



भारत सरकार / Government of India
विद्युत मंत्रालय / Ministry of Power
केन्द्रीय विद्युत प्राधिकरण / Central Electricity Authority
प्रणाली योजना एवं परियोजना मूल्यांकन प्रभाग
System Planning & Project Appraisal Division
सेवा भवन ए आर. के. पुरम, नई दिल्ली-110066
वेबसाइट / Website: www.cea.nic.in



Sewa Bhawan, R. K. Puram, New Delhi-110066 [ISO: 9001:2008]

No. 26/10/2013-SP&PA/ 74-87

Date: 4th February, 2013

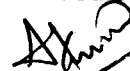
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Sub: 35th meeting of the Standing Committee on Power System Planning in Western Region

Sir,

The minutes of the 35th meeting of the Standing Committee on Power System Planning in Western Region held on 3rd January 2013 at M.P Hall, Power Grid Township, Gurgaon are available on CEA website (www.cea.nic.in) at the following link: Home page-Wing Specific Document-Power Systems-Standing Committee on Power System Planning-Western Region).

Yours faithfully,


H. 2. 13
Director, SP&PA

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भारत सरकार
केन्द्रीय विद्युत प्राधिकरण
प्रणाली योजना एवं परियोजना मूल्यांकन प्रभाग
सेवा भवन, रामकृष्णपुरम्, नई दिल्ली 110066

क. सं. : 26/10/2013-प्र. यो. प. मू/ 74-87

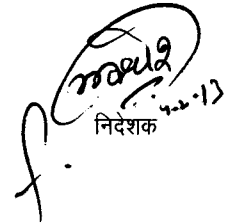
दिनांक: 04.02.2013

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विषय :- पश्चिमी क्षेत्र विद्युत प्रणाली योजना की स्थाई समिति की 35वीं बैठक - कार्यवृत्त ।
महोदय,

पश्चिमी क्षेत्र विद्युत प्रणाली योजना की स्थाई समिति की 35वीं बैठक का कार्यवृत्त केन्द्रीय विद्युत प्राधिकरण की वेबसाइट www.cea.nic.in
पर लिंक Home page - Power Systems-Standing Committee on Power System Planning-Western Region) पर उपलब्ध है।

संलग्न - उपरोक्त


निदेशक

Minutes of the 35th Meeting of Standing Committee on Power System Planning in Western Region held on Thursday 3rd January 2013

- 1.0** The 35th meeting of the Standing Committee on Power System Planning of Western Region was held on Thursday 3rd January, 2013 at M.P Hall, Power Grid Township Sector-43, Gurgaon. The list of participants is at Annex – I.
- 1.1 The meeting was chaired by Member (PS), CEA. He welcomed all the participants to the meeting. He said that as you are aware, CERC has implemented Point of Connection (PoC) tariff for inter-state transmission system (ISTS), in which inter-state transmission assets are pooled at National level and addition of ISTS assets in one region has an impact on transmission tariff of other region. Keeping this in view, meetings of all the regions have been scheduled one after other, so as to give opportunity to constituents to participate in the meetings of other regions as per their interest. He requested Director (SP&PA) to take up the agenda items.
- 2.0 Confirmation of the minutes of 34th meeting of the Standing Committee on Power System Planning in Western Region (SCPSPWR) held on 9th May 2012 at NRPC, Katwaria Sarai, New Delhi.**
- 2.1 The minutes of the 34th SCPSPWR issued vide CEA letter No.26/10/2011-SP&PA/498 - 551 dated 25th May 2012 were confirmed.
- 3.0 Review of Progress on Earlier Agreed Transmission Schemes.**
- 3.1 Director (SP&PA), CEA requested POWERGRID to intimate the latest status of progress of ongoing / earlier agreed transmission schemes. POWERGRID informed the status of ongoing schemes in Western Region and the details are enclosed at Annexure-II. The status of transmission schemes being implemented through tariff based competitive bidding is enclosed at Annexure- III.
- 3.2 **400/220 kV 315 MVA 3rd ICT at Vapi (PG) and establishment of Kala 400/220 kV substation in DNH:** MD, GETCO stated substantial quantum of load of DD & DNH was being catered through GETCO system, resulting in critical loading on their 220/66 kV ICTs at Bhilad and Vapi substation. Due to this, they were facing difficulty in releasing new HT and EHV connections and in availing planned outages. This requires the review of 66 kV interconnection between GETCO and DD & DNH systems. He enquired about the status of implementation 3rd ICT at Vapi 400/220 kV substation and establishment of Kala 400/220 kV substation in DNH. DGM, POWERGRID informed that the 3rd ICT at Vapi 400/220 kV substation would be commissioned by February / March 2013 and Kala 400/220 kV substation is scheduled for commissioning by July 2013. However on best effort basis, the substation may be commissioned in March / April '13. SE, WRPC informed that this issue has been discussed in the OCC meeting and system study carried out at WRPC indicate a relief of about 100 MW to GETCO system after the commissioning of 3rd ICT at Vapi 400/220 kV substation. MD, GETCO said that they would review the situation after commissioning the 3rd ICT at Vapi 400/220 kV substation. After further discussion, it was decided that in case GETCO system is not relieved after commissioning of 3rd ICT at Vapi 400/220 kV substation, a meeting of the stakeholders would be convened to review the 66 kV interconnections between GETCO and DD & DNH system.

- 3.3 **Interconnection of Navsari 400 kV (GIS) and Vapi 400 kV substation:** The interconnection of Navsari– Boisar and Vapi-Navi Mumbai 400 kV D/C lines at the point of start of multi-circuit section was agreed as an interim arrangement in order to transfer power from Navsari to Vapi in the 34th SCM. POWERGRID informed that the interim arrangement would be implemented by February 2013.
- 3.4 **LILO of one circuit of 400 kV D/C Mundra UMPP – Chorania line at Halvad (GETCO) substation, as an interim arrangement:** The LILO of one circuit of 400 kV D/C Mundra UMPP – Chorania line at Halvad (GETCO) substation was agreed as an interim arrangement till the planned network from Halvad sub-station was completed in the 34th SCM, in order to provide operation flexibility. GETCO informed that the interim arrangement would be implemented in 5 to 6 months time and as regarding planned system from Halvad, order for the same would be placed in four months time.
- 3.5 **LILO of 400 kV S/c line between Raipur (PG) and Khedamera (Bhilai) at Raipur (Raita) 400kV substation and provision of 2X50 MVAR switchable line reactors at Raita end.** In the 34th standing committee meeting, interalia, provision of 2x50 MVAR switchable line reactors at Raipur (Raita) end of Raipur (Raita)-Jagdarpur 400 kV D/C line was agreed instead of 1x125 MVAR bus reactor at Raipur (Raita). In the meeting, CSPTCL stated that the 2X50 MVAR reactors were initially planned as fixed line reactors and now they exploring the possibility of conversion fixed line reactors to switchable line reactors.
- 3.6 **Status of 10 nos. of bus reactors agreed in the 33rd SCM of WR:** POWERGRID informed that the order for 1x125 MVAR bus reactors at Jabalpur, Khandwa, Shujalpur, Bhatapara, Raigarh, Aurangabad has already placed and would be commissioned progressively from Jan'14 to Jun'14. GETCO informed that the order for 1x125 MVAR bus reactors at Ranchodpura, Versana, Amreli and Rajkot has been placed and would be commissioned by June 2013.
- 3.7 **Status of 17 nos. of bus reactors agreed in the 34th SCM of WR:** MSETCL informed that for 1x125 MVAR bus reactors at Nanded, Sholapur, Kolhapur and Akola, LOI would be issued within three months time and would be commissioned in 12 months time after issue of LOI. Regarding reactors at Jetpur, Zerda and Limbdi (Chorania) GETCO informed that order for these reactors has been placed and would be commissioned by July 2013. MPPTCL informed that they have ordered two no. of 80 MVAR bus reactors for Bhopal and Indore and the same would be commissioned by October, 2013. Regarding reactor at Nagda, MPPTCL stated that there is space constraint at Nagda and they are exploring the possibility of creating additional space at Nagda or replacing one of the existing 2x50 MVAR by 1x125 MVAR reactor. POWERGRID informed that order for the reactors at Damoh, Bachau, Pirana, Itarsi, Seoni, Parli, Raipur and Gwalior would be placed by March 2013.
- 4.0 Shifting of 1x315 MVA ICT-III at Wardha S/s to Solapur (PG) substation.**
- 4.1 Director, CEA stated in the 34th SCM, it was agreed to shift 1x315 MVA, 400/220kV ICT-III at Wardha substation to some other location. Accordingly, POWERGRID has proposed to shift 400/220kV ICT-III along with 2 nos. 220 kV bays equipments at Wardha S/s to 400 kV Solapur (PG) S/s as 3rd 1X315 MVA transformer at Solapur (PG) 400/220 substation. The provision of 3rd transformer at 400kV Solapur (PG) S/s was agreed in the 30th Standing Committee meeting under the Solapur STPP (2x660MW) transmission scheme.

- 4.2 POWERGRID informed that 3rd transformer at Wardha is of 500 MVA rating and the same shall be transferred to Solapur (PG).
- 4.3 Members noted the above.
- 5.0 Provision of 2 nos. of 400 kV bays at Boisar for termination of Ghodbunder – Boisar 400 kV D/C line.**
- 5.1 Director (SP&PA), CEA stated that in the 34th SCM, POWERGRID was requested to implement the two no. of AIS bays at Boisar for terminating Aurangabad – Boisar 400 kV D/c line as GIS bays so as to accommodate the termination of Ghodbunder – Boisar 400 kV D/C line at Boisar. Subsequently, POWERGRID has conveyed that they would be implementing the line bays of Aurangabad – Boisar 400 kV D/c line at Boisar as AIS bays instead of GIS bays and space for two 400 kV line bays for termination of Ghodbunder – Boisar 400 kV D/C line at Boisar would be provided with some rearrangement works at Boisar.
- 5.2 DGM, POWERGRID intimated that the bays for termination of Aurangabad-Boisar 400 kV D/C line has been awarded as AIS bays and space for 2 no GIS bays would be provided at Boisar for termination of Ghodbunder-Boisar 400 kV D/C line.
- 5.3 MSETCL informed that Reliance infra is not getting land for establishment of Ghodbunder sub-station.
- 5.4 After further discussion, it was agreed that POWERGRID would reserve space at Boisar for termination of 2 no. 400 kV GIS bays.
- 6.0 Interim arrangement for reconfiguration of one circuit of Mundra - Limbdi 400 kV D/C line for LILO at Jetpur.**
- 6.1 Director (SP&PA), CEA stated that in principle approval for reconfiguration of one circuit of Mundra - Limbdi 400 kV D/C line for LILO at Jetpur so as to form Mundra-Jetpur 400 kV S/C line and Jetpur-Limbdi 400 kV S/C line, as an interim arrangement, was given in August 2012. This was agreed as it would help in reducing the line loading of Hadala-Jetpur 400 kV S/C line and meeting increased agriculture demand of Saurashtra area from Jetpur and Amreli sub-station from August 2012 onwards.
- 6.2 DGM, POWERGRID informed that the interim arrangement was implemented in August 2012. With the commissioning of Mundra-Jetpur 400 kV D/C line in December 2012, the interim arrangement on one circuit of Mundra-Limbdi line was removed and line was restored to its original configuration i.e. Mundra-Limbdi 400 kV D/C line.
- 6.3 MD, GETCO informed that the above interim arrangement has helped them in meeting the increased demand of Saurashtra area.
- 6.4 Member noted the above.
- 7.0 LILO of Padghe – Kharghar 400 kV line at Navi Mumbai substation and use of 400 kV cable for termination at Navi Mumbai.**

- 7.1 Director, CEA stated that LILO of 400 kV Lonikhand/Pune – Kalwa S/C line at Navi-Mumbai 400 kV substation was agreed, as a part of Western Region System Strengthening Scheme (WRSSS-V), in the 25th SCM in Western Region. There are two no, 400 kV lines between Lonikhand and Kalwa. Line-1 has been LILO at Chakan, Padghe and Kharghar, while Line-2 has been LILO at Pune.
- 7.2 He said that POWERGRID has intimated implementation of LILO of Line-2, as agreed under WRSSS-V, would have involved crossing of Line-1 and also some additional tower locations. In view of severe RoW problem in this area, POWERGRID has proposed LILO of Kharghar – Padghe section of Line-1 at Navi Mumbai, which has also been agreed by MSETCL. POWERGRID has also intimated that construction of about 1.5 km of the LILO near gantry of Navi Mumbai is held up due to severe RoW issues and local people are demanding huge compensation which is estimated to be about Rs.300 crores. To overcome the RoW issues POWERGRID has proposed laying of 1.5 km of 400 kV under ground cable near the gantry of Navi Mumbai sub-station with an estimated cost of Rs. 55 crores. In order to expedite the implementation of the LILO arrangement, CEA has given in principle approval for the same.
- 7.3 MD, GETCO enquired about the laying of the cable and acquisition of the RoW used for the cable to prevent the cable from getting damaged due to digging by local agencies. POWERGRID informed that for LILO section underground cable would be laid and Right to Use agreement for the RoW would be made with concerned agencies. In the estimated cost, this aspect has been taken care of.
- 7.4 After further discussions members concurred with the proposal.
- 8.0 220 kV interconnections from Kala 400/220 kV substation in DNH – modifications in the earlier agreed schemes.**
- 8.1 Director, CEA stated that to meet the growing demand in UT of Dadra & Nagar Haveli (DNH) , establishment of 400/220 kV, 2X315 MVA substation at Kala by LILO of both circuits of Vapi – Navi Mumbai 400 kV D/C line has been agreed. In the 30th SCM of WR, for drawal of power, Electricity Department, DNH had proposed two no. of 220 kV D/C lines from 400/220 kV Kala substation, one to existing 220 kV Kharadpada and the other to existing 220 kV Khadoli substation. DNH was advised to implement 220 kV interconnections from Kala 400/220 kV substation with Moose conductors keeping in view future requirement of power transfer and RoW constraints.
- 8.2 He said subsequently, DNH has intimated that due to RoW constraints near Kala sub-station, the two nos. of 220 kV D/C lines are planned to be strung on multi circuit towers in the initial stretch. As, POWERGRID did not have the design of 220 KV multi circuit tower with Moose conductor, these 220 kV links from Kala are being implemented with Zebra conductors.
- 8.3 He added that, Electricity Department, DNH has proposed establishment of a new Kharadpada 220 kV switching station to extend 220 kV supply to M/s RIL (due to space constraint at existing Kharadpada) and terminate the 220 kV D/C line from Kala 400/220 substation at new Kharadpada 220 kV switching station instead of at Kharadpada (existing) 220/66 kV substation agreed earlier. The new Kharadpada 220 kV switching station and the Kharadpada (existing) 220/66 kV substation would also be interconnected through a 1.25 km 220 kV D/C line.

8.4 He said that in view of above, revised 220 kV interconnection from Kala 400/220 kV GIS substation with Zebra conductor is as given below:

- (i). Kala 400/220 kV S/s – Khadoli 220 kV D/C line.
- (ii). Kala 400/220 kV S/s – New Kharadapada switching station 220 kV D/C line.
- (iii). New Kharadapada switching station – Kharadpada 220 kV D/C line.

8.5 Members noted the above change.

9.0 Laying of Multi circuit towers near approach end of 765/400 kV Vadodara GIS substation.

9.1 Director, CEA stated that the 765/400 kV Vadodara GIS substation was under implementation by POWERGRID as a part of WR System Strengthening for IPP projects in Madhya Pradesh and Chhattisgarh (being pooled at Bilaspur Pooling station). There were four number of 400 kV lines planned from the Vadodara 765/400 kV substation

- (i) TEL (DGEN) TPS – Vadodara 400 kV D/C line (Under Transmission System strengthening in WR for the 1200 MW LTA granted to DGEN TPS of Torrent Energy Limited). This line will be implemented through tariff based competitive bidding route.
- (ii) Vadodara – Asoj 400 kV (Quad) D/C line.(As a part of Transmission System Strengthening in WR associated with New IPP projects in Chattishgarh). Being implemented by POWERGRID.
- (iii) Vadodara – Pirana 400 kV D/C (Quad) line. (As a part of Transmission System Strengthening in WR associated with IPP projects in Madhya Pradesh and Chhattishgarh being pooled at Bilaspur Polling station). Being implemented by POWERGRID.
- (iv) Vadodara – Vataman 400 kV D/C (Quad) line. (As a part of transmission system associated with 3960 (6X660) MW Chhattisgarh UMPP). Implementation by POWERGRID.

9.2 He further stated that POWERGRID have intimated that they were facing severe RoW problems in laying of the above transmission lines near Vadodara substation and they proposed to lay these lines on two nos. of multi-circuit towers for about 3 kms length from the Vadodara substation. Based on the route alignment, Vadodara – Pirana 400 kV (Quad) line and Vadodara – Vataman 400 kV (Quad) D/C line was proposed on one multi- circuit towers and Vadodara – Asoj 400 kV (Quad) D/C line and Vadodara – DGEN 400 kV D/C (Twin) line on the other multi-circuit towers.

9.3 He added that the Vadodara – DGEN 400 kV D/C line was to be implemented through tariff based competitive bidding route. To avoid any ambiguity in cost sharing, the 3 km corridor of the Vadodara – DGEN 400 kV D/C line from Vadodara, proposed on multi circuit towers may be implemented by POWERGRID and the line beyond the multi circuit portion may be implemented under tariff based competitive bidding route.

9.4 Members agreed with the proposal.

10.0 Direct interconnection of Vadodara – Pirana and Vadodara – Asoj 400 kV D/C (Quad) lines by passing Vadodara substation as a contingency arrangement.

10.1 Director, CEA stated that establishment of 765/400kV, 2x1500MVA GIS at Vadodara along with Indore – Vadodara 765kV S/c line and Vadodara – Pirana 400kV D/c Quad line was being implemented by POWERGRID under the transmission scheme associated with WR System Strengthening for IPP projects in Madhya Pradesh and Chhattisgarh (being pooled at Bilaspur Pooling station).

10.2 He further stated that POWERGRID has intimated that 765kV Vadodara S/s was getting delayed due to land acquisition problem and the substation was likely to be commissioned by April 2014. The implementation of transmission lines was as per original schedule and it was expected that Vadodara - Pirana 400kV D/c (Quad) line would be completed by September 2013. The Vadodara – Asoj 400 kV (Quad) D/C line under implementation by POWERGRID as a part Transmission System Strengthening in WR associated with New IPP projects in Chhattisgarh was also expected to be completed by Sep/Oct'13.

10.3 He added that, in view of the delay in completion of Vadodara 765/400 kV substation and expected completion of the Vadodara – Asoj 400 kV D/C line and Vadodara - Pirana 400kV D/c line by September / October 2013, POWERGRID has proposed direct interconnection of 400 kV lines at suitable location, by passing Vadodara substation, as an interim arrangement. The direct interconnection would result in Pirana – Asoj 400 kV D/C (Quad) line of approx. 130 km length and would help in supplying power to Asoj (a load centre) in Gujarat. The interim arrangement shall be in place till the availability of 765/400kV Vadodara S/s.

10.4 Members approved the proposed interim arrangement.

11.0 Commissioning of line reactors as bus reactors at Satna and Bilaspur 765 kV substations

11.1 Director, CEA POWERGRID has intimated that the 2X240 MVAR, 765 kV switchable line reactors at Satna substation for Sasan – Satna 765 kV 2XS/C lines and 1X240 MVAR, 765 kV line reactor at Bilaspur substation for Bilaspur – Ranchi 765 kV S/C line are available, while the associated lines are yet to be completed. In view of the high voltages prevailing in Western Region during off peak conditions, POWERGRID has proposed to utilise these line reactors as bus reactors till the completion of the associated transmission lines. Upon completion of the associated lines, these reactors would be utilized as line reactors. In principle approval to POWERGRID proposal was given by CEA.

11.2 Members agreed to the proposal.

12.0 Procurement of Spare 333 MVA, 765/400 kV and 500 MVA, 765/400 kV ICTs for Western Region

12.1 Director, CEA stated that POWERGRID has informed that at present twenty seven (27) units of 500 MVA 765/400 kV single phase ICTs are under operation at 4500 MVA 765/400 kV Bilaspur (10X500), 4500 MVA 765/400 kV Wardha (10X500) and 3000 MVA 765/400 kV Seoni (7X500) substations. At each substation, one 500 MVA, 765/400 kV ICT is kept as a spare. Similarly, eleven (11) units of 333 MVA of

765/400 kV single phase ICTs are under operation at 2000 MVA 765/400 kV Satna (7X333) and 1000 MVA Bina (4X333) substations. One unit of 333 MVA is kept as spare at each of sub-station. Twelve (12) more units of 500 MVA and three (3) more units of 333 MVA, 765/400 kV ICTs are planned for commissioning by 31.03.2013.

- 12.2 He said that POWERGRID has intimated that the above transformers were manufactured at off-shore works of ABB and Hyundai. If any of these units fails, it has to be transported to off shore works of manufacturer for the repair, which is a time consuming process. During the repair period, failure of second unit may lead to overloading of the other units operating in parallel and may cause transmission constraint at 765 kV level. Keeping this in view, POWERGRID has proposed to procure two (2) nos. single phase 500 MVA capacity and one (1) no. single phase 333 MVA capacity 765/400 kV ICT as spare for Western Regional Grid.
- 12.3 MD, GETCO stated that every station has got one unit as spare transformer, as such there was no need for procurement additional spare transformer. To improve the reliability, periodic maintenance the ICTs should be given priority. He enquired about the failures of 765/400 kV transformer so far.
- 12.4 GM, POWERGRID informed that 765/400 kV ICTs has failed at Gaya and Moga substations. He requested members to consider the proposal of procurement of spare transformers, in order to avoid any cause evacuation constraints, because of failure of additional unit.
- 12.5 After further deliberations, members did not agree with proposal of procurement of spare 765/400 kV ICTs in WR and requested POWERGRID to give priority to periodic maintenance and monitoring of these ICTs.

13.0 Requirement of Reactive Compensation at 400kV Bina Substation

- 13.1 Director, CEA stated that POWERGRID has intimated for a considerable period of time in year 2012, voltage at 400kV Bina Bus remained high and was more than 415kV for around 80% of the time in August, 2012. This required opening of multiple 400kV circuits emanating from Bina Sub-station on instruction from RLDC to contain over voltage. In order to control over voltage at Bina, POWERGRID has proposed replacement of the existing 63MVAR bus reactor at 400kV Bina Sub-station by 125MVAR Bus reactor. The existing 63 MVAR bus reactor shall be maintained as regional spare.
- 13.2 GM, WRLDC endorsing the proposal stated that additional compensation at Bina would help in overcoming the difficulty presently being faced in charging of Bina-Gwalior line.
- 13.3 Members agreed with the proposal.

14.0 Interim arrangement for evacuation of power from proposed Vindhyachal – IV (2x500MW) generation project

- 14.1 Director, CEA stated that in the 32nd SCM of WR the following interim arrangement was discussed and agreed due to non availability of associated transmission system in the matching time frame of Vindhyachal-IV generation project (March 2012) to avoid evacuation constraints:

- i) Completion of Vindhyachal IV- Sasan 400kV D/c (bypassing at Vindhyachal Pooling Station) and bunching of both ckts. to make single ckt only
- ii) Completion of Sasan - Satna 765kV S/c (to be operated at 400kV level) with termination at 765kV yard as planned by interconnecting 400kV and 765kV yards as well as interconnect Vindhyachal IV- Sasan 400kV bunched line
- iii) Completion of Satna – Bina 765kV S/c (to be operated at 400kV level) with termination at 765kV yard as planned by interconnecting 400kV and 765kV yards
- iv) Installation of 765/400kV transformers each at Bina and Gwalior S/s
- v) Completion of 765kV Bina - Gwalior S/c

In the 33rd SCM of WR the interconnection of Vindhyachal-IV STPP 400 kV bus with the existing Vindhyachal-III STPP 400 kV along with 1x125 MVAR bus reactor at Bina end was also agreed as an interim arrangement till the commissioning of Vindhyachal-IV transmission system.

- 14.2 He further stated in view of the delay in implementation of the interim arrangement mentioned above due to delay in getting forest clearance and anticipated commissioning of first unit of Sasan UMPP generation project by January 2013, POWERGRID has proposed a new interim arrangement to facilitate the evacuation of power from Vindhyachal –IV and Sasan UMPP generation projects. The interim arrangement involves (i) charging of Sasan – Satna 765 2XS/C lines at 765 kV level (as per original scheme of Sasan UMPP) and (ii) completion of Vindhyachal IV – Sasan 400 kV D/C line (through interconnection of Vindhyachal IV – Vindhyachal pooling station 400 kV D/C (Quad) line with Vindhyachal pooling station – Sasan 400 kV D/C (Twin) line bypassing Vindhyachal pooling station). To facilitate implementation, in principle approval for the new interim arrangement was given to POWERGRID by CEA in November 2012.
- 14.3 NTPC informed that 1st unit of Sasan would be commissioned by Jan-2013 and subsequent units were also expected to be added progressively with 1-2 months time gap. Balance 3x 660 MW units of Sasan were anticipated to be added by November 2013. Thus by July 2013 about 3480 MW (3x 660 MW Sasan, 2x500 MW Vindhyachal-IV & 1x 500 MW Rihand-III) and by November 2013 about 5000-5500MW would be required to be evacuated from Sasan switchyard. Hence as an interim arrangement third 765 kV circuit from Sasan to Satna (by using Sasan-Vindhyachal pool 765 kV tie line & connecting to Vindhyachal pool-Satna 765 kV by passing Vindhyachal pool) need to be considered till availability of Vindhyachal pooling station.
- 14.4 DGM, POWERGRID informed that 765/400 kV Vindhyachal -pooling substation has been considerably delayed due to land issue. In view of delay in associated transmission system of Vindhyachal-IV, the interim arrangement for Vindhyachal-IV shall be now Vindhyachal IV - Sasan 400 kV D/C line bypassing Vindhyachal pool (already commissioned) and beyond Sasan through 765 kV Sasan-Satna lines. One circuit of 765 kV Sasan-Satna is already charged and second circuit expected by March 2013. Vindhyachal pool -Satna 765 kV 2xS/C lines along with the Vindhyachal pooling station are also anticipated to be commissioned by June 2013.
- 14.5 Members concurred with the interim arrangement.

15.0 Unified Real Time Dynamic State Measurement (URTDSM) Project

15.1 COO, CTU stated that the Unified Real Time Dynamic State Measurement (URTDSM) Project was approved in the Joint Standing Committee Meeting held on 5th March 2012. As per Joint Standing Committee approval, 15% of the PMUs to be installed under this project are to be manufactured in India. Subsequent to this approval, the matter was discussed with prospective bidders. During discussions with the bidders, it emerged that 15 % PMU to be manufactured in India is a small quantity to attract Vendors to establish manufacturing facility in India. Hence this percentage needs to be enhanced. This enhanced provision shall help establish indigenous manufacturing and utilities shall also have the benefit of O&M support available within India. Therefore, it is proposed to increase the provision of the PMUs to be installed under URTDSM project to be manufactured in India from 15 % to 30%.

15.2 Members agreed to the change.

16.0 Transmission system associated with New IPP projects in Chattishgarh-Shifting of converter terminal associated with \pm 600 kV 4000 MW , Raigarh (Kotra) – Dhule HVDC line from Dhule in Western Region to a suitable location in Southern Region.

16.1 Director, CEA stated that the transmission system associated with IPPs coming up in Raigarh and Champa generation complex was discussed and finalized in the 29th and 30th SCM of WR. The transmission system associated with new IPPs in Chattishgarh, interalia, included \pm 600 kV 4000 MW, Raigarh (Kotra) – Dhule (PG) HVDC bipole line along with interconnection of Dhule (PG) with Malegaon, Nashik and Dhule (IPTC). Further, in the 15th Meeting of Western Regional Power Committee held on 12th Nov. 2010, MSETCL had indicated that about 3000MW generation near Dhule at Dondaicha and 1350 MW generation at Sinnar in Nasik District was planned. They had planned parallel additional corridors in Dhule – Nashik - Malegaon area and therefore, had requested POWERGRID to review the decision of establishing HVDC converter station at Dhule with +/- 600kV Raigarh (Kotra) – Dhule (PG) HVDC bipolar link and 400kV interconnecting lines with Malegaon, Nashik, Dhule (IPTC).

16.2 He added that presently, Southern Region is facing acute shortage of power of about 5000 MW. Load in SR is expected to increase at least by another 20,000 MW during 12th Plan. The envisaged 33,500 MW of installed capacity addition can give a maximum generation availability of 25,000 MW. Most of the upcoming IPP generation projects in Southern Region are based on Gas / Imported Coal and in view of the shortage of fuel, power availability from these projects would be uncertain. The anticipated deficit in SR by the end of 12th plan would be of the order of 10000 – 13000 MW. This deficit is to be met from the surplus power available in neighboring regions and which requires augmentation of the inter-regional links with SR.

16.3 POWERGRID stated that Chhattisgarh IPPs have not indicated any firm beneficiaries for power generated from their plants and therefore the power can be transferred to Southern Region for meeting its demand, subject to the availability of inter-regional transfer capacity. Hence, considering the requirement of transfer of

power from Chhattisgarh to Southern Region, it is proposed to shift the converter station associated with the ± 600 kV, 4000 MW Raigarh (Kotra) – Dhule (PG) HVDC bipolar link proposed at Dhule in Western Region to any suitable location in Southern Region.

16.4 After discussion, members agreed the termination of ± 600 kV, 4000 MW HVDC bipolar link from Raigarh (Kotra) to suitable location in Southern Region, instead of Dhule in Western Region. Thus, the transmission system associated with new IPPs in Chhattisgarh is modified as under :-

- ± 600 kV, 4000 MW HVDC bipole between Raigarh pooling station (near Kotra) to a suitable location in Southern Region along with metallic return conductor.
- Establishment of 4000 MW, ± 600 kV HVDC bipole terminal each at Raigarh (Kotra) and at a suitable location in Southern Region.
- Deletion of establishment of 2X315 MVA, 400/220 kV substation at Dhule (PG) along with 400 kV interconnections of Dhule (PG) with Dhule (IPTC), Nashik and Malegaon.

17.0 Proposal for Static VAR Compensators (SVC) in Western Region.

17.1 Director, CEA stated that enquiry committee was constituted by Ministry of Power to analyse the causes of grid disturbances in NEW Grid in July 2012 under the chairmanship of Chairperson, CEA. The committee, inter alia, recommended installation of adequate static and dynamic reactive power compensators to provide voltage support under steady state and dynamic conditions.

17.2 He added that system studies have been carried out jointly by CEA and POWERGRID corresponding to 2016-17 time frame, peak load condition considering all India network to identify / estimate the dynamic reactive power support requirement. In initial set of studies, 24 locations were identified based on voltage profile, short circuit level, interconnection with generating switchyard, location of existing / planned FACTS devices, availability of space etc. The voltage variations observed at these locations during last year were very high in the range of 40-60 kV. The studies were conducted considering SVC of ± 600 MVAR at candidate location one at a time.

17.3 He said that the studies were analysed and it was found that SVCs try to use its maximum range in first swing, while actual usage of SVC capacity was in the range of ± 200 MVAR to ± 250 MVAR. Accordingly, a size of ± 400 MVAR was considered as optimum size with additional benefit of ± 150 MVAR to ± 200 MVAR during steady state. Based upon the above studies, 11 no. of locations were identified in All India Grid for providing dynamic reactive power support in the first phase. Further studies were carried out considering ± 400 MVAR SVC at these eleven locations and 4 more existing / approved SVCs in Northern Region simultaneously. Based on the studies, SVC of ± 400 MVAR is proposed at four locations in first phase i.e. a) Gwalior b) Aurangabad (PG) c) Sholapur (PG) d) Satna in Western Region.

17.4 MD, GETCO stated that SVC was an old technology and fading out at utility level. He suggested that STATCOM may be preferred over SVC.

- 17.5 GM, POWERGRID endorsing the view of GETCO stated that STATCOM has faster response time, requires less space as compared to SVC and they are preferred world wide over SVC at utility level i.e. at voltage level of 220 kV and above.
- 17.6 COO, CTU proposed additional SVC at Indore (PG) as voltage variations observed at Indore (PG) are high. He also proposed an additional SVC at Kolhapur, as the same was an inter-regional interconnection point.
- 17.7 Director (SP&PA), CEA stated that the studies for assessing the requirement of dynamic compensation in all India grid was carried by CEA and POWERGRID jointly. These studies were carried out by modeling dynamic compensators as SVC and not as STATCOM. He added that STATCOMs are generally preferred at locations where SCR (Short Circuit Ratio) is not very high and where power quality was an issue.
- 17.8 SE, WRPC was of the opinion that there would be no significant difference in study results whether the dynamic compensators were modeled as SVCs or STATCOMs.
- 17.9 Member (PS), CEA stated that each dynamic compensator involves substantial investment and it would be appropriate if detail system studies are carried out before selecting any additional node for providing dynamic reactive compensation.
- 17.10 After, further discussions Static Var Compensators (SVCs) was agreed at following locations in first phase in Western Region:
- a) Gwalior \pm 400 MVAR
 - b) Aurangabad (PG) \pm 400 MVAR
 - c) Sholapur (PG) \pm 400 MVAR
 - d) Satna \pm 400 MVAR
- 18.0 Termination of Vapi – Navi Mumbai 400kV D/c line at upcoming Kudus substation of MSETCL.**
- 18.1 Director, CEA stated that Vapi – Navi Mumbai 400 D/c line is being constructed by POWERGRID under WRSS-V. The line was awarded in the year 2007. However, the construction progress of the line has been very slow since beginning, due to severe ROW problems. As informed by POWERGRID out of total length of 185 kms, the last 73 kms of the line from Navi Mumbai end involves 115 Ha of forest and Matheran Eco sensitive zone. Gram Panchayats of 11 villages, in the vicinity of Mumbai / Navi Mumbai area / sub-urban area, have refused to give their NOC for FRA and are obstructing work. Also, proposal for Matheran Eco-sensitive zone is pending before National wildlife Board for last one year for approval. After this clearance, the proposal will have to be cleared from Supreme Court. POWERGRID has been pursuing the matter for resolving the ROW with state administration at all levels regularly, however their response is not encouraging.
- 18.2 He added that in view of the RoW problem POWERGRID has proposed that the 400kV Vapi – Navi Mumbai D/c line may be terminated at upcoming Kudus substation of MSETCL. The Kudus 400kV substation is under construction by MSETCL near Padghe, which is located at a distance of around 2-3 kms, from the tower location no. 115/2 of the Vapi – Navi Mumbai 400kV D/c line. With termination of the line at Kudus, the route length of the 400 kV Vapi – Kudus (MSETCL) D/c line will be tentatively 125 kms (approx.).

18.3 After discussion, the termination of Vapi – Navi Mumbai 400kV D/c line at Kudus substation (near Padge) of MSETCL was agreed. However, POWERGRID will continue their effort for completing the balance portion of the Vapi- Navi Mumbai 400 kV D/C line.

19.0 400 kV outlet from 765/400 kV Gwalior (PG) sub-station

19.1 Director, CEA stated the Bina-Gwalior 765 kV 2xS/C lines and Gwalior-Agra 765 kV 2xS/C lines are being presently operated at 400 kV. With 765 kV operation of these lines in near future, there would no 400 kV inter connection at Gwalior (PG), except for two nos. of 315 MVA, 400/220 kV ICTs. Additional 400 kV outlets from Gwalior (PG) needs to be planned.

19.2 MPPTCL stated that no substantial load growth around Gwalior area is anticipated.

19.3 After discussion, it was decided that 400 kV outlets from Gwalior (PG) may be explored by CTU/CEA in consultation with MPPTCL.

20.0 Review of Transmission System for transfer of power from IPPs of SR to WR / NR

20.1 Director, CEA stated that the Transmission System Associated with IPP projects in Southern Region, for transfer of power to other regions was finalized in the 30th meeting of SCM of WR. The same was agreed in 14th WRPC meeting held on 19-08-2010. The transmission system, interalia, included Jabalpur Pooling station – Orai-Bulandshahar 765 KV S/c line, establishment of 2x1500 MVA 765/400 kV S/S at Bulandshahar and Sonipat. In the 32nd SCM of WR, the change in quantum of LTA and beneficiaries from various IPPs in Southern Region was noted by the constituents. Subsequently, with the grant of LTA to IPPs in Western Region like Today Energy Ltd. (1320MW), Dhariwal Infrastructure Ltd.(600MW) and DB Power Ltd.(1320MW) with target beneficiaries in Northern Region, the Jabalpur pooling station – Orai –Bulandshahar 765 kV S/C corridor was strengthened as 765 kV D/C corridor along with addition of Sonipat (New) – Kaithal 400 kV D/C (Quad line). The Regulatory Approval for implementation of the Transmission System for transfer of power from IPPs of SR to WR/NR has been granted by CERC to POWERGRID. However, implementation of the transmission scheme was not taken up by POWERGRID due to slow progress of generation projects in Southern Region.

20.2 He added that POWERGRID has intimated that in Northern Region grid, the following changes have taken place:

- (i) UP is establishing a 765 kV substation at Greater Noida under PPP mode which is close to Bulandshahar S/s. Two 765 kV substations in close proximity is not desirable.
- (ii) Kanpur – Jhatikara 765 kV S/c line is under construction, which is about 450 km long and for smooth operation it is desirable to LILO this line at some substation to reduce its length.
- (iii) Earlier a 765/400 kV substation at Sonipat was planned, however with the coming up of CLP Jhajjar and Aravali Jhajjar generations as well as

considering the injection of power from Adani at Mohindergarh, there is a need to review the requirement of establishment of 765/400 kV substation at Sonipat.

20.3 He said that in view of above, POWERGRID has proposed that the establishment of 765/400 kV substation at Bulandshahar may be shifted to Aligarh and Kanpur – Jhatikara 765 kV S/c line may be LILO at Aligarh. Further, for power dispersal from Aligarh, a 765 kV D/c line may be taken towards Hapur substation. POWERGRID has also proposed to take up the Transmission System agreed for transfer of power from IPPs of SR to WR / NR as WR-NR System Strengthening Scheme. Accordingly, the following transmission works are proposed as WR-NR System Strengthening Scheme:

- (i) Solapur – Pune 765kV S/c (2nd) line.
- (ii) Jabalpur Pooling station - Orai 765 KV D/c line.
- (iii) Orai – Aligargh 765kV D/c line.
- (iv) Aligarh – Hapur 765kV D/c line.
- (v) Orai – Orai (UPPTCL) 400kV D/c (Quad) line.
- (vi) LILO of one circuit of Satna-Gwalior 765 KV line at Orai S/s.
- (vii) 2x1000MVA, 765/400KV substation at Orai S/s.
- (viii) LILO of Agra-Meerut 765 kV S/c line at Aligarh S/s.
- (ix) 2x1500MVA, 765/400KV S/s at Aligarh.
- (x) LILO of Kanpur – Jhatikara 765 kV S/c at Aligarh S/s.

20.4 Members agreed with the proposal.

21.0 Commissioning of line reactors as bus reactors at Bina 765kV substation.

21.1 Director, CEA stated that as informed by POWERGRID high voltage persists on 765 kV and 400 kV side of Bina 765/400 kV substation most of the time. The Bina-Gwalior 2xS/C lines upgradation to 765 kV is pending as ICT Bays at Gwalior 765/400kV substation are not ready. However, 1x240MVAR Line Reactor of Bina - Gwalior line along with the bay is available and POWERGRID has proposed to utilize the 240 MVAR Bina-Gwalior line reactor as a Bus Reactor at Bina. With the upgradation of Bina-Gwalior line at 765 kV voltage level, this reactor shall be used as line reactor.

21.2 Members agreed to the proposal.

22.0 Intra-state Transmission System proposed by MSETCL for evacuation of power from various IPPs located in eastern part of Maharashtra.

22.1 Director, CEA stated that MSETCL has proposed a new transmission corridor for evacuation of about 5000 MW power from various IPPs / generating stations namely Lanco Vidarbha Thermal Power Limited (1320 MW), Ideal Energy Limited (540 MW), Koradi – II (1980 MW), Jinbhuvish Power Generation Pvt. Ltd (1320 MW) to load centers for vetting of CEA. The proposed transmission corridor was discussed among MSETCL, CEA and CTU at CEA, New Delhi in July 2012. Based on discussions and system studies, MSETCL was, interalia, advised to include a 400 kV link between Warora and Nanded, additional 400 kV D/C line between Lonar and Lonikhhand, provision of reactive compensation and augmentation / new stations planned for delivery and absorption of power. MSETCL has agreed to the changes / modifications suggested by CEA. The revised transmission corridor, interalia,

proposes establishment of 765/400 kV, 3000 MVA Wardha (M) Pooling Station, 765/400 kV, 3000 MVA Lonar (Buldhana) substation and installation of 400/220 kV ICT at 400 kV Ner (Yavatmal) substation of M/s Jimbuvish along with transmission lines and interconnection with the existing grid. The details of the new transmission corridor are as given below:

A. Immediate Evacuation system from the proposed generating stations		
S.No.	Transmission Line/ Substation	Distance/ Capacity
(i)	M/s Lanco switchyard - Wardha (M) Pooling Station 765 kV D/C line.	10 km
(ii)	Termination of the Koradi II – Wardha 400 kV D/C line at Wardha (M) Pooling Station (part system)	15 km
(iii)	LILO of one ckt. of Koradi II-Wardha(M) 400 kV D/C at Ideal Energy Ltd.	
(iv)	Injection at 400 kV Ner (Yavatmal) substation of M/s Jimbuvish.	-
B. Common transmission system strengthening		
B1. Establishment of 765/400 kV, 3000 MVA Wardha (M) Pooling Station		
S.No.	Transmission Line/ Substation	Distance/ Capacity
(i).	765/400 kV, 2X1500 MVA ICT at Wardha (M) Pooling Station.	3000 MVA
(ii).	Wardha (M) Pooling Station – Lonar (Buldhana) 765 kV D/C line.	250 km
(iii).	Bus reactor at 765/400 kV Wardha(M) pooling station	1X240 MVAR
(iv).	Switchable Line reactors at both ends of Wardha (M) Pooling Station – Lonar (Buldhana) 765 kV D/C line	2X240 MVAR 2X240 MVAR
B2. Establishment of 765/400/220 kV, 3000 MVA Lonar (Buldhana) substation		
(v).	765/400 kV , 2X1500 MVA ICT at Lonar (Buldhana) substation.	3000 MVA
(vi).	400/220 kV , 2X500 MVA ICT at Lonar (Buldhana) substation.	1000 MVA
(vii).	Lonar (Buldhana) – Lonikhand II 400 kV D/C quad line (1st ckt.)	320 km
(viii).	Lonar (Buldhana) – Retwadi 400 kV D/C quad line	350 km
(ix).	Retwadi – Ambernath 400 kV D/C quad line.	110 km
(x).	Warora – Nanded 400 kV D/C quad line.	230 km
(xi).	Lonar (Buldhana) – Bhokardan 220 kV D/C line.	80 km
(xii).	Lonar (Buldhana) – Partur 220 kV D/C line.	60 km
(xiii).	LILO of Jalna – Chikhali 220 kV D/C line at Lonar (Buldhana).	20 km
(xiv)	Bus reactor at 765/400 kV at Lonar substation.	1X240 MVAR
(xv)	Switchable Line reactors at both ends of Lonar (Buldhana) – Lonikhand-II 400 kV D/C quad line.	2X125 MVAR 2X125 MVAR

(xvi)	Switchable Line reactors at both ends of Lonar (Buldhana) – Retwadi 400 kV 2XD/C quad line.	2X125 MVAR 2X125 MVAR
B3.	Installation of 400/220 kV ICT at 400 kV Ner (Yavatmal) substation of M/s Jimbuvish	
(xvii)	400/220 kV, 2X500 MVA ICT at 400 kV Ner (Yavatmal) substation of M/s Jimbuvish.	1000 MVA
(xviii).	Ner (Yavatmal) – Lonar (Buldhana) 400 kV D/C line	120 km
(xix)	Ner (Yavatmal) – Ghatodi 220 kV D/C line.	40 km
(xx).	LILO of Wardha-I – Yavatmal 220 kV S/C line at Ner (Yavatmal).	25 km
(xxi).	LILO of Wardha-II (Bhugaon) – Pusad 220 kV S/C line at Ner (Yavatmal).	20 km
(xxii)	Bus reactor at Ner (Yavatmal) 400 kV substation.	1X125 MVAR
C.	System Strengthening connected with above corridor already proposed in the STU 5 year plan (2012-13 to 2016-17) of MSETCL.	
S.No.	Transmission Line/ Substation	Distance/ Capacity
C1.	Establishment of 400/220 kV substation at Retwadi	
(i)	400/220 kV, 2X500 MVA ICT at Retwadi	1000 MVA
(ii).	Lonikhand II – Retwadi 400 kV D/C quad line.	30 km
(iii)	220 kV interconnection from 400/220 kV Retwadi to Rajgurunagar	5 km
C2.	Establishment of 400/220 kV substation at Ambernath	
(i)	400/220 kV, 2X500 MVA ICT at Ambernath	1000 MVA
(ii)	LILO of both circuits Padge – Nagothane 400 kV D/C line at Ambernath. Lonikhand II – Retwadi 400 kV D/C quad line.	10 km
(iii)	220 kV interconnection from 400/220 kV Ambernath to Anandnagar (existing 220 kV Ambernath substation)	2.5 km
(iv)	400/220 kV Ambernath to Kalyan 220 kV D/C line	15 km
(v)	400/220 kV Ambernath to Ulhasnagar 220 kV D/C line	5 km
C3.	Establishment of 400/220 kV substation at Lonikhand – II	
(i)	400/220 kV, 2X500 MVA ICT at Lonikhand – II. (one ICT commissioned)	1000 MVA
(ii).	LILO of both circuits Parli (MSETCL) – Lonikhand I 400 kV D/C line at Lonikhand II. (one ckt LILO commissioned).	5 km
(iii)	LILO of both circuits Parli (PG) – Pune (PG) 400 kV D/C line at Lonikhand II.	30 km
(iv)	400/220 kV Lonikhand II to Theur 220 kV D/C line	18 km
(v)	400/220 kV Lonikhand II to Chakan 220 kV D/C line	28 km
(vi)	400/220 kV Lonikhand II to Rajgurunagar 220 kV D/C line	40 km

(vii)	400/220 kV Lonikhand II to VSNL Dighi 220 kV D/C line	25 km				
C4.	220/66-33-22 kV new substation/ augmentation planned					
S.No.	Substations	Voltage	New/Aug. /Rep.	Existing cap.	Cap. Proposed	Additional Capacity
(i).	Kalyan	220 kV	New	0	2X50	100
(ii).	Ulhasnagar	220 kV	New	0	2X50	100
(iii).	Bhivandi-IV	220 kV	New	0	4X50	200
(iv).	Anandnagar	220 kV	Aug		1X50	50
(v).	Jambhul	220 kV	Aug		2X50	100
(vi).	Kambha	220 kV	Rep	2X50	2X100	100
(vii).	Rajgurunagar	220 kV	New	0	2X50	100
(viii).	Mukhai	220 kV	New	0	2X50	100
(ix).	Chakan-II	220 kV	New	0	2X50	100
(x).	Partur	220 kV	New	0	2X50	100
(xi).	Jalna (MIDC)	220 kV	New	0	2X50	100
				Total	1150	1050

22.2 DGM, POWERGRID stated that Lanco Vidarbha has taken connectivity from CTU and also from STU and this amounts to dual connectivity. Lanco Vidarbha should withdraw the connectivity either from CTU or STU. Further, in case of Tiroda TPS, MSETCL's planned transmission system viz., Tiroda-Akola-Aurangabad and Warora-Chandrapur-II is not ready and the power from Tiroda TPS is injected into ISTS at Wardha (PG) through Tiroda-Warora-Wardha 400 kV line. She enquired about the status of implementation of the planned transmission system of Tiroda TPS.

22.3 MSETCL informed that the Warora 400 kV substation would be commissioned by March 2013, Aurangabad 765/400 kV substation would be commissioned by December 2013.

22.4 After further discussion, it was decided that CTU, CEA and MSETCL would further deliberate and finalise the intra state transmission proposed by MSETCL

23.0 Review of Transmission Planning Criteria

23.1 Director, CEA stated that the Enquiry Committee headed by Chairperson, CEA for grid events in July 2012 has recommended that transmission planning criteria needs to be reviewed in the context of market scenario within three months. In this regard, a note on the issues relating to "Review of Planning Criteria" has been prepared. A copy of this note and the existing "Manual on Transmission Planning Criteria" are available on CEA website.

23.2 He said that comments on the Review of Planning Criteria have been received from some utilities and based on that Planning Criterion is being reviewed and the draft would be ready soon.

23.3 He requested members who have not send their comments / suggestions to give their views / suggestions at earliest.

24.0 Integrated planning for State transmission system:

- 24.1 Director, CEA stated that as per section 39 of the Electricity Act, STUs need to carry out their planning function related to intra-state transmission in coordination with the CEA and CTU. There have been a few instances in the past, when the STU has planned important transmission system or allowed connectivity to large generation capacities without involving CEA and CTU and this may result in congestion / operational difficulties for the ISTS/national grid. It is proposed that STU should evolve following of their systems involving CEA and CTU.
- (a) 220 kV and above system
 - (b) Large scale harnessing of renewable generation
 - (c) System for evacuation of power from a complex having generation capacity of 250 MW and above in case of conventional generation and 50 MW and above in case of renewable generation.

25.0 State wise assessment of Load Generation Scenario of Western Region:

- 25.1 Director, CEA said that in order to have reasonably correct assessment of load generation scenario, STUs are requested to provide seasonal load and generation in the format given in the agenda note.

Additional Agenda Items taken up during the meeting:

26.0 3rd 765 kV line from Sipat STPP – Agenda by NTPC

- 26.1 NTPC stated that the power evacuation from 2980 MW Sipat STPP is primarily through two nos. 765 KV S/C lines. The 400 KV Ranchi Line is almost floating or on many occasions imports power to Sipat station. The Korba-Lanco Patadi- Sipat-Raipur Line has been bypassed from Sipat bus as an interim arrangement. Thus power evacuation outlets at 400 KV are very limited. In recent past, there have been several instances of station outages at Sipat Station. In some of the instances, it has been observed that tripping of one of the 765 KV Sipat-Bilaspur Pooling station line has led to tripping of other 765 KV line. The matter has also been discussed by WRPC/RLDC and the committee constituted to investigate the Sipat station failure on 21.09.2012 has recommended strengthening of transmission system from Sipat like additional 765 KV circuit to Bilaspur Pooling station. In view of the above, it requested to review the evacuation system of Sipat STPP and an additional 765 KV circuit to Bilaspur/ any other location from Sipat to enhance the redundancy in the evacuation system may be planned.
- 26.2 The matter was discussed and it was agreed that studies would be carried by POWERGRID and CEA to assess the requirement of additional 765 kV outlet from Sipat STPP.

27.0 LILO of both circuits of Korba-Kotmikala-Amarkantak 220 kV D/C line at Annuppur – Agenda by MPPTCL.

- 27.1 Director, CEA stated that MPPTCL has informed that MP power generating company Ltd. (MPPGCL) has proposed dismantling of generating units (1x30 MW and 1x20 MW, which have become obsolete) and 132 kV switchyard at Amarkantak TPS. This requires shifting of 132 kV feeders from the Amarkantak TPS to 220/132 kV S/S at Annuppur about 3 km from the TPS being constructed by MPPTCL.

- 27.2 He said that MPPTCL has also informed that the works of LILO of both circuits of Korba-Kotmikala-Amarkantak 220 kV D/C line at Annuppur has been completed and shutdown was required for making jumpering arrangement. The matter of charging of LILO arrangement has been discussed at WRPC, wherein it was suggested that Korba-Kotmikala - Amarkantak 220 kV D/C line being an inter-state line, approval of standing committee for charging the LILO arrangement may be taken by MPPTCL.
- 27.3 MPPTCL requested the members for approval of the LILO of both circuits of Korba-Kotmikala-Amarkantak 220 kV D/C line at Annuppur.
- 27.4 CSPTCL stated that normally power flows from Korba towards Kotmikala / Amarkantak and they had no objection to the proposal provided power flow from Korba towards Amarkantak is not affected. MPPGCL has a proposal to install 250 MW unit at Amarkantak TPS, which may affect the power flow on Korba-Kotmikala-Amarkantak line.
- 27.5 MPPTCL clarified that the installation of 250 MW unit at Amarkantak by MPPGCL is a future proposal and its evacuation system is yet to be planned.
- 27.6 Director, CEA stated that as per the results of the studies carried out by MPPTCL there is no change in power flow with LILO at Annuppur. The 132 kV outgoing feeders from Amarkantak TPS are to be shifted to 132 kV side of the new 220/132 kV Annuppur substation, where LILO of both circuits of Korba-Kotmikala-Amarkantak 220 kV D/C line has been proposed. Further, MPPTCL may take into account the apprehensions raised by CSPTCL while planning the evacuation system for 250 MW unit at Amarkantak TPS.
- 27.7 After discussion members agreed with proposal.
- 28.0 Strengthening of ISTS system in Gujarat- proposal by GETCO.**
- 28.1 DGM, POWERGRID stated that they have received a letter from GETCO in which GETCO have emphasized the need of strengthening of STU-CTU interconnections in Gujarat. A number of generation projects have come up / are coming up in western parts of Gujarat, which are given below:-
- a. Mundra UMPP : 4150 MW
 - b. Adani Mundra : 4620 MW
 - c. Essar Salaya Phase-I : 1200 MW
 - d. Essar Salaya Phase-II :1200 MW
 - e. Shapoorji Pallonji Kodinar :1320 MW
 - f. UNO-Sugen Surat : 382 MW
 - g. Torrent Power Sugem : 1148 MW
 - h. Pipavav energy : 1200 MW
- 28.2 She said that Gujarat has a major share in these generation plants. Further, IPPs in other states have also indicated Gujarat as target beneficiaries. Hence, following corridor in Gujarat as a part of High Capacity Transmission Corridors is under implementation as ISTS :
- i) Indore- Vadodara 765kV S/c
 - ii) Dhule (New) — Vadodara 765kV S/c line
 - iii) Vadodara — Pirana 400kV D/c (Quad)
 - iv) Establishment of 765/400kV, 2x1500 MVA substation at Vadodara

v) Vadodara — Asoj (GETCO) 400kV D/c (Quad) line

- 28.3 She added that for absorption of this power by Gujarat state, it is necessary to have sufficient STU-CTU interconnections. The necessity of strengthening STU-CTU interconnections was also discussed in meeting on High Capacity Transmission Corridors held in CEA in Oct, 2012. Further, Gujarat has highlighted on several occasions that a substation in Saurashtra is needed to be set up to cater to increasing load of that area.
- 28.4 Considering the above, following STU-CTU interconnections are proposed to be implemented under ISTS:
- a) Establishment of new 765/400kV, 2x1500MVA Pooling Station in Saurashtra area
 - b) Saurashtra Pooling Station — Vadodara 765kV D/c line
 - c) Saurashtra Pooling Station — Halvad 400kV D/c line
 - d) LILO of both circuits of Mundra UMPP — Jetpur 400kV D/c (Triple conductor) at Saurashtra Pooling Station.
 - e) LILO of both circuits Of Mundra UMPP — Limbdi 400kV D/c (Triple conductor) at Saurashtra Pooling Station (LILO of one ckt of Mundra UMPP — Limbdi 400kV D/c at Halvad may be opened after implementation of this scheme)

In future, this Pooling Station shall be connected to Essar (Salaya) generation project when additional LTA from this project is applied by M/s Essar.

- 28.5 MD, GETCO stated that Kosamba – Vapi (PG) 400 kV D/C was agreed in the 31st SCM of WR to provide additional feed to Vapi (PG) 400 kV substation. The line was to be implemented by GETCO. He suggested that in order to meet the increased demand of DNH & DD and Navi Mumbai area this line was required on urgent basis and the same may implemented as ISTS line by POWERGRID.
- 28.6 The above proposals were agreed by the members.

29.0 Open Access Meeting.

- 29.1 The minutes of the Connectivity, Open Access (Medium term and Long term) cases discussed in the 17th meeting of WR constituents regarding Connectivity / Long Term Access (LTA) applications in Western Region received from POWERGRID is enclosed as Annexure-OA.

The meeting ended with thanks to the chair.

List of Participants during the 35th Meeting of Standing Committee of Power System Planning in WR held on 03-01-2013 at POWERGRID, Gurgaon.

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**Status of Progress of Transmission Projects Awarded Through Tariff Based Competitive Bidding Route
Annexure II**

1. Name of transmission scheme: System Strengthening in NR for import of Power from North Karanpura and other projects outside NR and System Sterengthening in WR for import of power from North Karanpura and other projects outside Western Region and also for projects within western Region

Name of Transmission Company: North Karanpura Transmission Company Limited (RPTL)

Scope of work and physical progress (as on 31-12-2012)

Scope of work	Nominal Voltage (KV)	Length (ckm) / MVA	Tower Loc./Land Acq.(%)	Stub Comp./Civil work (%)	Tower erected/Recp. Material (%)	Stringing Completed /Erection (%)	Remark
Sipat/Korba (Pooling) – Seoni S/C line	765	334	0	0	0	0	Matter in CERC for advancement of date of completion. 1 st hearing -08.09.2011 14 th hearing -24.07.12 15 th hearing-30.8.2012. CERC order reserved
Lucknow-Bareilly S/C line	765	220	0	0	0	0	
Bareilly-Meerut S/C line	765	240	0	0	0	0	
Agra-Gurgaon D/C line	400	440	0	0	0	0	
Gurgaon-Gurgaon (PG) D/C line	400	40	0	0	0	0	
Gurgaon GIS	400/220	2x500	0	0	0	0	

Status of Progress of Transmission Projects Awarded Through Tariff Based Competitive Bidding Route

2. Name of transmission scheme: Augmentation Talcher II Transmission System

Name of Transmission Company: Talchar Transmission Company Limited (RPTL)

Scope of work and physical progress (as on 31-12-2012)

Scope of work	Nominal Voltage (kV)	Length (ckm) / MVA	Tower Loc./Land Acq.(%)	Stub Comp./Civil work (%)	Tower erected/Recp. Material (%)	Stringing Completed/ Erection (%)	Remark
Talcher II-Rourkela D/C line(Quad)	400	322	0	0	0	0	Matter in CERC for Advancement of date of completion. 1 st hearing -08.09.2011 15 th hearing-30.8.2012. CERC order reserved
Talcher II-Bhrampur D/C line	400	440	0	0	0	0	
Bhrampur-Gazuwaka D/C line	400	580	0	0	0	0	
Bhrampur sub-station	400/220	2x315	0	0	0	0	

Status of Progress of Transmission Projects Awarded Through Tariff Based Competitive Bidding Route

3. **Name of transmission scheme:** Scheme for enabling import of NER/ER surplus by NR

Name of Transmission Company: East North Interconnection Company Limited (Sterlite Grid)

Scope of work and physical progress (as on 31-12-2012)

Scope of work	Nominal Voltage (kV)	Length (ckm)	Tower Location	Stub Completed	Tower erected	Stringing Completed	Remark
Bongaigaon – Siliguri D/C line (Quad)	400	444	610	516	403	34	Stage-I forest clearance is awaited (1.5648 hectare in WB& Assam). For assam portion, MoEF has returned the file for clarification whether user agency is GOI-PSU or otherwise; compensatory afforestation over double degraded forest land can only be accepted after submission of certificate from Chief Secretary about non-availability of non-forest land as per new guidelines dated 13.2.2012 if the user agency is GOI-PSU. Letter has been submitted for allocation of non forest land West Bengal and Assam. aviation clearance awaited
Purnia – Biharsharif D/C line(Quad)	400	464	626	616	592	201	There is agitation on Ganga river crossing 7 nos. pile foundation. aviation clearance awaited
Scheduled date of completion: March 2013.							

Status of Progress of Transmission Projects Awarded Through Tariff Based Competitive Bidding Route

4. **Name of transmission scheme:** Scheme for System strengthening common for WR and NR

Name of Transmission Company: Jabalpur Transmission Company Limited (Sterlite Grid)

Scope of work and physical progress (as on 31-12-2012)

Scope of work	Nominal Voltage (kV)	Length (ckm)	Tower Loc	Stub Comp	Tower erected/	Stringing Completed	Remark
Dhramjaygarh-Jabalpur D/C line	765	754	958	164	0	0	(1) Clearance under Section 164 : approval is expected to receive in Jan. 2013 (2) All type of tower testing completed. (3) Tower material as per schedule reached at site. (4) FC awaited for Dhramjaygarh-Jabalpur D/C line.
Jabalpur-Bina S/C line	765	236	635	273	70	0	

Scheduled date of completion: March 2014.

Status of Progress of Transmission Projects Awarded Through Tariff Based Competitive Bidding Route

5. **Name of transmission scheme:** Transmission System Associated with Krishnapattnam UMPP – Synchronous interconnection between SR and WR (Part- B)

Name of Transmission Company: Raichur Solapur Transmission Company Limited (A consortium of Patel Engg. B S Tanscom Ltd. and Simplex Infrastructure Ltd.)

Scope of work and physical progress (as on 31-12-2012)

Scope of work	Nominal Voltage	Length (ckm)	Tower Location	Stub Completed	Tower erected	Stringing Completed (KM)	Remark
Raichur-Sholapur S/C Line	765 kV	208	541	272	20	0	Tower erection work is yet to commence. Tower material for 30 nos. reached at site. Material of 50 nos. tower is expected by month end.
Scheduled date of completion: January 2014.							

Status of Progress of Transmission Projects Awarded Through Tariff Based Competitive Bidding Route

6. Name of transmission scheme: Scheme for system strengthening for WR

Name of Transmission Company: Bhopal Dhule Transmission Company Limited (Sterlite Grid)

Scope of work and physical progress (as on 31-12-2012)

Scope of work	Nominal Voltage (kV)	Length (km) / MVA	Tower Loc./Land Acq.(%)	Stub Comp./ Civil work (%)	Tower erected/ Recp. Material (%)	Stringing Complete d/Erection (%)	Remark
Jabalpur-Bhopal S/C Line	765	261	668	262	109	0	
Bhopal-Indore S/C Line	765	174	452	289	68	0	
765/400 kV substation at Bhopal, with 2x1500 MVA 765/400 kV	765/400	2x1500	100	5	0	0	Land leveling complete. Equip. delivery started.
Bhopal-Bhopal D/C Line	400	16	24	0	0	0	
Aurangabad-Dhule S/C Line	765	191	505	284	193	7	
Dhule-Vadodara S/C Line	765	263	682	209	89	0	FC awaited for the line
765/400 kV substation at Dhule with 2x1500 MVA 765/400 kV	765/400	2x1500	100	65	75	0	Transformer and reactor inspected & dispatched. Balance equipments received at site. Erection started. Cable trench, road, CR u/p. other CW completed.
Dhule-Dhule D/C Line	400	36	55	20	11	0	
<p>Clearance under Section 164 is expected to receive in Jan. 2013. Scheduled date of completion: Mar 2014. The application for PTCC Clearance have been submitted.</p>							

Status of Progress of Transmission Projects Awarded Through Tariff Based Competitive Bidding Route

7. **Name of transmission scheme:** Transmission System associated with IPP of Vemagiri Area (Package-A)

Name of Transmission Company: POWERGRID Vemagiri Transmission Limited (Formerly Vemagiri Transmission System Limited)

Scope of work and physical progress (as on 31-12-2012)

	Nominal Voltage (kV)	Length (km)	Tower Loc.	Stub Comp.	Tower erected.	Stringing Completed	Remark
Vemagiri Pooling station - Khammam D/C Line-I	765 (6 x Zebra ACSR or AAAC)	227.79	0	0	0	0	(1) LOI placed on 20/03/12 (2) Special Purpose Vehicle acquired on 18/04/2012 (3) Tr. License application filed in CERC on 19.4.2012 and application for tariff adoption filed on 19.4.2012 (4) Clearance U/s 164 – application submitted to CEA on 21.9.2012, gazette notification on 14/7/12 and public notice issued on 23.5.2012
Khammam – Hyderabad D/C Line-I	765 (6 x Zebra ACSR or AAAC)	205.75	0	0	0	0	
Scheduled completion : 18.04.2015(36 month)							

Status of Progress of Transmission Projects Awarded Through Tariff Based Competitive Bidding Route

8. Name of transmission scheme: Transmission System associated with IPP of Nagapattinam/Cuddalore (Package-A)

Name of Transmission Company: POWERGRID NM Transmission Limited (Formerly Nagapattinam-Madhugiri Transmission Company Limited)

Scope of work and physical progress (as on 31-12-2012)

Scope of work	Nominal Voltage (kV)	Length (km)	Tower Location	Stub Completed	Tower erected/	Stringing Completed	Remark
Nagapattinam Pooling station- Salem D/C line	765	211.73	0	0	0	0	(1) LOI placed on 06/03/12 (2) Special Purpose Vehicle acquired on 29/03/2012 (3) Tr. License application filed in CERC on 4.4.2012 and application for tariff adoption filed on 4.4.2012.
Salem-Madhugiri S/C line	765	234.461	0	0	0	0	(4) Clearance U/s 164 – application submitted to CEA on 17.9.2012, gazette notification on 7/7/12 and public notice issued on 20.6.2012
Scheduled completion : 29.03.2015(36 month)							

STATUS OF WESTERN REGION TRANSMISSION SCHEME

Sl. No.	Description of Scheme	Estimated Cost (Rs. Cr)	Date of firming up in WR standing committee	Date of FR	Date of investment approval	Target date as of now	Remarks
1	Western Region System Strengthening Scheme-II	5222	20 th (23.01.04)	Sep'05 (Rev)	July'06		commissioned
	Set-A: For absorbing import in eastern and central part of WR Grid (POWERGRID)	1700					
	a) Raipur – Wardha 400kV D/c					commissioned	
	b) Seoni – Wardha 765kV 2 nd S/c (initially to be operated at 400kV)					commissioned	
	c) Wardha – Parli(PG) 400kV D/c (Quad)					commissioned	
	d) Bhadravati – Parli(PG) 400kV D/c					commissioned	
	e) Parli(MSEB) – Parli(PG) 400kV D/c					commissioned	
	Set-B: For regional strengthening in Southern Maharashtra (100 % private)	1050					Implementation by Reliance
	a) Parli(PG) - Pune 400kV D/c					Mar'13	
	b) Pune – Aurangabad 400kV D/c					Mar'13	
	c) Parli(PG) – Solapur 400kV D/c					commissioned	
	d) Solapur - Kolhapur 400kV D/c					commissioned	
	e) LILO of Lonikhand – Kalwa 400kV D/c line at Pune...					one ckt commissioned 2nd ckt by Mar'13	
	f) LILO of Sholapur – Karad 400kV S/c line at South Solapur					commissioned	
	Set-C: For regional strengthening in Gujarat (100 % private)	600					Implementation by Reliance
	a) Rajgarh – Karamsad 400kV D/c					Mar'13	
	b) Limdi(Chorania) – Ranchodpura 400kV D/c...commissioned					commissioned	
	c) Ranchodpura – Zerda(Kansari) 400kV D/c...commissioned					commissioned	

	Set-D: For regional Strengthening in Northern Madhya Pradesh (POWERGRID) a) Korba STPP – Birsinghpur 400kV D/c b) Birsinghpur - Damoh 400kV D/c c) Damoh - Bhopal 400kV D/c d) Bina – Gwalior 765kV 2 nd S/c (initially to be operated at 400kV)	1050					commissioned
	Sub-Stations (POWERGRID) a) Establishment of 400/220kV 2x315MVA substation at Pune and South Solapur b) Establishment of 400kV switching station at Parli(PG) c) 25% Fixed Series Compensation at Rajgarh & Wardha	830					commissioned commissioned commissioned commissioned
2	Western Region System Strengthening -V a) 400 kV Vapi- Navi Mumbai D/c b) LILO of 400 kV Lonikhand/Pune - Kalwa line at Navi Mumbai c) Establishment of 400/220 kV, 2 x 315 MVA new S/s (GIS) at Navi Mumbai d) 220 kV Vapi- Khadoli D/c.	478	25 th (30.09.06)	Jan'07	Dec'07	Completion uncertain - ROW problem commissioning matching with LILO line commissioned	Under implementation

3	<p>Tr. System of Sasan Ultra Mega Power Project (4000 MW)</p> <p>Transmission Lines</p> <p>a) Sasan – Satna 765 kV 2xS/c</p> <p>b) Satna - Bina(PG) 765 kV 2xS/c</p> <p>c) Bina(PG)-Indore(PG) 765 kV S/c</p> <p>d) LILO of Vindhyaachal-Jabalpur 400 kV D/c at Sasan</p> <p>e) Indore (MP)– Indore(PG) 400kV D/c (Quad)</p> <p>f) Bina(PG)-Bina(MP) 400 kV D/c</p> <p>Substations</p> <p>a) Establishment of new 765/400 kV, 2x1500MVA substation at Gwalior and 765/400 kV, 2x1000 MVA at Bina(PG) for charging of Bina-Gwalior and Agra-Gwalior 2xS/c lines at 765 kV level</p> <p>b) Provision of 765 kV Bays for charging of Seoni- Bina S/c line at 765 kV level</p> <p>c) Establishment of new 765/400 kV, 2x1000 MVA substation at Satna</p> <p>d) Establishment of new 765/400 kV, 2x1500 MVA substation at Indore(PG)</p>	5323	26th (23.02.07)	Jun'07	Dec'08	<p>Jan'13</p> <p>commissioned</p> <p>Commissioned by-passing Indore (PG) (charged at 400kV)</p> <p>Commissioned</p> <p>Commissioned by-passing Indore (PG)</p> <p>Mar'13</p> <p>Gwalior- Mar'13</p> <p>Bina- Commissioned</p> <p>Commissioned</p> <p>Commissioned</p> <p>June'13</p>	Under implementation
4	<p>Tr. System of Mundra Ultra Mega Power Project (4000 MW)</p> <p>Transmission Lines</p> <p>a) Mundra – Bachchau-Ranchodpura 400 kV (Triple) D/c</p> <p>b) Mundra – Jetpur 400 kV (Triple) D/c</p> <p>c) Mundra – Limbdi 400 kV (Triple) D/c</p> <p>d) Gandhar-Navsari 400 kV D/c</p> <p>e) Navsari- Boisar 400 kV D/c</p> <p>f) LILO of both circuits of Kawas Navsari 220 kV D/c at Navsari (PG)</p>	4546	26th (23.02.07)	Jun'07	Oct'08	<p>Commissioned</p> <p>Commissioned</p> <p>Commissioned</p> <p>Commissioned</p> <p>Mar'13</p> <p>Commissioned</p>	Under implementation

	g) Wardha-Aurangabad 400 kV(Quad) D/c (with provision to upgrade at 1200 kV at later date)					Dec'13	
	Substations a) 40% Fixed Series Compensation each on Wardha - Aurangabad 400 kV D/c at Wardha end b) Establishment of new 400/220 kV, 2x315 MVA substation at Navsari & Bachchau c) Establishment of new 765/400 kV, 3x1500 MVA, substation at Wardha for charging of Seoni - Wardha 2xS/c lines at 765 kV level					Mar'14 Commissioned Commissioned	
5	Tr. System associated with DVC, Maithon in ER (Part system) a) Ranchi-WR Pooling Station 765kV S/c	1100	27 th (30.07.07)	Sept'07	Aug'08	Dec'13 Land acquisition and forest clearance problem	Under implementation
6	Transmission system associated with Krishnapatnam (5x800 MW) (WR Portion)- now delinked from Krishnapatnam UMPP a) Raichur – Sholapur 765 kV S/c b) Sholapur – Pune 765 kV S/c c) LILO of 400kV Aurangabad-Pune D/c & Parli- Pune D/c lines at Pune(GIS) d) Establishment of new 765/400 kV substations at Sholapur & Pune with 2x1500 MVA transformation capacity	1928	27 th (30.07.07)	Jan'08		Oct'14 best effort Mar'14	Under implementation

7	<p>Split Bus arrangement and reconfiguration/shifting of terminating lines at Raipur 400kV S/s</p> <p>a) Splitting 400kV Raipur bus into two sections between existing line bays of Chandrapur-1 & Chandrapur-2 through bus sectionaliser.</p> <p>b) Bypass 400kV Bhatapara-Raipur Bhilai line at Raipur and restore the line as 400kV Bhatapara-Bhilai S/c</p> <p>c) Shifting of Chandrapur-2 and Chandrapur-3 line bays from Section Raipur-B* to Raipur-A*.</p>	16	28 th (06.12.08)	Apr'09	Aug'10	Mar'13	Under implementation
8	<p>Associated transmission system of VSTPP-IV and Rihand-III</p> <p>a) Rihand-III- Vindhyachal Pool 765 kV D/c (initially to be op. at 400kV)</p> <p>b) Vindhyachal-IV Vindhyachal Pool 400kV D/c(Quad)</p> <p>c) Vindhyachal Pool-Satna 765 kV 2xS/c</p> <p>d) Satna -Gwalior 765 kV 2xS/c</p> <p>e) Gwalior – Jaipur(South) 765 kV S/c</p> <p>f) Vindhyachal Pool-Sasan 765 kV S/c</p> <p>g) Vindhyachal Pool-Sasan 400 kV D/c</p> <p>h) Establishment of 765/400kV, 2x1500 MVA substation at Vindhyachal Pool</p>	4673	29 th (10.09.09)	Sep'09	Mar'10	<p>Sep'13</p> <p>Test Charged</p> <p>Sep'13</p> <p>June'13</p> <p>Dec'13</p> <p>June'13</p> <p>Test Charged</p> <p>June'13</p>	Under implementation
9	<p>Establishment of 400/220kV substation in UT DNH</p> <p>a) LILO of Vapi- Navi Mumbai 400kV D/c at Kala S/s in UT DNH</p> <p>b) Establishment of 400/220kV, 2x315 MVA substation at Kala in UT DNH</p>	181	28 th (06.12.08)	Jan'10	Jul'11	<p>Jul'13</p> <p>best efforts</p> <p>Mar'13</p>	Under implementation

10	Installation of transformer at Vapi sub station a) Installation of 400/220kV, 1x315MVA transformer (3rd) at Vapi(PG)	21	30 th (08.07.10)	Nov'10	Sep'11	Feb'13	Under implementation
11	Establishment of 400/220kV substation in UT Daman a) LILO of Navsari- Boisar 400kV D/c at Magarwada in UT Daman-30 km b) Establishment of 400/220kV, 2x315 MVA substation at Magarwada	234	30 th (08.07.10)	Mar'10	Jan'12	Jan'14 Jan'14	Under implementation
12	Western Region System Strengthening Scheme-XIII a) Bachau(PG) –Versana(GETCO) 400kV D/c-10 km	49	30 th (08.07.10)	Jan'11	Dec'11	Dec'13	Under implementation
13	Solapur STPP(2x660MW) transmission system a) Solapur STPP – Solapur (PG) 400kV D/c b) Solapur STPP – Pune(PG) [Pune S/s under Krishnapatnam UMPP] 400kV D/c (Quad) c) Augmentation of 400/220kV ICT by 1x315MVA transformer (3 rd) at Solapur (PG)	630	30 th (08.07.10)	Jul'11		June'15	Tendering under progress
14	Augmentation of transformer and bays in Western Region a) Installation of 400/220kV, 1x315MVA transformer (3rd) at Mapusa(PG) along with 2 nos. 220kV line bays at Mapusa (PG) sub station b) Installation of 400/220kV, 1x500MVA transformer (3rd) at Navsari c) Two nos. 400kV line bays at 765/400kV Indore(PG) Substation d) Two nos. 220kV line bays at 400/220kV Pirana(PG) Substation.	65	30 th /32 nd (WR SCM)	Aug'11	June'12	June'14	Under implementation

15	Transmission system for evacuation of Kakrapar Atomic Power Project unit 3 &4 (2x700 MW) a) Kakrapar NPP – Navsari 400kV D/c – 65 km b) Kakrapar NPP – Vapi 400kV D/c - 120 km	250	31 st (27.12.10)	Nov'12	-	June'15	Tendering under progress
16	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 – Rajgarh 400kV D/c (2nd)-215 km d) Establishment of 400/220kV 2x315MVA substation at Betul	1100	32 nd (13.05.11)	Apr'12	-	June'15	Tendering under progress
17	Provision of 1x315MVA ICT for reliable auxliary power supply at HVDV back to back station at Bhadravati	143	33 rd (21.10.11)	June'12	-	Feb'15	Tendering under progress
18	Installation of Reactors in Western Region a)420kV, 125 MVAR Reactors at Jabalpur, Khandwa, Shujaplur, Bhatpara , Raigarh & Aurangabad 400kV substation b) 420kV , 80MVAR Reactor at 400kV Solapur Substatoin.	83	33 rd (21.10.11)	Jan'12	Sep'11	Aug'14	Under implementation
19	Installation of Reactors in Western Region (Part-II) a)420kV, 125 MVAR Reactors at Damoh (PG), Bachau (PG), Pirana (PG), Seoni (PG), Parli (PG) , Raipur (PG), Itarsi (PG) and Gwalior (PG) 400kV Substations b) 420kV , 63MVAR Reactor at 400kV Raipur (PG) substation.	98	34 th (09.05.12)	Aug'12	-	Feb'15	Tendering under progress