towers instead of double circuit towers, so that the same could be utilized for establishment of their Xeldam – Mapusa 220 kV D/C line (via Kadamba & Verna) and reduce the overall RoW requirements.

To discuss the issue raised by GED, a meeting was held in CEA on 14.06.2017, wherein, it was observed that the three alternative routes for the proposed for Xeldem (new)-Mapusa 400 kV D/C line marked in the survey report submitted by BPC were not passing through the proposed route of 220 kV Mapusa-Kadamba-Verna-Xeldem D/C line of the GED. Further, Xeldem (new)–Mapusa 400 kV D/C line is an ISTS line, which is to be implemented through TBCB route and the 220 kV D/C line from Mapusa–Kadamba–Verna–Xeldem D/C line is an intra state line of GED. Therefore, it was decided that both 400 kV and 220 kV circuits cannot be implemented on same multi-circuit towers, and they are to be implemented independently.

- 7.3. After deliberations members agreed with above interconnection between Xeldam (New) 400/220 kV S/s and Xeldam (GED) through 220 kV D/C line with HTLS conductor (capacity equivalent to twin moose conductor). GED was requested to implement the 220 kV lines under their scope in matching time frame of the 400/220 kV Xeldam(new) substation.

**8. Progress of dedicated transmission lines of IPPs which are connected through interim arrangement – Extension of Essar Power (Mahan) interim connectivity:**

- 8.1. CEA stated that the cases of connectivity on interim LILO arrangement in Western Region (including M/s EPMPPL case) were discussed in the 40<sup>th</sup> & 41<sup>st</sup> meeting of SCPSPWR held on 01.06.2016 & 21.12.2016 respectively, to finalize the replacement of interim LILOs of generation developer by their dedicated transmission lines as per direction of the CERC. In the

41<sup>st</sup> meeting of SCSPWR, M/s EPTCL was requested to expedite the implementation of Mahan STPS–Bilaspur Pooling Station 400 kV D/C line before monsoon as against their completion target of December 2017. In line with direction given by CERC vide order no. 30/MP/2014 dated 28.06.2016, the matter was referred to WRPC forum for further deliberation. WRPC in their 33<sup>rd</sup> meeting held on 31.01.2017 & 01.02.2017 had agreed to the TCC recommendation that M/s EPMPL should complete the line by 30.06.2017 and CTU to discuss such issues in WRPC forum. CTU vide their later dated 15.06.2017 has written to WRLDC to initiate action for disconnection of interim arrangement of M/s EPMPL by 30.06.2017.

- 8.2. M/s EPMPL vide their later dated 13.06.2017 has requested CEA for extension of LILO arrangement for evacuation of power from their generation plant up to January 2018. A meeting was held under the Chairmanship of Member (Power System), CEA on 28.06.2017 at CEA, New Delhi to discuss the extension of LILO arrangement for evacuation of power of M/s EPMPL Power Project (2x600 MW) at Mahan in Madhya Pradesh. In the meeting, following was decided:
- i) The transmission system for evacuation of power from M/s EPMPL generation plant at Mahan is now an ISTS system being implemented by M/s EPTCL (ISTS Transmission Licensee) and not a dedicated transmission system of generation developer. As such LILO of Vindhyachal–Korba STPP 400 kV S/C would not be an interim arrangement. This change would be brought to the notice of constituents in the next meeting of SCSPWR.
  - ii) The system studies indicate that the LILO of Vindhyachal–Korba STPP 400 kV S/C line at Mahan STPS would also be essential to take care of contingency of outage of one ckt of Mahan SPTS–Bilaspur Pooling Station 400 kV D/C line for reliable evacuation of power from 2x600 MW units of Mahan TPS.
  - iii) M/s EPTCL has agreed to complete the remaining works of Mahan STPS–Bilaspur Pooling Station 400 kV D/C line by December 2017.
- 8.3. CEA stated that Hon’ble CERC vide its order dated 10.04.2008 and 15.09.2009 had granted transmission license to M/s EPTCL (Essar Power Transmission Company Ltd) for implementation of following scope of works for evacuation power from Essar Mahan located in Madhya Pradesh.
- i) Mahan STPS - Sipat (Bilaspur Pooling Station) 400 kV D/C (Quad moose conductor) line
  - ii) LILO of existing 400 kV Vindhyachal – Korba S/C lines at Mahan STPS
  - iii) Gandhar NTPC – Hazira 400 kV D/C (twin moose) line
  - iv) Establishment of 3 x 500 MVA, 400/220 kV S/s at Hazira
- Further, M/s EPTCL had completed the establishment of 3x500 MVA, 400/220 kV S/s at Hazira, implementation of LILO of existing 400 kV Vindhyachal – Korba S/C line at Essar Mahan STPS and Gandhar (NTPC)–Hazira 400 kV D/C (twin moose) line by 2014.
- 8.4. CTU stated that from system studies, it was observed that with opening of the LILO, oscillations were observed at Essar Mahan Generators under n–1 contingency of 400 kV Essar Mahan–Bilaspur PS D/C line. The matter was discussed in the above mentioned meeting at CEA on 28.06.2017, wherein it was discussed that continuation of LILO of Korba–Vindhyachal 400 kV at Essar Mahan is also required from system point of view. CTU further stated that in view of the above facts, LTOA for transfer of 450MW from EPMPL to M/s Essar Steel India Limited (ESIL), Hazira located in Gujarat (WR) for which PPA has already been signed between M/s EPMPL and M/s ESIL has been operationalized w. e .f. 01.10.2017. The same has facilitated reduction in the PoC burden on the other DICs and hence has benefitted the constituent states of WR.
- 8.5. WRLDC representative intimated that M/s Essar Mahan has been injecting power through the LILO of 400 kV Korba – Vindhyachal S/C line at Essar Mahan switchyard under STOA for last

three years, which is endangering the grid security. Further, the transmission license was granted for implementation of the above scheme in 2009, however, till date the progress of Essar Mahan–Bilaspur PS 400 kV D/C line is not satisfactory. Hon'ble CERC in its various orders had mentioned the above LILO as an interim arrangement and till date none of the respondents including M/s Essar Mahan / EPTCL had brought this to the notice of Hon'ble CERC.

- 8.6. WRPC representative stated that as per the decision of 41st meeting of SCPSPWR, the matter (regarding the extension of interim connectivity) was already referred to WRPC for further necessary action. WRPC in its 33rd meeting held on dated 01.02.2017 allowed / extended above LILO up to June, 2017 and in its 34th meeting of WRPC the above LILO was allowed till, September, 2017 and recently WRPC extended the above up to December 2017. There is a gap between the document / information furnished by M/S EPMPPL / EPTCL to CEA / CTU and WRPC / WRLDC. Hon'ble CERC vide its letter dated 10.10.2017 had requested WRPC to take weekly progress regarding the implementation of dedicated transmission line of ESSAR Mahan i.e. Essar Mahan–Bilaspur PS 400 kV D/C line and the same is under close monitoring. The above issue would be taken up in the upcoming WRPC meeting
- 8.7. CEA stated that, in line with the decision taken in the meeting held in CEA on 28.06.2017, this agenda has been included to inform the WR constituents regarding the changes in the evacuation system of the Essar Mahan.
- 8.8. Members took note of the transmission license granted to M/s EPTCL by Hon'ble CERC for the scope of works mentioned at 8.3 above. In line with the decision of 41<sup>st</sup> meeting of SCPSPWR, it was agreed that the matter would continue to be deliberated at WRPC forum.

## **9. Connectivity of Railways' TSS with ISTS Network**

- 9.1. CEA stated that in the 41<sup>st</sup> meeting of SCPSPWR held on 21.12.2016, the issue of connectivity to Railways Traction Sub Station (TSS) from various ISTS points along Delhi – Bharuch route was discussed. PGCIL had confirmed the availability of space for two nos. of 220 kV bays at ISTS substations along the Delhi – Bharuch route i.e., space for 2 no. of 220 kV AIS bays at Rajgarh, Dehgam, Pirana, Kota, Bassi substations and space for 2 no. of GIS bays at Vadodara. In the meeting, it was mentioned that as per the Railways Act, 1989, Railways can build transmission lines, maintain & operate the same for its own utilization and as per CERC petition no. 197/MP/2015 order dated 05.11.2015, Railways is authorized to undertake transmission and distribution activities in connection with the working of Railways independent of its status under the Electricity Act, 2003.

The issue of Connectivity of Railways' TSS with ISTS network along Delhi – Bharuch route was also discussed in the 39<sup>th</sup> meeting of SCPSPNR held on 29<sup>th</sup> – 30<sup>th</sup> May 2017 (as Kota and Bassi 400/220 ISTS substations fall in Northern Region). Members were of the view that Railway networks are already connected with STU networks and they are getting reliable power from STU network. Creating a parallel infrastructure through connectivity with ISTS network would not be economical. With Railways getting connected with ISTS network, the STU transmission assets supplying power to Railways would become stranded. Also, the maximum anticipated load of Railways at each ISTS point would be of the order of 80 to 100 MW, which means underutilization of ISTS asset. In the 39<sup>th</sup> meeting of SCPSPNR, it was agreed that Railways would once again look into the cost economics of connectivity to ISTS points vis-a-vis open access through STUs network and share the same with CEA.

- 9.2. CEA further stated that South East Central Railways, Bilaspur vide its dated 24.05.2017 had intimated that PGCIL has granted connectivity to South East Central Railway (SECR) at Raipur (Kumhari – PGCIL). In order to provide uninterrupted Traction Power Supply, SECR has proposed an alternate standby arrangement at Raigarh 400/220 kV substation i.e., connectivity

of Railways 220/132 kV substation to 400/220 kV Raigarh ISTS substation. Subsequently, South East Central Railways, Bilaspur vide its dated 26.07.2017 has proposed one more connectivity at Bhatpara (between Kumhari and Raigarh) 400/220 kV ISTS substation. SECR has requested for inclusion of the following proposal in the Standing Committee meeting:

- i) Connectivity to Railway's 220/132 kV substation at Raigarh with 400/220 kV Raigarh ISTS substation.
- ii) Connectivity to Railway's 220/132 kV substation at Bhatpara with 400/220 kV Bhatpara ISTS substation.
- iii) Reconfirmation of connectivity of SEC Railway 220/132 kV substation at Bhilai in Chhattisgarh to Raipur (Kumhari) 400/220 kV PGCIL substation.

9.3. He further said that the connectivity at Raipur (Kumhari) 400/220 kV PGCIL substation to SECR has been granted as a bulk consumer. Railways may clarify, whether the connectivity being sought at Raigarh and Bhatpara as Bulk Consumer or Licensee. Railway / CSPTCL may furnish the details of the connectivity of the existing TSS with Chhattisgarh system. Railways may present the economic analysis of seeking connectivity through ISTS points vis-à-vis seeking open access from STUs (CSPTCL in this case).

9.4. Director, Ministry of Railways stated that presently Railways is procuring its entire requirement of power from states power utilities and ISTS through open access. Most of the power is routed through STU network, thus, it is paying energy charges, ISTS transmission charges, STU transmission charges etc., for the power procured in ISTS open access. Further, it is facing constraints like reliability, quality and quantity of power with STU network of some the states. Further, CEA in its report submitted in Feb 2015, had recommended Railways may obtain connectivity & apply LTA in ISTS and build its own transmission lines. To save STU transmission charges, Railways has planned to shift its load from STU to ISTS by getting connectivity to ISTS network.

9.5. Director, Ministry of Railways, made presentation highlighting the following points:

- i) Indian Railway is presently using about 16 billion units of electrical energy for traction purposes and has a connected load of about 2000 MW. Railway has also decided to electrify its entire BG network (presently 50%) and thereby the consumption of electricity on railway is expected to grow to about 49 billion units by 2035-36 with a combined load of about 3000 MW. Further dedicated freight corridors and high speed network are also being executed which will additionally require power for their operations.
- ii) Indian Railway has planned for construction of transmission line to cover the entire DLI-HWH route and on Golden Quadrilateral routes of Indian Railways between DLI-Mumbai & HWH-Chennai.
- iii) Railways at present owns dedicated transmission line from Delhi (Dadri) to Allahabad (about 600 km), Diwana- Markanda (via Taravadi), 105 Kms and Ballabgarh to Hodal (60 Kms). Delhi (Dadri) to Allahabad route TSS is getting feed from Dadri, Fafound and Cheonki ISTS points of POWERGRID. Railways is constructing transmission line along the Allahabad-Mugalsarai-Sonnagar (about 290 km) and Raigarh - Paniyajob (480 km) route. Transmission line project in the Delhi –Bharuch (1055 km) is also under planning.
- iv) The Raigarh - Paniyajob route consists of 12 TSS and for feeding these TSS from ISTS, there is drawl requirement of about 80-100 MW from each ISTS substation at Raigarh, Raipur and Bhatpara. CTU had already granted connectivity at Raipur (Kumhari-POWERGRID) as Bulk consumer. In order to provide alternate source of feeding to the railway TSS along

Howrah – Mumbai (Raigarh – Paniyajob section) route, Railways is seeking connectivity to Raigarh GSS and Bhatapara GSS.

- v) The Delhi Bharuch route consists of 21 TSS and for feeding these TSS from ISTS, there is drawl requirement of about 80-100 MW from each ISTS substation at Rajgarh, Dehgam, Pirana, Kota, Bassi and Vadodara. Railway has sought connectivity at these ISTS substations.
  - vi) Railways in association with NTPC, is establishing a thermal power plant at Nabi Nagar, Bihar as a JV with a proposed installed capacity of 1000 MW (2x250 MW under operation and another 2x250 MW under construction), which is operating as CPP. Further, to meet RPO obligations and striving for energy mix towards greener energy, Railways is planning for installation of RE power projects (Solar and Wind).
  - vii) As per the financial analysis carried out by them for ISTS open access vis a vis open access through CSPTCL(STU) system, getting open access through ISTS is cheaper and there is a saving of about 4 paisa per unit in transmission charges. Therefore, railway is keen on getting directly connected with ISTS (and availing open access) network through their own transmission network instead of through STU network.
- 9.6. CTU stated that Railways can get connectivity for its existing demand after obtaining NoC from respective STU. Further, it was also mentioned that availability of bays at various substation is tentative and the same would be confirmed only after receipt of LTA application from Railways for respective substations.
- 9.7. In Western Region, Railways is open access consumer in all the states except in Chattishgarh where it is DISCOM consumer. WR constituents stated that if Railways is moving from STU network to ISTS network for existing load, the assets established by STUs to meet the demand of Railways (upstream network) would become stranded, which is a wastage of national assets, and may increase the burden of DISCOMs, thus it is undesirable. Further, as the Railways is connected with STU networks, the Railways is immune to the impact of DSM charges and after getting connected with ISTS Railways would become liable to pay applicable DSM charges. GETCO representative stated that any additional augmentation in the ISTS required for meeting the railways existing demand (when shifted from STU to ISTS network) would increase transmission charges which was not acceptable to them.
- 9.8. Director, Ministry of Railways stated that the infrastructure for providing connectivity to railway from STU's network was funded by Railways and built by respective STUs as a deposit work of Railways. As per the contract agreement these assets are maintained by respective STUs and disconnection with the STUs would be as per the contract signed with the STUs. Regarding the upstream transmission system established by STU to meet the existing demand of Railways, STUs can utilize these assets to meet the future load demand of the state.
- 9.9. CEA stated that with Railway taking LTA (Long Term Access) for their existing and future demands once they get connected with ISTS, they would be sharing the ISTS transmission charges and any ISTS augmentation to enable railway to drawl their load should not be an issue. The disconnection of railway from the STU network would be as per the contract signed with the STUs. The commercial and contractual aspects of disconnection may be deliberated separately at appropriate forums by Railways and respective STUs.
- 9.10. CEA stated that connectivity to Railways at Raipur (Kumhari) 400/220 kV PGCIL S/s was granted as a bulk consumer. Regarding the connectivity at Raigarh and Bhatpara, Railway clarified that the connectivity at these locations has been sought as Licensee.
- 9.11. After further deliberations, members agreed to grant in principle approval for connectivity to Railways for existing demand with the ISTS points (Raigarh & Bhatapara) through 220kV D/c line along with line bays at both ends from each substation under the scope of SECR. The

commercial and contractual aspects of disconnection from STU network to be deliberated separately between Railways and respective power utilities. CSPTCL representative stated that railway is DISCOM consumer in Chhattisgarh, therefore they would communicate their views after consultation with CSPDCL within 15 days.

## 10. Transmission System for Solar Power Parks in Madhya Pradesh

- 10.1. CEA stated that in the 40<sup>th</sup> meeting of SCPSPWR, 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 (1<sup>st</sup>) 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).
- (iii) 1x125 MVA, 420 kV Bus Reactor at Bijawar pooling station.
- (iv) 4 nos. 220kV line bays for termination of LILO of both ckts of Tikamgarh- Chatarpur 220 kV D/c line at Bijawar.
- (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) Stringing of 2<sup>nd</sup> circuit of Tikamgarh – Chhatarpur 220kV S/c on D/c line.
- (ii) LILO of both circuits of Tikamgarh-Chhatarpur 220 kV D/c line at Bijawar 400/220 kV substation (60 km)

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:

S. No.	Solar Park	Capacity (MW)	Proposed Transmission System
1	Suwasara Distt. Mandsaur	250	<p><b><u>Intra-State Scheme</u></b></p> <p><b>MPPTCL scope</b> (already under implementation by MPPTCL under Green Energy Corridor Phase-I):</p> <ol style="list-style-type: none"> <li>(i) 400/220kV Sitamau (Mandsaur) substation</li> <li>(ii) Mandsaur-Nagda 400kV D/c line (100km)</li> </ol> <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 up to 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><u>Intra-State Scheme</u></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>	750	<p><b><u>Inter-state transmission system</u></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 MVA, 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>Rajgarh</b> comprises of two solar parks:  (i) Jeerapur Solar Park (125 MW)  (ii) Khilchipur Solar Park (125 MW)</p>		<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>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	<p>Morena</p>	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>

- 10.2. CEA further stated that a meeting was held in CEA on 28.08.2017 to review the status of the transmission scheme “Connectivity System for Lanco Vidarbha Thermal Power Pvt. Ltd. (LVTPPL) and Inter State Transmission system strengthening in Chhatarpur area in Madhya Pradesh”, which is to be implemented through TBCB but its bidding process is yet to started. M/s Rewa Ultra Mega Solar Ltd. (RUMSL), the Solar Power Project Developer (SPPD) for development of solar parks in Madhya Pradesh, vide their letter dated 26.08.2017 have stated that RUMSL is unable to develop solar park at Chhatarpur and does not require associated substation in that area, but CEA may take decision on development of proposed ISTS substation at Chhatarpur.

As establishment of Bijawar 400/220 kV substation was agreed for the purpose of evacuation of power from Chhatarpur Solar Park and to cater the present and future power drawl requirements in Chhatarpur area, CEA vide its letter dated 30.08.2017 has requested MPPTCL to intimate the implementation time frame of the intra-state strengthening scheme in Chhatarpur area (220 kV outlets from proposed Bijawar 400/220 kV substation) and the tentative location(s) of the proposed 400/220 kV substation in Chhatarpur area.

- 10.3. Regarding the time frame for implementation of Bijawar 400/220 kV S/s, MPPTCL representative stated that it would be required beyond 2021–22. However, in case the scheme was scheduled in earlier time frame they would take up the implementation of the 220 kV outlets from Bijawar 400/220 kV substation in matching time frame.
- 10.4. CEA stated that the evacuation system for Neemuch Solar park (spread over three different locations at Rampura SP (150 MW), Singoli Solar Park (200 MW) and Jeeran Solar Park (150 MW)) was agreed in the 40<sup>th</sup> meeting of SCPSPWR held on 01.06.2017. RUMSL vide its letter dated 02.06.2017 has intimated that it has identified suitable land (total of 1120 Hectares) in the vicinity of Singoli to establish entire 500 MW at Singoli itself (instead of 150 MW at Rampura, 200 MW at Singoli and 150 MW at Jeeran) and the solar parks at Jeeran & Rampura would not be developed. RUMSL has requested for grant of connectivity to Neemuch solar Park in ISTS by LILO of Chhittorgarh–Nagda line at Neemuch Solar park and establish a 400 kV or above substation adjacent to Neemuch solar park.
- 10.5. RUMSL representative stated that in addition to Neemuch solar park, the capacity of Agar SP, Rajgarh SP and Shajapur SP was 250 MW, 250 MW and 250 MW respectively, is now envisaged to be 400 MW, 250 MW and 400 MW respectively, thus the total installed capacity would be 1050 MW. Therefore, the earlier planned evacuation system for these solar parks may also be reviewed.
- 10.6. CEA stated that resuming the bidding process of the transmission scheme “Connectivity System for Lanco Vidarbha thermal power Pvt. Ltd and Inter State Transmission System Strengthening in Chhattarpur area in Madhya Pradesh” would depend on the progress of generation project of LVTPPL and inputs of MPPTCL when the Bijawar S/s is required. Also due to revision of capacity of solar parks namely Neemuch, Rajgarh, Shajapur and Agar as indicated by RUMSL, their evacuation system also needs to be reviewed.
- 10.7. After further deliberations, the following was agreed:
- i) The bidding process of transmission scheme “Connectivity System for Lanco Vidarbha Thermal Power Pvt. Ltd. (LVTPPL) and Inter State Transmission system strengthening in Chhatarpur area in Madhya Pradesh” to be put on hold till the progress of LVTPPL generation project is ascertained and there is clarity on time-frame of requirement of Bijawar S/s from MPPTCL.

- ii) Evacuation system for solar parks at Neemuch, Rajgarh, Shajapur and Agar would be reviewed after receipt of connectivity / LTA application from RUMSL.

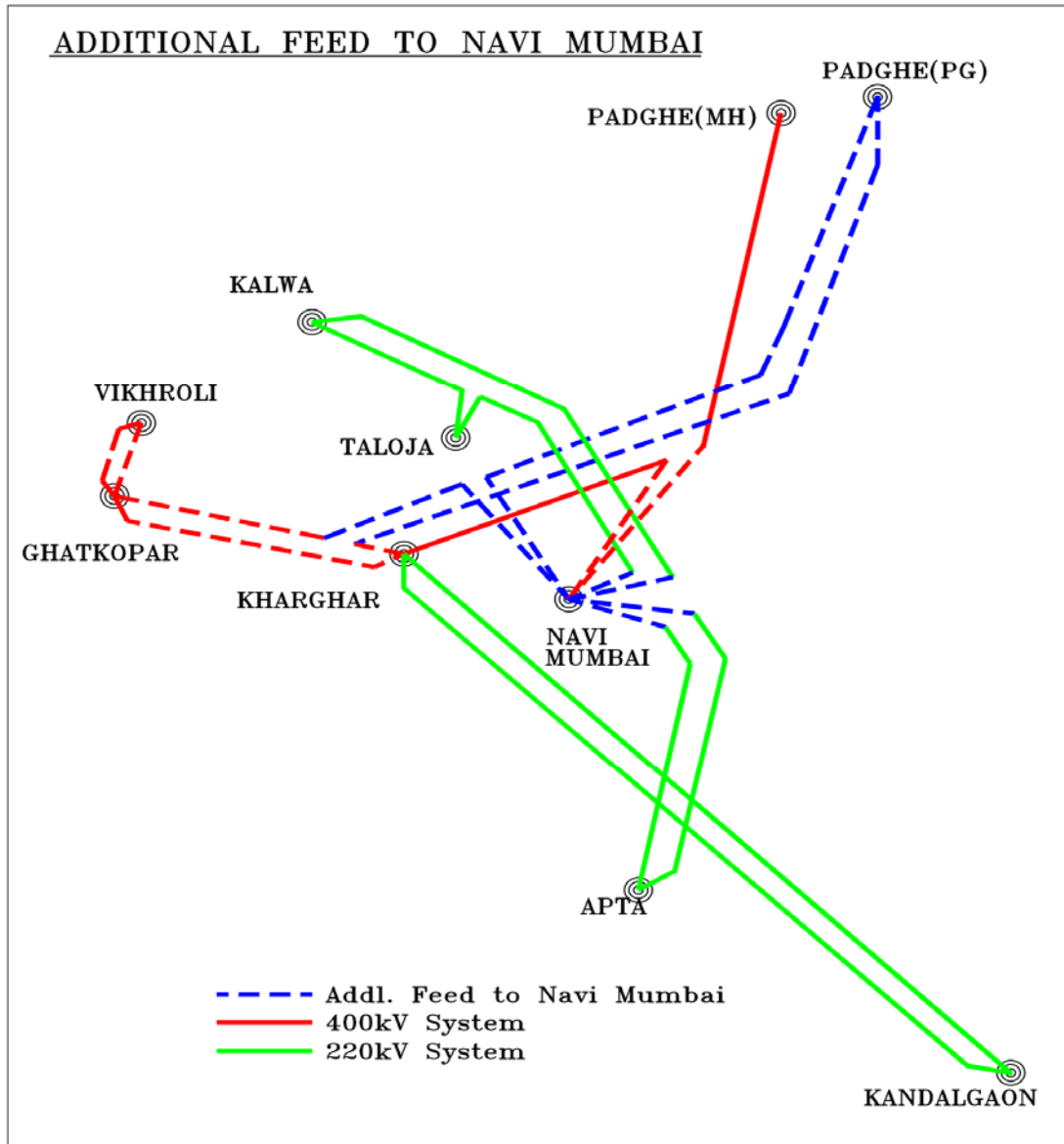
## **11. Additional ISTS feed to Navi Mumbai 400/220 kV substation of POWERGRID**

- 11.1. CEA stated that in the 41<sup>st</sup> meeting of SCPSPWR held on 21.12.2017 and subsequent meeting held on 13.01.2017, following transmission system was agreed for providing ISTS feed to Navi Mumbai 400/220 kV S/s subject to implementation feasibility of 220 kV outlets from Navi Mumbai S/s.
  - i) Padghe (PG)–Kharghar 400 kV D/c quad line to be terminated into one ckt. of Kharghar–Ghatkopar 400 kV D/c line (thus forming Padghe (PG)-Kharghar 400 kV S/c quad line and Padghe (PG)-Ghatkopar 400 kV S/c quad line)
  - ii) LILO of Padghe (PG) – Ghatkopar 400 kV S/c line at Navi Mumbai (PG)
  - iii) LILO of Taloja–Kalwa 220 kV S/c line at Navi Mumbai (PG)
  - iv) LILO of Apta–Kalwa 220 kV S/c line at Navi Mumbai (PG)
- 11.2. CEA added that in line with the decision of 41<sup>st</sup> meeting of SCPSPWR held on 21.12.2017, a joint site visit was carried out on 07.04.2017 by CEA, CTU & MSETCL, for ascertaining the implementation feasibility of 220 kV outlets from Navi Mumbai 400/220 kV S/s. During the site visit, it was noted that the distance of LILO point of Taloja–Kalwa 220kV S/c section from Navi Mumbai S/s (as mentioned at sl. no. iii) is about 7 km. The implementation of this 7 km LILO length shall not be practically possible due to severe ROW issues in this area. Accordingly, it was decided that LILO of Apta–Taloja / Kalwa 220 kV D/c line shall be carried out at Navi Mumbai instead of earlier mentioned LILO of Apta – Kalwa & Taloja – Kalwa 220 kV lines.

In view of the above, the modified transmission system for providing ISTS feed to Navi Mumbai (to be implemented through TBCB route) and the schematic is given below.

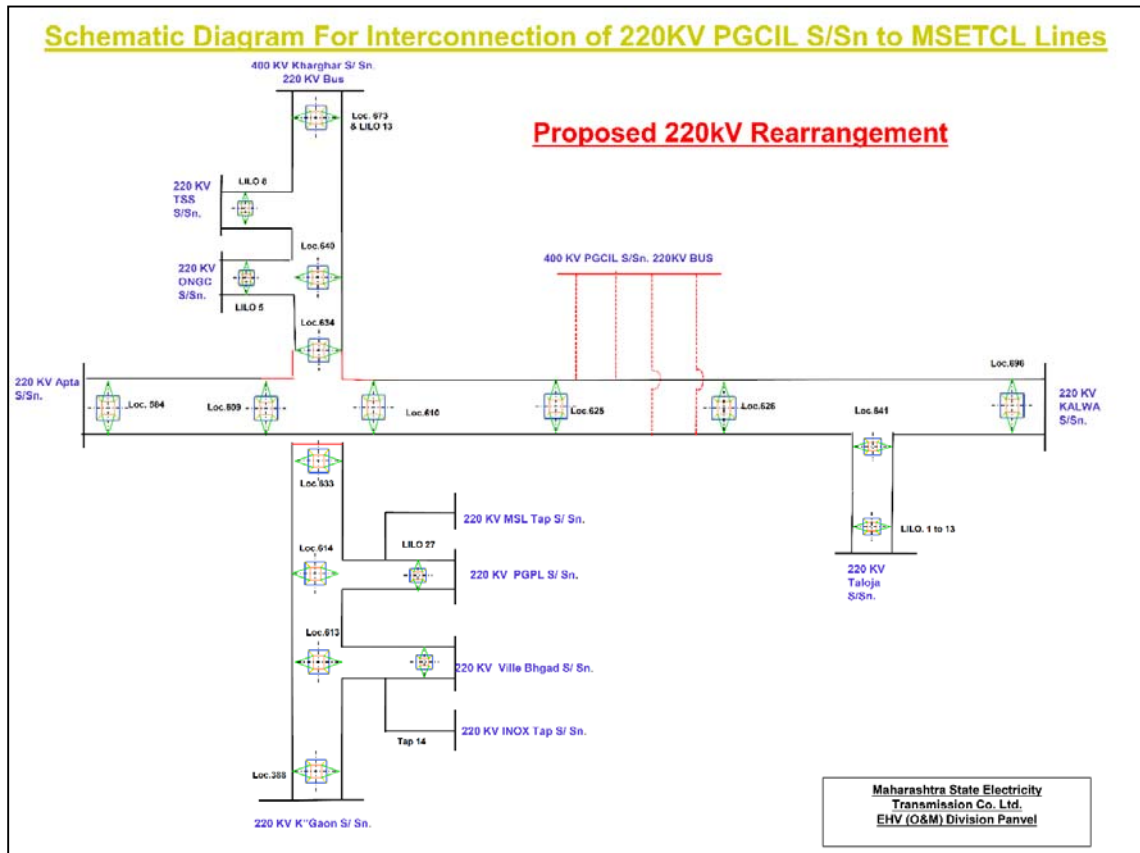
### **Transmission System for providing ISTS feed to Navi Mumbai:**

- i) Padghe (PG)–Kharghar 400 kV D/c quad line to be terminated into one ckt. of Kharghar–Ghatkopar 400 kV D/c line (thus forming Padghe (PG) - Kharghar 400 kV S/c quad line, Padghe (PG) - Ghatkopar 400 kV S/c quad line)
- ii) LILO of Padghe (PG) – Ghatkopar 400kV S/c line at Navi Mumbai (PG)
- iii) LILO of Apta–Taloja and Apta-Kalwa section of the Apta-Taloja/Kalwa 220 kV D/c line at Navi Mumbai (PG)



**Figure-1: Schematic Diagram of Transmission System around Mumbai area**

During the joint visit, it was also decided that to ensure that power flows are well balanced on all the 220 kV outlets from Navi Mumbai substation, MSETCL shall carry out reconfiguration of the Kharghar – Kandalgaon 220 kV D/c line and Apta – Taloja / Kalwa 220 kV D/c at the crossing point. One of the feasible option is shown in the figure below:



**Figure-2: LILO of Apta – Kalwa 220kV D/c line at Navi Mumbai S/s of POWERGRID with Interconnection of Kharghar – Khandalgaon 220kV D/c line with one circuit of Apta – Kalwa 220kV D/c line along-with bunching of the other section of Kharghar – Khandalgaon 220kV D/c line near location 633**

- 11.3. CEA further stated that MSETCL vide their letter MSETCL/CO/STU/9849 dated 07.09.2017 had requested minor modifications in above proposed system. MSETCL had proposed that Padghe(PG)–Kharghar 400 kV D/C line should be terminated at 400 kV Kharghar (MSETCL) S/s instead of terminating it to one circuit of Kharghar– Ghatkopar (Vikhroli) 400 kV D/C line, as Padghe(PG)–Kharghar 400 kV D/C line was planned with quad moose while Kharghar – Ghatkopar 400 kV D/C line was planned with twin moose. MSETCL vide their letter dated 07.09.2017 had also proposed the LILO of 400 kV Talegaon (PG) – Kalwa line at Ghatkopar S/s to have an alternate source to import power from Maharashtra grid.
- 11.4. MSETCL representative stated that the 400 kV Kharghar – Ghatkopar D/C with twin moose conductor has already been approved by MERC. Therefore, the implementation of 400 kV Kharghar – Ghatkopar D/C with quad moose may not be feasible.
- 11.5. CEA stated that Kharghar–Ghatkopar (Vikhroli) 400 kV line would be implemented using existing RoWs due to severe RoW problems in this area therefore, Kharghar–Ghatkopar 400 kV line should be implemented either with quad moose conductor or with twin HTLS conductor (equivalent ampacity of quad moose). Also by terminating the Padghe–Kharghar 400 kV D/C line into one circuit of Kharghar- Ghatkopar (Vikhroli) 400 kV D/C, the 400 kV Kharghar and Ghatkopar substations (through Navi Mumbai sub-station) would be connected to strong ISTS source i.e. Padghe (PG). And in case Phadge (PG)-Kharghar 400 kV D/C line is terminated at Kharghar, two no. of additional bays would be required at Kharghar.

- 11.6. Regarding MSETCL proposal of LILO of Talegaon (PG)–Kalwa 400 kV line at Vikhroli, CEA stated that this line is also with twin moose conductors and MSETCL needs to plan this link high ampacity conductor in view of severe RoW problem in Mumbai area.
- 11.7. CE, CEA stated that keeping the long term in view and severe row of problems in Mumbai area, MSETCL need to revise the DPR of Kharghar–Ghatkhopar 400 kV D/C line and resubmit to MERC for its approval and plan LILO of Talegaon (PG)–Kalwa 400 kV line at Vikhroli with high ampacity conductor. MSETCL agreed for the same.
- 11.8. On a query about LILO of Padghe (MH) – Kharghar 400 kV line at Navi Mumbai sub-station, part of which is through cable, POWERGRID inform that works would be completed by March, 2018.
- 11.9. After further deliberations, the following transmission system for providing ISTS feed to Navi Mumbai and drawal of power from Navi Mumbai was agreed:

**A. Under Inter State Transmission System (through TBCB)**

**Transmission System for providing ISTS feed to Navi Mumbai and drawal of power:**

- i) Padghe (PG)–Kharghar 400 kV D/c (quad moose ampacity) line to be terminated into one ckt. of Kharghar–Ghatkhopar 400 kV D/c line (thus forming Padghe (PG) - Kharghar 400 kV S/c (quad moose ampacity) line, Padghe (PG) - Ghatkhopar 400 kV S/c (quad moose ampacity) line)
- ii) LILO of Padghe (PG) – Ghatkhopar 400kV S/c (quad moose ampacity) line at Navi Mumbai (PG)
- iii) LILO of Apta–Taloja and Apta-Kalwa section of the Apta-Taloja/Kalwa 220 kV D/c line at Navi Mumbai (PG)

**B. Under Intra State Transmission System (by MSETCL / Intra state Transmission Licensee)**

- i) Reconfiguration of the Kharghar – Kandalgaon 220 kV D/c line and Apta – Taloja / Kalwa 220 kV D/c at their crossing point for achieving balanced power on the 220 kV outlets from Navi Mumbai 400/220 substation.
- ii) Implementation of the planned Kharghar–Ghatkhopar 400 kV D/C line (Twin Moose conductor) as Kharghar–Ghatkhopar 400 kV D/C (quad moose ampacity) line.

**12. Interim arrangement of Koradi II–Wardha 400 kV D/C quad line and power evacuation beyond Warora.**

- 12.1. CEA stated that in the 41<sup>st</sup> meeting of SCSPWR, following measures to control fault level at Wardha were agreed:
  - (i) Koradi II-Wardha 400 kV D/C line to be terminated into one ckt of Warora–Wardha 400 kV D/C line thus forming Koradi-II–Wardha 400 kV S/C line, Koradi-II–Warora 400 kV S/C line and Warora–Wardha 400 kV S/C line as an interim arrangement. After the commissioning of Koradi II–Koradi III 400 kV D/C quad line, the interim arrangement would be removed by bypassing of Koradi II-Wardha 400 kV line and Wardha (PG)–Warora 400 kV line at Wardha thus forming Koradi II–Warora 400 kV D/C line. One ckt of Koradi II–Koradi III 400 kV D/C quad line was commissioned in Dec’2016 and another circuit was commissioned in Feb, 2017.

- (ii) MSETCL would finalize the transmission system strengthening beyond their Warora 400 sub-station for evacuation of power from Koradi-II / Tiroda generation projects and intimate the same in the next meeting of SCSPWR.
- 12.2. MSETCL representative stated that to remove the constraints in transmission system for evacuation of power from Koradi II generation project, they are planning strengthening of transmission system beyond Warora 400 kV sub-station through LILO of Chandrapur-Parli 400 kV line at Warora. It is requested that till the implementation of the system strengthening beyond Warora, the interim arrangement may be allowed to continue.
  - 12.3. CEA stated that the scheme to control fault level at Wardha Substation that has already been agreed in the previous SCM takes into account that the 2 no. of 400 kV bays released at Wardha due to the removal of the interim arrangement and by passing of Wardha-Warora 400 kV D/C line at Wardha and connecting it with line from Koradi-II, so as to form Koradi-II-Warora 400 kV D/C line. For the scheme to be effective it has to be implemented in totality.
  - 12.4. After further deliberation, it is decided to have a separate meeting among CEA, CTU and MSETCL to discuss the adequacy of MSETCL proposal of LILO of Chandrapur-Parli 400 kV line at Warora and removal of the interim arrangement.

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

- 13.1. CEA stated that in the 40<sup>th</sup> meeting of SCSPWR held on 01.06.2016, high fault level at 400 kV Korba STPS (3x200+4x500) of NTPC was discussed and the following scheme was agreed to control high fault current 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 Sipat STPS – bypassing arrangement at Sipat STPS is existing).

Further, CSPTCL vide its letter no. 02 – 12 / SE (C & RA) / 1016 dated 02.09.2016 intimated that the above arrangement (i.e. Korba STPS-Korba West 400 kV S/C line in normally open conditions) would cause overloading of the 400 kV & 220 kV lines emanating from Korba (West) power plant under n–1–1 contingency condition and requested to review the proposal. In view of this, in 41<sup>st</sup> meeting of SCSPWR, it was decided to have a joint meeting among CEA, CTU, WRPC, WRLDC & CSPTCL.

- 13.2. In line with the decision of the 41<sup>st</sup> meeting of SCSPWR, a meeting was held on 22.09.2017 at CEA, New Delhi with participation from CTU, CSPTCL, WRLDC and NTPC. In the meeting, it was decided to carryout system studies for 2021-22 time frame for three different alternatives as give below:

**Alternative 1 (A1):** Korba (NTPC) – Korba (W) 400 kV S/C open + Korba(NTPC) - Sipat STPS 400 kV S/C line and Sipat STPS – Raipur 400 kV S/C line bypassed at Sipat so as to form Korba STPS- Raipur 400 kV S/C line, as proposed in 41<sup>st</sup> meeting of SCSPWR

**Alternative 2 (A2):** Reconfiguration of Korba (West) – Korba (NTPC) 400 kV line and Korba (NTPC) - Sipat 400 kV S/C line as Korba (W) – Sipat 400 kV S/C line through bypassing at Korba (NTPC).

**Alternative 3 (A3):** Reconfiguration of Korba(W)-Korba(NTPC) 400 kV line and Korba(NTPC)- Essar Mahan 400 kV line as Korba(W)-Essar Mahan 400 kV line through bypassing at Korba(NTPC)



From the study results it was observed that the fault level was within limits for both the alternatives i.e. A1 & A2. In alternative A1, one 400 kV interconnections (Korba (NTPC) – Korba (W) 400 kV S/C line) would not be available from both Korba(W) and Korba (NTPC) 400 kV bus. But in alternative A2, two no. of 400 kV interconnections (Korba (NTPC) – Korba (W) 400 kV S/C line and Korba(NTPC) - Sipat STPS 400 kV S/C line) would not be available for evacuation of power from Korba (NTPC) 400 kV bus. Based on the study the following alternative to control high fault current at Korba STPS (3x200 MW+4x500 MW) of NTPC was recommended:

- i) Korba STPS - Korba West 400 kV S/C line to be normally kept open. CSPTCL to take Korba (W) to Korba (NTPC) 400 kV S/C line into service in case of planned shutdown of any of 400 kV lines emanating from Korba(W). This line would be normally idle charged from one end say Korba (NTPC).
- ii) Korba STPS- Sipat STPS 400 kV S/C line and Sipat STPS – Raipur 400 kV S/C line to be rearranged as Korba STPS- Raipur 400 kV S/C line bypassing at Sipat STPS. (bypassing arrangement at Sipat STPS already exists).

CTU, WRLDC and NTPC had agreed with the above proposal. However, CSPTCL had stated that they would convey their opinion on the proposal after consultation with their SLDC.

- 13.3. WRLDC representative stated that interconnection of Korba (NTPC) and Korba (West) i.e. 400 kV Korba (NTPC) – Korba (W) 400 kV S/C increase the loading of CSPTCL network, the above proposal relieves the over loading of transmission network of CSPTCL.
- 13.4. CSPTCL representative stated that power flows observed on some of the lines in the study's result is opposite to actual power flows on these lines. He requested for review of the studies.
- 13.5. CEA stated that studies were carried out for 2021–22 timeframe, thus the power flows on the lines would be different from actual / present power flows. Further, CSPTCL had communicated their agreement with the above proposal subject to availability of Korba (NTPC)–Korba (W) 400 kV line as and when required. Therefore, the above proposal may be agreed.
- 13.6. After deliberations, Members agreed with the following scheme for controlling high fault level at Korba(NTPC):
  - i) Korba STPS - Korba West 400 kV S/C line to be normally kept open. CSPTCL to take Korba (W) to Korba (NTPC) 400 kV S/C line into service in case of planned shutdown of any of 400 kV lines emanating from Korba(W). This line would be normally idle charged from Korba (NTPC) and breaker at the CSPTCL end i.e. Korba (W) end to be kept open.
  - ii) Korba STPS- Sipat STPS 400 kV S/C line and Sipat STPS – Raipur 400 kV S/C line to be rearranged as Korba STPS- Raipur 400 kV S/C line bypassing at Sipat STPS. (bypassing arrangement at Sipat STPS already exists).
  - iii) Scheme to be operationalized by WRLDC within a fortnight.

#### **14. Reviewing the intra state transmission system and 220 kV interconnection with Vapi – II DNH**

- 14.1. CEA stated that based on the joint system studies carried out by CEA, CTU and GETCO, following interstate transmission system was proposed in the 41<sup>st</sup> meeting of SCMPSPWR to cater the demand of DNH and Daman & Diu (due to non-availability of space for putting additional transformers at existing Vapi 400/220 kV sub-station) and provide 220 kV feed to South Gujarat:
  - i) Establishment of 2x500 MVA, 400/220 kV S/s near Vapi / Ambheti (Vapi-II)

ii) LILO of KAPP–Vapi 400 kV D/c line at Vapi-II

iii) 1x125 MVA bus reactor at Vapi–II Substation

220 kV connectivity from Vapi–II is given below:

(a) For Gujarat (GETCO)

- Vapi-II–Atul (GETCO) 220kV D/c line

- LILO of Chikhli (Ambetha) – Vapi (GETCO) 220 kV S/c line at Vapi-II

(b) For Dadra and Nagar Haveli (DNHPDCL)

- Vapi-II – Sayali (DNH) 220 kV D/c line (high capacity)

- Vapi-II – New Kharadpada (DNH) 220 kV D/c line (high capacity)

In the 41<sup>st</sup> meeting of SCPSW held on 21.12.2016, it was observed that Vapi–Khadoli 220 kV D/C and Vapi–Kharadpada 220 kV D/C lines were lightly loaded and there was space constraint at Sayali and severe RoW problems in implementation of these lines. Therefore, it was agreed to review the intra state network of DNH and its interconnection with Vapi II separately.

14.2. As per the decision of 41<sup>st</sup> SCM, a meeting was held at Silvassa on 01.06.2017 & 02.06.2017 with participation from CEA, CTU, PGCIL and DNH. In the meeting, interconnection from the Vapi-II and intrastate constraints in the DNH network (based on the comprehensive system study report in the 2021-22 time frame submitted by POWERGRID) were discussed. After detailed deliberations, following system was agreed in the meeting:

I. 220 kV connectivity from 400/220 kV, 2x500 MVA Vapi–II substation to DNH (Transmission System under ISTS)

a. Vapi-II–Sayali 220kV D/C line (from Vapi-II to LILO point of one circuit of Vapi(PG)–Khadoli 220kV D/C line at Sayali substation with ampacity equivalent to twin zebra conductor).

b. Interconnection with LILO section (of LILO of one circuit of Vapi(PG)–Khadoli 220kV D/C line at Sayali substation) so as to form Vapi-II–Sayali 220 kV D/C line and Vapi-Khadoli 220 kV D/C line. The LILO section is with zebra conductor.

II. Intra State system strengthening in DNH transmission network

#### **220 kV system**

a. Kala – Khadoli 220 kV (2<sup>nd</sup>) D/C line.

b. Establishment of 220 kV switching station at Bhilosa (GIS) with provision of 8 nos. of 220 kV bays (4 nos. equipped line bays and 4 nos. future bays). (Out of the 4 equipped line bays, 2 nos. line bays are for LILO of one ckt. of Vapi- Kharadpada 220 kV D/C line at Bhilosa and 2 nos. line bays are for Bhilosa industries)

c. LILO of one ckt. of Vapi-Kharadpada 220 kV D/C line at Bhilosa.

d. Establishment of Vagchipa 220/66, 2x160 MVA substation by LILO of both ckts of Vapi-Khadoli 220 kV D/C line. (already under implementation).

e. Conversion of Sayali 220 kV switching station to 2x100 MVA, 220/66 kV substation.

f. Conductor replacement of the LILO section (of LILO of one circuit of Vapi(PG)–Khadoli 220kV D/C line at Sayali substation) with ampacity equivalent to twin zebra conductor depending on the loading of the lines in future, if required.

### **66 kV system**

- g. Establishment of three 66kV circuits between Vaghchipa & Dadra
  - h. Establishment of three 66kV circuits between Vaghchipa & Amli
  - i. 66 kV Vaghchipa – Silli D/C line
  - j. Establishment of Sayali new 66/11 kV substation with LILO of Sayali 220/66 kV-Rakholi 66 kV D/Cline at Sayali new and LILO of Masat – Khadoli 66kV S/C line at Sayali New 66/11kV S/s.
  - k. Amli- Silvassa Town 66 kV D/C line.
  - l. Shifting of about 20MVA bulk load from Amli to Silli
- 14.3. CEA stated that considering the above, the scheme for establishment of new 400/220 kV substation in Vapi/Ambethi area and its associated transmission lines as system strengthening scheme in WR is as given below:

#### **Establishment of new 400/220 kV substation in Vapi/Ambethi area and its associated transmission lines (under ISTS):**

- i) Establishment of 2 x 500 MVA, 400/220 kV S/s near Vapi / Ambethi (Vapi – II)
- ii) LILO of both circuits of KAPP – Vapi 400 kV D/c line at Vapi – II
- iii) 1 x 125 MVar bus reactor at Vapi – II Substation
- iv) Vapi-II – Sayali D/C 220kV line
  - From Vapi-II to LILO point of one circuit of Vapi(PG) –Khadoli 220kV D/C line at Sayali substation with ampacity equivalent to twin zebra conductor.
  - Interconnection with LILO section (of LILO of one circuit of Vapi(PG) –Khadoli 220kV D/C line at Sayali substation) so as to form Vapi-II – Sayali 220 kV D/C line and Vapi-Khadoli 220 kV D/C line. The LILO section is with zebra conductor.

#### **220 kV outlets to be implemented by GETCO in matching time frame of the above scheme is given below:**

- a) Vapi-II–Atul (GETCO) 220kV D/c line
  - b) LILO of Chikhli (Ambetha)–Vapi (GETCO) 220 kV S/c line at Vapi-II
- 14.4. POWERGRID suggested that as Vapi-II–Sayali 220kV D/C line up to the LILO point would be implemented with high capacity conductor with ampacity equivalent to twin zebra conductor, therefore, DNHPDCL should implement re-conductoring of the LILO section (LILO of one circuit of Vapi(PG)–Khadoli 220kV D/C line at Sayali substation is with Zebra conductor) with high capacity conductor with ampacity equivalent to twin zebra conductor in matching time-frame.
- 14.5. CEA stated that the intrastate system of DNH also includes establishment of 220 kV switching station at Bhilosa (GIS) with LILO of one ckt. of Vapi- Kharadpada 220 kV D/C line at Bhilosa. The scheme has already been discussed and agreed in the meeting held among CEA, CTU & PGCIL from 01.06.2017 to 02.06.2017 at Silvassa. The scheme involves LILO of an interstate line, therefore the scheme, as given below, has been put for approval of WR constituents:
- a. Establishment of 220 kV switching station at Bhilosa (GIS) with provision of 8 nos. of 220 kV bays (4 nos. equipped line bays and 4 nos. future bays). (Out of the 4 equipped line bays,

2 nos. line bays are for LILO of one ckt. of Vapi- Kharadpada 220 kV D/C line at Bhilosa and 2 nos. line bays are for Bhilosa industries)

b. LILO of one ckt. of Vapi- Kharadpada 220 kV D/C line at Bhilosa.

Based on the request received from DNH, CEA had already conveyed in principle approval of the scheme to DNH.

14.6. GETCO representative stated that the Vapi II 400 / 220 kV S/s is required in timeframe beyond 2021–22. CEA stated that Vapi II 400/220 kV S/s would be implemented in a timeframe as per requirement of GETCO and DNH. This scheme would be implemented through TBCB route and the time required for notification of the scheme, bidding process and implementation time, it is expected to be implemented by end of 13<sup>th</sup> plan.

14.7. After further deliberations, members agreed to the ISTS scheme and associated intrastate transmission system to be implemented by GETCO and DNH.

14.8. The following scheme for establishment of new 400/220 kV substation in Vapi/Ambethi area and its associated transmission lines as system strengthening scheme in WR was agreed:

**A. Establishment of new 400/220 kV substation in Vapi/Ambethi area and its associated transmission lines (under ISTS):**

- i) Establishment of 2 x 500 MVA, 400/220 kV S/s near Vapi / Ambethi (Vapi – II)
- ii) LILO of both circuits of KAPP – Vapi 400 kV D/c line at Vapi – II
- iii) 1 x 125 MVA bus reactor at Vapi – II Substation
- iv) Vapi-II – Sayali D/C 220kV line
  - From Vapi-II to LILO point of one circuit of Vapi(PG) –Khadoli 220kV D/C line at Sayali substation with ampacity equivalent to twin zebra conductor.
  - Interconnection with LILO section (of LILO of one circuit of Vapi(PG) –Khadoli 220kV D/C line at Sayali substation) so as to form Vapi-II – Sayali 220 kV D/C line and Vapi- Khadoli 220 kV D/C line. The LILO section is with zebra conductor.

**B. 220 kV outlets to be implemented by GETCO in matching time frame**

- a) Vapi-II–Atul (GETCO) 220kV D/c line
- b) LILO of Chikhli (Ambetha)–Vapi (GETCO) 220 kV S/c line at Vapi-II

**C. Reconductoring to be implemented by DNH**

- i) Reconductoring of the LILO section (of LILO of one circuit of Vapi(PG)–Khadoli 220kV D/C line at Sayali substation) with ampacity equivalent to twin zebra conductor in matching time-frame of the ISTS line i.e., Vapi-II – Sayali D/C 220kV line.

14.9. The members also agreed to the following intra state proposal of DNH:

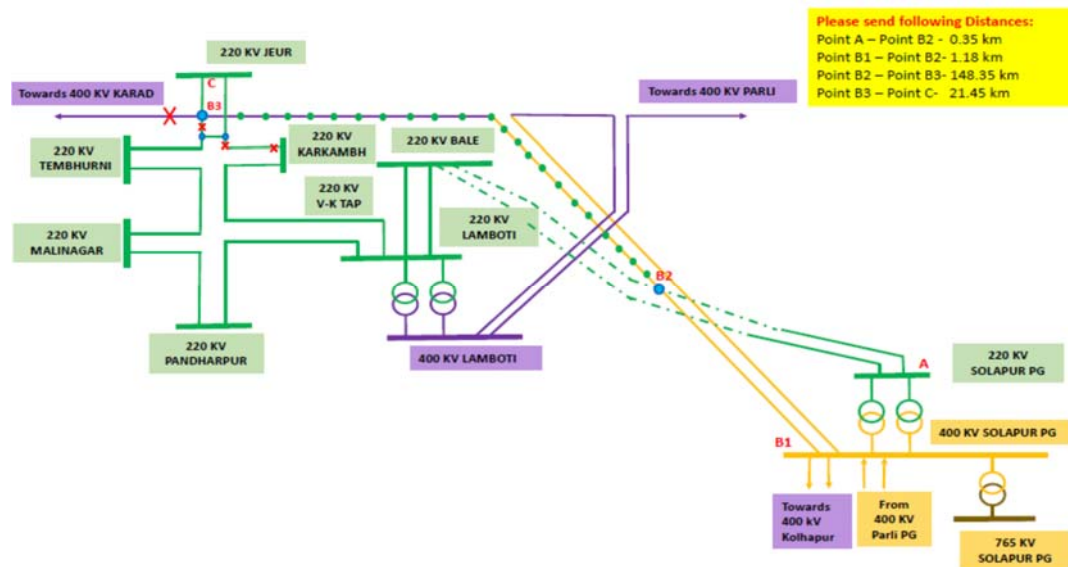
- a) Establishment of 220 kV switching station at Bhilosa (GIS) with provision of 8 nos. of 220 kV bays (4 nos. equipped line bays and 4 nos. future bays). (Out of the 4 equipped line bays, 2 nos. line bays are for LILO of one ckt. of Vapi- Kharadpada 220 kV D/C line at Bhilosa and 2 nos. line bays are for Bhilosa industries)
- b) LILO of one ckt. of Vapi- Kharadpada 220 kV D/C line at Bhilosa.

**15. Charging of 400 kV Solapur PG – Karad line on 220 kV Level for resolving low voltage problems in Solapur District**

15.1. CEA stated that MSETCL vide its letter no. MSETCL/CO/STU/2818 dated 18.03.2017 has requested for charging a part of the existing 400 kV Solapur (PG)–Karad S/C line at 220 kV level

using one circuit of under construction Solapur (PG)-Bale 220 kV D/C line as an interim arrangement. The interim arrangement was proposed to solve the low voltage problems in Solapur District during agriculture peak load. MSETCL's 220 kV substations at Pandharpur, Malinagar, Jeur, Tembhurni and Karkambh of Solapur district were fed from 400/220 kV Lamboti S/s through radially connected 220 kV Lamboti–Karkambh–Jeur (189 km) line and 220 kV Lamboti–Pandarpur–Malinagar–Tembhurni–Jeur (166 km) line. However, during the peak agriculture load (6 AM to 12 Noon), power flow through these lines was beyond their SIL limit thus, the low voltage was observed at all above substations along with 400 kV Lamboti S/s i.e. up to 370 kV. In order to address the low voltage problem, MSETCL is implementing 220 kV Solapur (PG) – Bale D/C line and MSETCL has also planned 400/220 kV 2x500 MVA S/s at Tembhurni / Karjat in 2021–22 time frame.

Parli–Karad 400 kV S/C line is LILOed at 400 kV Lamboti S/s (i.e. Solapur - MSETCL). Subsequently, under WRTS–II, LILO of 400 kV Lamboti-Karad S/C line at Solapur (PG) was implemented by M/s Reliance Power Transmission Limited (RPTL). The schematic of the interim arrangement is as under:



The above interim arrangement was discussed in 493<sup>rd</sup> OCC meeting held on 10<sup>th</sup> March, 2017 at Vindhyachal, wherein, it was deliberated that any reconfiguration of the network would require approval of CEA / CTU and the Reliance Power Transmission Ltd.

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

- i) The proposal of MSETCL as shown in the block diagram above was agreed as an interim arrangement to mitigate the low voltage problem faced in Solapur district.
- ii) The interim arrangement shall be disconnected by Dec, 2017 or after the completion of Solapur (PG) – Bale 220 kV D/C line, whichever is earlier.
- iii) The above proposal is agreed in principle and the proposal would be put up in forthcoming meeting of the Standing Committee on Power System Planning of Western Region for ratification.
- iv) All the expenditure for implementation of the interim arrangement and its restoration shall be borne by M/s MSETCL.

- v) MSETCL shall expedite the implementation of 400/220 kV Tembhurni / Karjat sub-station along with upstream and downstream network.
  - vi) MSETCL shall implement Under Voltage Load Shedding (UVLS) relays at all its S/s at the earliest and provide adequate reactive compensation at 33 kV and below voltage level in Solapur district at the earliest.
  - vii) MSETCL shall explore interconnection between Solapur (PG) – Lamboti (MSETCL) by using LILO portions of Parli - Karad 400 kV line at Solapur (PG) and Lamboti.
  - viii) The idle section of Solapur (PG) – Karad 400kV S/c line along with the line bays at Solapur (PG) end shall be deemed 100% available subjected to regulatory norms.
- 15.2. MSETCL informed that the above interim arrangement was implemented by MSETCL on 03.05.2017 and it has resulted into the following benefits:
- i) Voltage profile of Pandharpur, Jeur Grid increased from 7 to 14 kV
  - ii) Low voltage & hunting problem resolved. Now, Minimum voltage always above 198kV
  - iii) System Stability improved
  - iv) Additional Source from power grid
  - v) ICT loading of lamboti reduced
  - vi) Over loading of Lamboti – Pandharpur and Lamboti – Karkamb/Khanapur lines has reduced.
  - vii) Utilization of ICT capacity at PGCIL increased.
- 15.3. MSETCL stated that with the implementation of the interim arrangement, voltage profile of many 220 kV substations had improved. In Maharashtra, peak agricultural load is from October – February, therefore, the interim arrangement may be allowed to be continued beyond December 2017 and further till commissioning of proposed 400/220 kV Karjat S/s.
- 15.4. CEA enquired about the status of implementation of Solapur (PG) – Bale 220 kV D/C line. MSETCL informed that Sholapur (MSETCL)–Bale 220 kV D/C line is expected to be completed by June 2018 and also MSETCL Board had given its consent for establishment 400/220 kV Karjat S/s and the same is expected to be commissioned by March 2020.
- CEA stated that as per the meeting held in CEA on 12.04.2017, the interim arrangement shall be disconnected by Dec, 2017 or after the completion of Solapur (PG) – Bale 220 kV D/C line, whichever is earlier. As the Sholapur (MSETCL)–Bale 220 kV D/C line is expected to be completed by June 2018, therefore, extension of the interim arrangement beyond needs to be deliberated.
- 15.5. WRLDC representative stated the interim arrangement has been useful and has improved the voltage profile and grid conditions. However, Unit–1 of Sholapur TPP of NTPC (1320 MW – 2 x 660 MW) was synchronized in April, 2017 and its COD was done on 25.09.2017 and unit–2 is expected to synchronize shortly. As the Sholapur (PG)–Karad 400 kV S/C line charged on 220 kV level, during 72 hours trial run operation of the Unit–1 of Solapur, evacuation constraints were observed as only Sholapur (PG)–Kolhapur 400 kV D/C was available i.e. the power flow through each of this was 550 MW, which is ‘n – 1’ non-compliant. In order to carryout full trial run operation, an SPS was required to be implemented for backing down of generation in case of high line loadings. Therefore, further time extension of charging 400 kV Sholapur (PG)–Karad S/C on 220 kV level may not be considered.
- 15.6. WRLDC representative further stated that to address the low voltage problem in Solapur area MSETCL must provide Under Voltage Load Shedding (UVLS) relays at all its S/s and provide

adequate reactive compensation at 33 kV and below voltage level in Solapur district at the earliest.

- 15.7. CEA requested MSETCL to study the feasibility of interconnection between Solapur (PG) – Lamboti (MSETCL) by using LILO portions of Parli-Karad 400 kV line at Solapur (PG) and Lamboti.
- 15.8. After deliberations, members concurred the interim arrangement approved in the meeting held on 12.04.2017 at CEA, New Delhi.

In view of the concerns raised by MSETCL (low voltage after removal of interim arrangement) and WRLDC (evacuation constraint for Sholapur STPP due to continuation of interim arrangement), it was agreed that the issue may be further deliberated in OCC forum of WRPC.

Members requested MSETCL to expedite implementation of 400/220 kV Karjat S/s and 220 kV Sholapur (PG) – Bhale D/C line.

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

- 16.1. CEA stated that the 5.4. Proviso (iii) of Indian Electricity Grid Code (IEGC) (Fourth Amendment) Regulations, 2016, of CERC dated 06.04.2016 is as follows:

*“Where the transmission system executed by a transmission licensee is required to be connected to the transmission system executed by any other transmission licensee and both transmission systems are executed in a manner other than through tariff based competitive bidding, the transmission licensee shall endeavor to match the commissioning of its transmission system with the transmission system of the other licensee as far as practicable and shall ensure the same through an appropriate Implementation Agreement.”*

The purpose of the above provision of signing of Implementation Agreement (IA) between the parties involved is that both the upstream and downstream network may be completed in the matching timeframe to avoid any situation of transmission system remaining unutilized. In WR there are many instances, where 400/220 kV substation along with the associated 220 kV bays has already been commissioned as ISTS asset but the 220 kV line bays are still unutilized due to delay in completion of the associated 220 kV line. Many 400/220 kV substation are under implementation and it is required that downstream 220 kV networks is also implemented in the matching timeframe.

- 16.2. The status of the 220 kV lines from various 400/220 kV substations were deliberated with STUs and the updated status of execution of downstream network is indicated in the table below:

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

SI	ISTS Substation	Voltage ratio in use	Status of Bays		220kV Lines for unutilized bays	Status of 220kV lines
			Total	Unutilized		
1	Raipur (PG)	3x315 MVA, 400/220 kV	6	2 no bays ready since 01.07.2011 (WRSS-6)	Raipur (PG) – Doma 220 kV D/c	Completion by 30 <sup>th</sup> November 2017
2	Mapusa (PG)	3x315 MVA, 400/220kV	4	2 nos Bays ready since : 01.11.2013	Mapusa – Cuncolin 220 kV D/c	No participation
3	Pirana	2x315 MVA, 400/220kV	4	2 nos Bays ready since 19.03.15 (WRSS-6)	Pirana – Barjadi 220 kV D/c	March 2019
4	Boisar	2x315 +500 MVA, 400/220 kV	6	1 no Bay ready since 30.05.15	Boisar – Borivali 220 kV line S/c	Completion by March 2018
5	Magarwada	2x315 MVA, 400/220kV	4	2 nos Bays ready since 03/11/14	Magarwada – Ringanwada 220 kV D/c	No participation. March 2018
6	Wardha	2x315 MVA, 400/220 kV	6	2 nos Bays ready since 01.02.2011	Wardha- Yavatmal 220 kV D/C line	December 2018
				2 nos Bays ready since 01.01.2012	Wardha – Bhugaon 220 kV S/c	Commissioned in August 2016
					Wardha – Pusad220kV S/c	Commissioned in August 2016
7	Solapur	2x315 +1x500 MVA, 400/220 kV	6	2 nos Bays ready since 01.04.2011	Solapur – Bhale (MS) 220kV D/c	June 2018
				2 nos Bays ready since 02.11.2015	Solapur – Narangwadi 220 kV D/c line	Narangwadi 220 kV substation planned in 2019-20 time frame. Award not placed yet.
8	Damoh	1 x 500 MVA 400/220 kV	6	2 no. of bays ready since Nov – 2016	LILo of 2nd 220kV circuit of Damoh (MPPTCL) - Sagar 220kV line at Damoh (PGCIL) 400kV S/s. (1Km)	Commissioned on 28.8.2017



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

S. No.	ISTS Substation	Proposed Bays	Comm. Schedule	220kV Lines emanating from Substation	Status of 220kV lines	Remarks
1	Betul GIS 2x315 MVA, 400/220 kV	4	Commnd	(i) Betul (PG) - Betul D/C 220 kV line (3 Km)	Completed July 2017	
				ii) LILO of Sarni - Pandhurna 220kV line at Betul GIS(PGCIL) 400 kV S/s (41 Km).	targeted to completed by December 2018	
2	Morena (TBCB) 2 x 315, 400/220 kV	4	May'18 (Chhattisgarh & WR SS)	i) LILO of one circuit of Malanpur – Mehgaon 220kV line at Morena (TBCB) 400kV S/s (8Km from Loc. No.12). ii) Morena(TBCB)400 - Sabalgarh 220kV DCDS line (92Km) with LILO of one circuit of Morena(TBCB)400 - Sabalgarh 220kV line at Morena 220kV S/s of MPPTCL (0.5Km)	targeted to complete by March 2018	
3	Navi Mumbai 2 x 315, 400/220 kV	4	Bays ready since Mar'14 (WRSS-V)	STU line	Planned for implementation through TBCB route.	Severe RoW issues are involved
4	Indore (PG) 2x500 MVA, 400/220 kV	6	Jul'18 (WRSS-14)	LILO of both circuit of Indore-II (Jaitpura) - Ujjain 220 kV line at Indore (PGCIL) 765 kV S/s. (2X4Km)	Targeted to complete by December 2018	
				(ii) Remaining 2 Nos. feeders from Indore(PGCIL) 765kV S/s shall be intimated at later stage	Yet to be planned.	
5	Itarsi (PG) 1x500 MVA, 400/220 kV	2	Jul'18 (WRSS-14)	LILO of 2nd 220kV circuit of Itarsi (MPPTCL) - Hoshangabad 220 kV line at Itarsi (PGCIL) 400kV S/s (Existing)	Completed on 9.8.2017	
6	Parli (PG) 2x500 MVA, 400/220 kV	4	Jun/Jul'18 (WRSS-16)	LILO of Parli - Harnkul 220 kV S/c	Dec, 2018	
				LILO of Osmanabad (MS) - Parli 220 kV S/c	Dec, 2018	
7	Mapusa (PG) 3X315 MVA, 400/220	2	Jun/Jul'18 (WRSS-16)	Mapusa - Tuem 220 kV D/c	No participation	

8	Satna (PG) 1x500MVA, 400/220kV	2	Jun/Jul'18 (WRSS-16)	LILO of one circuit of Satna (MPPTCL) - Chhatarpur 220 kV line at Satna (PGCIL) 400 kV S/s (3Km)	Line completed.	
9	Vadodara GIS 2 x 500 MVA, 400/220 kV	4	March – 2017	220 kV Venkatpura-Vadodara D/C Line 220 KV Jambua – Vadodara D/C Line	March, 2018 Dec, 2018	
10	Bijawar (TBCB) 2 x 500 MVA, 400/220 kV	4	RfQ stage	LILO of Tikamgarh – Chhatarpur 220kV D/c line at Bijawar	TBCB scheme put on hold.	
11	Navsari 2x315MVA + 1x500MVA, 400/220kV	2	May'18	Navsari – Bhestan 220kV D/c line	Scheduled COD : May'18	DGENTPL has confirmed that they are not taking up implementation of the scheme
12	Rewa PS 3x500MVA, 400/220kV	6	Oct'17	Rewa UMSP – Rewa PS 220kV 3xD/c line	UC by Rewa UMSP	Matching with Generation Project
13	Khandwa 1x500MVA, 400/220kV	2	Sep'19/June 2018	Khandwa – Chamera 220kV D/c line	June 2018	

STU to make all effort to maintain the time schedule indicated.

## 17. Requirement of Transformer Augmentation in Western Region- Agenda by POWERGRID

17.1. CEA stated that POWERGRID had intimated that several 400/220kV ICTs in WR are getting critically loaded in current time frame. In case of tripping of one ICT in that S/s, the situation becomes critical as the parallel ICT gets overloaded. Studies have been carried out and the list of transformers with high anticipated loadings in 2021-22 time frame and which violate n-1 criteria is given below:

REGION / TRANSFORMER			EXISTING /PLANNED TRANSFORMERS (MVA)	CURRENT TIME FRAME		2021-22 TIME FRAME	
				PEAK LOADING (MW)	AVERAGE LOADING (MW)	PEAK LOADING (MW)	N-1 Outage loading (MW)
WR-II	JABALPUR	400/220 kV	2x315	2x285	2x169	2x284	1x399 (315MVA outage)
WR-II	ITARSI	400/220 kV	1x315 + 1x500*	1x274	1x217	1x224+1x355	1x306 (500 MVA outage)
WR-II	GWALIOR	400/220 kV	3x315	3x257	3x187	3x228	2x294 (315 MVA outage)
WR-II	MAGARWADA	400/220 kV	2x315	2x139	2x88	2x201	1x358 (315MVA outage) with Magarwada 220kV (D&D) bus split & 1x317 (315MVA outage) without the split arrangement

\*Additional 500MVA ICT under implementation (under WRSS-14 scheme by POWERGRID)

Based on above, POWERGRID has proposed following transformer augmentation:

- i) Augmentation of 400/220kV transformation capacity at Jabalpur(PG) S/s by 500MVA
- ii) Replacement of 315MVA, 400/220kV transformer at Itarsi (PG) S/s by 500MVA ICT and shifting the 315MVA ICT thus freed to Gwalior as 4<sup>th</sup> 400/220kV ICT
- iii) Augmentation of 400/220kV transformation capacity at Magarwada (PG) S/s by 500MVA

Subsequently, MPPTCL vide its letter no. 04 – 02 /n – 171 / 2601 dated 16.10.2017 had intimated that the existing 2x315 MVA ICTs at Jabalpur (PG) are feeding Jabalpur, Panagar and Narsinghpur 220 kV S/s. The max loading on these ICTs observed during April 2017 was 287.16 MW and generally the loading on these ICTs was around 200 MVA on each throughout the year. Under n–1 contingency of above transformers, it becomes difficult to manage the loads of Jabalpur and Narsinghpur areas. Therefore, MPPTCL has proposed additional 1x500 MVA or 1x315 MVA ICT at Jabalpur (PG) 400/220 kV S/s. MPPTCL has also proposed 2 no. of 220/33 kV, 50 MVA ICT at Jabalpur 400/220 kV S/s.

- 17.2. CEA stated that the loading on ICTs at Itarsi and Gwalior 400/220 kV S/s are within acceptable limit, even under ‘n–1’ contingency. Further, in view of implementation of Morena 400/220 kV S/s through TBCB, loadings on Itarsi and Gwalior (PG) 400/220 kV sub-stations may not increase.
- 17.3. CTU / PGCIL intimated that in the studies, Morena (TBCB) 400/220 kV S/s has been considered and the loading of ICTs of Itarsi and Gwalior are at margin under n-1 contingency, therefore the same may be considered.
- 17.4. CEA stated that the anticipated load of Daman & Diu (D&D) corresponding to 2021–22 timeframe would be around 430 MW (including 40 MW of Diu). Presently, the demand of Daman & Diu is met through Magarwada (D&D) 220 kV S/s which is connected with 400/220 kV, 2x315 MVA, Magarwada (PG) S/s (through Magarwada (PG)–Magarwada (D&D) 220 kV D/C line) and Vapi(PG) (through Vapi (PG) – Magarwada (DD) 220 kV D/C line). Apart from this Ringanwada 220 kV S/s along with Ringanwada – Magarwada (PG) 220 kV D/C lines is under implementation. In view of this transformer capacity augmentation at Magarwada 400/220 substation may not be required. Further, in studies of PGCIL, 220 kV bus of Magarwada (DD) S/s was considered as split bus, which might be leading power flow through 315 MVA ICT is almost at its rated capacity, under n–1 contingency. However, without bus splitting at of 220 kV level at Magarwada (DD) S/s, the loading on 315 MVA ICT is marginally crossing 315 MVA limits, under n–1 contingency.
- 17.5. After deliberations, augmentation of transformation capacity at following ISTS substations in Western Region was agreed:

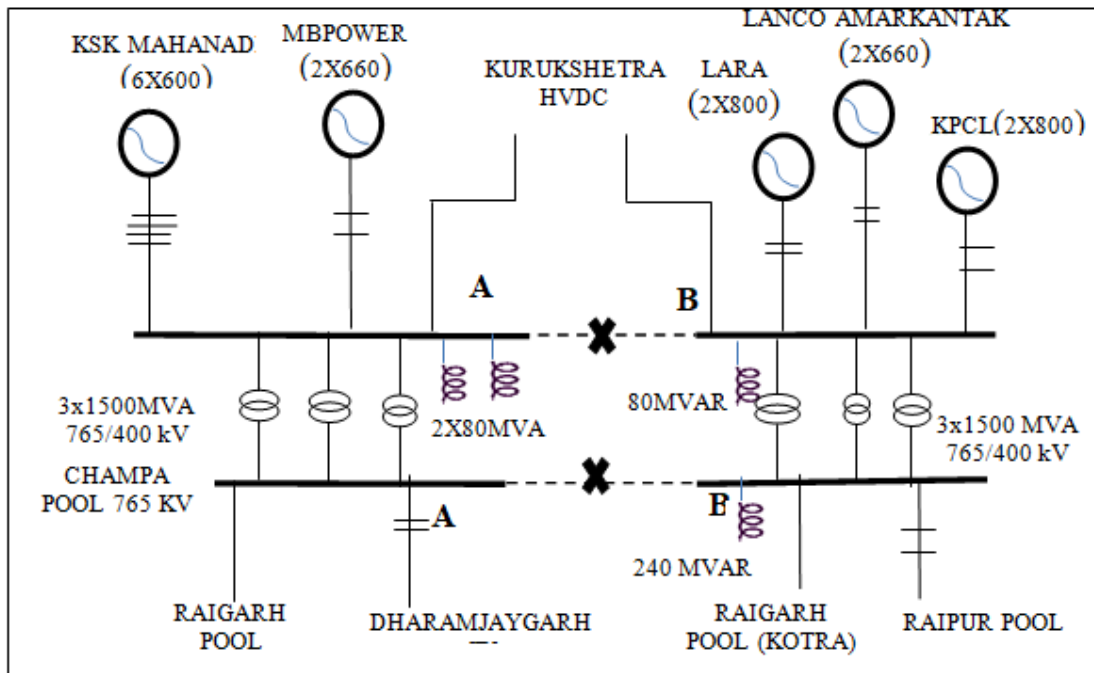
S. No.	Sub station	Voltage	Existing / Already planned MVA	Transformation capacity agreed
1	JABALPUR	400/220kV	2x315	1 x 500
2	ITARSI	400/220kV	1x315 + 1x500	1 x 500#
3	GWALIOR	400/220kV	3x315	1x315 (to be shifted from Itarsi)
# After implementation of this 500 MVA ICT at Itarsi S/s, the existing 1 x 315 MVA of Itarsi S/s would be shifted to Gwalior S/s.				

It was also agreed to further review the requirement of augmentation of transformation capacity at Magarwada 400/220 kV sub-station.

**18. Provision of Bus Reactor at Champa Pool Split Section –A Part – Agenda by POWERGRID**

18.1. CEA stated that during the 39<sup>th</sup> meeting of SCSPWR held on 30.11.2015, the following split bus arrangement was agreed at Champa P.S.

**i. Champa Pooling Station after BUS Splitting:**



Champa Pool Voltage Level (in kV)	Description		BUS Section A	BUS Section B
400	Generation (in MW)	Available	4920	4520
	BUS Reactor (in MVAR)	Available	2x80	1x80
	765/400 kV ICT (in MVA)	Available	3x1500	3x1500
765	BUS Reactor (in MVAR)	Available	-	240
		Proposed	240	-

POWERGRID has informed that under the proposed splitting arrangement, 2x80MVAR bus reactor under Section A of Champa 400kV bus was inadvertently mentioned as “available”, whereas only space for 2x80MVAR bus reactors is available at section A of Champa 400kV bus. There is only one 80 MVAR bus reactor at Champa Pooling Station on Section B of 400kV bus. Hence, there will be no bus reactor at section A of Champa 400kV bus after the implementation of splitting arrangement. Accordingly, POWERGRID had proposed to install a 420kV, 1x125MVAR bus reactor at Champa bus section A to control over voltage as Section A shall be operating as an independent substation after splitting.

18.2. After deliberations, members agreed for provision of 1x125 MVAR bus reactor at 400 kV bus section A of Champa PS.

**19. Transmission System associated with DGEN TPS (4x300MW) under implementation by DGEN Transmission Co. Ltd.**

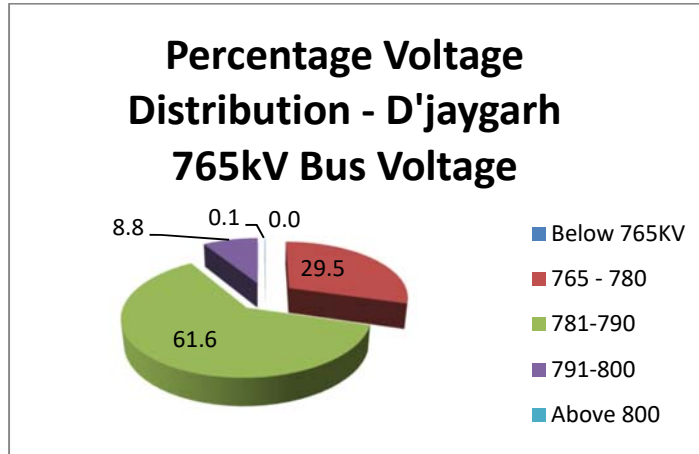
- 19.1. CEA stated that the transmission scheme “Transmission system associated with DGEN TPS (1200 MW) of Torrent Power Limited”, which consists of i) DGEN - Vadodara 400 kV D/C line and ii) Navsari – Bhestan 220 kV D/C line has been awarded to DGEN Transmission Company Ltd (DGENTCL) through Tariff Based Competitive Bidding (TBCB) route with commissioning schedule of May 2018. The zero date of the project is 17.03.2015, however, M/s DGENTCL has not yet taken up the implementation of the scheme

Further in a meeting held at CEA on 26.04.2017 to review the progress of the above transmission scheme, M/s DGENTCL had confirmed that they were not taking up the implementation of the project. Therefore, it was decided that (LTTC of the transmission scheme) shall initiate action as per relevant clause of TSA for termination of transmission scheme and CEA shall inform the status of project to CERC in due course. In the meeting, representative from Torrent Energy Ltd. had informed that all three units of 1200 MW DGEN gas based power project at Dahej near Bharuch, South Gujarat had been commissioned along with dedicated connectivity line i.e. DGEN – Navsari 400 kV D/C line. There may be constraint in evacuation of power from DGEN plant in case of outage of one ckt of DGEN-Vadodara 400 kV D/C line. Due to non-availability of gas DGEN power plant is not running at full load.

- 19.2. GETCO representative stated that the Navsari (PG)–Navsari (GETCO) 220 kV D/C line is getting over loaded and requested for implementation of Navsari (PG)–Bhestan 220 kV D/C at the earliest, independent of DGEN–Vadodara 400 kV D/C. It was also intimated that GETCO had already implemented 2 no. of 220 kV line bays at Bhestan S/s for Navsari (PG)– Bhestan 220 kV D/C.
- 19.3. CEA stated that M/s Torrent Energy Ltd, the LTTC of the above project has not initiated any action for termination of the scheme so far. On a query about the implementation of Navsari (PG) – Bhestan 220 kV D/C line by GETCO, GETCO representative stated that Bhestan being in vicinity of Surat, there would be RoW issues. He requested that the line may be implemented in ISTS through TBCB.
- 19.4. After deliberations, it was agreed that the Navsari (PG)– Bhestan 220 kV D/C line is required on an urgent basis. It was decided that a separate meeting among CEA, CTU, GETCO, M/s Torrent Energy Ltd and PFCCL (BPC) would be called to deliberate upon the following:
- Necessary action / procedure for cancellation of the transmission scheme as per TSA
  - Requirement of DGEN–Vadodara 400kV D/c line for evacuation of power from DGEN
  - Mode of implementation of Navsari (PG) – Bhestan 220 kV D/C line and DGEN–Vadodara 400 kV D/C line (if required).

**20. Charging of 2x330 MVAR Line Reactors of Dharamjaygarh – Jharsuguda 765kV 2<sup>nd</sup> D/c line as Bus Reactor at 765/400 kV Dharamjaygarh Substation**

- 20.1. CEA stated that POWERGRID has intimated that 765 kV bus voltage of Dharamjaygarh substation remains high for most of the time even though all available line reactors / bus reactors are in service. To control overvoltage 765 kV lines are required to be opened. During the months of May’17 to Jul’17, the maximum & minimum voltages observed at Dharamjaygarh 765kV bus were 802kV and 765kV respectively and voltages remained in the range of 781kV to 800kV for more than 70% of the time. The voltage profile at Dharamjaygarh substation is as given below:



Further POWERGRID has informed that the line bays associated with 765 kV Jharsuguda–Dharamjaygarh ckt 3 & 4 along with 2x330 MVAR line reactors are ready for charging at Dharamjaygarh substation, whereas the construction of the line is in progress and is expected to be completed by June 18. In view of above, POWERGRID has proposed to charge the 2x330 MVAR line reactors as bus reactors till completion of 765 kV Jharsuguda-Dharamjaygarh Ckt 3 & 4. System studies indicate that voltage at Dharamjaygarh 765 kV level reduces by 5.0 kV after use of 2x330 MVAR line reactors as bus reactors.

- 20.2. After deliberations, members agreed with proposal of charging of line reactors of both circuits of 765 kV Dharamjaygarh-Jharsuguda D/C line (ckt 3 & 4) at Dharamjaygarh Pooling Station as bus reactors till the completion of Dharamjaygarh-Jharsuguda 765 kV D/C line (ckt 3 & 4) as it would provide operational flexibility for controlling high voltage at Dharamjaygarh substation.

## 21. Interconnection of MSETCL lines with PGCIL lines or S/s

- 21.1. CEA stated that MSETCL vide its letter dated 29.05.2017 had intimated that in its five-year plan (from 2017–18 to 2021–22), it has proposed to interconnect some of its existing or upcoming new lines / substations with PGCIL network and requested to take up the same in the meeting of SCSPSPWR for approval. The list of elements of MSETCL is given below:

S. No.	Transmission Element	PGCIL S/s	Remark	Target Year	Type of Ckt
1	LILO of 400 kV Talegaon (PG) – Kalwa at Vikhroli	Talegaon		2021 – 22	D/C
2	Wardha (PG) – Yavatmal 220 kV D/C	Wardha		2017 - 18	D/C
3	Solapur (PG) – Bale 220 kV D/C	Solapur		2016 – 17	D/C
4	Conversion of existing 220 kV S/C Urse – Chinchwad line to M/C for portion between Chinchwad S/s to prop 220 kV Talegaon PGCIL line LILO point (Loc no. 50)	Talegaon		2016 – 17	
5	LILO of one Ckt. of 400 kV Tarapur – Padghe D/C at Kudus (Padghe II)	Padghe / Kudus		2017 – 18	

6	LILO of one Ckt. of Aurangabad (PG) – Shendra D/C at Phulambri	Aurangabad		2019 – 20	
7	LILO of 220 kV Parli – Harangul S/C at Parli (PG)	Parli		2018 – 19	
8	LILO of Parli – Osmanabad S/C at Parli (PG)	Parli		2018 – 19	
9	LILO of 2 <sup>nd</sup> Ckt of South Solapur – Kolhapur D/C at Alkud 400 kV S/s	Solapur		2016 – 17	
10	LILO of both ckts of Parli (PG) – Pune (PG) 400 kV D/C at Lonikhand II	Pune		2017 – 18	
11	LILO of one ckt. Of 220 kV Borivali – Boisar (M) M/C line at Boisar (PG) and 220 kV Nalasopara at Boisar PG Idle line	Boisar		2016 – 17	
12	LILO of both ckts of Dhule – SSP 400 kV D/C at Balsane PS	Dhule / SSP		2019 – 20	

21.2. The above proposed interconnections were deliberated and it was observed that the lines mentioned at s. no 2,3,6,7,8 and 11 are downstream 220 kV network from 400/220 kV ISTS substation, which were already agreed in earlier meetings of SCPSPWR and line at s. no. 4 is only conversion of section of line on multi circuit towers. The line indicated at s. no. 12 has already discussed and agreed at agenda item no. 6. The other transmission elements enumerated at s. no. 1, 5, 9 and 10 needs detailed deliberation along with system studies.

21.3. In view of the above, it was agreed that the transmission elements proposed at s. no. 1, 5, 9 and 10 would be further discussed among CEA, CTU, PGCIL and MSETCL

**22. Declaration of 132 kV Neapanagar (Madhya Pradesh)–Dharni (Maharashtra) line as ISTS line – proposal by MSETCL**

22.1. CEA stated that MSETCL vide its letter no. MSETCL/CO/STU/9849 dated 07.09.2017 had intimated that 132 kV Neapanagar (Madhya Pradesh)–Dharni (Maharashtra) line (approx. 60 km) has been charged on 09.02.2017 in radial mode and power is flowing towards Maharashtra. As it is interconnected between two states, MSETCL had requested to declare this line as an ISTS line (Inter State Transmission System).

22.2. Members opined that as this line interconnects two states it is a natural ISTS line. However, MSETCL should approach Hon'ble CERC to address the issue.

**23. Advancement in schedule of 2 no. of 220 kV line bays at Khandwa (PG) 400/220 kV S/s associated with 1 x 500 MVA, 400/220 kV, 3<sup>rd</sup> ICT**

23.1. CEA stated that MPPTCL vide its letter dated 29.08.2017 has intimated that 1x500 MVA, 400/220 kV 3<sup>rd</sup> ICT at Khandwa was agreed in 39<sup>th</sup> meeting of SCPSPWR held on 30.11.2015 and its associated 2 no. of 220 kV line bays were agreed the 41<sup>st</sup> meeting of SCPSPWR held on 21.12.2016. MPPTCL has further intimated that the downstream network of above ICT (220 kV Chhenera–Khandwa (PG) D/C line) was expected to be completed by Dec, 2018. However, the target for completion of 500 MVA, 400/220 kV 3<sup>rd</sup> ICT at Khandwa along with 2 no. of 220 kV bays is September, 2019, therefore, MPPTCL had requested to implement the ICT in matching time frame of Khandwa (PG) – Chhenera 220 kV D/C line i.e. Dec, 2018.

- 23.2. In the meeting MPPTCL intimated that the downstream network associated with 3rd ICT at Khandwa (being implemented by POWERGRID under WRSS-17 scheme), Chhenera – Khandwa (PG) 220 kV D/c line, is expected to get completed as early as Jun'18. Accordingly, MPPTCL requested POWERGRID to complete the 2 nos. bays at Khandwa in matching time-frame.
- 23.3. Representative from WR-II (POWERGRID) assured that they would make all efforts to complete the 220kV bays at Khandwa in matching time-frame

**24. Provision of 400/220 kV, 2x500 MVA ICT at Kakrapar Nuclear Power Station – proposal by GETCO**

- 24.1. CEA stated that the installed capacity of KAPP is 2x220 MW (Unit-1 & 2) and work is under progress for units 3 & 4 (2x700 MW). The Associated Transmission System (ATS) for KAPP is as follows:

Unit 3&4 (400 kV level):

- (i) KAPP – Navsari 400 kV D/C
- (ii) KAPP – Vapi (PG) 400 kV D/C

Unit 1&2 (220 kV level):

- (iii) KAPP – Vav 220 kV D/C
- (iv) KAPP – Vapi 220 kV D/C
- (v) KAPP – Haldarwa 220 kV D/C

GETCO vide its letter dated 04.09.2017 has intimated that at present, the 400 kV switchyard and 220 kV switchyard at KAPP are operating in isolated mode. During low / no generation at KAPP, the power flows from Haldarwa to Vav & Vapi through 220 kV Haldarwa–KAPP D/C and KAPP–Vav 220 kV D/C & KAPP–Vapi 220 kV D/C, thus some of the 220 kV lines in this area getting over loaded. Therefore, GETCO had proposed installation of 2 x 500 MVA, 400/220 kV ICT at KAPP.

- 24.2. KAPS representative stated that the above issue was discussed in 31<sup>st</sup> meeting of SCSPWR held on 27.12.2010, wherein, it was deliberated that due to the space constraints the interconnection of 220 kV and 400 kV level at KAPS switchyard cannot be implemented. In view this, GETCO proposal for installation of 400/220 kV, 2x500 MVA ICT at KAPS switchyard may be dropped.
- 24.3. Members agreed to drop the above proposal.

**25. Installation of 2x50MVA, 220/33kV transformer with 10 Nos. 33kV feeder bays at 220kV Jabalpur substation**

- 25.1. CEA stated that Jabalpur 400/220 kV sub-station of POWERGRID presently has 2x315 MVA, 400/220 kV ICTs and the 220kV & 132kV works including 220kV bus and 220kV side ICT bays located in the same premises are owned by MPPTCL. Earlier NTPC (then owner of Jabalpur 400kV sub-station) vide letter dated 22-05-1987 had allowed MPPTCL (then MPEB) to carry out 220/132kV extension works at its Jabalpur sub-station subject to, inter-alia, the following conditions:

- i) MPEB will not provide any 132/33 kV extension at Jabalpur 400kV sub-station
- ii) MPEB shall not construct any staff quarter in the space given by NTPC
- iii) The ownership of the land allotted to MPEB for 220/132kV extension rests with NTPC

- 25.2. CEA further stated that MPPTCL vide letter dated 10.04.2017 has requested POWERGRID to provide consent towards the installation of 2x50MVA, 220/33kV transformer along with 10 nos.



33 kV outgoing feeders (to be implemented by MPPTCL) to cater to future load growth of Jabalpur & surrounding area. The existing 33kV auxiliary supply to Jabalpur substation is also from a 16km long 33kV line from 220/132/33kV MPPTCL substation, which is not reliable. The proposal of 220/33kV ICTs will also help in providing reliable auxiliary supply to Jabalpur (PG) substation.

- 25.3. POWERGRID stated that that it does not have any objection for installation of 220/33 kV, 2x50 MVA transformers by MPPTCL. The associated 220 kV and 33 kV ICT bays would be under the scope of MPPTCL. Considering the above augmentation of MPPTCL and growth in demand of Jabalpur area, the loading of Jabalpur ICT would increase. Therefore, augmentation of transformation capacity at 400/220kV Jabalpur substation would also be required.
- 25.4. CEA stated that the augmentation of transformation capacity by 1x500 MVA, 400/220 kV ICT at Jabalpur S/s has already discussed and agreed at item no. 17.
- 25.5. Members agreed to the proposal of MPPTCL for installation of 220/33 kV, 2x50 MVA transformers along with ICT bays at 220 kV and 33kV level and 10 no. 33 kV feeder bays at Jabalpur S/S by MPPTCL.

## **26. Retention of LILO of 400kV Khandwa- Rajgarh at Khargone – Agenda by NTPC**

- 26.1. CEA stated that NTPC has intimated that one double circuit line has been approved for many of recently approved NTPC projects namely Darlipalli, Khargone, Rihand III. Under planned shutdown of any one circuit, as per operational practice auto reclose of second circuit is blocked. This has resulted in station blackout and damage to LP turbine diaphragm due to loss of cooling water (Mouda) in case of any fault on the line. It takes minimum 6-8 hours to replace the diaphragm, subject to availability of spares if required to be replaced for multiple units. Even if single phase auto reclose is kept enabled, during dead time, generators will be subjected to very high negative sequence current (Rotor heating) and torsional stress. In view of this NTPC has made the following proposal:
  - a) Provision of at least two D/C lines preferably to two different substations may be considered for new projects as immediate transmission system.
  - b) For Khargone TPS, the LILO of 400kV Khandwa-Rajgarh at Khargone may be allowed to be retained.
- 26.2. CEA further stated that following transmission system associated with Khargone TPP has been agreed and the same is under implementation through tariff based competitive bidding route:

### **1. Connectivity system for Khargone STPP**

- (i) LILO of one ckt of Rajgarh-Khandwa 400kV D/C line at Khargone TPP (The LILO shall be used for startup power and commissioning activities requirement. After commissioning of balance transmission system, the LILO would be bypassed at Khargone generation switchyard and may be utilized only under contingency condition)
- (ii) Khargone TPP Switchyard – Khandwa pool 400 kV D/C (Quad) line

### **2. System strengthening in WR in time frame of Khargone TPP**

- (i) Khandwa Pool – Indore 765kV D/C line
- (ii) Khandwa Pool – Dhule 765 kV D/C line
- (iii) Establishment of 765/400kV, 2x1500MVA pooling station at Khandwa pool

As per the approved scheme the LILO shall be used for startup power and commissioning activities requirement. After commissioning of balance transmission system, the LILO would be

- bypassed at Khargone generation switchyard and may be utilized only under contingency condition. Now NTPC has requested to retain the LILO on continuous basis for evacuation of power.
- 26.3. NTPC representative stated that PLCC settings, relay settings etc., need to be updated / changed each and every time the above LILO is brought into service and taken out of service. Thus, it would be very difficult to implement the same. Therefore, the above LILO may allowed permanently as an evacuation system for Khargone TPP.
  - 26.4. WRLDC stated that recently Hon'ble CERC had directed not allow power evacuation through interim / LILO arrangement. Therefore, power evacuation through above LILO can't be allowed, however, if necessary, another transmission line(s) may be planned.
  - 26.5. CTU stated that providing another 400 kV D/C from Khargone TPP would not be optimum transmission system planning and it would reduce loading on 765kV network emanating from 765/400kV Khandwa PS.
  - 26.6. After deliberations, it was agreed to review the evacuation transmission system of Khargone TPP of NTPC in a separate meeting among CEA, CTU, WRLDC and NTPC.
- 27. Signing of Transmission Service Agreement (TSA) by Long Term Transmission Customers (LTTC) for the transmission scheme "Additional 400 kV Feed to Goa and Additional System for Power Evacuation from Generation Projects pooled at Raigarh (Tamnar) Pool" – Agenda by PFCCL**
- 27.1. CEA stated that the transmission scheme "Additional System for Power Evacuation from Generation Projects pooled at Raigarh (Tamnar) Pool" was agreed in 39<sup>th</sup> meeting of SCSPWR held on 30.11.2015 and transmission scheme "Additional 400 kV feed to Goa" was agreed in 40<sup>th</sup> meeting of SCSPWR held on 01.06.2016. Empowered Committee on Transmission in its 36<sup>th</sup> meeting held on 26.07.2016 clubbed the above schemes under scheme "**Additional 400 kV Feed to Goa and Additional System for Power Evacuation from Generation Projects pooled at Raigarh (Tamnar) Pool**" with following scope of work and recommended its implementation through TBCB.
    - a) Additional 400kV feed to Goa
      - i) LILO of one ckt. of Narendra (existing) – Narendra (New) 400kV D/c quad line at Xeldam
      - ii) Xeldam – Mapusa 400kV D/c (quad) line
      - iii) Establishment of 2x500MVA, 400/220kV substation at Xeldam
    - b) Additional System for Power Evacuation from Generation Projects pooled at Raigarh (Tamnar) Pool
      - i) Dharamjaygarh Pool Section B – Raigarh (Tamnar) Pool 765 kV D/c line.
  - 27.2. Ministry of Power vide Gazette Notification dated 28.10.2016 had appointed PFC Consulting Limited (PFCCL) as Bid Process Coordinator for the scheme. As per the Guidelines issued by Ministry of Power, a Transmission Service Agreement (TSA) has to be signed among the SPV and the concerned beneficiaries / LTTC for payment of the transmission charges finalized on the basis of competitive bidding and accepted by the appropriate Commission. In line with the requirement of the RfP documents, the copy of the duly executed TSA is to be made available to the bidders, 7 days prior to the last date of submission of RfP bids. Accordingly, PFCCL vide its letter dated 12.06.2017 has requested to the following 7 nos. LTTC for signing of the TSA.

- i) Maharashtra State Electricity Distribution Company Limited
- ii) Gujrat Urja Vikas Nigam Limited
- iii) M. P. Power Management Company Limited
- iv) Chattisgarh State Power Distribution Company
- v) Goa Electricity Department
- vi) DNH power Distribution Corporation Limited
- vii) Electricity Department, Daman & Diu

As on date only following 5 LTTCs have signed the said TSA and the following two (2) LTTCs are yet to sign the TSA

- i) Maharashtra State Electricity Distribution Company Limited.
- ii) Chhattisgarh State Power Distribution Company

The status of the bidding process for the above scheme, is given below:

- RfQ stage completed on 25.04.2017 and bidders were short listed for RfP.
- RfP documents were issued to the shortlisted bidders w.e.f. 06.06.2017.
- The submission of RfP Bid (Non - Financial & Financial) was scheduled on 19.09.2017.
- RfP (Financial) bid was opened on 11.10.2017 and the evaluation is under progress.

- 27.3. CEA further said that the above transmission scheme was deliberated and agreed in earlier meetings of SCSPWR with the consent of all members (STUs). If utilities had any observations / comments on transmission schemes, the same needs to be raised at the time of finalization of the scheme. Further, as the schemes were agreed with the consent of STUs of states, concerned STU may follow up their respective LTTC / DISCOMs for signing of TSA.
- 27.4. GUVNL representative stated that the LTTCs / DISCOMs of Western Region are not invited to the meeting of SCSPWR. Thus, LTTCs are not aware of the detailed deliberations of SCSPWR. Sometimes STUs are not able convince the respective LTTC for schemes agreed in SCSPWR. Further, GUVNL suggested that LTTCs of Western Region may be invited to SCSPWR to make LTTCs aware of the schemes and avoid difficulties in signing of TSA.
- 27.5. MSEDCL representative stated that the present total load of Goa is around 600 MW and the same expected to increase to 850 MW by 2021–22. Presently, Goa is interconnected with Mapusa 400 / 220 kV, 3x315 MVA S/s (4 no. of 220 kV lines) & Kolhapur S/s (2 no. of 220 kV lines) and a 220 kV D/C interconnection with Ambewadi S/s (Southern Region). Thus, the transmission scheme additional feed to Goa, which includes establishment of 400/220 kV, 2x500 MVA S/s and interconnection may be reviewed, if necessary, 1x500 MVA may be considered instead of 2 x500 MVA.
- 27.6. CEA stated that presently, North Goa strongly interconnected with Western grid (at 400 kV and 220 kV level) and South Goa is inter connected with Southern region (at 220 kV level only). The above proposal strongly interconnects both Northern & Southern Goa. The 2x500 MVA ICTs proposed at Xeldam (TBCB) S/s is to meet the n–1 criterion. In view of marginal cost difference between 500 MVA ICT and 315 MVA ICT, and taking a long term view 2x500 MVA ICTs has been proposed at Xeldam.
- 27.7. After further deliberations, MSEDCL representative intimated that the TSA would be signed shortly and CSPTCL representative stated that the signing of TSA would be taken up with CSPDCL. It was also agreed that in future the STUs may include the LTTCs of respective states as part of their delegation attending meetings of the SCSPWR.

**28. Extension of Essar Power Gujarat Ltd (EPGL) - Bhachau 400 kV D/c (Triple) line of POWERGRID upto Bhogat substation – Agenda by PGCIL**

- 28.1. CEA stated that the utilization of EPGL – Bhachau 400 kV D/C line was deliberated in the 41<sup>st</sup> meeting of SCPSPWR held on 21.12.2016, wherein, GETCO had stated that POWERGRID should come out with a win - win solution for the reconfiguration proposal for EPGL (Essar) – Bhachau 400 kV D/C line, which entails no loss to Gujarat, even if benefits are not envisaged immediately. It was also requested that POWERGRID shall work out the burden to be shared by GUVNL for various conditions i.e., existing case and additional burden on GUVNL with any kind of reconfiguration and power flow benefits thereof. PGCIL has intimated that the above matter was further discussed in a meeting between GETCO and CTU on 17.06.2017 at Vadodara, wherein POWERGRID had presented various alternatives of utilization of Essar – Bhachau 400kV D/C line followed by discussions regarding modalities of implementation, impact on tariff, discussions regarding PoC, etc. CERC vide its order dated 11.10.2017 in reference to petition no. 187/MP/2015 filed by Essar power Gujarat Limited (EPGL) has stated that CTU in consultation with CEA, GETCO and EPGL may explore the possibility of optimum utilization of the Essar Gujarat TPS – Bachau 400 kV D/C (Triple) Line. Till the alternative arrangements for utilization of the said transmission line, the EPGL shall continue to pay the transmission charges as determined by the Commission.
- 28.2. CTU stated that as per the wind power potential map available at MNRE website, the South – West part of Gujarat has a high wind potential. Hence, it is proposed to extend the EPGL – Bhachau 400 kV D/C (triple) line upto Bhogat Substation of GETCO, would provide a strong inter-connection of the STU network in the RE rich area of Gujarat with the ISTS system facilitating evacuation of RE power from Bhogat area and also for supplying power to nearby load centers of Gujarat. Some connectivity applications for inter-connection in ISTS have been received in vicinity of Devbhumi Dwarka region of Gujarat, for which a new 400/220 kV Pooling Station near to Jam Khambhaliya is being envisaged. The proposed extension of EPGL – Bhachau (PG) 400 kV D/C (triple snowbird) line upto Bhogat S/s could also be LILOed at the proposed Jam Khambhaliya PS in future, to facilitate evacuation of power from RE projects in the area.
- 28.3. GETCO / GUVNL representative stated that in the vicinity of Bhogat S/s, the anticipated total RE power is of around 1200MW, as on date, applications have been received for 1000 MW in intra state and it is proposed to consume above RE power within the state only. Further, 400 kV Bhogat–Kalawad D/C line is already under implementation in intra state GEC of Gujarat. Therefore, ISTS connection to Bhogat S/s is not required. Further, it was also stated that the 400 kV Bhachau – ESSAR D/C may be extended only after receipt of LTA application from this area.
- 28.4. After deliberations, it was agreed that a separate meeting among CEA, CTU, GETCO and Essar shall be called to discuss the alternatives for the utilization Essar–Bhachau 400 kV D/c line as per CERC order dated 11.10.2017 in petition no. 187/MP/2015.

## 29. Operational feedback of NLDC period from Jul'2017 to Sep'2017

### 29.1. Transmission Line Constraints

Sl. No	Corridor	Constraints	Deliberation in 41 <sup>st</sup> Meeting of SCSPWR
1	<p>Constraints in –Bableshwar – Padghe corridor</p> <p><b>Antecedent Conditions:</b> With high Maharashtra Demand of the order of 18500-23000 MW during morning peak and no generation at TAPS, low generation at Parli, RGPPL, Jaigad and SSP.</p>	<p>400 kV Bableshwar - Padghe corridors carrying more than 500 MW in each ckt. The corridor is N-1 non-compliant.</p>	<p><b>Remedial Actions:</b> Commissioning of 400 kV Bableshwar – Kudus D/C and Kudus Sub-station to be expedited by MSETCL.</p> <p>In the meeting, MSETCL informed that Kudus substation would be commissioned in Dec., 17. 400 kV Bableshwar – Kudus D/C line would be commissioned by Dec., 2018.</p>
2	<p>765/400 kV ICT at Tirora and 765/400 kV ICT at Akola II</p> <p><b>Antecedent Conditions:</b> When generation at APML Tirora is above 2400 MW and Rattan India (5 X 270 MW) is in service.</p>	<p>The system is not n-1 compliant.</p>	<p><b>Remedial Actions:</b> Single ICT at Tirora and Akola-II is a constraint leading to n-1 non-compliance and at present managed by SPS. Commissioning of ICTs need to be expedited.</p> <p>In the meeting, MSETCL stated that they have reviewed the provision of 2<sup>nd</sup> 1x1500 MVA ICT, at Tirora &amp; Akola II as the existing 1500 MVA ICTs have 3 single phase units of 500 MVA each with a spare unit. CEA stated that 2<sup>nd</sup> 1500 MVA ICTs are required at Tirora &amp; Akola II to make then n-1 compliant.</p>
3	<p>Transmission system for Koradi St-II (3x660 MW) and IEPL (2x270 MW)</p> <p><b>Antecedent Conditions:</b> Koradi-II station is connected with 400 kV Koradi II-Koradi III D/C, 220 kV Koradi II-Kaulewada D/C and LILO of 400 kV Wardha-Warora one circuit (Interim arrangement).</p>	<p>At present Koradi-II 3x660 MW are commissioned and managed with SPS. System is N-1 non-compliant and there is no generation at IEPL.</p>	<p><b>Remedial Actions:</b> The Evacuation plan for APML, Tirora (5x660 MW) Rattan India, Amravati (5x270 MW), Chandrapur st-2 (2x500 MW), IEPL (2x270MW), and Dhariwal (1x300 MW) need to be studied by the STU in order to check whether the existing plan and available network will provide secure evacuation under various contingency during n-1 criteria.</p> <p>MSETCL stated that they have planned LILO of Chandrapur – Parli 400 kV line at Warora and the interim arrangement (Koradi II-Wardha 400 kV D/C line terminated into one ckt of Warora–Wardha 400 kV D/C line) may be allowed till it is implemented.</p>

Sl. No	Corridor	Constraints	Deliberation in 41 <sup>st</sup> Meeting of SCPSPWR
4	400 kV Bina-Sujalpur D/C  <b>Antecedent Conditions:</b> N-1 insecure operation of Bina -Sujalpur D/C after commissioning of Shujalpur – RAPS D/C coupled with high Demand in MP of above 11000 MW.	High loading observed above 600 MW/ckt on most of the occasions	<b>Remedial Actions:</b> Commissioning of HVDC Champa-Kurukshetra Bipole may help in reduced loading on these lines.  <b>Present Status:</b> One Pole of Champa - Kurukshetra has been commissioned in Mar'17 and reduced the loading to some extent. Other Pole of HVDC has been commissioned in Sep. 17.
5	220 kV Gwalior-Malanpur D/C  <b>Antecedent Conditions:</b> High loading observed when MP demand is more than 8500MW.	The system is n-1 insecure, currently managed by load trimming scheme by MPPTCL.	<b>Remedial Actions:</b> Network strengthening may be planned in this area. Commissioning of 400/220 kV Morena S/S and 400 kV Gwalior-Morena D/C (Dec., 17) line may relieve the loading on 220 kV lines
6	220 kV Navsari (PG) - Navsari (GETCO) D/C  <b>Antecedent Conditions:</b> With High generation at DGEN, Ukai, Jhanor.	High loading observed more than 220 MW and N-1 non-compliant	<b>Remedial Actions:</b> Early commissioning of Navsari- Bhesthan (Popada) 220 kV D/C line being implemented by DGENTPL under TBCB. M/s DGENTPL has intimated that they are not developing the scheme. The scheme need to be cancelled and the line may be implemented separately.
7	400 kV Jhanor-Navsari (PG) S/C and 400 kV Sugan-Vapi S/C  <b>Antecedent Conditions:</b> With less generation at TAPS and nil generation at KAPS and DGEN, Jhanor-Navsari S/C loading is high.	400 kV Jhanor-Navsari and 400 kV Sugan-Vapi loading are high and n-1 Non-Compliant.	<b>Remedial Actions:</b> KAPS unit 1&2 will be restored in 2018, thus interim arrangement needs to be restored to original configuration. In the meeting, GETCO representative stated that even with interim arrangement both Ukai-Navsari 400 kV S/C and Jhanor – Navsari 400 kV S/C are fully loaded. Even with the restoration to the original configuration overloading would be there. He suggested to expedite the 765 kV Kudus S/S along with associated network. Further, KAPS – Navsari 400 kV D/C and KAPS – Vapi 400 kV D/C lines are already commissioned. With the commissioning of KAPS 3 & 4 the over loading would be addressed.

## 29.2. ICT Constraints

S. No	ICT	Description of the constraints	Deliberation in 41 <sup>st</sup> Meeting of SCPSPWR
1	2x315 MVA 400/220 kV Chakan ICTs  <b>Antecedent Conditions:</b> All time	It is observed that the loading on ICTs at Chakan (2x315 MVA) are above 200 MW and additional ICT has to be proposed.	Presently, MSETCL has implemented load trimming scheme to take care of overloading.  In the meeting, MSETCL intimated that additional ICT has been approved and is under tendering process. The same is expected to be commissioned by March, 2019.
2	3x315 MVA + 1x600 MVA 400/220 kV Padghe ICTs  <b>Antecedent Conditions:</b> All time	It is observed that the Padghe ICTs are fully loaded and system is n-1 non-compliant.	MSETCL intimated that it has planned 5 <sup>th</sup> ICT, 1x500 MVA at Padghe and is expected to be commissioned by Nov. 2017. Kudus S/s is expected to commission by Dec, 2017.
3	2x315+1x500 MVA 400/220 kV Parli (MS) ICTs  <b>Antecedent Conditions:</b> All time	It is observed that loading on these ICTs are N-1 non-compliant	<b>Remedial Actions:</b> Nanded Sub-station with 2x500MVA 400/220 kV ICTs and 220 kV lines commissioned in Mar16 and Parli ICTs are relieved to some extent. ICTs and bays at Parli (PG) are under implementation by POWERGRID and are expected to be commissioned by Jun/July'18. The 220 kV lines associated with ICTs by MSETCL are expected to be commissioned by Dec-2018.
4	2x315+500 MVA 400/220 kV Kolhapur (MS) ICTs  <b>Antecedent Conditions</b> With High Demand in Maharashtra and Low Wind generation in Southern Maharashtra	It is observed that loading on these ICTs are N-1 non-compliant.	<b>Remedial Actions:</b> Additional 400/220 kV 1x500 MVA ICT is planned for Kolhapur S/s.

S. No	ICT	Description of the constraints	Deliberation in 41 <sup>st</sup> Meeting of SCPSPWR
5	3x315 MVA 400/220 kV Karad ICTs  <b>Antecedent Conditions</b> With High Demand in Maharashtra and Low Wind generation in Southern Maharashtra	It is observed that loading on these ICTs are N-1 non-compliant.	<b>Remedial Actions:</b> Additional ICTs to be Planned for Karad S/s. Load has to be shifted to 400/220 kV Alkud and Sholpaur PG S/s with augmentation of 220 kV Lines. MSETCL representative intimated that with the commissioning of 220 kV network for ICT at Alkud 400/220 kV S/S and Kolhapur S/S, ICT at Karad would be relieved.
6	2x500 MVA 400/220 kV Sholapur (MS) ICTs  <b>Antecedent Conditions</b> With High Demand in Maharashtra system above 18500 MW	It is observed that loading on these ICTs are N-1 non-compliant.	<b>Remedial Actions:</b> Shifting of Loads to the 400/220 kV ICTs of Sholapur (PG) in order to reduce the loading on these ICTs. MSETCL intimated that 1x500 MVA 400/220 kV ICT is proposed at Solapur which is expected to be commissioned by March 2019.
7.	2x315 MVA 400/220 kV Wardha (PG) ICTs  <b>Antecedent Conditions</b> With Commissioning of Koardi Units 3x660 MW.	The ICTs are loaded are above 200 MW most of the time with the commissioning of Koradi stage 2.	<b>Remedial Actions:</b> 2x500 MVA 400/220 ICTs of Koardi 2 are lightly loaded. Network augmentation and load distribution to be done so that loads of Wardha should be shifted to these ICTs. MSETCL intimated that redistribution of loads is not feasible in the area and requested augmentation of Wardha (PG) by 400/220 kV 1x500 MVA ICT.
8.	2x500 MVA+1x600 MVA 400/220 kV Kalwa ICTs	With increased demand and low network augmentation in the area, the system is not N-1 compliant.	<b>Remedial Actions:</b> The Navi Mumbai substation need to be utilized with 220 kV network augmentation. 220 kV lines from Navi Mumbai would be implemented through TBCB, MSETCL intimated that 4 <sup>th</sup> 400/220 kV 500 MVA ICT at Kalwa S/S is expected to be commissioned by March 2018.
9.	2x315 MVA 400/220 kV Satna ICTs  <b>Antecedent Conditions</b> High Demand in Madhya Pradesh above 9000 MW	It is observed that the loading on ICTs at Satna (2x315MVA) are above 200 MW and additional ICT has to be proposed.	MPPTCL has implemented Load trimming scheme for overloading of ICTs.



S. No	ICT	Description of the constraints	Deliberation in 41 <sup>st</sup> Meeting of SCPSPWR
10	3x315 MVA 400/220 kV Gwalior PG ICTs  <b>Antecedent Conditions</b> High Demand in Gwalior and nearby area.	The high loading on these ICTs is due to absence of required 220 kV outlets, low generation at Auraiya.	<b>Remedial Actions:</b> SPS has to be implemented by MP SLDC/PGCIL for n-1 compliance of these ICTs and 220 kV network augmentation in the area has to be done to ensure n-1 compliance. 400/220 kV Morena S/s (TBCB) and 220 kV LILO of one circuit of Malanpur – Mehgaon 220 kV line at 400/220 kV Morena S/s (TBCB is expected to be commissioned by Dec. 2017 and would relieve Gwalior ICTs.
11	3x315 MVA 400/220 kV 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>Remedial Actions:</b> MPPTCL informed that 4th 315 MVA ICT at Bhopal 400/220 kV S/S is under implementation by MPPTCL. Award has been placed on 04.04.2016 and is expected to be completed by March 2018.
12	315 MVA 400/220 kV 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. 500 MVA ICT-II and LILO of Itarsi-Hosangabad at Itarsi (PG) commissioned. System n-1 non-compliant.	<b>Remedial Actions:</b> Augmentation by another 1x500MVA 400/220 kV ICT at Itarsi approved in the meeting.
13	2x315 MVA Dehgam ICTs  <b>Antecedent Conditions</b> Gujarat meeting high demand and generation at Wanakbori being low.	It is observed that the loading on ICTs at Dehgam (2x315 MVA) are above 180 MW and additional ICT has to be proposed.	<b>Remedial Actions:</b> Augmentation by 1x500 MVA, 400/220 kV ICT at Dehgam is under implementation and is expected to be commissioned by March 2019. POWERGRID was requested to expedite the same.

S. No	ICT	Description of the constraints	Deliberation in 41 <sup>st</sup> Meeting of SCPSPWR
14	2x315 MVA APL Mundra ICTs  <b>Antecedent Conditions</b> With High Wind Generation in 220 kV Network near Nanikhakar area and Low APL Generation.	It is observed that loading on these ICTs are high	<b>Remedial Actions:</b> GETCO intimated that 4 <sup>th</sup> 400/220 kV 315 MVA ICT at Varsana is already charged. Through this, Intra State Renewable generation of Gujarat is evacuated. This would reduce the loading on the ICTs at Mundra.

### 29.3. Lines / ICTs opened to control overloading

Sl. No	Transmission Element (s) opened	Overloaded corridor	Remarks
1.	400/220 kV Pune(PG) one ICT	To control loading in 220 kV Pune (PG) –Talegaon D/C lines	Additional 220 kV outlets from Pune (PG) to be expedited by MSETCL.  MSETCL intimated that Pune -Hingewadi 220 kV D/C is under implementation, however, due to urbanization it has severe RoW constraints and this line is expected to get commissioned by Dec, 2018. Further, it was stated that Talegaon-Chinchwad 200 kV D/C is under implementation and expected to be commissioned by March, 2018.
2	400/220 kV 2x315 MVA+1x500 MVA Sholapur(PG) ICTs	2x500 MVA Sholapur (MS) ICTs loading will reduce if loads are shifted to Sholapur PG ICTs	MSETCL intimated that Solapur-Bale 220 kV D/C would be implemented by March 2018. Presently total connected load is to the tune of 200-250 MW. 220 kV Solapur-Jeur line is being operated as interim arrangement by reconfiguration of Karad-Solapur 400 kV line.
3.	400/220kV 2x500 MVA Warora ICTs	Idle charged in the absence of 220kV downstream network.	MSETCL intimated that one ICT has been shifted to Bableshwar and commissioned on 27.11.2016. Second ICT has been shifted to Padghe and would be commissioned by Nov., 2017.
4.	400/220 kV 1x500 MVA Alkud ICT	Idle charged in the absence of 220kV downstream network.	MSETCL intimated that the LILO of Vita-Miraj line at Alkud is expected to be commissioned by Sep. 2018.
5	400/220 kV 2x500 MVA ICTs at Vadodara	Idle charged in the absence of 220kV downstream network.	GETCO informed that 220 kV Venkatpura-Vadodara D/C line is expected to be commissioned by Jan. 18 and 220 kV Jambua – Vadodara D/C line by March 19.

Sl. No	Transmission Element (s) opened	Overloaded corridor	Remarks
6	400/220 kV 2x315 MVA ICTs at Betul	Idle charged in the absence of 220kV downstream network.	MPPTCL intimated that Betul (PG)-Betul 220 kV D/C line has been commissioned in Aug. 2017 and LILO of Sarni - Pandhurna 220 kV line at Betul GIS would be commissioned by Dec. 2018.

### Section 3: Delay in Transmission / Generation

#### 29.4. Delay in transmission lines affecting grid operation adversely

S. No.	Transmission Corridor	Scheduled Commissioning Date	Actual/ Likely Commissioning Date	Transmission Constraint Caused	Remarks
1.	400 kV Essar Vadinar – Amreli D/C	July'13	Dec'17	Would complete Vadinar evacuation and relieve Hadala - Chorania S/C. However, interim arrangement with completed portion of Amreli - Vadinar one ckt terminated at Jetpur and one ckt at Hadala relieved loading of Chorania – Kasor.	GETCO stated that with the implementation of interim arrangement loading issues were addressed. GETCO requested to expedite the line.
2.	400 kV Amreli – Kasor D/C	June'13	Mar'18	Would relieve Chorania-Kasor S/C. However, interim arrangement with completed portion of Amreli-Vadinar D/C, one ckt terminated at Jetpur and one ckt at Hadala has relieved the loading of Chorania –Kasor. <b>41<sup>st</sup> SCM Discussion:</b> GETCO representative stated that in this area, no transmission line is over loaded. However, it was stated that 60 % of the line has been completed and now the work is stranded due to RoW issues. This line expected to be commissioned by Dec, 2018	GETCO stated that with the implementation of interim arrangement loading issues were addressed. GETCO requested to expedite the line.
3.	400 kV Essar Mahan-Bilaspur Pooling Station D/C	Mar13	June'17	This would complete transmission system planned for evacuation of Essar Mahan (2x600 MW) which is on interim connectivity with LILO of 400 kV Korba-V'chal-1. Bilaspur pooling station is commissioned in Mar'12 and dedicated lines from Essar Mahan to Bilaspur are delayed indefinitely by developer causing constraints in the transmission system from Korba.	EPTCL requested to expedite the line.

S. No.	Transmission Corridor	Scheduled Commissioning Date	Actual/ Likely Commissioning Date	Transmission Constraint Caused	Remarks
				<b>This interim connectivity has also resulted in poor maintenance of line and bay equipment as several time outages are being cancelled as generator.</b> <b>41<sup>st</sup> SCM:</b> - Essar Mahan initially gave a schedule after 6 months, but extended to Dec'17. Committee advised Essar Mahan to complete the lines by June'17. Essar Mahan has again requested for extension.	
4.	400 kV Kudus S/s along with 400 kV Bableshwar -Kudus D/C and associated 220 kV system	Mar'16	Dec'17	Due to delay in commissioning of 400 kV Bableshwar –Kudus D/C, heavy loading is observed on 400 kV Bableshwar-Padghe S/s. <b>41<sup>st</sup> SCM Discussion :</b> Kudus substation is expected to commission by Dec, 2017 & Kudus –Bableshwar would be commissioned along with the Kudus S/s.	The additional ICT at Bableshwar has been commissioned. The Kudus S/S is expected by Dec. 2017. The 400 kV Kudus–Bableshwar is expected by Dec. 2018.
5.	400 kV KSK - Champa 2 X D/C	2015	Dec'16	<b>Present Status:</b> 400 kV KSK-Champa PS ckt 3 & 4 were charged on 4 <sup>th</sup> October 2016. KSK to submit the status of 400kV KSK-Champa ckt 1&2.	It was intimated that the line 1 & 2 would be commissioned by Dec, 2018

#### 29.5. Requirement of 220 kV System Augmentation in Maharashtra System:

29.5.1. NLDC stated that during the real time operation in Maharashtra system, it has been observed that most of the 400/220 kV ICTs are being operated with load trimming scheme due to high loading. Further, various 220 kV lines are operated with load trimming scheme due to high loading in the absence of adequate 220 kV network. In addition, planned lines, which were required for reducing the loading on existing system, are delayed in commissioning schedule. Recent example is the blackout of Karad-Kolhapur substations on 13 and 26 April 2017 where more than 1900 MW of load loss has occurred with large scale blackout in the 220 kV system.

29.5.2. After deliberations, it was agreed that Maharashtra STU in consultation with CEA and CTU would review the planning and network augmentation in the state of Maharashtra so that real time operation can be made N-1 and N-1-1 secure.

#### 29.6. Requirement of 220 kV System Augmentation in Chhattisgarh System:

29.6.1. NLDC stated that on 25<sup>th</sup> May 2017, due to tripping of one 220kV line, a large part of Bhilai system went dark. This incident involved tripping of most of the 220/132 kV

ICTs, 220 kV incoming feeders on overcurrent protection. During the event 220/132 kV Bhilai, Gurur, Siltara, Basoor and 132 kV Sector C, Rajnanandgaon and Dongargrah got blackout causing 876 MW load loss. Further, one similar tripping has occurred in the past on 3<sup>rd</sup> June 2016 also in which large load loss has occurred due to tripping on overload protection.

- 29.7. After deliberations, it was agreed that Chhattisgarh STU in consultation with CEA and CTU would review the planning and network augmentation in the state of Chhattisgarh so that real time operation can be made N-1 and N-1-1 secure.

**30. Implementation modalities on provision of 400/220 kV, 315 MVA or 500 MVA ICT along with one no. of 400 kV ICT bay and one no. of 220 kV bay ICT bay at M/s CGPL Switchyard – agenda by WRPC**

- 30.1. CEA stated that in the 40<sup>th</sup> meeting of SCSPWR held on 01.06.2016, 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 was agreed as the interconnection between CGPL UMPP and APL Mundra STPS. This interconnection between Adani Mundra STPS and CGPL UMPP would be normally open and would be closed whenever required. It was also agreed that the implementation modalities of the scheme may be finalized in the WRPC.

WRPC vide its letter no. WRPC/Protection/CGPL/1316 dated 17.10.2017 had intimated that the above matter was discussed in the 33<sup>rd</sup>& 34<sup>th</sup> meetings of WRPC. In the 34<sup>th</sup> meeting of WRPC, it was agreed for independent funding and work to be executed by PGCIL as regards to the implementation modalities for the scheme.

- 30.2. Members deliberated the above issue and agreed to refer it to WRPC for further deliberations / clarifications on the issue of independent funding for its implementation by POWERGRID.

**31. Implementation of the future GIS bay along-with the planned GIS bay in the same diameter in view of complexities involved with interfacing different manufacturer make GIS bay modules**

- 31.1. CTU stated that, one and a half breaker scheme is generally followed in all 400kV and 765kV substations of POWERGRID. For a given transmission element requiring one bay in an AIS substation, a half equipped diameter (consisting of main and tie CBs) is generally implemented and the future CB bay is taken up separately as when a new transmission element is planned in the substation. However, in case of a GIS substation, it is not practical to install the future CB bay at a later date in a half equipped GIS diameter on account of following parameters which differ from manufacturer to manufacturer:

- i) Dimension of GIS modules (with respect to layout).
- ii) Bus Orientation (i.e. vertical, horizontal, triangular etc.)
- iii) Switchgear Height of various GIS components (CB, Isolator, CT, PT etc.)
- iv) Proprietary Technology

Further in order to join the two different make GIS, interface modules are additionally required which increase the space requirement in GIS hall or else an irregular shaped GIS building is required to be designed. Further, existing vendors charge exorbitant

cost as opportunity cost to share proprietary information regarding dimensional details and technical parameters of existing GIS modules with the upcoming GIS manufacturer. Moreover, during erection of an upcoming GIS, alignment with existing GIS active parts is very vulnerable and any disturbance to the same may result in damage of the existing GIS, which may affect reliability in power transfer.

- 31.2. CTU further stated that in view of the complexities involved in the interfacing of GIS modules of different manufacturers, it is proposed that the complete diameter (with 3 CB bays) be installed in the beginning itself even though the third CB would be used for an upcoming feeder in future. This would not only facilitate ease of integration of future transmission elements as and when they are planned, but would also enhance system reliability.
- 31.3. Members deliberated the proposal and agreed that in case of GIS substation the complete diameter (with 3 bays) should be installed in the beginning itself even though the third bay would be used for an upcoming feeder in future.

**32. Converting Fixed Line Reactors into Switchable Line Reactors in Kankroli – Zerda line at Kankroli end**

- 32.1. POWERGRID stated that Zerda – Kankroli 400 kV S/C line is a 234 km, long inter-regional line between WR and NR grids. Fixed reactive compensation (63MVAR at Zerda end and 50MVAR at Kankroli end) have been provided for this line to facilitate charging and to contain dynamic over voltage. Now, due to wide variation in the grid conditions, line reactors are often required to be switched off under low voltage conditions (especially during peak load conditions) and switched on during high voltage conditions (especially during the winter months in Northern Region). Since, initially the line reactors on the Zerda – Kankroli line were planned as fixed line reactors, switching on/off the line reactors based on requirement is not possible. In view of the above, the scheme for “Conversion of fixed line reactors to switchable line reactors” was discussed and agreed during 39<sup>th</sup> meeting of SCPSNR which includes conversion of fixed line reactors to switchable reactors at both ends of Zerda – Kankroli 400 kV S/C line.
- 32.2. CEA stated that Zerda – Kankroli 400 kV S/C line being an interregional line, the scheme for conversion of fixed line reactors to switchable line reactors has been put up approval of WR constituents.
- 32.3. POWERGRID stated that based on the feedback from site, space is not available at Zerda S/s end for conversion of fixed line reactor into switchable line reactor. Therefore, the proposal of conversion of fixed line reactor of Zerda–Kankroli 400 kV S/C at Zerda end may be dropped. Accordingly, it is proposed to convert the fixed line reactor (420 kV, 50 MVAR) at Kankroli end of Zerda–Kankroli 400kV line only into switchable line reactor. Further, as per the DOV studies, the dynamic over-voltages at both Zerda and Kankroli S/s is within limits even when the line reactor at Kankroli end is switched off.
- 32.4. Members agreed with scheme of conversion of fixed line reactor (420 kV, 50MVAR) at Kankroli end of Zerda–Kankroli 400kV line into switchable line reactor

### **Agenda item tabled by CEA in meeting**

#### **33. Submission of data for Geospatial Energy Portal being developed by ISRO**

- 33.1. CEA stated that as per the direction of NITI AYOOG, ISRO is in the process of formulating a Geospatial Energy Portal, which is web based information system portal. In view of this, ISRO had requested CEA to provide data and information pertaining to Power Sector to develop energy map of India. ISRO has sought information about generation (25 MW and above), transmission lines (33 kV and above), substations etc.
- 33.2. CEA requested all the utilities to furnish the information as on 31.10.2017 about transmission lines and Substations for voltage level 66 kV and above at the earliest to CEA. The format for submission of data for Geospatial Energy Portal for both transmission lines and substations is enclosed at Annexure - V.

#### **34. Open Access Meeting**

- 34.1. The summary of the 25<sup>th</sup> meeting of WR constituents regarding connectivity / open access applications is enclosed as Annexure VI. The detailed minutes of the meeting would be circulated by CTU separately.

**Annexure - I**

**List of participants of the 42<sup>st</sup> meeting of Standing Committee on Power System Planning in Western Region held on 17.11.2017**

S. No	Name	Designation	Contact No.	Email ID
<b>CEA</b>				
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**Annexure - II**

**Status of TBCB Transmission Projects - Western Region**

S.N.	Name of the Project	BPC / Implementing Agency / Milestones	Scope of works	Current Status
1	<p>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.</p> <p>Estimated Cost Rs. 2700 Cr</p>	<p>REC</p> <p>NKTCL (Reliance Power Transmission Company Ltd)</p> <p><b>Milestones:</b></p> <p>(i) SPV acquired by Reliance on 20-05-2010 (ii) Approval u/s 164 received on 12.08.2013.</p>	<p>(i) Sipat/Korba (Pooling) - Seoni 400 kV D/C line (ii) Lucknow - Bareilly 765 kV D/C line (iii) Bareilly - Meerut 765 kV D/C line (iv) Agra - Gurgaon(ITP) 400 kV D/C line (v) Gurgaon (ITP) - Gurgaon (PG) 400 kV D/C line (vi) Gurgaon (ITP) 400/220 kV GIS Substation</p>	<p>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 dated 14.1.2014. Beneficiaries have appealed SC. SC on 12th August has disposed of the appeal and directed ATE to decide on the appeal.</p> <p><b>Work Yet to start.</b></p>
2	<p>Transmission System Associated with Krishnapattnam UMPP- Synchronous interconnection between SR and WR (Part-B)</p> <p>Estimated Cost Rs. 440 Cr</p>	<p>REC</p> <p>RSTCL (Consortium of Patel-Simplex- BS Transcomm)</p> <p><b>Milestones:</b></p> <p>(i) Lol placed on 16.12.2010 (ii) SPV acquired on 07.01.2011 (iii) Trans. license received on 24.08.2011 (iv) Approval u/s 164 received on 29.08.2011 Tariff adoption on 12.8.2011</p>	<p>(i) Raichur - Sholapur 765 kV S/C line-1 (208 ckm)</p>	<p><b>Commissioned in 06/2014</b></p>
3	<p>System strengthening common for WR and NR</p> <p>Estimated Cost Rs. 1720 Cr</p>	<p>PFC</p> <p>Jabalpur Transmission Company Limited (Sterlite Grid)</p> <p><b>Milestones:</b></p> <p>(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</p>	<p>(i) Dhramjaygarh - Jabalpur 765 kV D/C (ii) Jabalpur - Bina 765 kV S/C line</p>	<p><b>Line commissioned in 09/2015</b></p> <p><b>Line commissioned in 06/2015</b></p>

S.N.	Name of the Project	BPC / Implementing Agency / Milestones	Scope of works	Current Status
		(vi) Clearance under Section 164 : received on 12.07.13		
4	System strengthening for WR  Estimated Cost Rs. 2900 Cr	PFC  BDTCL(Sterlite Grid)  <b>Milestones:</b> (i) Lol placed on 19.1.2011 (ii) SPV acquired on 31.3.2011 (iii) Trans. license received on 12.10.2011 (iv) Approval u/s 164 received on 29.01.2013 (v) Tariff adoption on 28.10.2011 (vi) Original COD : Mar2014	(i) Jabalpur-Bhopal 765 kV S/C line (ii) Bhopal-Indore 765 kV S/C line (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	<b>Line commissioned in 06/2015</b> <b>Line commissioned in 10/2014</b> <b>Commissioned in 07/2014</b> <b>Line Commissioned in 07/2014</b> <b>Line commissioned in 10/2014</b> <b>Line commissioned in 10/2015</b> <b>Commissioned in 11/2014</b> <b>Line Commissioned in 11/2014</b>
5	Transmission System associated with DGEN TPS (1200 MW) of Torrent Power Ltd.  Estimated Cost Rs. 275 Cr	PFC  M/s Instalaciones Inabensa, S.A. Spain  <b>Milestones:</b> (i) Lol issued on 19.05.2014 (ii) Approval under section 68 on 30.01.2014. (iii) Approval under Sec 164 of EA,2003 on 24.04.2016	(i) DGEN TPS – Vadodara 400 kV D/C, Twin Moose line. (ii) Navsari – Bhestan 220 kV D/C line	Project authority had not started construction activity as per execution plan. Matter was taken up with the project authority and notice served in August/Sept 2016 but project authority did not respond.  Member(PS), CEA took a meeting on 26.04.2017 to review the progress of Tr. project wherein project authority informed to close the project due to financial constraints in parent company. CEA vide letter dated 14.06.2017 informed CERC to take appropriate action.  <b>Completion Target : May 2018</b>
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) Lol issued on 11.03.2015 (ii) Approval under section 68 on 26.11.2014 (iii) Approval under Sec 164 of EA,2003 on 24.04.2017	(i) Gadawara STPS - Jabalpur Pool 765kV D/C line (ii) Gadawara STPS - Warora P.S. (New) 765 kV 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 Pooling Station (2x1500 MVA).	<b>Completion Target: November, 2017</b>
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) Warora P.S.- Parli (New) 765 kV D/C line (ii) Parli (New) - Solapur 765 kV D/c line (iii) Parli (New) - Parli (PG) 400 kV D/C (Quad) line (iv) 765/400 kV Parli (New) Sub-station (2x1500 MVA)	<b>Completion Target: January, 2018</b>

S.N.	Name of the Project	BPC / Implementing Agency / Milestones	Scope of works	Current Status
		(i) Lol issued on 11.03.2015 (ii) Approval under section 68 on 10.12.2014 (iii) Approval under Sec 164 of EA,2003 on 28.06.2017		
8	Transmission System Strengthening associated with Vindhyachal- V	REC  Powergrid Jabalpur Transmisson Limited (A subsidiary of PGCIL)  <b>Milestones:</b> (i) Lol issued on 10.02.2015 (ii) SPV has been acquired by the successful bidder on 26.02.2015 (iii) Approval u/s 164 of EA,2003 on 19.09.2016	(i) Vindhyachal P. S- Jabalpur P. S. 765 kV D/C line.	<b>Completion Target: June, 2018</b>
9	System strengthening for IPPs in Chhattisgarh and other generation projects in Western Region	PFC  Chhattisgarh - WR Transmission Ltd. (A subsidiary of Adani Power Limited)  <b>Milestones:</b> (i) Lol issued on 28.07.2015 (ii) SPV acquisition on 23.11.2015 (iii) Approval u/s 68 of EA,2003 on 24.04.2015 (iv) Approval u/s 164 of EA,2003 on 20.10.2016	(i) Gwalior 765/400 kV – Morena 400 kV D/C line 400 kV D/C Length- 50 km (ii) Establishment of 400/220 kV S/s at Morena, 2X315 MVA (iii) Vindhyachal-IV & V– Vindhyachal Pool 400 kV D/C (Quad) line Length-15 km (iv) Sasan UMPP – Vindhyachal Pooling station 765 kV S/C (Q) line 7 Length-8 km (v) LILO of one circuit of Aurangabad – Padghe 765 kV D/C line at Pune Length-50 km (vi) Raigarh (Kotra) – Champa (Pool) 765kV S/C (Q) line (vii) Champa (Pool) – Dharamjaygarh 765kV S/C (Q) line	<b>Scheduled Date of Completion: March, 2019</b>
10	Additional System Strengthening for Sipat STPS	PFC  Sipat Transmission Ltd (A subsidiary of Adani Power Limited)  <b>Milestones:</b> (i) SPV acquisition on 23.11.2015 (ii) Lol issued on 28.07.2015 (iii) Approval u/s 164 of EA,2003 on 05.08.2016	(i) Sipat – Bilaspur Pooling Station 765 kV S/C line Length-25 km (ii) Bilaspur PS – Rajnandgaon 765 kV D/C line Length-180 km	<b>Scheduled Date of Completion: March, 2019</b>
11	Additional System Strengthening Scheme for Chhattisgarh IPPs – Part B	PFC  Raipur - Rajnandgaon - Warora Transmission Ltd (A subsidiary of Adani Power Limited)	(i) Raipur (Pool) – Rajnandgaon 765 kV D/C line Length - 60 KM (ii) Rajnandgaon – New Pooling station near Warora 765 kV D/C line Length - 270 KM (iii) Establishment of new 765/400 kV substation near	<b>Scheduled Date of Completion: Nov, 2018</b>

S.N.	Name of the Project	BPC / Implementing Agency / Milestones	Scope of works	Current Status
		<b>Milestones:</b> (i) SPV acquisition on 23.11.2015 (ii) Lol issued on 28.07.2015 (iii) Approval u/s 164 of EA,2003 on 15.06.2016	Rajnandgaon      2x1500 MVA	
12	Additional inter-Regional AC link for import into Southern Region i.e. Warora – Warangal and Chilakaluripeta - Hyderabad - Kurnool 765 kV link	PFC  Warora Kurnool Transmission Ltd (A subsidiary of Essel Infraprojects Limited)  <b>Milestones:</b> (i) Lol issued on 29.02.2016 (ii) SPV acquisition on 06.07.2016 (iii) Approval u/s 164 of EA,2003 on 27.06.2017	(i) Establishment of 765/400 kV S/s at Warangal (New) with 2x1500 MVA ICTs and 2x240 MVAR bus reactors (ii) Warora Pool – Warangal (New) 765kV D/c line with 240 MVAR switchable line reactor at both ends Length - 350 KM (iii) Warangal (New) – Hyderabad 765 kV D/c line with 330 MVAR switchable line reactor at Warangal end Length- 160 KM (iv) Warangal (New) – Warangal (existing) 400 kV (quad) D/c line Length-10 KM (v) Hyderabad – Kurnool 765 kV D/c line with 240 MVAR switchable line reactor at Kurnool end Length- 170 KM (vi) Warangal (New) – Chilakaluripeta 765kV D/c line with 240 MVAR switchable line reactor at both ends Length – 250 KM (vii) Cuddapah – Hoodi 400kV (quad) D/c line with 63 MVAR switchable line reactor at both ends Length-200 KM	<b>Scheduled Date of Completion : Nov, 2019</b>
13	Common Transmission System for Phase-II Generation Projects in Odisha and Immediate Evacuation System for OPGC (1320 MW) Project in Odisha	PFC  Orissa Generation Phase-II Transmission Limited (A subsidiary of Sterlite Grid Limited)  <b>Milestones:</b> (i) Lol issued on 06.01.2016 (ii) SPV acquisition on 08.04.2016 (iii) Approval u/s 164 of EA,2003 on 07.03.2017	(i) OPGC (IB TPS) – Jharsuguda (Sundargarh) 400 kV D/C line with Triple Snowbird Conductor Length - 50 KM (ii) Jharsuguda (Sundargarh) – Raipur Pool 765 kV D/C line Length - 350 KM	<b>Scheduled Date of Completion: August, 2019</b>
14.	Transmission System Strengthening in WR associated with Khargone TPP (1320 MW)	REC  Khargone Transmission Limited (Sterlite Grid Ltd.)  <b>Milestones:</b> (i) Lol issued on 26.05.2016 (ii) SPV acquisition on 22.08.2016 (iii) Approval u/s 164 of EA,2003 on 05.07.2017	<b>A. Connectivity system for Khargone TPP</b> (i) LILO of one ckt of Rajgarh - Khandwa 400 kV D/C line at Khargone TPP (ii) Khargone TPP Switchyard – Khandwa pool 400 kV D/C (Quad) line  <b>B. System strengthening in WR in time frame of Khargone TPP</b> (i) Khandwa Pool – Indore 765 kV D/C line.	<b>Scheduled Date of Completion: July, 2019</b>

S.N.	Name of the Project	BPC / Implementing Agency / Milestones	Scope of works	Current Status
			(ii) Khandwa Pool – Dhule 765 kV D/C line. (iii) Establishment of 765/400 kV, 2x1500 MVA pooling station at Khandwa pool	
15.	New WR- NR 765 kV Inter-regional corridor	REC  Milestones: (i) MoP vide Gazette Notification dated 28.10.2016 appointed RECTPCL as BPC (ii) Request for Qualification : 28.12.2016 (iii) Request for Proposal : 28.03.2017	(i) Vindhyanal Pooling Station- Varanasi 765 kV D/C line	Yet to get Awarded
16.	A. Additional 400kV feed to Goa  B. Additional System for Power Evacuation from Generation projects pooled at Raigarh (Tamnar) Pool	PFC  Milestones: (i) MoP vide Gazette Notification dated 28.10.2016 appointed PFCCCL as BPC (ii) Request for Qualification : 01.02.2017 (iii) Request for Proposal : 01.05.2017	<b>A. Additional 400kV feed to Goa</b> (i) LILO of one ckt. of Narendra (existing) – Narendra (New) 400 kV D/c quad line at Xeldem (ii) Xeldem – Mapusa 400 kV D/c (Q) line (iii) Establishment of 2x500MVA, 400/220kV substation at Xeldem  <b>B. Additional System for Power Evacuation from Generation Projects pooled at Raigarh (Tamnar) Pool</b> (i) Dharamjaygarh Pool section B - Raigarh (Tamnar) Pool 765 kV D/c line	Yet to get Awarded
17.	A. Connectivity System for Lanco Vidarbha Thermal Power Ltd. (LVTPL)  B. Inter State Transmission system strengthening in Chhatarpur area in Madhya Pradesh	PFC  Milestones: (i) MoP vide Gazette Notification dated 28.10.2016 appointed PFCCCL as BPC	<b>A. Connectivity System for Lanco Vidarbha Thermal Power Ltd. (LVTPL)</b> (i) LVTPL TPS switchyard – Warora Pool 765kV D/c line  <b>B. Inter State Transmission system strengthening in Chhatarpur area in Madhya Pradesh</b> (i) LILO of both circuits of Satna – Bina 400kV (1st) D/c line at Bijawar. (ii) Establishment of 2x500MVA, 400/220kV substation at Bijawar	Bidding process is kept in abeyance

## Annexure- III

STATUS OF TRANSMISSION SCHEMES UNDER IMPLEMENTATION BY POWERGRID IN WESTERN REGION							
Sl. No.	Description of Scheme	Estimated Cost (Rs. Cr)	Date of firming up in WR standing committee	Date of FR	Date of 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>	5222	20 <sup>th</sup> (23.01.04)	Sep'05 (Rev)	July'06	Commissioned	Implementation by Reliance
		1700				Commissioned	
		1050				---	
		600				commissioned	
		1050				commissioned	
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>	722	25 <sup>th</sup> (30.09.06)	Jan'07	Dec'07	Dec'17	Under implementation
						Dec'17	Vapi-Kala portion commissioned in Mar'14. Kudus S/s being implemented by MSETCL. Cable work in progress (2km.) Critical ROW issues

	<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>					<p>Substation is ready and shall be commissioned matching with line</p> <p>Commissioned</p>	
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)	Jun'07	Oct'08	<p>Commissioned</p> <p>Commissioned</p> <p>Commissioned</p> <p>Commissioned</p> <p>Commissioned</p> <p>Commissioned</p> <p>Feb'18</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>c) Establishment of new 765/400 kV, 3x1500 MVA, substation at Wardha for charging of Seoni - Wardha 2xS/c lines at 765 kV level</p>					<p>Feb'18</p> <p>Commissioned</p> <p>Commissioned</p>	<p>Commissioning matching with the line</p>
4	<p><b>Transmission system associated with Krishnapatnam (5x800 MW) (WR Portion)- now delinked from Krishnapatnam UMPP</b></p> <p>a) Raichur – Solapur (PG) 765 kV S/c</p> <p>b) Solapur(PG) – Pune 765 kV S/c</p>	1928	27th (30.07.07)	Jan'08		<p>Commissioned</p> <p>Commissioned</p>	<p>Under implementation</p>



	c) LILO of 400kV Aurangabad I (Waluj) - Pune (PG) D/c & Parli (PG) - Pune (PG) D/c lines at Pune(GIS)					Commissioned	
	d) Establishment of new 765/400 kV substations at Pune (GIS) with 2x1500 MVA transformation capacity					Commissioned	
5	<b>Associated transmission system of VSTPP-IV and Rihand-III</b> a) Rihand III- Vindhychal Pool 765 kV D/c (initially to be op. at 400kV) b) Vindhychal IV - Vindhychal Pool 400kV D/c(Quad) c) Vindhychal Pool - Satna 765 kV 2xS/c d) Satna -Gwalior 765 kV 2xS/c e) Gwalior – Jaipur(South) 765 kV S/c f) Vindhychal Pool-Sasan 765 kV S/c g) Vindhychal Pool-Sasan 400 kV D/c h) Establishment of 765/400kV, 2x1500 MVA substation at Vindhychal Pool	4673	29th (10.09.09)	Sep'09	Mar'10	Commissioned Commissioned Commissioned Commissioned Commissioned Commissioned Commissioned Commissioned	Under implementation
6	<b>Solapur STPP(2x660MW) transmission system</b> a) Solapur STPP – Solapur (PG) 400kV D/c (Quad) b) Augmentation of 400/220kV ICT by 1x500MVA transformer (3 <sup>rd</sup> ) at Solapur (PG)	63.32	30th (08.07.10)	Jul'11	Oct'13	Commissioned Commissioned	Under implementation Line completed in Apr'15
7	<b>Solapur STPP (2x660MW) transmission system (Part-A)</b> a) Solapur STPP – Solapur (PG) 400kV 2nd D/c (Quad)	50.52	36th (29.08.13)		Mar'15	Sep'17	Award placed in May'15 Expected by end of Sep'17
8	<b>Transmission system for evacuation of Kakrapar Atomic Power Project unit 3 &amp;4 (2x700 MW)</b>	378.71	31 <sup>st</sup> (27.12.10)	Nov'12	Feb'14		Under Implementation

	a) Kakrapar NPP – Navsari 400kV D/c – 38 km b) Kakrapar NPP – Vapi 400kV D/c - 104 km					Commissioned Commissioned	Stringing commenced from Mar'16
9	<b>Transmission System associated with Mauda Stage-II (2x660 MW)</b>  a) Mauda II – Betul 400KV D/c (Quad)- 210 km b) Betul– Khandwa 400KV D/c (Quad)- 180 km c) Khandwa – Indore(PG) 400kV D/c - 215 km d) Establishment of 400/220kV 2x315MVA substation at Betul	1575.3	32 <sup>nd</sup> (13.05.11)	Apr'12	Sep'13	Commissioned Commissioned Commissioned Commissioned	Under Implementation
10	<b>Provision of 1x315MVA ICT &amp; Spare Converter Trf for reliable auxilliary power supply at HVDC back to back station at Bhadravati</b>	143	33 <sup>rd</sup> (21.10.11)	June'12	-	Commissioned	ICT commissioned in Mar'15. Balance work under progress.
11	<b>Establishment of Pooling Station at Champa and Raigarh (Near Tamnar) for IPP Generation Projects in Chhattisgarh</b>  a) Champa Pooling Station - Raipur Pooling Station 765kV D/c b) Raigarh Pooling Staiton (near Kotra) - Raigarh pooling (near Tamnar) 765kV D/c c) Champa Pooling Station - Dharamjaygarh Pooling Station 765kv S/c d)Raigarh Pooling Staiton (near Kotra) - Champa pooling 765kV S/c e) Establishment of 765/400kV 6x1500MVA Champa Pooling Station f)Establishment of 765/400kV 3x1500MVA Raigarh Pooling Station (near Tamnar)	2066.85	29 <sup>th</sup> (10.09.09)	Apr'10	May'11	Commissioned Commissioned Commissioned Commissioned Commissioned	Under Implementation
12	<b>Transmission system strengthening in Western Part of WR for IPP generation proejects in Chhattisgarh</b> a) Aurangabad(PG) – Boisar 400kV D/c (Quad)	2127.51	29 <sup>th</sup> (10.09.09)	March'11	Nov'11	Sep'17	Under Implemetation Expected by end of Sep'17

	b) Wardha - Aurangabad (PG) 765kV D/c c) Establishment of 765/400kv 2x1500MVA auraganbad (PG) S/s d) Augmentation of transformation capacity at Boisar by 400/220kV, 1x500MVA					Commissioned Commissioned Commissioned	
13	<b>System strengthening in North/West part of WR for IPP Projects in Chhattisgarh</b> a) Aurangabad (PG) – Padghe(PG) 765kV D/c b) Vadodara – Asoj 400kV D/c(Quad) c) Padghe – Kudus 400kV D/c (Quad)	2073.26	29th (10.09.09)	May'10	Dec'11	Dec'17 Commissioned Dec'17	Under Implementation
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)	June'10	Jan'12	Commissioned	Under Implementation
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) - Jallandhar 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)	Dec'11	Mar'12	Commissioned Commissioned Commissioned Commissioned Commissioned	Under Implementation  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	36 <sup>th</sup> (29.08.13)		Oct'13	Commissioned	Completed

17	<b>Transmission System Associated with Lara STPS-I (2x800MW)</b> 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	400.47	17 <sup>th</sup> LTA (03.01.13)	Aug'13	Jun'14	Commissioned  Commissioned	Under Implementation  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)	Dec'13	Jun'14	Pole-III: Jun'18; Pole-IV: Dec'18  Oct'17	Under Implementation  Tentative
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	Mar'18  Mar'18  Mar'18  Mar'18  Mar'18	Under Implementation  Efforts being made to commission earlier
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	Commissioned  Commissioned	
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  (d) Establishment of 765/400/220kV (765/400kV - 2x1500 MVA &	3705.61	36 / 37 <sup>th</sup> (29.08.13/05.09.14)	Jan'14	Apr'15	Apr'18  Apr'18  Apr'18  Apr'18	Under Implementation

	400/220kV - 2x500MVA) substation at Banaskanta						
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)	Jan'14	July'15	July'18  July'18	Under Implementation
23	<b>Transmission System Strengthening Associated with Vindhyachal V - Part A</b> (a) 1x1500MVA, 765/400kV ICT at Vindhyachal Pooling Station		34th (09.05.12)	May'13	Feb'15	Commissioned	
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		34th (09.05.12)			Jun'18  Jun'18	Under Implementation
25	<b>STATCOMs in Western Region</b> (a) Aurangabad (b) Gwalior (c) Solapur (d) Satna		36th (29.08.13)	Jun'13	Mar'15	Sep'17 Apr'18 Sep'17 Sep'17	
26	<b>Western Region System Strengthening Scheme XIV</b> (a) 2x500MVA, 400/220kV transformer alongwith six nos of 220kV bays at Indore (PG) 765/400kV Substation (b) 1x500MVA, 400/220kV transformer alongwith two nos of 220kV bays at Itarsi (PG) 400/220kV S/s	93.96	37th (05.09.14)		Jan'16	July'18  Commissioned	
27	<b>Powergrid works associated with Part-A of Transmission system for Gadarwara STPS of NTPC</b>		36/37th (29.08.13 /		Apr'16		

	(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}		05.09.14 )			Commissioned in May'17	
28	<b>Powergrid works associated with Part-B of Transmission system for Gadawara STPS of NTPC i.e. WRSS XV</b>  (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}  (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)}		36/37th (29.08.13 / 05.09.14 )		Apr'16	Matching with TBCB schedule  Jan'18  Feb'18	
29	<b>Powergrid works associated with System Strengthening for IPPs in Chhattisgarh and other generation projects in Western Region</b>  (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}  (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)}  (c) 2 no. 400 kV line bays at Gwalior Substation {for Gwalior - Morena 400 kV D/c (quad)}  (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)}  (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}		36th (29.08.13)		Jul'16	Matching with TBCB schedule  Nov'18  Jan'19  May'18  Mar'19  Nov'18	

	(f) 1 no. 765 kV line bay at 765/400kV Raigarh (Kotra) Pooling Station of POWERGRID {for Champa PS(PG) - Raigarh (Kotra) PS(PG) 765 kV 2nd S/c}					Nov'18	
	(g) 1 no. 765 kV line bay at 765/400kV Dharamjaigarh Pooling Station of POWERGRID {for Champa PS(PG) – Dharamjaigarh(PG)765 kV 2nd S/c}					Nov'18	
30	<b>Powergrid works associated with Additional System Strengthening Scheme Chhattisagrh IPPs Part-B</b>  (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}		36/37th (29.08.13 / 05.09.14 )		Jul'16	Matching with TBCB schedule  Nov'18	
30	<b>Powergrid workds associated with Additional System Strengthening for Sipat STPS</b>  (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)  (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		36/37th (29.08.13 / 05.09.14 )		Jul'16	Matching with TBCB schedule  Nov'18-Mar'19  Mar'19	
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)		Jul'16	Dec'17	
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 /17.07.2015)			Dec'18	
33	<b>Bays for Transmission System Associated with DGEN Torrent Energy Ltd (1200MW)</b>		13/14th LTA (27.12.10/13.05.2011)		Jul'16		Execution of TBCB scheme critical

	(a) 2nos 400kV Bays at Vadodara (GIS) (b) 2nos 220kV Bays at Navsari (GIS)				May'18 May'18	
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)	Jul'16	July'18	
35	<b>Western Region System Strengthening -17</b> 1. Provision of 1x240 MVAR switchable line reactor at Pune GIS S/s end {for Aurangabad (PG) – Pune GIS 765kV S/C line, formed after LILO of one ckt of Aurangabad (PG) – Padghe (PG) 765kV D/C line at Pune GIS}. 2. Conversion of followings Fixed Line Reactor into Switchable Line Reactors / BUS Reactor. a. Itarsi – Indore (MPPTCL) 400kV 2xS/C lines: 420kV 50 MVAR fixed line reactors at both ends of each line are to be converted into switchable line reactors. b. Bina (PG) – Shujalpur 400kV D/C line: 420kV 50 MVAR fixed line reactor at Shujalpur end is to be converted into switchable line reactor. The 420kV 63 MVAR line reactor installed at Bina (PG) end is already switchable. c. 1x63 MVAR BUS Reactor at Bhadravati S/s: 420kV 3. Installation of ICTs along with associated bays at following substations of POWERGRID:		39th (30.11.15)	Feb'17	Sep'19	



	<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>					
36	<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</p> <p>b. Raigarh Pool (Kotra) 400kV &amp; 765kV BUS</p> <p>c. Champa Pool 400 kV &amp; 765kV BUS</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>		39th (30.11.15)		Feb'17	Feb'20
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</i></p>		38th & 39th (17.07.15 & 30.11.15)		Feb'17	Feb'18  July'19

	<i>Khandwa PS – Indore 765 kV D/C line, being implemented under TBCB }</i>						
	3. 240 MVAR Switchable Line Reactors along with 700Ω NGR at Indore (765/400kV S/s) end of each circuit of Khandwa Pool – Indore 765kV D/c line (Line being implemented under TBCB)					July'19	
38	<b>POWERGRID Works associated with New WR - NR 765kV Inter-regional corridor</b> a. 2 nos. of 765kV Line Bays at Vindhyaachal 765/400 kV Pooling Station; b. 2 nos. of 765kV Line Bays along with 765kV, 1x330 MVAR line reactor in each bay at Varanasi 765/400 kV GIS sub-station		40th (01.06.2016)			Matching with TBCB Line	
39	<b>POWERGRID Works associated with Additional 400kV feed to Goa</b> 2 nos of 400kV line bays at Mapusa s/s for termination of Xeldem – Mapusa 400kV D/c (quad) line & 1x80MVAR LR at Narendra (New) S/s for Narendra(New) - Xeldam 400kV line		40th (01.06.2016) 41st (21.12.2016)			Matching with TBCB works	
40	<b>POWERGRID Works associated with Additional System for Power Evacuation from Generation Projects pooled at Raigarh (Tamnar) Pool</b> 2 nos. of 765kV Line Bays each at Dharamjaygarh Pool and Raigarh (Tamnar) Pool		40th (01.06.2016)			Matching with TBCB works	
41	<b>Transmission system for Ultra Mega Solar Power Park (700MW) at Banaskantha (Radhanesda), Gujarat</b> 400KV D/C Banaskantha PS - Banaskantha (PG) line 765/400kV Banaskantha (PG) 2 nos line bays	118	40th (01.06.2016)		May' 17	Matching with Banaskantha (Radhanesda) Solar Park (expected by Jun'19)	

42	<p><b>Supplementary Transmission system for Ultra Mega Solar Power Park (700MW) at Banaskantha (Radhanesda), Gujarat</b></p> <p>Establishment of 2x500MVA, 400/220kV pooling station at Banaskantha (Radhanesda) [GIS] along with 1x125MVA bus reactor 4 nos. 220kV line bays at 400/220kV at Banaskantha (Radhanesda) pooling station for Solar Park Interconnection.</p>		41st (21.12.2016)			Matching with Transmission system for Ultra Mega Solar Power Park (700MW) at Banaskantha (Radhanesda) Gujarat
43	<p><b>Transmission System for Ultra mega Solar Park in Rewa District, Madhya Pradesh .</b></p> <p>Establishment of 3x500MVA, 400/220kV substation at Rewa Pooling Station LILO of Vindhyachal - Jabalpur 40kV D/c (both circuits) at Rewa Pooling Station 6 nos. 220kV line bays at Rewa Pooling Station</p>		38th (17.07.2015)		Jan'16 / Mar'17	Matching with Rewa UMSPP (expected by Oct'17)

**Annexure – IV**

**The elementwise details of the transmission schemes(under implementation by M/s STL, RRWTL and CWRTL through TBCB ) along with their scheduled COD as per TSA, TSP’s proposed early commissioning COD and the mutually agreed date for early commissioning as agreed in, a meeting was held on 16.06.2017 in CEA.**

S. No.	Elements	Developer	SCOD as per TSA	Indicated Early date of commissioning	Mutually agreed date of Early Commissioning	Remarks
1	<b>Sipat Transmission Ltd. (STL) - Additional System Strengthening for Sipat STPS</b>					
a	765 kV S/C Sipat - Bilaspur Pooling Station	STL	Nov' 18	Dec'17	June' 18	Early commissioning of this transmission line would improve the reliability of evacuation system of Sipat STPS.
i	1 no. 765 kV line bay at Sipat STPP of NTPC	STL	Nov'18	May'17		
ii	1no. of 765 kV line bay at Bilaspur PS	PGCIL	Nov'18*	June'18		
b	765 kV D/C Bilaspur Pooling Station - Rajnandgaon	STL	Mar' 19	July 18	Nov'18	The system beyond Rajnandgaon (i.e, Rajnandgaon-Warora-Parli) is under implementation by different TSPs (RRWTL, PWTL, and PPTL).
i	2 no. of Bays at Bilaspur PS	PGCIL	Mar'19*	Nov'18		
ii	2 no. of 765 kV bay at Rajnandgaon SS (Switching)	RRWTL	Nov' 18	Nov'17	Nov'18 (SCOD)	
2	<b>Raipur - Rajnandgaon Warora Transmission Ltd. (RRWTL) - Additional System Strengthening Scheme for Chhattisgarh IPPs – Part B</b>					
a	765 kV D/C Raipur Pool - Rajnandgaon	RRWTL	Nov'18	May'17	Nov'18 (SCOD)	System Strengthening Scheme for Chhattisgarh IPPs, no requirement of early commissioning. This scheme is interlinked with transmission system being implemented by M/s PWTL (Nov'17) & PPTL (January 18). The line reactors of the Rajnandgaon- Warora 765 kV D/C line at Warora substation are in the scope of M/s WKPL (Nov'19 with SCOD of reactors as Nov 18).
i	2 no. of 765 kV Bays at Raipur PS	PGCIL	Nov'18*	-		
ii	2 no. of 765 kV bays at Rajnandgaon SS (Switching)	RRWTL	Nov'18	Nov'17		
b	765 kV D/C Rajnandgaon - New Pooling Station near Warora	RRWTL	Nov'18	June'18	Nov'18 (SCOD)	
i	2 no. of 765 kV bays at Rajnandgaon SS (Switching)	RRWTL	Nov'18	Nov'17		
ii	2 no. of 765 kV bays at New Warora Pooling Station	Powergrid Warora Transmission Ltd	Nov'17	Nov'17	Nov'17 (SCOD)	
iii	2X240 MVAR line reactors at Warora end	WKTL	Nov'18	-	Nov'18 (SCOD)	
c	Establishment of new 765kV switching station near Rajnandgaon	RRWTL	Nov'18	Nov'17	Nov'18 (SCOD)	

3	Chhattisgarh WR Transmission Limited (CWRTL) - System Strengthening for IPPs in Chhattisgarh & Other Generation Projects in Western Region					
a	400 kV D/C Gwalior - Morena	CWRTL	May'18	Jan'18	Jan'18	This line is planned to establish an interconnection between Gwalior (PG) & Morena (MPPTCL). MPPTCL agreed to implement their 220 kV outlets from Morena 400/220 kV SS by January 2018
i	2 no. of 400 kV bays at Gwalior (PG)	PGCIL	May'18*	Jan'18		
ii	2 no. of 400 kV bays at Morena (TBCB)	CWRTL	May'18	Jan'18		
iii	4 no. of 220 kV outlets from Morena (TBCB)	MPPTCL	May'18	Jan'18		
b	400 kV D/C Vindhychal IV & V STPP - Vindhychal Pool	CWRTL	Jan'19	Jan'18	Jan'18	To improve reliability of power evacuation of Vindhychal stage IV & V.
i	2 no. of 400 kV Bays at Vindhychal STPP of NTPC	CWRTL	Jan'19	Jan'18		
ii	2 no. of Bays at Vindhychal Pool	PGCIL	Jan'19*	Jan'18		
c	765 kV S/C Sasan UMPP - Vindhychal Pooling Station	CWRTL	Nov'18	Dec'17	Jun'18	To improve the reliability of power evacuation of Sasan UMPP
i	1 no. of 765 kV Bay at Sasan UMPP of M/s. SPL, Reliance	CWRTL	Nov'18	Dec'17		
ii	1 no. of 765 kV Bay at Vindhychal Pool	PGCIL	Nov'18*	Jun'18		
d	LILO of one circuit of Aurangabad - Padghe 765 kV D/C line at Pune	CWRTL	Mar'19	Jul'18	Jul'18	System strengthening line
i	2 no. of 765 kV bays at Pune	PGCIL	Mar'19*	Jul'18		
e	765 kV S/C Raigarh (Kotra) - Champa (Pool)	CWRTL	Nov'18	Mar'18	Jun'18	To improve reliability in Chattishgarh generation complex( Raigarh kotra, Raigarh Tamna, Champa)
i	1 no. of 765 kV bay at Raigarh (Kotra)	PGCIL	Nov'18*	Jun'18		
ii	1 no. of 765 kV bay at Champa (Pool)	PGCIL	Nov'18*	June'18		
f	765 kV S/C Champa (Pool) - Dharamjaigarh	CWRTL	Nov'18	Apr'18	Jun'18	To improve reliability in Chattishgarh generation complex( Raigarh kotra, Raigarh Tamna, Champa)
i	1 no. of 765 kV bay at Champa PS	PGCIL	Nov'18*	Jun'18		
ii	1 no. of 765 kV bay at Dharamjaygarh	PGCIL	Nov'18*	Jun'18		

\*Bays in matching time frame of the associated line.



**Summary of the 25th meeting of WR constituents regarding connectivity / open access applications held on 17.11.2017**

**1.0 Confirmation of the minutes of 24<sup>th</sup> Meeting of WR Constituents regarding Connectivity & Long-term Access applications in Western Region held on 21-12-2016 at NRPC, New Delhi**

1.1 CTU had circulated the minutes of 24<sup>th</sup> Meeting of WR Constituents regarding Connectivity & Long-term Access applications in Western Region held at New Delhi on 21.12.2016 vide their letter dated 22.02.2017. Subsequently, on request of M/s IWISL corrigendum to the minutes was issued by CTU vide their letter dated 16.03.2017 incorporating Single Moose equivalent conductor instead of Twin ACSR Moose equivalent conductor for dedicated connectivity line of M/s IWISL.

**2.0 LTA Application of REWA Ultra Mega Solar (RUMS) Ltd. for partial change in target region**

2.1 REWA Ultra Mega Solar (RUMS) Ltd. has been granted LTA with the following target beneficiaries: WR: 550MW and NR: 200MW vide intimation dated 29.07.16. Subsequently, M/s RUMS Ltd. had submitted a revised application (received on 29.06.2017) regarding change in target region (from NR to WR) for transfer of 101MW power from the solar project to MPPMCL (WR) so that the total power transfer requirement of MPPMCL(WR) for 651MW (550MW already granted+101MW requested) is met. The start date of LTA as per the application is 30.11.2017.

2.2 The following was agreed:

- i) The revised beneficiaries (firm) of M/s RUMS Ltd. - *WR (MPPMCL): 651MW; NR (DMRC): 99MW.*
- ii) LTA for transfer of complete 651MW power to MPPMCL shall be made effective with the commissioning of following Transmission system:
  - Addition of 400/220kV, 2x500 MVA ICT at Rewa PS
  - LILO of 2<sup>nd</sup> circuit of Vindhychal STPS-Jabalpur 400kV 2<sup>nd</sup> D/c line (ckt-3&4) at Rewa PS
  - 1x125 MVAr, 420 kV Bus Reactor at Rewa PS
- iii) LTA for power transfer to NR (99MW) shall be made effective with the progressive enhancement in TTC in WR - NR corridor with progressive commissioning of following transmission schemes:

**Inter-regional System Strengthening Scheme for NR & WR:**

- Jabalpur Pooling station - Orai 765 KV D/c line
- Orai – Aligarh 765kV D/c line

- Orai – Orai(UPPTCL) 400kV D/c (Quad) line
- LILO of one circuit of Satna-Gwalior 765 KV line at Orai S/s
- 2x1000MVA, 765/400KV substation at Orai S/s
- LILO of Agra-Meerut 765 kV S/c line at Aligarh S/s
- 765KV Switching Station at Aligarh (GIS)
- LILO of Kanpur – Jhatikara 765 kV S/c at Aligarh S/s

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

- Up gradation of  $\pm 800$ kV, 3000MW HVDC bipole between Champa Pooling Station – Kurukshehtra (NR) to 6000MW
  - Kurukshetra (NR) – Jind 400kV D/c (Quad)
- iv) M/s RUMS Ltd to pay applicable relinquishment charges in line with CERC regulations for reduction in LTA quantum to NR from 200MW to 99MW.
- v) The solar generation project is expected to come up in phases progressively from Feb'18 to Dec'18.

### **3.0 Operationalisation of 450MW LTOA for transfer of power from Essar Power M.P. Ltd. (EPMPL) to Essar Steel India Limited, Hazira (WR)**

- 3.1 Essar Power M.P. Ltd. (EPMPL) was granted Long Term Open Access vide letter dated 01.11.2007 for transfer of 1200MW from its generation project at Mahan (2x600MW). M/s EPMPL vide letter dated 22.12.2016 had requested for relinquishment of 750 MW of the LTOA ( from total of 1200 MW) and operationalise the balance LTOA of 450MW through existing LILO of Vindhyachal – Korba 400kV S/c line at Essar Mahan with M/s Essar Steel India Limited (ESIL), Hazira located in Gujarat (WR) as the beneficiary.
- 3.2 CTU has already operationalized the LTOA for transfer of 450MW from EPMPL to M/s Essar Steel India Limited (ESIL), Hazira located in Gujarat (WR) w.e.f. 01.10.2017. The same has facilitated reduction in the PoC burden on the other DICs and hence has benefitted the various constituent states of WR.
- 3.3 It was agreed that the LTOA may be kept operational. However, regarding continuation of the LILO arrangement after Dec'17, it was agreed that the matter would continue to be deliberated at WRPC forum, in line with the decision of 41st meeting of SCSPWR.
- 3.4 The following progress was reported by M/s EP for the dedicated connectivity line (EPMPL – Bilaspur PS 400kV D/c line):



**Table 1**

<b>Sl. No.</b>	<b>Activity</b>	<b>UOM</b>	<b>Scope</b>	<b>Completed</b>	<b>Balance</b>
<b>1</b>	Tower Foundation	Location	942	940	2
<b>2</b>	Tower Erection	Location	942	923	19
<b>3</b>	Conductor Stringing	Kms	337	246.3	90.7

**4.0 LTA Application of Ostro Kutch Wind Pvt. Ltd. (300MW Wind Farm in Kutch, Gujarat)**

4.1 The LTA application of M/s Ostro Kutch Wind Private Limited (OKWPL-Kutch) for 300MW LTA with NR as target region was discussed and agreed in the 24th WR Conn/LTA meeting held on 21.12.2016 and in the 10th NR Conn/LTA meeting held on 30.05.2017. M/s OKWPL-Kutch vide letter dated 15.06.2017 informed that they have tied up beneficiaries for a capacity of 250MW as per details given below: *UP: 100MW, Bihar: 50MW, Jharkhand: 50MW & Gridco: 50MW.*

Subsequently, M/s OKWPL have submitted a revised application with NR (150MW) and ER (150MW) as target beneficiaries.

4.2 The following was agreed:

i) For transfer of power to beneficiaries in ER & NR, following transmission system is required which is under implementation as part of various schemes.

**Green Energy Corridor – ISTS:**

- Bhuj PS – Banaskantha 765kV D/c line
- Banaskantha – Sankhari 400kV D/c line
- Banaskantha PS – Chittorgarh 765kV D/c line
- Chittorgarh – Chittorgarh (RVPN) 400kV D/c (quad) line

**Transmission System Strengthening associated with Mundra UMPP (Part B):**

- Mundra UMPP – Bhuj PS 400kV D/c (Triple) line

ii) M/s OKWPL-Kutch shall have to enter into Long Term Access Agreement (LTAA) within stipulated time after grant of LTA in default of which the LTA shall be liable for revocation.

iii) In view of the revised application, the earlier application for grant of 300MW LTA to NR (Target) shall be closed.

iv) The start date of LTA for entire 300MW is from 04.10.2018. M/s OKWPL-Kutch would be liable to pay transmission charges for 300 MW w.e.f. 04.10.2018 or the commissioning of transmission system for LTA as identified above (whichever is later).