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विद्युत मंत्रालय / Ministry of Power
केन्द्रीय विद्युत प्राधिकरण / Central Electricity Authority
विद्युत प्रणाली योजना एवं परियोजना मूल्यांकन प्रभाग - I
Power System Planning & Project Appraisal Division-I
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No. 26/10/2015-PSP&PA-I/ 375-388

Date: 16.11.2015

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

Sir / Madam,

The 39th meeting of the Standing Committee on Power System Planning of Western Region will be held on 30.11.2015 (Monday) at 10:30 Hrs at NRPC, **18-A, Qutab Institutional Area Shaheed Jeet Singh Marg, Katwaria Sarai, New Delhi – 110016**. The agenda notes of the meeting are also available on CEA website (www.cea.nic.in) at the following link: <http://www.cea.nic.in/compsplanning.html> i.e. Home page-Wings-Power Systems-PSP&PA-I - Standing Committee on Power System Planning-Western Region).

Kindly make it convenient to attend the same.

Yours faithfully,

Chandra
(Chandra Prakash),
Director, PSP&PA - I 16/11/2015

1.0 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. MSETCL/CO/TU/302B/GC/201/12990 dated 8.10.2015 has observed that in item no. 5.2 of the **minutes LILO of Parli- Osmanabad 220 kV D/C line at Parli (PG) 400/220 kV, 2X500 MVA substation** may kindly be corrected 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 minutes of the 38th SCPSPWR.
- 1.4 Members may deliberate and confirm the minutes of the 38th meeting of the Standing Committee on Power System Planning in Western Region.

2.0 Review of Progress on Earlier Agreed Transmission Schemes.

- 2.1 The status of implementation of transmission projects under tariff based competitive bidding are enclosed at Annexure-1 and the status of transmission schemes under implementation by POWERGRID is enclosed at Annexure-2.

Members may deliberate.

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

- 3.1 MSETCL vide their letter dated 19.10.2015 has forwarded the proposal for provision of 2 nos. of 220 kV bays at the existing Aurangabad 765/400/220 kV substation of POWERGRID. The two nos. of 220 kV bays are required for termination of Shendra GIS – Aurangabad 765/400/220 kV substation 220 kV D/C line at Aurangabad 765/400/220 kV substation.
- 3.2 The Shendra 220 kV GIS has been proposed to meet 200 MW load under Delhi-Mumbai- Industrial Corridor (DMIC) Phase-I. The scope of works for establishment of Shendra 220 kV GIS are:

- (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.

3.3 MSETCL may confirm the implementation agency for the Shendra 220 kV GIS proposal. POWERGRID may confirm the availability of space for 2nos of 220kV bays at Aurangabad 765/400/220 kV substation.

Members may deliberate.

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

4.1 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 Maharashtra 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 The peak demand met by Maharashtra in August 2015 was 18447 MW. Accordingly, load flow studies were carried out by taking recent load flow file from WRLDC for a demand of 18,445 MW in Maharashtra. In the studies intrastate generation of Maharashtra of 11893.4 MW (Tirora – 2418MW, Koyna – 552.8, Jaigad – 1000MW, Amravati- 750 MW) and import of about 6500 MW from ISTS has been considered. The load flow study was carried out to see the impact of the following transmission schemes which are already under implementation by PGCIL/MSETCL on the power flows in Aurangabad (Waluj)- Aurangabad(PG) 400 kV interconnection:

- (i) LILO of 400kV D/C lines Parli – Pune (PG) at Pune (GIS) - already commissioned.
- (ii) LILO of Aurangabad – Pune (PG) at Pune(GIS)) by September 2015
- (iii) 2 nos. of 400 kV bays at Dhule (MSETCL) for termination of Dhule(Sterlite) – Dhule (MSETCL)400 kV D/C line.
- (iv) Aurangabad – Sholapur D/C 765kV line by December 2015
- (v) Aurangabad – Boisar D/C 400 kV line by March 2016
- (vi) Aurangabad – Padghe 765 kV D/C line by March 2016
- (vii) LILO of one circuit of Aurangabad – Padghe 765 kV S/C line at Pune (GIS) – project under bidding stage.

4.3 The load flow results are attached as Annexure-3. From the load flow analysis it is evident that with the commissioning of the above mentioned elements loading on 400kV Aurangabad (Waluj) – Aurangabad (PG) D/C line has been reduced from 2200MW to 640MW and Aurangabad (Waluj) – Aurangabad (PG) D/C line would not be constraint for import of power to Maharashtra. 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) is not required.

Members may deliberate.

5.0 Additional 400 kV feed to Goa

5.1 In the 38th SCM of WR the following Inter State Transmission System scheme was proposed:

- (i) Establishment of 2X500 MVA, 400/200 kV substation at Xeldam and its interconnection with Narendra (existing) 400 kV substation through 400 kV D/C line with quad conductor. 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) 400kV (Quad) connectivity between the new substation at Xeldem and Mapusa to take care of any N-1-1 contingencies involving outage of any one 400kV infeed to Goa.

In the meeting POWERGRID has suggested the alternative of LILO of Narendra-Kolhapur 400 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 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 included in the scheme that would be put in the SR SCM for their approval.

5.2 POWERGRID has further carried out studies and suggested alternatives (**One**- LILO of one ckt of Narendra (existing) – Kaiga 400kV D/c line at Xeldem (New) and Xeldem (New) – Colvale (Mapusa) 400 kV (Quad/HTLS) D/c line, **Two**- Kolhapur (PG) – Colvale (Mapusa) 400kV (Quad/HTLS) 2nd D/c line and Colvale (Mapusa) - Xeldem (New) 400 kV(Quad/HTLS) D/c line). Although alternative **One** is better in terms of power flow, the LILO shall involve construction of more than 100KM line length in the hilly and forested areas of Western Ghats. About 30% of the area of the Western Ghats Region is under forests. In the past, during forest clearance process of Kaiga-Narendra 400 kV line, POWERGRID faced lot of resistance from various activists and NGOs. The clearance was recommended by Karnataka government in 2002 only after joint confirmation from POWERGRID and CEA during detailed review that no further transmission line shall be laid in the area. It is therefore apprehended that LILO of one ckt of Kaiga-Narendra 400 kV D/C line in Western Ghat area shall be resisted by the activists/NGOs and obtaining forest clearance and actual implementation of line may be delayed as in case of Mysore-Kozikode 400 kV line (Mysore –Kutta portion) due to such resistance and possible legal intervention. Therefore, alternative **Two** has been suggested by POWERGRID along with reconductoring of Sholapur (PG) – Kolapur 400kV Double Circuit Line with HTLS conductor.

5.3 The following alternatives for feeding Xeldam 400 kV substation has been studied including the alternative proposed in the 38th SCM and the alternative proposed by POWERGRID:

S. No	Alternative	Exhibit
1	Narendra (existing)- Xeldam- Mapusa 400 kV D/c quad line	Option 1 (as proposed in 38 th SCM)
2	Kolhapur (PG)- Mapusa – Xeldam 400 kV D/C quad line	Option 2 (suggested by POWERGRID)
3	Kolhapur (PG) – Xeldam- Mapusa 400 kV D/C quad line	Option 3
4	Kolhapur (PG) – Xeldam 400 kV D/C quad line and LILO of one ckt at Mapusa	Option 4
5	LILO of one ckt. of Narendra (New)- Kolhapur (PG) 400 kV D/C line at Xeldam	Option 5 (suggested by POWERGRID)
6	LILO of one ckt. of Narendra (existing) - Narendra(New) 400 kV D/C line at Xeldam	Option 6
7	LILO of one ckt. of Kaiga-Narendra (existing) 400 kV D/C line at Xeldam with LILO point at Narendra end.	Option 7
8	LILO of one ckt. of Kaiga-Narendra (existing) 400 kV D/C line at Xeldam with LILO point at Kaiga end.	Option 8

The results of the load flow studies conducted for the above mentioned eight alternatives is enclosed as Annexure - 4. The observations based on analysis of the results are:

- (i) **Option 1** is technically best possible alternative for providing ISTS feed to Goa system since it has successfully relieved loading on existing 220kV network as well as 400kV network which is feeding power to Goa system.
- (ii) For implementation of Option 1 two no. of 400 kV bays would be required at Narendra (existing) 400/220 kV substation. In case of space constraints GIS bay may be provided. If no space is available then **option 6** or **option 7** could be implemented which are equally good as **option1**.
- (iii) In the all the eight alternatives, the 400 kV lines to Mapusa/ Xeldam has to cross the Western Ghats section.
- (iv) In the corridor through which the Narendra(existing)-Xeldam 400 kV D/C line would pass, there are already existing Ambewadi – Xeldam/Ponda 220 kV D/C line and Supa-Ponda 110 kV D/C line. Ambewadi – Xeldam/Ponda 220 kV D/C line is functional whereas the Supa-Ponda 110 kV D/C line is not in use. These lines are maintained and operated in their respective geographical areas by Goa and Karnataka respectively. 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 could be used.
- (v) **Option 2** - there will be only a single source for feeding Goa at 400kV level i.e., 765/400 kV Kolhapur (PG).
- (vi) **Option5** i.e, LILO of one ckt. of Narendra(New)- Kolhapur(PG) 400 kV D/C line at Xeldam which was suggested in the 38th SCM is not a suitable alternative as there is uneven loading on the 400 kV circuits feeding power to Xeldam (540 on one ckt and 82 MW on other ckt.) . Also Narendra(New)- Kolhapur(PG) is a 765 kV D/C line which in present scenario is being operated 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.

- 5.4 Members may deliberate and finalize the second 400 kV feed to Goa so that the same could be taken up for approval in the SCM of SR.

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

- 6.1 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 LVTPPL TPS) for 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 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 and subsequently a meeting was held in CEA on 2.9.2015 to discuss the connectivity issue (Minutes enclosed as Annexure- 5). 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 Empowered Committee for implementation of the scheme through TBCB route.

- 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.

- 6.3 Response from M/s LVTPPL is awaited. However connectivity of 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 Base Competitive Bidding route.

Members may deliberate.

7.0 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 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 at Pune GIS in lieu of Kolhapur-Padghe (PG) 765kV D/c one ckt via Pune GIS was agreed as System Strengthening Schemes in WR for transfer of power to SR from IPPs in Chhattisgarh.

- 7.2 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**. Presently the process of transfer of SPV is under progress.

As per the route survey carried out by the BPC for 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 are available 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 line reactor along with 1200 Ohms is proposed at Pune GIS for Aurangabad (PG) – Pune GIS 765kV line.

Members may deliberate.

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

- 8.1 Transmission System for KAPP 1 & 2 consists of KAPP 1&2 – Vapi/Balitha (GETCO) 220kV D/c Single ACSR Zebra line - 117KM which is an ISTS line and tariff of the same is claimed by POWERGRID. 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 proposed to replace existing 220kV conductor with approx. 255mtr underground 220kV XLPE cable from 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 POWERGRID/ GETCO may present the scheme details.

9.0 Conversion of fixed Line Reactors to switchable Line Reactors

- 9.1 Fixed line reactors on small 400 kV lines may lead to cases of over-compensation in lines. Several short length 400 kV lines have been identified in Western Region which has a high degree of compensation and the same have been tabulated below:

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 I	207	50	50	F	F	87.83
3	Itarsi – Indore (MPPTCL) 400kV S/c II	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 POWERGRID has proposed to convert the fixed line reactors 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. DOV Studies for the above lines have been carried out and no DOV phenomenon has been observed in absence of the line reactor.

9.3 POWERGRID may present the DOV studies and members may deliberate.

10 Operational feedback by NLDC.

10.1 The operational feedback by NLDC on Transmission constraints in Western Region for the quarter July 2015 to September 2015 is summarized below:

10.1.1 Transmission Line Constraints

S. No	Corridor	Constraint	Description of the constraint
1.	400 kV Aurangabad(PG) - Aurangabad (MSETCL) D/C Antecedent Conditions With commissioning of 765 kV Durg-Wardha D/C, 765kV Wardha-Aurangabad 4 ckts and high demand of Maharashtra, the constraint has shifted to 400 kV Aurangabad (PG)-Aurangabad (MS)	Critical Loading of 400 kV Aurangabad (PG) - Aurangabad (MSETCL) D/C leading to n-1 non-compliance.	Constraint observed from July'14 after commissioning of 765 kV Wardha-Aurangabad 1 & 2 lines. Further, 765 kV Wardha-Aurangabad 3 & 4 also have been commissioned and all 4 ckts are usually not kept in service in order to control the loading on the 400 kV Aurangabad (PG)-Aurangabad (MS) D/C and to control the high voltages at Wardha. With the commissioning of Vadodara Sub-station along with the 765 kV Dhule-Vadodara S/C, there is power flow of around 400MW through 765kV Aurangabad-Dhule-Vadodara

S. No	Corridor	Constraint	Description of the constraint
	D/C in the absence of 220 kV network from 400 kV Aurangabad (PG) S/S. The 2 x 315 MVA ICTs are in idle charged condition at Aurangabad(PG) S/s.		S/C and 765/400kV Aurangabad ICTs and 400 kV Aurangabad (PG) - Aurangabad (MS) D/C are relieved to a certain extent. 765 kV Aurangabad-Solapur D/C has been commissioned and relieved the line loading of 400kv Aurangabad-Aurangabad D/C.
2.	Constraints in 400 kV Khandwa – Dhule - Bableshtar-Padghe corridor Antecedent Conditions With high Maharashtra Demand of the order of 18500-20000 during morning peak and no Generation at RGPPL and low generation at Jaigad and Parli and SSP generation is less.	400 kV Khandwa-Dhule - Bableshtar-Padghe corridors carrying more than 500 MW in each ckt. The corridor is N-1 non-compliant.	400 kV Taphithanda-Bableshtar D/C has been commissioned on 31.12.14, but in real time operation one circuit is kept open by MSETCL to control the loading on 400kV Bableshtar-Padghe D/C which is generally loaded above 550 MW each . Commissioning of 400 kV Bableshtar-Kudus D/C and Kudus Sub-station to be expedited by MSETCL.
3.	765/400 kV ICT at Tirora and 765/400 kV ICT at Akola II Antecedent Conditions When generation at Tirora is 1800-2400 MW.	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 – Taphithanda D/C are charged at 400kV. Commissioning of 400 kV Bableshtar-Kudus D/C and Kudus Sub-station to be expedited by MSETCL. Single ICT at Tiroda and Akola-II is a constraint leading to n-1 non-compliance and at present managed by SPS. Second ICT to be planned and expedited by APMIL and MEGPTCL.
4.	400 kV Wardha-Parli D/C Antecedent Conditions With high Maharashtra Demand of the order of 18500-20000MW during morning peak and no Generation at RGPPL and low generation at	High loading of Wardha-Parli D/C	After commissioning of 765 kV Wardha-Aurangabad ckt, 765kV Pune-Sholapur S/C and 765kV Aurangabad-Dhule-Vadodara S/C, loading 400kV Wardha-Parli D/C is reduced and is generally loaded below 600 MW each except under contingency of unit tripping / overdrawal of Southern Region. The Commissioning of 765kV Aurangabad-Sholapur D/C would

S. No	Corridor	Constraint	Description of the constraint
	Jaigad and Parli. High drawal of Southern Region through 765kV Raichur-Sholapur D/c also contributes critical loading of this section.		further relieve 400 kV Wardha-Parli-Sholapur corridor. The 765 kV Solapur-Aurangabad D/C has been charged on 30 th September 2015 and line loading of 400 kV Wardha-Parli has been relieved.
5.	400kV Parli(PG)-Sholapur(PG) D/C Antecedent Conditions With high demand of Maharashtra, Goa and high drawal of Southern Region		765kV Pune-Sholapur S/C helps under contingency in real time and has improved reliability in this corridor. 765 kV Sholapur-Aurangabad D/C has been charged on 30 th September 2015 and line loading of 400 kV Parli-Solapur D/C has been relieved. Constraint on this corridor is relieved.
6.	400 kV Aurangabad-Pune D/C Antecedent Conditions With commissioning of 765 kV Wardha - Aurangabad D/C and high demand of Maharashtra, the constraint has shifted to Aurangabad. Intra state transmission within Maharashtra is not scheduled along with Interstate Transmission schemes.	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).	220 kV network from Pune to be planned and expedited by MSETCL. The 765 kV Solapur-Aurangabad D/C has been charged on 30 th September 2015 and line loading of 400 kV Aurangabad-Pune D/C has been relieved. Constraint on this corridor is relieved.
7.	400 kV SSP-Asoj S/C and SSP-Kasor S/C Antecedent Conditions SSP generating full and with high demand in Gujarat coupled with less generation at APL and CGPL, Mundra.	Continuous loading of above 550 MW in SSP-Asoj and SSP-Kasor.	Bus split operation done from 22.9-30.9.14. Due to less generation at SSP, constraints were not observed in last 2 months. Further, with the commissioning of 765/400kV Vadodara Pooling station along with 765 kV Indore –Vadodara S/C, 765 kV Dhule –Vadodara S/C along with 400 kV Asoj-Vadodara D/C and 400 kV Vadodara-Pirana(PG) D/C, have helped in reducing the loading on SSP-Asoj and SSP-Kasor.

10.1.2 ICT Constraints

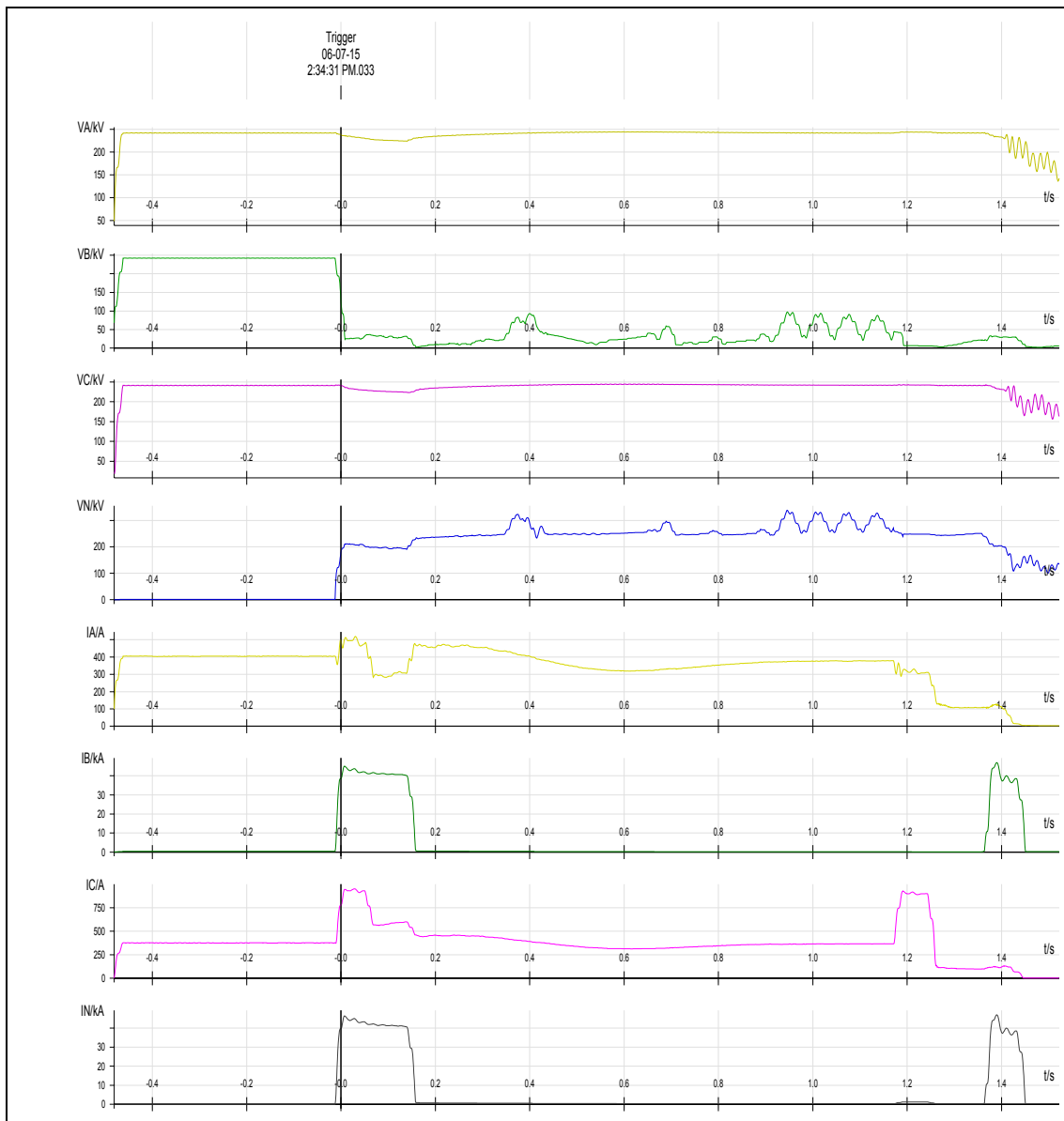
S. No	ICT	Constraint	Description of the constraints
1.	2 x 315 +1 x 500 MVA Bableshwar ICTs Antecedent Conditions With Maharashtra demand above 17500 MW	It is observed that the Bableshwar ICTs are fully loaded and system is n-1 non-compliant. MSETCL has implemented load trimming scheme to take care of overloading.	One ckt of Taphithanda-Bableswar as well as Akola-Taphithanda kept out by MSETCL to control loading on ICTs and Bableshwar-Padghe D/c. Shifting of unutilized ICT from Warora may be explored by MSETCL.
2.	2 X 1500 MVA Aurangabad (PG) ICTs Antecedent Conditions Maharashtra meeting high demand of above 18500 MW	It is observed that the loading on ICTs are more than 800 MW resulting in 'N-1' non-compliance.	Commissioning of 765kV Aurangabad-Dhule-Vadodara S/C has relieved ICT loading at 765/400kV Aurangabad to a certain extent.765kV Aurangabad- Sholapur D/C relieve the loading to some extent. The 765 kV Solapur-Aurangabad D/C has been charged on 30 th September 2015 and line loading of Aurangabad ICT's has been relieved. Constraint on this corridor is relieved.
3.	2 X 315 MVA Chakan ICTs Antecedent Conditions Maharashtra meeting high demand of above 18500 MW	It is observed that the loading on ICTs at Chakan (2x315MVA) are above 200 MW and additional ICT has to be proposed	Discussed in 38 th SCM of WR. MSETCL to plan additional ICTs at Chakan and Lonikhand I 400/220 kV substations and more nos. of 220 kV outlets from Pune (PG) and Lonikhand-II 400/ 220 kV substation.
4.	3 X 315 MVA Lonikhand ICTs Antecedent Conditions Maharashtra meeting high demand of above 18500 MW	It is observed that the loading on ICTs at Lonikhand (3 x 315 MVA) are above 200 MW and additional ICT has to be proposed or 2 x 500 MVA ICTs at Lonikhand-II are underutilized and the 220 kV lines from Lonikhand II and Pune(PG) to be expedited.	Discussed in 38 th SCM of WR. MSETCL to plan additional ICTs at Chakan and Lonikhand I 400/220 kV substations and more nos. of 220 kV outlets from Pune (PG) and Lonikhand-II 400/ 220 kV substation.
5.	3 X 315 MVA + 600 MVA Padghe ICTs Antecedent Conditions	It is observed that the Padghe ICTs are fully loaded and system is N-1 non-compliant. MSETCL has implemented load	These ICTs are heavily loaded with the increase in Maharashtra demand.

S. No	ICT	Constraint	Description of the constraints
	Maharashtra meeting high demand of above 18500 MW	trimming scheme to take care of overloading.	
6.	2 X 315 MVA Khandwa ICTs Antecedent Conditions Madhya Pradesh meeting high demand of above 9000 MW	It is observed that the loading on ICTs at Khandwa (2x315MVA) are above 200 MW and additional ICT has to be proposed.	Discussed in 38 th SCM of WR.1X315 MVA, 400/220 kV ICT (2 nd) at Chhegaon is under implementation by MPPTCL and is expected to be completed by December 2015. This would relieve loading on Khandwa ICTs.
7.	2 X 315 MVA Satna ICT Antecedent Conditions Madhya Pradesh meeting high demand of above 7000 MW	It is observed that the loading on ICTs at Satna (2x315MVA) are above 200 MW and additional ICT has to be proposed.	Discussed in 38 th SCM of WR .500 MVA, 400/220kV ICT at Satna (PGCIL) S/s with provision of 2 Nos. 220kV bays approved.
8.	3 X 315 MVA Bhopal ICTs Antecedent Conditions Madhya Pradesh meeting high demand of above 9000 MW	It is observed that the loading on ICTs at Bhopal (3x315MVA) are above 200 MW and additional ICT has to be proposed	Discussed in 38 th SCM of WR .1X315 MVA, 400/220 kV ICT (4 th) at Bhopal is under implementation by MPPTCL and is expected to be completed by December 2015.This would relieve loading on the existing ICTs at Bhopal
9	2 X 315 MVA Dehgam ICTs Antecedent Conditions Gujarat meeting high demand and generation at Wanakbori being low.	It is observed that the loading on ICTs at Dehgam (2 x 315 MVA) are above 180 MW and additional ICT has to be proposed	

10.1.3 Lines/ICTs opened to control overloading

S. No	Transmission Element (s) opened	Overloaded corridor	Remarks
1.	400/220 kV Pune(PG) one ICT	To control loading in 220 kV Pune(PG) – Talegaon D/C lines	Additional 220 kV outlets from Pune (PG) to be expedited by MSETCL.
2.	400/220 kV 2 x 315 MVA Aurangabad(PG) ICTs		Idle charged in the absence of 220kV downstream network, which has to be expedited by MSETCL. In the 38 th SCM of WR MSETCL has proposed LILO of both circuits of Chitegaon-Shendra 220 kV D/C line at Aurangabad (PG) 400/220 kV, 2X315 MVA substation. MSETCL may intimate the implementation schedule.
3.	400/220 kV 2 x 315 MVA Sholapur(PG) ICTs		South Solapur has been connected which is around 50 MW. Further loads from Solapur (MS) need to be transferred for reducing ICTs loading at Solapur(MS)
4.	400/220kV 2 x 315 MVA Warora ICTs		Idle charged in the absence of 220kV downstream network, which has to be expedited by MSETCL or shifting to Bableshwar may be explored.
5	400 kV Akola2-Taptithanda one circuit	400/220 Bableshwar loading	765 kV Ektuni, 765 kV Padghe, 400 kV Kudus and associated circuits need to come along with 220 kV Associated network in Western Maharashtra to reduce the loading.

10.1.4 High Fault Level at Korba Bus: Large fault current was observed during a close in fault at Korba Sub-station on 6th July 2015. During this event, Y phase to earth fault occurred on 400 kV Korba-Raipur 3 and the fault current at Korba end was of 45 kA. The DR from Korba end is given below.



10.1.5 Sub-synchronous resonance due to HVDC: Sub-synchronous resonance at HVDC Mundra-Mohindergarh at Mundra end has been observed in the past. The Sub-synchronous study performed was based on the data of 660 MW units of Mundra and there were no lines between Varsana and Bhachau. In the past the sub-synchronous resonance has led to Bipole tripping and loss of generation at APL during which SSR protection has acted but could not damp the sub-synchronous resonance. As with the commissioning of 400 kV Bhachau-Varsana circuit, the electrical distance between CGPL UMPP and Mundra Generation complex has reduced significantly. Earlier any commutation fault on HVDC side is also felt only by the Mundra generating complex and CGPL is located at large electrical distance. However as of now both are experiencing the electrical jerks from these faults. In view of this there is a chance that Sub-synchronous resonance is going to get affected with the both generating complex. So, a sub-synchronous resonance study of HVDC Mundra Mohindergarh considering 330/660 MW units of Mundra and 830 MW units of CGPL may kindly be done in order to take remedial action for damping of the SSR.

10.1.6 Nodes Experiencing High Voltage:

400 kV Nodes: Khandwa, Dehgam, Satpura, Koradi, Bhadrawati New Koyna, Karad, Kolhapur, Chandrapur, Dhule , Solapur(MS) , Aurangabad (MS) , Bhilai , Rajgarh, Akola, Damoh, Birsinghpur, Katni, Bhatapara, Raigarh, RGPPL.
765 kV Nodes: Durg, Kotra, Raigarh Tamnar, Wardha, Aurangabad

10.2 NLDC may make presentation on the above issues.

Members may deliberate

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 In the 38th SCM of WR the following transmission system associated with Khargone TPP and Dwarkesh TPP was agreed:

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 In the 35th meeting of Empowered Committee on Transmission, the following transmission scheme, to be implemented through tariff based competitive bidding, was recommended for notification by Govt. of India:

Scope of the Transmission Scheme
<p>1. Connectivity system for Khargone STPP</p> <p>(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)</p> <p>(ii) Khargone TPP Switchyard – Khandwa pool 400 kV D/C (Quad) line</p>
<p>2. System strengthening in WR in time frame of Khargone TPP</p> <p>(i) Khandwa Pool – Indore 765kV D/C line</p> <p>(ii) Khandwa Pool – Dhule 765 kV D/C line</p> <p>(iii) Establishment of 765/400kV, 2x1500MVA pooling station at Khandwa pool</p> <p><u>765 kV</u></p> <ul style="list-style-type: none"> • 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) <ul style="list-style-type: none"> • 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. <p><u>400 kV</u></p> <ul style="list-style-type: none"> • 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. <p>(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</p>
<p>Total Estimated Cost (Rs. Crore)</p>

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.

This is for kind information of the members.

12 Transmission system for Rewa Ultra Mega Solar Ltd. (750MW)

12.1 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 Ltd. (RUMS) was agreed in-principle by the members with the assumption that entire power would be evacuated through ISTS.

- a. 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)
- b. Establishment of 400/220kV, 3x500 MVA Pooling station at Rewa
- c. 1x125 MVar bus reactor at Rewa Pooling Station
- d. 6 Nos. 220kV Line bays at Rewa Pooling station (for its interconnection with solar park)

12.2 In the meeting it was noted that the implementation of above system shall be taken up only after receipt of LTA application from RUMS. Accordingly, RUMS has applied for LTA of 750MW in Aug'15 with target region as WR: 350MW, ER: 350MW & NR: 50MW. Further, RUMS vide its letter dated 02.11.2015 informed that the prospects of buyers in ER are not forthcoming. However, they are envisaging prospective buyers in Northern Region who could buy solar power of 250-350MW. Subsequently, RUMS Ltd. has re-applied for LTA with only WR and NR as target regions vide application dated 03.11.15. The revised target beneficiaries for RUMS Ltd. are: WR – 450MW and NR – 300MW.

12.3 This is for kind information of the members.

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

13.1 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.

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

Members may note

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

- 14.1 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 the 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. After that no updates were received from generation developer.

- 14.2 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 may note.

15 Open Access Meeting.

- 15.1 The 22nd meeting of WR constituents regarding connectivity/ open access applications would be held after Standing Committee meeting. The agenda would be circulated by POWERGRID.

16 Any other item with the permission of the chair.

Status of TBCB Tr. Projects

Annexure - I

S. No.	Name of the Project	BPC / Implementing Agency / Milestones	Scope of works	Current Status
1.	<p>Scheme for enabling import of NER/ER surplus by NR</p> <p>Estimated Cost 1700 cr</p>	<p>PFC</p> <p>ENICL(Sterlite Technologies Ltd)</p> <p>Milestones :</p> <p>(i) LOI place on 7.1.2010,</p> <p>(ii) SPV acquired on 31.3.2010</p> <p>(iii) Trans. license received on 4.11.2010</p> <p>(iv) Approval u/s 164 received on 21.6.2011,</p> <p>(v) Tariff adoption on 2.11.2010</p> <p>Original COD: March 2013</p>	<p>(i) Bongaigaon-Siliguri 400 kV Quad D/C</p> <p>(ii) Purnea-Biharsharif 400 kV D/C Quad D/C</p>	<p>Line Commissioned in 11/2014</p> <p>Line Commissioned in 9/2013</p>
2.	<p>System Strengthening in NR for import of power from North Karanpura and other projects outside NR and System Strengthening in WR for import of power from North Karanpura and other projects outside Western Region and also for projects within Western Region.</p> <p>Estimated Cost 2700 cr.</p>	<p>REC</p> <p>NKTCL (Reliance Power Transmission Company Ltd)</p> <p>Milestones :</p> <p>(i) SPV acquired by Reliance on 20-05-2010 (Effective date)</p> <p>(ii) Approval u/s 164 received on 12.08.2013.</p>	<p>1. Sipat/Korba (Pooling) – Seoni</p> <p>2. Lucknow-Bareilly</p> <p>3. Bareilly-Meerut</p> <p>4. Agra-Gurgaon</p> <p>5. Gurgaon-Gurgaon (PG)</p> <p>6. Gurgaon S/S</p>	<p>Matter was in CERC for revision of tariff and extension of date of commissioning. NKTCL filed an appeal in appellate tribunal challenging CERC order of 9.5.2013. Appellate Tribunal has given final judgment on 2.12.13 setting aside CERC order and allowing the appeal. NKTCL is initiating steps for implementing of order. The judgment of Appellate Tribunal accepts delay in clearance under section-164 as force majeure. According NKTCL have requested MoP to extend the validity of section 68 clearance vide their letter dtd 14.1.2014</p> <p>Beneficiaries have appealed SC.</p> <p>Work Yet to start.</p>
3.	<p>Talcher-II Augmentation System</p> <p>Estimated Cost 1400 cr</p>	<p>REC</p> <p>TTCL (Reliance Power Transmission Company Ltd.)</p> <p>Milestones :</p> <p>(i) LOI issued on 18-12-2009.</p>	<p>(i) Talcher II- Rourkela 400 kV D/C Quad line</p> <p>(ii) Talcher II – Behrampur 400 kV D/C line</p> <p>(iii) Behrampur-Gazuwaka 400 kV D/C line</p>	<p>Matter was in CERC for revision of tariff and extension of date of commissioning. TTCL 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</p>

S. No.	Name of the Project	BPC / Implementing Agency / Milestones	Scope of works	Current Status
		(ii) SPV acquired by Reliance on 27-04-2010 (Effective date).	(iv)400/220 kV, 2x315 MVA Behrampur substation	allowing the appeal. TTCL is initiating steps for implementing of order. The judgment of Appellate Tribunal accepts delay in clearance under section-164 as force majeure. According TTCL 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.
4.	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
5.	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	Length-760ckm, Locations-985, Foundation-794, Tower Erection-762, Stringing completed-416ckm, Progress affected due to pending forest Clearance(284 Ha in MP and 114Ha in Chhattisgarh) and Severe row problem. JTCL informed, stage-II clearance has been issued in MP and is pending in Chhattisgarh. Line expected to be commissioned by 09/15

S. No.	Name of the Project	BPC / Implementing Agency / Milestones	Scope of works	Current Status
6.	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 12.10.2011 (iv) Approval u/s 164 received on 29.01.2013 (v) Tariff adoption on 28.10.2011 Original COD : Mar 2014	(ii) Jabalpur-Bina 765 kV S/C line	Length-237ckm, Locations-610, Foundation-577, Tower Erection-577, Stringing completed-218ckm, Progress affected due to pending forest Clearance (140Ha in MP) and Severe row problem. JTCL informed that Stage-II clearance has been issued in MP in March-2015 Line expected to be commissioned by 06/15
			(i) Jabalpur-Bhopal 765 kV S/C line	Length-260ckm, Locations-664, Foundation-644, Tower Erection-633, Stringing completed-234ckm, Progress affected due to pending forest Clearance (112Ha in MP) and Severe row problem. Stage-II Clearance is pending in MP Line expected to be commissioned by 06/15
7.	Transmission system associated with IPPs of Nagapattinam/ Cuddalore Area- Package A Estimated Cost 1025 cr	PFC PGCIL Milestones: (i) SPV acquired on 29/03/2012 (ii) Tr. License issued on 15.7.2013 (iii) Tariff adoption by CERC on 9.5.2013. (iii) Clearance U/s 164 received on 9.12.2013. (iv) Scheduled COD 29.3.2015	(ii) Bhopal-Indore 765 kV S/C line	Line commissioned in 10/14
			(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

S. No.	Name of the Project	BPC / Implementing Agency / Milestones	Scope of works	Current Status
		(30months effective from 20.6.13, date of grant of license) Work awarded on 16.5.2014 to M/s Gammon and M/s IComm	(vi) Dhule-Vadodara 765 kV S/C line (vii) 2x1500 MVA, 765/400 kV substation at Dhule (viii) Dhule - Dhule(Msetcl)400 kV D/C Line	Line ready for commissioning on 02/15 CEA Inspection completed and s/s is ready for energisation since 28.2.14. Line ready for commissioning since 9/2014 (400 kV bays by MSETCL at Dhule s/s is under construction and schedule for completion by Mar 2015)
			(i) Nagapattinam Pooling Station-Salem 765 kV D/C line - 200ckm	Length-400ckm, Locations-543, Foundation-401, Tower Erection-197, Stringing completed-36ckm
8.	Transmission System associated with IPPs of Vemagiri Area-Package A	REC PGCIL Milestones: SPV acquired on 18/04/2012	(ii) Salem-Madhugiri 765 kV S/C line –217km (i) Vemagiri Pooling Station–Khammam 765 kV 1xD/C (1 st ckt.) line. (ii) Khammam-Hyderabad 765 kV 1xD/C (1 st ckt.) line.	Length-217ckm, Locations-619, Foundation-225, Tower Erection-55, Stringing completed-Nil Put on hold as commissioning of the associated generating station is delayed due to non-availability of gas. The scheme is under consideration of CERC for the decision of its implementation.
9.	Transmission System required for evacuation of power from Kudgi TPS (3x800 MW in Phase-I) of NTPC Limited. Estimated Cost 1240 cr	REC KudgiTCL (M/s L&T Infrastructure Development Projects Limited) Milestones: (i) LOI placed on31/07/13 (ii) SPV acquired on 30.8.2013 (iii) PG submitted on 22.8.2013 (iv) Tr. License application filed in CERC on2.9.2013 and application for tariff adoption filed on 2.9.2013. Tr. License issued on 7.1.2014 and tariff adoption by CERC on 8.1.2014.	(i)Kudgi TPS – Narendra 400 kV 2xD/C line (I&II)	Length-36ckm, Locations-46, Foundation-9, Tower Erection-5, Stringing completed-0ckm, Scheduled completion : 28.02.2015(18month)

S. No.	Name of the Project	BPC / Implementing Agency / Milestones	Scope of works	Current Status
		(v) Clearance U/s 164 – issued 24.4.2014 (vi) Awarded EPC contract 7.1.2014 (vii) Detailed contract signed on 24.2.2014 (viii) Financial closure on 24.2.2014		
10.	Transmission system for system strengthening in SR for import of power from ER Estimated Cost 1180 cr	REC Vizag Transmission Limited Milestones: (i) LOI placed on 31.07.13 (ii) Special Purpose Vehicle acquired on 30.8.2013 (iii) Tr. License issued on 8/1/2014 and tariff adoption by CERC on 23/1/2014 (iv) Clearance U/s 164 – received on 21.05.2014 (v) Schedule COD 30.8.2016 Work awarded on 28.2.2014 to Tata Proj. Icomm, L&T and M/s Gammon	(ii)Narendra (New) – Madhugiri 765 kV D/C line	Length-758ckm, Locations-870, Foundation-789, Tower Erection-720, Stringing completed-384ckm, Scheduled completion : 31.12.2015 (28 months)
			(iii)Madhugiri – Bidadi 400 kVD/C Line	Length-186ckm, Locations-256, Foundation-221, Tower Erection-189, Stringing completed-36ckm, Scheduled completion : 31.12.2015(28 months)
			(i)Srikakulam PP – Vemagiri-II Pooling Station 765 kV D/c line- 334km	Length- 668ckm, Locations-877, Foundation-691, Tower Erection-372, Stringing completed-40ckm
11	Transmission System for Patran 400kV S/S Estimated Cost 200 cr	PFC PTCL (Techno Electric and Engineering Company Ltd.) Milestones: (i) LOI placed on	(ii) Khammam(existin g) – Nagarjuna Sagar 400 kV D/c line-145km	Length- 290ckm, Locations-388, Foundation-340, Tower Erection-273, Stringing completed-108ckm,

S. No.	Name of the Project	BPC / Implementing Agency / Milestones	Scope of works	Current Status
		17.09.2013 (ii) SPV acquired on 13.11.2013 (iii) Application for adoption of tariff filed in CERC. Hearing on 18.03.2014. (iv) Application for grant of License filed in CERC. Hearing on 18.03.2014 (v) Clearance under Section 164 : Request not received in MoP Scheduled COD: 13.05.2016.	LILO of both circuits of Patiala-Kaithal 400kV D/c at Patran (Triple snow Bird Conductor)	Work yet to award
12	Eastern Region System Strengthening Scheme-VI Estimated Cost 540 cr	PFC DMTCL (Essel Infraprojects Ltd.) Milestones: (i) LOI placed on 17.10.2013 Special Purpose Vehicle acquired on 10.12.2013 (ii) Tariff adoption approval issued by CERC on 20.5.2014 Transmission license received on 30.5.2014 (iii) Clearance u/s 164: received in 4/9/2014. Scheduled COD: 01.07.2016.	(i) 2x500 MVA, 400/220 kV Substation at Patran	Work yet to award
			(ii) 2x500 MVA, 400/220 kV GIS Substation at Darbhanga with space for future extension (1x500 MVA)	Land 100% Civil work 15% Equip Supply 0% Equip. Erection 0%
13	Part ATS for RAPP U-7&8 in Rajasthan Estimated Cost 310 cr	PFC RAPPTCL (Sterlite Grid Ltd) Milestones: (i) LOI placed on 17/09/13 (ii) Special Purpose Vehicle acquired on	(i) 2x200 MVA, 400/132 kV GIS Substation at Mothihari with space for future extension (1x200 MVA)	Land 100% Civil work 7% Equip Supply 0% Equip. Erection 0%
			(ii) Muzaffarpur(PG)- Darbhanga 400 kV D/c line with triple snowbird conductor	Loc 173 Fdn 128 TE 106 STG 15/64 KM

S. No.	Name of the Project	BPC / Implementing Agency / Milestones	Scope of works	Current Status
		12/03/2014 (iii) Scheduled COD: 28.02.2016. Clearance under Section 164 : Request not received in MoP	(iii) LILO of Barh – Gorakhpur 400 kV D/c line at Mothihari, 400kV 2xD/C quad (iv) RAPP - Shujalpur 400kV D/C line	Loc 209 Fdn 109 TE 32 STG 0/76 KM Engg work started and EPC Contract awarded. work expected to start by 11/2014. Forest proposal (30 ha) has been initiated. Loc 521 Fdn 401 TE 482 Stg 227/310 ckm
14	ATS of Unchahar TPS Estimated Cost 70 cr	REC UnchaharTCL(PGCIL) Milestones: (i) LOI placed on 14/02/14. (ii) SPV acquired on 24/03/2014. (iii) Transmission license granted (iv) Tariff charged adopted by CERC and approval recd on 3.7.2014 (v) Clearance under Section 164 : Newspaper/Gazette publication completed, Application submitted to CEA/MoP is under process.	(i) Unchahar - Fatehpur 400 kV D/C line	Scheduled completion : 23/09/2016
15	Eastern Region System Strengthening Scheme-VII Estimated Cost 370 cr	PFC PKTCL(Sterlite Grid Ltd.) Milestones: (i) LOI placed on 17.09.2013 (ii) Special Purpose Vehicle acquired on 09.12.2013 (iii) Application for adoption of tariff filed in CERC. Hearing on 27.02.2014. (iv) Application for	(ii) Purulia PSP(WB) – Ranchi (PG) 400 kV D/C line (iii) Chaibasa – Kharagpur 400 kV D/C line	(1) Loc: 370 Fnd:302 Erec:35 Stg: 0/35 (ii) Loc: 421 Fnd:318 Erec:279 Stg:38 cKM

S. No.	Name of the Project	BPC / Implementing Agency / Milestones	Scope of works	Current Status
		grant of License filed in CERC. Hearing on 27.02.2014. (v) Clearance under Section 164 : Request not received in MoP (vi) Scheduled COD: 09.03.16.		
16	NR System strengthening Scheme-NRSS-XXXI(Part-A) Estimated Cost 225 cr	REC PGCIL Milestones: (i) LOI placed on 26/02/14. (ii) Special Purpose Vehicle acquired on 12/05/2014. (iii) Transmission license granted (iv) Tariff charges adopted CERC (v) Clearance under Section 164: is under process will be applied after finalisation of land for s/s which shall be finalised by Dec 2014.	(i) 7x105 MVA (1 phase), 400/220 kV GIS at Kala amb (ii) LILO of both ckt of Karcham Wangtoo-Abdullapur 400 kV D/c line at Kala Amb(on M/C tower) (iii) 40% series compensation on 400 kV Karcham Wangtoo – Kala Amb D/C line at Kala Amb end	S/s package awarded to siemens on Aug 2014 Scheduled COD : 12/07/2017
17.	Northern Region System Strengthening Scheme, NRSS-XXXI (Part-B) Estimated Cost 565 cr	REC M/s Essel Infraprojects Ltd Milestones: (i) LOI placed on 26/02/14. (ii) SPV acquired on 12/05/2014. (iii) Transmission license application filed in CERC on 13/05/14. (iv) Tariff adoption by CERC: under process in CERC for adoption. (v) Clearance under Section 164 : submitted in MoP in 9/2014 (vi) Scheduled	(i) Kurukshetra- Malerkotla 400 kV D/C line (ii) Malerkotla-Amritsar 400 kV D/C line	1 Loc 375 Fdn 216 TE 100 Stg 2/139 km 2 loc 412 Fdn 198 TE 108 Stg 0/149 km

S. No.	Name of the Project	BPC / Implementing Agency / Milestones	Scope of works	Current Status
		completion : 12/09/2016		
18.	Northern Regional System Strengthening Scheme, NRSS-XXIX Estimated Cost 2621 cr	REC Sterlite Technologies Ltd. Milestones: The LoI has been issued on 23.05.2014.	(i) Jullandhar – Samba 400 kV D/C line (ii) Samba – Amargarh 400 kV D/C line (iii) GIS Sub- station at Amargarh 400/220 kV S/s. (iv) LILO of both circuit of Uri – Wagoora Line 400 kV D/C line.	(v) Approval for transfer of SPV to selected bidder is pending with MoP (vi) Scheduled completion : 05/08/18
19.	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	
20.	Transmission System associated with Gadawara 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) Gadawara STPS- Jabalpu Pool 765 D/C line (ii) Gadawara STPS- Warora P.S. (New) 765 D/C line (iii) LILO of both Ckts. Of Wardha-Parli 400 kV D/C at Warora P.S. (2xD/C). (iv) Warora 765/400 kV P.S. (2x1500 MVA).	
21.	Transmission System associated with Gadawara 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).	

S. No.	Name of the Project	BPC / Implementing Agency / Milestones	Scope of works	Current Status
22.	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
23	ATS for Tanda Expansion TPS (2X660 MW) Estimated Cost as provided by Empowered Committee: Rs. 345 crore Rs. 336 crore (as per cost Committee)	PFCCL Milestones: (i) MoP vide letter dated 05.06.2013 & Gazette Notification dated 20.05.13 appointed PFCCL as BPC. (ii) SPV incorporated on 09.09.2013 (iii) LoI issued to the successful bidder M/s. Essel Infraprojects Limited on 09.10.2015	(1) Tanda TPS –Sohawal 400 kV D/C Line 400 kV D/c. length 80 km	Under Bidding Process
25	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.	(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 –	The process for Transfer of SPV is under progress.

S. No.	Name of the Project	BPC / Implementing Agency / Milestones	Scope of works	Current Status
		(iv) LoI issued to the successful bidder Adani Power Ltd on 28.07.2015.	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	
26	Additional System Strengthening for Sipat STPS Estimated Cost as provided by Empowered Committee: Rs. 867 crore Rs. 1097 crore (as per cost Committee)	PFCCCL Milestones: (i) MoP vide letter dated 15.01.2014 trans dated 15-07-2014 & Gazette Notification dated 09.07.14 appointed PFCCCL 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 Station 765 kV S/C line 765 kV S/C Length-25 km (ii) Bilaspur Pooling Station - Rajnandgaon 765 kV D/C line 765 kV D/C Length-180 km	The process for Transfer of SPV is under progress.
27	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)	PFCCCL Milestones: (i) MoP vide letter dated 15.01.2014 trans dated 15-07-2014 & Gazette Notification dated 09.07.14 appointed PFCCCL 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	The process for Transfer of SPV is under progress.

S. No.	Name of the Project	BPC / Implementing Agency / Milestones	Scope of works	Current Status
28	<p>Additional inter-Regional AC link for import into Southern Region i.e. Warora – Warangal and Chilakaluripeta - Hyderabad - Kurnool 765kV link</p> <p>Estimated Cost as provided by Empowered Committee: Rs. 7760 crore</p>	<p>PFCCCL</p> <p>Milestones:</p> <p>(i) MoP vide Gazette Notification dated 06.02.15 appointed PFCCCL as BPC.</p> <p>(ii) SPV incorporated on 0.04.2015 RFQ notice published on 23.04.2015.</p> <p>(iii) RfQ responses received and opened on 22.05.2015. RfQ evaluation completed.</p> <p>(iv) The revised RfQ has been re-issued on 11.09.2015 with submission of response due on 12.10.2015.</p> <p>(v) 5 nos. RfQ responses received on schedule date i.e 12.10.2015 and opened on the same day. The RfQ evaluation is under progress.</p>	<p>(i) Establishment of 765/400kV substations at Warangal (New) with 2x1500 MVA transformers and 2x240 MVAR bus reactors. 765/400kV</p> <p>(ii) Warora Pool – Warangal (New) 765kV D/c line with 240 MVAR switchable line reactor at both ends. 765 KV D/C Length- 350 KM</p> <p>(iii) Warangal (New) – Hyderabad 765 kV D/c line with 330 MVAR switchable line reactor at Warangal end. 756 KV D/C Length- 160 KM</p> <p>(iv) Warangal (New) – Warangal (existing) 400 kV (quad) D/c line. 400KV D/C Length- 10 KM</p> <p>(v) Hyderabad – Kurnool 765 kV D/c line with 240 MVAR switchable line reactor at Kurnool end. 765 KV D/C Length- 170 KM</p> <p>(vi) Warangal (New) – Chilakaluripeta 765kV D/c line with 240 MVAR switchable line reactor at both ends. 765 KV D/C Length-250</p> <p>(vii) Cuddapah – Hoodi 400kV (quad) D/c line with 63 MVAR switchable line reactor at both ends. 400 KV D/C Length-200</p>	Under Bidding process
29	<p>Common Transmission System for Phase-II Generation Projects in Odisha and Immediate Evacuation System for OPGC (1320 MW) Project in Odisha</p> <p>Estimated Cost as</p>	<p>PFCCCL</p> <p>Milestones:</p> <p>(i) MoP vide Gazette Notification dated 06.02.15 appointed PFCCCL as BPC.</p> <p>(ii) SPV incorporated on 17.04.2015</p> <p>(iii) RFQ notice published on 23.04.2015.</p>	<p>(i) OPGC (IB TPS) – Jharsuguda (Sundargarh) 400kV D/C line with Triple Snowbird Conductor 400 kV D/C Length- 50 KM</p> <p>(ii) Jharsuguda (Sundargarh)– Raipur Pool 765 kV D/C line 765 KV D/C Length- 350 KM</p>	Under Bidding process

S. No.	Name of the Project	BPC / Implementing Agency / Milestones	Scope of works	Current Status
	provided by Empowered Committee: Rs. 2748 crore			
30	Creation of new 400kV GIS Substations in Gurgaon and Palwal area as a part of ISTS: Rs 1759 crore	<p>PFCCL</p> <p>Milestones:</p> <p>(i) MoP vide Gazette Notification dated 22.07.15 appointed PFCCL as BPC.</p> <p>(ii) The agenda for approval of the incorporation of SPV has been approved by the PFC board on 23.09.2015.</p> <p>(iii) The RfQ is issued from 15.10.2015 with the last date of submission of response 16.11.2015.</p>	<p>(i) Aligarh–Prithala 400kV D/C HTLS line</p> <p>(ii) Prithala–Kadarpur 400kV D/C HTLS line</p> <p>(iii) Kadarpur–Sohna Road 400kV D/C HTLS line</p> <p>(iv) LILO of Gurgoan–Manesar D/C line at Sohna Road</p> <p>(v) Neemrana (PG)–Dhonanda (HVPNL) 400kV D/C HTLS line</p> <p>(vi) Creation of 400/220kV, 2X500 MVA GIS substation at Kadarpur in Gurgaon area.</p> <p>(vii) Creation of 400/220 kV, 2X500 MVA GIS substation at Sohna Road in Gurgaon area.</p> <p>(viii) Creation of 400/220 kV, 2X500 MVA GIS substation at PrithalainPalwal area</p> <p>(ix) To cater to the future load growth of the area, space provision for capacity augmentation by 2X500 MVA transformations at all these substations may be kept.</p> <p>(x) 2Nos.of bays at 400kV Dhonanda (HVPNL) S/s</p>	Under Bidding process
32	Strengthening of transmission system beyond Vemagiri	<p>REC</p> <p>TPCL</p> <p>Milestones:</p> <p>1 Date of Notification 09.02.2015</p> <p>2 Date of RFQ 12.04.2015</p> <p>3 Date of RFP 10.07.2015</p> <p>4 Date of announcement of successful bidder 21.10.2015</p> <p>5 Date of issue of LoI</p>		Under Bidding process

S. No.	Name of the Project	BPC / Implementing Agency / Milestones	Scope of works	Current Status
		29.10.2015 6 Date of acceptance of offer 02.11.2015		
33	Transmission System Strengthening in Indian System for transfer of power from new HEPs in Bhutan	REC TPCL Milestones: 1 Date of Notification 09.02.2015 2 Date of RFQ 16.04.2015 3 Date of RFP 08.07.2015 4 Date of announcement of successful bidder 21.10.2015 5 Date of issue of LoI 29.10.2015 6 Date of acceptance of offer 03.11.2015		Under Bidding process
34	Transmission System for NER System Strengthening Scheme-II	REC TPCL Milestones: 1 Date of Notification 09.02.2015 2 Date of RFQ 23.04.2015 3 Response to RFQ opened on 25.05.2015		Under Bidding process
35	System Strengthening Scheme in Northern Region (NRSS-XXXVI) along with LILO of Sikar-Neemrana 400 kV D/c line at Babai (RRVPNL)	REC TPCL Milestones: 1 Date of Notification 24.07.2015 2 Date of RFQ 25.08.2015	LILO of Sikar- Neemrana 400 kV D/c line at Babai (RRVPNL)	Under Bidding process

STATUS OF TRANSMISSION SCHEMES UNDER IMPLEMENTATION BY POWERGRID IN WESTERN REGION						
S. No.	Description of Scheme	Estimated Cost (Rs. Cr)	Date of firming up in WR standing committee	Date of investment approval	Target date as of now	Remarks
1	Western Region System Strengthening Scheme - II	5222	20 th (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	25 th (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 implemented 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.				Commissioned		
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	
	Transmission system associated with Krishnapatnam (5x800 MW) (WR Portion)- now delinked from Krishnapatnam UMP	1928	27 th (30.07.07)			Under implementation
	a) Raichur – Solapur (PG) 765 kV S/c				Commissioned	

STATUS OF TRANSMISSION SCHEMES UNDER IMPLEMENTATION BY POWERGRID IN WESTERN REGION

S. No.	Description of Scheme	Estimated Cost (Rs. Cr)	Date of firming up in WR standing committee	Date of investment approval	Target date as of now	Remarks
4	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)				Nov'15	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	One ckt charged at 400kV on 26.06.14 by-passing Vindhyachal PS.
	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)				Ready for commissioning	Line completed in Apr'15
	b) Augmentation of 400/220kV ICT by 1x500MVA transformer (3 rd) at Solapur (PG)				Commissioned	
7	Solapur STPP (2x660MW) transmission system (Part-A)	50.52	36th (29.08.13)	Mar'15		Award placed in May'15
	a) Solapur STPP – Solapur (PG) 400kV 2nd D/c (Quad)				Mar'17	
8	Transmission system for evacuation of Kakrapar Atomic Power Project unit 3 & 4 (2x700 MW)	378.71	31 st (27.12.10)	Feb'14		Under Implementation
	a) Kakrapar NPP – Navsari 400kV D/c – 38 km				Oct'16	
	b) Kakrapar NPP – Vapi 400kV D/c - 104 km				Oct'16	
9	Transmission System associated with Mauda Stage-II (2x660 MW)	1575.3	32 nd (13.05.11)	Sep'13		Under Implementation
	a) Mauda II – Betul 400KV D/c (Quad)-210 km				May'16	
	b) Betul– Khandwa 400KV D/c (Quad)-180 km				May'16	
	c) Khandwa – Indore(PG) 400kV D/c -215 km				May'16	
	d) Establishment of 400/220kV 2x315MVA substation at Betul				May'16	
10	Provision of 1x315MVA ICT & Spare Converter Trf for reliable auxilliary power supply at HVDC back to back station at Bhadravati	143	33 rd (21.10.11)	-	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	2066.85	29th (10.09.09)	May'11		Under Implementation
	a) Champa Pooling Station - Raipur Pooling Station 765kV D/c				One ckt commissioned	Other ckt terminated at D'jaygarh bypassing Champa
	b) Raigarh Pooling Staiton (near Kotra) - Raigarh pooling (near Tamnar) 765kV D/c				Commissioned	
	c) Champa Pooling Station - Dharamjaygarh Pooling Station 765kv S/c				Commissioned by-passing Champa Pool	
	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

STATUS OF TRANSMISSION SCHEMES UNDER IMPLEMENTATION BY POWERGRID IN WESTERN REGION

S. No.	Description of Scheme	Estimated Cost (Rs. Cr)	Date of firming up in WR standing committee	Date of investment approval	Target date as of now	Remarks
	f) Establishment of 765/400kV 3x1500MVA Raigarh Pooling Station (near Tamnar)				Commissioned	
12	Transmission system strengthening in Western Part of WR for IPP generation projects in Chhattisgarh	2127.51	29th (10.09.09)	Nov'11		Under Implementation
	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) Establishment 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				Sep'16	Matching with Kudus S/s of MSETCL
	b) Vadodara – Asoj 400kV D/c(Quad)				Commissioned	
	c) Padghe – Kudus 400kV D/c (Quad)				Sep'16	Matching with Kudus S/s of MSETCL
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) - Jalandhar 400kV D/c(Quad) one ckt. via 400/220kV Nakodar				Dec'15	
	c) LILO of Abdullapur – Sonapat 400kV D/c(triple) at Kurukshetra				Dec'15	
	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		
16	Inter-regional system strengthening scheme for WR and NR-Part A	1315.9	36 th (29.08.13)	Oct'13		Completed
	a) Solapur - Aurangabad 765kV D/c				Commissioned	
17	Transmission System Associated with Lara STPS-I (2x800MW)	400.47	17 th LTA (03.01.13)	Jun'14		Under Implementation
	a) Lara STPS-I – Raigarh (Kotra) Pooling Station 400 kV D/c line – 18km				Dec'15	
	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	35 th (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	

STATUS OF TRANSMISSION SCHEMES UNDER IMPLEMENTATION BY POWERGRID IN WESTERN REGION

S. No.	Description of Scheme	Estimated Cost (Rs. Cr)	Date of firming up in WR standing committee	Date of investment approval	Target date as of now	Remarks
	(d) 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 / 37 th (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 / 37 th (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		34th (09.05.12)	Feb'15		Award placed in Aug'15
	(a) 1x1500MVA, 765/400kV ICT at Vindhyachal Pooling Station				July'17	
24	Transmission System Strengthening Associated with Vindhyachal V - Part B		34th (09.05.12)			Investment Approval pending
	(a) 2 nos of 765kV Line bays alongwith 2x330MVAR Line Reactor at Vindhyachal Pooling Station				Jun'18	
	(a) 2 nos of 765kV Line bays alongwith 2x330MVAR Line Reactor at Jabalpur Pooling Station				Jun'18	
25	STATCOMs in Western Region		36th (29.08.13)	Mar'15		
	(a) Aurangabad				Sep'17	Award placed in Jun'15
	(b) Gwalior				Sep'17	Award under progress
	(c) Solapur				Sep'17	Award placed in Jun'15
	(d) Satna				Sep'17	Award placed in Jun'15
26	Western Region System Strengthening Scheme XIV	93.96	37th (05.09.14)		30 Months from date of investment approval	
	(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					
27	Powergrid works associated with Part-A of Transmission system for Gadawara STPS of NTPC		36/37th (29.08.13 / 05.09.14)			Matching with TBCB Schedule
	(a) 2 nos. 765 kV line bays at 765/400kV Jabalpur Pooling Station of POWERGRID (for Gadawara STPS (NTPC) - Jabalpur PS 765 kV D/c)					
	Powergrid works associated with Part-B of Transmission system for Gadawara STPS of NTPC i.e. WRSS XV		36/37th (29.08.13 / 05.09.14)			Matching with TBCB Schedule

STATUS OF TRANSMISSION SCHEMES UNDER IMPLEMENTATION BY POWERGRID IN WESTERN REGION

S. No.	Description of Scheme	Estimated Cost (Rs. Cr)	Date of firming up in WR standing committee	Date of investment approval	Target date as of now	Remarks
28	(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)}					
	Powergrid works associated with System Strengthening for IPPs in Chhattisgarh and other generation projects in Western Region		36th (29.08.13)			Matching with TBCB Schedule
29	(a) 1 no. 765 kV line bay at 765/400kV Vindhyachal Pooling Station of POWERGRID {for Sasan UMPP - Vindhyachal PS (PG) 765 kV 2nd S/c}					
	(b) 2 no. 400 kV line bays at 765/400kV Vindhyachal Pooling Station of POWERGRID {for Vindhaychal (IV/V) STPP switchyard (NTPC) - Vindhyachal PS (PG) 400 kV 2nd D/c (quad)}					
	(c) 2 no. 400 kV line bays at Gwalior Substation {for Gwalior - Morena 400 kV D/c (quad)}					
	(d) 2 nos. 765 kV line bays at 765/400kV Pune (GIS) sub-station of POWERGRID {for LILO of one circuit of Aurangabad(PG) – Padghe(PG)765 kV D/c at Pune (GIS) (PG)}					
	(e) 2 nos. 765 kV line bays at 765/400kV Champa Pooling Station of POWERGRID {1for Champa PS(PG) - Raigarh (Kotra) PS(PG) 765 kV 2nd S/c, 1 for Champa PS(PG) – Dharamjaigarh(PG) 765 kV 2nd S/c}					
	(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 with Additional System Strengthening Scheme Chhattisagrh IPPs Part-B		36/37th (29.08.13 / 05.09.14)			DPR under Preparation
	(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}					
31	Powergrid workds associated with Additional System Strengthening for Sipat STPS		36/37th (29.08.13 / 05.09.14)			DPR under Preparation
	(a) 3 nos. 765 kV line bays at 765/400kV Bilaspur Pooling Station of POWERGRID (1 no. for Sipat STPS(NTPC) - Bilapur PS(PG) 3rd 765kV S/c, 2 nos. for Bilaspur PS(PG)-Rajnandgaon(TBCB) 765 kV D/c)					
	(b) 2 nos. 240 MVAR, 765 kV switchable line reactors at 765/400kV Bilaspur PS end for Bilaspur PS(PG) - Rajnandgaon(TBCB) 765 kV D/c					
32	Transmission System Strengthening associated with Mundra UMPP- Part A	266.19	36th(29.08.13)		30 months from date of investment approval	
	(a) LILO of both circuits of Mundra UMPP-Limbdi 400kV D/c (triple snowbird) line at Bachau					

STATUS OF TRANSMISSION SCHEMES UNDER IMPLEMENTATION BY POWERGRID IN WESTERN REGION

S. No.	Description of Scheme	Estimated Cost (Rs. Cr)	Date of firming up in WR standing committee	Date of investment approval	Target date as of now	Remarks
33	Transmission System Strengthening associated with Mundra UMPP- Part B		36/38th (29.08.13 /17.07.2015)			DPR under Preparation
	(a) Mundra UMPP - Bhuj Pool 400kV D/c line (triple snowbird)					
34	Bays for Transmission System Associated with DGEN Torrent Energy Ltd (1200MW)		13/14th LTA (27.12.10 /13.05.2011)			DPR under Preparation
	(a) 2nos 400kV Bays at Vadodara (GIS)					
	(b) 2nos 220kV Bays at Navsari (GIS)					
35	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					

Report on MSETCL proposal of shifting of Aurangabad I (Waluj) – Pune (PG) 400kV D/C line from 400kV Aurangabad I (Waluj) to 765/400kV Aurangabad (PG)

In the 38th SCM of WR held on 17.07.2015, MSETCL has proposed shifting of Aurangabad I (Waluj) – Pune (PG) 400kV D/C line from 400kV Aurangabad I (Waluj) to 765/400kV Aurangabad (PG) 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 (PG) - Aurangabad I (Waluj) 400 kV inter connection was the limiting factor for import of power in Maharashtra from ISTS. In the meeting, it was agreed that MSETCL proposal of shifting Aurangabad I (Waluj) – Pune (PG) 400kV D/C line from 400kV Aurangabad I (Waluj) to 765/400kV Aurangabad (PG) would be studied jointly by CEA, CTU, WRLDC and MSETCL.

The peak demand met by Maharashtra in August 2015 is 18447 MW. Accordingly, load flow studies was carried out by taking recent load flow file from WRLDC for a demand of 18,445 MW in Maharashtra. In the studies intrastate generation of Maharashtra of 11893.4 MW (Tirora – 2418MW, Koyna – 552.8, Jaigad – 1000MW, Amravati- 750 MW) and import of about 6500 MW from ISTS has been considered.

Load generation balance for Maharashtra Area is given below:

GENE- FROM IND TO IND TO TO BUS GNE BUS TO LINE FROM TO TO TIE TO TIES	X-- AREA --X RATION GENERATN MOTORS LOAD SHUNT DEVICES SHUNT CHARGING LOSSES LINES + LOADS
3012	11893.4 0.0 0.0 17784.0 0.0 0.0 0.0 0.0 671.1 -6561.6 -6631.5
MAHARASHTRA	119.0 0.0 0.0 2598.7 -2104.9 0.0 4026.9 11560.1 7049.8 108.6 98.5
COLUMN	11893.4 0.0 0.0 17784.0 0.0 0.0 0.0 0.0 671.1 -6561.6 -6631.5
TOTALS	119.0 0.0 0.0 2598.7 -2104.9 0.0 4026.9 11560.1 7049.8 108.6 98.5

The generation dispatch from Maharashtra intrastate generation projects is given below:

Bus No.	Bus Name	MW	Bus No.	Bus Name	MW
331002	BHIPU1	70.4	332097	BHIRA	72.4
331006	BHIRA1	138	332101	VITA	0
331007	KHOPO1	45.2	332105	PARAS	402.2
331013	BHUSA1	0	332109	JAMDE	100.6
331122	KHAPRALE	7	332120	BHIGWAN	0
331156	BHANRDHR	36	332132	PURTY	0
331192	DAUND	15	332136	Ghatndar	50.3
331202	VAITRAN	0	332140	Ghatghar	201.1
331249	VIR-HYDR	3	332154	NIGHDE	15.1
331252	ELDARI	15	332165	PAWAS	20.1
331268	BHATGHAR	13	332171	SUN-FLEG	15.1
331283	MUKHED	18	332174	VALVE	45.3
331309	VARASGN	7	332175	GANGAPUR	0
331314	MANDRUP	12	332179	INDORAM	0
331323	PANSHET	7	332182	CHND-MDC	55.3
331326	UJANI-HY	0	332183	MATRDEV	0
332005	URAN	265	332185	FINOLEX	0
332011	KOYNA 3-2	0	332190	KSK-WRDH	201.1
332019	KARAD	0	332198	VIDARBHA	0
332020	KOYNA 1-2	50	332199	ABHI-NG	150.8

332022	TILLARY	50		334007	CHANDRAPUR	1125.7
332024	PARLI	0		334010	KORADI	367.4
332027	CHANDPUR	201.1		334023	JAIGAD	1000
332029	WARDHA	40.2		334025	KOYNA	502.8
332031	KORADI	0		334026	NEW KHAPKHDA	402.2
332039	CHALISGAON	0		334029	DEEPNAGAR	462.6
332040	NASIK	550		334030	TIRORA	1206.7
332041	TROMBAY	938.2		334032	NANDGAONPETH	750
332042	KHAPERKHEDA	380.1		334035	NASIK-SINNER	0
332069	MALHRPTH	0		334036	DHARIWAL	0
332070	WANKUSWD	0		334039	DHARIWAL	0
332080	KDPH	20.1		337001	TIRORA	1211.4
332081	BHIRA	150.8			TOTALS	11893.4
332082	DAHANU	502.8				
332097	BHIRA	72.4				

Load flow study has been carried out to see the impact of the following transmission schemes which are already under implementation by PGCIL/MSETCL on the power flows in Aurangabad I (Waluj) - Aurangabad (PG) 400 kV interconnection:

- (i) LILO of 400kV D/C lines Parli – Pune (PG) at Pune (GIS) - already commissioned.
- (ii) 2 nos. of 400 kV bays at Dhule (MSETCL) for termination of Dhule (Sterlite) – Dhule (MSETCL) 400 kV D/C line.
- (iii) LILO of both circuits of Aurangabad I (Waluj) – Pune (PG) at Pune(GIS)) by September 2015
- (iv) Aurangabad (PG) – Sholapur D/C 765kV line by December 2015
- (v) Aurangabad (PG) – Padghe 765 kV D/C line by March 2016
- (vi) Aurangabad (PG) – Boisar D/C 400 kV line by March 2016
- (vii) Bableshwar – Kudus 400kV D/C line by March 2016.
- (viii) LILO of one circuit of Aurangabad (PG) – Padghe 765 kV D/C line at Pune (GIS) – project under bidding stage.

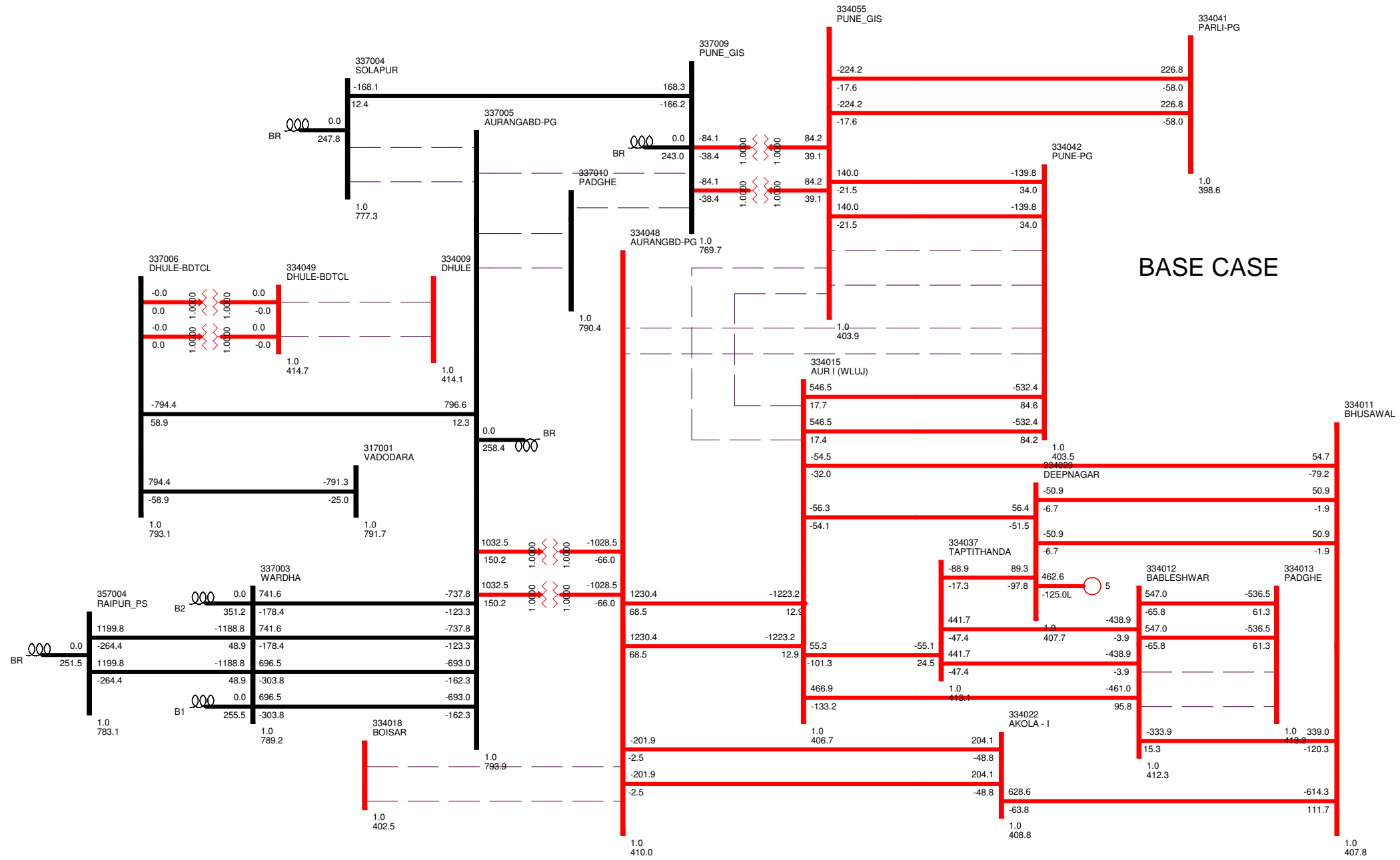
The load flow results are attached as annexures. The results are summarized in the table given below. From the load flow analysis it is clearly evident that with the commissioning of the above mentioned elements loading on 400kV Aurangabad (Waluj) – Aurangabad (PG) D/C line has been reduced from 2460MW to 706MW and Aurangabad (Waluj) – Aurangabad (PG) D/C line would not be constraint for import of power from Maharashtra.

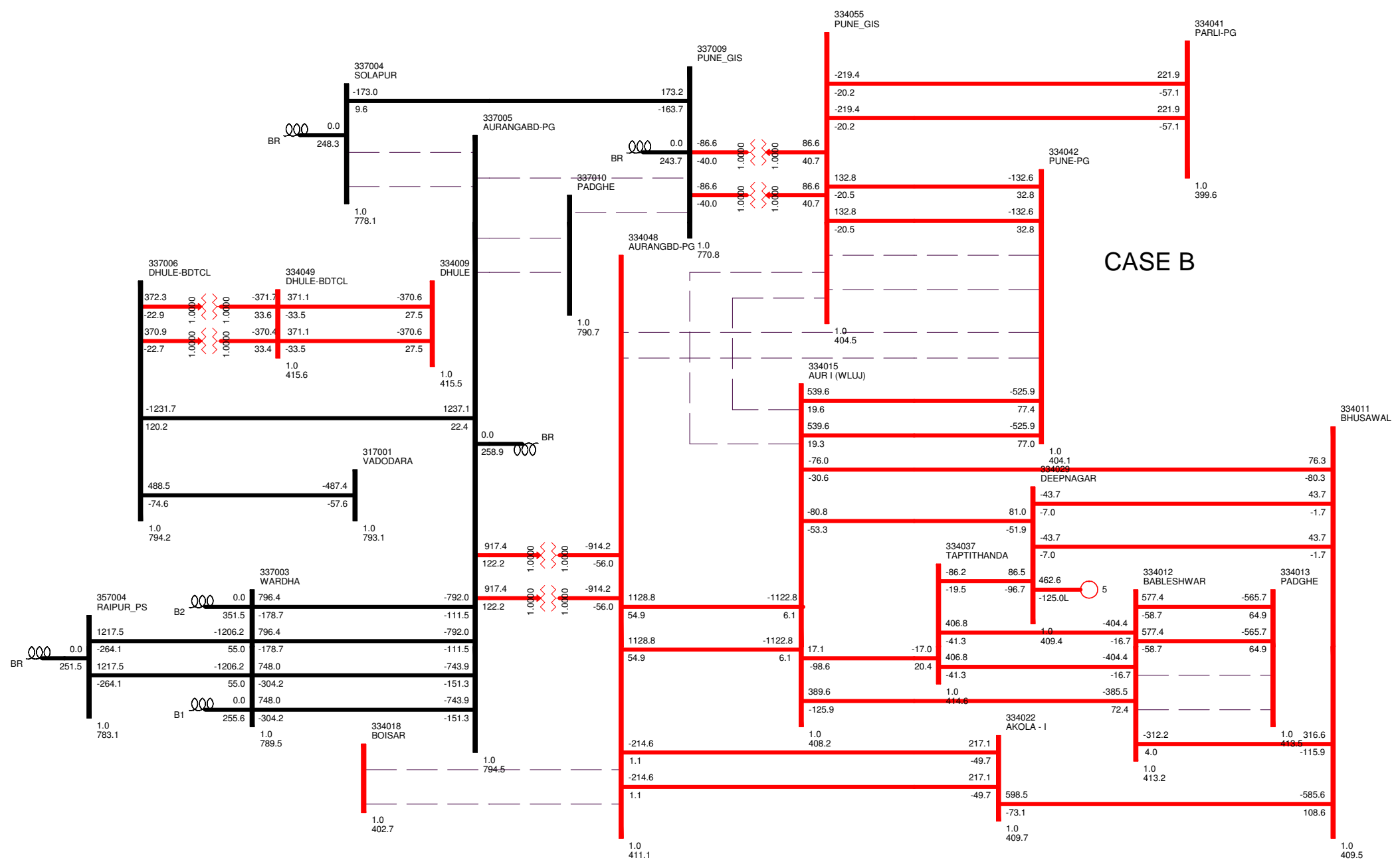
S.No	Name of the transmission line	A :Base Case	B: A+ (ii)	C: B+ (iii)	D: C + (iv)	E: D + (v)	F: E+ (vi) + (viii) + (viii)
1	Aurangabad (Waluj) – Aurangabad (PG) 400kV D/C line.	2460	2256	2196	1500	1158	706
2	Aurangabad (PG) 765/400kV 2X1500MVA ICT's Flow	2064	1834	1784	976	598	488

3	Pune (GIS) 765/400kV 2X1500MVA ICT's Flow	168	172	192	676	470	1416
4	Aurangabad I (Waluj) -Pune (PG) 400kV D/C line.	1092	1080	-	-	-	-
5	Aurangabad I (Waluj) - Pune (GIS) 400kV D/C line.			890	478	384	82
6	400kV D/C line Pune (GIS) - Pune (PG) line.			552	760	574	800

In view of the above, MSETCL has proposed shifting of Shifting of Aurangabad I (Waluj) – Pune(PG) 400kV D/C line from 400kV Aurangabad I (Waluj) to 765/400kV Aurangabad (PG) is not required.

BASE CASE





CASE B

337004 SOLAPUR

337005 AURANGABD-PG

337009 PUNE_GIS

334055 PUNE_GIS

334041 PARLI-PG

337006 DHULE-BDTCL

334049 DHULE-BDTCL

334009 DHULE

334048 AURANGABD-PG

334042 PUNE-PG

317001 VADODARA

317001 VADODARA

BR

334015 AUR I (WLUJ)

334011 BHUSAWAL

337003 WARDHA

357004 RAIPUR_PS

B2

B1

334018 BOISAR

334037 TAPTITHANDA

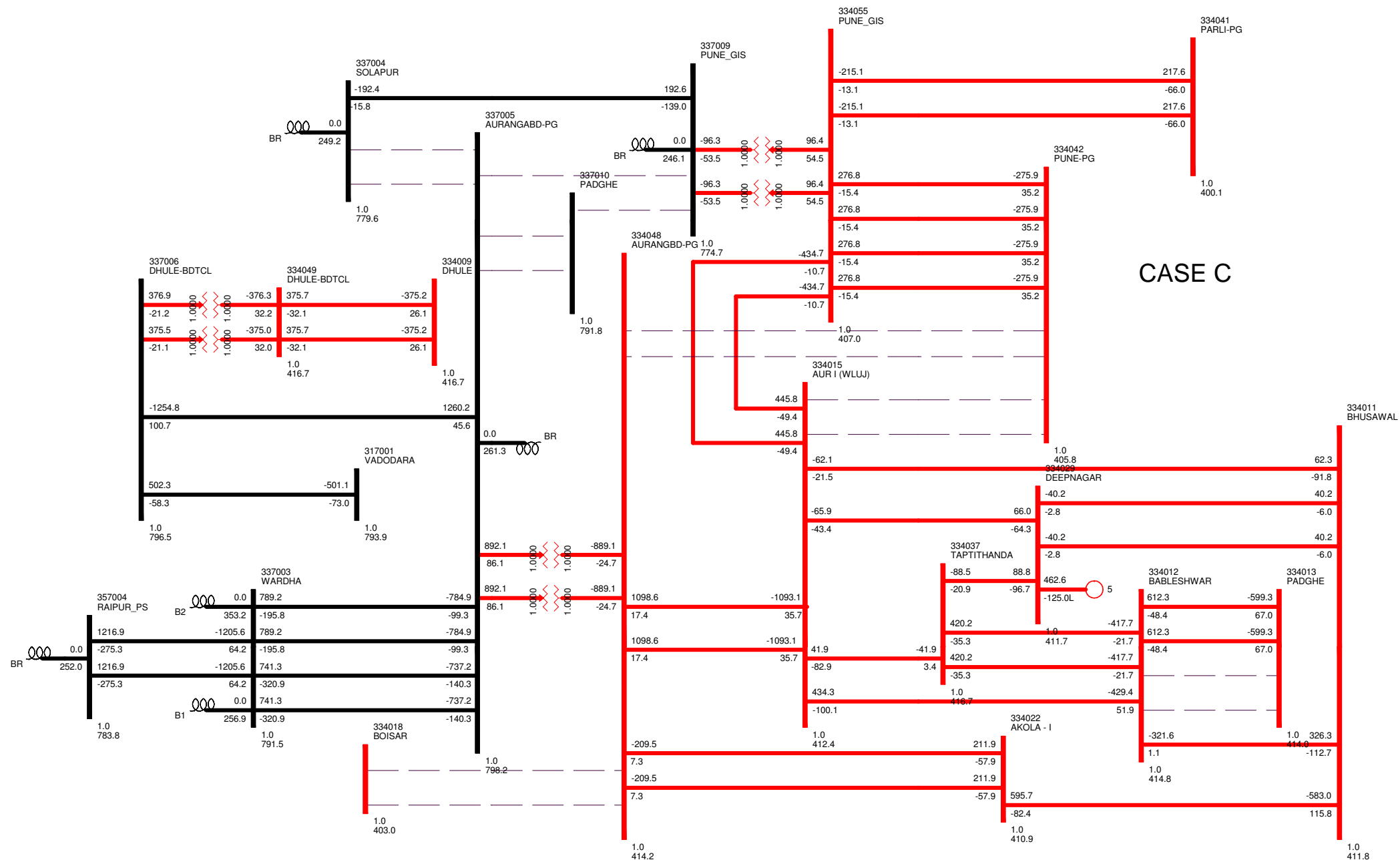
334012 BABLESHWAR

334013 PADGHE

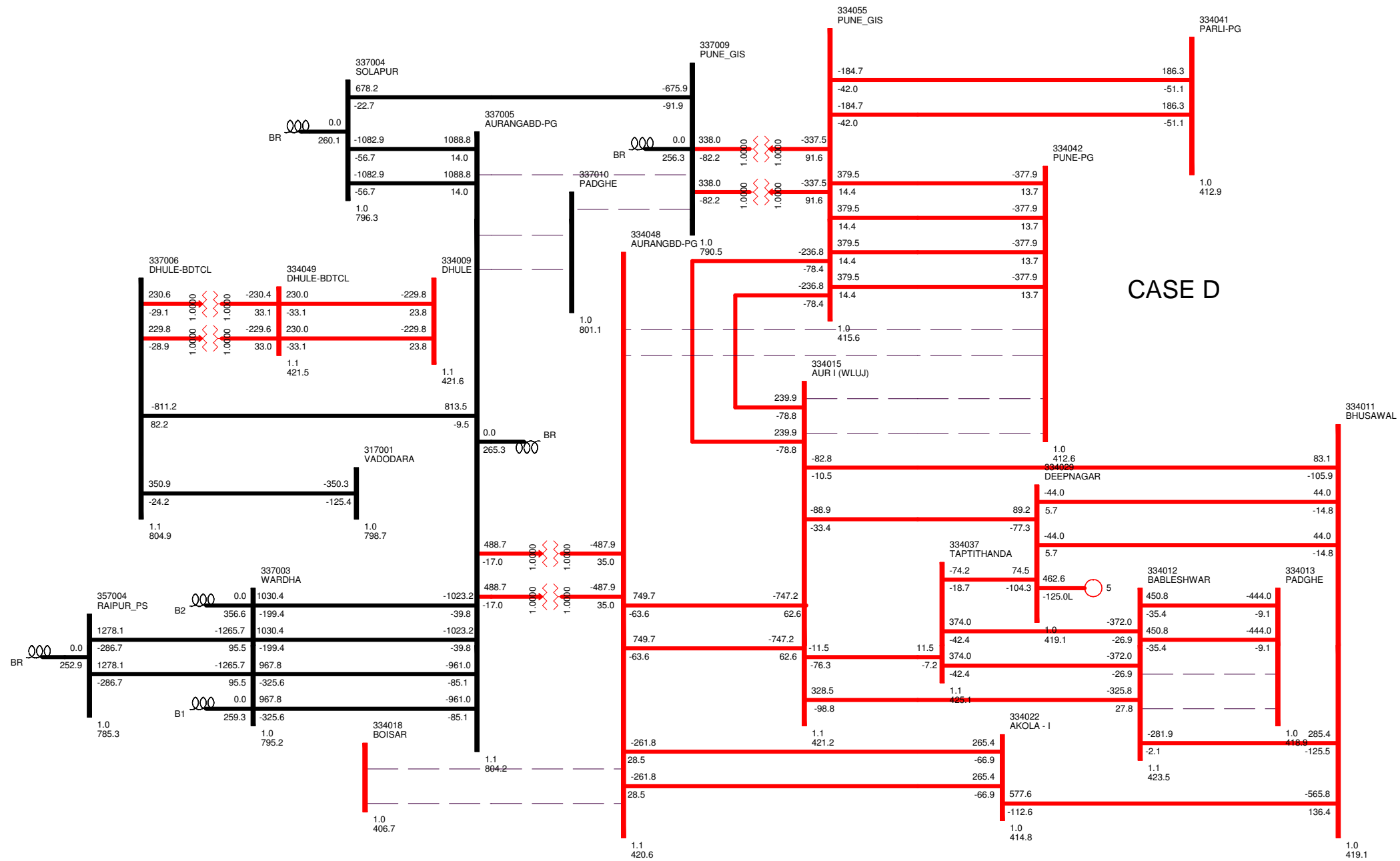
334022 AKOLA - I

5

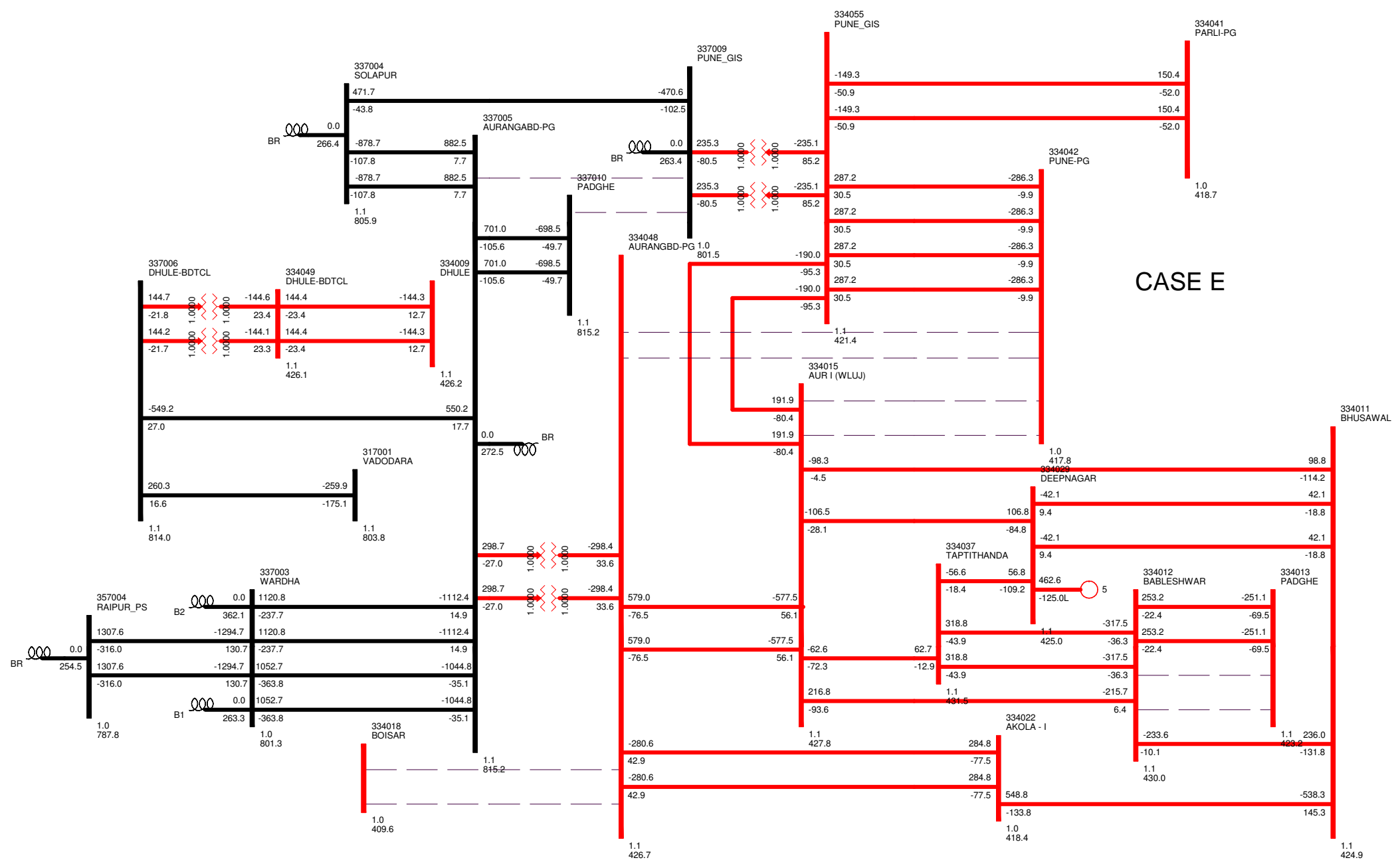
CASE C

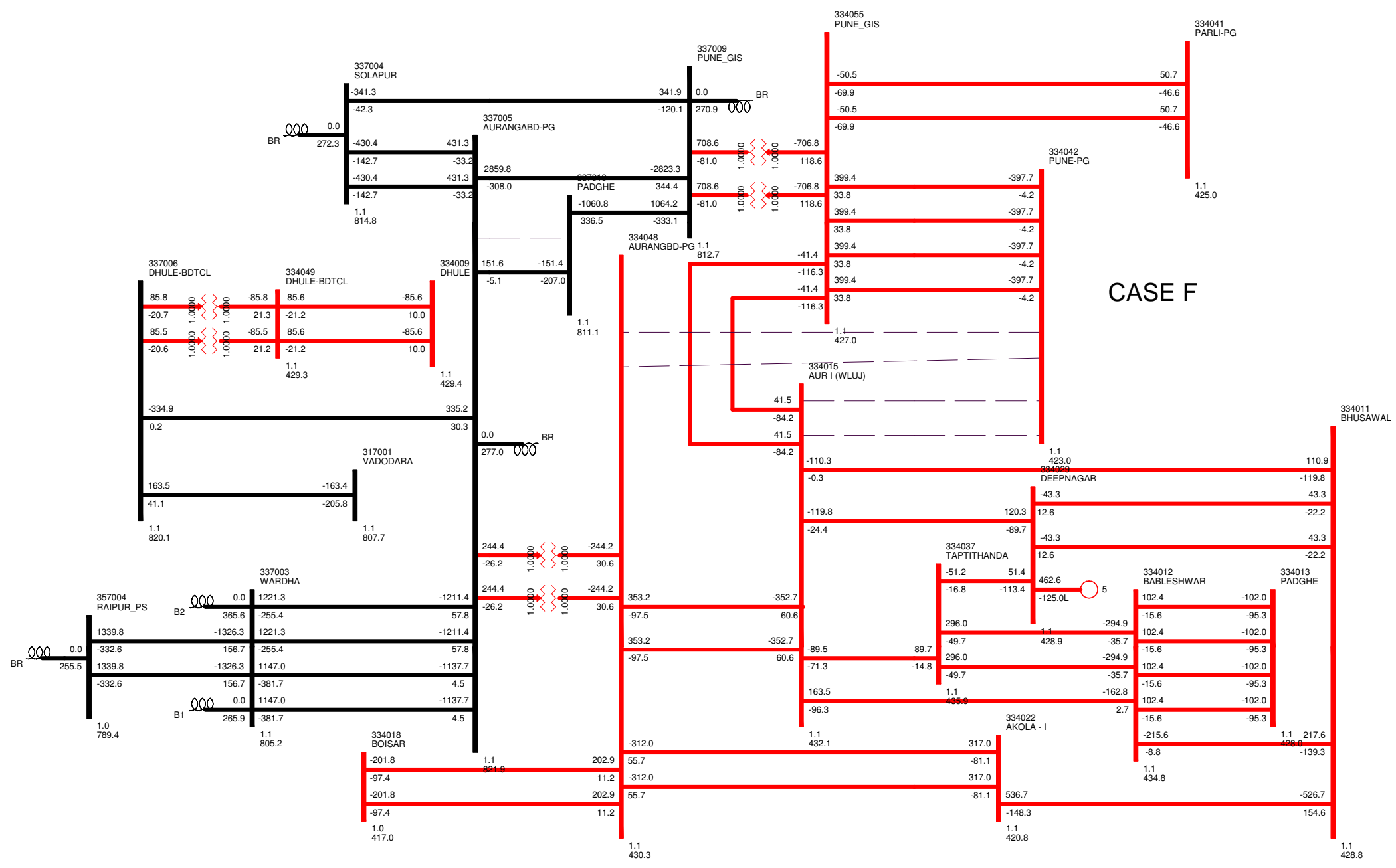


CASE D



CASE E





CASE F

Report on 400kV additional in feed to GOA:

In the 38th SCM of WR held on 17.07.2015, the following Inter State Transmission System scheme was proposed to provide second 400 kV feed to Goa system.

- (i) Establishment of 2X500 MVA, 400/200 kV substation at Xeldam and it's inter connections Narendra (Existing) 400kV substation through Quad conductor. The inter connection between existing Xeldom substation and the proposed Xeldom 400/220KV substation could be through bus extension or through 220kV lines as the case may be.
- (ii) 400kV (Quad) connectivity between the new substation at Xeldem and Mapusa to take care of any N-1-1 contingencies involving outage of any one 400kV infeed to Goa.

In the meeting alternative LILO of Narendra – Kolhapur 765kv D/C line charged at 400kV level was suggested by POWER GRID. It was decided that alternatives would be studied jointly by CEA and CTU. Accordingly the following alternatives for feeding Xeldam 400 kV substation has been studied including the alternative proposed in the 38th SCM:

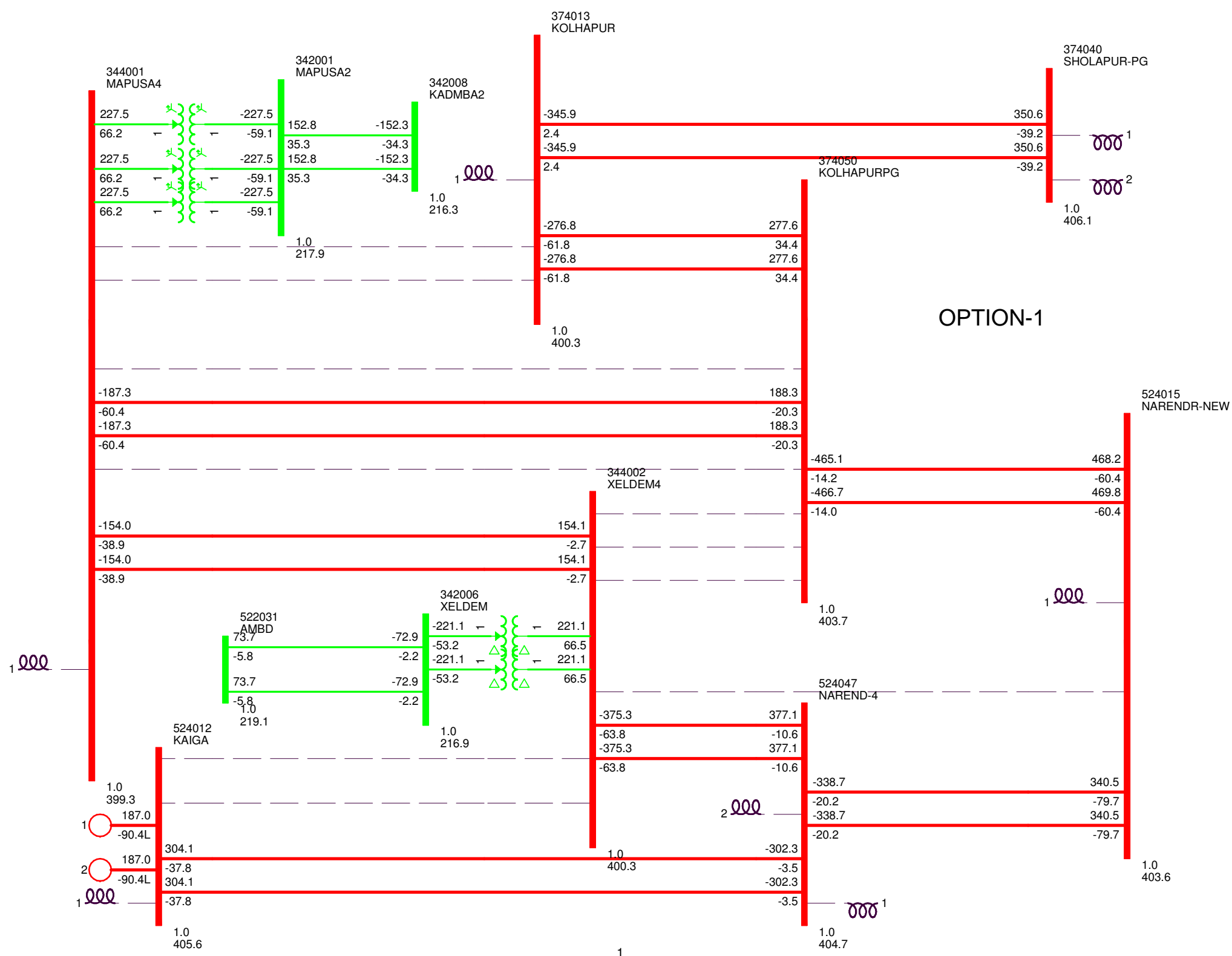
S.No	Alternative	Exhibit
1	Narendra (existing)- Xeldam- Mapusa 400 kV D/c quad line	Option 1
2	Kolhapur(PG)- Mapusa – Xeldam 400 kV D/C quad line	Option 2
3	Kolhapur(PG) – Xeldam- Mapusa 400 kV D/C quad line	Option 3
4	Kolhapur(PG) – Xeldam 400 kV D/C quad line and LILO of one ckt at Mapusa	Option 4
5	LILO of one ckt. of Narendra(New)- Kolhapur(PG) 400 kV D/C line at Xeldam	Option 5
6	LILO of one ckt. of Narendra(existing) - Narendra(New) 400 kV D/C line at Xeldam	Option 6
7	LILO of one ckt. of Kaiga-Narendra(existing) 400 kV D/C line at Xeldam with LILO point at Narendra end.	Option 7
8	LILO of one ckt. of Kaiga-Narendra(existing) 400 kV D/C line at Xeldam with LILO point at Kaiga end.	Option 8

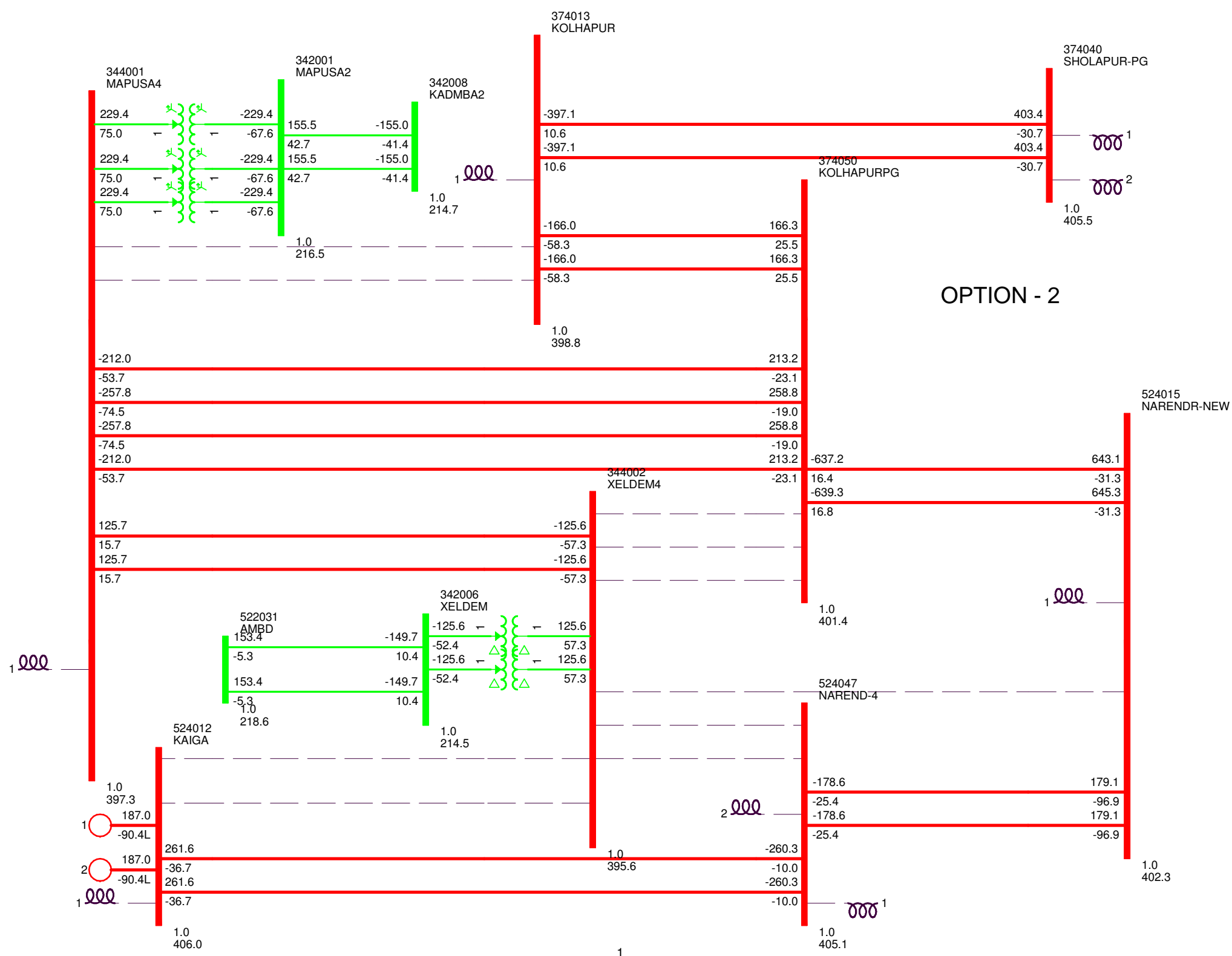
The results of the load flow studies conducted for the above mentioned eight alternatives are summarized as given in table.

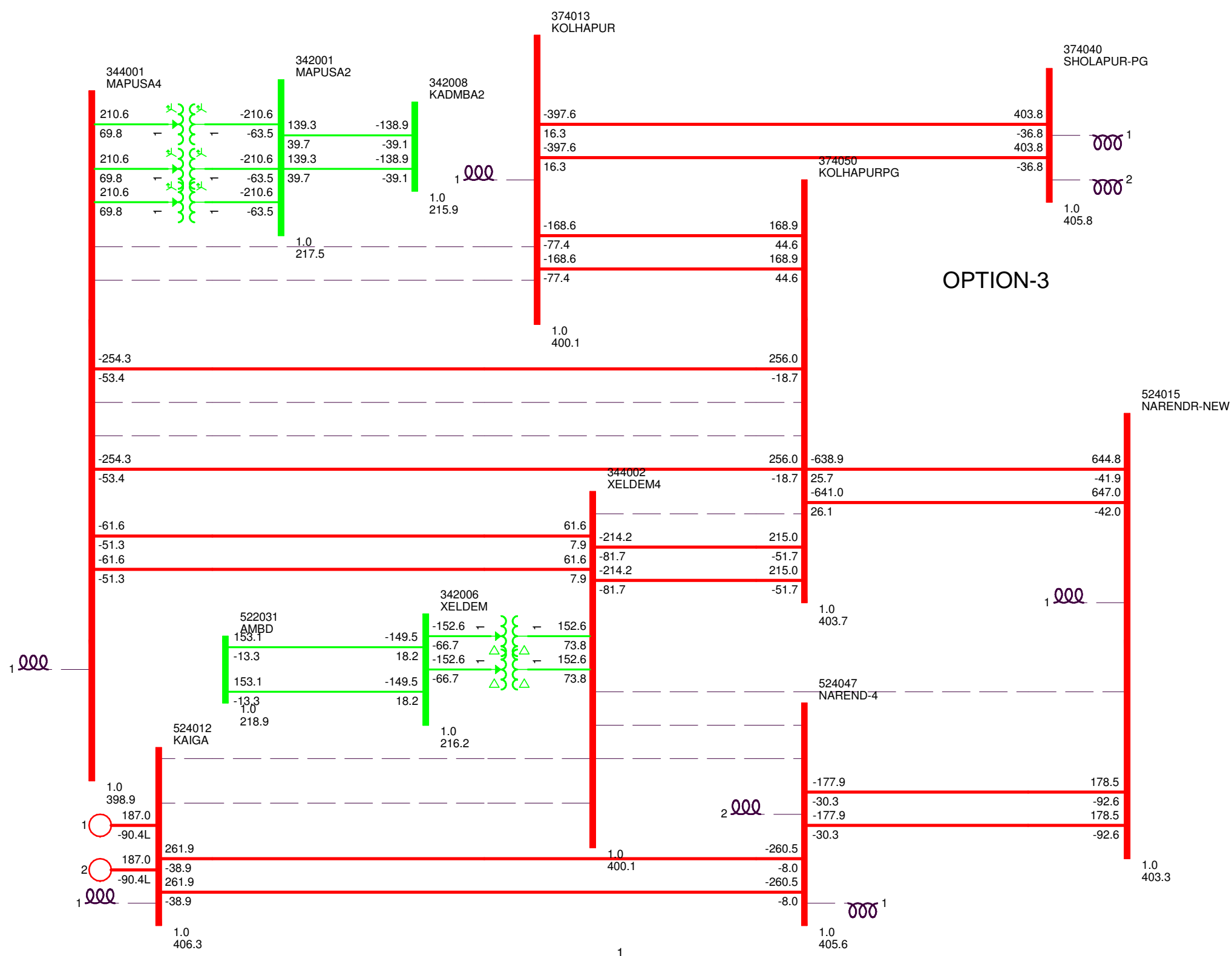
S.No	Name of the transmission line	OPTION :1	OPTION :2	OPTION :3	OPTION :4	OPTION :5	OPTION :6	OPTION :7	OPTION :8
1	Ambewadi - Xeldom 220kV D/C line.	148	308	308	306	288	148	148	74
2	Kolhapur(PG) - Mapusa 400kV 1st D/C line.	374	469	512	300	346	362	372	216
3	Narenda(New) - Kolhapur(PG) 765kV D/C line (Charged at 400kV)	933	1276	1380	1276		915	932	847

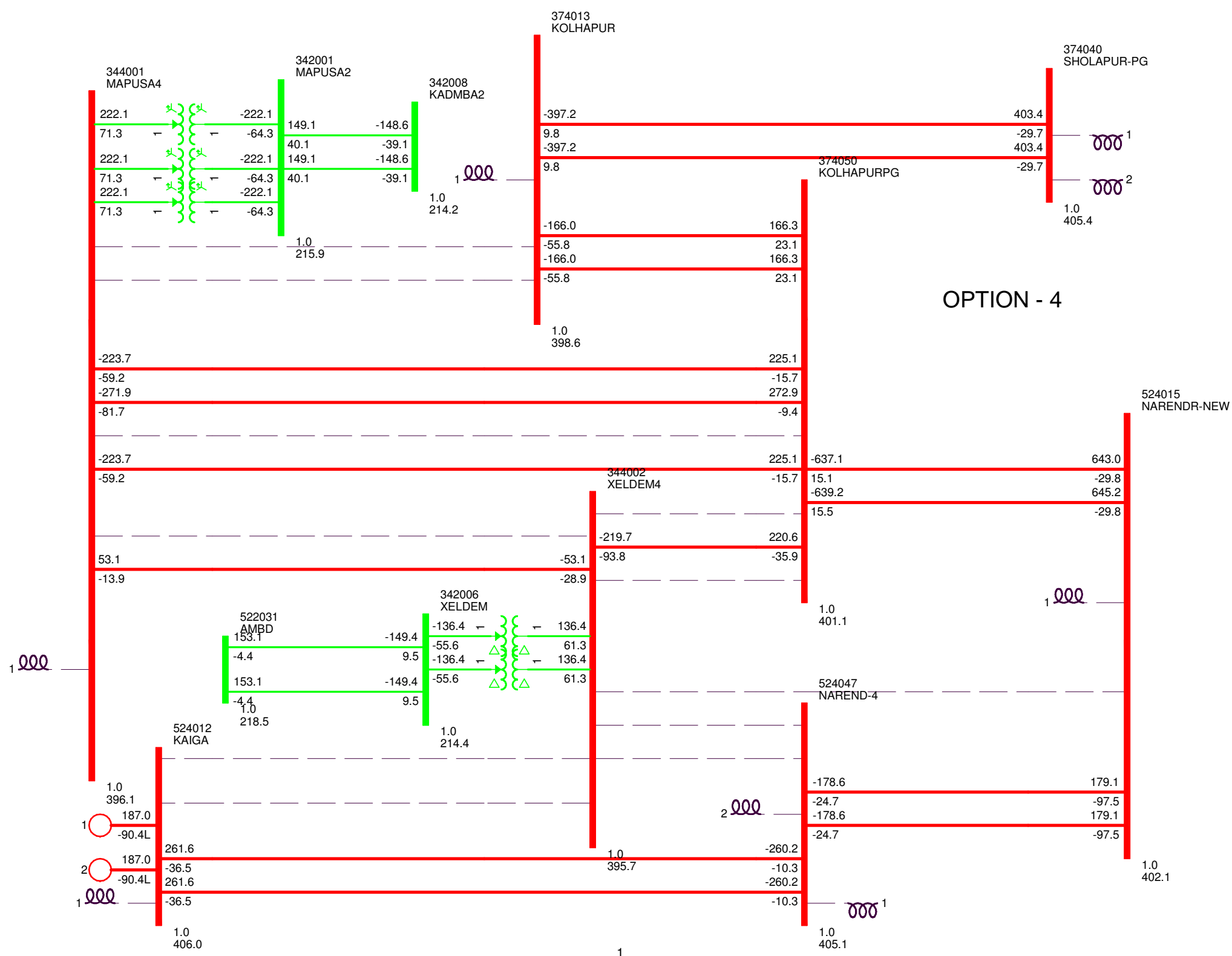
The observations based on analysis of the results are:

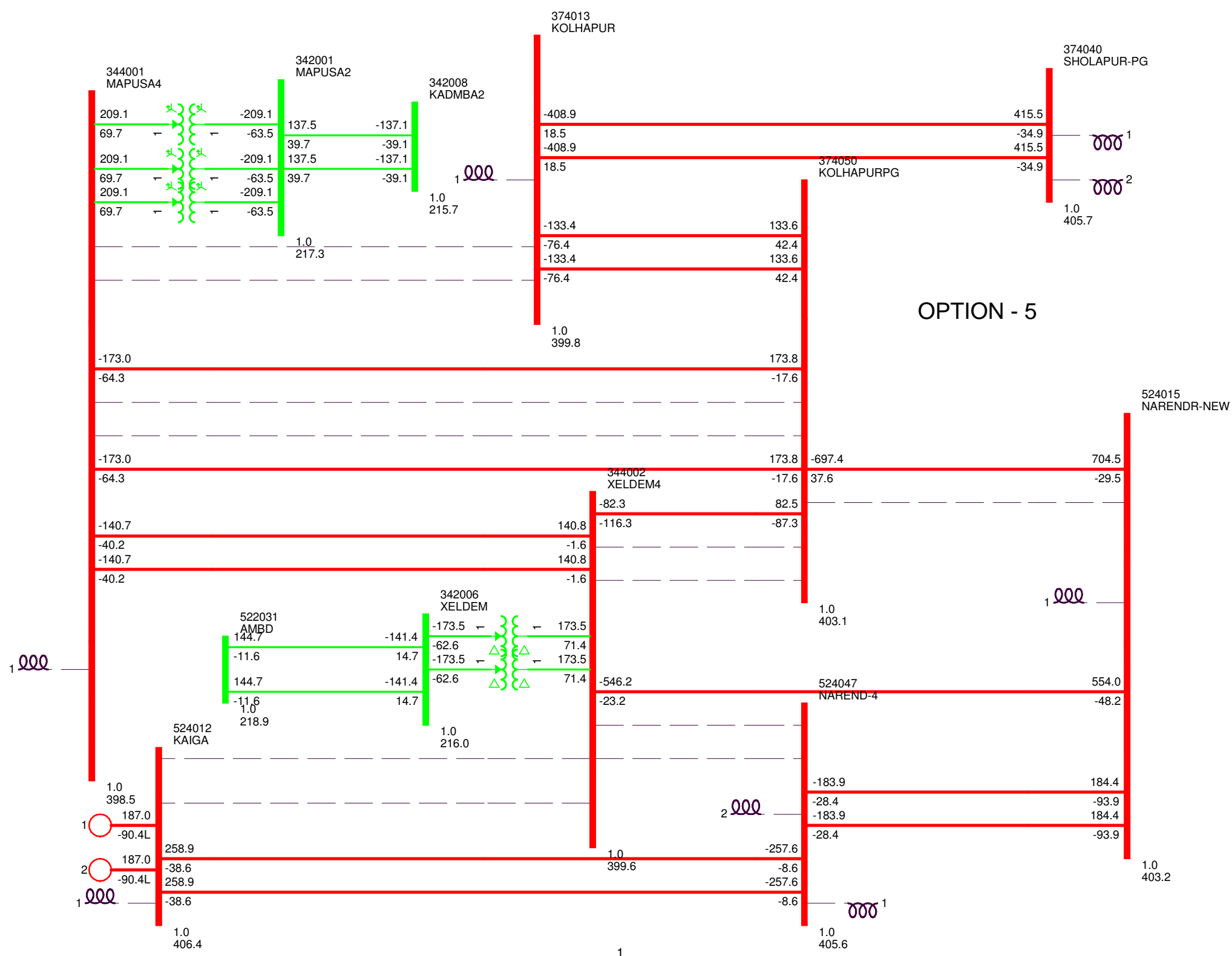
- **OPTION: 1** is best possible alternative for providing ISTS feed to Goa system since it has successfully relieved loading on existing 220kV network as well as 400kV network which is feeding power to Goa system
- For implementation of Option 1 two no. of 400 kV bays would be required at Narendra (existing) 400/220 kV substation. In case of space constraints GIS bay may be provided. If no space is available then **option 6** or **option 7** could be implemented which are equally good as **option1**.
- In the all the eight alternatives, the 400 kV lines to Mapusa/ Xeldam has to cross the Western Ghats section.
- In the corridor through which the Narendra(existing)-Xeldam 400 kV D/C line would pass, there are already existing Ambewadi – Xeldam/Ponda 220 kV D/C line and Supa-Ponda 110 kV D/C line. Ambewadi – Xeldam/Ponda 220 kV D/C line is functional whereas the Supa-Ponda 110 kV D/C line is not in use. These lines are maintained and operated in their respective geographical areas by Goa and Karnataka respectively. 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 could be used.
- **Option5** i.e, LILO of one ckt. of Narendra(New)- Kolhapur(PG) 400 kV D/C line at Xeldam which was suggested in the 38th SCM is not a suitable alternative as there is uneven loading on the 400 kV circuits feeding power to Xeldam (540 on one ckt and 82 MW on other ckt.) . Also Narendra(New)- Kolhapur(PG) is a 765 kV D/C line which in present scenario is being operated 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.











OPTION - 5

344001
MAPUSA4

342001
MAPUSA2

342008
KADMBA2

374013
KOLHAPUR

374040
SHOLAPUR-PG

209.1
69.7
209.1
69.7
209.1
69.7

-209.1
-63.5
137.5
39.7
-137.1
-39.1

137.5
39.7
-137.1
-39.1

-408.9
18.5
-408.9
18.5

415.5
-34.9
415.5
-34.9

374050
KOLHAPURPG

1.0
405.7

1.0
217.3

-133.4
-76.4
-133.4
-76.4

133.6
42.4
133.6
42.4

1.0
399.8

-173.0
-64.3

173.8
-17.6

-173.0
-64.3

173.8
-17.6

-697.4
37.6

704.5
-29.5

344002
XELDEM4

-82.3
-116.3

82.5
-87.3

-140.7
-40.2
-140.7
-40.2

140.8
-1.6
140.8
-1.6

342006
XELDEM

-173.5
-62.6
-173.5
-62.6

173.5
71.4
173.5
71.4

522031
AMBD

144.7
-11.6
144.7
-11.6

-141.4
14.7
-141.4
14.7

-546.2
-23.2

1.0
403.1

524047
NARENDR-4

554.0
-48.2

524012
KAIGA

1.0
398.5

187.0
-90.4L

187.0
-90.4L

258.9
-38.6

258.9
-38.6

1.0
406.4

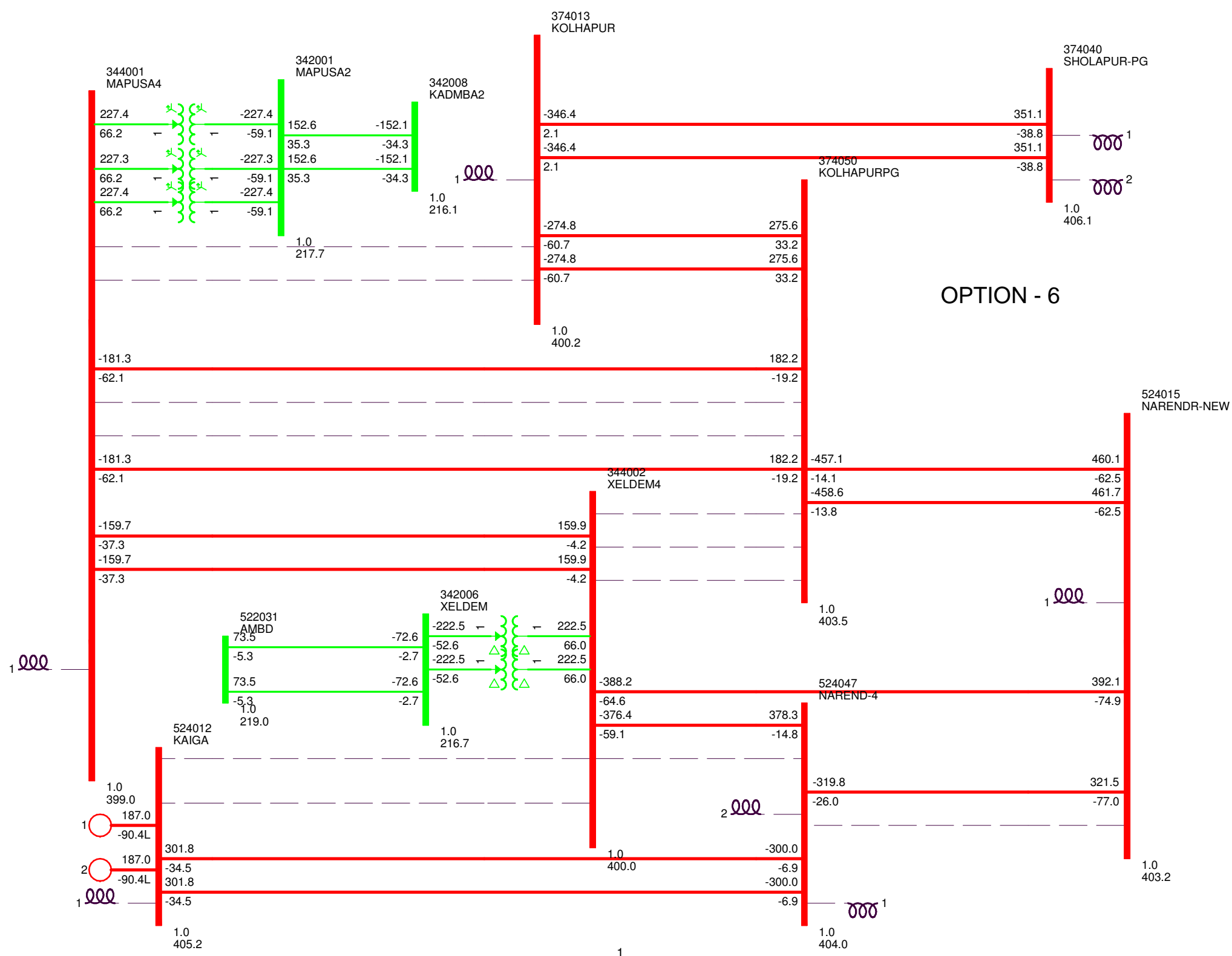
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399.6

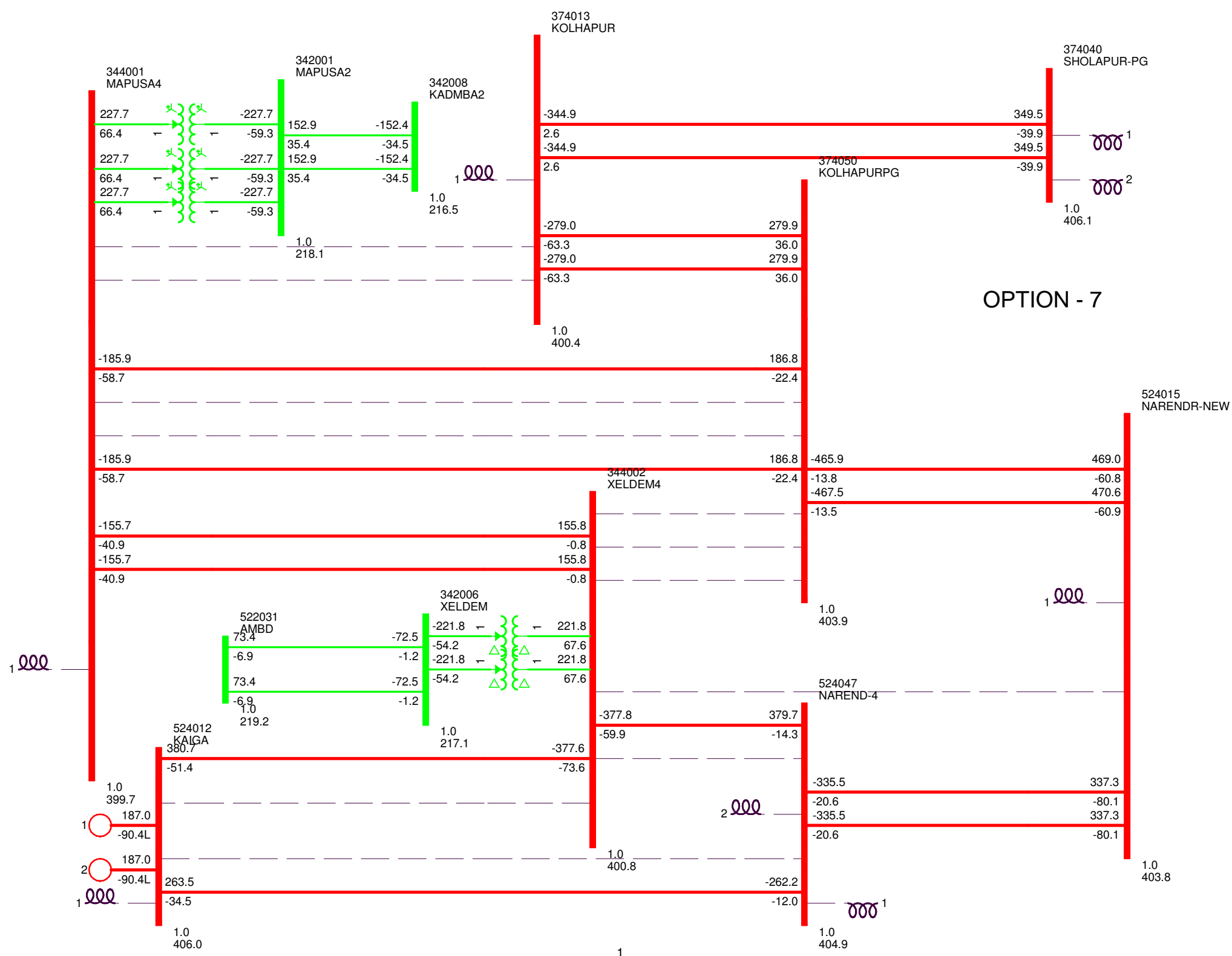
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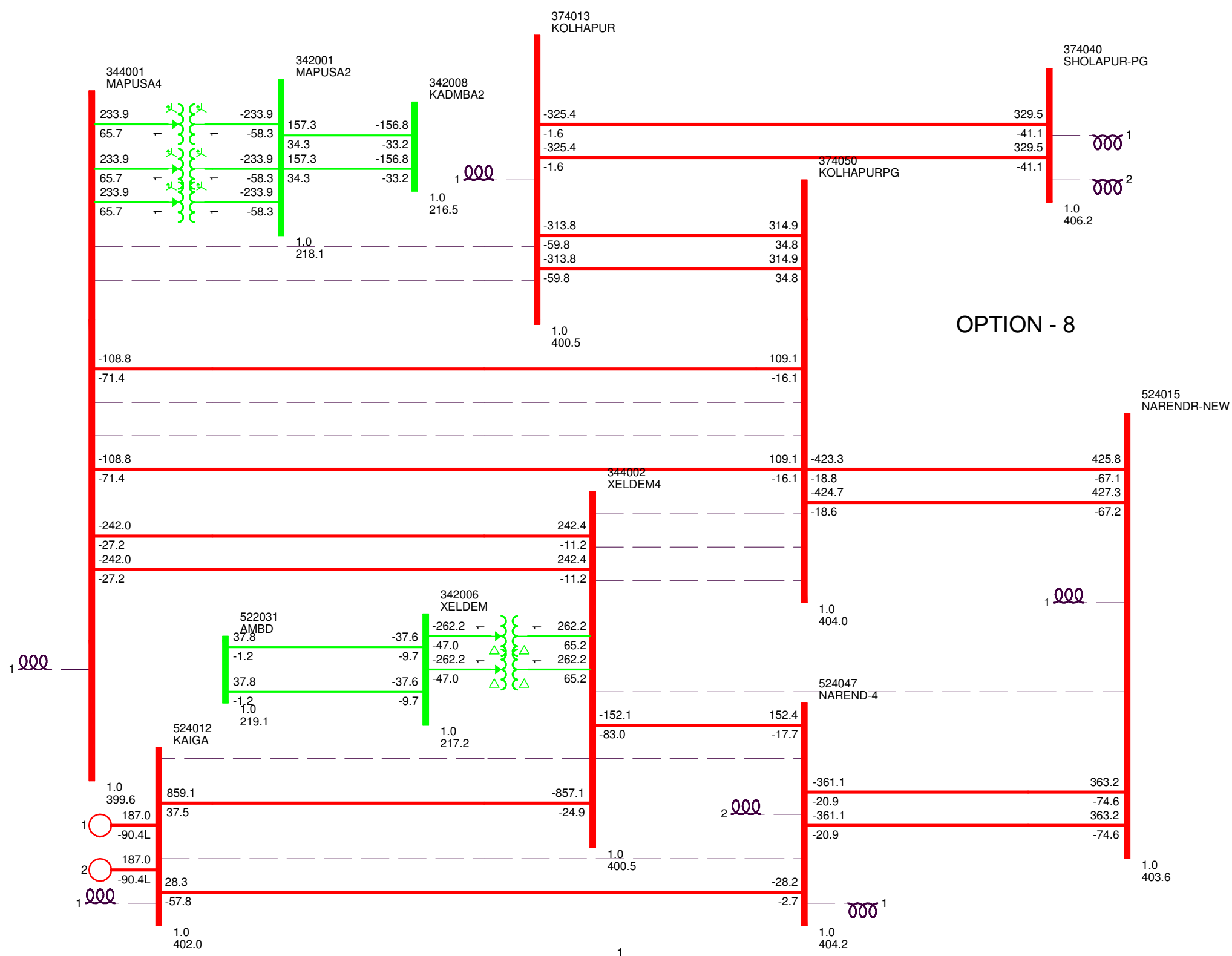
-257.6
-8.6

1.0
405.6

1.0
403.2









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



[ISO: 9001:2008]

No. 26/10/PSP&PA-I/2015/ 234-36

Dated: 06.10.2015

To

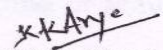
1. COO (CTU), PGCIL, Saudamini Plot no. 2, Sector – 29, Gurgaon – 122 001.
2. CEO, POSOCO, B-9, Qutub Institutional Area Katwaria Sarai, New Delhi 110016.
3. COO, LVTPL, Lanco House, Plot No. 392, Udyog Vihar, Phase – III, Gurgaon – 122016

Sub: Minutes of the meeting on issue related to connectivity of 2x660 MWs LVTPL – reg.

Sir / Madam,

The minutes of the meeting held on 02.09.2015 on the issue related to Connectivity of M/s LVTPL (Lanco Vidarbha Thermal Power Limited) 2x660 MW generation project of is enclosed herewith for further necessary action.

Yours Sincerely,


(K.K. Arya)
Chief Engineer (PSP&PA-I)



**Minutes of the meeting held on 02.09.2015 on issue related to connectivity
of 2x 660 MW Generation Project of M/s Lanco Vidarbha Thermal Power
Ltd. (LVTPL)**

A meeting to discuss the issues related to connectivity of 2x660 MW generation project of M/s Lanco Vidarbha Thermal Power Limited (LVTPL) was taken by Member (Power System), CEA on 2nd September 2015 at CEA, New Delhi. The list of participants is enclosed at **Annexure-I**.

1. CEA informed that the connectivity arrangement, LILO of Seoni - Wardha 765 kV S/C line at LVTPL TPS, for 2x660 MW generation project of M/s LVTPL was agreed in the 12th meeting of WR Constituents regarding Connectivity / Open Access Applications held on 08-07-2010. Subsequently, in the 21st meeting of WR Constituents regarding Connectivity / Open Access Applications held on 17-07-2015, the connectivity arrangement for generation project of M/s LVTPL was revised to LVTPL TPS – Warora pool 765kV D/C line and M/s LVTPL was requested to confirm the time frame by which connectivity line was required, so that suitable action may be initiated for implementation of the line through Tariff Based Competitive Bidding route. M/s LVTPL vide their letter dated 27th August, 2015 has requested for continuation of the earlier connectivity granted i.e. LILO of Seoni - Wardha 765 kV S/C line at LVTPL TPS.
2. M/s LVTPL informed that
 - i) They are developing 2X660 MW thermal power project near Mandva village in Wardha district of Maharashtra. Based on the connectivity arrangement agreed earlier (i.e., LILO of Seoni - Wardha 765 kV S/C line at LVTPL TPS), the switchyard equipment has already been ordered and most of the equipment have been received and the work at their switchyard end is going on.
 - ii) The work on the project got hampered for 34 months due to enormous delay in obtaining the Environmental Clearance (EC). After receipt of EC in August 2014, approval of the project lenders was obtained in March 2015 for cost overrun funding with a revised completion schedule of May 2017 (for Unit 1) and September 2017(for Unit 2).
 - iii) The synchronization of Unit 1 is targeted by November 2016, as such the start-up power would be required for the project by August, 2016. The connectivity line is required before August 2016. Any change in the connectivity arrangement already agreed, at this stage, would lead to schedule mismatch which would be unacceptable to Project Lenders and would jeopardize the progress work taken up with great difficulty.

- iv) Therefore, the connectivity arrangement agreed earlier (i.e., LILO of Seoni-Wardha 765 kV S/C line at LVTPL TPS) needs to be retained for the project to achieve its target timelines.
3. CTU informed that the LILO connectivity was agreed in year 2010 and significant developments have taken place in the transmission system in last 5 years and Seoni - Wardha 765 kV line has become part of the trunk transmission corridor in WR. LILO interconnection would result into unbalance power flow in the trunk corridor besides increasing the fault level at Wardha 765 kV bus, which has already reached near design level of 40 kA. Further, a new 765/400 kV Warora pooling station is under implementation as a part of transmission system associated with Gadarwara STPS (2x800MW) of M/s NTPC Ltd., which is scheduled for commissioning by November 2017. In view of this the connectivity has been revised to LVTPL TPS – Warora Pool 765kV DC line.
4. POSOCO said that they are not in favour of LILO of trunk lines at generating stations. They have already filed petition in CERC wherein it has been prayed that Central Transmission Utility (CTU) should be directed to review all connectivity granted to ensure that the CEA Standards are followed and stop granting connectivity through interim LILO arrangement and the connectivity already granted through interim LILO arrangements may be shifted to final arrangements. The hearing has been completed and the order is reserved.
5. CEA and CTU stated that
- i) M/s LVTPL has applied only for connectivity. The power to the beneficiaries of the project on firm basis cannot be transferred without taking LTA in ISTS and till date M/s LVTPL has not applied for LTA. On receipt of LTA application, the additional transmission system strengthening requirement would be identified and LTA would be effective after implementation of the identified transmission system strengthening.
- ii) The connectivity line as agreed in the 21st LTA meeting held on 17.07.2015, LVTPL TPS – Warora pool 765kV DC line, would be adequate to take care of the evacuation requirements till Warora pool. The additional transmission system strengthening requirements, if any, based on LTA application of M/s LVTPL would be only beyond Warora pool.
- iii) The implementation of the LVTPL TPS – Warora pool 765kV DC line would be taken though TBCB route wherein, the completion time of the line in matching time frame of the generation project would be specified. In case of mismatch (transmission line along with Warora pooling station not coming in matching time frame of generation project), interim arrangement would be evolved.

- iv) For taking up the implementation of the line through TBCB route
- a) M/s LVTPL 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 LVTPL to pay the transmission charges.
 - c) M/s LVTPL needs to sign connectivity agreement and submit requisite Bank Guarantee.

The issue was further deliberated and M/s LVTPL was requested to confirm the above requirements so that the connectivity line (LVTPL TPS – Warora pool 765kV DC line) could be put as agenda in the 35th Empowered Committee meeting on transmission, scheduled to be held on 14.09.2015, for implementation of the scheme through TBCB route.

M/s LVTPL stated that they would come back on the issues after discussion with their management.

The meeting ended with thanks to the chair.

Annexure - I

List of Participants of the Meeting held on 02.09.2015 in CEA, Sewa Bhawan, New Delhi					
S. No.	Name	Designation	Organization	Mobile No.	e-mail
1.	Shri. S.D. Dubey	Member (Power System)	CEA		
2.	Shri. K.K. Arya	Chief Engineer	CEA		
3.	Shri. Awdhesh Kumar Yadav	Director	CEA		
4.	Shri. Shiva Suman	Deputy Director	CEA		
5.	Shri. K.V.S. Baba	GM, NRLDC	POSOCO	8527607575	KVSbaba@posoco.in
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7.	Shri. Pratyush Singh	Engineer	PGCIL	8826094863	pratyush.singh@powergridindia.com
8.	Shri. K.E. Prasad	Director	LVTPL	9650648844	keprasad@lancogroup.com
9.	Shri. B.L. Jangir	ED	LVTPL	9717395868	jangir.bl@lancogroup.com
10.	Shri. P.K. Sarma	Sr. VP	LANCO	9650415511	sarmapk@lancogroup.com
11.	Shri. Vibhuti	DGM	LANCO	9958699038	vibhuti@lancogroup.com
12.	Shri. Harpreet Walia	DGM	LANCO	9810707197	harpreet.walia@lancogroup.com