

I/1241/2018



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

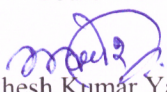
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15. Director (Trans), MoP, Shram Shakti Bhawan, Rafi Marg, New Delhi

Sub: Minutes of the 43rd meeting on Standing Committee on Power System Planning of W R
Sir / Madam,

The minutes of the 43rd meeting of Standing Committee on Power System Planning of Western Region held on 11.05.2018 at Vadodara is available on CEA website (www.cea.nic.in) at the following link: <http://www.cea.nic.in/compsplanning.html> (i.e. Home page-Wings-Power Systems-PSP&PA-I - Standing Committee on Power System Planning-Western Region).

Yours faithfully,

Enclosures: As above


(Awdhesh Kumar Yadav)
Director, PSPA-I

Minutes of the 43rd Meeting of Standing Committee on Power System Planning of Western Region held on 11.05.2018 at Vadodara

Member (Power System), CEA welcomed all participants to the 43rd meeting of Standing Committee on Power System Planning of Western Region held at Vadodara on 11.05.2018. He thanked POWERGRID for hosting the meeting at short notice.

He stated that the agenda for the meeting, interalia, includes important items like evacuation of power from renewable generation in Gujarat and Maharashtra, which needs detailed deliberation, constitution of Western Region Standing Committee on Transmission (WRSCOT) and reconstitution of empowered committee on transmission by Ministry of Power. He requested Chief Engineer, PSPA-I, CEA to start the proceedings of the meeting.

Chief Engineer, PSPA-I, CEA welcomed the participants and stated that Government of India has set up an ambitious target of establishing 175 GW of generation based on renewable sources by 2021–2022, which include 100 GW from Solar, 60 GW from wind, 10 GW from Biomass and 5 GW from small hydro. The target of 60 GW of wind power by 2021–2022, include existing capacity of 33 GW and out of the remaining 27 GW of wind power, 15 GW is envisaged to be evacuated through intra state network and 12 GW is envisaged through inter-state network. Towards achieving the inter-state target, SECI has recently completed bidding for 6050 MW of wind power in 4 tranches. In view of the short gestation period of renewable energy sources, bringing the evacuation system in matching timeframe of generation would be a huge challenge. Therefore, the transmission system need to be planned well in advance based on the potential site of renewable generation and regulatory facilitation would be required for implementation of the planned transmission system. He requested Director PSPA-I, CEA to take up agenda items.

The list of participants is enclosed at Annexure – I.

1.1 Confirmation of the minutes of 42nd meeting of the Standing Committee on Power System Planning in Western Region (SCPSPWR) held on 17.11.2017 at Mumbai

1.2 The minutes of the 42nd meeting of SCPSPWR were issued vide CEA no. 26/10/2017/PSP&PA-I/ 32 – 47 dated 10.01.2018.

1.3 The following two nos. of corrigendum has been requested subsequent to issue of the minutes of the meeting:

WRLDC vide its letter WRLDC/SO-II/SCM/1610–A/2018/59 dated 19.01.2018 has requested the following modification in point no. 15.5 on page no. 28 of minutes of 42nd meeting of Standing Committee on Power System Planning of Western Region

“15.5 WRLDC representative stated, 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”

the modified para may be read as

“15.5 WRLDC representative stated which is ‘n – 1’ non-compliant. Therefore, further time extension of charging 400 kV Sholapur (PG)–Karad S/C on 220 kV level may not be considered and SLDC Maharashtra is requested for early restoration of 400 kV Sholapur–Karad line”.

Ministry of Railways vide its letter no. 2012/Elect (G)/150/1 Pt – II dated 02.05.2018 has intimated that the ISTS connectivity of Railways dedicated transmission line on Delhi–Bharuch route was also agreed, however the same was not recorded in the minutes of the meeting. Accordingly Railways had requested to modify the minutes of the meeting by incorporating in-principle approval for ISTS connectivity to Traction Sub Stations (TSS) of Railways along the Delhi – Bharuch route.

- 1.4 CEA stated that the ISTS connectivity for TSS of Railways along the Delhi – Bharuch route was also deliberated in the meeting along with connectivity to various TSS of Railways at ISTS points, however the same was not mentioned in the conclusion at para 9.11 of the minutes. Therefore, the same may be modified.
- 1.5 GM, CTU suggested that the transmission line from ISTS point to TSS of Railways along with the bays at the both ends the line are in the scope of Railways, the same may be recorded in the minutes.
- 1.6 After deliberations the following corrigendum was agreed by the members:

Modified Para 9.11

After further deliberations, members agreed to give in principle approval for connectivity to Railways for existing demand with the ISTS points (Raigarh & Bhatapara) through 220 kV 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 a consumer of distribution company of Chhattisgarh, therefore they would communicate their views after consultation with CSPDCL within 15 days.

Members also agreed to grant in principle approval for connectivity to the TSS of Railways at Rajgarh (WR), Dehgam (WR), Pirana (WR), Vadodara (WR), Kota (NR) and Bassi (NR) ISTS substations, along the Delhi – Bharuch route, through 220 kV D/C transmission line along with 2 no. of 220 kV bays at both ends of the transmission line under the scope of Railways.

Modified para 15.5

“15.5 WRLDC representative stated which is ‘n – 1’ non-compliant. Therefore, further time extension of charging 400 kV Sholapur (PG)–Karad S/C on 220 kV level may not be considered and SLDC Maharashtra is requested for early restoration of 400 kV Sholapur–Karad line”.

- 1.7 Members confirmed the minutes of the 42nd meeting of SCSPWR with the above two modifications.
- 2.1 **Reviewing the Progress of Earlier Agreed Transmission Schemes**
- 2.2 CEA stated that the updated status of implementation of transmission projects under tariff based competitive bidding (TBCB) in Western Region was enclosed at Annexure–2.1 and the status of transmission schemes under

implementation by POWERGRID in Western Region was enclosed at Annexure –2.2 of the agenda for kind perusal of the members.

2.3 Members noted the same.

3.1 Two no. of 220 kV feeder bays at Itarsi (PG) 400 kV S/s for interconnection of proposed 220 kV Budhni S/s of MPPTCL

3.2 CEA stated that MPPTCL vide its letter no. 04-02/N-171/662 dated 26.03.2018 has intimated that Govt. of Madhya Pradesh has planned to set up a textile hub in Budhni, District Sehore and the anticipated demand of this area is around 100 MVA. In order to meet this load, MPPTCL has proposed establishment of a 1x160 MVA, 220/132 kV S/s at Budhni, and its interconnection through Itarsi (PG)–Budhni 220 kV D/C line (about 35 km). For this they require 2 no. of 220 kV bays at Itarsi (PG).

3.3 POWERGRID confirmed availability of space for 2 nos. of 220 kV line bays at Itarsi 400/220 kV substation.

3.4 CEA stated that the existing transformation capacity at Itarsi (PG) 400/220 kV S/s is 815 MVA (1x315 MVA+1x500 MVA). In 42nd meeting of SCPSPWR held on 17.11.2017, replacement of existing 1x315 MVA, 400/220 kV ICT with new 1x500 MVA, 400/220 kV ICT was agreed to meet the n–1 contingency criteria at Itarsi (PG) S/s and this 1x315 MVA, 400/220 kV ICT was agreed to be shifted to Gwalior S/s. Thus, the transformation capacity available at Itarsi (PG) 400/220 kV s/s would be 1000 MVA (2x500 MVA). Keeping In view of the additional demand of 100 MW of Budhni S/s at Itarsi (PG) S/s, the transformation capacity at Itarsi (PG) S/s may not be adequate to meet the n– 1 contingency criteria. Therefore, instead of replacing existing 1x315 MVA ICT with 1x500 MVA ICT, the 1x500 MVA, 400/220 kV may be added at Itarsi (PG) S/s so as the transformation capacity would become 1315 MVA (1x315 MVA+2x500 MVA). Further, 400/220 kV Morena (TBCB) S/s under TBCB is expected to be commissioned shortly, which would relieve the loading of Gwalior 400/220 kV S/s. CEA suggested MPPTCL to implement Budhni 220/132 kV S/S with 2x160 MVA transformation capacity instead of 1x160MVA to provide n-1 contingency.

3.5 MPPTCL stated that the load at Budhni S/s would grow progressively and Budhni S/s has already have interconnections at 132 kV level as well. Therefore, 1x160 MVA would be sufficient to meet the n –1 criteria.

3.6 After deliberations, the following was agreed:

- (i) Establishment of 1x160 MVA, 220/132 kV S/s at Budhni by MPPTCL.
- (ii) Itarsi (PG)–Budhni 220 kV D/C line along with 2 no. of 220 kV bays at both ends would be under the scope of MPPTCL.
- (iii) PGCIL would provide the space for 2 no. of 220 kV bays at Itarsi (PG) S/s.
- (iv) The shifting of 1x315 MVA, 400/220 kV ICT from Itarsi (PG) S/s to Gwalior S/s is dropped.
- (v) Augmentation of existing transformation capacity of 815 MVA, at 400/220 kV Itarsi (PG) S/S by 1x500 MVA, thus total transformation capacity would be 1315 MVA (1 315 MVA+2x500 MVA) – under ISTS.

4.0 Two no. of 220 kV feeder bays at Morena (TBCB) 400 kV S/s for interconnection of proposed 220 kV Bhind S/s of MPPTCL

4.1 CEA stated that MPPTCL vide its letter no. 04-02/N-171/662 dated 26.03.2018 has intimated that presently existing 132 kV Bhind S/s is fed through Mehgaon–Bhind 132 kV S/C line and in the outage of above transmission line, supply to this area is interrupted. The transformation capacity of Mehgaon 220/132 kV S/s is 320 MVA (2x160 MVA). The loading on these ICTs remains high and the maximum loading recorded at Mehagon S/s is 245 MVA (77 %). Considering the prospective load growth of Bhind area and space constraints for augmentation of the existing 132 kV Mehgaon substation, MPPTCL has proposed following transmission system as a part of their intra-state system, to be implemented through intra state Tariff Based Competitive Bidding (TBCB) route::

(i) Establishment of new 2x160 MVA, 220/132 kV substation at Bhind

(ii) Morena (TBCB)–Bhind DCDS 220 kV D/C line (about 65 kms)

MPPTCL has requested 2 no. of 220 kV line bays at 400/220 kV Morena (TBCB) S/s for interconnection of Bhind substation through Bhind–Morena (TBCB) 220 kV D/C line.

4.2 CEA informed that the Morena (TBCB) S/s is under implementation by M/s CWRTL through TBCB route and as per the scope of work space is available for 4 no. of 220 kV bays.

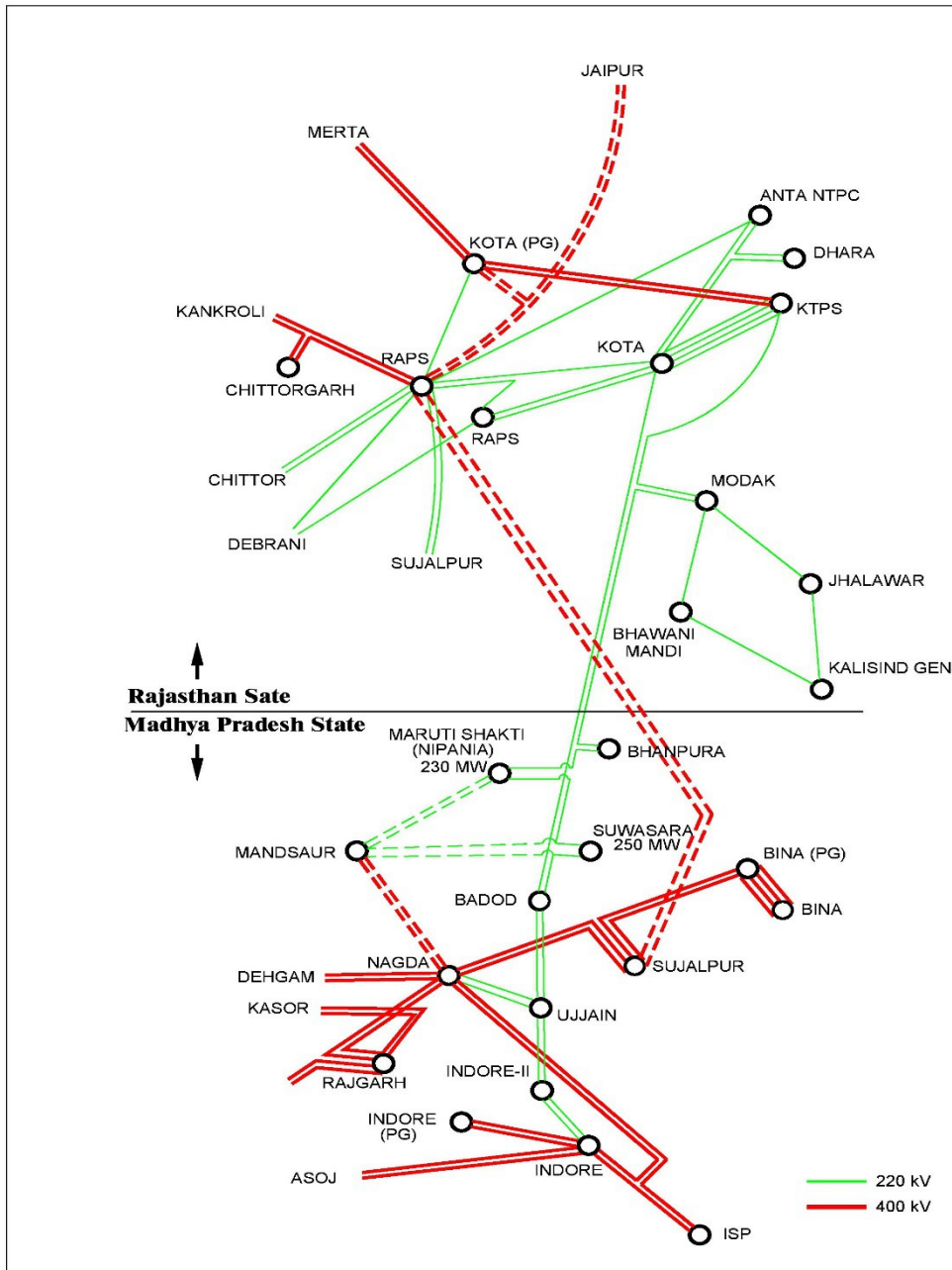
4.3 After deliberations, members agreed for the following:

(i) M/s CWRTL would provide space for 2 no. 220 kV line bays at Morena (TBCB) 400/220 kV S/s

(ii) Morena (TBCB)–Bhind 220 kV D/C along with 2 no. 220 kV line bays at both ends of this line would be implemented by MPPTCL at its own cost.

5.0 LILO of Badod–Kota 220 kV line at Bhanupura S/s

5.1 CEA stated that MPPTCL vide its letter no. 04–02/N–171/90 dated 10.01.2018 has intimated that they have completed the works associated with LILO of Badod–Kota 220 kV S/C line at Bhanupura 220 kV S/s (MPPTCL) and the same was yet to be interconnected with 220 kV Bhanupura S/s. In order to charge this LILO at Bhanupura S/s, MPPTCL had sought the shutdown of Badod–Kota 220 kV S/C line, however NLDC/WRLDC had stated that the line being an inter-regional line, consent of Standing Committee on Power System Planning / CEA for charging the proposed LILO of Badod–Kota 220 kV S/C line at Bhanupura 220 kV S/s was required. Accordingly, MPPTCL has sought the ‘in principle’ approval of CEA for interconnection of above LILO of Badod–Kota 220 kV S/C line at 220 kV Bhanupura S/s.



Network in and around Bhanpura S/s

5.2 CEA further stated that to discuss the proposal of MPPTCL, a meeting was held with MPPTCL, NLDC, CTU, Rajasthan and CEA on 23.01.2018 at CEA, New Delhi, in which the following was agreed:

- a) The LILO of Badod–Kota 220 kV S/C line at Bhanupura S/s is agreed in principle and the same would be taken up in the next meeting of SCSPWR and SCSPNR.
- b) The ISTS metering point shall change from Badod S/s to Bhanpur S/s.

- c) MPPTCL was requested to expedite the implementation of Mandsaur 400 kV S/s and restore the LILO of Badod–Maruti Shakti at Suwasra Solar Park at the earliest.
- d) MPPTCL was requested to examine the feasibility of restoration of LILO of Badod–Bhanupura at Maruti Shakti, after completion of Mandsaur S/s and Maruti Shakti–Mandsaur 220 kV D/C line.
- 5.3 Subsequently, CEA vide its letter No. 29/1/2018/PSP&A-I/202–205 dated 01.02.2018 has given in principle approval to the above proposal.
- 5.4 Member Secretary, WRPC stated that originally this line was Ujjain–Kota 220 D/C, which has been LILO at no. of substations. Present LILO should not have any impact on the grid.
- 5.5 CEA stated that Ujjain–Kota 220 kV D/C was implemented by Madhya Pradesh and Rajasthan for exchange of power between these states. Later, one ckt of 220 kV Ujjain–Kota D/C was LILO at Modak 220 kV S/s of Rajasthan. Subsequently, MPPTCL implemented the LILO of Ujjain–Kota 220 kV line and Ujjain–Modak 220 kV line at Badod S/s of MPPTCL. Subsequently, Hon'ble CERC vide its order dated 14.03.2012 in regard to petition no. 15/Suo–Motu/2012, declared some transmission lines as ISTS, which included Badod–Kota 220 kV S/C and Badod–Modak 220 kV S/C. Subsequently, MPPTCL had implemented the LILO of 220 kV Badod–Modak line at Bhanupura S/s on 26.02.2015 [Later, this Badod–Bhanupura 220 kV S/C line is LILO at Maruti Shakti (Nipaniya) 230 MW wind generation project and recently, as an interim arrangement, Suwasra Solar Park is interconnected through LILO of Maruti Shakti–Badod 220 kV line]. Thus now, Badod–Kota 220 kV S/C and Bhanupura–Modak 220 kV S/C are ISTS / inter regional lines.
- Further CEA has given its consent only after considering the views of Rajasthan. Rajasthan was LILO of existing Badod–Kota 220 kV S/c at Modak. It can be seen that with multiple LILO on Ujjain – Kota 220 kV D/C line the ISTS point is getting shifted towards geographical boundary of Madhya Pradesh & Rajasthan and major portion of the line is being utilised by the states as a part of their intra-state network.
- 5.6 On enquiring the information about implementation status of various elements associated with above LILO, MPPTCL intimated the following:
- (i) LILO of Badod–Kota 220 kV S/C at Bhanupura S/s on 16.03.2018
 - (ii) Establishment of Mandsaur 400/220 kV S/s - Dec, 2019
 - (iii) Mandsaur–Nagda 400 kV D/C line - Dec, 2019
- 5.7 CEA suggested that all intra-State schemes, which involve reconfiguration of ISTS elements, inter-connection with ISTS elements and all 400kV intra-state schemes planned by State needs to be specifically deliberated in the meetings of the Standing Committee on Power System planning. Also, other intra state schemes planned by the State may also be intimated to Standing Committee
- 5.8 CEA further stated that all utilities needs to submit the proposals to CEA well in advance, rather than submitting the same after its implementation / just prior to charging, so that the same can be deliberated in the meeting of standing committee in detail and approval can be given with consent of the members of the committee.

- 5.9 After deliberations, members concurred the LILO of Badod–Kota 220 kV S/C at Bhanupura S/s.

MPPTCL was requested to expedite the implementation of Suwasra–Mandsaur 220 kV D/C, Maruti Shakti–Mandsaur 220 kV D/C and Mandsaur 400/220 kV substation so that the present LILO arrangement (done as an interim arrangement) for evacuation of power from Suwasara and Maruti Shakti RE generation projects could be restored at the earliest. MPPTCL agreed for the same.

Members also agreed that all intra-State schemes which involve reconfiguration of ISTS elements, inter-connection with ISTS elements and all 400kV intra-state schemes planned by State would be deliberated in the meetings of the Standing Committee on Power System planning before taking up its implementation. They also agreed to intimate other intra state schemes planned by the State to Standing Committee.

- 6.0 **Transmission System plan for potential wind energy zones (WEZs) in Western Region – Bhuj, Bhachau, Dwarka (in Gujarat) and Osmanabad (in Maharashtra)**

- 6.1 CEA informed that in 36th meeting of SCPSPWR held on 29.08.2013, the transmission system for evacuation of power from 32 GW of RE power that was envisaged by the end of 12th five year plan in 8 RE rich states viz Rajasthan (5694 MW), Himachal Pradesh (1281 MW), J&K (476 MW), Gujarat (4729 MW), Maharashtra (4063 MW), erstwhile Andhra Pradesh (4827 MW), Karnataka (4290 MW) and Tamil Nadu (7353 MW) was discussed. In order to transfer RE power from these RE rich states to RE deficit states, the following inter–state transmission system was agreed:

Western Region (Gujarat):

- (i) Bhuj Pool – Banaskantha 765 kV D/C
- (ii) Banaskantha – Chittorgarh 765 kV D/C
- (iii) Banaskantha – Sankhari 400 kV D/C
- (iv) 765/400/220kV (765/400 kV-2x1500 MVA & 400/220kV-2x500MVA) sub-station each at Bhuj Pool and Banaskantha.
- (v) Associated reactive compensation (Bus reactors & line reactors)

Northern Region (Rajasthan):

- (i) Chittorgarh – Ajmer (New) 765 kV D/C
- (ii) Ajmer (New) – Suratgarh (New) 765 kV D/C
- (iii) Suratgarh (New) – Moga (PG) 765 kV D/C
- (iv) Chittorgarh – Chittorgarh (RVPN) 400 kV D/C (Quad)
- (v) Ajmer (New) – Ajmer (RVPN) 400 kV D/C (Quad)
- (vi) Suratgarh (New) – Suratgarh 400 kV D/C (Quad)
- (vii) 2x1500 MVA, 765/400 kV sub-station each at Chittorgarh, Ajmer (New) and Suratgarh (New)

(viii) Associated reactive compensation (Bus reactors & line reactors).

The above scheme is being implemented by POWERGRID in four phase as a part of Green Energy Corridor-I. 765/400 kV Bikaner pooling station is being implemented in place of 765/400 kV Suartgarh pooling station. Part A, B & C is being implemented with soft loan from KfW and D is being implemented with loan from ADB.

(A) Green Energy Corridors – ISTS – Part – A (Tranche-I)

Rajasthan (Northern region)

- (i) Ajmer (New) - Ajmer (RVPN) 400 kV D/C (Quad) – 57 km
- (ii) Chittorgarh (New) - Chittorgarh (RVPN) 400 kV D/C (Quad) – 25 km
- (iii) Establishment of 2 x 1500 MVA, 765/400 kV S/s at Chittorgarh
- (iv) Establishment of 2 x 1500 MVA, 765/400 kV S/s at Ajmer (New)

Tamil Nadu (Southern region)

- 1) Tirunelveli Pooling Station - Tuticorin Pooling Station 400 kV 2 x D/C (Quad) - 1st Ckt 57 km / 2nd Ckt – 55km
- 2) Establishment of 2x500 MVA, 400/230 kV S/s at Tirunelveli Pooling Station

(B) Green Energy Corridors-ISTS-Part-B (Tranche - II)

Gujarat (Western Region)

- (i) Establishment of 765/400/220 kV (765/400 kV – 2 x 1500 MVA & 400/220 kV – 2 x 500 MVA) sub-station at Banaskantha
- (ii) Banaskantha – Chittorgarh 765kV D/C - 285 km
- (iii) Banaskantha – Sankhari 400 kV D/C - 26 km

Rajasthan (Northern region)

- i.1. Chittorgarh – Ajmer (New) 765 kV D/C – 200 km

(C) Green Energy Corridors – ISTS – Part – C (Tranche – III)

Gujarat (Western Region)

1. Establishment of 765/400/220 kV (765/400 kV – 2 x 1500 MVA & 400/220 kV – 2 x 500 MVA) sub-station at Bhuj Pool
2. Bhuj Pool – Banaskanta 765 kV D/C – 315 km

(D) Green Energy Corridors – ISTS – Part – D

Rajasthan (Northern Region)

- (i) Ajmer – Bikaner 765 kV D/C
- (ii) Bikaner – Moga 765 kV D/C
- (iii) Establishment of 765/400 (765/400 kV – 2 x 1500 MVA) sub-station at Bikaner

- (iv) LILO of one Ckt of 400 kV Bikaner (RVPNL) – Badla (RVPNL) D/C at Bikaner 765 / 400 kV S/s.

- 6.2 CEA stated that Government of India has an ambitious programme of establishing 175 GW power from RE sources (100 GW–Solar, 60 GW–Wind, 10 GW–Biomass and 5 GW–Small Hydro) by 2022.

To assess the power evacuation and transmission requirement for achieving wind power capacity target of 60 GW by 2022, a meeting was held on 25.01.2018 in MNRE, New Delhi which was attended by officials of MNRE, POWERGRID, NIWE (National Institute of Wind Energy), SNAs (State Nodal Agency) of wind resource rich states and Wind IPPs/Developers & IWTMA (Indian Wind Turbine Manufacturers Association). In the meeting, it was noted that out of total envisaged 60 GW wind capacity by 2022, the existing wind power capacity was 33 GW and balance 27 GW still to be established by 2022. Out of this 27 GW, it was estimated that about 15 GW would be developed in Intra state and balance 12 GW or more may come up in ISTS.

The Kutch Distt of Gujarat possesses about 8000 MW of wind potential (West of Bhuj is around 6000 MW and around 2000 MW in Northeast of Bachau). Further, based on the SNA/STU inputs and information provided by various wind IPPs/Developers, the following wind energy zones in Western Region were agreed in the meeting as prioritized wind energy zones for planning / development of additional ISTS infrastructure:

S. No.	State	District	Quantum
1	Gujarat	Dwarka	2000 MW
2	Maharashtra	Osmanabad	2000 MW

- 6.3 CEA further stated that Solar Energy Corporation of India (SECI) vide its letter dated 09.04.2018 intimated that as on date, it has conducted bidding for about 6050 MW of wind power projects across India and out of this 4050 MW (Tranche 1, 2 & 3) has already been awarded and remaining 2000 MW (Tranche 4) has been bid out and will be awarded shortly. Though the bidding was carried out pan India, the bidders have opted to establish 4500 MW (3900 MW at Bhuj PS & 600 MW at Bhachau S/s) of wind power in Gujarat and 1550 MW (Tamil Nadu : 950 MW at Tirunelveli & 300 MW at Pugalur, Kerala:300 MW at Palakkad) in Southern Region.

A meeting was taken by Member (PS), CEA on 16.04.2018 to discuss the evacuation system for wind power plants, which have been awarded and bid out by SECI recently, wherein the following was decided:

- (i) MNRE / SECI would make a presentation on their road map for development of RE power in India.
- (ii) A meeting would be held on 23.04.2018 with successful wind project developers of SECI bids to know the location of their wind farms, individual wind farm capacity, connectivity voltage etc. SECI to coordinate in this regard.
- (iii) CTU to carry out studies to identify additional system required for evacuation of power from successful wind power projects developers in SECI bids in Gujarat in coordination with CEA considering GETCO intra-state proposals for RE evacuation.

- 6.4 Subsequently, two meetings were taken by Member (Power System), CEA on 23.04.2018. One with MNRE / SECI on their road map for development of RE power in India and other with successful wind project developers of SECI bids. In the meeting with SECI / MNRE on roadmap for development of RE power in India SECI has intimated that based on their interactions with various wind power project developers, the state wise wind power potential is as tabulated below:

S. No.	State	Area	Potential (MW)
1	Gujarat	Bhuj	4000
		Amreli	2000
		Jam Nagar	2000
		Bhav Nagar	2000
		Sub Total	10000
2	Tamil Nadu	Karur	2000-2500
		Kanya Kumari	1000-2000
		Udamalpet	2000
		Other Areas in TN	20000
		Sub Total	25000-29500
3	Karnataka	Munirabad	2000-2500
		Gadag	2000-2500
		Chitra Durg	1000-1700
		B Bagewadi	2000
		Chikkodi	1000-1500
		Other Areas in Karnataka	31000 – 39200
		Sub Total	39000
4	Andhra Pradesh	Kurnool & Anantapur	3000

6.4.1 In the meeting with MNRE / SECI, in order to facilitate the advance planning and implementation of the transmission system, following was suggested:

- (i) Some agency (say MNRE or SECI) should provide data such as potential sites, capacity at each site, developmental plan, tentative beneficiaries etc. to CEA and CTU.
- (ii) SECI may explore site specific bidding instead of pan India.
- (iii) CERC may expedite the finalization of Procedure for Grant of connectivity to projects based on renewable energy sources to inter-State Transmission System.
- (iv) For taking up implementation of the identified transmission system, there must be some agency who will apply for connectivity / LTA on behalf of renewable project developers to be selected through site specific competitive bidding by SECI.

6.4.2 In the meeting held with the developers, it was noted that the wind power generation projects which have been successful in SECI bids of tranche 1, 2 & 3 are scheduled to be commissioned by Oct, 2018, May, 2019 & Nov, 2019 respectively and the schedule for wind projects of tranche 4 is yet to be decided. The details of the tranche wise bids won by wind project developer in MW at Bhuj PS, Bachau S/s, Tirunelveli S/s, Pugalur S/s and Palakkad S/s is as given below:

S. No.	Developer / Tranche	1	2	3	4	Total
Bhuj 765/400/220 kV Pooling Station						
1	Inox wind	250	250	200	100	800
2	Adani Green	50	50	250	300	650
3	Ostro Kutch					0
4	Green Infra		250	300		550
5	Renew			300	265	565
6	Srijan				250	250
7	Torrent			499.8		499.8
8	BLP				285	285
9	Alfanar			300		300
	Total	300	550	1849.8	1200	3899.8

S. No.	Developer / Tranche	1	2	3	4	Total
Bachau 400/220 kV Sub Station						
1	Ostro Kutch	250				250
2	Renew		250	100		350
	Total	250	250	100	0	600
Tirunelveli 400/220 Pooling Station						
1	Mytrah	250				250
2	Green Infra	249.9				249.9
3	Orange Sironge		200			200
4	Betam Wind			50.2		50.2
5	Betam Wind				200	200
	Total	499.9	200	50.2	200	950.1
Pugalur Sub Station						
1	Spring Energy	0	0	0	300	300
	Total	0	0	0	300	300
Palakkad Sub Station						
1	Mytrah	0	0	0	300	300

	Total	0	0	0	300	300
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6.4.3 In the meeting with the developers, it was seen that in general, the developers were interested in getting connectivity at 220 kV level of the ISTS pooling station, as the wind farms of the developers, who had won more than one bid, were not contiguous. One developer had won the bidding carried out by Maharashtra Government with injection point at Bhuj pooling station.

6.5 CEA informed that POWERGRID is implementing Bhuj pooling station with transformation capacity 1000 MVA (2x500 MVA, 400/220 kV) and 3000 MVA (2x1500 MVA, 765/400 kV). Considering the space availability at Bhuj PS for extension of bays at various level and augmentation of ICTs, at the maximum the Bhuj PS could accommodate the wind power projects to be developed in tranche 1, 2 & 3 only i.e. around 2700 MW. Thus, in order to facilitate evacuation system for tranche 4 of SECI bid along with 4000 MW potential of wind power in Bhuj area, additional transmission system needs to be planned.

6.6 Accordingly, system studies were carried out by CEA and CTU to identify the additional transmission system for the high potential wind energy zones in WR such as Bhuj & Bhachau in Kutchh area, Dwarka (Khambhaliya) in Gujarat and Osmanabad in Maharashtra. Based on the studies, the following additional transmission system may be required evacuation of power from the high potential wind energy zones in WR. This identified system may be agreed in principle and the same may be taken up after receipt of the connectivity and LTA applications.

A. Transmission system augmentation at Bhuj 765/400 Bhuj pooling station

- (i) 4x500MVA 400/220kV (addl) ICTs at Bhuj PS*
- (ii) 1x1500MVA 765/400kV ICT at Bhuj PS
- (iii) LILO of Zerda – Ranchhodpura 400kV S/c at Banaskantha (approved in 42nd WR SCM) to be expedited

(* On account of space constraints at Bhuj PS, all future 220kV line bays at Bhuj PS may need to be implemented as GIS)

B. Transmission System for RE Projects in Kutch area: Bhuj-II PS (3000MW) + Lakadia PS (2000MW)

Alt-I

- (i) Bhuj-II PS (GIS) along-with 12 nos. 220kV bays for wind farms' integration
- (ii) Establishment of 5x1500MVA & 5x500MVA, 765/400/220kV Lakadia PS (GIS) along-with 8 nos. 220kV bays for wind farms' integration
- (iii) Bhuj-II – Lakadia PS 400kV 2xD/c (Quad) line (~120km)
- (iv) Lakadia PS – Vadodara 765kV D/c line (~300km)
- (v) Lakadia PS – Banaskantha 765kV D/c line (~150km)

Alt-II

- (i) Establishment of 3x1500MVA (765/400kV) 7x500MVA (400/220kV) Bhuj-II PS (GIS) along-with 12 nos. 220kV bays for wind farms' integration
- (ii) Establishment of 3x1500MVA & 5x500MVA, 765/400/220kV Lakadia PS (GIS) along-with 8 nos. 220kV bays for wind farms' integration
- (iii) Interconnection of 765kV Bhuj S/s with the proposed Bhuj-II (GIS) S/s through bus extension or 765kV D/c line
- (iv) Bhuj-II – Lakadia PS 765kV D/c line (~120km)
- (v) Lakadia PS – Vadodara 765kV D/c line (~300km)
- (vi) Lakadia PS – Banaskantha 765kV D/c line (~150km)

C. Transmission system for RE projects in Devbhumi Dwarka (2000MW)

Alt-I

- (i) Establishment of 5x500MVA, 400/220kV Jam Khambhaliya PS (GIS) along-with 8 nos. 220kV line bays
- (ii) Extension of Essar – Bhachau 400kV D/c (triple) line upto Jam Khambhaliya PS
- (iii) Jam Khambhaliya PS (GIS) – Kalavad (GETCO) 400kV D/c line
- (iv) Reconductoring of Bhachau – Varsana 400kV D/c line to HTLS conductor, alternatively, LILO of Jam Khambhaliya PS – Bhachau 400kV D/c line at Halvad (GETCO) S/s may also be considered as it significantly helps to relieve loading on Bhachau – Varsana 400kV D/c line

Alt-II

- (i) Establishment of 5x500MVA, 400/220kV Jam Khambhaliya PS (GIS) along-with 8 nos. 220kV line bays
- (ii) Extension of Essar – Bhachau 400kV D/c (triple) line upto Jam Khambhaliya PS
- (iii) Jam Khambhaliya PS (GIS) – Kalavad (GETCO) 400kV D/c line (~75km)
OR Jam Khambhaliya PS (GIS) – Shapar (GETCO) 400kV D/c line (~130km)
- (iv) Reconductoring of Bhachau – Varsana 400kV D/c line to HTLS conductor, alternatively, LILO of Jam Khambhaliya PS – Bhachau 400kV D/c line at Halvad (GETCO) S/s may also be considered as it significantly helps to relieve loading on Bhachau – Varsana 400kV D/c line.
- (v) Bhachau – Lakadia 400kV D/c (Quad) line OR LILO of Jam-Khambhaliya-Bhachau 400kV D/c (triple) line at Lakadia PS

D. Transmission system for RE projects in Osmanabad area (2000 MW)

- (i) Establishment of 3x1500 MVA, 765/400/220 kV Kallam PS (GIS)
- (ii) Kallam – Parli (New) 765 kV D/c line (~70 km) or LILO of one circuit of Parli (New) – Solapur 765 kV D/c line at Kallam (GIS)

6.7 CTU stated that with the above proposal 3000 MW would be evacuated through augmentation of the existing Bhuj pooling station and evacuation of balance 1000 MW (out of SECI bids of 4000 MW) would be with implementation of Bhuj-II pooling station. Studies shows that with minor modifications in the scheme mentioned at point A of para 6.6, the entire 4000 MW capacity under SECI bids can be evacuated with following scheme:

- (i) 9 x 500 MVA, 400/220 kV ICTs at Bhuj PS (2 are under implementation & 7 nos. additional augmentation)
- (ii) 4 x 1500 MVA, 765 / 400 kV ICTs at Bhuj PS (2 are under implementation & 2 nos. additional augmentation)
- (iii) In view of the space constraints and in order to accommodate above ICTs and 220 kV bays for wind project developers at Bhuj PS, the 400 kV bays and 220 kV bays required to be developed as GIS bays.
- (iv) Augmentation of transmission system i.e. LILO of Essar – Bachau at Halvad S/s of Gujarat (LILO portion is 50 km) to avoid over loading of Bachau – Versana 400 kV D/C line or re - conductoring of Bachau – Versana 400 kV D/C line.
- (v) Bhuj II S/s can be developed in matching time frame of future RE projects envisaged at Bhuj.

6.8 CEA stated that the above studies has been done with certain assumptions, which needs deliberations. Assumptions pertains to dispatches to be considered from Solar and Wind generation projects for evolution of the transmission system, the applicability of n-1 criteria for evacuation system of RE power projects, as the availability of RE power is only for few hours in a day.

6.9 GETCO representative made the following observations on the scheme proposed:

- (i) The installed capacity of RE power (wind and solar) in Gujarat is around 5500 MW. And as per the data available with the Gujarat, the maximum wind RE power generated is 3763 MW (July 2017 in the year 2017-18) as against installed capacity of 5531 MW (as on March 2018). The maximum solar RE power generated is 1072 MW (March 2018 in the year 2017-18) as against installed capacity of 1493 MW (as on March 2018). The maximum dispatch from wind projects is around 70 % and that of solar projects is 72 % of the installed capacity at state level. Analysis of individual wind pooling station like Suthri, Sidhori, Jamnawad, which have about 300 MW of wind farm installed, shows that maximum injection ranging from 83% to 93% of the installed capacity. Therefore, despatch of 80% of the installed capacity of wind farms at Bhuj pool may considered for evolving the transmission scheme.

- (ii) Though the RE power addition envisaged in Bhuj and Dwarka region is proposed to be evacuated through ISTS network and Gujarat intra state network being well connected with the ISTS, the RE power may cause increased loadings of intra state network. Therefore, GETCO may have to augment its intra state transmission system. The proposed inter-connection of ISTS with state network may increase the PoC charges of Gujarat.
- (iii) In the above scheme, re-conductoring of Bachau–Versana 400 kV D/C line has been proposed to take care of overloading during N-1 conditions. The increased loading on this line is observed when the generation at APL is low and high RE power injection at Bhuj pooling station. In Gujarat, high wind injection scenario is only for 3 months (July–September) in a year. Therefore, instead of re-conductoring, the studies may be carried out by keeping the Bachau–Versana 400 kV D/C line in open conditions.
- (iv) GETCO is also implementing Kalavad 400 kV substation for evacuating RE generation and interconnection of ISTS line (Essar- Bachau 400 kV D/C line) corridor with Halvad or Kalavad would further cause RE power injection into Gujarat intra state system. The interconnections / re-conductoring proposed in the scheme needs to review.
- (v) In the studies the demand considered for Kutch area is about 5800 MW, which is on the higher side as compared to load of Kutch area during off peak. The ratio of off peak to peak demand of Kutch area is around 40 to 50 %.
- (vi) For integration of additional RE power with their intra–state grid, GETCO has declared the available marginal transmission capacity at each substation and Govt. of Gujarat has carried bidding for RE power at these locations where margins are available. On similar lines, CTU may declare the available marginal capacity at each ISTS substations and SECI may carry out bidding accordingly.
- (vii) The RE project developers should be given connectivity at 220 kV or 400 kV voltage level depending on the RE project capacity to optimise the addition of 400/220 kV transformers.

6.10 MSETCL representative suggested that the proposed transmission system is based on the potential envisaged at present, however implementation of the transmission system may be taken up in phases based on the actual RE capacity addition. Moreover, the RE potential in any region is distributed across the region, therefore anticipating injection from the entire region at single proposed pooling station may not be feasible.

In Maharashtra, the wind RE potential of 2000 MW has been assessed in Osmanabad area and for evacuation of power from RE projects 765/400/220 kV pooling station has been proposed. The entire 2000 MW RE projects would not get connected immediately. Therefore, initially injection would be done at 220 kV level and with increase in capacity addition, the system can be upgraded to 400 kV or 765 kV level as per requirement. Connectivity of RE projects to ISTS may also be allowed through intra state network so that transmission system can be optimized.

6.11 POSOCO/NLDC representative made the following observations on the proposed transmission schemes for RE projects:

- (i) The studies carried out don't mention about the RE dispatches considered.

It may be noted that in the studies carried out under GREENING THE GRID PROGRAM (a joint initiative by USAID and Ministry of Power), it was observed that adjacent states of Rajasthan and Gujarat have a high RE generation correlation coefficient (0.72 %). Thus, the transmission system for RE power in Gujarat should not be evolved in isolation, without considering the RE generation in Rajasthan. The studies may be carried out considering all possible combinations of RE power in Gujarat and Rajasthan i.e. High RE in both Gujarat & Rajasthan, Low RE in both Gujarat & Rajasthan, Low RE in Gujarat and high RE in Rajasthan and vice versa.

- (ii) Earlier Green Energy Corridor was planned in 2013 without considering exact quantum of RE that would be injected at each pooling station. Further, the 765 kV pooling stations planned along the 765 kV D/C Bhuj Pool–Banaskantha–Chittorgarh–Ajmer–Bikaner–Moga as part of the Green Energy corridor have very weak connection with the existing grid, thus affecting the safe evacuation of power.
- (iii) The Short Circuit Ratio (SCR) being an important aspect of grid security, the same should also be considered while deciding the quantum of RE power that is to be connected at each Pooling Station. In the draft amendment to the CEA Technical Standards for Connectivity to the grid issued in Nov 2016, it was mentioned that the Short Circuit Ratio (SCR) shall be 5 or above and further, as per the recent studies carried out by M/s Powertech Labs (in Task-IV), it has been recommended that the SCR should be 3 or more for proper grid integration of RE projects. Considering this, as 4000 MW wind power is planned to be connected at Bhuj Pool, the fault level at 400 kV Bhuj PS should be 12000 MVA or more. However, since only 400 kV CGPL–Bhuj Pool D/C is planned and under implementation, the fault level aspect may be considered prior to grant of connectivity to wind power projects.
- (iv) As per transmission planning criteria of CEA, the maximum transformation capacity at 400 kV level is 2000 MVA, however in the above proposal, it is proposed to grant the connectivity to 4000 MW of wind power through 9x500 MVA, 400/220 kV transformers (4500 MVA transformation capacity) and in view of the space constraint, proposed 15 no. of 220 kV bays would be developed as GIS bays. It may be noted that GIS equipment has a very high Mean Time to Repair (MTTR). In view of this, at 220 kV level, adequate sectionalisation may be planned for reliability.
- (v) The 765 kV Bhuj PS–Banskantha D/C is expected by July 2018, and the anchoring at 400 kV through CGPL Mundra – Bhuj Pool D/C is expected in Dec, 2018, however, the wind projects of tranche 1 (300 MW at Bhuj PS) of SECI bid are scheduled for Oct 2018. Therefore, system studies may be carried out separately for the above scenario prior to grant of connectivity to wind projects.
- (vi) Studies may also be carried out considering 80% RE dispatch from Bhuj, high wind scenario in Rajasthan, low dispatch from APL Mundra generation, various generation scenarios of APL Mundra and / or CGPL. Further the additional transmission system being planned should not only facilitate RE integration but also add reliability to the system.

- 6.12 MS, WRPC stated that the scheme proposes 2200 kV bays as GIS bays. The cost of GIS bays is high and the extension of GIS bays would be very difficult as the specification for GIS bays varies from manufacturer to manufacturer, thus there may be challenges in integration of GIS bays. As the output from RE projects would be available for limited period, thus the transmission of RE would have lower utilization, therefore, n-1 criteria may not be applied and CEA Planning Criteria may be reviewed accordingly.
- 6.13 CEA clarified that the studies have been carried for 2021-22 time frame for other than peak demand conditions and the wind & solar dispatches have been considered as 70 % and 60 % respectively on All India basis except for Rajasthan. This has already been mentioned in agenda notes already circulated. However, the studies needs to be revised considering the issues raised by GETCO and POSOCO.

Regarding GETCO suggestion for carrying out location specific bidding depending upon margins available in ISTS (as is being done in Gujarat), it was clarified that the SECI carries out pan India bidding to get least price. However, as far as the connectivity voltage to each RE project at ISTS pooling station, would depend upon the capacity of the project for which connectivity has been applied.

Regarding MSETCL observation of allowing connectivity to RE projects through intra state transmission system, CEA stated that in view of waiver of ISTS charges, RE project developer would like to get directly connected with ISTS system. For evacuation of power from Osmanabad area a 765/400/220 kV pooling station has been created, which directly inject the power in ISTS system. Establishing additional interconnection at 400 kV/ 220 kV level may overload intra state transmission system.

Further, CEA's Manual on Transmission Planning Criteria at 16.2 states that N-1 criteria may not be applied to immediate connectivity of wind / Solar farms with ISTS / intra-STS grid i.e. connecting the farm to the grid and the step up transformers at grid stations.

- 6.14 The proposed transmission scheme was further deliberated and members broadly agreed with the above proposed transmission system except for interconnections with intra-state transmission system of Gujarat (in view of observations made by GETCO). It was decided that:
- (i) The transmission system for wind power projects to be developed in Bhuj, Dwarka and Osmanabad would be further deliberated in a joint study committee meeting with participation from NLDC, CTU, GETCO, MSETCL and CEA, wherein, all the observations / suggestions made by the members would be studied and the schemes would be finalised.
 - (ii) Augmentation at 765/400/220 kV Bhuj pooling station would be done for evacuation of 4000 MW of RE wind projects. The numbers of 400/220 kV ICT and 765/400 kV ICT augmentation would be decided based on the studies.

7.0 **Interconnection of MSETCL lines with ISTS**

- 7.1 CEA stated that in 42nd meeting of SCPSPWR held on 17.11.2017, MSETCL had proposed interconnection of 12 nos. of existing or new lines / substations with ISTS network of POWERGRID. These elements were already included in their five year

(from 2017–18 to 2021–22) STU transmission plan. In the meeting interconnection of 8 nos. lines / substations were agreed and for other four, it was decided to have further deliberations along with studies.

S. No.	Transmission Element	PGCIL S/s	Remark
1	LILO of 400 kV Talegaon (PG) – Kalwa at Vikhroli	Talegaon	To be discussed
2	Wardha (PG) – Yavatmal 220 kV D/C	Wardha	Agreed
3	Solapur (PG) – Bale 220 kV D/C	Solapur	Agreed
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	Agreed
5	LILO of one Ckt. of 400 kV Tarapur – Padghe D/C at Kudus (Padghe II)	Padghe / Kudus	To be discussed
6	LILO of one Ckt. of Aurangabad (PG) – Shendra D/C at Phulambri	Aurangabad	Agreed
7	LILO of 220 kV Parli – Harangul S/C at Parli (PG)	Parli	Agreed
8	LILO of Parli – Osmanabad S/C at Parli (PG)	Parli	Agreed
9	LILO of 2 nd Ckt of South Solapur – Kolhapur D/C at Alkud 400 kV S/s	Solapur	To be discussed
10	LILO of both ckts of Parli (PG) – Pune (PG) 400 kV D/C at Lonikhand II	Pune	To be discussed
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	Agreed
12	LILO of both ckts of Dhule – SSP 400 kV D/C at Balsane PS	Dhule / SSP	Agreed

Accordingly, the system studies were carried out for 2021–22 timeframe for interconnections proposed at S. No.1, 5, 9 & 10 of above table and the corresponding loads flows and short circuit levels results with and without interconnections were included in the agenda notes.

7.2 LILO of Tarapur – Padghe 400 kV D/C line at Kudus (MSETCL) 400 kV substation.

7.2.1 WRLDC representative stated that the transformation capacity under implementation at Kudus 400 kV S/s is 1000 MVA (2x500 MVA, 400/220 kV), however in the studies 3x500 MVA transformers have been considered. As per power flow results, 2 no. of transformers each of 500 MVA may not meet the n–1

criteria. Further, as on date, the ICTs at Kudus are idle charged as this S/s don't have any 220 kV outlets therefore, the LILO of 2nd Ckt of Tarapur–Padghe 400 kV D/C at Kudus may be considered after the establishment of 220 kV downstream network.

7.2.2 CE, MSETCL stated that total 8 no. of 220 kV outlets from Kudus S/s have been planned. Among these 8, 4 no. of 220 kV outlets (LILO of 220 kV Wada–Padghe S/C at Kudus S/s and LILO of 220 kV Wada–Kolshet S/C at Kudus S/s) would be completed by March, 2019 and if required, additional ICT of 1x500 MVA, 400/220 kV can be planned and implemented at Kudus S/s along with remaining 4 no. of 220 kV outlets from Kudus S/s. He also stated that the LILO of Tarapur–Padghe 400 kV D/C at Kudus was agreed in 32nd meeting of SCPSPWR, however as the LILO of 2nd Ckt of Tarapur–Padghe 400 kV D/C at Kudus yet to be taken up, the same has been brought to the notice of members of Standing Committee.

7.2.3 CEA stated that the LILO of both ckts of Tarapur–Padghe 400 kV D/C at Kudus 400/220 kV S/s (agreed in the 32nd meeting of SCPSPWR) was later revised to LILO of one Ckt of Tarapur–Padghe 400 kV D/C at Kudus 400/220 kV S/s to accommodate termination of Vapi–Navi Mumbai 400 kV D/C at Kudus due to space constraints. Further with LILO of both ckts at Kudus, fault level of about 42 kA is observed at existing Phadge (MSETCL) 400/220 kV substation.

7.2.4 After deliberations LILO of 2nd ckt of Tarapur–Padghe 400 kV D/C at Kudus was agreed to be implemented in matching timeframe of implementation of 3rd 500 MVA, 400/220 kV and remaining 4 no. of 220 kV outlets from Kudus 400/220 kV S/s. MSETCL to study the impact of short circuit level of this interconnection at their Padghe 400/220 kV substation and take necessary mitigation measure, if any. MSETCL agreed for the same.

7.3 **LILO of 2nd Ckt of South Solapur – Kolhapur D/c at Alkud 400 kV S/s**

7.3.1 WRLDC representative stated that establishment of Alkud 400/220 kV substation along with LILO of 1st ckt of Solapur (PG)–Kolhapur 400 kV D/C line at Alkud has been completed but the downstream network associated with Alkud S/s is yet to come up. Therefore, the LILO 2nd of Solapur (PG)–Kolhapur 400 kV D/C may be considered after completion of downstream network at Alkud S/s.

7.3.2 CE, MSETCL stated that the downstream network of Alkud 400/220 kV S/s is planned by LILO of 2 no. of 220 kV lines (LILO of 220 kV Jath–Mhaisal at Alkud S/s and LILO of Vita–Miraj 220 kV S/C at Alkud S/s). Thus, it would have 4 no. of 220 kV outlets from Alkud S/s. LILO of Vita–Miraj 220 kV S/C line at Alkud S/s would be completed by Sep, 2018 and for LILO of Jath–Mhaisal 220 kV line at Alkud S/s, tendering is in process and the works are expected to be completed by March, 2019.

7.3.3 After deliberations, LILO of 2nd Ckt of Solapur (PG)–Kolhapur 400 kV D/C at Alukd S/s was agreed to be implemented by MSETCL in matching timeframe of LILO of Jath– Mhaisal 220 kV line at Alukd S/s.

7.4 **LILO of both Ckts of Parli (PG)–Pune (PG) 400 kV D/C at Lonikhand II**

7.4.1 CEA stated that MSETCL had earlier proposed LILO of both ckts of Parli (PG)–Pune (PG) 400 kV D/C at Lonikhand II. Subsequently, MSETCL vide its letter no. MSETCL/CO/STU/5013 dated 07.05.2018 had proposed Pune (GIS)–Lonikhand

II 400 kV D/C line instead of LILO of both Ckts of Parli (PG)–Pune (PG) 400 kV D/C at Lonikhand II.

7.4.2 CE, MSETCL stated that LILO of both Ckts of Parli (M)–Lonikhand 400 kV D/C at Lonikhand II substation has already been implemented. With the present proposal Lonikhand II would directly get feed from Pune (GIS).

7.4.3 PGCIL confirmed the availability of space Pune at (Shikrapur) GIS.

7.4.4 After deliberations, it was agreed that both the proposals (LILO of both ckts of Parli (PG) – Pune (PG) 400 kV D/C at Lonikhand II and Pune (GIS) – Lonikhand II 400 kV D/C line) serves the purpose of providing strong ISTS source to Lonikhand II (MSETCL) substation. MSETCL to finalise and implement one of the proposal after exploring the implementation feasibility of both the proposals and communicate the same to CEA. In case, MSETCL opts for implementation of Pune (GIS)–Lonikhand II 400 kV D/C line, then two of 400 kV GIS bays at 765/400 kV Pune (GIS) substation would be implemented under ISTS.

7.5 **LILO of Talegaon–Kalwa 400 kV S/C line at Vikhroli 400/220 kV S/s**

7.5.1 CE, MSETCL stated that Kharghar–Vikhroli 400 kV D/C was planned and the same is under implementation by M/s Tata Power Ltd. In order to provide additional source (other than Kharghar) to Vikhroli 400 kV S/s, the above LILO of Talegaon–Kalwa 400 kV S/C line at Vikhroli 400/220 kV substation has been proposed.

7.5.2 CEA suggested that implementation of LILO of Talegaon–Kalwa 400 kV S/C line at Vikhroli 400/220 kV with HTLS conductor, as there would be RoW issues in this line.

7.5.3 CE, MSETCL stated that the Talegaon–Kalwa 400 kV S/C line is with twin Moose conductor and implementation of a section of this line with high ampacity conductor may not serve the purpose.

7.5.4 CEA stated that suggestion has been made to cater to future requirement. Whatever corridors is being planned to feed Mumbai area needs to be of high capacity. LILO of Talegaon–Kalwa S/C line at Vikhroli 400/220 kV may be done with high ampacity conductor as it would interconnect Vikhroli and Kalwa through high ampacity 400 kV line. In future, based on the requirements, re-conductoring of the balance section of the line i.e. from LILO point to Kalwa and from LILO point to Talegaon could be taken up at later date.

7.5.5 CEA informed that ISTS transmission scheme “**Additional ISTS feed to Navi Mumbai 400/220 kV substation of POWERGRID**” has already been notified by Govt. of India to be implemented through TBCB route. This scheme involves termination of 400 kV D/C quad line from 765/400 kV Padghe (GIS) into one ckt of Kharghar–Vikhroli 400 kV D/C quad line (under implementation as intra state scheme) and further LILO of Padghe (PG)–Vikhroli 400 kV S/C quad line at Navi Mumbai. Therefore, the time line of implementation of Kharghar–Vikhroli 400 kV D/C quad line as well as the coordinates of the LILO point needs to be finalized. The

implementation of Kharghar–Vikhroli 400 kV D/C line needs to schedule well in advance of the ISTS scheme (Additional ISTS feed to Navi Mumbai 400/220 kV substation of POWERGRID).

7.5.6 After deliberations, LILO of Talegaon–Kalwa S/C line at Vikhroli 400/220 kV substation was agreed. The LILO would be implemented by MSETCL with HTLS / high ampacity conductor.

MSETCL also agreed to expedite the implementation of Kharghar–Vikhroli 400 kV D/C quad line so that the same is completed ahead of the ISTS scheme (Additional ISTS feed to Navi Mumbai 400/220 kV substation of POWERGRID).

Regarding finalisation of coordinates of LILO point (for termination of 400 kV D/C quad line from 765/400 kV Padghe (GIS) into one ckt of Kharghar–Vikhroli 400 kV D/C quad line), it was agreed that the same would be deliberated in a separate meeting.

8.0 **Conversion of 400kV Line Reactors at Itarsi & Indore (MPPTCL) as switchable line reactor**

8.1 CEA stated that in the 39th meeting of SCPSPWR held on 30.11.2015, conversion of 400 kV fixed line reactors at each end of Itarsi–Indore 400kV 2xS/C lines into switchable line reactors was agreed on account of over-compensation of the line (about 85%) and it was decided that after making them switchable, these reactors can be utilized as Bus Reactors (with NGR bypassing) to improve voltage profile.

Now, POWERGRID has intimated that during execution of the same, it was observed that adequate electrical clearance is not available at Itarsi 400/220 kV S/s to install 400 kV circuit breakers, thus, fixed line reactors of Indore–Itarsi 400 kV 2xS/C lines can't be converted into switchable reactors at Itarsi end. Further, though the breakers can be installed at Indore 400 kV S/s (MP), these reactors can't be used as bus reactors as the Indore 400 kV S/s has Double Main and Transfer (DMT) switching scheme and the line reactors are installed after line isolator towards the line. Thus, POWERGRID has proposed to drop the following proposal:

- (i) Conversion of fixed line reactors to switchable line reactors of Itarsi–Indore 400kV 2xS/C lines at Itarsi end.
- (ii) NGR bypassing scheme of both the switchable line reactors (originally fixed line reactors) of Itarsi–Indore 400kV 2xS/C lines at Indore end.

8.2 CEA stated that with the above proposal only 2 nos. of fixed line reactors at Indore end would get converted to switchable line reactor and without NGR bypassing. These reactors would not be used as bus reactors.

8.3 CTU stated that conversion of fixed line reactor to switchable line reactor at Indore (MP) is proposed in view of the change in network topology. High compensation lead to resonance especially when one of circuits is out service, which in turn lead to over voltage. In order to avoid this resonance, the fixed reactors shall be converted into switchable reactors.

I/1241/2018

8.4 After deliberations, members agreed to drop the conversion of fixed line reactors of Indore–Itarsi 400 kV 2xS/C at Itarsi end and to drop the NGR bypassing at Indore (MP) end for these lines.

9.0 **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 ICT bay at M/s CGPL Switchyard**

9.1 CEA stated CGPL Mundra and Adani Mundra power plants each having generating capacity of the order of 4000 MW are geographically separated by 2–3 kms. However, there is no direct interconnection between these two generating stations. Thus to provide direct interconnection, which can be utilized to provide start up power during the black start from one plant to other plant, an interconnection between CGPL UMPP and APL Mundra STPS through one no. 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 in 40th meeting of SCPSPWR held on 01.06.2016. It was also agreed that the implementation modalities of the scheme may be finalized in the WRPC.

Regarding the implementation modalities for the scheme, WRPC in their 34th meeting agreed for independent funding of the scheme and the work to be executed by PGCIL.

Further, in the 42nd meeting of SCPSPWR held on 17.11.2017, it was agreed to refer the scheme to WRPC for further deliberations / clarifications on the issue of independent funding and its implementation by POWERGRID

The matter was discussed in the 35th WRPC meeting held on 20.12.2017, wherein members agreed that the work of installation of ICT and associated bays at CGPL Complex shall be carried out by PGCIL and the cost of the same shall be recovered through PoC mechanism.

9.2 On enquiring about 220 kV CGPL–Nanikhakkar line and 220 kV bay at Nanikhakkar S/s of Gujarat, GETCO informed that the CGPL–Nanikhakkar 220 kV S/C along with 220 kV bay at Nanikhakkar has been established during the commissioning of CGPL Mundra to draw the start-up power from the grid and at present line is only kept in charges condition from GETCO end and the line is not being utilised for transfer of any power.

At CGPL generation switchyard there is no 220 kV level, therefore, it was deliberated that the 220 kV Nanikhakkar–CGPL Mundra may be directly connected to 1x 500 MVA, 400/220 kV ICT to be installed at CGPL. The line would be charged from Nanikhakkar end and ICT would charge from 400 kV busbar.

9.3 After deliberations, members agreed for the following:

(i) 1x500 MVA, 400/220 kV ICT at CGPL Mundra to be installed at CGPL switchyard along with one no. of 400 kV bay and one no. of 220 kV bay at CGPL Mundra. This would be implemented as an ISTS scheme.

(ii) The CGPL Mundra–Nanikhakkar 220 kV S/C line along with 220 kV bay at Nanikhakkar S/s would be kept in healthy condition by GETCO. GETCO would

furnish the suitable switching arrangement at 220 kV Naikhakkar S/s for extending start up power supply to CGPL, whenever required.

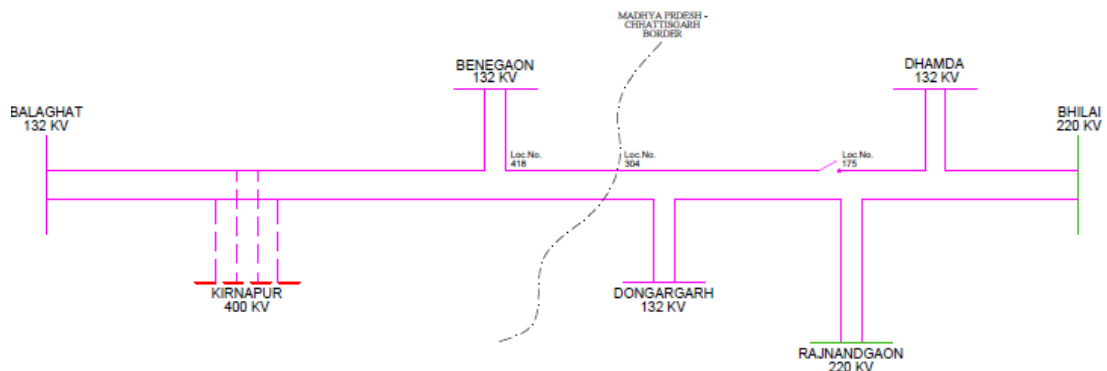
- (iii) The Nanikhakkar–CGPL Mundra 220 kV S/C would be charged from Nanikhakkar end and 1x500 MVA, 400/220 kV ICT would be charged from 400 kV side and kept isolated from 220 kV side.

10.0 LILO of Balaghat – Dhamdha – Dongargarh 132 kV DCDS at Kirnapur 400/132 kV S/s

10.1 CEA stated that in 38th meeting of SCPSPWR, the scheme of establishment of 2x100 MVA, 400/132 kV Kirnapur, District Balaghat substation by LILO of 400 kV Bhilai–Seoni S/C at Kirnapur by MPPTCL as a part of intrastate system strengthening was noted by members. MPPTCL vide its letter no. 04-02/N-171/983 dated 04.05.2018 has intimated that it has completed the works associated with the establishment of Kirnapur 400/132 kV S/s and LILO of 400 kV line and 132 kV line. In this regards, SLDC of Madhya Pradesh requested for shut down of Balaghat (MP)–Dhamdha (CG)–Dongargarh 132 kV D/C for its LILO at Kirnapur S/s. However, SLDC of Chhattisgarh has denied the shutdown of this 132 kV line and sought the approval of Standing Committee on Power System Planning of Western Region. Accordingly, MPPTCL has sought the approval for LILO of Balaghat (MP)–Dhamdha (CG)–Dongargarh 132 kV D/C at Kirnapur 400/132 kV S/s.

10.2 MPPTCL stated that at present one circuit of Balaghat (MP)-Bhilai (Chhattisgarh) 132 kV D/C line has been LILO at Bhanegaon (MP) and Dhamdha (Chhattisgarh) 132 kV sub-stations thus forming Bhanegaon (MP)-Dhamdha (Chhattisgarh) inter-state line. The other circuit of Balaghat (MP)-Bhilai (Chhattisgarh) 132 kV D/C line has been LILO at Dongargarh (Chhattisgarh) and Rajnandgaon (Chhattisgarh) sub-stations thus forming Balaghat (MP)-Dongargarh (Chhattisgarh) inter-state line. Now LILO of Balaghat-Bhanegaon and Balaghat-Dongargarh section of Balaghat (MP)–Bhilai (Chhattisgarh) 132 kV D/C at Kirnapur 400/132 kV S/s is proposed / under implementation. The existing as well as proposed arrangement is shown below:

EXISTING & PROPOSED 132KV LINE ARRANGEMENT BETWEEN BALAGHAT & BHILAI



10.3 CSPTCL representative stated that SLDC of Chhattisgarh had denied the shutdown of the 132 kV line as it an interstate line between the Madhya Pradesh and

Chhattisgarh. Thus, the approval of Standing Committee on Power System Planning of Western Region was sought.

- 10.4 MPPTCL representative stated that presently, the power flows from Dongargarh (CG) to Balaghat (MPPTCL) and with establishment of 400/132 kV Kirnapur substation along with its 400 kV and 132 kV interconnections, CSPTCL network may get relieved, thus the proposed LILO of Balaghat–Dhamdha–Dongargarh 132 kV line at Kirnapur 400/132 kV S/s may be agreed.
- 10.5 After further deliberations, MPPTCL proposal of LILO of Balaghat–Dhamdha–Dongargarh 132 kV DCDS line at Kirnapur 400/132 kV S/s was agreed. After implementation of the LILO, Kirnapur (MP)-Dongargarh (Chhattisgarh) and Bhanegaon (MP)-Dhamdha (Chhattisgarh) would become interstate lines and interstate metering points would be shifted accordingly.

11.0 **Constitution of Western Region Committee on Transmission (WRSCT)**

- 11.1 CEA stated that Ministry of Power vide its order no. 15/3/2017 – Trans dated 13.04.2018 (copy enclosed) has constituted the “Western Region Standing Committee on Transmission” with the following ToR (Terms of Reference):

- i) Evolve and finalize System Strengthening Schemes for removal of operational constraints and transfer of surplus power through inter-Regional corridors.
- ii) Examine the proposals for transmission System for Access/ Connectivity Applications.
- iii) Examine the Associated Transmission System with Electricity Generators.
- iv) Review the up-stream and down-stream network associated with Transmission schemes.
- v) Examine and evaluate the intra-State transmission proposals.

- 11.2 Accordingly, the composition of the **Western Region Standing Committee on Transmission (WRSCT)** is as given below:

S. No.	Member of the Committee	
1	Member (PS), CEA	Chairperson
2	COO, CTU (PGCIL)	Member
3	Director (System Operation), POSOCO	Member
4	Chairman & Managing Director, Maharashtra State Electricity Transmission Company Ltd. Maharashtra	Member
5	Managing Director, Gujarat Energy Transmission Corporation Ltd, Gujarat	Member
6	Managing Director, Madhya Pradesh Power Transmission Company Ltd, Madhya Pradesh	Member

7	Managing Director, CSPTCL, Chhattisgarh	Member
8	Chief Engineer, Electricity Department, Goa	Member
9	Secretary (Power), Daman & Diu	Member
10	Secretary (Power), Dadra Nagar & Haveli	Member
11	Member Secretary of WRPC	Member
12	Chief Engineer, PSP&A-I, CEA	Member Secretary

WRSCT shall meet at least once in three months.

11.3 Members noted the constitution of WRSCT and it was agreed that the next meeting of Standing Committee with above members would be considered as 1st meeting of Western Region Standing Committee on Transmission.

12.0 Operational feedback of NLDC for Jan'2018 – Mar'2018

12.1 Transmission line constraints

S. No	Corridor	Constraints	Deliberation in 43 rd Meeting of SCPSPWR
1.	400 kV Padghe–Kudus–Kala D/c corridor Antecedent Conditions High demand of Maharashtra of the order of 18500 – 22000 MW during morning peak and low generation at Parli, RGPPL, Jaigad and nil generation at SSP	400 kV Padghe–Kudus–Kala corridors carrying more than 500 MW in each ckt. The corridor is n-1 non-compliant.	Commissioning of 400 kV Aurangabad–Boisar D/C (Oct' 2017), 765 kV Aurangabad–Padghe D/C (Dec, 2017), 400 kV Padghe–Kudus–Kala D/C (Dec' 2017) relieved the loading of 400 kV Babhleshwar–Padghe D/C. However, one ckt of 765 kV Aurangabad–Padghe is kept out of service to control the loading on Padghe–Kudus–Kala D/C. POSOCO intimated that presently, 2x500 MVA 400/220 kV Kudus ICTs are idle charged in the absence of 220 kV downstream network. MSETCL informed that the downstream network of Kudus S/s may be completed by March, 2019 and 400 kV Kudus–Babhleshwar D/c would be completed by May, 2019.
2.	400kV Padghe–Kalwa D/c Antecedent Conditions High loading is observed in general during High demand in Mumbai system.	Facilitating outage in this corridor in normal days is difficult. Outages are being planned only on Saturday/Sundays with planned load shedding.	In order to relieve the loading on this line additional feed to Mumbai may be expedited i.e. Commissioning of 400 kV Vikhroli–Kharghar 400 kV D/C and / or the transmission system associated Navi Mumbai would relieve the loading of Padghe–Kalwa 400 kV D/C.

S. No	Corridor	Constraints	Deliberation in 43 rd Meeting of SCSPWR
3.	765/400 kV ICT at Tirora and 765/400 kV ICT at Akola II Antecedent Conditions When generation at APML Tirora is above 2400 MW and Rattan India (5 X 270 MW) is in service.	With Single ICT at Tiroda and Akola, the system is not N-1 compliant for any trippings at 765kV Ektuni. At present tripping of Akola and Tiroda ICT is managed by SPS actions.	43rd SCM Discussion: In the meeting, MSETCL stated that the existing 1x1500 MVA ICT is meeting the n-1 criteria and this 1500 MVA ICT consists of 3 no. of single phase transformers each of 500 MVA along with one spare unit (500 MVA). Even in case of failure of any single phase transformer, the same can be replaced within few hours. Therefore, no additional 1500 MVA ICT is planned at Tirora & Akola II S/s. Further, in order to provide power evacuation beyond Warora S/s, LILO of Chandrapur – Parli 400 kV S/C at Warora S/s is planned.
4.	220 kV Boisar (PG) – Boisar (M) T/C Antecedent Conditions With high demand of Mumbai and less generation at 220kV Tarapur, Trombay and Dahanu	The Ckts are loaded above 200MW each and managed with load trimming scheme implemented by MSETCL. With the commissioning of 400kV Aurangabad-Boisar D/C and less internal generation in Mumbai, the loading has further increased. One ckt of 400kV Aurangabad-Boisar D/C is kept open to control the loading on 220kV Boisar–Boisar ckts.	43rd SCM Discussion: MSETCL stated that additional (4 th) Ckt. between Boisar (PG)–Boisar (M) (LILO of Boisar–Borivali at Boisar (PG)) is scheduled for June, 2018. It was also intimated that 1x500 MVA, 400/220 kV 4 th ICT at Boisar (PG) was commissioned by PGCIL 02.05.2018.
5.	220 kV Pune (PG)–Talegaon (M) D/C Antecedent Conditions High Loading	Generally the lines are loaded above 250 MW and n-1 non-compliant. One ICT at Pune PG kept out to control the line loading.	43rd SCM Discussion: MSETCL intimated that earlier the load of Chinchwad area fed through Talegaon (PG)–Talegaon (M)–Urse 220 kV D/C and Urse–Chinchwad 220 kV S/C. Subsequently, Talegaon (PG)–Talegaon (M)–Urse–Chinchwad 220 kV D/C is planned & under implementation and this line has been completed up to Urse S/s. Thus, Pune (PG) and Talegaon (M) have 4 no. of 220 kV lines however, 2 no. of Talegaon (PG)–Talegaon (M) are kept open to restrict the loading on Urse–Chinchwad 220 kV S/C. Therefore, the loading of 220 kV Pune (PG)–Talegaon (M) D/C is high. It was intimated that Urse–Chinchwad 220 kV D/C would be expected to get completed by Dec, 2018.
6.	400 kV Chandrapur–Chandrapur (II) D/C Antecedent Conditions	Skew dispatch at Chandrapur leading in critical loading on these lines resulted in restriction of flow on Chandrapur–Padghe HVDC to ensure N-1 of lines, which in resulted in less reliability and low voltages at	43rd SCM Discussion: POSOCO suggested to plan additional inter-connection between Chandrapur (II)–Chandrapur. MSETCL informed that due to water shortage Old Chandrapur plant is under shutdown.

S. No	Corridor	Constraints	Deliberation in 43 rd Meeting of SCSPWR
	When generation at Chandrapur is less and Chandrapur (II) is high	Parli, Lonikhand, Padghe in the month of March.	It was agreed to carry out joint studies to find a solution.
7.	400 kV Bina–Shujalpur D/c Antecedent Conditions 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 time in Q3 (17-18). Although MP demand was less in Q4(17-18), power flow on these ckts was above 550MW /ckt for 20% of the time as APL Mundra generation in Gujarat area is very less.	43rd SCM Discussion: The line flows through 400 kV Bina–Shujalpur D/C is high because with the commissioning of RAPP–Shujalpur 400 kV D/C, the power flowing from Shujalpur (WR) to RAPS (NR). With the commissioning of Bipole of Champa–Kurukshetra, loading on Bina–Shujalpur D/C has reduced slightly. Commissioning of RAPS 7 & 8 generation would relieve the loading of this line. PCIL representative stated that RAPS 3 & 4 units are expected to be commissioned by June, 2020. CEA suggested Shujalpur 400 kV S/s may be interconnected with another source like Indore or Bhopal to address the high loadings on Bina – Shujalpur 400 kV D/C.
8.	220 kV Gwalior-Malanpur D/c & 220 kV Gwalior PG–Mahalgaon D/c Antecedent Conditions High loading is observed in general during Rabi season MP when demand is more than 8500 MW.	The system is n-1 insecure. Presently system is being managed by load trimming scheme by MPPTCL for overloading of 220kV Gwalior-Malanpur D/C and overloading of 220/132kV Mahalgaon ICTs. 220kV Gwalior-Mahalgaon D/C is loaded more than 250MW for 70% of the time.	Commissioning of 400/220 kV Morena (TBCB) S/S, 400 kV Gwalior–Morena D/C, LILO of one circuit of Malanpur–Mehgaon 220 kV line at 400/220 kV Morena (TBCB) S/s and LILO of one circuit of 400/220 kV Morena (TBCB)–Sabalgarh (220 kV line) at 220kV Morena S/s of MPPTCL would help to relieve the loading on 220 kV lines. 43rd SCM: 400/220 kV Morena S/s (CWRTL) has been completed in February, 2018. The following elements likely to be commissioned in May 2018: <ul style="list-style-type: none"> • 400/220 kV Morena S/s along with Gwalior–Morena 400 kV D/C line • LILO of Malanpur–Mehgaon 220 kV line at 400/220 kV Morena S/s. • Morena (TBCB) 400- Morena 220 kV S/s 220 kV S/C line (MPPTCL Sabalgarh 220 kV DCDS line (92 km) with LILO of one circuit of Morena (TBCB) 400-Sabalgarh 220 kV line at (0.5Km) 220 kV Morena MPPTCL S/s)

S. No	Corridor	Constraints	Deliberation in 43 rd Meeting of SCSPWR
9.	400 kV Bhachau–Versana D/c Antecedent Conditions With skewed dispatch in Gujarat system with almost nil generation at APL Mundra, Vadinar and full generation at CGPL	High loading of 400kV Bhachau - Versana D/C (short lines-10km each) are observed due to reverse power flow to APL from Versana with very less generation at APL. 400kV Versana – Hadala or Versana – Zerda lines are opened to control the Bachhau – Versana loading to 575 MW/ckt to ensure N-1 compliance. Tripping of the D/C would critically overload Bhachau ICTs.	43rd SCM Discussion: The power flow in this corridor is from Bhachau to Mahendragarh through Bhachau–Versana–APL AC lines and APL–Mahendragarh HVDC line. POSOCO intimated that recently, testing has been carried out for reverse power flow on HVDC Mundra–Mahendragarh Bi-pole i.e. power flown from Mahendragarh to Mundra. This has relieved the loading of Bachau–Versana 400 kV D/C to the great extent. It was also agreed that the issue of high loading of 400 kV Bhachau – Versana D/C line would be studied separately with CEA, POSOCO, GETCO and CTU.
10.	220 kV Navsari (PG)–Navsari (GETCO) D/c Antecedent Conditions With High generation Ukai, Kawas Jhanor.	High loading observed more than 220 MW and N – 1 non-compliant	GETCO has planned up gradation of Vav 220 kV S/s to 400 kV S/s with LILO of one Ckt of Jhanor–Navsari 400 kV D/C at Vav S/s & LILO of one Ckt of Ukai–Kosamba 400 kV D/C at Vav S/s. This would results in power flows from Vav to Popanda / Sachin, thus relieves loading on 220 kV Navsari (PG)–Navsari Ckts. 220 kV Navsari–Bhesthan (Popada) D/C was to be implemented by DGENTPL under TBCB. 43rd SCM Discussion: M/s DGENTPL is not taking up the implementation of the scheme. As agreed in a meeting held on 23.01.2018 among CTU, GETCO & NLDC, CTU & GETCO may explore the transmission scheme to reduce the over loading of Vav–Popadiya, Vav–Navsari, Navsari–Navsari (PG).
11.	220 kV Jhanor (NTPC)–Haldarwa D/c Antecedent Conditions High loading is observed in general when more than three machines are in service at Jhanor NTPC	The 220kV Jhanor-Haldarwa D/C lines (short lines-13 kms) are highly loaded and not N-1 compliant. Many reliability measures like bus split at Jhanor has to be taken to facilitate the shutdown of one line.	The LILO of 220 kV Haldarwa–Jagadia S/C line LILO at Jhanor S/s was agreed in 36 th meeting of SCSPWR and this would relieve the loading. In the 35 th WRPC meeting GETCO had intimated that the works associated with line have been already completed, however, the 220 kV bays at Jhanor are expected by Sep, 2018, thus the LILO of 220 kV Haldarwa–Jagadia S/C line at Jhanor S/s would be completed by Sep, 2018.
12.	220 kV Amreli-Sawarkundla D/C	For 50% of the time, lines were loaded more than 250 MW (total) and N-1 non-	GETCO intimated that the Sawarkundla 220 kV S/s has also interconnected with 4 Generators (Pipavav & BECL) and if any of

S. No	Corridor	Constraints	Deliberation in 43 rd Meeting of SCSPWR
	<p>Antecedent Conditions</p> <p>High loading during Rabi season and when generation at Padva BECL and GPPC is not available in Gujarat system.</p>	compliant.	<p>these 4 units is in service, the loading on these lines would be normal. Further between Amreli and Timbdi, there are two parallel paths (Amreli– Suwarkundla–Dhokadva–Timbdi and Amreli–Visavdhar–Timbdi 220 kV D/C). However, the power flow on Amreli–Suwarkundla–Dhokadva–Timbdi path is high due to short length. So the loading on 220 kV Amreli-Sawarkundla D/C is high.</p> <p>Further, in absence of all 4 units, the line loadings on 220 kV Amreli–Sawarkundla D/C would be high but the same is managed by opening Dhokadva–Timbdi 220 kV line, so that power of Timbdi would met through Amreli–Visavdhar–Timbdi 220 kV line.</p>
13.	<p>220 kV Ukai -Mota D/c</p> <p>Antecedent Conditions</p> <p>When Ukai generation is high at 220kV side.</p>	The lines are loaded above 250MW (total) for 50% of time and n – 1 non-compliant	<p>43rd SCM Discussion: GETCO has planned 400 kV Vav S/s with LILO of one Ckt of Jhanor – Navsari 400 kV D/C at Vav S/s & LILO of one Ckt of Ukai-Kosamba 400 kV D/C at Vav S/s. This would relieve the loading of this line.</p> <p>GETCO stated that 400 kV Vav S/s would be commissioned by March, 2019.</p>
14.	<p>220 kV DSPM–Korba (E)</p> <p>Antecedent Conditions</p> <p>With full generation in DSPM and less generation in Korba East and Budhipadar</p>	DSPM (2X250 MW) generation was planned with LILO of one ckt of existing 220 kV Korba West-Korba East and 220kV Suhela-Banari line. No additional evacuation was planned for DSPM evacuation. This has resulted in overloading of 220kV DSPM-Korba East line when the power flow is towards Budhipadar end. SLDC CSPTCL raised concerns of forced backing down at DSPM even when they were overdrawing from the grid	<p>43rd SCM Discussion: CSPTCL stated that LILO of 220 kV Siltara – Korba (E) S/C at DSPM is under implementation, which would be completed by Aug, 2018. However, the 2 no. of 220 kV bays at DSPM have to be provided by M/s CSPGCL, which are expected to be ready by December, 2019.</p> <p>CSPTCL to take up the matter with CSPGCL to expedite the implementation of two no, of 220 kV bays at DSPM for LILO of 220 kV Siltara–Korba (E) S/C at DSPM.</p>
15.	<p>220kV Raigarh-Raigarh D/C</p> <p>Antecedent Conditions</p> <p>All time</p>	The lines are loaded above 200MW always and N-1 non-compliant.	<p>43rd SCM Discussion: CSPTCL stated that the LILO of 220 kV Budhipadar–Raigarh S/C line at Raigarh (PG) was completed recently, however, the metering of the same is yet complete and the same is expected to be completed by August, 2018.</p>

12.2 ICT Constraints

S. No	ICT	Constraints	Remedial measures
1	2x315 MVA 400/220 kV Chakan ICTs Antecedent Conditions 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. MSETCL has implemented load trimming scheme to take care of overloading.	43rd SCM: MSETCL intimated that Lol has been placed for additional 400/220 kV, 315 MVA ICT at Chakan S/s and the same is expected to be commissioned by March, 2019.
2	(2x315+1x500 MVA) 400/220 kV Parli (M) ICTs Antecedent Conditions With high demand in Maharashtra and low generation at Parli	It is observed that loading on these ICTs are high and n-1 non-compliant. MSETCL has implemented load trimming scheme to take care of overloading.	The commissioning of Nanded 400/220 kV S/s with 2x500MVA ICTs and 220 kV lines (commissioned in March, 2016) relieved the loading of ICTs at Parli S/s to the some extent. 43rd SCM: ICTs and bays at Parli (PG) are under implementation by POWERGRID and are expected to be commissioned by Jun/July'18. MSETCL stated that LILO of 220 kV Parli–Harangul S/c at Parli (PG) is expected to be commissioned by Dec, 2018 and LILO of Osmanabad (M)–Parli 220 kV S/c at Parli (PG) is expected to be commissioned by Sep, 2018. This would relieve the loading of ICTs at Parli (M) S/s.
3	2x315+500 MVA 400/220 kV Kolhapur (MS) ICTs and 3x315 MVA 400/220 kV Karad ICTs Antecedent Conditions 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 when wind generation is very low in Southern Maharashtra. MSETCL thereafter planned and implemented load trimming scheme.	43rd SCM: MSETCL intimated that the LILO of 220 kV Vita-Miraj S/C line at Alkud S/s and 220 kV Jet–Mhaisal S/C line at Alkud S/s are under implementation and these are expected to be commissioned by Sep 2018 and March, 2019 respectively. Commissioning of these 220 kV network at Alkud S/s would relieve the loading ICTs at Kolhapur S/s and Karad S/s. MSETCL informed that one 315 MVA ICT at Kolhapur would be replaced by 500 MVA.

S. No	ICT	Constraints	Remedial measures
4	2x500 MVA 400/220 kV Sholapur (M) ICTs Antecedent Conditions With High Demand in Maharashtra system above 18500 MW	It is observed that loading on these ICTs are high and N-1 non-compliant. MSETCL has implemented load trimming scheme to take care of overloading.	Some loads of Sholapur (M) i.e. Lamboti has to be shifted to Sholapur (PG), which would relieve the loading of ICTs at Sholapur (M) and ICTs at Sholapur (PG) can be loaded properly, which are underutilized. As an interim arrangement 400 kV Sholapur (PG)–Karad S/c line is being charged at 220 kV level as Sholapur (PG)–Jeur S/C line which relieved the loading on ICTs at Sholapur (M) S/s. 43rd SCM: MSETCL intimated that 3 rd 1x500 MVA 400/220 kV ICT is proposed at Sholapur (M), which is expected to be commissioned by March 2019.
5.	2x315 MVA 400/220 kV Wardha (PG) ICTs Antecedent Conditions With Commissioning of Koardi Units 3x660 MW.	The ICTs are loaded above 200 MW most of the time with the commissioning of Koradi stage 2.	The original transformation capacity of Wardha 400/220 kV S/s was 1130 MVA (2x315+1x500). As there were many generators connected at 220 kV of Wardha, loading on these transformers was is less, therefore, on request of Maharashtra, one ICT (of 500 MVA, 400/220 kV) was shifted to Sholapur (PG). 43rd SCM: MSETCL intimated that loading of ICTs at Wardha was increased as additional load (Pusad) is connected with Wardha S/s. Further, redistribution of loads is not feasible in this area and requested augmentation of Wardha (PG) by 400/220 kV 1x500 MVA ICT. It was agreed that proposal of ICT augmentation at Wardha would be jointly studied by CEA, CTU and MSETCL.
6.	2x500 MVA+1x600 MVA 400/220 kV Kalwa ICTs Antecedent Conditions With high demand in Maharashtra	With increased demand and low network augmentation in the area, the system is not N-1 compliant.	Additional source to Mumbai area would relieve the loading of these ICTS 400 kV Vikhroli–Kharghar 400 kV D/C and / or the transmission system associated Navi Mumbai. 43rd SCM: MSETCL intimated that 4 th 400/220 kV 500 MVA ICT at Kalwa S/s is expected to be commissioned by June, 2018.

S. No	ICT	Constraints	Remedial measures
7	2x315 MVA+1x500 MVA 400/220 kV Boisar ICTs Antecedent Conditions With low Generation at Tarapur – 1 & 2, Dahanu and high Mumbai demand	High loading is observed on these ICTs. One ckt of 400 kV Aurangabad – Boisar D/C is kept out to control loading on ICTs.	Load trimming schemes to be implemented by MSETCL for contingency of 500 MVA ICT. 43rd SCM: MSETCL stated that 4 th ICT of 500 MVA is commissioned on 02.05.2018
8	3x315 MVA 400/220 kV Bina ICTs Antecedent Conditions High Demand in MP	400/220 kV Bina ICT-1 is out of service from 15 th Jan'18 and ICT-2 is out of service from 14 th Feb'18. Now there is only one ICT at Bina (MP) and to manage its loading, load is transferred to Gwalior ICTs, which is causing overloading of ICTs at Gwalior.	43rd SCM: MPPTCL stated that 2 nd 315 MVA ICT was put into service on 02.05.2018 and 3 rd 315 MVA ICT would be put into service in June, 2018.
9	3x315 MVA 400/220 kV Gwalior (PG) ICTs Antecedent Conditions High Demand in Gwalior and nearby area and low generation in Auraiya	The ICTs are N-1 non-compliant. As the 2 no. of ICTs at Bina S/s are out of service, the loading on ICTs at Gwalior s/s has increased. Facilitating outage of Gwalior ICTs requires load shedding by MP in the present system operation.	43rd SCM: 400/220 kV Morena (TBCB) S/s has been completed in February, 2018. Some load of Gwalior (PG) has been transferred by LILO of Malanpur – Mehgaon 220 kV line at 400/220 kV Morena (TBCB) S/s and this would be completed in May, 2018. Further, 220 kV Morena (TBCB) – Morena (MP) - Sabalgarh D/C is planned and the same is under implementation. The 220 kV Morena (TBCB) – Morena (MP) D/C would be commissioned in May, 2018 and Morena (MP) – Sabalgarh 220 kV D/C is expected to be commissioned by Dec, 2018. The 2 nd 315 MVA ICT at Bina S/s was put into service on 02.05.2018 and 3 rd 315 MVA ICT would be put into service in June, 2018. These would relieve the loading of ICTs Gwalior. Further, commissioning of Morena (TBCB) 400/220 kV in May, 2018 would relieve these ICTs after establishing all interconnections with it.

S. No	ICT	Constraints	Remedial measures
10	3x315 MVA 400/220 kV Bhopal ICTs Antecedent Conditions Madhya Pradesh meeting high demand of above 9000 MW	It is observed that the loading on ICTs at Bhopal (3 x315MVA) are above 200 MW and additional ICT is already proposed.	220 kV Bhopal–Shujalpur D/c lines are kept open by SLDC MP to control the ICT's loading. 43rd SCM: 1x315 MVA, 400/220 kV ICT (4 th) at Bhopal S/s was commissioned on 17.04.2018.
11	315 MVA+500 MVA 400/220 kV Itarsi ICT Antecedent Conditions Madhya Pradesh meeting high demand of above 9000 MW	System is not N-1 compliant for tripping of 500 MVA ICT.	43rd SCM: Additional (3 rd) 500 MVA, 400/220 kV ICT is planned at Itarsi 400/220 kV S/s. Augmentation of existing transformation capacity of 815 MVA, at 400/220 kV Itarsi (PG) S/S by 1x500 MVA, thus total transformation capacity would be 1315 MVA (1x315 MVA+2x500 MVA).
12	2x315 MVA 400/220 kV Dehgam ICTs Antecedent Conditions High demand in Gujarat and less generation at Wanakbori.	It is observed that the loading on ICTs at Dehgam (2x315 MVA) are above 180 MW and additional ICT has to be proposed.	43rd SCM: 1x500 MVA, 400/220 kV ICT at Dehgam S/s has already been planned and would be commissioned in May, 2018.
13	2x315 MVA 400/220 kV Kala ICTs Antecedent Conditions With commissioning of 765 kV Aurangabad PG – Padghe D/c, 400 kV Padghe–Kala–Kudus D/c corridor and increased load of DNH	It is observed that ICTs are loaded above 250 MW n-1 non-compliant. One ckt of 765 kV Aurangabad–Padghe is opened to control loading of ICT at Kala 400/220 kV S/s.	41st SCM Decision: 3 rd ICT of 500 MVA, 400/220 kV is planned and expected to be commissioned in September, 2018.

12.3 **Nodes experiencing high voltage at 400 kV level:** Kalwa, Aurangabad (M), Chandrapur, Dhule, Karad, Mapusa, Rajgarh, Khandwa (PG), Wardha (PG), Raigarh (PG), Solapur (PG), Solapur (M), Dehgam, Seoni, Sami and GPEC. In this regards it was mentioned that bus reactors were recently commissioned at various nodes and some more reactors are already planned for various high voltage nodes like Aurangabad

765 kV, Chandrapur-II, Dhule, Balsane, Rajgarh, Khandwa, Wardha 765 kV, Solapur 765 kV, Raigarh 765 kV, Nagda etc., and it was observed that with already planned reactors in 2021–22 timeframe the voltage at above substation would be within limits.

12.4 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 on 220 kV Pune (PG) –Talegaon D/C lines	<p>Additional 220 kV outlets from Pune (PG) to be expedited by MSETCL.</p> <p>43rd SCM Discussion: MSETCL intimated that earlier the load of Chinchwad area fed through Talegaon (PG)–Talegaon (M)–Urse 220 kV D/C and Urse–Chinchwad 220 kV S/C. Subsequently, Talegaon (PG)–Talegaon (M)–Urse–Chinchwad 220 kV D/C is planned & under implementation and this line has been completed up to Urse S/s. Thus, Pune (PG) and Talegaon (M) have 4 no. of 220 kV lines however, 2 no. of Talegaon (PG) – Talegaon (M) are kept open to restrict the loading on Urse–Chinchwad 220 kV S/C. Therefore, the loading of 220 kV Pune (PG) – Talegaon (M) D/C may be the concern.</p> <p>The Talegaon (PG)–Hingewadi 220 kv D/C is expected to complete by Dec, 2018. Therefore, this ICT may be taken up into service as when either of the Urse–Chinchwad 220 kV D/C or Talegaon (PG)–Hingewadi 220 kV D/C gets commissioned.</p> <p>It was intimated that Urse–Chinchwad 220 kV D/C and Pune (PG)–Hingewadi 220 kV D/C would be expected to get completed by Dec, 2018.</p>
2	400/220 kV, (2x 315+1x500) MVA Sholapur (PG) ICTs	2x500 MVA Sholapur (MS) ICTs loading will reduce if loads are shifted to Sholapur PG ICTs	<p>South Sholapur has been connected which is around 100 MW. Further 2x500 MVA Sholapur (M) ICTs are heavily loaded. Therefore, loads from Sholapur (M) need to be transferred to Sholapur (PG) for reducing ICT loading at Sholapur (M) and better utilization of ICTS at Sholapur (PG).</p> <p>Present: Load connected to Sholapur (PG) is in tune of 200 – 250 MW. The 400 kV Karad -</p>

Sl. No	Transmission Element (s) opened	Overloaded corridor	Remarks
			<p>Sholapur (PG) S/C has been reconfigured and made as an 220 kV Sholapur (PG) – Jeur S/C line as an interim arrangement.</p> <p>43rd SCM: MSETCL intimated that 220 kV Sholapur (PG)–Bale D/c line is expected to commissioned by Dec'18 (in the timeframe of commissioning of 2nd unit at Sholapur).</p> <p>MSETCL is requested to expedite the commissioning of Sholapur (PG) – Bale 220 kV D/C and restore 400 kV Sholapur (PG)–Karad S/C as 2nd unit of Sholapur NTPC is expected to commission soon.</p>
3.	400/220 kV 1x500 MVA Alkud ICT	Idle charged in the absence of 220kV downstream network.	<p>The Loading on these ICTs will help in reducing the loading on Kolhapur (M), Karad and Sholapur (M) ICTs. However, 220 kV System is not yet ready.</p> <p>43rd SCM: MSETCL intimated that the LILO of 220 kV Vita–Miraj S/C line at Alkud S/s and LILO of 220 kV Jath–Mhaisal S/c line at Alkud S/s are expected to be commissioned by Sep 2018 and March, 2019 respectively.</p>
4	400/220 kV 2x500 MVA ICTs at Vadodara GIS	Idle charged in the absence of 220 kV downstream network.	<p>Power flow on these ICTs will help in reducing loading on ICTs of Asoj S/s and other nearby Substations.</p> <p>43rd SCM: GETCO has informed that 220 kV Venkatapura–Vadodara D/C line commissioned in March, 2018 and 220 kV Jhambua–Vadodara D/C line is expected to be commissioned by June, 2019.</p>
6	400/220 kV 2x315 MVA ICTs at Betul GIS	ICTs at Betul are underutilized and ICTs at Itarsi (PG) are highly loaded. The loading of 220 kV Betul – Betul GIS D/c lines is very low.	<p>Shifting of load on ICTs at Betul would relieve the loading of ICTs at Itarsi S/s</p> <p>43rd SCM: LILO of Sarni – Pandhurna 220 kV line at Betul GIS is under implementation and the same is expected to commissioned by Dec'18.</p> <p>Additional (3rd) 1x500 MVA, 400/220 kV ICT at</p>

Sl. No	Transmission Element (s) opened	Overloaded corridor	Remarks
			Itarsi S/s is planned.
7.	400/220 kV, 2x500 MVA ICTs at Kudus MSETCL	Idle charged in the absence of 220 kV downstream network.	The ICT 1 (Charges in Dec, 2017) and ICT – 2 (charged in March, 2018) each of 500 MVA are idle charged at Kudus S/s. MSETCL representative intimated that LILO of both 220 kV Padghe–Wada S/C and 220 kV Wada–Kolshet S/C at Kudus S/s are planned and the same are expected to commissioned by March, 2019.
8.	400 kV Raita–Jagdalpur one Ckt and 400/220kV ICT (1x315 MVA) at Jagadalpur CSPTCL	Idle charged in the absence of 220kV downstream network.	400/220 kV ICT-1 at Jagdalpur idle charged since Sept, 2017. CSPTCL stated that 220 kV Barsoor–Jagadalpur D/C line has been planned and the same is under implementation. It was also mentioned that this line is passing through LWE (Left Wing Extremist) affected area, thus, its implementation getting delayed, however, the same is expected to be commissioned by Dec, 2018.
9.	DGEN (400/220 kV, 3 X 315 MVA) ICTs	Idle charged in the absence of 220 kV downstream network.	GETCO intimated that ICTs at DGEN are planned to meet the loads of DGEN area only.
10.	400 kV Essar Vadinar – Bhachau D/c lines	Lines are idle charged from Bhachu PG.	The generation (Phase II & III) at Essar Vadinar couldn't be realized and generating switchyard is not available for the termination of 400 kV Essar Vadinar – Bhachau D/c lines at Essar Vadinar.

12.5 Delay in transmission lines affecting grid operation adversely

S. No.	Transmission Corridor	Scheduled Commissioning Date	Actual/ Likely Commissioning Date	Deliberations held in 43 rd meeting of SCPSPWR
1.	400 kV Essar Vadinar –Amreli D/C	July'13	Mar'19	<p>Presently, the power of Essar Vadinar (phase I) is evacuated through Essar Vadinar – Hadala 400 kV D/C line. Completion of 400 kV Essar Vadinar – Amreli D/C would complete evacuation system of Essar Vadinar and relieve Hadala – Chorania S/C.</p> <p>However, interim arrangement with completed portion of Amreli – Vadinar one ckt terminated at Jetpur and one ckt at Hadala relieved loading of Chorania – Kasor.</p> <p>GETCO intimated that 70 % of the line has been completed, however, further progress of the line affected due to contractual issues and contract has been terminated. A fresh LoA is issued on 05.03.2018 and the line expected to be commissioned by Aug, 2019.</p> <p>GETCO was requested to expedite the implementation of this line.</p>
2.	400 kV Amreli – Kasor D/C	June'13	Dec'18	<p>This would relieve loading of 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.</p> <p>GETCO intimated that the implementation of the line involves severe RoW problems and the same is expected to be commissioned by Mar, 2019.</p> <p>GETCO was requested to expedite the implementation of this line.</p>
3.	400 kV Essar Mahan – Bilaspur Pooling Station D/C	Mar13	June'18	<p>This would complete transmission system planned for evacuation of Essar Mahan (2 X 600 MW) which is at present connected with LILO of one circuit of 400 kV Korba-V'chal D/c line. 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</p>

I/1241/2018

S. No.	Transmission Corridor	Scheduled Commissioning Date	Actual/ Likely Commissioning Date	Deliberations held in 43 rd meeting of SCPSPWR
				from Korba. This interim connectivity has also resulted in poor maintenance of line and bay equipment as several time outages are being cancelled as generator. Line expected to be commissioned by June 2018
4.	400 kV Bableshwar–Kudus D/C and associated 220 kV system	Mar'16	May'19	Delay in commissioning of 400 kV Bableshwar–Kudus D/C, has resulted in high loading on 400 kV Padghe–Kudus–Kala D/C. MSETCL informed that commissioning of 400 kV Bableshwar – Kudus D/C line may relieve the loading of Padghe–Kudus 400 kV D/C, however, this would further increase the loading of Kudus – Kala 400 kV D/C. It was also intimated that the downstream network of Kudus S/s would be completed by March, 2019 and 400 kV Kudus – Bableshwar D/c would be completed by May, 2019.
5.	400 kV KSK-Champa 2xD/C	2015	Aug'18	400 kV KSK–Champa PS Ckts 3 & 4 were charged in Oct, 2016. Presently 3 rd Unit at KSK (Unit-2 of 600 MW) has declared COD on 28.02.2018. AS intimated in JCC, 2 nd D/C would be commissioned by Dec, 2019.

(iii) Delay in Generation affecting grid operation adversely

Sl. No	Generating Unit	Area/ State	Proposed Commissioning Date	Actual/ Likely Commissioning Date	Operational Constraint Caused
1	Kakrapar 3&4 (2x700 MW)	South Gujarat	2015	2019	400 kV Kakrapar–Vapi D/C and Kakrapar–Navsari D/C are commissioned prior to the commissioning of at 400 kV KAPP switchyard (unit 3 & 4 of KAPS are yet

					<p>get commission). This has resulted in only loop flows and the lines are underutilized. Commissioning of KAPP 3 & 4 units would help in feeding Vapi and Navsari areas.</p> <p>43rd SCM: NPCIL representative intimated that U-3 would be commissioned by December, 2018 and U-4 would be commissioned by June, 2019.</p>
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13.0 Progress of downstream network whose terminating bays are under construction by PGCIL

13.1 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 endeavour 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.”

13.2 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:

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

I/1241/2018

S. No.	ISTS Substation	Voltage ratio in use	Status of Bays		220kV Lines for unutilized bays	Status As per 43 rd SCM
			Total	Unutilized		
1	Raipur (PG)	3x315 MVA, 400/220 kV	6	2 no of bays ready since 01.07.2011 (WRSS-6)	Raipur (PG)–Doma 220 kV D/c	The line commissioned on 30.11.2017
2	Mapusa (PG)	3x315 MVA, 400/220kV	4	2 no of bays ready since : 01.11.2013	Mapusa–Cuncolin 220 kV D/c	No representation from Goa
3	Pirana	2x315 MVA, 400/220kV	4	2 no of bays ready since 19.03.15 (WRSS-6)	Pirana–Barjadi 220 kV D/c	Severe RoW issues involved as it involves Ahmedabad area. The scheduled commissioning of line is uncertain
4	Boisar	2x315 +500 MVA, 400/220 kV	6	1 Bay ready since 30.05.15	Boisar–Borivali 220 kV line S/c	June, 2018
5	Magarwada	2x315 MVA, 400/220 kV	4	2 no of bays ready since 03/11/14	Magarwada–Ringanwada 220 kV D/c	Commissioned on March, 2018
6	Wardha	2x315 MVA, 400/220 kV	6	2 no of bays ready since 01.02.2011	Wardha–Yavatmal 220 kV D/C line	Dec, 2018
				2 no of bays ready since 01.01.2012	Wardha–Bhugaon 220 kV S/c	Commissioned on August 2016
					Wardha–Pusad220kV S/c	Commissioned on August 2016
7	Sholapur	2x315 +1x500 MVA, 400/220 kV	6	2 no of bays ready since 01.04.2011	Sholapur–Bale (M) 220kV D/c	Dec, 2018
				2 no of bays ready since 02.11.2015	Sholapur–Narangwadi 220 kV D/c line	Dec, 2019
8	Damoh	1 x 500 MVA 400/220 kV	6	2 no. of bays ready since Nov – 2016	LILo of 2 nd 220 kV circuit of Damoh (MPPTCL)–Sagar 220 kV line at Damoh (PGCIL) 400kV S/s. (1Km)	Commissioned on 28.08.2017

B. 400 kV line bays:

S. No.	ISTS Substation	Proposed Bays	Commissioning Schedule	Lines emanating from Substation
1	Indore (PG)	2	Jul, 2018	Indore (PG)–Ujjain 400 kV D/c line MPPTCL representative intimated that the line would be completed by Dec, 2019.

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

S. No.	ISTS Substation	Proposed Bays	Commissioning Schedule	220 kV Lines emanating from Substation	Status of 220kV lines as per 43 rd SCM
1	Betul GIS 2x315 MVA, 400/220 kV	4	Commissioned	Betul (PG)–Betul D/C 220 kV line (3 Km)	Completed in July, 2017
				LILO of Sarni-Pandhurna 220kV line at Betul GIS (PGCIL) 400 kV S/s (41 Km).	Dec, 2018
2	Morena (TBCB) 2 x 315, 400/220 kV	4	May'18	LILO of one circuit of Malanpur – Mehgaon 220kV line at Morena (TBCB) 400kV S/s (8Km from Loc. No.12).	To be commissioned in May 2018
				Morena (TBCB) 400-Sabalgarh 220 kV DCDS line (92 km) with LILO of one circuit of Morena (TBCB) 400-Sabalgarh 220 kV line at Morena 220 kV S/s of MPPTCL (0.5Km)	To be commissioned in May 2018
3	Navi Mumbai 2 x 315, 400/220 kV	4	Bays ready since Mar'14 (WRSS-V)	LILO of Apta–Taloja and Apta-Kalwa section of the Apta-Taloja/Kalwa 220 kV D/c line at Navi Mumbai (PG)	TBCB
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)	Dec, 2018
				(ii) Remaining 2 Nos. feeders from Indore (PGCIL) 765kV S/s shall be intimated at later stage	Yet to plan
5	Itarsi (PG) 1x500	2	Commissioned	LILO of 2 nd 220kV circuit of	Completed on

S. No	ISTS Substation	Proposed Bays	Commissioning Schedule	220 kV Lines emanating from Substation	Status of 220kV lines as per 43 rd SCM
1	Betul GIS 2x315 MVA, 400/220 kV	4	Commissioned	Betul (PG)–Betul D/C 220 kV line (3 Km)	Completed in July, 2017
				LILO of Sarni-Pandhurna 220kV line at Betul GIS (PGCIL) 400 kV S/s (41 Km).	Dec, 2018
	MVA, 400/220 kV		in Jul'17. (WRSS-14)	Itarsi (MPPTCL)–Hoshangabad 220 kV line at Itarsi (PGCIL) 400 kV S/s	09.08.2017
6	Parli (PG) 2x500 MVA, 400/220 kV	4	Jul'18 (WRSS-16)	LILO of Parli–Harangul 220 kV S/C	Dec, 2018
				LILO of Osmanabad (MS) – Parli 220 kV S/C	Sep, 2018
7	Mapusa (PG) 3X315 MVA, 400/220	2	Jul'18 (WRSS-16)	Mapusa–Tuem 220 kV D/c	No representative from Goa
8	Satna (PG) 1x500MVA, 400/220kV	2	Commissioned in Oct'17. (WRSS-16)	LILO of one circuit of Satna (MPPTCL) - Chhatarpur 220 kV line at Satna (PGCIL) 400 kV S/s (3Km)	Line completed in Oct, 2017
9	Vadodara GIS 2 x 500 MVA, 400/220 kV	4	Commissioned	220 kV Venkatpura – Vadodara D/C line	Commissioned in Mar, 2018
				220 kV Jhambua – Vadodara D/C Line	June, 2019
10	Navsari 2x315MVA + 1x500 MVA, 400/220 kV	2	May'18	Navsari – Bhestan 220kV D/c line	Uncertain
11	Rewa PS 3x500 MVA, 400/220kV	6	Substation charged (ICT-I and II)	Rewa UMSP – Rewa PS 220kV 3xD/c line	As per the PSPM report of CEA, the lines are ready for commissioning
12	Khandwa 1x500 MVA, 400/220 kV	2	Sep'19	Khandwa – Chamera 220 kV D/c line	June, 2018

14.0 Connectivity application of 250 MW as Bulk Consumer for BALCO

I/1241/2018

- 14.1 CEA stated that M/s BALCO has been granted ISTS connectivity for 4x300 (1200) MW as IPP through BALCO–Dharamjaygarh 400 kV D/C (initially agreed as BALCO–Champa PS 400 kV D/C later modified as BALCO–Dharamjaygarh 400 kV D/C), which was later modified to 1335 MW (**4x300+2x67.5**) as Generator (IPP) vide intimation dated 29.05.2012. Subsequently, in addition to this, connectivity was granted to BALCO for 675 (**4x135+2x67.5**) MW of Captive Generation through the above same line vide intimation dated 13.06.2013, thus the total connectivity granted to M/s BALCO through above 400 kV D/C was 2010 MW.

BALCO vide letter dated 21.10.2016 requested for a second 400 kV D/C line to improve the reliability, to meet RPO obligation, to have separate point of connection for import (to meet the demand of CPP in case of deficit) and export (to meet LTA) etc., This was deliberated in 41st meeting of SCPSPWR held on 21.12.2016, in which M/s BALCO intimated that it has proposed to segregate its plant as 600 MW IPP and 1410 MW CPP. In the meeting, 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

Subsequently, a meeting was held on 10.03.2017 among CTU, POSOCO, BALCO and CEA in which, 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.
- 14.2 CEA further stated that M/s BALCO vide its letter dated 24.10.2017 had intimated that it has planned for new smelter with an additional load of around 750 MW. Out of the above 750 MW, it is proposed to meet around 600 MW through own generation and the remaining 150 MW through imports from grid. The 600 MW of own generation would be met through upgradation of existing 4x67.5 MW units of stage I (spare boiler of 67.5 MW is available) into 5x67.5 MW along with existing unit 2 of 300 MW (of IPP). Thus M/s BALCO had sought connectivity for 150 MW as a bulk consumer.

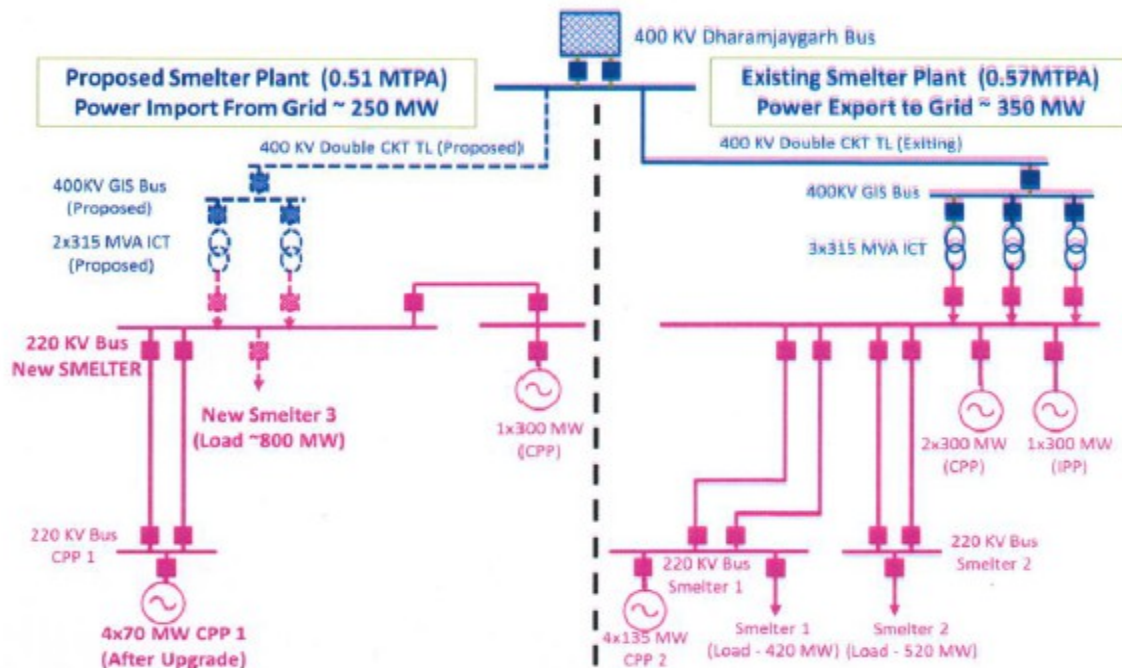
In this regards, a meeting held on 13.11.2017 in CEA among CTU, NLDC, BALCO & CEA, in which BALCO was suggested to apply for its connectivity in the capacity of bulk consumer.

Subsequently, the matter was deliberated in the 42nd meeting of SCPSPWR held on 17.11.2017, in which CTU was suggested that on receipt of application from BALCO, CTU may process the application as per regulations of CERC.

I/1241/2018

- 14.3 CTU stated that M/s BALCO has submitted an online application for 250 MW connectivity as a bulk consumer with following arrangement wherein BALCO seeks to segregate units as under:
- 580 MW [1x300 MW (CPP) + 4x70MW (up gradation of 4x67.5MW) (CPP)] units on one bus with New Smelter Load of 800 MW] for which BALCO now seeks connectivity to the tune of 250 MW for meeting the average demand of the smelter load
 - 1440 MW [1x300 (IPP)+2x300MW (CPP)+4x135MW (CPP)] units on the other bus with existing smelter load of 940 MW. Accordingly, the exportable capacity on this bus shall be about 500 MW against which LTA of 350 MW [200 (TN) + 95 (KSEB) + 55 (CSPTCL)] is already granted.
 - Accordingly, M/S BALCO seeks to modify the status of its 3x300MW+2xX67.5MW units from IPP to CPP.

The schematic regarding proposed connectivity arrangement sought for 250 MW as Bulk Consumer are given below:



- 14.4 CTU further stated that at presently, all units of M/s BALCO were granted connectivity as IPP through single point of connection i.e. through 400 kV BALCO–Dharamjaygarh D/C line. Now with the proposed segregation, generating station of M/s BALCO consists of both IPP and CPP. As an IPP, M/s BALCO has an LTA obligation (export) of around 350 MW and as a CPP with smelter load it has a drawal requirement (import) of 250 MW.

Thus, M/s BALCO is changing the status of its units from CPP to IPP and vice versa, very frequently. CTU suggested the following:

- i) M/s BALCO shall firm up the status of its all units and obtain the authentication of the same from the concern authority like CEA/ SERC/ CEI etc., and submit the same to CTU prior modifying the grant of connectivity to these units. Upon confirmation, M/s BALCO would need to sign connection agreement in accordance with connectivity granted for the generators (IPP/ CPP)/Bulk Consumer.
 - ii) Connectivity for the Bulk consumer section may be provided through another Balco-Dharamjaygarh 400kV D/c line. The line and associated bays may be constructed by M/s BALCO. M/s BALCO may approach CERC regarding construction modalities for the 400kv D/c line.
- 14.5 CE, CEA stated that implementation of the BALCO–Dharamjaygarh 400 kV D/C by M/s BALCO in its capacity as Bulk Consumer would be an issue. CEA suggested that connectivity to M/s BALCO may be provided through LILO of Korba Birsinghpur 400 kV S/C at BALCO (an interim arrangement already existing which has been bypassed at BALCO switchyard) as it would not require construction of line for establishing connectivity.
- 14.6 NLDC representative stated that earlier LILO of Korba–Birsinghpur 400 kV S/C at BALCO was given as an interim arrangement and that was provided for injection of 1200 MW power from BALCO to ISTS grid. With proposed connectivity as Bulk Consumer, M/s BALCO would be normally drawing the power up to 250 MW from the grid. However, in case of outage of all its captive generators drawal from the grid would be in the range of 800 MW and in such instances, LILO of Korba–Birsinghpur 400 kV S/C at BALCO may not be adequate.
- 14.7 M/s BALCO representative stated that:
- (i) At the time of submitting the application for initial grant of connectivity, regulations defined only generating stations and didn't distinguished between IPP and CPP. In the connectivity application submitted to CTU, the status is mentioned as generator with captive load.
 - (ii) In regards to frequent change in the status of IPP and CPP, the 1200 MW capacity (4 x 300 MW) was planned and implemented: 2 x 300 MW as IPP and remaining 2 x 300 MW as CPP. The same status has been continued till 31.03.2018. However, in view of the lack of LTA agreement with IPP and in order to meet the demand of newly proposed smelter, as per the regulations of CSERC, the status of one unit of IPP is proposed to be change as CPP, since 01.04.2018. Further, there would no changes in the status of the units.
 - (iii) M/s BALCO has substantial quantum of RPO obligations to be met, which is envisaged to be increased as per Gol norms. In regards to meeting RPO obligation through purchase of REC (Renewable Energy Certificate), BALCO stated that though REC is available in Solar Power, the same is not available in non-Solar power. Thus, they have to import to RE power to meet this RPO obligation.
 - (iv) Regarding proposal of LILO of Korba–Birsinghpur 400 kV S/C at BALCO, it was stated that, smelter being a critical load, any kind of power interruption to smelter is

undesired. BALCO desired to have the control over the transmission line through which connectivity would be granted to the plant.

In view of the above, M/s BALCO requested to provide connectivity as Bulk Consumer through BALCO – Dharamjaygarh 400 kV D/C (2nd D/C line)

14.8 MS, WRPC stated that as per MoP guidelines,

- (i) A plant can be classified as CPP which caters the needs of a particular industry/consumer or group of industries/consumers for their own use, which should be not less than 50% of the total output of the plant.
- (ii) The owner of the plant shall hold more than 26 % share of the company
- (iii) The status of a plant as a CPP or IPP is granted as a post-facto considering the previous consumption and status may be maintained by respective Electrical Inspector of the state.

14.9 After deliberations, the following was agreed

- (i) Grant of connectivity to BALCO for 250 MW, as a bulk consumer, subject to submission of supporting documents with regard to status of IPP/ CPP units.
- (ii) M/s BALCO has to submit the supporting documents with regard to status of IPP/ CPP units within 15 days i.e. by 26.05.2018 for timely processing of 250MW connectivity application as a bulk consumer.
- (iii) The connectivity to M/s BALCO, as a bulk consumer, would be granted through BALCO–Dharamjaygarh 400 kV 2nd D/C. The BALCO – Dharamjaygarh 400 kV 2nd D/C along with 2 no. of 400 kV bays at both ends would be implemented by M/s BALCO on its own cost.
- (iv) M/s BALCO may approach CERC regarding construction modalities for the 400 kV D/c line.

15.0 **Proposal for extension of 220 kV main bus bars for replacement of old 220/33 kV, 25 MVA transformers at 220 kV switchyard of TAPS – 1&2 – Agenda by BARC**

15.1 CEA stated that BARC vide its letter no. BARC/NRB/2018/89752 dated 04.05.2018 intimated that BARC has specific allocation of 10 MW from unallocated power of TAPS 3 & 4 and presently it is supplied to BARC from 220 kV switchyard of TAPS 1 & 2 through 220/33 kV, 2x25 MVA transformers. The 2 no. of transformers were installed in 1975, thus are very old and these need to be replaced at the earliest along with the water sprinkler and oil soak pits. However, due to space constraints at the existing location, the same can't be implemented. Also BARC has been registered as regional entity of WRLDC.

15.2 Accordingly, BARC has made the following proposal:

- (iv) Construction 2 no. of 220 kV additional bays by extension of 220 kV switchyard of TAPS 1 & 2 and installation 220/33 kV, 2x50 MVA ICTs along with necessary requirements like water sprinkler, oil soak pits.

- (v) Shifting of existing BARC load at 33 kV from the old existing transformers to new 2 no. of transformers. The existing metering scheme would be utilized and telemetering would be reconfigured as per requirement.
- (vi) The existing old 2 no. of 220 kV ICT bays would be kept as spare, which can be used as and when required.

- 15.3 On query regarding the cost implications of the above scheme, BARC / NPCIL representative stated that the cost would be shared by BARC and NPCIL in 60:40 ratio. This 40 % of NPCIL fund met through R & D fund of NPCIL, thus there would be no cost implication on state utilities.
- 15.4 After deliberations, members agreed with the BARC proposal at 15.2.

Agenda item tabled in the meeting:

16.0 Transmission system for Dholera Solar park

- 16.1 Representative of M/s GPCL stated that it has proposed to set up a 5000 MW solar park in the vicinity of Dholera in District of Ahmedabad, Gujarat and this would be developed in three phases. The details of phase wise development are as follows:

Phase	Quantum (MW)	Scheduled Commissioning
1	1000	Dec, 2019
2	2000	Dec, 2020
3	2000	Dec, 2021
Total	5000	

- 16.2 M/s GPCL further stated that Govt. Gujarat has committed for consumption of 20 % of the installed capacity of the project i.e. 1000 MW. However, phase wise segregation of this 1000 MW yet to be finalized, thus, the remaining 4000 MW of above solar park need to be evacuated and to be injected into ISTS grid.
- 16.3 NLDC representative observed that 5000 MW of Solar power envisaged at Dholera, Gujarat was in addition to the 8000 MW wind power in Bhuj and 2000 MW wind power in Devbhumi Dwarka. Therefore, the transmission system for RE power in Gujarat may be planned in holistic way considering the wind power in Bhuj, Devbhumi Dwarka, Solar Power at Dholera and RE power in Rajasthan.
- 16.4 After deliberations the following was agreed:
- (i) M/s GPCL shall apply for both connectivity and LTA for its Dholera Ultra Mega Solar Park at the earliest in view of anticipated commissioning schedule of December 2019, December 2020 and December 2021 for Phase I (1000 MW), Phase II(2000 MW) and Phase III (2000 MW) of the project respectively.

- (ii) The transmission system for Dholera UMSP would be evolved in a separate meeting among CEA, CTU and GETCO.

**List of participants of 43rd meeting of Standing Committee on Power System Planning of Western Region held on 11.05.2018 at
Vadodra, Gujarat**

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Status of TBCB Transmission Projects - Western Region

S. No.	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>Milestones:</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 kVD/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 kVD/C line (vi) Gurgaon (ITP) 400/220 kV GIS Substation</p>	<p>Under Litigation. Work Yet to start.</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>Milestones:</p> <p>(i) LoI 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>Commissioned in 06/2014</p>
3	<p>System strengthening common for WR and NR</p> <p>Estimated Cost</p>	<p>PFC</p> <p>Jabalpur Transmission Company Limited (Sterlite Grid)</p>	<p>(i) Dhramjaygarh - Jabalpur 765 kV D/C (ii) Jabalpur - Bina 765 kV S/C line</p>	<p>Line commissioned in 09/2015</p> <p>Line commissioned in 06/2015</p>

S. No.	Name of the Project	BPC / Implementing Agency / Milestones	Scope of works	Current Status
	Rs. 1720 Cr	Milestones: (i) LOI placed on 31.01.2011 (ii) Special Purpose Vehicle acquired on 31.03.2011 (iii) Scheduled Completion Date is 31.03.2014. (iv) Transmission License granted on 12.10.2011. (v) Tariff adoption approval on 28.10.2011 (vi) Clearance under Section 164 : received on 12.07.13		
4	System strengthening for WR Estimated Cost Rs. 2900 Cr	PFC BDTCL(Sterlite Grid) Milestones: (i) LoI placed on 19.1.2011 (ii) SPV acquired on 31.3.2011 (iii) Trans. license received on 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	Line commissioned in 06/2015 Line commissioned in 10/2014 Commissioned in 07/2014 Line Commissioned in 07/2014 Line commissioned in 10/2014 Line commissioned in 02/2015 Commissioned in 11/2014 Line Commissioned in 11/2014
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 Milestones: (i) LoI 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

S. No.	Name of the Project	BPC / Implementing Agency / Milestones	Scope of works	Current Status
				action.
6	Transmission System associated with Gadawara STPS (2x800 MW) of NTPC (Part-A)	REC Powergrid Warora Transmisson Limited (A subsidiary of PGCIL) Milestones: (i) LoI 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 400kV D/C at Warora P.S. (2xD/C) (iv) Warora 765/400 kV Pooling Station (2x1500 MVA).	Completion Target: April, 2018
7	Transmission System associated with Gadawara STPS (2x800 MW) of NTPC (Part-B).	REC Powergrid Parli Transmisson Limited (A subsidiary of PGCIL) Milestones: (i) LoI 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	(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)	Completion Target: April, 2018
8	Transmission System Strengthening associated with Vindhayachal- V	REC Powergrid Jabalpur Transmisson Limited (A subsidiary of PGCIL) Milestones: (i) LoI 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) Vindhayachal P. S- Jabalpur P. S. 765 kV D/C line.	Completion Target: June, 2018
9	System strengthening for IPPs in Chhattisgarh and other generation projects in Western Region	PFC Chhattisgarh - WR Transmission Ltd.	(i) Gwalior 765/400 kV – Morena 400 kV D/C line 400 kV D/C Length- 50 km	Commissioned on 05/2018.

S. No.	Name of the Project	BPC / Implementing Agency / Milestones	Scope of works	Current Status
		<p>(A subsidiary of Adani Power Limited)</p> <p>Milestones: (i) LoI 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</p>	<p>(ii) Establishment of 400/220 kV S/s at Morena, 2X315 MVA (iii) Vindhychal-IV & V- Vindhychal Pool 400 kV D/C (Quad) line Length-15 km (iv) Sasan UMPP – Vindhychal 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</p>	<p>Commissioned on 05/2018.</p> <p>Commissioned on 05/2018.</p> <p>Scheduled Commissioning: 11/2018</p> <p>Scheduled Commissioning: 03/2019</p> <p>Scheduled Commissioning: 11/2018</p> <p>Scheduled Commissioning: 11/2018</p>
10	Additional System Strengthening for Sipat STPS	<p>PFC</p> <p>Sipat Transmission Ltd (A subsidiary of Adani Power Limited)</p> <p>Milestones: (i) SPV acquisition on 23.11.2015 (ii) LoI issued on 28.07.2015 (iii) Approval u/s 164 of EA,2003 on 05.08.2016</p>	<p>(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</p>	<p>Scheduled Commissioning: 11/2018</p> <p>Scheduled Commissioning: 03/2019</p>
11	Additional System Strengthening Scheme for Chhattisgarh IPPs – Part B	<p>PFC</p> <p>Raipur - Rajnandgaon - Warora Transmission Ltd (A subsidiary of Adani Power Limited)</p> <p>Milestones: (i) SPV acquisition on 23.11.2015 (ii) LoI issued on 28.07.2015 (iii) Approval u/s 164 of EA,2003 on 15.06.2016</p>	<p>(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 Rajnandgaon 2x1500 MVA</p>	<p>Scheduled Date of Completion: Nov, 2018</p> <p>Anticipated Date of Completion: Nov, 2018</p>
12	Additional inter-Regional AC link for import into Southern Region	PFC	(i) Establishment of 765/400 kV S/s at Warangal (New) with 2x1500 MVA ICTs and 2x240	Scheduled Date of Completion : Nov, 2019

S. No.	Name of the Project	BPC / Implementing Agency / Milestones	Scope of works	Current Status
	i.e. Warora – Warangal and Chilakaluripeta - Hyderabad - Kurnool 765 kV link	Warora Kurnool Transmission Ltd (A subsidiary of Essel Infraprojects Limited) Milestones: (i) LoI issued on 29.02.2016 (ii) SPV acquisition on 06.07.2016 (iii) Approval u/s 164 of EA,2003 on 27.06.2017	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	
13	Common Transmission System for Phase-II Generation Projects in Odisha and Immediate Evacuation System for OPGC (1320 MW) Project in Odisha	PFC Orissa Generation Phase-II Transmission Limited (A subsidiary of Sterlite Grid Limited) Milestones: (i) LoI 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	Scheduled Date of Completion: August, 2019 Anticipated date of completion: May, 2018
14.	Transmission System Strengthening in WR associated with Khargone TPP (1320 MW)	REC Khargone Transmission Limited	A. Connectivity system for Khargone TPP (i) LILO of one ckt of Rajgarh - Khandwa 400 kV D/C line at Khargone TPP	Scheduled Date of Completion: July, 2019

S. No.	Name of the Project	BPC / Implementing Agency / Milestones	Scope of works	Current Status
		(Sterlite Grid Ltd.) Milestones: (i) LoI issued on 26.05.2016 (ii) SPV acquisition on 22.08.2016 (iii) Approval u/s 164 of EA,2003 on 05.07.2017	(ii) Khargone TPP Switchyard – Khandwa pool 400 kV D/C (Quad) line B. System strengthening in WR in time frame of Khargone TPP (i) Khandwa Pool – Indore 765 kV D/C line. (ii) Khandwa Pool – Dhule 765 kV D/C line. (iii) Establishment of 765/400 kV, 2x1500 MVA pooling station at Khandwa pool	Anticipated Date of Completion: Feb, 2018
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) Vindhyanchal Pooling Station- Varanasi 765 kV D/C line	The project was awarded to PGCIL and SPV acquired on 27.03.2018
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 PFCCL as BPC (ii) Request for Qualification : 01.02.2017 (iii) Request for Proposal : 01.05.2017	A. Additional 400kV feed to Goa (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. 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	SPV acquired by SPTL on 14.03.2018
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 PFCCL as BPC	A. Connectivity System for Lanco Vidarbha Thermal Power Ltd. (LVTPL) (i) LVTPL TPS switchyard – Warora Pool 765kV D/c line B. Inter State Transmission system strengthening in Chhatarpur area in Madhya Pradesh	Bidding process is kept in abeyance

S. No.	Name of the Project	BPC / Implementing Agency / Milestones	Scope of works	Current Status
			(i) LILO of both circuits of Satna – Bina 400kV (1st) D/c line at Bijawar. (ii) Establishment of 2x500MVA, 400/220kV substation at Bijawar	
18	Part ATS for RAPP U-7&8 in Rajasthan	PFC SPV: RAPP Transmission Company Limited (subsidiary of Sterlite Power Transmission Ltd) Milestones (vii) LoI placed on 17.09.2013 (viii) SPV acquired on 12.03.2014 (ix) Trans. license received on 31.07.2014 (x) Approval u/s 164 received on 07.01.2015 (xi) Tariff adoption on 23.07.2014	RAPP - Shujalpur 400kV D/C line- (Length: 402 Ckm; Locations: 521)	Completed in Nov, 2016

STATUS OF TRANSMISSION SCHEMES UNDER IMPLEMENTATION BY POWERGRID IN WESTERN REGION
(as on 31.03.2018)

Sl. No.	Description of Scheme	Estimated Cost (Rs. Cr)	Date of firming up in WR standing committee	Date of investment approval	Target date as of now	Remarks
1	Western Region System Strengthening Scheme -II Set-A: For absorbing import in eastern and central part of WR Grid (POWERGRID) Set-B: For regional strengthening in Southern Maharashtra (100 % private) Set-C: For regional strengthening in Gujarat (100 % private) a) Rajgarh – Karamsad 400kV D/c b) Limdi(Chorania) – Ranchodpura 400kV D/c c) Ranchodpura – Zerda(Kansari) 400kV D/c Set-D: For regional Strengthening in Northern Madhya Pradesh (POWERGRID)	5222 1700 1050 600 1050	20 th (23.01.04)	July'06	Commissioned Commissioned --- commissioned commissioned commissioned commissioned	Implementation by Reliance
2	Western Region System Strengthening - V a) 400 kV Vapi- Kala - Kudus D/c b) LILO of 400 kV Lonikhand - Kalwa line at Navi Mumbai c) Establishment of 400/220 kV, 2 x 315 MVA new S/s (GIS) at Navi Mumbai d) 220 kV Vapi- Khadoli D/c.	722	25 th (30.09.06)	Dec'07	commissioned Dec'18 Substation is ready and shall be commissioned matching with line Commissioned	Under implementation Contingency arrangement to connect Vapi-Navi Mumbai with Navsari-Boisar line by passing ROW area, to from Vapi - Navsari line (24 Ckm) commissioned in Mar'13. 400KV D/C Vapi-Kala portion commissioned in Mar'14 (61 Ckm). Balance portion commissioned in Dec'17. Cable work in progress (2km.) Critical ROW issues
3	Tr. System of Mundra Ultra Mega Power Project (4000 MW) a) Mundra – Bachchau -Ranchodpura 400 kV (Triple) D/c b) Mundra – Jetpur 400 kV (Triple) D/c	4824	26 th (23.02.07)	Oct'08	Commissioned Commissioned	Under implementation

**STATUS OF TRANSMISSION SCHEMES UNDER IMPLEMENTATION BY POWERGRID IN WESTERN REGION
(as on 31.03.2018)**

Sl. No.	Description of Scheme	Estimated Cost (Rs. Cr)	Date of firming up in WR standing committee	Date of investment approval	Target date as of now	Remarks
	c) Mundra – Limbdi 400 kV (Triple) D/c d) Gandhar-Navsari 400 kV D/c e) Navsari - Boisar 400 kV D/c f) LILO of both circuits of Kawas-Navsari 220 kV D/c at Navsari (PG) g) Wardha-Aurangabad 400 kV(Quad) D/c (with provision to upgrade at 1200 kV at later date) g) Aurangabad (PG) -Aurangabad I (Waluj) 400 kV(Quad)				Commissioned Commissioned Commissioned Commissioned Dec'18 Commissioned	Severe ROW & Forest issue. Both Contracts terminated due to unsatisfactory performance. Tender awarded for both the packages.
	Substations a) 40% Fixed Series Compensation each on Wardha - Aurangabad 400 kV D/c at Wardha end b) Establishment of new 400/220 kV, 2x315 MVA substation at Navsari & Bachchau c) Establishment of new 765/400 kV, 3x1500 MVA, substation at Wardha for charging of Seoni - Wardha 2xS/c lines at 765 kV level				Dec'18 Commissioned Commissioned	Commissioning matching with the line
4	Transmission system associated with Krishnapatnam (5x800 MW) (WR Portion)- now delinked from Krishnapatnam UMPP a) Raichur – Solapur (PG) 765 kV S/c b) Solapur(PG) – Pune 765 kV S/c c) LILO of 400kV Aurangabad I (Waluj) - Pune (PG) D/c & Parli (PG) - Pune (PG) D/c lines at Pune(GIS)	1928	27 th (30.07.07)		Commissioned Commissioned Commissioned	

**STATUS OF TRANSMISSION SCHEMES UNDER IMPLEMENTATION BY POWERGRID IN WESTERN REGION
(as on 31.03.2018)**

Sl. No.	Description of Scheme	Estimated Cost (Rs. Cr)	Date of firming up in WR standing committee	Date of investment approval	Target date as of now	Remarks
	d) Establishment of new 765/400 kV substations at Pune (GIS) with 2x1500 MVA transformation capacity				Commissioned	
5	Associated transmission system of VSTPP-IV and Rihand-III a) Rihand III- Vindhyachal Pool 765 kV D/c (initially to be op. at 400kV) b) Vindhyachal IV - Vindhyachal Pool 400kV D/c(Quad) c) Vindhyachal Pool - Satna 765 kV 2xS/c d) Satna -Gwalior 765 kV 2xS/c e) Gwalior – Jaipur(South) 765 kV S/c f) Vindhyachal Pool-Sasan 765 kV S/c g) Vindhyachal Pool-Sasan 400 kV D/c h) Establishment of 765/400kV, 2x1500 MVA substation at Vindhyachal Pool	4673	29th (10.09.09)	Mar'10	Commissioned Commissioned Commissioned Commissioned Commissioned Commissioned	
6	Solapur STPP(2x660MW) transmission system a) Solapur STPP – Solapur (PG) 400kV D/c (Quad) b) Augmentation of 400/220kV ICT by 1x500MVA transformer (3 rd) at Solapur (PG)	63.32	30th (08.07.10)	Oct'13	Commissioned Commissioned	Line completed in Apr'15
7	Solapur STPP (2x660MW) transmission system (Part-A) a) Solapur STPP – Solapur (PG) 400kV 2nd D/c (Quad)	50.52	36th (29.08.13)	Mar'15	Commissioned	Award placed in May'15
8	Transmission system for evacuation of Kakrapar Atomic Power Project unit 3 &4 (2x700 MW) a) Kakrapar NPP – Navsari 400kV D/c – 38 km b) Kakrapar NPP – Vapi 400kV D/c - 104 km	378.71	31 st (27.12.10)	Feb'14	Commissioned Commissioned	Stringing commenced from Mar'16

**STATUS OF TRANSMISSION SCHEMES UNDER IMPLEMENTATION BY POWERGRID IN WESTERN REGION
(as on 31.03.2018)**

Sl. No.	Description of Scheme	Estimated Cost (Rs. Cr)	Date of firming up in WR standing committee	Date of investment approval	Target date as of now	Remarks
9	Transmission System associated with Mauda Stage-II (2x660 MW) 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 nd (13.05.11)	Sep'13	Commissioned Commissioned Commissioned Commissioned	
10	Provision of 1x315MVA ICT & Spare Converter Trf for reliable auxilliary power supply at HVDC back to back station at Bhadravati	143	33 rd (21.10.11)	-	Commissioned	ICT commissioned in Mar'15. Balance work under progress.
11	Establishment of Pooling Station at Champa and Raigarh (Near Tamnar) for IPP Generation Projects in Chhattisagrh 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 th (10.09.09)	May'11	Commissioned Commissioned Commissioned Commissioned Commissioned	
12	Transmission system strengthening in Western Part of WR for IPP generation proejects in Chhattisgarh a) Aurangabad(PG) – Boisar 400kV D/c (Quad) b) Wardha - Aurangabad (PG) 765kV D/c c) Establishement of 765/400kv 2x1500MVA auraganbad (PG) S/s	2127.51	29 th (10.09.09)	Nov'11	Commissioned Commissioned Commissioned	

**STATUS OF TRANSMISSION SCHEMES UNDER IMPLEMENTATION BY POWERGRID IN WESTERN REGION
(as on 31.03.2018)**

Sl. No.	Description of Scheme	Estimated Cost (Rs. Cr)	Date of firming up in WR standing committee	Date of investment approval	Target date as of now	Remarks
	d) Augmentation of transformation capacity at Boisar by 400/220kV, 1x500MVA				Commissioned	
13	System strengthening in North/West part of WR for IPP Projects in Chhattisgarh 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)	Dec'11	Commissioned Commissioned Commissioned	
14	System Strengthening in Raipur-Wardha Corridor for IPP projects in Chhattisgarh (DPR-6) a) Raipur Pooling station - Wardha 765kV 2nd D/c	1422.85	29th (10.09.09)	Jan'12	Commissioned	
15	WR-NR HVDC interconnector for IPP Projects in Chhattisgarh a) A ± 800kV, 3000Mw HVDC bipole between Champa Pooling Station-Kurukshetra (NR) (provision to upgrade to 6000MW at a latter date) b) Kurukshetra(NR) - Jalandhar 400kV D/c(Quad) one ckt. via 400/220kV Nakodar c) LILO of Abdullapur – Sonapat 400kV D/c(triple) at Kurukshetra d) Establishment of 3000MW 800KV HVDC bipole terminal each at Champa Pooling station and Kurukshetra(NR) respectively: to be upgraded to 6000MW. e) Establishment of 400/220kV 2x500 MVA S/s at Kurukshetra (GIS) 2x500MVA	9569.76	29th (10.09.09)/30th (08.07.10)	Mar'12	Commissioned Commissioned Commissioned Commissioned Commissioned	Under Implementation 400kV bays ready for commissioning in Dec'15. ICT-II under progress.
16	Inter-regional system strengthening scheme for WR and NR-Part A	1315.9	36 th (29.08.13)	Oct'13		Completed

**STATUS OF TRANSMISSION SCHEMES UNDER IMPLEMENTATION BY POWERGRID IN WESTERN REGION
(as on 31.03.2018)**

Sl. No.	Description of Scheme	Estimated Cost (Rs. Cr)	Date of firming up in WR standing committee	Date of investment approval	Target date as of now	Remarks
	a) Solapur - Aurangabad 765kV D/c				Commissioned	
17	Transmission System Associated with Lara STPS-I (2x800MW) 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 th LTA (03.01.13)	Jun'14	Commissioned Commissioned	Tower erection commenced in Oct'15
18	Transmission System Strengthening in WR-NR Transmission Corridor for IPPs in Chattisgarh 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 th (03.01.13)	Jun'14	Mar'19 Commissioned	Under Implementation
19	Inter-regional system strengthening scheme for WR and NR-Part 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	Commissioned Apr'18 Commissioned Commissioned Commissioned	Under Implementation
20	Wardha - Hyderabad 765kV Links (a) 765KV D/C Wardha - Hyderabad line (b) 400KV D/C Nizamabad - Dichpali line	3662.02		Jan'15	Commissioned Commissioned	
21	GREEN ENERGY CORRIDORS:- Inter State Transmission Scheme (ISTS) - Part B (a) 765KV D/C Banaskanta - Chittorgarh (New) line	3705.61	36 / 37 th (29.08.13/05.09.14)	Apr'15	Sep'18	Under Implementation

**STATUS OF TRANSMISSION SCHEMES UNDER IMPLEMENTATION BY POWERGRID IN WESTERN REGION
(as on 31.03.2018)**

Sl. No.	Description of Scheme	Estimated Cost (Rs. Cr)	Date of firming up in WR standing committee	Date of investment approval	Target date as of now	Remarks
	(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 & 400/220kV - 2x500MVA) substation at Banaskanta				Commissioned Sep'18 Sep'18	
22	GREEN ENERGY CORRIDORS:- Inter State Transmission Scheme (ISTS) - Part C (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 th (29.08.13/05.09.14)	July'15	 July'18 July'18	Under Implementation
23	Transmission System Strengthening Associated with Vindhyachal V - Part A (a) 1x1500MVA, 765/400kV ICT at Vindhyachal Pooling Station		34 th (09.05.12)	Feb'15	 Commissioned	
24	Transmission System Strengthening Associated with Vindhyachal V - Part B (a) 2 nos of 765kV Line bays alongwith 2x330MVAR Line Reactor at Vindhyachal Pooling Station (a) 2 nos of 765kV Line bays alongwith 2x330MVAR Line Reactor at Jabalpur Pooling Station		34 th (09.05.12)		 Jun'18 Jun'18	Under Implementation
25	STATCOMs in Western Region (a) Aurangabad (b) Gwalior (c) Solapur (d) Satna		36 th (29.08.13)	Mar'15	 Apr'18 Sep'18 Apr'18 commissioned	
26	Western Region System Strengthening Scheme XIV	93.96	37 th (05.09.14)	Jan'16		

**STATUS OF TRANSMISSION SCHEMES UNDER IMPLEMENTATION BY POWERGRID IN WESTERN REGION
(as on 31.03.2018)**

Sl. No.	Description of Scheme	Estimated Cost (Rs. Cr)	Date of firming up in WR standing committee	Date of investment approval	Target date as of now	Remarks
	(a)2x500MVA, 400/220kV transformer alongwith six nos of 220kV bays at Indore (PG) 765/400kV Substation (b)1x500MVA, 400/220kV transformer alongwith two nos of 220kV bays at Itarsi (PG) 400/220kV S/s				July'18 Commissioned	
27	Powergrid works associated with Part-A of Transmission system for Gadarwara STPS of NTPC (a) 2 nos. 765 kV line bays at 765/400kV Jabalpur Pooling Station of POWERGRID {for Gadarwara STPS (NTPC) - Jabalpur PS 765 kV D/c}		36/37th (29.08.13 / 05.09.14)	Apr'16	Commissioned in May'17	
28	Powergrid works associated with Part-B of Transmission system for Gadarwara STPS of NTPC i.e. WRSS XV (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 Apr'18 Apr'18	
29	Powergrid works associated with System Strengthening for IPPs in Chhattisgarh and other generation projects in Western Region (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)}		36th (29.08.13)	Jul'16	Matching with TBCB schedule Mar'18 commissioned	Bay ready for commissioning. Commissioning matching with line (Adani).

**STATUS OF TRANSMISSION SCHEMES UNDER IMPLEMENTATION BY POWERGRID IN WESTERN REGION
(as on 31.03.2018)**

Sl. No.	Description of Scheme	Estimated Cost (Rs. Cr)	Date of firming up in WR standing committee	Date of investment approval	Target date as of now	Remarks
	(c) 2 no. 400 kV line bays at Gwalior Substation {for Gwalior - Morena 400 kV D/c (quad)}				May'18	
	(d) 2 nos. 765 kV line bays at 765/400kV Pune (GIS) sub-station of POWERGRID {for LILLO of one circuit of Aurangabad(PG) – Padghe(PG)765 kV D/c at Pune (GIS) (PG)}				Mar'19	
	(e) 2 nos. 765 kV line bays at 765/400kV Champa Pooling Station of POWERGRID {1for Champa PS(PG) - Raigarh (Kotra) PS(PG) 765 kV 2nd S/c, 1 for Champa PS(PG) – Dharamjaigarh(PG) 765 kV 2nd S/c}				Nov'18	
	(f) 1 no. 765 kV line bay at 765/400kV Raigarh (Kotra) Pooling Station of POWERGRID {for Champa PS(PG) - Raigarh (Kotra) PS(PG) 765 kV 2nd S/c}				Nov'18	
	(g) 1 no. 765 kV line bay at 765/400kV Dharamjaigarh Pooling Station of POWERGRID {for Champa PS(PG) – Dharamjaigarh(PG)765 kV 2nd S/c}				Nov'18	
30	Powergrid works associated with Additional System Strengthening Scheme Chhattisagrh IPPs Part-B		36/37th (29.08.13 / 05.09.14)	Jul'16	Matching with TBCB schedule	
	(a) 2 nos. 765 kV line bay at 765/400kV Raipur Pooling Station of POWERGRID {for Raipur PS(PG) – Rajnandgaon (TBCB) 765 kV D/c}				Nov'18	
30	Powergrid workds associated with Additional System Strengthening for Sipat STPS		36/37th (29.08.13 / 05.09.14)	Jul'16	Matching with TBCB schedule	
	(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)				Apr'18	
	(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				Apr'18	
31	Transmission System Strengthening associated with Mundra UMPP- Part A	266.19	36th (29.08.13)	Jul'16		

**STATUS OF TRANSMISSION SCHEMES UNDER IMPLEMENTATION BY POWERGRID IN WESTERN REGION
(as on 31.03.2018)**

Sl. No.	Description of Scheme	Estimated Cost (Rs. Cr)	Date of firming up in WR standing committee	Date of investment approval	Target date as of now	Remarks
	(a) LILO of both circuits of Mundra UMPP-Limbdi 400kV D/c (triple snowbird) line at Bachau				commissioned	
32	Transmission System Strengthening associated with Mundra UMPP- Part B (a) Mundra UMPP - Bhuj Pool 400kV D/c line (triple snowbird)		36/38th (29.08.13/17.07.2015)		Dec'18	
33	Bays for Transmission System Associated with DGEN Torrent Energy Ltd (1200MW) (a) 2nos 400kV Bays at Vadodara (GIS) (b) 2nos 220kV Bays at Navsari (GIS)		13/14th LTA (27.12.10/13.05.2011)	Jul'16	May'18 May'18	Execution of TBCB scheme critical
34	Western Region System Strengthening - 16 (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 July'18 commissioned July'18	
35	Western Region System Strengthening - 17 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.		39th (30.11.15)	Feb'17	Sep'19	

**STATUS OF TRANSMISSION SCHEMES UNDER IMPLEMENTATION BY POWERGRID IN WESTERN REGION
(as on 31.03.2018)**

Sl. No.	Description of Scheme	Estimated Cost (Rs. Cr)	Date of firming up in WR standing committee	Date of investment approval	Target date as of now	Remarks
	<p>b. Bina (PG) – Shujalpur 400kV D/C line: 420kV 50 MVAR fixed line reactor at Shujalpur end is to be converted into switchable line reactor. The 420kV 63 MVAR line reactor installed at Bina (PG) end is already switchable.</p> <p>c. 1x63 MVAR BUS Reactor at Bhadravati S/s: 420kV</p> <p>3. Installation of ICTs along with associated bays at following substations of POWERGRID:</p> <p>a. Khandwa 400/220kV Substation: 1x500 MVA, 400/220kV 3rd ICT.</p> <p>b. Boisar 400/220kV Substation: 1x500 MVA, 400/220kV 4th ICT.</p> <p>c. Kala 400/220kV Substation: 1x500 MVA, 400/220kV 3rd ICT.</p> <p>d. Dehgam 400/220kV Substation: 1x500 MVA, 400/220kV 3rd ICT.</p>					
36	<p>Western Region System Strengthening - 18</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 & 765kV BUS</p> <p>c. Champa Pool 400 kV & 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>PG Works associated with Transmission System for Khargone TPP</p>		38th & 39th (17.07.15 & 30.11.15)	Feb'17		

**STATUS OF TRANSMISSION SCHEMES UNDER IMPLEMENTATION BY POWERGRID IN WESTERN REGION
(as on 31.03.2018)**

Sl. No.	Description of Scheme	Estimated Cost (Rs. Cr)	Date of firming up in WR standing committee	Date of investment approval	Target date as of now	Remarks
	<p>1. 63 MVAr switchable line reactor along with 500Ω NGR at Rajgarh(PG) end of Khargone TPS – Rajgarh (PG) 400kV line <i>{formed after LILO of one circuit of Khandwa - Rajgarh 400 kV D/C line at Khargone TPS, being implemented under TBCB}</i></p> <p>2. 2 nos. of 765 kV line bays at 765/400kV Indore Substation of POWERGRID <i>{for termination of Khandwa PS – Indore 765 kV D/C line, being implemented under TBCB }</i></p> <p>3. 240 MVAr Switchable Line Reactors along with 700Ω NGR at Indore (765/400kV S/s) end of each circuit of Khandwa Pool – Indore 765kV D/c line (Line being implemented under TBCB)</p>				<p align="center">Feb'18</p> <p align="center">July'19</p> <p align="center">July'19</p>	Ready for commissioning. Commissioning matching with TBCB line.
38	<p>POWERGRID Works associated with New WR - NR 765kV Inter-regional corridor</p> <p>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</p>		40th (01.06.2016)		Matching with TBCB Line	
39	<p>POWERGRID Works associated with Additional 400kV feed to Goa</p> <p>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</p>		40th (01.06.2016) 41st (21.12.2016)		Matching with TBCB works	
40	<p>POWERGRID Works associated with Additional System for Power Evacuation from Generation Projects pooled at Raigarh (Tamnar) Pool</p> <p>2 nos. of 765kV Line Bays each at Dharamjaygarh Pool and Raigarh (Tamnar) Pool</p>		40th (01.06.2016)		Matching with TBCB works	
41	<p>Transmission system for Ultra Mega Solar Power Park (700MW) at Banaskantha (Radhanesda), Gujarat</p>	118	40th (01.06.2016)	May'17	Matching with Banaskantha (Radhanesda) Solar Park	

**STATUS OF TRANSMISSION SCHEMES UNDER IMPLEMENTATION BY POWERGRID IN WESTERN REGION
(as on 31.03.2018)**

Sl. No.	Description of Scheme	Estimated Cost (Rs. Cr)	Date of firming up in WR standing committee	Date of investment approval	Target date as of now	Remarks
	400KV D/C Banaskantha PS - Banaskantha (PG) line 765/400kV Banaskantha (PG) 2 nos line bays				Sep'18 Sep'18	
42	Supplementary Transmission system for Ultra Mega Solar Power Park (700MW) at Banaskantha (Radhanesda), Gujarat Establishment of 2x500MVA, 400/220kV pooling station at Banaskantha (Radhanesda) [GIS] along with 1x125MVA r bus reactor 4 nos. 220kV line bays at 400/220kV at Banaskantha (Radhanesda) pooling station for Solar Park Interconnection.		41st (21.12.2016)		Matching with Transmission system for Ultra Mega Solar Power Park (700MW) at Banaskantha (Radhanesda) Gujarat Jun'19 Jun'19	
43	Transmission System for Ultra mega Solar Park in Rewa District, Madhya Pradesh . Establishment of 3x500MVA, 400/220kV substation at Rewa Pooling Station LILO of Vindhychal - Jabalpur 40kV D/c (both circuits) at Rewa Pooling Station 6 nos. 220kV line bays at Rewa Pooling Station		38th (17.07.2015)	Jan'16 / Mar'17	Matching with Rewa UMSP Sep'18 Mar'18 Sep'18	Sub station alongwith ICT I & II completed & charged in Mar'18. balance work under progress. Line completed & charged in Mar'18. Sub station alongwith ICT I & II completed & charged in Mar'18. balance work under progress.