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

क• सं• : 26/10/2015– वि प्र. यो. प. मू - I/ 1–15 दिनांक: 28th December , 2015

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विषय :– **पश्चिमी क्षेत्र विद्युत प्रणाली योजना की स्थाई समिति की 39वीं बैठक ।**

महोदय,

पश्चिमी क्षेत्र विद्युत प्रणाली योजना की स्थाई समिति की 39वीं बैठक का कार्यवृत्त केन्द्रीय विद्युत प्राधिकरण की वेबसाइट www.cea.nic.in पर लिंक (http://www.cea.nic.in/compsplanningwr.html) पर उपलब्ध है।

संलग्न – उपरोक्त

भवदीय,

(अवधेश कुमार यादव)
निदेशक (पी एस पी एंड पी ए - I)

भारत सरकार / Government of India
विद्युत मंत्रालय / Ministry of Power
केन्द्रीय विद्युत प्राधिकरण / Central Electricity Authority
विद्युत प्रणाली योजना एवं परियोजना मूल्यांकन प्रभाग - I
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वेबसाइट / Website: www.cea.nic.in

No. 26/10/2015-PSP&PA-I/ 1-15 **Date: 28th December, 2015**

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Sub: 39th meeting of the Standing Committee on Power System Planning in Western Region

Sir,

The minutes of the 39th meeting of the Standing Committee on Power System Planning in Western Region held on 30.11.2015 at NPRC, Katwaria Sarai, New Delhi is available on CEA website (at the following link: http://www.cea.nic.in/compsplanningwr.html).

Yours faithfully,

(Awdhesh Kr.Yadav)
Director, PSP&PA-I

Minutes of the 39th Meeting of Standing Committee on Power System Planning in Western Region held on 30.11.2015 at NRPC, Katwaria Sarai, New Delhi.

Member (Power System), CEA welcomed all the participants to the 39th meeting of Standing Committee on Power System Planning in Western Region. The list of participants is enclosed at Annexure – 1.

Member Secretary (WRPC), also welcomed the participants and thanked CEA for reducing the time gap between successive standing committee meetings. He further said the 30th WRPC meeting (already held on 24.11.2015) and the 39th SCM of WR (being held today i.e. 30.11.2015) has been held within a week. Normally the decisions of the Standing Committee are ratified by the WRPC. Therefore, he suggested that the timing of the WRPC meeting and SCM meeting needs to be coordinated in manner so that sufficient time gap is available between these meetings.

Member (Power System), CEA said that the suggestion made by Member Secretary (WRPC) would be kept in mind while convening next SCM and requested Director (PSP&PA-I), CEA to take up the agenda items.

1. Confirmation of the minutes of 38th meeting of the Standing Committee on Power System Planning in Western Region (SCPSPWR) held on 17th July 2015 at NRPC, Katwaria Sarai, New Delhi.

1.1. The minutes of the 38th SCPSPWR were issued vide CEA letter No.26/10/2014-SP&PA/ 1- 14 dated 25th August 2015.

1.2. MSETCL vide their letter no. MSECTL/CO/TU/302B/GC/201/12990 dated 8.10.2015 have observed that in item no. 5.2 of the minutes it has been recorded "**LILO of Parli- Osmanabad 220 kV D/C line at Parli (PG) 400/220 kV, 2X500 MVA substation"** and have requested to correct the same as **LILO of Parli- Osmanabad 220 kV S/C line at Parli (PG) 400/220 kV, 2X500 MVA substation**.

1.3. Taking into consideration the correction suggested by MSETCL, only six no. of 220 kV line bays [4 nos. for LILO of both circuits of Parli-Harngul 220 kV line at Parli (PG) and 2 nos. LILO of Parli- Osmanabad 220 kV S/C line at Parli (PG)] will be required instead of eight nos. of 220 bays at Parli (PG) 400/220 kV, 2X500 MVA mentioned at item no. 5.3 and 5.4 of the minutes of the 38th SCPSPWR.

1.4. With the above modifications the minutes of the 38th meeting of the Standing Committee on Power System Planning in Western Region were confirmed.

2. Review of Progress on Earlier Agreed Transmission Schemes.

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

3. Proposal for two nos. of 220 kV bays at existing Aurangabad 765/400/220 kV substation of POWERGRID.

3.1. Director (PSP&PA-I), CEA said that MSETCL has proposed establishment of Shendra 220 kV GIS to meet 200 MW load under Delhi- Mumbai- Industrial Corridor (DMIC) Phase-I with the following scope of works:

(i) Establishment of 220/132/33 kV, Shendra GIS.
(ii) 3X100 MVA, 220/33 kV Transformers at Shendra GIS. Provision of 132 kV switchyard for EHV consumer to be taken up in future.
(iii) Shendra GIS – Aurangabad 765/400/220 kV substation 220 kV D/C line.

MSETCL has requested for provision of 2 nos. of 220 kV bays at the existing Aurangabad 765/400/220 kV substation of POWERGRID for termination of the 220 kV D/C line from Shendra GIS at Aurangabad 765/400/220 kV substation.

3.2. MSETCL confirmed that the above scope of works would be implemented by them. POWERGRID confirmed the availability of space for 2nos of 220kV bays at Aurangabad 765/400/220 kV substation.

3.3. Director (Operations), MSETCL informed that the existing 4 nos. of 220 kV bays at Aurangabad (PG) 765/400/220 kV substation would be utilized for LILO of both circuits of Chitegaon – Shendra 220 kV D/C line at Aurangabad (PG) 765/400/220 kV substation. The LILO works were likely to be completed by February 2016.

3.4. After deliberations, MSETCL proposal of provision of 2 nos. of 220 kV bays at the existing Aurangabad 765/400/220 kV substation of POWERGRID for termination of the 220 kV D/C line from Shendra GIS was agreed by the members.

4. MSETCL proposal of shifting of Aurangabad (Waluj) – Pune (PG) 400kV D/C line from 400kV Aurangabad (Waluj) to 765/400kV Aurangabad (PGCIL).

4.1. Director (PSP&PA-I), CEA said that in the 38th SCM of WR held on 17.07.2015, MSETCL has proposed shifting of Aurangabad (Waluj) – Pune(PG) 400kV D/C line from 400kV Aurangabad (Waluj) to 765/400kV Aurangabad (PGCIL) to remove the constraints for import of power in Maharashtra control area. The loading on the 2X1500 MVA, 765/400 kV ICTs at Aurangabad (PG) substation and Aurangabad- Aurangabad I (Waluj) 400 kV interconnection was the limiting factor for import of power in Maharastra from ISTS. In the meeting, it was agreed that MSETCL proposal of shifting of Aurangabad (Waluj) – Pune (PG) 400kV D/C line from 400kV Aurangabad (Waluj) to 765/400kV Aurangabad (PGCIL) would be studied jointly by CEA, CTU, WRLDC and MSETCL.

4.2. Subsequently, the report of the joint studies carried out by CEA and CTU to see the impact of the transmission schemes (**already commissioned:** LILO of 400kv D/C lines Parli (PG) – Pune (PG) at Pune GIS , Aurangabad – Sholapur 765kV D/C line and **under implementation :** LILO of Aurangabad – Pune (PG) 400 kV D/C line at Pune GIS, Aurangabad – Boisar D/C 400 kV line, Aurangabad – Padghe 765 kV D/C line, LILO of one circuit of Aurangabad – Padghe 765 kV

S/C line at Pune GIS) was forwarded to MSETCL for their comments. The load flow analysis showed that with the commissioning of the above transmission schemes, loading on 400kV Aurangabad (Waluj) – Aurangabad (PG) D/C line has reduced from 2200MW to 640MW and as such Aurangabad (Waluj) – Aurangabad (PG) D/C line would not be constraint for import of power in Maharashtra from ISTS.

4.3. In the meeting, MSETCL agreed with the report of the joint studies carried out by CEA and CTU. In view of this, MSETCL proposal of shifting of Aurangabad (Waluj) – Pune – PG 400kV D/C line from 400kV Aurangabad (Waluj) to 765/400kV Aurangabad (PGCIL) was dropped.

5. Additional 400 kV feed to Goa

5.1. Director (PSP&PA-I), CEA stated that in the 38th SCM of WR establishment of 2X500 MVA, 400/200 kV substation at Xeldam and its interconnection with Narendra (existing) 400 kV substation through 400 kV D/C (quad) line as second 400 kV feed to Goa and its interconnection with Mapusa through 400 kV D/C (quad) line to take care of any N-1-1 contingencies involving outage of any one 400kV infeed to Goa was proposed. In the meeting POWERGRID had suggested the alternative of LILO of Narendra (new)-Kolhapur 400(PG) kV D/C line (765 kV line to be initially charged at 400 kV level) at the proposed Xeldam 400 kV substation, as 765 kV operation of Narendra-Kolhapur (PG) D/C line was not envisaged in near future and it would increase the utilisation of Narendra-Kolhapur D/C line. It was decided that the alternative suggested by POWERGRID would be studied jointly by CEA and CTU and based on its merit the same would be put in the SCM agenda of Southern Region for their approval. Subsequently, POWERGRID has suggested Kolhapur (PG) – Colvale (Mapusa) 400kV (Quad/HTLS) 2nd D/c line and Colvale (Mapusa) - Xeldem (New) 400 kV (Quad/HTLS) D/c line along with re-conductoring of Sholapur (PG) – Kolhapur 400kV D/C line (with HTLS conductor) as the second 400 kV feed to Goa.

5.2. The following alternatives for feeding Xeldam 400 kV substation was discussed in the meeting :

Alternative	Details	Remarks
1	Narendra (existing) - Xeldam- Mapusa 400 kV D/c quad line.	Also proposed in 38th SCM. Technically better alternative for providing 2nd 400 kV ISTS feed to Goa system.
2	Kolhapur (PG) - Mapusa – Xeldam 400 kV D/C quad line.	Alternative suggested by POWERGRID along with re-conductoring of Sholapur (PG) – Kolhapur 400kV D/C line with HTLS conductor. There would a single source for feeding Goa at 400kV level i.e., 400 kV Kolhapur (PG).
3	Kolhapur(PG) – Xeldam-Mapusa 400 kV D/C quad line	
4	Kolhapur(PG) – Xeldam 400 kV D/C quad line and LILO of one ckt at Mapusa	
5	LILO of one ckt. of	Alternative suggested by POWERGRID in

	Narendra(New)-Kolhapur(PG) 400 kV D/C line at Xeldam	the 38th SCM. Narendra(New)- Kolhapur (PG) is a 765 kV D/C line which would be initially charged at 400 kV level and in future when this line would be operated at 765 kV voltage level , the Xeldam 400 kV along with the feeding lines also needs to be upgraded to 765 kV level
6	LILO of one ckt. of Narendra(existing) – Narendra (New) 400 kV D/C line at Xeldam	Alternative 6 or 7 equally good as Alternative 1 and could be implemented in case of non-availability of bay at Narendra (existing) 400 kV substation.
7	LILO of one ckt. of Kaiga-Narendra(existing) 400 kV D/C line at Xeldam with LILO point at Narendra end.	
8	LILO of one ckt. of Kaiga-Narendra(existing) 400 kV D/C line at Xeldam with LILO point at Kaiga end.	

5.3. CTU stated that presently Southern Region is power deficit region and incase the second feed to Goa is given from Narendra (existing) 400 kV substation, the power flow would be from WR to SR and then SR to Goa. This may reduce the ATC between WR and SR for exporting power to SR. Further, at Narendra (existing) 400 kV substation, space was available for only 1 no. of 400 kV bay, as such, termination of Narendra (existing) – Xeldam 400 kV D/C line at Narendra (existing) 400 kV substation would not be possible. Narendra (existing) – Xeldam 400 kV D/C line would pass though forest areas of Western Ghats. In the past also during forest clearance process of Kaiga-Narendra 400 kV D/C line a lot of resistance from various activists and NGOs was faced. The forest clearance was recommended by Karnataka Government in 2002 only after joint confirmation from POWERGRID and CEA that no further transmission line shall be laid in the area. Therefore, laying of Narendra (existing)-Xeldam 400 kV D/C line may be resisted by activists/NGOs and obtaining forest clearance and actual implementation of the line may be delayed as in case of Mysore- Kozikode 400 kV D/C line.

5.4. Chief Engineer, Goa Electricity Department (GED) stated that Goa is already well connected with the Wester Region grid at 400 kV (through Kolhapur - Mapusa 400 kV D/C line) and 220 kV lines. It is desirable to have the second 400 kV connectivity from SR side. Further, Goa has got share of 100 MW in the Ramagundam, STPS which is located in SR. Therefore, Narendra (existing) - Xeldam 400 kV D/c quad line may be agreed as the second 400 kV feed to Goa. He further said that the existing Supa – Ponda 110 kV D/C line at present is not in use and the line corridor could be released for implementation of Narendra (existing) – Xeldam 400 kV D/C line in their territory/state, if required.

5.5. NLDC said that with the implementation of the planned WR-SR interconnections, the existing issue of limited ATC between WR-SR corridors may not be a limiting factor for export of power from WR to SR. He said that Sholapur (PG) - Kolhapur (MSETCL) - Kolhapur (PG) 400 kV D/C line is with Twin Moose conductors.

Therefore, strengthening of this corridors in form of re-conductoring may also be taken up. CTU informed that in their proposal of providing second feed to Goa through Kolhapur (PG) - Mapusa 400 kV D/C quad line (2nd), the re-conductoring of Kolhapur-Sholapur 400 kV D/C line is included. CEA clarified that connectivity at Kolhapur (PG) 765 kV susbstation for Jaitapur nuclear project of M/s NPCIL has already been agreed in the past. Therefore, in future, with 765 kV operation of the Narendra (new) - Kolhapur D/C line (initially to be charged at 400 kV level), further strengthening of this section through 765 kV/ 400 kV interconnections would be required. In this context the re-conductoring of Sholapur-Kolhapur 400 kV D/C line may not be required. However, in case of any constraints in this line, if required, may be studied separately.

5.6. Director (PSP&PA-I), CEA said that the studies for future scenarios with the planned interconnection between WR and SR shows that there is power flow of about 1000 MW from Narendra(new) to Kolhapur i.e. from SR to WR. Therefore, the apprehension that providing the second feed to Goa through Narendra (existing) – Xeldam 400 kV D/C line would reduce the ATC/TTC available between WR and SR for export of power to SR is unwarranted. Also, in all the eight alternatives proposed as second feed to Goa, the 400 kV line either to Mapusa or Xeldam has to cross the Western Ghats section and as such forest clearance issues would be there. In case of difficulty in getting RoW for implementation of Narendra (existing)-Xeldam 400 kV D/C line, the RoW of the existing Supa-Ponda 110 kV D/C line (presently the line is not in use) could be used.

5.7. Member (Power System), CEA said that amongst the alternatives suggested, the alternative involving minimum forest clearance problems may be finalized as second 400 kV feed to Goa so that the same could be taken up in the SCM of SR for their approval.

5.8. The issue was further deliberated and it was noted that in all the alternatives crossing of Western Ghats (forest area) was involved, therefore the alternative which is best from power flow point of view could be finalized. As per the studies Alternative 1 (Narendra (existing) – Xeldam 400 kV D/C quad line) is the best alternative but there is no space available for 2 nos. of 400 kV bays at Narendra (existing) 400 kV substation. Therefore, Alternative 6 is finalized as second feed to Goa. The following Transmission system strengthening was agreed for providing second 400 kV feed to Goa:

(i) Establishment of 2X500 MVA, 400/220 kV substation at Xeldam. The interconnection between the existing 220 kV Xeldam substation and the proposed 400/220 kV Xeldam substation could be through bus extension or through 220 kV interconnecting lines, as the case may be.
(ii) LILO of one circuit of Narendra (existing) – Narendra (new) 400 kV D/C quad line at Xeldam.
(iii) 400kV (Quad) connectivity between the new substation at Xeldem and Mapusa to take care of any N-1-1 contingency involving outage of any one 400kV infeed to Goa.

The above scheme shall be taken up approval of the Standing Committee on Power System Planning of Southern Region.

6. Connectivity System for Lanco Vidarbha Thermal Power Pvt. Ltd. (LVTPPL)

6.1. Director(PSP&PA-I), CEA said that in the 21st Meeting of WR constituents regarding Connectivity / Open Access Applications held on 17.07.2015, the connectivity arrangement agreed earlier (i.e., LILO of Seoni - Wardha 765 kV S/C line at LVTPL TPS) for M/s LVTPPL was revised as below:

(i) LVTPPL TPS Switchyard – Warora Pool 765kV D/c line (to be implemented through Tariff Base Competitive Bidding route)

In the meeting, M/s LVTPPL was requested to confirm the time frame by which connectivity line is required so that suitable action may be initiated for implementation of the line through Tariff Based Competitive Bidding route.

6.2. Subsequently, M/s LVTPPL vide their letter dated 27th August, 2015 has requested for continuation of the earlier connectivity granted i.e. LILO of Seoni – Wardha 765kV S/c line at LVTPPL TPS. A meeting was held in CEA on 2.9.2015 to discuss the connectivity issue with M/s LVTPPL, CTU and POSOCO. In the meeting M/s LVTPPL was requested to confirm the following requirements so that the connectivity line (LVTPPL TPS – Warora Pool 765kV D/c line) could be included in the agenda for 35th Empowered Committee meeting (scheduled to be held on 14.09.2015).

a. M/s LVTPPL needs to confirm the commissioning schedule of the generation project

b. As per CERC sharing regulations, transmission charges are payable by beneficiaries only after the commercial operation of the generator. Till then, it is the responsibility of M/s LVTPPL to pay the transmission charges.

c. M/s LVTPPL need to sign connectivity agreement and submit requisite bank guarantee.

The response of M/s LVTPL on the above issues is still awaited.

6.3. The issue was deliberated and it was agreed that connectivity to M/s LVTPPL may be granted through LVTPPL TPS Switchyard – Warora Pool 765kV D/c line. M/s LVTPPL would be required to sign requisite agreements for taking up the transmission scheme under Tariff Based Competitive Bidding route.

7. Provision of 1x240MVAR line reactor at Pune GIS end for Aurangabad (PG) – Pune GIS 765kV line (formed after LILO of one ckt of Aurangabad (PG) – Padghe (PG) 765kV D/c line at Pune GIS - LILO Length Considered - 67KM).

7.1. Director (PSP&PA-I), CEA said that in 36th Meeting of Standing Committee on Power System Planning in Western Region held on 29.08.2013, LILO of one ckt of Aurangabad (PG) – Padghe 765kV D/c line at Pune GIS in lieu of Kolhapur(PG)-Padghe (PG) 765kV D/c line one ckt via Pune GIS was agreed as System Strengthening Scheme in WR for transfer of power to SR from IPPs in Chhattisgarh. Subsequently, in 32nd meeting of Empowered Committee on Transmission held on 17.01.2014, the above scheme was agreed to be implemented through TBCB under System Strengthening for IPPs in Chhattisgarh and other Generation Projects in Western Region.

7.2. CTU said that as per the route survey carried out by the BPC (LILO of one ckt of Aurangabad (PG) – Padghe (PG) 765kV D/c line at Pune GIS), the route length for LILO portion comes out to be 67KM approximately. Originally the length of Aurangabad (PG) – Padghe (PG) 765kV D/c line was about 285KM and 2x240MVAR line reactors along with 2x1200Ohm NGR at both ends of Aurangabad – Padghe 765kV D/c line. After LILO at Pune GIS, the length of modified sections i.e. Aurangabad (PG) – Pune GIS 765kV line would be about 254KM and Pune GIS – Padghe (PG) would be about 165KM. Accordingly, in order to have proper reactive compensation, 1x240MVAR switchable line reactor along with NGR of suitable rating is proposed at Pune GIS for Aurangabad (PG) – Pune GIS 765 kV S/C line.

7.3. CTU proposal of provision of 1x240MVAR switchable line reactor along with NGR of suitable rating at Pune GIS for Aurangabad (PG) – Pune GIS 765kV line was agreed by the members.

8. Replacement of Overhead conductor with UG cable on GETCO portion of KAPP 1&2 – VAPI/Balitha (GETCO) 220kV D/c line.

8.1. Director(PSP&PA-I), CEA said that Transmission System for KAPP 1 & 2 consists of KAPP 1&2 – Vapi/Balitha (GETCO) 220kV D/c (ACSR Zebra) line - 117KM which is an ISTS line. A certain portion of above line towards the end of Vapi (GETCO) substation is owned and maintained by GETCO. GETCO portion of KAPP 1&2 – Vapi / Balitha (GETCO) 220kV D/c line is terminated in different D/c towers upto the point from which POWERGRID portion starts. In order to release the adjoining land for developing various residential schemes at Vapi / Balitha, GETCO has proposed to replace existing 220kV conductor with approx. 255mtr underground 220kV XLPE cable in their portion of KAPP 1&2 – Vapi 220kV ckt 2 from 220kV Vapi / Balitha S/s. The cost of the modification work would be borne by M/s GETCO.

8.2. GETCO confirmed that replacement of Overhead conductor with UG 220 kV cable on GETCO portion of KAPP 1&2 – VAPI/Balitha (GETCO) 220kV D/c line would be carried out by GETCO at their own cost.

8.3. The committee took a note of the replacement proposal of GETCO and suggested GETCO to carry out the replacement work by taking shutdown in a manner that does not affect the evacuation of power from KAPP 1&2. Any protection related issues arising out of underground cable provision needs to be deliberated and finalized in the Protection Coordination Committee of WRPC.

9. Conversion of fixed Line Reactors to switchable Line Reactors

9.1. Director (PSP&PA-I), CEA said that POWERGRID has identified 400 kV lines in Western Region which have a high degree of compensation due to fixed line reactors and has proposed conversion of following fixed line reactors to switchable line reactors:

Sl.	Name of the Line	Length (in km)	Capacity (MVAR)		Switchable (S) / Fixed (F)		% Compensation
			End I	End II	End I	End II	
1	Aurangabad(PG) – Aurangabad I (Waluj) 400kV D/c (Quad)	52.56	--	50	--	F	**158.54**

2	Itarsi – Indore (MPPTCL) 400kV S/c (1st) line	207	50	50	F	F	**87.83**
3	Itarsi – Indore (MPPTCL) 400kV S/c (2nd) line	214	50	50	F	F	**84.96**
4	Bina (PG) – Shujalpur 400kV D/c	199.94	63	50	S	F	**102.76**
5	Bhadravati – Dhariwal 400kV S/c	17.7	63	--	F	--	**647.15**

9.2. MPPTCL enquired about the need of conversion of fixed line reactors to switchable line reactors.

9.3. POWERGRID said that fixed line reactors on small 400 kV lines may lead to cases of over-compensation in lines. These fixed line reactors have been proposed to be converted into switchable line reactors so that they may be utilized as Bus Reactors, as and when needed to improve voltage profile. Further, NGR removal/bypassing may be considered for the above lines for successful auto-reclose. The DOV (Dynamic Over Voltage) Studies for the above lines have been carried out and no DOV phenomenon has been observed in absence of the line reactor.

9.4. After deliberations, conversion fixed line reactors associated with transmission lines indicated at s.no. 1 to 4 in the above table was agreed by the members. Regarding the fixed line reactor associated with Bhadrawati-Dhaiwal 400 kV S/C line , it was agreed to convert it into 1X63 MVAR bus reactor at Bhadrawati in view of very short length of the (about 17 km) of the line.

10. Operational feedback by NLDC for the quarter July 2015 to September 2015

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

Transmission Line Constraints

Sl. No	Corridor	Constraint	Deliberation in the 39th SCM
1.	400 kV Aurangabad(PG) -Aurangabad (MSETCL) D/C	Critical Loading of 400 kV Aurangabad (PG) -Aurangabad (MSETCL) D/C leading to n-1 non-compliance.	Commissioning of 765 kV Aurangabad-Sholapur D/C has relieved the loading of Aurangabad (PG)-Aurangabad (MSETCL) 400 kV D/c line.
2.	Constraints in 400 kV Khandwa – Dhule - Bableshwar-Padghe corridor	400 kV Khandwa-Dhule - Bableshwar-Padghe corridors carrying more than 500 MW in each ckt. The corridor is N-1 non-compliant. Commissioning of 400 kV Bableshwar-Kudus D/C and Kudus Sub-station to be expedited by MSETCL.	**MSETCL**- Forest Clearance (FC) still awaited (for about 120 locations) involved in the Bableshwar – Kudus 400 kV line. Expected completion time is six months after obtaining FC. Kudus substation expected by June 2016.

Sl. No	Corridor	Constraint	Deliberation in the 39th SCM
3.	765/400 kV ICT at Tirora and 765/400 kV ICT at Akola II	The system is not n-1 compliant. It has been observed that tripping of 765 kV Tirora ICT or 765 Akola II ICT would cause sudden increase in the loading of Tirora-Warora lines causing oscillations in the grid. 765 kV Tiroda-Koradi-III-Akola D/C commissioned. Due to delay in commissioning of 765/400 kV Ektuni (Aurangabad (MS)) S/S, Akola –Tapthithanda D/C are charged at 400kV. Commissioning of 400 kV Bableswar-Kudus D/C and Kudus Sub-station to be expedited by MSETCL.	MSETCL- 765/400 kV Ektuni expected to be commissioned by March 2016. 2nd ICT at Tiroda and Akola-II already planned. MSETCL to intimate the implementation schedule.
4.	400 kV Wardha-Parli D/C	High loading of Wardha-Parli 400 kV D/C line	With the commissioning of 765 kV Solapur (PG) –Aurangabad (PG) D/C line loading of 400 kV Wardha-Parli has been relieved.
5.	400kV Parli(PG)-Sholapur(PG) D/C		With the commissioning of 765 kV Solapur-Aurangabad D/C line loading of 400 kV Parli-Sholapur D/C has been relieved
6.	400 kV Aurangabad-Pune D/C	The transmission system at 220kV Pune is inadequate (only 2 lines from 220kV Pune (PG)). 400/220kV one ICT at Pune is kept open to control loading on 220kV lines from Pune (PG).	MSETCL- Additional outlets at Pune already under implementation
7.	400 kV SSP-Asoj S/C and SSP-Kasor S/C	Continuous loading of above 550 MW in SSP-Asoj and SSP-Kasor. 400 kV Dhule BDTCL-Dhule MSETCL D/C held up for want	Bus split operation done from 22.9-30.9.14.Further, with the commissioning of 765/400kV Vadodara Pooling station along with 765 kV Indore – Vadodara 765 kV S/C, 765 kV Dhule –Vadodara 765 kV S/C, 400 kV Asoj-Vadodara D/C line and 400 kV Vadodara-Pirana(PG) D/C line, have helped in reducing the loading on SSP-Asoj 400 kV S/C line and SSP-Kasor 400 kV S/C line . MSETCL- 400 kV Bays at Dhule are ready for

Sl. No	Corridor	Constraint	Deliberation in the 39th SCM
		of bays at Dhule MSETCL.	commissioning.

ICT Constraints

Sl. No	ICT	Constraint	Deliberation in the 39th SCM
1.	2 x 315 +1 x 500 MVA Bableshwar ICTs	It is observed that the Bableshwar ICTs are fully loaded and system is n-1 non-compliant. MSETCL has implemented load sheding scheme to take care of overloading.	MSETCL- Some loads presently fed from Bableshwar to be shifted to Lonikhand I/II to reduce ICT loading on Bableshwar. For provision of new 1X500 MVA, 400/220 ICT at Bableshwar tendering is under progress.
2.	2 X 1500 MVA Aurangabad (PG) ICTs	It is observed that the loading on ICTs are more than 800 MW resulting in 'N-1' non-compliance.	The 765 kV Solapur-Aurangabad D/C has been charged on 30th September 2015 and loading of Aurangabad ICT's has been relieved.
3.	2 X 315 MVA Chakan ICTs	It is observed that the loading on ICTs at Chakan (2x315MVA) are above 200 MW and additional ICT has to be proposed	MSETCL- Proposal for additional ICT at Chakan under approval by MSETCL.
4.	3 X 315 MVA Lonikhand ICTs	It is observed that the loading on ICTs at Lonikhand (3 x 315 MVA) are above 200 MW and additional ICT has to be proposed or 2 x 500 MVA ICTs at Lonikhand-II are underutilized and the 220 kV lines from Lonikhand II and Pune(PG) to be expedited.	MSETCL - Loads from Lonikhand I to be shifted to Lonikhand II to relieve loading on Lonikhand I.
5.	3 X 315 MVA + 600 MVA Padghe ICTs	It is observed that the Padghe ICTs are fully loaded and system is N-1 non-compliant. MSETCL has to implemented load trimming scheme to take care of overloading.	MSETCL - Kudus 400/220 kV substation is expected to be commissioned by June 2016. Also shifting of 1X315 MVA, 400/220 kV ICT from Warora (MSETCL) to Phadge has been planned.

Sl. No	ICT	Constraint	Deliberation in the 39th SCM
6.	2 X 315 MVA Khandwa ICTs	It is observed that the loading on ICTs at Khandwa (2x315MVA) are above 200 MW and additional ICT has to be proposed.	Discussed at item no. 17
7.	2 X 315 MVA Satna ICT	It is observed that the loading on ICTs at Satna (2x315MVA) are above 200 MW and additional ICT has to be proposed.	Discussed in 38th SCM of WR. 500 MVA, 400/220kV ICT at Satna (PGCIL) S/S approved.
8.	3 X 315 MVA Bhopal ICTs	It is observed that the loading on ICTs at Bhopal (3x315MVA) are above 200 MW and additional ICT has to be proposed	Discussed in 38th SCM of WR. 1X315 MVA, 400/220 kV ICT (4th) at Bhopal is under implementation by MPPTCL and is expected to be commissioned by December 2015.This would relieve loading on the existing ICTs at Bhopal
9	2 X 315 MVA Dehgam ICTs	It is observed that the loading on ICTs at Dehgam (2 x 315 MVA) are above 180 MW and additional ICT has to be proposed.	Discussed at item no. 17

Lines/ICTs opened to control overloading

Sl. No	Transmission Element (s) opened	Overloaded corridor	Remarks
1.	400/220 kV Pune(PG) one ICT	To control loading in 220 kV Pune(PG) – Talegaon D/C lines	MSETCL- Pune- Hingewadi 220 kV D/C line expected to be commissioned by June 2016
2.	400/220 kV 2 x 315 MVA Aurangabad(PG) ICTs	Idle charged in the absence of 220kV downstream network.	MSETCL- LILO of both circuits of Chitegaon- Shendra 220 kV D/C line at Aurangabad (PG) 400/220 kV, 2X315 MVA substation expected to be completed by March 2016.
3.	400/220 kV 2 x 315 MVA Sholapur(PG) ICTs		MSETCL- About 50 MW load connected with Solapur (PG) which would be increased to about 200 MW by June 2016.
4.	400/220kV 2 x 315 MVA Warora ICTs		MSETCL- Shifting of one ICT at Kalwa and one ICT at Phadge has been planned.

			MSETCL to intimate the implementation schedule.
5	400 kV Akola2-Taptithanda one circuit	400/220 kV Bableshwar ICT loading	MSETCL - Bableshwar ICT loading to be reduced by shifting of loads to Lonikhand I/II, by provision of additional ICT and with commissioning of 765 kV Ektuni and 400 kV Kudus substations.

10.2. **Sub-Synchronous Resonance (SSR) due to HVDC:** AGM, NLDC said that Sub-synchronous resonance at APL Mundra has been observed in the past, which has led to tripping of Mundra - Mohindergarh HVDC Bipole and loss of generation at APL (SSTI- Sub-synchronous Torsional Interaction- controller could not damp out the sub-synchronous resonance). The first incident occurred on 30th May 2014 when there was a load crash in Northern Region due to dust storm /thunderstorm leading to high voltages as well as frequent faults on the 400 kV on the inverter side (Mohindergarh). Even before actions could be taken to reduce power order on HVDC, the bipole tripped due to SSTI controller. The SSR observed on 5-6th September 2014 was with only one 330 MW unit at APL Mundra in service and the FSCs (Fixed Series Capacitors) on Adani-Sami-Dehgam 400 kV D/C line was out of service.

In the past, the Sub-synchronous study performed for SSTI controller in the HVDC was based on the data of 660 MW units of Mundra and there were no lines between Varsana and Bhachau. With the commissioning of 400 kV Bhachau-Varsana circuit, the electrical distance between CGPL UMPP and Mundra Generation complex has reduced significantly. In view of this, there is a need to carry out the sub-synchronous resonance studies by considering 330 and 660 MW units of APL Mundra and 830 MW units of CGPL for effective functioning of the SSTI controller provided for damping of the oscillations due to SSR.

10.2.1. AGM, NLDC further said that CEA Regulations (Technical Standards for Connectivity to the Grid) specifies carrying out of inter-connection studies by the appropriate Transmission Utility so that generator getting connected to the grid do not have any adverse impact on the grid and vice versa. CTU clarified that for any new generation getting connected to the grid, studies are conducted based on the Installed capacity of the generation project for specifying the transformation voltage of the generation along with bus reactors and bays to be provided at their switchyard. SSR studies are specialised studies which requires detailed modelling of the generator along with the system data. Therefore, the SSR studies could be carried out by the generator through their consultant and the necessary system data would be provided by CTU. The report of the studies submitted could be examined by CTU/CEA/POSOCO.

10.2.2. SE, WRPC suggested that there is a need to form a study group which could take up specialized studies like SSR, PSS tuning etc. To start with some courses could be organized with the help of institutions like IIT Bombay for the study group.

10.2.3. After further deliberations, it was agreed that APL shall carry out SSR studies for different scenarios considering 330, 660 MW units of APL Mundra and 830

MW units of CGPL and submit its report to CEA/CTU/POSOCO. CTU would provide the necessary system data while the generators such as APL and CGPL Mundra would provide the required machine specific data. The members also appreciated the need for developing expertise of the System Study Group of WRPC along with representations from CEA, CTU and POSOCO. The necessary modalities for the same may be explored by WRPC.

10.3. **Nodes Experiencing High Voltage :** Director(PSP&PA-I), CEA said that in the operational feedback high voltages have been reported at 400 kV Nodes (namely- Khandwa, Dehgam, Satpura, Koradi, Bhadrawati New Koyna, Karad, Kolhapur, Chandrapur, Dhule , Solapur(MS) , Aurangabad (MS) , Bhilai , Rajgarh, Akola, Damoh, Birsinghpur, Katni, Bhatapara, Raigarh, RGPPL) and 765 kV Nodes (namely Durg, Kotra, Raigarh Tamnar, Wardha, Aurangabad).

10.3.1. SE, WRPC said that the last high voltage studies for Western Region was done for off-peak conditions of 2013-14 and to contain the high voltages, 17 (seventeen) nos. of 125 MVAR, 400 kV bus reactors were identified on the principle of voltage sensitivity of the nodes / buses towards reactive compensation (Q-V analysis) using MATLAB. The studies can be again done for off-peak conditions of 2017-18 in Western Region by computing sensitivity matrix in MATLAB by CEA/CTU for which all necessary assistance would be provided by WRPC.

10.3.2. After deliberations, it was agreed that high voltage studies for Western Region for off-peak conditions of 2017-18 would be done by CEA/CTU/POSOCO for identifying the requirements of bus reactors using the principle of voltage sensitivity of the nodes / buses towards reactive compensation. The necessary assistance for computing sensitivity matrix in MATLAB would be provided by WRPC.

11. LTA and Connectivity Application of NTPC Ltd. for Khargone TPP (2x660MW) and Connectivity Application of 2x660MW Dwarkesh Energy Ltd. in Madhya Pradesh

11.1. Director(PSP&PA-I), CEA said that the following transmission system associated with Khargone TPP and Dwarkesh TPP was agreed in the 38th SCM of WR:

A. Transmission System for Khargone TPP (1320 MW)

(i) LILO of one ckt of Rajgarh-Khandwa 400kV D/c line at Khargone TPP#
(ii) Khargaon TPP Switchyard – Khandwa pool 400kV D/c (Quad) line

B. Transmission System for strengthening of WR associated with Khargone TPP (1320 MW)

(i) 765/400kV, 2x1500MVA pooling station at Khandwa pool.
(ii) Khandwa pool – Indore 765kV D/c line.
(iii) Khandwa pool – Dhule 765 kV D/C line.

Note: #The LILO shall be used for startup power and commissioning activities requirement. After commissioning of balance transmission system, the LILO would be bypassed at Khargone generation switchyard and may be utilized only under contingency condition.

Transmission system under A is for connectivity for Khargone TPP and Transmission system under B is for LTA of Khargone TPP

C. Transmission System for DEL TPP (1320 MW)

(i) DEL TPP Switchyard – Khandwa pool 400kV D/c (Quad) line

Till date, DEL has applied only for connectivity and not for LTA. After receipt of LTA application from DEL, the additional transmission strengthening required for transfer of power would be identified.

11.2. Subsequently, in the 35th meeting of Empowered Committee on Transmission, the following transmission scheme, to be implemented though tariff based competitive bidding, was recommended. This has been notified and allocated to BPC "REC Transmission Projects Company Ltd.".

Scope of the Transmission Scheme
1. Connectivity system for Khargone STPP (i) LILO of one ckt of Rajgarh-Khandwa 400kV D/C line at Khargone TPP (The LILO shall be used for startup power and commissioning activities requirement. After commissioning of balance transmission system, the LILO would be bypassed at Khargone generation switchyard and may be utilized only under contingency condition) (ii) Khargone TPP Switchyard – Khandwa pool 400 kV D/C (Quad) line
2. System strengthening in WR in time frame of Khargone TPP (i) Khandwa Pool – Indore 765kV D/C line (ii) Khandwa Pool – Dhule 765 kV D/C line (iii) Establishment of 765/400kV, 2x1500MVA pooling station at Khandwa pool **765 kV** • ICTs: 7x500MVA, 765/400 kV (1 spare unit) • ICT bays: 2 no. • Line bays: 4 no. (2 no. for Khandwa pool – Indore 765 kV D/C & 2 no. for Khandwa Pool to Dhule 765 kV D/C) • Bus reactor: 3 X 80 MVAr • Bus reactor bay: 1 no. • Switchable Line reactors : 7 X 80 MVAr (1 unit is as a spare unit) for Khandwa Pool – Dhule 765 kV D/C (each reactor with 800 Ω NGR alongwith its auxiliaries) • Space for line bays (future): 4 no. • Space for ICT bays (future): 3 no. • Space for 1500 MVA, 765/400 kV ICTs (future) : 3 no. **400 kV** • ICT bays: 2 no. • Line bays for termination of Khargone – Khandwa PS 400 kV

D/C line: 2 no.

- Bus reactor: 1 X 125 MVAr
- Bus reactor bay: 1
- Space for line bays (future): 6 no.
- Space for ICT bays (future): 3 no.

(iv) 2 nos. of 765 kV bays and 7 X 80 MVAr switchable line reactors (1 unit as spare) along with 800 Ω NGR & its auxiliaries for Khandwa Pool – Dhule 765 kV D/C at Dhule 765/400 kV substation of M/s BDTCL

Note:

- M/s PGCIL will provide 2 no. of 765 kV line bays for termination of Khandwa PS – Indore 765 kV D/C line and 6 X 80 MVAR switchable line reactors along with 700 Ω NGR & its auxiliaries at 765/400 kV Indore S/s.
- M/s PGCIL will provide 400 kV, 63 MVAr switchable line reactor along with 500 ohm NGR and its auxiliaries at Rajgarh (PG) 400 kV S/s for Khargone TPP – Rajgarh 400 kV S/C line formed after LILO of one circuit of Khandwa – Rajgarh 400 kV D/C line at Khargone TPP.
- M/s BDTCL will provide space for 2 no. of 765 kV line bays for termination of Khandwa Pool – Dhule 765 kV D/C alongwith 7 X 80 MVAr switchable line reactor at 765 kV Dhule S/s.
- NTPC will provide 4 no. of 400 kV line bays at Khargone TPP (2 no. for termination of Khargone – Khandwa Pool 400 kV D/C and 2 no. for LILO of one circuit of 400 kV Rajgarh – Khandwa D/C).
- NTPC will provide 400 kV, 1 X 125 MVAr bus reactor along with 400 kV reactor bay at Khargone TPP.

11.3. Members noted the above changes.

12. Connectivity System for M/s Jinbhuvish Power Generations Pvt. Ltd. (JPGPL) (600MW)

12.1. Director(PSP&PA-I), CEA said that in 21st Meeting of WR constituents regarding Connectivity / Open Access Applications held on 17.07.2015, following connectivity system for JPGPL was agreed.

(i) JPGPL TPS Switchyard – Warora Pool 400kV D/c line (to be implemented through Tariff Base Competitive Bidding route)

The generation developer informed that the commissioning schedule of generating units is Jan-2017 (1st unit) & March-2017 (2nd unit).

Considering above connectivity arrangement, following provisions need to be kept at the generation switchyard which shall be under the scope of the M/s JPGPL.

(ii) Generation step up Voltage : 400kV,
(iii) 400kV line bays : 2 nos.
(iv) 420kV bus reactor : 1x125MVAR

M/s JPGPL would be required to sign requisite agreements for taking up the transmission scheme under Tariff Base Competitive Bidding route.

Members noted the same.

13. Connectivity System for NTPC-SAIL Power Co. Ltd. (2x250MW, Phase III, Stage-II)

13.1. Director(PSP&PA-I), CEA said that NTPC-SAIL Power Co (P) Ltd (NSPCL) had applied for connectivity of its 500MW generation project in Chhattisgarh as per the CERC regulation, 2009. The application was initially discussed in 16th meeting of WR Constituents regarding Connectivity / Open Access Applications held on 09.05.2012 wherein connectivity was proposed to be granted through Bus extension of existing 400kV NSPCL switchyard. In 16th meeting, it was decided to defer the grant of connectivity till next meeting in view of the very little progress with respect to fuel and environmental clearance made by the generation project. Applicant was requested to keep the status of the generating project informed so that their application may be processed accordingly.

13.2. The application was again discussed in 21st meeting of WR Constituents regarding Connectivity / Open Access Applications held on 17.07.2015. NSPCL informed that they are anticipating the COD of generation unit by 2018. He also informed that most of the power would go to SAIL plant, hence only bus extension is sufficient for said connectivity. Accordingly, it was decided that intimation for grant of connectivity with bus extension of existing 400kV NSPCL switchyard to be issued. NSPCL to sign connectivity agreement within 30 days, otherwise the grant of connectivity shall be cancelled.

Members noted the same.

14. Provision of 4 nos. of 220kV feeder bays at 750MW Rewa Ultra Mega Solar Project (UMSP) Pooling Station – proposal by MPPTCL.

14.1. Director (PSP&PA-I), CEA said that in 38th Meeting of Standing Committee on Power System Planning in Western Region held on 17.07.2015, following transmission system for Rewa Ultra Mega Solar Project (RUMSP) was agreed in-principle by the members with the assumption that entire power would be evacuated through ISTS.

(i) Establishment of 400/220kV, 3x500 MVA Pooling station at Rewa.
(ii) LILO of Vindhyachal – Jabalpur 400kV 2nd D/c line (circuit-3&4) at Rewa Pooling Station – 59KM (2x27=54KM D/c portion + 5KM M/c portion).
(iii) 1x125 MVAr bus reactor at Rewa Pooling Station
(iv) 6 Nos. 220kV Line bays at Rewa Pooling station (for its interconnection with solar park)

In the meeting it was noted that the implementation of above system shall be taken up only after receipt of LTA application from RUMSP.

14.2. Accordingly, RUMSP has applied for LTA of 750MW in Aug'15 with target region as WR: 350MW, ER: 350MW & WR: 50MW. Subsequently, RUMSP vide their application dated 03.11.15 has re-applied for LTA to CTU with only WR (450 MW) and NR (300 MW) as target regions. Further, MPPTCL has requested for provision of 4nos. of 220kV feeder bays at the proposed 400/220kV Rewa

pooling station at their own cost as intra state strengthening scheme for terminating the following proposed 220 kV lines :

(i) 220kV D/C line from 400/220kV Rewa Solar Pooling Station to Rewa 220kV S/s.
(ii) 220kV D/C line from 400/220kV Rewa Solar Pooling Station to Sidhi 220kV S/s.

14.3. In the meeting, MPPTCL representative said that 400/220kV Satna (PGCIL) S/s is the only 400 kV substation feeding power to Rewa, Satna, Sidhi and Chhatarpur areas of Madhya Pradesh. The 400/220kV Satna (PGCIL) S/s is critically loaded and outage of any element would result in loss of supply in the above areas. Further, 400/220kV substation at Rewa which has been proposed as a part of the evacuation system for 750MW RUMSP (solar power which is available around 8hrs during the day time only) would be utilized for 8hrs only (during day time) and for remaining period of about 16hours the proposed pooling station remains unutilized. For better utilization of proposed 400/220kV Rewa pooling station and to relieve loading on 400/220kV transformers at Satna (PGCIL), the above two nos. of 220 kV D/C lines have been proposed.

14.4. CTU informed that the load flow study done with full injection of 750 MW from the Rewa Solar park under peak load conditions shows that 220 kV D/C line to Rewa (MPPTCL) from Rewa pooling station gets overloaded.

14.5. Director (PSP&PA-I), CEA said that load flow studies done by both MPPTCL and CTU shows that the Rewa 400/220 ps – Rewa (MPPTCL) 220 kV D/C line gets overloaded with full injection from the Rewa solar park under peak load conditions. The maximum generation from the solar park would be during the day time and peak load conditions occurs generally during the evening, therefore the scenario of full injection from solar park during peak load conditions considered in the studies would rarely occur. Further, MPPTCL studies shows a maximum loading 332 MW (166 MW on each ckt.) on Rewa 400/220 – Rewa (MPPTCL) during peak load conditions (without any injection from Rewa solar park). The loading on the proposed two nos. of 220 kV D/C line is not equal even though they are connected to load centres because, Rewa pool – Rewa 220 kV D/C line (about 10 kms) is of shorter length as compared to the Rewa pool-Sidhi 220 kV D/C line (about 100 kms). The transmission system proposed by MP improves the utilization of the Rewa pooling station which otherwise would be utilized only for evacuating power from Rewa solar park during the day time.

14.6. After further deliberations, members agreed with MPPTCL proposal of 4 nos. of 220kV line bays at 750MW Rewa Ultra Mega Solar Project (UMSP) Pooling Station. PGCIL would provide the space for 4 no. of 220 kV bays at Rewa PS. MPPTCL agreed to make necessary arrangements at Rewa (existing) 220 kV substation (load segregation or radialisation) to restrict the loading on the proposed Rewa PS- Rewa 220 kV D/C line. To take care of overloading on the proposed 220 kV lines, provision of 220 kV bus sectionaliser at Rewa PS was also agreed. The necessary switching arrangements/sequence for controlling the 220 kV lines overloading, if any, would be worked out by CEA, CTU, POSOCO and MPPTCL.

15. Standardization of OPGW in lieu of One Earth Wire in all Transmission lines – agenda by POWERGRID

15.1. Director (PSP&PA-I), CEA said that POWERGRID has proposed to include one 24 Fiber (OPGW) in all transmission lines along with communication equipment (SDH– STM-16) at all the upcoming substations to ensure availability of wideband Communication from all substations.

15.2. AGM, LD&C POWERGRID said that the Power System requirement for Communication is increasing multifold due to provision of special protection schemes, ever increasing data reporting to Load Dispatch Centre, phasor measurements based data collection and reporting, remote monitoring/operation of sub-station/elements, differential protection on Lines etc. Inclusion of 24 fibre (OPWG) in all transmission lines will ensure availability of wide band connection from all substations. The present practice of putting fiber in selected lines leads to a situation where communication connectivity to substation is held up either due to delay in implementation of the line or re-routing/ LILO of existing lines. Further OPWG installation on the existing lines takes longer time due to delay in getting shutdowns, ROW issues as well as capacity constraints of the executing agencies.

15.3. Director (PSP&PA-I), CEA said the existing CEA (Technical Standards for Construction of Electrical Plants and Electric Lines) Regulations, 2010 provides that - *The earthwire shall be either of galvanized stranded steel (GSS) or alternatively ACSR or AACSR conductor type. Optical fibre ground wires may also be used as earthwire. Other new technology earthwires conforming to international standards and specifications may also be used. Generally, one earthwire shall be used for transmission lines upto 220 kV and two earthwires shall be used for transmission lines of 400 kV and higher voltage classes*.

The POWERGRID proposal implies that all the transmission lines of 400 kV and above either in interstate or intrastate needs to be provided with one earthwire as OPWG.

15.4. POWERGRID clarified that the proposal is for interstate transmission lines. CEA said that the transmission line being implemented under TBCB, the provision for one earthwire as OPWG is included in the scope of works at RFP level. In the transmission lines being implemented by POWERGRID, one of the earthwire is already provided as OPWG. Therefore, one earthwire as OPWG on interstate transmission line was already getting implemented. CTU/POWERGRID said that provision of one earthwire as OPWG was not mentioned anywhere. Therefore, it has been put for the approval of the committee members. This proposal has already been approved by SCM of NR.

15.5. MSETCL representative stated that MSETCL has already taken up implementation of OPGW network for establishing its own communication network by replacing the existing Earth wire on (400/220/132 kV) EHV lines with the Optical Power Ground Wire (OPGW) having 48 fibres along with necessary telecom equipment's.

15.6. Director (PSP&PA-I), CEA informed that in a meeting taken by Secretary (Power) on 24.07.2015. regarding Reliable Communication and Data Acquisition System for substations, POWERGRID has expressed the view that considering importance of reliable communication in various applications and difficulties in

installation of OPGW under O&M stage, the provision of OPGW in place of one of the earthwire(s) should be kept in all the upcoming lines so that OPGW is installed during construction of line. The same was agreed upon and Secretary (Power) had advised Chairperson, CEA to issue necessary guidelines in this regard. PCD division of CEA deals with telecommunications issues on transmission lines and they have already taken up the issue. SCM is a planning forum and what kind of communication would be appropriate for power line communication was not under its purview. Also standardization of OPWG (24 fibers) as one of the earthwire, as proposed by POWERGRID, will restrict use of new upcoming/alternative technology for the purpose.

15.7. The committee acknowledged the importance of wideband communication network for reliable communication requirements from all substations in the power system. For use of earthwire for communication purpose, the necessary changes need to done in the CEA (Technical Standards for Construction of Electrical Plants and Electric Lines) Regulations, 2010 which is already under revision.

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

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

16.2. In the meeting, CSPTCL representative confirmed that the two no. of unutilized 220 kV bays at Raipur (PG) would be used for termination of 220 kV D/C line from DOMA which is likely to be implemented in 9 months' time. Also they would not implement LILO of Khademara – Borjhara S/c line at Raipur (PG) due to RoW problems in its implementation.

16.3. Director (PSP&PA –I), CEA said that the proposal of LILO of Khedamara – Borjhara S/c line at Raipur (PG) was agreed as a part rearrangement of existing 220 kV lines between Khedamara 400/220 (CSPTCL) and Raipur 400/220 kV (PG) substations. The rearrangement works were proposed by CSPTCL due to high loading on Khedemara- Bhilai 220 kV D/C line and Raipur – Bhilai 220 kV S/C line and they were facing difficulty in managing contingencies / availing shut down on these lines. The rearrangement works without LILO of Khademara – Borjhara S/c line at Raipur (PG) would not solve problem of high loading of 220 kV lines presently being faced by CSPTCL. In case of RoW issues in implementation of LILO of Khademara – Borjhara S/c line at Raipur (PG), the option of laying cables could be explored by CSPTCL.

16.4. CSPTCL representative stated that they would revert back on the issue.

17. Augmentation of Transformation Capacity at ISTS substations in WR to meet n-1 contingency of transformer- agenda by POWERGRID

17.1. Director (PSP&PA-I), CEA said that POWERGRID has proposed the augmentation of Transformation Capacity at ISTS substations in WR to meet n-1 contingency criteria. List of substations along with recorded peak loadings on the transformers and loading on these transformers in 2018-19 time frame, as intimated by POWERGRID, is given below:

Sl. No.	Name of the S/S	ICT Rating (MVA)	No. of ICT	Aggregate capacity (MVA)	N-1 Capacity (Outage of Largest ICT)	Peak Loading (MW)	Loading in 2018-19 Time Frame (MVA)
1	Khandwa 400/220kV	315	2	630	315	530	2x241 = 482 (345:n-1)
2	Boisar 400/220kV	315 500	2	1130	630	800	2x366+581= 1313 (1000:n-1 of 500MVA)
3	Bhachau 400/220kV	315	2	630	315	510	2x163 = 326 (245: n-1)
4	Kala(DNH) 400/220kV	315	2	630	315	466	2x278 = 558 (389: n-1)
5	Vapi 400/220kV	315	3	945	630	836	3x335 = 1005 (2x415: n-1)
6	Dehgam 400/220kV	315	2	630	315	450	2x257= 514 (331: n-1)
7	Raigarh (Existing) 400/220kV	315	2	630	315	400	2x168 = 336 (262: n-1)
8	Bhatapara 400/220kV	315	2	630	315	440	2x183 = 366 (263: n-1)
9	Bina(PG) 400/220kV	315	1	315	0	235	304 (n-1 criteria violated as only 1 trf)

The peak loading on transformers at Bhachau, Raigarh (Existing) and Bhatapara that has already occurred are expected to be reduced after commissioning of on-going and planned transmission in 2018-19 timeframe and n-1 criteria is fulfilled even without augmentation.

17.2. MPPTCL representative said that 1X315 MVA, 400/220 kV ICT at (2nd) Chhegaon is already under implementation and it would relieve the loading on Khandwa ICTs after its completion. POWERGRID clarified that even in 2018-19 time frame loading of about 500 MW is observed on Khandwa ICTs, therefore augmentation is required at Khandwa.

17.3. CEA enquired about loading observed at Vapi and Kala 400/220 kV substation feeding power to UT of DNH and Daman & Diu. He suggested instead of augmenting transformation capacity at both the substations, a new substation may proposed to cater to the demand of DNH and Daman & Diu. Also with consideration of Magarwada 400/220 kV substation loading on Vapi ICTs would get reduced. CTU clarified that Magarwada 400/220 kV substation has already been considered in the studies. At Vapi 400/220 kV substation there is no space

available for putting additional transformers, therefore, it has been proposed to install 3X500 MVA ICTs in place of the existing 3X315, 400/220 kV ICTs and shift one each to Dehgam, Raigarh (existing) and Bhatpara 400 kV substations.

17.4. POWERGRID informed that at Bina (PG) 400/220 kV substation there is only 1X315 MVA ICT and to meet n-1 criteria there is requirement of an additional ICT but there is no space available for installation of additional ICT. Director (PSP&PA-I), CEA said that the effect of outage of ICT at Bina (PG) on 220 kV lines emanating from Bina (MPPTCL) needs to be studied to ascertain the requirement of additional ICT at Bina (PG). MPPTCL agreed to do the study and intimate the results to CEA/CTU.

17.5. Regarding the query on additional outlets from Boisar, MSETCL representative informed that Boisar- Borivali 220 kV multicircuit line is already under implementation and was expected to be commissioned by March 2016.

17.6. The loadings on the above ICTs for the period December 2014 to November 2105 (furnished by WRLDC) were analyzed. In the analysis it was seen that :

- Loading on Vapi ICTs above 700 MW was observed during the period when Kala ICTs were out of service. Otherwise, the loading on the Vapi ICTs (3X315 MVA) has not reached above 550 MW. Similarly maximum loading of 390 MW has been observed on Kala ICTs (2X315 MVA) during the period when one Vapi ICT was out of service.

- Loading of 426 MW has been observed on Raigarh 400/220 kV ICTs (2X315) only 2nd April 2015, otherwise loading are normally below 300 MW.

- Loading of the order of 450 MW has been observed on Bhatpara 400/220 kV ICTs (2X315) only on few occasions, otherwise loading are normally in the range of 300 to 350 MW.

17.7. The following augmentation of transformation capacity at ISTS substations in WR is agreed:

Sl. No.	Name of the S/S	Existing ICTs			Augmentation
		Rating (MVA)	No. of ICT	Aggregate capacity (MVA)	
1	Khandwa 400/220kV	315	2	630	1x500MVA, 400/220kV (3rd)
2	Boisar 400/220kV	2X315 + 1X500	3	1130	1x500MVA, 400/220kV (4th)
3	Kala(DNH) 400/220kV	315	2	630	1x500MVA, 400/220kV (3rd)
4	Dehgam 400/220kV	315	2	630	1x500MVA, 400/220kV (3rd)

The requirement of augmentation of transformation capacity at Bina (PG) 400/220 kV substation would be further studied by MPPTCL.

18. Measure to control Fault Level at pooling stations/ substations in Chhattisgarh area

18.1. Director (PSP&PA-I), CEA said that issue of high short circuit levels at almost all pooling stations of Chhattisgarh viz. Raigarh (Kotra), Raigarh (Tamnar), Champa, Dharamjaygarh, Bilaspur Pool and Raipur Pool, was discussed in the 38th Standing Committee Meeting (SCM) of WR wherein it was decided that joint studies shall be done by CEA and CTU and the issue shall be finalized in the next SCM of WR. Joint study results indicate that following measures need to be taken to control the fault levels of the pooling stations in the Chhattisgarh area:

a. To improve the reliability of power transfer from generating stations connected at Raigarh Pool (Tamnar), LILO of both ckts of Jharsuguda – Dharamjaygarh765kV 1x D/c line at Raigarh (Tamnar) Pool was agreed in 36th SCM of Western Region held on 29.08.2013. The LILO proposal is causing high fault level at Dharamjaygarh Pool, Raigarh (Tamnar) Pool and Jharsuguda. To contain the fault level and to ensure reliable evacuation of power from generation projects at Raigarh (Tamnar) Pool, the following is proposed in place of LILO of both ckts of Jharsuguda – Dharamjaygarh765kV 1x D/c line at Raigarh (Tamnar) Pool.

   - Raigarh (Tamnar) Pool – Dharamjaygarh 765 kV D/c Line.

b. In order to contain the fault level within designed value at Champa pool, proposal for Series Reactors and BUS Split arrangement was discussed in the 37th WR SCM held on 05.09.2014. After comprehensive studies, it has been observed that fault levels at Champa Pool may be contained with Bus splitting arrangement at both 765kV & 400kV levels even without series reactors.

c. Further, in the 30th WR SCM held on 08.07.2010, it was decided to keep following circuits in normally open condition at a later date:

   - Raigarh Pool (Kotra) – Raigarh (Existing) 400 kV D/c line.
   - Raipur Pool– Raipur (Existing) 400kV D/c line.

   These lines may be kept normally open and may be closed depending on the system condition

d. Bus splitting of 765kV bus at Dharamjaygarh S/s and splitting of both 765kV & 400kV buses at Raigarh Pool (Kotra) S/s and Champa pool.

e. During the studies, it was observed that the interconnection between 4x600MW TPP and 4x250MW TPP of M/S Jindal Power Ltd, when switched ON, contributes excessive fault current to Raigarh (Tamnar) Pool & Raipur Substations. Hence, the same has been switched OFF in the studies. The same shall have to be ensured by M/s Jindal Power Ltd.

The results of the short circuit studies with the above bus split are shown in the table below:

Sl.No	Substation	Voltage Level (in kV)	Designed SC MVA (in kA)	1	2	
				Fault level in Base Case (kA)	Fault level after Proposed bus splitting (kA)	
					Part A	Part B
1	Dharamjaigarh	400	50	37	33	#
		765	50	71	41	38
2	Raigarh Pool (Kotra)	400	50	102	47	31
		765	50	59	38	19
3	Raipur Pool	400	50	49	30	#
		765	50	53	44	#
4	Champa Pool	400	50	90	48	42
		765	50	62	37	26
5	Bilaspur Pool S/s	400	40	40	39	#
		765	40	46	44	#
6	Raigarh Pool (Tamnar)	765	50	61	38	#
		400	50	55	46	#
7	Raipur(Existing)	400	40	47	26	#
	Raipur (Existing) Split	400	40	41	39	#
8	Raigarh	400	40	88	34	#
9	Rajnandgaon	765	50	36	34	#
10	Sipat	765	50	42	41	#
		400	50	40	39	#

 # BUS not split

18.2. The Single Line Diagram of the pooling stations/ substations after bus splitting are given below-

i. Dharamjaygarh Pooling Station after splitting:

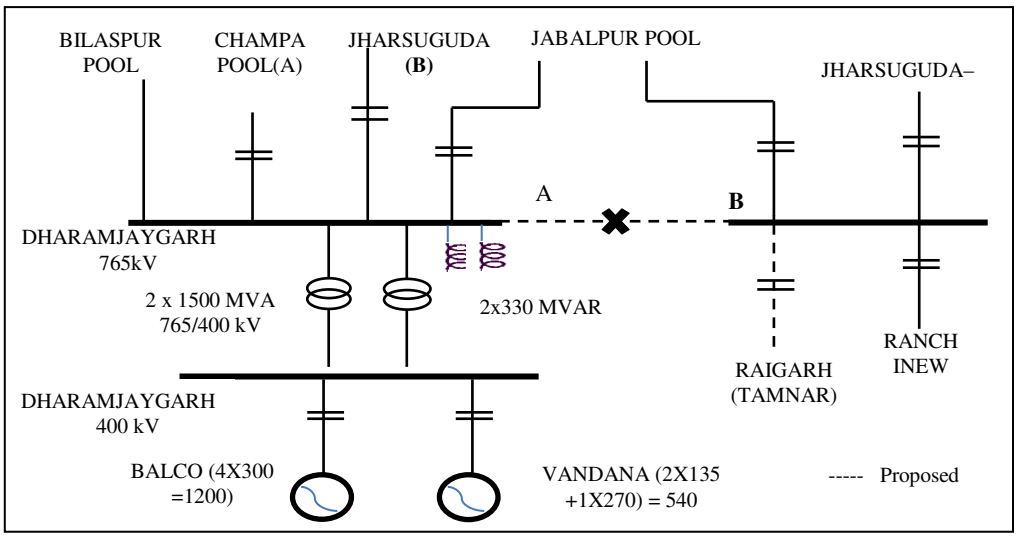


Fig. 1: Dharamjaygarh Pooling Station after splitting

Dharamjaygarh S/s Voltage Level (in kV)	Description		BUS Section A	BUS Section B
400	Generation (in MW)		1740	-
	BUS Reactor (in MVAR)	Available	-	-
		Proposed	1x125	-
	765/400kV ICT(in MVA)	Available	2x1500	-
765	BUS Reactor(in MVAR)	Available	2x330	-
		Proposed	-	1X330

 # Balco TPP is a captive plant and LTA granted for 584MW (200MW for Balco Ltd & 384MW for CSPTCL)

ii. Raigarh Pool (Kotra) after splitting :

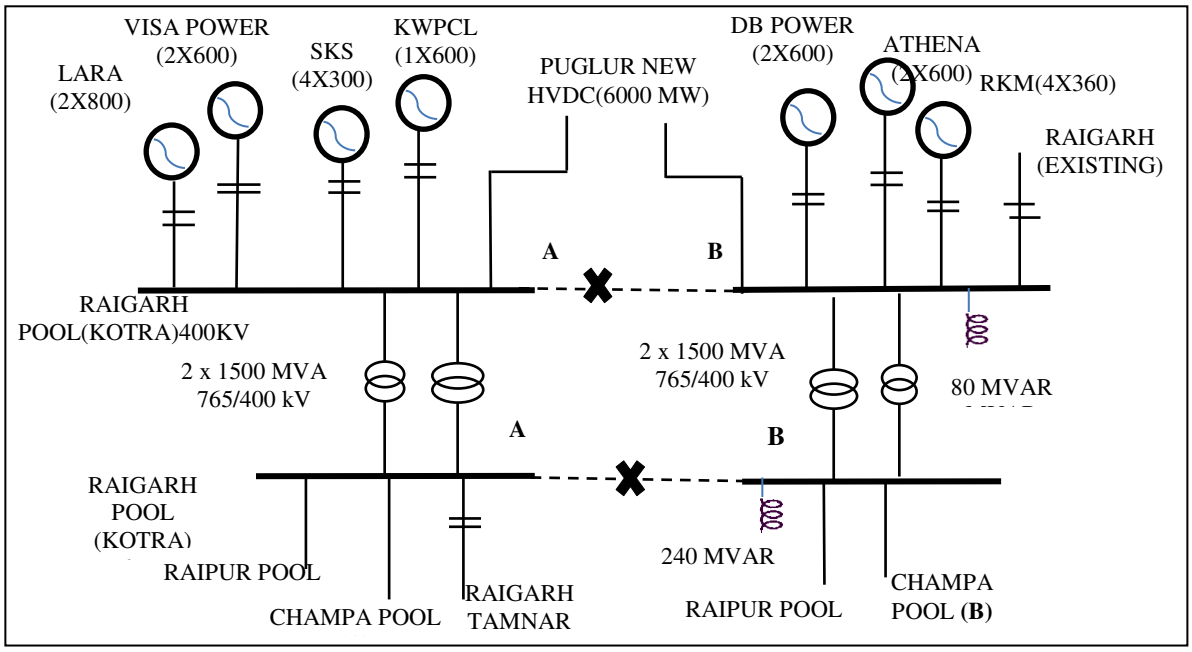


Fig. 2: Raigarh Pool (Kotra) after splitting.

Raigarh Pool (Kotra) Voltage Level (in kV)	Description		BUS Section A	BUS Section B
400	Generation (in MW)		3000	3840
	BUS Reactor(in MVAR)	Available	-	80
		Proposed	1 X 125	-
	765/400kV ICT (in MVA)	Available	2x1500	2x1500
765	BUS Reactor (in MVAR)	Available	-	240
		Proposed	240	

iii. Champa Pooling Station after BUS Splitting :

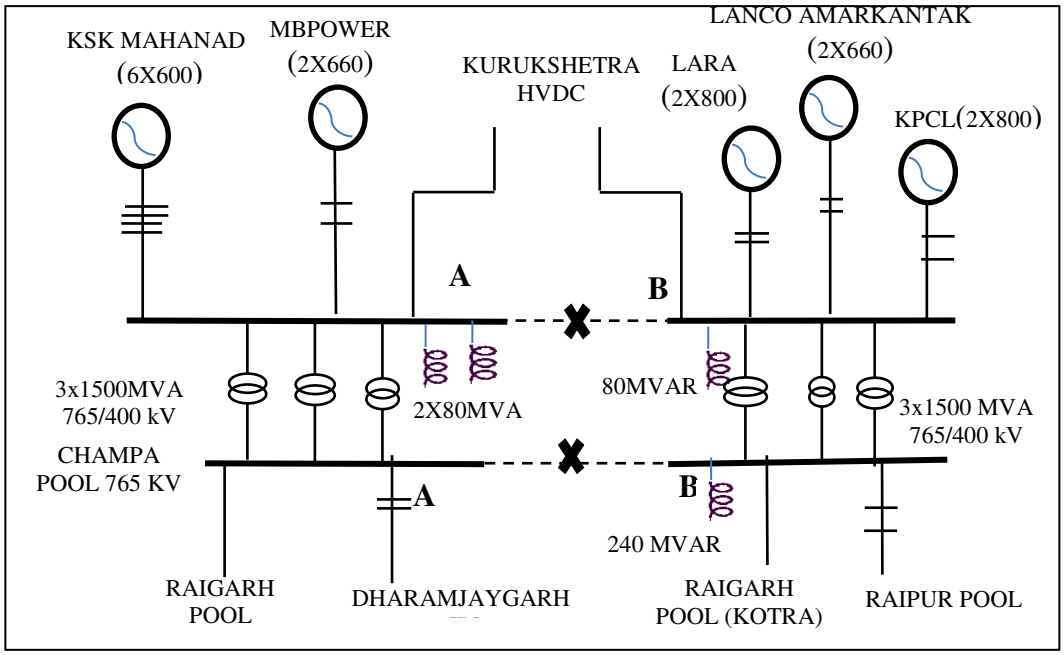


Fig. 3: Champa Pooling Station after splitting.

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

18.3. The proposal to control fault level at pooling stations/ substations in Chhattisgarh area is summarized below:

1.	Splitting Arrangement of following substations along with necessary switching arrangement (i) Dharamjaygarh Pool 765kV BUS as per Fig. 1. (ii) Raigarh Pool (Kotra) 400kV & 765kV BUS as per Fig. 2. (iii) Champa Pool 400 kV & 765kV BUS as per Fig 3.
2.	Followings ckts shall be operated as normally open and may be switched on as per operational requirement of grid: (iv) Raigarh Pool (Kotra) – Raigarh (Existing) 400 kV D/c line. (v) Raipur Pool – Raipur (Existing) 400kV D/c line
3.	Reactors: (vi) 1x125 MVAR BUS Reactor at 400 kV BUS Section A of Dharamjaygarh Pool. (vii) 1x125 MVAR BUS Reactor at 400 kV BUS Section A of Raigarh Pool (Kotra). (viii) 1x240MVAR BUS Reactor at 765 kV BUS Section A of Raigarh Pool (Kotra). (ix) 1x240MVAR BUS Reactor at 765 kV BUS Section A of Champa

	Pool. (x) 1X330MVAR BUS Reactor at 765kV BUS Section B of Dharamjaygarh Pool
4.	Additional System for Power Evacuation from Generation Projects pooled at Raigarh (Tamnar): (xi) Dharamjaygarh Pool section B - Raigarh (Tamnar) Pool 765kV D/c line

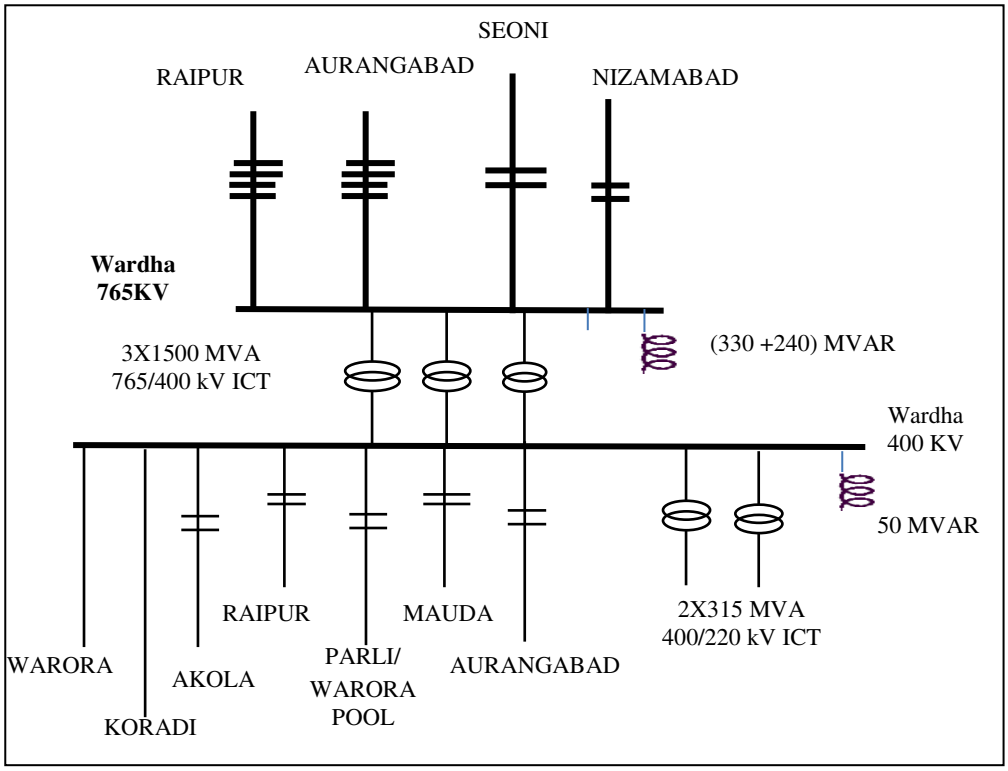
Note # 1: Wherever there is space constraint, GIS bay would be used.
 # 2: The interconnection between 4x600MW TPP and 4x250MW TPP of M/S Jindal Power Ltd to normally remain in open condition and the same may be switched on as per operational requirement of grid.

18.4. AGM, NLDC enquired about the 400 kV outlets available from Raipur (existing) 400 kV bus section B, in case Raipur Pool – Raipur (Existing) 400kV D/c line would be normally kept open. CTU clarified that Raipur – Wardha 400 kV D/C line was available for onward transfer of power from Raipur 400 kV Bus section B. CEA said that Raipur Pool – Raipur (Existing) 400kV D/c line was to be normally kept open with 765 kV operation of the pooling stations in Chattisgarh namely, Raipur pool, Raigarh (Kotra) and Champa . However, in case of any mismatch in the bus section the same could be studied, if required. Regarding the implementation of the proposal, it was clarified that item no. 1 and 3 would be implemented by POWER GRID and item no.4 would be implemented through TBCB.

18.5. Members agreed with proposal to control fault level at pooling stations/ substations in Chhattisgarh as detailed above (at 18.3).

19. Measure to control fault level at Wardha Substation

19.1. Director(PSP&PA-I), CEA said even after splitting of buses at Dharamjaygarh, Raigarh pool (Kotra) and Champa pool in Chhattisgarh, the studies for 2018-19 condition shows a fault level of about 46 kA at Wardha 765kV bus and about 78 kA at Wardha 400kV bus. The single line diagram of Wardha substation is given below:



Wardha Sub-Station

At 400kV Wardha bus, major fault current contributions are from: Warora Pool D/c line – 16kA, Warora (MSETCL) S/c line – 7.7kA, Koradi II (MSETCL) S/c line – 9.6kA, Mauda TPP D/c line – 5.6kA and 765/400kV ICTs – 26kA. It is seen that Warora Pool contributes the most at Wardha 400kV bus. Further, it is seen that the interconnection with MSETCL system contributes about 17.6kA at 400kV Wardha bus. To reduce the fault current contribution, the following re-arrangement is proposed at Wardha Substation:

(i) Bypassing Mauda TPP – Wardha 400kV D/c line at Wardha bus and connecting it with Wardha – Warora Pool 400kV D/c (Quad) line so as to form Mauda TPP – Warora Pool 400kV D/c (Quad) line

(ii) Bypassing Koradi TPP II – Wardha 400kV (Quad) line at Wardha bus and connecting it with Wardha – Warora (MSETCL) 400kV (Quad) line so as to form Koradi TPP II – Warora (MSETCL) 400kV (Quad) D/c line (one ckt via IEPL TPP)

The results of the short circuit studies done by CTU incorporating the above re-arrangement are tabulated below:

Name of the S/s (BUS)	Voltage Level (kV)	3-Ph SC fault level of the Substations (in kA)	
		Base Case	Base Case + Proposed re-arrangement at Wardha (PG)
Wardha (PG)	400	78	44
Wardha (PG)	765	46	40
Warora MSETCL)	400	41	34
Koradi III MSETCL)	400	38	36

Koradi TPP II	400	56	53
Koradi TPP I	400	52	50
Aurangabad (PG)	400	45	44
Warora Pool	400	51	32
Chandrapur I (MSETCL)	400	51	48
Chandrapur II (MSETCL)	400	51	48

The design rating of Wardha substation is 40kA (3 phase) for both 400kV and 765kV levels. With the proposed re-arrangement, fault levels at Wardha has reduced from 78kA to 44kA at 400kV level and from 46 to 40kA at 765kV level but are still more than the design limit of 40 kA at 400 kV level.

19.2. SE, MSETCL said the bypassing of Warora (MSETCL) - Wardha 400 kV D/C line at Wardha connecting it Koradi- Wardha 400 kV D/C line may cause overloading Warora- Chandrapur- Parli section and it needs to be studied further.

19.3. Director(PSP&PA-I), CEA said that even with the proposed re-arrangement faults level observed at Wardha (PG), Koradi I &II, Chandrapur I & II are above design ratings. Additional measures to contain the fault levels needs to be further studied by CEA, CTU and MSETCL and proposal would be put in the next SCM of WR.

20. Measures to control High fault levels observed in Vindhyachal complex

20.1. Director (PSP&PA-I), CEA said that fault levels in Vindhyachal complex have reached beyond the design limits. Short circuit studies carried out by CTU indicate following fault levels at Vindhyachal Complex:

Sl. No.	**Substation**	**3 Phase fault level**	**LG fault level**
1	Vindhyachal STPS – I,II,III 400kV	59kA	64kA
2	Vindhyachal STPS – IV, V 400kV	56kA	59kA
3	Sasan UMPP 400kV	49kA	46kA
4	Vindhyachal Pool 400kV	50kA	48kA
5	Korba STPS	57kA	56kA

In the previous Standing Committee Meetings on Power System Planning in Western Region, the following has been agreed:

(i) Interconnection of Vindhyachal-IV STPP 400 kV bus with the existing Vindhyachal-III STPP 400 kV as an interim arrangement till the commissioning of Vindhyachal-IV transmission system (agreed in the 33rd WR SCM held on 21.10.2011)

(ii) In order to reduce the short circuit levels, under Sasan transmission it has been decided to delete the LILO of Vindhayachal STPP – Jabalpur 400 kV D/C at Sasan subsequent to development of 765 kV system from Sasan. One of the LILO line would be retained at Sasan with suitable switching

arrangements at Sasan 400 kV switchyard to meet its starting power requirements in future. The LILO of the other ckt would be bypassed and the 400 kV bays at Sasan would be utilized for Vindhyachal Pool-Sasan 400 kV D/C line to be terminated at Sasan(agreed in 29th WR SCM held on 10.09.2009).

After removal of the 400 kV interconnection of Vindhyachal-IV & Vindhyachal -III and LILO of Vindhayachal STPP – Jabalpur 400 kV D/C at Sasan in the short circuit studies, fault levels are seen to reduce considerably, as given below:

Sl. No.	Substation	3 Phase fault level	LG fault level
1	Vindhyachal (NTPC) – I,II,III 400kV	38kA	41kA
2	Vindhyachal (NTPC) – IV, V 400kV	24kA	26kA
3	Sasan UMPP 400kV	28kA	29kA
4	Vindhyachal Pool 400kV	29kA	30kA
5	Korba STPS	56kA	56kA

20.2. He further said that high fault levels at Korba STPS has been reported by NLDC in their operational feedback. It is seen that removal of the 400 kV interconnections at Sasan and Vinhyachal STPS is not having any effect on the fault levels at Korba STPS. Therefore, it needs to be further studied. Also the Vindhyachal STPS IV Transmission system has already been commissioned as such the 400kV interconnection between Vindhyachal STPS I, II, III and Vindhyachal IV, V of NTPC Ltd which, was agreed as interim arrangement, needs to be disconnected.

20.3. AGM, NTPC said initially Vindhyachal IV was interconnected with Vindhyachal III through a 400 kV D/C line. With commissioning of Vindhyachal V, LILO of the 400 kV interconnection between stage IV and III was done at Stage V. Therefore at present the 400 kV interconnection exists between Stage-IV & Stage V and between Stage V & Stage III. Out of the total evacuation system of Vindhyachal stage IV and V, the second Vindhyachal IV – Vindhyachal pool 400 kV D/C (quad) line is still under implementation through tariff based competitive bidding route. As of now, the 400 kV interconnection between Stage-IV & Stage V could be opened and with completion of the 2nd Vindhyachal IV – Vindhyachal pool 400 kV D/C (quad) line , the 400 kV interconnection between Stage-V & Stage III could also be opened.

20.4. After further deliberations, it was agreed that the 400 kV interconnection between Vindhyachal Stage-IV & Stage V would be kept open. Vindhyachal V would remain connected with Stage III. In case of operational requirements, Stage V could be connected with Stage IV after its disconnection from Stage III. With completion of the 2nd Vindhyachal IV – Vindhyachal pool 400 kV D/C (quad) line, Vindhyachal Stage IV & V would be interconnected and the link between Stage V & III would be kept normally open. Regarding 400 kV bypassing at Sasan , it was agreed that WRLDC/NLDC shall take up the matter with M/s Sasan power Ltd and ensure the opening of the LILO of one ckt of Vindhyachal STPS – Jabalpur 400kV D/c line at Sasan UMPP.

21. Reactive compensation of various schemes agreed to be implemented through TBCB

21.1. Director (PSP&PA-I), CEA informed that the following transmission schemes has been approved in 36th / 37th /38th meeting of Standing Committee on Power System Planning in Western Region held on 29.08.2013/05.09.2014/ 17.07.2015 respectively.

Transmission System associated with Gadarwara STPS (2x800MW) of NTPC (Part –A)

(i) Gadarwara STPS – Jabalpur Pooling Station 765kV D/c line
(As per interim arrangement, LILO of existing Seoni – Bina 765kV S/c line at Gadarwara STPP would be established. At a later date, LILO portion would be delinked from Seoni – Bina 765kV S/c line to restore the Seoni – Bina 765kV s/c direct, and the LILO portion would be extended to the Jabalpur 765/400kV Pooling Station to form the proposed Gadarwara STPS – Jabalpur Pool765kV D/c line)

(ii) Gadarwara STPS – Pooling Station (near Warora) 765 kV D/c line

(iii) Establishment of 2x1500 MVA, 765/400 Substations at Pooling Station (near Warora)

(iv) LILO of both circuits of Wardha - Parli (PG) 400 kV D/c quad line at Pooling Station (near Warora)

Transmission System associated with Gadarwara STPS (2x800MW) of NTPC (Part –B) now renamed as WRSS 15.

(i) Pooling Station (near Warora) – Parli (new) 765 kV D/c line

(ii) Parli (new) – Solapur 765 kV D/c line

(iii) Establishment of 2x1500 MVA, 765/400 Substations at Parli (new)

(iv) Parli (new) – Parli (PG) 400 kV D/c (Quad) line

Additional Transmission System Strengthening for Sipat STPS

(i) Sipat – Bilaspur Pooling Station 765kV 3rd S/c line

(ii) Bilasapur Pooling Station – Rajnandgaon 765kV D/c line

System Strengthening for IPPs in Chhattisgarh and other generation projects in Western Region

(i) **400kV interconnections at Gwalior 765/400kV S/s:**

- Gwalior 765/400 kV – Morena 400 kV D/C (Quad) line
- Establishment of 2X315 MVA, 400/ 220 kV substation at Morena

(ii) **Additional evacuation line from Vindhyachal-IV & V STPP (3x500 MW):**

- Vindhyachal-IV & V STPP – Vindhyachal Pool 400 kV 2nd D/C (Quad) line

(iii) **Additional System Strengthening Scheme for Chhattisgarh IPPs (Part A):**

- Sasan UMPP – Vindhyachal Pooling station 765 kV 2nd S/C line
- LILO of one circuit of Aurangabad – Padghe 765 kV D/C line at Pune GIS
- Raigarh (Kotra) - Champa Pool 765 kV 2nd S/C line.
- Champa Pool) – Dharamjaigarh 765 kV 2nd S/C line.

Additional System Strengthening Scheme for Chhattisgarh IPPs (Part B):

(i) Raipur Pool – Rajnandgaon (TBCB) 765 kV D/c line.

(ii) Rajnandgaon (TBCB) – Warora Pool (TBCB) 765 kV D/c line.

21.2. The above schemes have already been notified along with reactive compensation based on the recommendation of the 32nd /33rd Empowered Committee on Transmission held on 06.02.2014 / 30.09.2014 respectively. The details for reactive compensation are as below:

Bus reactors

Sl. No.	Transmission scheme	Substation	Bus Reactor
1	Transmission System associated with Gadarwara STPS (2x800MW) of NTPC (Part –A)	765/400kV,2x1500MVA Warora Pooling Station	765kV, 1x330MVAR
		Gadarwara STPS Switchyard	765kV, 1x330MVAR
2	Transmission System associated with Gadarwara STPS (2x800MW) of NTPC (Part –B) now renamed as WRSS-15	765/400kV, 2x1500MVA Parli (New) Substation	765kV, 1x330MVAR
3	System Strengthening for IPPs in Chhattisgarh and other generation projects in Western Region	400/220kV, 2x315MVA Morena Substation	400kV, 1x125MVAR
4	Additional System Strengthening Scheme for Chhattisgarh IPPs – Part B	765kV Rajnandgaon Switching Station	765kV, 1x330MVAR

Line Reactors:

Sl. No.	Transmission scheme	Transmission Line	Line Reactors (MVAR)	
			From End	To End
1	Transmission System associated with	Gadarwara STPS – Warora Pooling Station 765kV D/c line	2x330*	2x330

	Gadarwara STPS (2x800MW) of NTPC (Part –A)	Warora Pool – Parli (PG) 400kV D/c quad line (formed after LILO of Wardha – Parli (PG) 400kV D/c quad line at Warora Pooling Station)	2x80*	--
2	Transmission System associated with Gadarwara STPS (2x800MW) of NTPC (Part –B) now renamed as WRSS-15	Warora Pooling Station – Parli (New) 765kV D/c line	2x330*	2x330
3	Additional System Strengthening Scheme for Sipat STPS	Bilaspur Pooling Station – Rajnandgaon 765kV D/c line	2x240*	
4	Additional System Strengthening Scheme for Chhattisgarh IPPs – Part B	Rajnandgaon – Warora Pooling Station 765kV D/c line	2x330*	

**switchable line reactor*

21.3. CTU has informed that the length of Rajnandgaon – Warora Pooling Station 765kV D/c line (under the Transmission scheme Additional System Strengthening Scheme for Chhattisgarh IPPs – Part B) is about 275KM (As per route survey done by PFCCL). On this line only 2x330 MVAR switchable line reactors has been provided at Ranjnandgaon end. It is proposed that 2x240MVAr switchable line reactor at Warora Pooling station end for Rajnandgaon – Warora Pooling Station 765kV D/c line may be taken up under Additional inter-Regional AC link for import of power into Southern Region (Warora – Warangal line) which is presently under RFP stage.

21.4. Members noted the reactive compensation already provided on the above lines and agreed for the provision of 2x240 MVAR switchable line reactors on Rajnandgaon – Warora Pooling Station 765kV D/c line at Warora end. The same would be included in the scope of Additional inter-Regional AC link for import of power into Southern Region (Warora – Warangal line) which is presently under RFP stage.

22. Open Access Meeting.

22.1. The detailed minutes of the 22nd meeting on Connectivity, Open Access (Medium term and Long term) applications in Western Region is being issued separately by POWERGRID. The summary of the schemes agreed in the open access meeting is enclosed at Annexure-4.

The meeting ended with thanks to the chair.

Annexure 1

List of Participants during the 39th Meeting of Standing Committee of Power System Planning in WR held on 30.11.2015 at NRPC, Katwaria Sarai, New Delhi.

S.No.	Name (S/Sh)	Designation	Contact No	E-mail
CEA				
1.	S D Dubey	Member (PS)		
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Annexure-2

Status of TBCB Tr. Projects - Western Region

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

S.N.	Name of the Project	BPC / Implementing Agency / Milestones	Scope of works	Current Status
		12.10.2011 (iv) Approval u/s 164 received on29.01.2013 (v) Tariff adoption on28.10.2011 Original COD : Mar2014	(iii) 2x1500 MVA 765/400 kV substation at Bhopal	**Commissioned in 7/2014**
			(iv) Bhopal-Bhopal (MPPTCL) 400 kV D/c quad line.	**Commissioned in 7/2014**
			(v) Aurangabad-Dhule 765 kV S/C line	**Line commissioned in 10/14**
			(vi) Dhule-Vadodara 765 kV S/C line	**Line ready for commissioning on 02/15**
			(vii) 2x1500 MVA, 765/400 kV substation at Dhule	**commissioned**
			(viii) Dhule - Dhule(Msetcl)400 kV D/C Line	**Line ready for commissioning since 9/2014 (400 kV bays by MSETCL at Dhule s/s is ready and expected to be charged by December 2015)**
5	Transmission System associated with DGEN TPS (1200 MW) of Torrent Power Ltd. 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.**	(i) DGEN TPS – Vadodara 400 kV D/C, Twin Moose line. (ii) Navsari – Bhestan 220 kV D/C line	
6	Transmission System associated with Gadarwara STPS (2x800 MW) of NTPC (Part-A) Estimated Cost 2525 cr	REC PGCIL **Milestones:** (i) Date of issuance of RFQ :15.08.2014 (ii) Date of RFP:14.11.2014 (iii) Date of signing of TSA: 09.02.2015	(i) Gadarwara STPS-Jabalpu Pool 765 D/C line (ii) Gadarwara STPS- Warora P.S. (New) 765 D/C line (iii) LILO of both Ckts. Of Wardha-Parli 400 kV D/C at Warora P.S. (2xD/C). (iv) Warora 765/400 kV P.S. (2x1500 MVA).	
7	Transmission System associated with Gadarwara STPS (2x800 MW) of NTPC (Part-B). Estimated Cost 2360 cr	REC PGCIL **Milestones:** (i) Date of issuance of RFQ :07.08.2014 (ii) Date of RFP:14.11.2014 (iii) Date of signing of TSA: 09.02.2015	(i) Warora P.S.-Parli (New) 765 kV D/C line (ii) Parli(New)-Solapur 765 D/c line (iii) Parli (New)-Parli (PG) 400 kV D/C (Quad) line (iv) 765/400 kV Parli (New) Sub-station (2x1500 MVA).	
8	Transmission System Strengthening associated with Vindhyachal- V Estimated Cost 1050 cr	REC PGCIL **Milestones:** (i) Date of issuance of RFQ :20.08.2014 (ii) Date of RFP:22.10.14 (iii) SPV has been acquired by the successful bidder on 26.02.2015 (iv) Date of filing of petition for adaptation of tariff and grant of license : 26.02.2015	(i) Vindhyachal P. S- Jabalpur P. S. 765 kV D/C line.	Completion Target: June,2018

S.N.	Name of the Project	BPC / Implementing Agency / Milestones	Scope of works	Current Status
9	System strengthening for IPPs in Chhattisgarh and other generation projects in Western Region Estimated Cost as provided by Empowered Committee: Rs. 823 crore Rs. 1285 crore (as per cost Committee)	PFCCL **Milestones:** (i) MoP vide letter dated 15.01.2014 trans dated 15-07-2014 & Gazette Notification dated 09.07.14 appointed PFCCL as BPC. (ii) SPV incorporated on 24.12.2014 (iii) RFQ notice published on 29.12.2015. (iv) LoI issued to the successful bidder Adani Power Ltd on 28.07.2015.	(i) Gwalior 765/400 kV – Morena 400 kV D/C line 400 kV D/C Length- 50 km (ii) Establishment of substation at Morena 400/ 220 kV 2X315 MVA (iii) Vindhyachal-IV & V STPP – Vindhyachal Pool 400 kV D/C (Quad) 2nd line 400 kV D/C Length-15 km (iv) Sasan UMPP – Vindhyachal Pooling station 765 kV S/C line 765 KV S/C Length-8 km (v) LILO of one circuit of Aurangabad – Padghe 765 kV D/C line at Pune 765 kV D/C Length-50 km	SPV transferred on 23.11.2015
10	Additional System Strengthening for Sipat STPS Estimated Cost as provided by Empowered Committee: Rs. 867 crore Rs. 1097 crore (as per cost Committee)	PFCCL **Milestones:** (i) MoP vide letter dated 15.01.2014 trans dated 15-07-2014 & Gazette Notification dated 09.07.14 appointed PFCCL as BPC. (ii) SPV incorporated on 23.12.2014 (iii) RFQ issued on 01.01.2015. (iv) LoI issued to the successful bidder Adani Power Ltd on 28.07.2015	(i) Sipat – Bilaspur Pooling Station765 kV S/C line 765 kV S/C Length-25 km (ii) Bilaspur Pooling Station - Rajnandgaon765 kV D/C line 765 kV D/C Length-180 km	SPV transferred on 23.11.2015
11	Additional System Strengthening Scheme for Chhattisgarh IPPs – Part B Estimated Cost as provided by Empowered Committee: Rs. 1930 crore Rs. 2260 crore (as per cost Committee)	PFCCL **Milestones:** (i) MoP vide letter dated 15.01.2014 trans dated 15-07-2014 & Gazette Notification dated 09.07.14 appointed PFCCL as BPC. (ii) SPV incorporated on 23.12.2014 (iii) RFQ notice published on 01.01.2015. (iv) LoI issued to the successful bidder Adani Power Ltd on 28.07.2015	(i) Raipur (Pool) – Rajnandgaon 765 kV D/C line 765 KV D/C Length-60 KM (ii) Rajnandgaon – New Pooling station near Warora 765 kV D/C line 765 KV D/C Length- 270 KM (iii) Establishment **of new substation** near Rajnandgaon 765/400kV 2x1500 MVA	SPV transferred on 23.11.2015
12	Additional inter-Regional AC link for import into Southern Region i.e. Warora – Warangal and Chilakaluripeta - Hyderabad - Kurnool 765kV link Estimated Cost as provided by Empowered Committee: Rs. 7760 crore	PFCCL **Milestones:** (i) MoP vide Gazette Notification dated 06.02.15 appointed PFCCL as BPC. (ii) SPV incorporated on 20.04.20155RFQ notice published on 23.04.2015. (iii) RfQ responses received and opened on 22.05.2015. RfQ evaluation completed. (iv) The revised RfQ has been re-issued on 11.09.2015 with submission of response due on 12.10.2015. (v) 5 nos. RfQ responses	(i) Establishment of 765/400kV substations at Warangal (New) with 2x1500 MVA transformers and 2x240 MVAR bus reactors. 765/400kV (ii) Warora Pool – Warangal (New) 765kV D/c line with 240 MVAR switchable line reactor at both ends. 765 KV D/C Length- 350 KM (iii) Warangal (New) –Hyderabad 765 kV D/c line with 330 MVAR switchable line reactor at Warangal end. 756 KV D/C Length- 160 KM (iv) Warangal (New) – Warangal (existing) 400 kV (quad) D/c	Under Bidding process RfP scheduled for 30.11.2015

S.N.	Name of the Project	BPC / Implementing Agency / Milestones	Scope of works	Current Status
		received on schedule date i.e 12.10.2015 and opened on the same day. The RfQ evaluation is under progress.	line. 400KV D/C Length-10 KM (v) Hyderabad – Kurnool 765 kV D/c line with 240 MVAR switchable line reactor at Kurnool end. 765 KV D/C Length- 170 KM (vi) Warangal (New) – Chilakaluripeta 765kV D/c line with 240 MVAR switchable line reactor at both ends.765 KV D/C Length-250 (vii) Cuddapah – Hoodi 400kV (quad) D/c line with 63 MVAR switchable line reactor at both ends. 400 KV D/C Length-200	
13	Common Transmission System for Phase-II Generation Projects in Odisha and Immediate Evacuation System for OPGC (1320 MW) Project in Odisha Estimated Cost as provided by Empowered Committee: Rs. 2748 crore	PFCCL **Milestones:** (i) MoP vide Gazette Notification dated 06.02.15 appointed PFCCL as BPC. (ii) SPV incorporated on 17.04.2015 (iii) RFQ notice published on 23.04.2015.	(i) OPGC (IB TPS) – Jharsuguda (Sundargarh) 400kV D/C line with Triple Snowbird Conductor 400 kV D/C Length- 50 KM (ii) Jharsuguda (Sundargarh) – Raipur Pool 765 kV D/C line 765 KV D/C Length- 350 KM	Under Bidding process

Annexure-3

STATUS OF TRANSMISSION SCHEMES UNDER IMPLEMENTATION BY POWERGRID IN WESTERN REGION

Sl. No.	Description of Scheme	Estimated Cost (Rs. Cr)	Date of firming up in WR SCM	investment approval	Target date as of now	Remarks
1	**Western Region System Strengthening Scheme -II**	5222	20th (23.01.04)	July'06		
	Set-A: For absorbing import in eastern and central part of WR Grid (POWERGRID)	1700			Commissioned	
	Set-B: For regional strengthening in Southern Maharashtra **(100 % private)**	1050			Commissioned	
	Set-C: For regional strengthening in Gujarat **(100 % private)**	600			---	Implementation by Reliance
	a) Rajgarh – Karamsad 400kV D/c				---	
	b) Limdi(Chorania) – Ranchodpura 400kV D/c				commissioned	
	c) Ranchodpura – Zerda(Kansari) 400kV D/c				commissioned	
	Set-D: For regional Strengthening in Northern Madhya Pradesh **(POWERGRID)**	1050			commissioned	
2	**Western Region System Strengthening -V**	722	25th (30.09.06)	Dec'07		Under implementation
	a) 400 kV Vapi- Kala - Kudus D/c				Jun'16	Vapi-Kala portion commissioned in Mar'14. Kudus S/s being implemente by MSETCL.
	b) LILO of 400 kV Lonikhand - Kalwa line at Navi Mumbai				Dec'15	Cable work in progress. Critical ROW issues
	c) Establishment of 400/220 kV, 2 x 315 MVA new S/s (GIS) at Navi Mumbai					Substation is ready and shall be commissioned matching with line
	d) 220 kV Vapi- Khadoli D/c.				Commis	

					sioned	
3	**Tr. System of Mundra Ultra Mega Power Project (4000 MW)**	4824	26th (23.02.07)	Oct'08		Under implementation
	a) Mundra – Bachchau - Ranchodpura 400 kV (Triple) D/c				Commissioned	
	b) Mundra – Jetpur 400 kV (Triple) D/c				Commissioned	
	c) Mundra – Limbdi 400 kV (Triple) D/c				Commissioned	
	d) Gandhar-Navsari 400 kV D/c				Commissioned	
	e) Navsari - Boisar 400 kV D/c				Mar'16	Severe ROW & Forest issue. Forest Clearance awaited.
	f) LILO of both circuits of Kawas-Navsari 220 kV D/c at Navsari (PG)				Commissioned	
	g) Wardha-Aurangabad 400 kV(Quad) D/c (with provision to upgrade at 1200 kV at later date)				Dec'16	Both Contracts terminated due to unsatisfactory performance. Tender awarded for 1 package and fresh tender being taken up for the other package.
	g) Aurangabad (PG) - Aurangabad I (Waluj) 400 kV(Quad)				Commissioned	
	Substations					
	a) 40% Fixed Series Compensation each on Wardha - Aurangabad 400 kV D/c at Wardha end				Jun'16	Commissioning matching with the line
	b) Establishment of new 400/220 kV, 2x315 MVA substation at Navsari & Bachchau				Commissioned	
	c) Establishment of new 765/400 kV, 3x1500 MVA, substation at Wardha for charging of Seoni - Wardha 2xS/c lines at 765 kV level				Commissioned	

4	**Transmission system associated with Krishnapatnam (5x800 MW) (WR Portion)- now delinked from Krishnapatnam UMPP**	1928	27th (30.07.07)			Under implementation
	a) Raichur – Solapur (PG) 765 kV S/c				Commissioned	
	b) Solapur(PG) – Pune 765 kV S/c				Commissioned	
	c) LILO of 400kV Aurangabad I (Waluj) - Pune (PG) D/c & Parli (PG) - Pune (PG) D/c lines at Pune(GIS)				Jan'16	LILO of Parli (PG)-Pune (PG) at Pune (GIS) commissioned
	d) Establishment of new 765/400 kV substations at Pune (GIS) with 2x1500 MVA transformation capacity				Commissioned	
5	**Associated transmission system of VSTPP-IV and Rihand-III**	4673	29th (10.09.09)	Mar'10		Under implementation
	a) Rihand III- Vindhyachal Pool 765 kV D/c (initially to be op. at 400kV)				Ready for commissioning	Ckt-I charged on 26.06.14. Ckt-II ready for commissioning in Aug'15
	b) Vindhyachal IV - Vindhyachal Pool 400kV D/c(Quad)				Commissioned	
	c) Vindhyachal Pool - Satna 765 kV 2xS/c				Commissioned	
	d) Satna -Gwalior 765 kV 2xS/c				Commissioned	
	e) Gwalior – Jaipur(South) 765 kV S/c				Commissioned	
	f) Vindhyachal Pool-Sasan 765 kV S/c				Commissioned	
	g) Vindhyachal Pool-Sasan 400 kV D/c				Commissioned	
	h) Establishment of 765/400kV, 2x1500 MVA substation at Vindhyachal Pool				Commissioned	
6	**Solapur STPP(2x660MW) transmission system**	63.32	30th (08.07.10)	Oct'13		Under implementation
	a) Solapur STPP – Solapur (PG) 400kV D/c (Quad)				Commissioned	Line completed in Apr'15
	b) Augmentation of 400/220kV ICT by 1x500MVA transformer (3rd) at Solapur (PG)				Commissioned	

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	 Mar'17	Award placed in May'15 Foundation commenced from Nov'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	31st (27.12.10)	Feb'14	 Oct'16 Oct'16	Under Implementation
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	32nd (13.05.11)	Sep'13	 May'16 May'16 May'16 May'16	Under Implementation
10	**Provision of 1x315MVA ICT & Spare Converter Trf for reliable auxlliary power supply at HVDC back to back station at Bhadravati**	143	33rd (21.10.11)	-	Sep'16	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	2066.85	29th (10.09.09)	May'11	 One ckt commissioned Commissioned Commissioned by-passing Champa Pool	Under Implementation Other ckt terminated at D'jaygarh bypassing Champa

	d)Raigarh Pooling Staiton (near Kotra) - Champa pooling 765kV S/c				Commissioned	
	e) Establishment of 765/400kV 6x1500MVA Champa Pooling Station				Jun'16	ICTs to be commissioned with C-K HVDC Link
	f)Establishment of 765/400kV 3x1500MVA Raigarh Pooling Station (near Tamnar)				Commissioned	
12	**Transmission system strengthening in Western Part of WR for IPP generation proejcts in Chhattisgarh**	2127.51	29th (10.09.09)	Nov'11		Under Implemetation
	a) Aurangabad(PG) – Boisar 400kV D/c (Quad)				Jun'16	Stage-I Forest Clearance received in Aug'15
	b) Wardha - Aurangabad (PG) 765kV D/c				Commissioned	
	c) Establishement of 765/400kv 2x1500MVA auraganbad (PG) S/s				Commissioned	
	d) Augmentation of transformation capacity at Boisar by 400/220kV, 1x500MVA				Commissioned	
13	**System strengthening in North/West part of WR for IPP Projects in Chhattisgarh**	2073.26	29th (10.09.09)	Dec'11		Under Implementation
	a) Aurangabad (PG) – Padghe(PG) 765kV D/c				Jun'16	Forest clearance awaited
	b) Vadodara – Asoj 400kV D/c(Quad)				Commisisoned	
	c) Padghe – Kudus 400kV D/c (Quad)				Jun'16	Matching with Kudus S/s of MSETCL & A'bad-Padghe line
14	**System Strengthening in Raipur-Wardha Corridor for IPP projects in Chhattisgarh (DPR-6)**	1422.85	29th (10.09.09)	Jan'12		Under Implementation
	a) Raipur Pooling station - Wardha 765kV 2nd D/c				Jun'16	Stage-I Forest Clearance received in Jun'15

15	**WR-NR HVDC interconnector for IPP Projects in Chhattisgarh**	9569.76	29th (10.09.09)/ 30th (08.07.10)	Mar'12		Under Implementation
	a) A ± 800kV, 3000Mw HVDC bipole between Champa Pooling Station-Kurukshetra (NR) (provision to upgrade to 6000MW at a latter date)				Jun'16	Completion matching with HVDC Champa Station.
	b) Kurukshetra(NR) - Jallandhar 400kV D/c(Quad) one ckt. via 400/220kV Nakodar				Nov'15	Ckt-I ready for commissioning in Nov'15
	c) LILO of Abdullapur – Sonepat 400kV D/c(triple) at Kurukshetra				Nov'15	Line ready for commissioning
	d) Establishment of 3000MW 800KV HVDC bipole terminal each at Champa Pooling station and Kurukshetra(NR) respectively: to be upgraded to 6000MW.				Jun'16	
	e) Establishment of 400/220kV 2x500 MVA S/s at Kurukshetra (GIS) 2x500MVA				Dec'15	400kV bays ready for commissioning in Nov'15. Balance work under progress
16	**Inter-regional system strengthening scheme for WR and NR-Part A**	1315.9	36th (29.08.13)	Oct'13		Completed
	a) Solapur - Aurangabad 765kV D/c				Commis sioned	
17	**Transmission System Associated with Lara STPS-I (2x800MW)**	400.47	17th LTA (03.01.13)	Jun'14		Under Implementation
	a) Lara STPS-I – Raigarh (Kotra) Pooling Station 400 kV D/c line – 18km				Jan'16	Severe ROW being faced
	b) Lara STPS-I – Champa Pooling Station 400 kV D/c (quad) line.- 112km				Apr'17	Tower erection commenced in Oct'15
18	**Transmission System Strengthening in WR-NR Transmission Corridor for IPPs in Chattisgarh**	5151.37	35th (03.01.13)	Jun'14		Award under progress

	a) Up-gradation of + 800kV, 3000MW HVDC bipole between Champa Pooling Station – Kurukshetra (NR) to 6000MW				Mar'18	
	b) Kurukshetra (NR) – Jind 400kV D/c (Quad)				Mar'18	
19	**Inter-regional system strengthening scheme for WR and NR-Part B**	6517.36		Dec'14		Award placed in Mar'15
	(a) 765KV D/C Jabalpur Pooling Station - Orai line				Apr'18	
	(b) 765KV D/C Orai - Aligarh line				Apr'18	
	(c) 400KV D/C Orai - Orai line (Q)				Apr'18	
	(d) LILO of one ckt of Satna-Gwalior 765KV 2x S/C line at Orai				Apr'18	
	(e) LILO of Agra - Meerut 765KV S/C at Aligarh				Apr'18	
	(f) LILO of Kanpur - Jhatikara 765KV S/C at Aligarh				Apr'18	
20	**Wardha - Hyderabad 765kV Links**	3662.02		Jan'15		
	(a) 765KV D/C Wardha - Hyderabad line				May'18	
	(b) 400KV D/C Nizamabad - Dichpali line				May'18	Award placed in Mar'15
21	**GREEN ENERGY CORRIDORS:- Inter State Transmission Scheme (ISTS) - Part B**	3705.61	36 / 37th (29.08.13/05.09.14)	Apr'15		Award placed in July'15
	(a) 765KV D/C Banaskanta - Chittorgarh (New) line				Apr'18	
	(b) 765KV D/C Chittorgarh (New) - Ajmer (New) line				Apr'18	
	(c) 400KV D/C Banaskanta - Sankhari line				Apr'18	
	(d) Establishment of 765/400/220kV (765/400kV - 2x1500 MVA & 400/220kV - 2x500MVA) substation at Banaskanta				Apr'18	
22	**GREEN ENERGY CORRIDORS:- Inter State Transmission Scheme (ISTS) - Part C**	2247.37	36 / 37th (29.08.13/05.09.14)	July'15		Award under progress.
	(a) 765KV D/C Bhuj Pool - Banaskanta line				July'18	

	(d) Establishment of 765/400/220kV (765/400kV - 2x1500 MVA & 400/220kV - 2x500MVA) pooling station at Bhuj				July'18	
23	**Transmission System Strengthening Associated with Vindhyachal V - Part A** (a) 1x1500MVA, 765/400kV ICT at Vindhyachal Pooling Station		34th (09.05.12)	Feb'15	 July'17	Award placed in Aug'15
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		34th (09.05.12)		 Jun'18 Jun'18	Investment Approval pending
25	**STATCOMs in Western Region** (a) Aurangabad (b) Gwalior (c) Solapur (d) Satna		36th (29.08.13)	Mar'15	 Sep'17 Sep'17 Sep'17 Sep'17	 Award placed in Jun'15 Award under progress Award placed in Jun'15 Award placed in Jun'15
26	**Western Region System Strengthening Scheme XIV** (a)2x500MVA, 400/220kV transformer alongwith six nos of 220kV bays at Indore (PG) 765/400kV Substation (b)1x500MVA, 400/220kV transformer alongwith two nos of 220kV bays at Itarsi (PG) 400/220kV S/s	93.96	37th (05.09.14)		30 Months from date of investment approval	

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)			Matching with TBCB Schedule
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)			Matching with TBCB Schedule
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)} (c) 2 no. 400 kV line bays at Gwalior Substation {for Gwalior - Morena 400 kV D/c (quad)}		36th (29.08.13)			Matching with TBCB Schedule

	(d) 2 nos. 765 kV line bays at 765/400kV Pune (GIS) sub-station of POWERGRID {for LILO of one circuit of Aurangabad(PG) – Padghe(PG)765 kV D/c at Pune (GIS) (PG)} (e) 2 nos. 765 kV line bays at 765/400kV Champa Pooling Station of POWERGRID {1for Champa PS(PG) - Raigarh (Kotra) PS(PG) 765 kV 2nd S/c, 1 for Champa PS(PG) – Dharamjaigarh(PG) 765 kV 2nd S/c} (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} (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}					
30	**Powergrid works associated withAdditional System Strengthening Scheme Chhattisagrh IPPs Part-B** (a) 2 nos. 765 kV line bay at 765/400kV Raipur Pooling Station of POWERGRID {for Raipur PS(PG) – Rajnandgaon (TBCB) 765 kV D/c}		36/37th (29.08.13 / 05.09.14)			DPR under Preparation
30	**Powergrid workds associated with Additional System Strengthening for Sipat STPS** (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)		36/37th (29.08.13 / 05.09.14)			DPR under Preparation

	(b) 2 nos. 240 MVAR, 765 kV switchable line reactors at 765/400kV Bilaspur PS end for Bilaspur PS(PG) - Rajnandgaon(TBCB) 765 kV D/c					
31	**Transmission System Strengthening associated with Mundra UMPP- Part A** (a) LILO of both circuits of Mundra UMPP-Limbdi 400kV D/c (triple snowbird) line at Bachau	266.19	36th (29.08.13)		30 months from date of investment approval	
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)			DPR under Preparation
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)			DPR under Preparation
34	**Western Region System Strengthening -16**		38th (17.07.15)			DPR under preparation
	(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 Raipur (PG) S/s (c) Provision of two nos. of 220kV bays at Mapusa (Colvale) 400/220 kV substation (d) Installation of 500MVA, 400/220kV (3rd) ICT with associated bays at Satna (PG) S/s with provision of two nos. 220kV line bays (e) Provision of two nos. of 400 kV bays at 765/400kV Indore(PG) substation					

Annexure -4

Summary of Connectivity/LTA agreed in the 22nd Meeting of WR Constituents regarding Connectivity, Long-term Access & Medium-term Open Access applications in Western Region

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

Salient features of the application:

Sl.	Particulars	Application Details
1.	Capacity for connectivity	750 MW
2.	Date from which connectivity is required	31.03.2017
3.	Quantum for which LTA required	750MW
4.	Date from which LTA is required	June 30, 2017
5.	Date upto which LTA is required	June 29, 2042
6..	Location of Generating station	Rewa, Madhya Pradesh (WR)
7.	Injection of Power	400/220kV, 3x500 MVA Pooling station at Rewa
8.	Drawl of Power	WR : 450MW; NR:300MW

Transmission System for M/s REWA Ultra Mega Solar (RUMS) Ltd.

S. No.	Transmission system	Transmission Elements	Implementing Agency
1	Transmission System for Connectivity	(i) RUMS Ltd. switchyard – Rewa Pooling Station 220kV 3xD/c line along with associated bays at Solar Park	M/s REWA Ultra Mega Solar (RUMS) Ltd.
2	Transmission System for LTA	(i) Establishment of 400/220kV, 3x500 MVA Pooling station at Rewa (ii) LILO of Vindhyachal STPS-Jabalpur 400kV 2nd D/c line (ckt-3&4) at Rewa PS (iii) 1x125 MVAr, 420 kV Bus Reactor at Rewa Pooling Station (iv) 6 Nos. 220kV Line bays at Rewa PS (for RUMS-Rewa PS 220kV 3xD/c)	POWERGRID
	Additional Transmission System for LTA from WR to NR	**New WR – NR Inter Regional Corridor** (i) Establishment of New 2x1500MVA, 765/400kV Substation at Allahabad (ii) Vindhyachal Pool – Allahabad (New) 765kV D/c line	Through TBCB

		(iii) Allahabad (New) – Lucknow 765kV D/c line (iv) LILO of Sasaram – Fatehpur 765kV S/c line at Allahabad (New) (v) LILO of Meja – Allahabad 400kV D/c line at Allahabad (New)	

As 300 MW power from RUMS Ltd. would be transferred to NR, the application as well as the new WR – NR corridor shall also be discussed in NR Standing Committee meeting and subsequently, LTA may be granted to M/s RUMS Ltd.

2. LTA application of M/s SEI Sunshine Power Private Limited (SSPPL) for Grant of Long-Term Access for transfer of 180 MW from Solar PV Projects located in Shivpuri District of Madhya Pradesh to Delhi

Salient features of the application:

Sl.	Particulars	Application Details
1.	Quantum for which LTA required	180 MW
2.	Date from which LTA is required	September 30, 2016
3.	Date upto which LTA is required	September 29, 2041 (25 years)
4.	Date upto which LTA has been considered	September 29, 2026 (20 years), as NOC has been issued for 20 years by MP from date of commercial operation of generating project
5.	Location of Generating station	Solar PV Projects in Shivpuri, Madhya Pradesh
6.	Injection of Power	Shivpuri 220 kV sub-station of MPPTCL
7.	Drawl of Power	Delhi

Transmission System for M/s SEI Sunshine Power Private Limited (SSPPL)

S. No.	Transmission system	Transmission Elements	Implementing Agency
1	Transmission System for LTA	**New WR – NR Inter Regional Corridor** (i) Establishment of New 2x1500MVA, 765/400kV Substation at Allahabad (ii) Vindhyachal Pool – Allahabad (New) 765kV D/c line (iii) Allahabad (New) – Lucknow 765kV D/c line (iv) LILO of Sasaram – Fatehpur 765kV S/c line at Allahabad (New) (v) LILO of Meja – Allahabad 400kV D/c line at Allahabad (New)	Through TBCB

As power from SSPPL would be transferred to NR, the application as well as the new WR – NR corridor shall also be discussed in NR Standing Committee meeting and subsequently, LTA may be granted to M/s SSPPL.

3. Evolution of New Corridor for transfer of power from WR to NR

In addition to the import requirement of NR of about 23243MW, additional requirement of about 2659 MW power transfer from WR to NR will be incident from following generation projects in WR with beneficiaries in NR.

Sl. No.	Generation Projects	Additional Allocation to NR (MW)	Discussed in
1	MB Power (MP) Ltd.	200 (169MW Firm)	20th WR LTA/Con Meeting on 17.02.2015
2	MB Power (MP) Ltd.	144	
3	DB Power Chhattisgarh Ltd.#	75(Firm)	22nd WR LTA/Con Meeting on 30.11.2015
4	Rewa Ultra Mega Solar Ltd.	300	New application (earlier application discussed in 38th meeting of Standing Committee on Power System Planning in WR held on 17.07.2015)
5	SEI Sunshine Power Pvt. Ltd.	180	New Application
6	Suzlon Power Infrastructure Ltd. (3 applications, location of project in SR)	120	New Application
7	Maruti Clean Coal & Power Ltd *	205 (Firm)	20th WR LTA/Con Meeting on 17.02.2015;
8	TRN Energy Ltd *	240 (Firm)	20th WR LTA/Con Meeting on 17.02.2015;
9	KSK Mahanadi Power Company Ltd	1000 (Firm)	20th WR LTA/Con Meeting on 17.02.2015;
10	Shirpur Power Pvt. Ltd.*	35	21st WR LTA/Con Meeting on 17.07.2015. NOC awaited.
	Grand Total	**2659MW (i.e. 2539 MW from WR & 120 MW from SR)**	

 # DB Power Chhattisgarh Ltd. (DBPCL) vide letter dated 21.08.2015 & 20.10.15 informed that Hon'ble RERC has adopted tariff for purchase of only 250 MW against the PPA quantum of 410 MW with Rajasthan Discom (through PTC India Ltd). Accordingly, DBPCL has requested to regularize 175 MW to Rajasthan in NR region from earlier granted LTA and balance 75 MW may be shifted from WR to Rajasthan for supply of 250 MW to Rajasthan as per the adopted tariff with the condition that the applicant shall pay relinquishment charges as may be decided by CERC in the Petition No: 92/MP/2015

** TRN Energy and Maruti Clean Coal & Power Ltd. had submitted LTA applications against firm PPAs signed with beneficiaries in NR; however same were closed on account of incomplete applications.*

** Application of Shirpur Power Pvt. Ltd. is liable to get closed as NOC from MSETCL is yet to be submitted.*

The above mentioned quantum of power transfer from WR to NR desired by DBPCL, TRN Energy, Maruti Clean Coal & Power Ltd. & Shirpur Power Pvt. Ltd. have been taken in the studies considering that they may apply afresh. In addition to above applications, LTA application of Barethi STPS indicates 871MW power allocation to Northern Region. Therefore, total power transfer requirement towards NR has been assessed as about **26773MW** (23243 + 2659 + 871). With this scenario maximum flow of about 18000MW on WR – NR corridor is observed, which is more than the expected ATC of about 16000MW of WR – NR corridor with commissioning of ongoing / planned system. Accordingly, the following corridor from WR to NR was agreed:

New WR – NR Inter Regional Corridor

(i) Establishment of New 2x15000MVA, 765/400kV Substation at Allahabad
(ii) Vindhyachal Pool – Allahabad (New) 765kV D/c line
(iii) Allahabad (New) – Lucknow 765kV D/c line
(iv) LILO of Sasaram – Fatehpur 765kV S/c line at Allahabad (New)
(v) LILO of Meja – Allahabad 400kV D/c line at Allahabad (New)

Applicants granted LTA to NR on the above WR – NR corridor:

Sl. No.	Generation Projects	Additional Allocation to NR (MW)
1	MB Power (MP) Ltd.	200 (169MW Firm)
2	MB Power (MP) Ltd.	144
3	Rewa Ultra Mega Solar Ltd	300
4	SEI Sunshine Power Pvt. Ltd.	180
5	Suzlon Power Infrastructure Ltd. (3 applications)	120
6	KSK Mahanadi Power Company Ltd	1000 (Firm)
	Grand Total	**1944MW**

As power from the above LTA applicants would be transferred to NR, the application as well as the new WR – NR corridor shall also be discussed in NR Standing Committee meeting and intimations for grant of Connectivity / LTA to above mentioned applicants can be issued after approval of the system by NR constituents.

In case of relinquishment of LTA already granted to various applicants for power transfer towards Northern Region, the available margin in the already planned transmission system may be re-allocated to new applicants in queue for power transfer towards NR based on system studies, according to relative priority.

4. LTA Application of Telangana State Southern Power Distribution Company Ltd. for 2000 MW power transfer from Chhattisgarh to Telangana State DISCOMs

Salient features of the application:

S.No.	Particulars	Application Details
1.	Quantum for which LTA required	2000 MW
2.	Date from which LTA is required	01.03.2015
3.	Date upto which LTA is required	29.02.2040 (25 years)
5.	Location of Generating station	1000 MW at Marwa STPP connected to STU & 1000 MW from CSDCL, Chhattisgarh
6.	Injection of Power	CTU-STU(CSPTCL) interface
7.	Drawl of Power	**Telangana** - namely Southern Power Distribution Company of Telangana Ltd. (**TSSPDCL**) & Northern Power Distribution Company of Telangana Limited (**TSNPDCL**)

In the meeting TSSPDCL requested that their LTA application for 2000 MW be considered for grant in phased manner with 1000MW (Marwa TPS in Chhattisgarh) in 1st phase and another 1000 MW (yet to be firmed up) in 2nd phase.

Transmission System for M/s Telangana State Southern Power Distribution Company Ltd. (TSSPDCL)

S. No.	Transmission system	Transmission scheme / elements	Implementing Agency
1	Transmission System for LTA	(i) Angul-Srikakulam-Vemagiri 765kV D/c line along with "Constraints in 400kV bay extensions at Vemagiri" (ii) Wardha - Maheshwaram 765kV D/c link with anchoring at Nizamabad alongwith connectivity lines associated with Maheshwaram substation (iii) Strengthening of transmission system beyond Vemagiri	Already under implementation

As power from the above LTA applicant would be transferred to SR, the application as well as system strengthening requirement in SR grid for transfer of 1000 / 2000 MW power from WR to SR shall also be discussed and decided in the forthcoming

Standing Committee / LTA meeting of Southern Region and LTA to the applicant shall be issued thereafter.

5. Connectivity of National High Power Test Laboratory (NHPTL), Bina (Madhya Pradesh)

National High Power Test Laboratory Pvt. Ltd. (NHPTL), a Joint Venture Company of NTPC, NHPC, POWERGRID, DVC and CPRI is establishing a state of the art, international class online short circuit test facility at Bina substation of POWERGRID in Madhya Pradesh. This online High Power Short Circuit Test Facility is expected to provide a full range of short circuit testing for the National Power equipment manufacturers, National Power utilities and International Power equipment manufacturers from SAARC, ASEAN & Middle East Countries in conformance to Indian and International Standards.

The connection of the test facility to the Western Region Grid at Bina 765/400 kV substation was agreed in the 30th meeting of Standing Committee on Power System Planning in WR held on 8th July, 2010. Now, the High Voltage Transformer Testing (HVTR) and Medium Voltage Transformer Testing (MVTR) laboratories are in advance stages of completion. System Studies are underway by CPRI to assess the impact of High Voltage Short Circuit testing of transformers (duration 250ms.) on Indian Grid

The connectivity to M/s National High Power Test Laboratory Pvt. Ltd. (NHPTL) is planned through following arrangement:

1. Bina (PG) – NHPTL (HVTR Lab) Switchyard 765kV S/c line (Quad Bull conductor) (about 700 m.)
2. Bina (PG) – NHPTL (HVTR Lab) Switchyard 400kV S/c line (Quad Bersimis conductor) (about 600 m.)

6. Supply of 250 MW power from M/s DB Power (Chhattisgarh) Ltd. generation project in Chhattisgarh to DISCOMs of Rajasthan

M/s DB Power (Chhattisgarh) Ltd. (DBPCL) has already been granted LTA for a quantum of 705 MW with target beneficiaries in WR (530MW) and NR (175MW). M/s DBPCL signed PPA with TANGEDCO for 208MW and target beneficiaries were proposed to be modified as WR-322MW (Target), NR-175MW (Target) and SR-208MW (Firm). M/s DBPCL had filed fresh application dated 23.05.15 for 410 MW with Rajasthan as firm beneficiary. DBPCL vide letter dated 21.08.2015 & 20.10.15 informed that Hon'ble RERC has adopted tariff for purchase of only 250 MW against the PPA quantum of 410 MW. It was decided to close the LTA application of 410 MW and grant LTA for additional 75MW power transfer to NR (Rajasthan) along with commissioning of new proposed Vindhyachal – Allahabad 765kV D/c corridor.

Transmission System for M/s DB Power (Chhattisgarh) Ltd. (DBPCL) for LTA of 250 MW to NR

S. No.	Transmission system	Transmission scheme / elements	Implementing Agency
1	Transmission	High Capacity Power Transmission	Already under

	System for LTA of 175 MW to NR	Corridor (HCPTC-V) and other transmission system as per the BPTA	implementation
2	Transmission System for LTA of 75 MW to NR	**New WR – NR Inter Regional Corridor** (i) Establishment of New 2x1500MVA, 765/400kV Substation at Allahabad (ii) Vindhyachal Pool – Allahabad (New) 765kV D/c line (iii) Allahabad (New) – Lucknow 765kV D/c line (iv) LILO of Sasaram – Fatehpur 765kV S/c line at Allahabad (New) (v) LILO of Meja – Allahabad 400kV D/c line at Allahabad (New)	Through TBCB

The grant of LTA of 75 MW is subject to fulfilling of other requirements by DBPCL / Rajasthan in line with CERC regulation, relinquishment of equivalent quantum from the LTA already granted for WR along with applicable relinquishment charges in line with CERC Regulations / directions and approval of the new WR – NR Inter Regional Corridor by NR constituents