



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 आर के पुरम नई दिल्ली-110066
वेबसाइट / Website: www.cea.nic.in



[ISO: 9001:2008]

No. 26/10/2016/PSP&PA-I/ 196-209

Date: 16.05.2016

- | | |
|---|---|
| 1 The Member (PS),
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Sub: Agenda notes of 40th meeting of the Standing Committee on Power System Planning of Western Region

Sir / Madam,

The 40th Standing Committee meeting on Power System Planning of Western Region will be held on 01.06.2016 (Wednesday) 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 is available on CEA website (www.cea.nic.in at the following link: <http://www.cea.nic.in/compsplanning.html> i.e. Home page-Wings-Power Systems-PSP&PA-I - Standing Committee on Power System Planning-Western Region).

Kindly make it convenient to attend the same.

Enclosures: as above

Yours' faithfully,


(K K Arya)
Chief Engineer



भारत सरकार / Government of India
विद्युत मंत्रालय / Ministry of Power
केन्द्रीय विद्युत प्राधिकरण / Central Electricity Authority
विद्युत प्रणाली योजना एवं परियोजना मूल्यांकन प्रभाग - I
सेवा भवन आर के पुरम नई दिल्ली-110066
वेबसाइट : www.cea.nic.in



[ISO: 9001:2008]

क्र. सं : 26/10/2016/ वि प्र. यो. & प. मू. -I/ 196-209

दिनांक: 16.05.2016

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|---|---|----|--|
| 1 | सदस्य (विद्युत प्रणाली),
केन्द्रीय विद्युत प्राधिकरण,
सेवा भवन, आर के पुरम,
नई दिल्ली-110066 | 8 | मुख्य अभियंता (पारेषण),
न्यूक्लीयर पावर कॉरपोरेशन ऑफ इंडिया लि,
9एस30, वीएस भवन, अणुशक्ति नगर,
मुम्बई-400094 फैक्स सं. 022-25993570 |
| 2 | सदस्य सचिव,
पश्चिमी क्षेत्रीय विद्युत समिति, एम. आई. डी. सी क्षेत्र,
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फैक्स सं. 022-28370193 | 9 | कार्यपालक निदेशक (अभियांत्रिकी),
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इंजीनियरिंग ऑफिस कॉम्प्लैक्स, ए-8, सैक्टर-24,
नोएडा-201301 फैक्स सं. 0124-2410201 |
| 3 | निदेशक (परियोजना),
पावरग्रिड कॉरपोरेशन ऑफ इंडिया लि.,
सौदामिनी, प्लॉट सं. 2, सैक्टर-29, गुडगाँव-122001
फैक्स सं. 0124-2571760 | 10 | मुख्य अभियंता,
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फैक्स सं. 0832-2222354 |
| 4 | अध्यक्ष एवं प्रबन्ध निदेशक,
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फैक्स सं. 0761-2664141 | 11 | कार्यपालक इंजीनियर (परियोजनाएं),
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विद्युत विभाग, सिलवासा,
फोन नं. 0260-2642338 |
| 5 | प्रबन्ध निदेशक
छत्तीसगढ़ रा. वि. बोर्ड,
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फैक्स सं. 0771-2574246 | 12 | कार्यपालक इंजीनियर,
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मोती दमन, पिन-396220
फोन नं. 0260-2250889, 2254745 |
| 6 | प्रबन्ध निदेशक,
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रेस कोर्स, बड़ोदा-390007
फैक्स सं. 0265-2338164 | 13 | कार्यपालक निदेशक, (विशेष आमंत्रित),
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एम आई डी सी एरिया, मेरोल,
अंधेरी पूर्व, मुम्बई-400093,
फैक्स संख्या-022-28235434 |
| 7 | निदेशक (प्रचालन),
महाट्रांसको, प्रकाशगड, प्लॉट संख्या-जी 9,
बांद्रा-पूर्व, मुम्बई-400051
फैक्स 022-26390383 / 26595258 | 14 | कार्यपालक निदेशक, एनएलडीसी
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कटवारिया सराय, नई दिल्ली-110016
फैक्स 011-26852747 |

विषय :- पश्चिमी क्षेत्र विद्युत प्रणाली योजना की स्थाई समिति की 40 वीं बैठक की कार्यसूची ।

महोदय / महोदया ,

पश्चिमी क्षेत्र के विद्युत प्रणाली योजना की 40 वीं स्थायी समिति की बैठक 10:30 बजे 01.06.2016 (बुधवार) NRPC, 18 ए, कुतुब इन्स्टीट्यूशनल एरिया, शहीद जीत सिंह मार्ग , कटवरीया सराय, नई दिल्ली -110016 में आयोजित की जाएगी । इस बैठक की कार्यसूची केन्द्रीय विद्युत प्राधिकरण की वेबसाइट www.cea.nic.in के लिंक <http://www.cea.nic.in/compsplanning.html> (i.e. Home page-Wings-Power Systems-PSP&PA-I - Standing Committee on Power System Planning-Western Region) पर उपलब्ध है ।

इस बैठक में भाग लेने की कृपा कीजिये ।

संलग्न - उपरोक्त

भवदीय

(के के आर्या)
मुख्य अभियंता

Agenda notes for the 40th Meeting of Standing Committee on Power System Planning in Western Region

1. **Confirmation of the minutes of 39th meeting of the Standing Committee on Power System Planning in Western Region (SCPSPWR) held on 30th November 2015** at NRPC, Katwaria Sarai, New Delhi.

- 1.1. The minutes of the 39th SCPSPWR were issued vide CEA letter No.26/10/2015-PSP&PA-I/ 1- 15 dated 28th December 2015. No comments have been received from any constituent members.

2. **Review of Progress on Earlier Agreed Transmission Schemes.**

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

- 2.2. Members may deliberate.

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

- 3.1. The following scope of works were agreed in the 25th SCM of WR held on 30.09.2006 to be implemented under Western Regional system strengthening scheme (WRSS –V) by PGCIL:

- (i) 400kV Vapi – Navi Mumbai D/C line.
- (ii) LILO of 400kV Lonikhand/Pune – Kalwa line at Navi Mumbai.
- (iii) Establishment of 400/220kV 2X315MVA new (GIS) at Navi Mumbai.
- (iv) 220kV Vapi – Khadoli D/C line.

The 220 kV transmission lines from Navi Mumbai 400/220 kV substation namely , LILO of Apta – Kalwa 220kV S/C line and Kandalgaoon– Kharghar 220kV S/C line at Navi Mumbai, was to be implemented by MSETCL.

- 3.2. In 27th SCM of WR held on 30.07.2007, Pune (PG) – Navi Mumbai (PG) 400kV D/C line was agreed as a regional system strengthening scheme in Western Region to be implemented in time frame of Krishnapatnam UMPP. In the 32nd SCM of WR held on 13.05.2011, PGCIL requested for reconsideration of Pune (PG) – Navi Mumbai (PG) 400kV D/C line in view of severe RoW constraints envisaged during implementation and it was agreed that MSETCL could suggest alternative location for termination of line from Pune for onward dispersal of power.
- 3.3. In the 35th SCM of WR held on 3/1/2013, LILO of Kharghar – Padghe section of Lonikhand – Kalwa line-1 at Navi Mumbai was agreed instead of LILO of Lonikhand/ Pune – Kalwa 400kV S/C line-2 as agreed under WRSSS – V. It was also agreed for laying of 1.5km of 400kV underground cable near gantry of Navi Mumbai sub – station with an estimated cost of Rs 55 crores to expedite the implementation of LILO arrangement which was held up due to severe RoW issues.

In the 35th SCM of WR held on 3/1/2013, in view of severe RoW problem termination of 400kV Vapi – Navi Mumbai D/C line at Kudus S/s of MSETCL was agreed and PGCIL was to continue their efforts for completing the balance portion of the Vapi – Navi Mumbai 400kV D/C line.

- 3.4. In the 38th SCM of WR held on 17.07.2015, MSETCL had stated that there was no ISTS source to Navi Mumbai. The Vapi - Navi Mumbai 400 kV D/C line is being terminated at Kudus which is about 80 km away. The LILO of Kharghar – Padghe 400 kV line at Navi Mumbai being presently implemented will only recirculate the power from intrastate network of MSETCL. If in future also if ISTS network was not being extended to Navi Mumbai 400 kV substation, then it should be shifted to some other location. In the meeting it was agreed that CEA, CTU and MSETCL would carry out joint study for exploring effective utilization of Navi Mumbai 400 kV substation and put a proposal in the next standing committee meeting
- 3.5. From system studies conducted by CTU, it emerges that ISTS feed from Padghe (765/400kV) substation of POWERGRID is the best alternative of providing a strong infeed to Navi Mumbai (Study report attached at **Annexure – 3**). Hence, the following system is proposed:
- (i) Padghe (765/400kV) – Navi Mumbai 400kV D/c (Quad) line
 - (ii) 1x500MVA, 400/220kV 3rd ICT at Navi Mumbai S/s
 - (iii) Installation of 220/33kV Transformer at Navi Mumbai substation and planning of 33kV outlets from Navi Mumbai substation in coordination with DISCOM / MSEDCL.

From study report it emerges that power flow on Navi Mumbai – Kharghar 400 kV S/C line (approximately 20 km in length), formed after LILO of Padghe – Kharghar 400kV S/C line at Navi Mumbai, is about 1025 MW. This loading may be reduced with shifting of load from Kharghar and Kalwa area to Navi Mumbai. The same needs to be identified and carried out by MSETCL.

4. As per the 25th SCM of WR, implementation of the following 220 kV system was under the scope of MSETCL:
- (i) LILO of Apta – Kalwa 220kV S/C line at Navi Mumbai S/s.
 - (ii) LILO of Kandalgaoon– Kharghar 220kV S/C line at Navi Mumbai S/s.

The system proposed for Navi Mumbai also includes installation of 220/33kV transformers and 33kV outlets from Navi Mumbai substation.

MSETCL may update on status of planning / implementation of 220kV / 33 kV outlets from Navi Mumbai substation of POWERGRID.

Members may deliberate.

5. **Interconnection between CGPL UMPP and Adani Mundra generation plants in Gujarat.**

- 5.1. The issue of interconnection between M/s CGPL UMPP and M/s Adani Mundra generation plant was discussed in 38th SCM of WR held on 17.07.2015 wherein it was decided that the issue would be studied jointly by CEA, CTU and GETCO.

- 5.2. A meeting was held in CEA on 09.10.2015 to discuss the possible interconnection. In the meeting it was observed that CGPL UMPP and Adani Mundra TPS were already interconnected through the Adani Mundra TPS – Varsana – Bachau – CGPL UMPP 400 kV link which was about 200 km long, however need was felt for a direct interconnection between the two plants, which are adjacent to each other. It was agreed to hold the next meeting at Adani Mundra TPS / CGPL UMPP so that physical feasibility of the possible interconnection may also be examined.
- 5.3. Accordingly, a meeting was held on 17.02.2016 at Adani Mundra TPS Gujarat (minutes enclosed as **Annexure-4**). The possible interconnections identified are as given below:
- (i) Provision of 400/220 kV, 315 or 500 MVA transformer along with one no. of 400 kV bay and one no. of 220 kV bay at M/S CGPL 400 kV / 220 kV switchyard.

The space for provision of transformer and bays are available at CGPL switchyard. The transformer would be normally kept disconnected either at 400 kV side or 220 kV side. In case of emergency start up power could be extended from Nanikhakar 220 kV substation to 400 kV CGPL bus.

- (ii) LILO of Adani-Varsana 400 kV S/C line-1 at CGPL Mundra UMPP 400 kV switchyard. Implementation of this alternative would require one or two nos. of 400 kV bays at CGPL switchyard. The LILO line has to cross two nos. of 220 kV D/C lines emanating from Adani switchyard and three nos. of 400 kV D/C lines emanating from CGPL switchyard.
- For termination of line at CGPL switchyard, two nos. of 400 kV bays in D arrangement would be required. The 400 kV switchyard has got Breaker and a half bus scheme with I Type bay arrangement, therefore termination of LILO line at CGPL switchyard would require more space. Normally the tie circuit breaker would be closed and the bus circuit breakers would be normally open. (CGPL opined that additional breaker/isolators associated with tie breaker may be installed outside CGPL switchyard so that during normal condition these isolators and breaker will be in closed condition thereby external power will not enter in CGPL 400KV switchyard).
 - For interconnection of the line with CGPL switchyard in T arrangement would require only one no. of 400 kV bay. The bay circuit breaker would normally be in open position. Adani- Varsana 400 kV S/C line via CGPL switchyard would be continuous line in normal operating conditions. In case of emergency, start up power could be availed (by closing the T section) either from Adani Mundra TPS or from Varsana.
 - CGPL – Bhuj pool 400 kV D/C line has already been agreed and is under implementation by POWERGRID. The walk over survey of this line has already been done by POWERGRID. The common route of the CGPL-Bhuj 400 kV D/C line and LILO of Adani-Varsana 400 kV S/C line at CGPL from the CGPL 400 kV switchyard could be implemented on multi circuit towers to conserve RoW.

- (iii) A direct 400 kV interconnection between CGPL Mundra UMPP and Adani Mundra TPS.

For implementation of this 400 kV S/C line one 400 kV bay each at Adani Mundra TPS and CGPL UMPP is required. Space for bays are available at both the switchyard but there are constraints in taking out the line from the APL Mundra 400 kV switchyard. This line has to cross Mundra-Mohindergarh HVDC line, Mundra to Earth electrode station line, three nos. of 400 kV D/C lines and two nos. of 220 kV lines emanating from Adani switchyard, three nos. of 400 kV D/C lines emanating from CGPL switchyard.

- 5.4. Members may deliberate and finalise one of the above three alternative as interconnection between CGPL Mundra UMPP and Adani Mundra TPS and also deliberate on the implementation modality.

6. Transmission System for Ultra Mega Solar Power Park in distt. Banaskanta, Gujarat (700 MW)

- 6.1. Government of India has taken initiative for development of Ultra Mega Solar parks in various parts of the country. As part of above initiative, setting up of ultra-mega solar park of 700 MW capacity has been envisaged by M/s Gujarat Power Corporation Limited (GPCL) at Radhanesda district Banaskantha in Gujarat. Power from above project is envisaged to be transferred to its various beneficiaries including Gujarat.
- 6.2. In line with the CERC regulatory requirement, MNRE has already issued authorization to M/s GPCL, Solar Power Park Developer (SPPD), to apply for Connectivity/LTA for its 700 MW Banaskantha Solar Park in Gujarat. MNRE also authorized SPPD to undertake infrastructural activities including arrangement for connectivity on behalf of the solar power generators in the park.
- 6.3. A meeting was held on 02.02.16 under the chairmanship of Member(PS), CEA for evolution of transmission schemes for solar parks in Madhya Pradesh and Gujarat in Western Region. Regarding the evacuation of power from Banaskantha solar park in Gujarat, it was suggested in the meeting that if step up voltage of 400 kV was made available at solar park, then a 400 kV D/C line from Banaskantha 765/400/220 kV to the solar park could be planned subject to the approval by SCM of WR. Otherwise, Banaskantha solar park needs to get connected with Banaskantha 765/400/220 kV substation through 220 kV lines or 400 kV lines for evacuation of power Banaskantha Solar Power Park in Gujarat. Subsequently M/s GPCL vide letter dated 18.02.16 has conveyed their acceptance to step up at 400kV level at pooling station to set up within solar park.
- 6.4. As part of Green Energy Corridor-Interstate Transmission scheme, 765/400 kV Banaskantha(PG) Pooling stations is under implementation. For onward dispersal of power, 765kV Banaskantha - Chittorgarh (POWERGRID) & 400kV Banaskantha - Sankhari (GETCO) transmission lines are also under implementation under Green Energy Corridor scheme. Apart from that the following transmission schemes are under implementation by GETCO in Charanka/Sankhari area:

- (i) LILO of one circuit of 400kV Vadavi (Ranchodpura) - Zerda (Kansari) D/c at Sankhari
- (ii) 400kV Charanka – Sankhari(New) D/c
- (iii) 220kV Charanka – Jangral S/c**
- (iv) 220kV Charanka – Deodhar S/c**
- (v) 220kV Randhanpur – Jangral S/c**
- (vi) LILO of one D/c of 400kV Mundra(Adnai) - Zerda 2xD/c line at Charanka
- (vii) LILO of both circuits of 220 kV Sankhari(existing) – Jangral D/c line at Sankhari (New)
- (viii) LILO of 220 kV Radhanapur - Mehsana S/c line at Sankhari (New)

**** Through line reconfiguration of 220kV Charanka-Sankhari & 220kV Radhanpur – Deodar line**

6.5. Accordingly, considering the above transmission schemes, studies have been carried out in solar maximized scenario (study results enclosed at **Annexure-5**) and the following transmission system is considered for Banaskanta (Radhanesda) Ultra Mega Solar Park (700MW) as a part of ISTS:

Transmission system for Banaskanta (Radhanesda) Ultra Mega Solar Park (700MW)

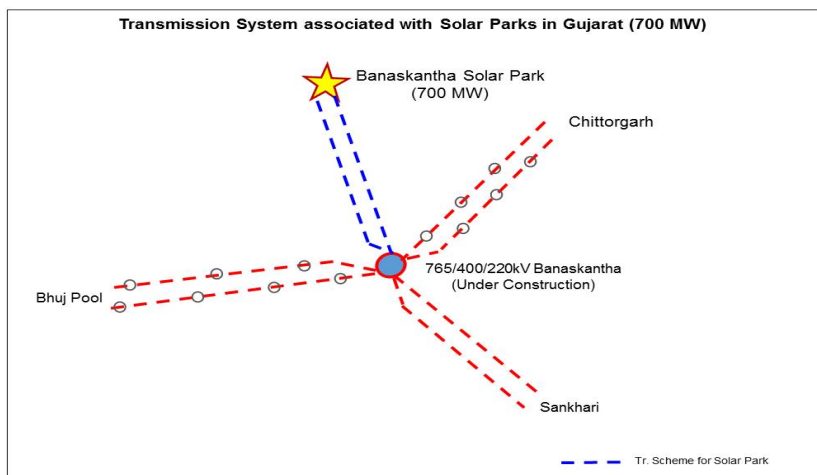
- (i) Banaskantha (Radhanesda) Pooling Station – Banaskantha(PG) 400 kV D/c
- (ii) 2 nos. 400 kV line bays at Bansakanta(PG) SS

Estimated Cost – Rs 120 Cr

Note: 400kV Banaskantha (Radhanesda) Pooling station shall be under the scope of the SPPD along with 2 nos. 400 kV line bays for interconnection at ISTS line

From the studies, it is observed that under its line contingency, loading on 400kV Banaskanta –Sankhari D/c is critical. However, with bypassing of LILO for Vadavi (Ranchodpura) - Zerda (Kansari) line (at 400/220kV Sankhari (GETCO) substation), loading is in order.

Schematic for the above proposed transmission scheme is as under:



- 6.6. M/s GPCL, the Solar Power Park Developer (SPPD) for the Banaskanta (Radhanesda) Ultra Mega Solar Park (700MW) is still to apply for connectivity/ LTA.
- 6.7. Ministry of Power (MoP) has assigned POWERGRID to implement transmission system for various solar parks including Banaskantha UMSP (700 MW) in Gujarat on compressed time schedule basis.

Members may deliberate.

7. **Agenda for Transmission System for Solar Power Parks in Madhya Pradesh (2250 MW)**

- 7.1. Government of India has taken an initiative for development of Ultra Mega Solar Power parks in various parts of the country including Madhya Pradesh. As part of above initiative, Solar Power parks of 2000 MW capacity are being proposed to be developed by M/s Rewa ultra Mega Solar (RUMS) in Neemuch (500 MW), Mandsaur (250 MW), Shajapur (250 MW), Rajgarh (250 MW), Chattarpur (250 MW), Morena (250 MW) and Agar (250 MW) districts of MP. Power from above project is envisaged to be transferred to its various beneficiaries including MP.
- 7.2. A meeting was held on 02.02.16 under the chairmanship of Member(PS), CEA for evolution of transmission schemes for solar parks in Madhya Pradesh and Gujarat in Western Region. The minutes of the meeting is enclosed as **Annexure – 6**. In the meeting it was observed that Intra state Transmission System Strengthening for evacuation of power from RE projects in Madhya Pradesh of about 5850 MW capacity has already been approved in 38th WR standing committee held in 17.07.15. The transmission system strengthening scheme for above RE capacity was proposed in two phases i.e. Phase –I (Rs. 2100 Crores) and Phase-II (Rs. 1475 Crores). The transmission system strengthening scheme for renewable energy sources under Phase-I has already been included in GEC-I through KFW funding which is under various stages of implementation. For evolving the transmission system for solar park of 2000 MW in Madhya Pradesh, system studies considering the transmission system already planned by MPPTCL was required to be carried out. Accordingly, MPPTCL was requested to:
 - (i) Provide updated PSSe file of their system for carrying out the studies.
 - (ii) Take-up with MNRE regarding the capacity of solar park at Chattarpur. At present it is 250 MW, but land that has been identified has potential of 500 MW capacity.
 - (iii) Provide the time frame of the development of solar parks in Madhya Pradesh along with the details of location.
- 7.3. Subsequently, a meeting held in CEA 21.03.16 with MPPTCL & PGCIL to further deliberate on the transmission system for solar parks in MP. Based on MPPTCL inputs regarding RE generation capacity as well as transmission strengthening(s) proposals, location of the proposed solar parks and deliberations amongst CEA/MPPTCL/POWERGRID, studies (**Annexure – 7 including the Exhibits I**

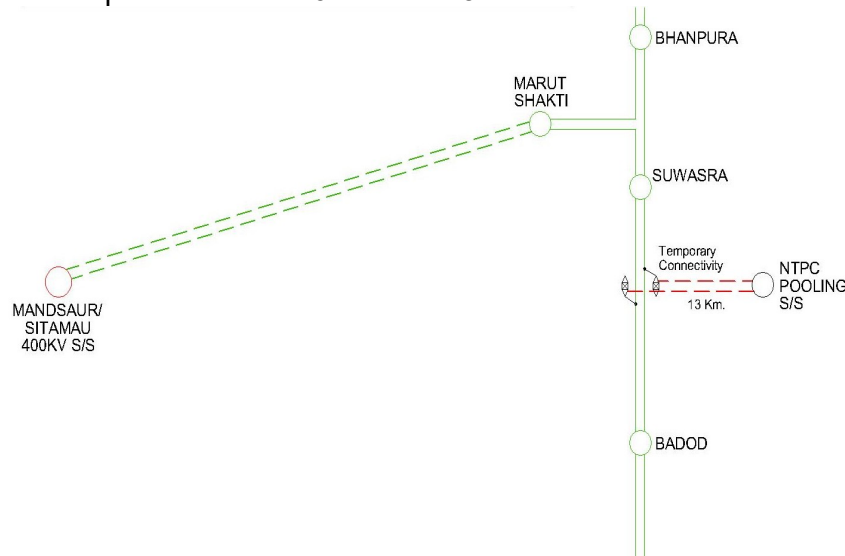
to IV) have been carried out with solar maximized scenario (installed capacity of the solar park) in the timeframe of 2018-19 and following schemes is proposed for envisaged MP solar power parks (2250 MW):

A. Scheme for Suwasara, distt Mandsaur Solar Park (250 MW)

1. Suwasara (250 MW) solar park is being established in distt. Mandsaur, MP by M/s NTPC. Under GEC Phase-I, MPPTCL had taken up activities for implementation of 400 kV Sitamau S/s in that area, which shall be connected to 400 kV Nagda substation. However, considering time schedule of 400/220kV Sitamau S/s (2018-19) and short gestation period of Suwasara Solar park (Mar 2017), an interim connectivity scheme is proposed:

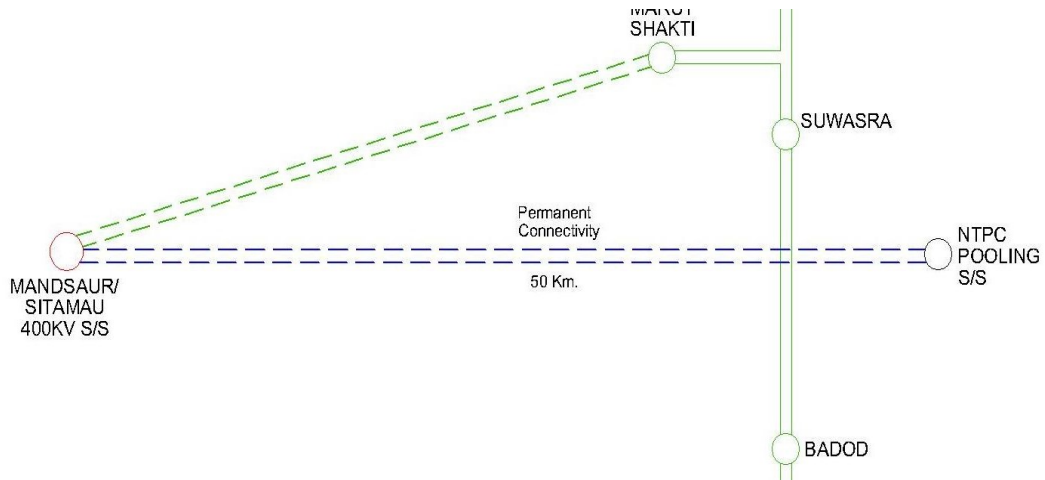
Interim transmission connectivity for Suwasara solar park -

- (i) 220kV D/c line from Solar Park Pooling station to crossing point of Bhanpura- Badod 220kV line –13 km



Final transmission connectivity for Suwasara solar park -

- (i) Extension of 220kV D/c line from Crossing point of Bhanpura- Badod 220kV line upto Sitamau (Mandsaur) S/s – 37 km
- (ii) Associated 220kV line bays for solar park interconnection



Scope of development of connectivity transmission upto STU S/s is to be developed by SPPD i.e. RUMS.

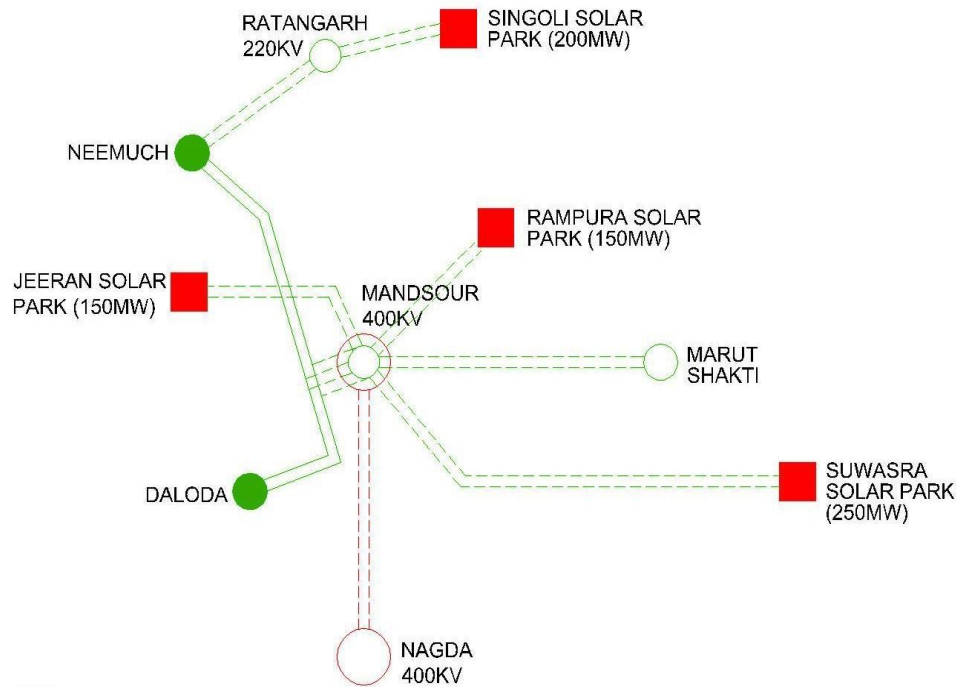
2. Study Results with proposed transmission system is enclosed at **Exhibit-I**. From the studies it is observed that with above injection, line loadings are within limits in normal as well as contingency scenario.

Note- Establishment of 400/220kV Substation at Sitamau (Mandsaur) and 400kV Mandsaur - Nagda D/c line (100km), already under implementation by MPPTCL under Green Energy Corridor Phase-I as an Intra State Scheme

B. Scheme for Neemuch Solar Park (500 MW)

1. As per the information provided by the RUMS/MPPTCL, Neemuch Solar Park comprises of three solar parks viz. Rampura Solar Park (150 MW), Singoli Solar Park (200 MW) and Jeeran Solar Park (150 MW). MPPTCL has already planned a 220 kV Ratangarh Pooling station & 400/220kV Sitamau S/s in that area under GEC Phase-I scheme. Therefore, to provide Connectivity of above solar parks, following connectivity system is proposed, which needs to be developed by M/s RUMS, the Solar Power Park Developer (SPPD)-

- (i) Rampura SP – Sitamau (Mandsaur) S/s 220 kV D/c Line –60 km
- (ii) Jeeran SP - Sitamau (Mandsaur) S/s 220 kV D/c Line – 60 km
- (iii) Singoli SP – Ratangarh 220 kV D/c Line – 30 km



In case of ROW issues in line termination to Sitamau S/s, a 220kV switching station with high capacity interconnection to 220kV Sitamau may also be considered as a second alternative. This would require establishment of a 220kV pooling station.

Further to evacuate /transfer of power following intra state transmission system strengthening is proposed for above three solar parks in Neemuch -

- (i) Establishment of 1x500 MVA (3rd), 400/220 kV transformer at Sitamau (Mandsaur) PS
2. Study Results with proposed transmission system is enclosed at **Exhibit-I**. From the studies it is observed that with above injection, line loadings are within limits in normal as well as contingency scenario.

C. Scheme for Agar SP (250 MW), Rajgarh SP (250 MW) & Shajapur SP (250 MW)

1. As informed by M/s RUMS, other Solar parks (750 MW) are envisaged in Agar (250 MW), Rajgarh (250 MW) and Shajapur (250 MW) complex. Details of Solar parks are as under:
 - (i) Agar Solar Park (250 MW) comprises two solar parks i.e. Agar Solar Park (125 MW) and Susner Solar Park (125 MW).
 - (ii) Rajgarh Solar Park (250 MW) also comprises of two solar parks viz. Jeerapur Solar Park (125 MW) and Khilchipur Solar Park (125 MW).
 - (iii) Shajapur Solar Park comprises of one Solar Park being established at Moman Badodiya (250 MW).

For pooling of power from above solar parks, establishment of a new 400/220kV pooling station at Jeerapur (contiguous to solar park) is

proposed to be established through LILO of both circuits of 400 kV RAPP-Shujalpur D/c Line.

2. The following connectivity transmission systems for all above solar parks upto Jeerapur Pooling station, shall be developed by the SPPD, as under-

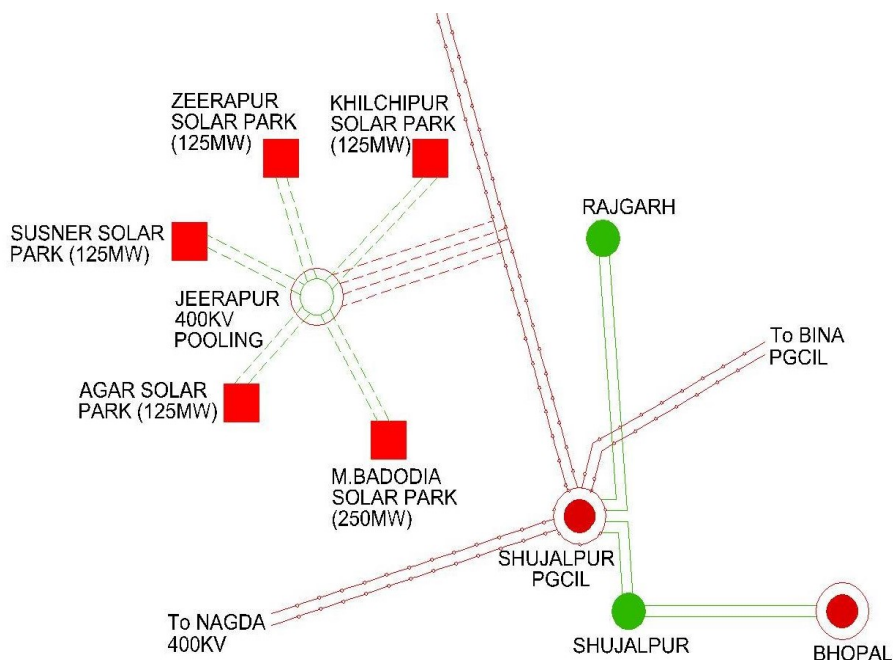
- (i) Agar SP – Jeerapur Pooling station 220 kV D/c Line – 35 km
- (ii) Susner SP – Jeerapur Pooling station 220 kV D/c Line – 20 km
- (iii) Jeerapur SP – Jeerapur Pooling station 220 kV D/c Line
- (iv) Khilchipur SP– Jeerapur Pooling station 220 kV D/c Line – 20 km
- (v) Moman Badodiya SP – Jeerapur Pooling station 220 kV D/c Line – 45 km*

**Moman Badodiya SP may also be terminated directly at 220kV Shujalpur (PG) as a second alternative, which have similar order of line length: 45-50 km*

3. The following inter-state transmission system is proposed for transfer of power from Agar (250 MW), Shajapur (250 MW) & Rajgarh (250 MW) solar parks-

- (i) Establishment of 3x500 MVA, 400/220 kV Pooling station at/near Jeerapur**
- (ii) LILO of RAPP –Shujalpur 400 kV both ckts at Jeerapur Pooling station
- (iii) 1X125 Mvar, 420 kV Bus Reactor at Jeerapur Pooling station
- (iv) 220kV line bays (10 nos) for solar park interconnections

***SPPD to provide land contiguous to Jeerapur solar park for establishment of 400/220kV Jeerapur Pooling Station*



4. Study Results with proposed transmission system is enclosed at **Exhibit-II (a) & II (b)**. From the studies it is observed that with above injection, major line loadings are within limits in normal as well as contingency scenario.

However, in case of contingency of 220kV Shujalpur-Shujalpur (MP) one line, loading on other circuit in 298 MW, which is critical. This would require second Shujalpur-Shujalpur (MP) 220 kV D/C line or another 220kV outlet from Shujalpur (PG) towards Ashta/other load center to be implemented by the STU, which relieves the loading level (**Exhibit-II (b)**).

D. Scheme for Chattarpur Solar Park (500 MW)

1. Chattarpur Solar Park is proposed to be established at Bijawar in distt. Chattarpur. As per the information made available by MoP/MNRE the capacity of the solar park is 250 MW. However, Madhya Pradesh in the meeting held on 02.02.2016 in CEA, had informed the land identified for the solar park has potential of installation of solar park of 500 MW capacity. Therefore, for transmission evacuation purpose the capacity at Chattarpur solar park has been considered as 500 MW.

For pooling of power from above solar park, establishment of a new 400/220kV pooling station at Bijawar (contiguous to solar park) is proposed to be established through LILO of Satna-Bina 400 kV D/C line.

2. In the 39th SCM of WR/ 22nd LTA meeting of WR held on 30.11.2015, during the discussion on Transmission system for Barethi TPS, MPPTCL has stated that Barethi TPS was located in Bundelkhand area and MP is beneficiary of the project, therefore a new 400/220 kV substation may be planned to cater to power dispersal needs in the Chhatarpur / Khajuraho area. Further, MPPTCL vide letter dated 12.02.2016 suggested creation of 400kV substation at Chhatarpur associated with Barethi TPS, which shall be able to cater the load of around 400-500MW of this area. The loads in this area at present is being catered through Tikamgarh (getting feed from Damoh) and Chhatrapur (getting feed from Satna) 220 kV substations.
3. At present, the implementation time schedule of Chhatarpur solar park as well as the Barethi TPS is not certain. However, establishment of Bijawar 400/220 kV as system strengthening scheme would serve the purpose of evacuation of power from solar park as well cater to power dispersal requirements in Chhatarpur area.
4. Accordingly, the following transmission system strengthening is proposed as Inter-State Transmission System for transfer of power from Bijawar (500 MW) solar park as power dispersal requirements of Chhatarpur area.

Inter State Transmission system strengthening in Chhatarpur area in Madhya Pradesh:

- (i) Establishment of 2x500 MVA, 400/220 kV Pooling station at Bijawar*
- (ii) LILO of Satna – Bina 400kV (1st) D/c line at Bijawar. *(there are four 400kV circuits between Satna and Bina out of which one is proposed to be LILoed at Sagar (MPPTCL) Substation. This LILO is on one D/c out of the above three remaining 400kV circuits between Satna and Bina).*
- (iii) 1X125 Mvar, 420 kV Bus Reactor at Bijawar pooling station.
- (iv) 4 nos. 220kV line bays for termination of LILO of both ckts of Tikamgarh - Chatarpur 220 kV D/c line.
- (v) 4 nos. of 220kV line bays for solar park interconnections

*SPPD shall provide land contiguous to solar park for establishment of 400/220kV Bijawar Pooling Station

The connectivity transmission system upto Bijawar Pooling station at Chhatarpur solar park, to be developed by the SPPD.

5. For power dispersal from 400/220 kV Bijawar Pooling station, the following works as a part intra-state transmission system needs to be implemented by MPPTCL:

Intra State Transmission system strengthening in Chhatarpur area in Madhya Pradesh

- (i) 2nd circuit stringing of 220kV Tikamgarh – Chhatarpur line.
- (ii) LILO of Tikamgarh - Chhatarpur 220 kV D/c line (both circuits) at Bijawar PS (60 km)

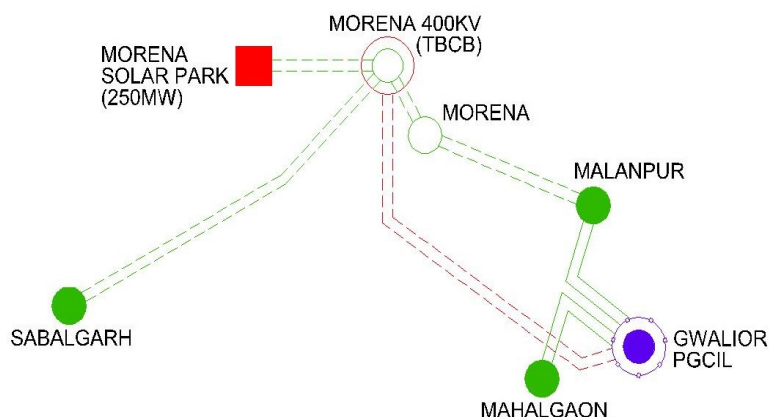
Study Results with proposed transmission system is enclosed at **Exhibit-III**. From the studies it is observed that line loadings are within limits in normal as well as contingency scenario.

E. Scheme for Morena Solar Park (250 MW)

To evacuate power from Morena solar park, studies have been carried out with following connectivity alternatives:

Alternative-I

- (i) 220kV Morena SP - Morena S/s (ISTS) D/c-35 km



Study Results with proposed transmission system is enclosed at **Exhibit-IVa**. From the studies, it is observed that loading on 220kV Morena (ISTS) – Morena (MP) line is critically loaded in n-1 contingency scenario (282 MW).

Alternative-II

- (i) 220kV Morena SP - Morena S/s (MPPTCL) D/c line -22 km

Study Results with proposed transmission system is enclosed at **Exhibit-IVb**. From the studies it is observed that line loadings are within limits in normal as well as contingency scenario.

Based on above, Alternative-II is proposed as evacuation system for Morena Solar park (250 MW).

The Connectivity transmission systems at Morena solar park upto 220kV Morena (MPPTCL) S/s, shall be developed by the SPPD.

7.4. Summary of the proposed transmission system of MP Solar Parks (2250 MW) is given in below-

S. No.	Solar Park	Capacity (MW)	Proposed Transmission System
1	Suwasara Distt Mandsaur	250	<p><u>Intra-State Scheme</u></p> <p>Connectivity System</p> <ul style="list-style-type: none"> • Extension of 220kV D/c line from crossing point of Bhanpura- Badod 220kV line upto Sitamau(Mandsaur) • Associated 220kV line bays <p>Interim Arrangement</p> <p>(ii) 220kV D/c line from Solar Park Pooling station to crossing point of Bhanpura- Badod 220kV line</p>
2	Neemuch	500	<p><u>Intra-State Scheme</u></p> <ul style="list-style-type: none"> • Establishment of 1x500 MVA (3rd), 400/220 kV transformer at Sitamau (Mandsaur) PS <p>Connectivity System - SPPD Scope</p> <ul style="list-style-type: none"> • Rampura SP – Sitamau (Mandsaur) 220 kV D/c • Jeeran SP - Sitamau (Mandsaur) 220 kV D/c • Singoli SP – Ratangarh 220 kV D/c
3	Agar, Rajgarh and Shajapur	750	<p><u>Inter-state transmission system</u></p> <ul style="list-style-type: none"> • Establishment of 3x500 MVA, 400/220 kV Pooling station at/near Jeerapur • LILO of both circuits of RAPP –Shujalpur 400 kV D/c at Jeerapur Pooling station • 1X125 Mvar, 420 kV Bus Reactor at Jeerapur Pooling station • 220kV line bays (10 nos) for solar park interconnections <p>Connectivity System – SPPD scope</p> <ul style="list-style-type: none"> • Agar SP – Jeerapur Pooling station 220 kV D/c • Susner SP – Jeerapur Pooling station 220 kV D/c • Jeerapur SP – Jeerapur Pooling station 220 kV D/c • Khilchipur SP– Jeerapur Pooling station 220 kV D/c • Moman Badodiya SP – Jeerapur Pooling station 220 kV D/c

4	Chattarpur	500	<p><u>Inter-state transmission system</u></p> <ul style="list-style-type: none"> • Establishment of 2x500 MVA, 400/220 kV Pooling station at Bijawar* • LILO of Satna – Bina 400kV (1st) D/c line at Bijawar. (there are four 400kV circuits between Satna and Bina out of which one is proposed to be LILOed at Sagar (MPPTCL) Substation. This LILO is on one D/c out of the above three remaining 400kV circuits between Satna and Bina). • 1X125 Mvar, 420 kV Bus Reactor at Bijawar pooling station. • 4 nos. 220kV line bays for termination of LILO of both ckts of Tikamgarh - Chattarpur 220 kV D/c line. • 4 nos. of 220kV line bays for solar park interconnections
5	Morena	250	<p><u>Intra-State Scheme</u></p> <p>Connectivity System – SPPD Scope (ii) 220kV Morena SP - Morena S/s (MPPTCL) D/c line</p>

7.5. In line with the CERC regulatory requirement, M/s RUMS needs to obtain authorization from MNRE as a Solar Power Park Developer (SPPD) for above solar power parks, to apply for Connectivity/LTA for Solar Parks to be connected in inter-state. MNRE shall also authorize SPPD to undertake infrastructural activities including arrangement for connectivity on behalf of the solar power generators in the park.

7.6. As on date no connectivity / LTA applications have been received for the above solar park. Govt. of Madhya Pradesh/ M/s RUMS needs to provide the time frame of the development of solar parks in Madhya Pradesh. The above transmission scheme has been evolved based on the information made available by MNRE, MPPTCL and Govt. of Madhya Pradesh.

Members may deliberate.

8. Provision of 3rd 315MVA 400/220kV ICT at Satna Substation as an interim arrangement

8.1. In the 38th Standing Committee meeting on power system planning in WR held on 17th July, 2015 installation of additional transformer (3rd) 500 MVA, 400/220kV ICT at Satna (PGCIL) S/s with provision of 2 Nos. 220kV feeder was agreed to maintain the reliability of supply in Satna area. The existing transformation capacity available at Satna Substation is 400/220kV, 2x315MVA.

8.2. The above scheme is being implemented by POWERGRID as a part of Western Region System Strengthening Scheme – XVI. The prior approval of the Government under section 68 has been issued by CEA vide their letter dated 06.04.2016.

8.3. On the request of MPPTCL, POWERGRID had devised contingency scheme for putting 315MVA Spare ICT in parallel to the existing 315MVA ICT # 2 at POWERGRID Satna substation as a contingency arrangement to take care of

the heavy loading in existing ICTs till the commissioning of new 3rd ICT. The scheme is as given below:

- Installation of 3rd 315MVA, 400/220kV ICT in parallel with existing 315MVA 400/220kV ICT under contingency plan at Satna S/s.

The 315MVA 400/220kV ICT shall be arranged from regional spare (proposed to be diverted from CGL, Mumbai works).

- 8.4. The proposal has been already been discussed and agreed in the 31st meeting of WRPC held on 31 March, 2016.
- 8.5. POWERGRID may present the details of the interim arrangement and furnish the implementation schedule of the interim arrangement as well as the 500 MVA 400/220 kV ICT at Satna.

Members may discuss and concur.

9. **2nd ICT at Bina (PG) 400/220 kV substation.**

- 9.1. In the 39th SCM of WR, POWERGRID had informed that at Bina (PG) 400/220 kV substation there was only 1X315 MVA ICT and to meet n-1 criteria, 2nd ICT was required but there was no space available for installation of additional ICT. In the meeting it was decided that the effect of outage of 1X315 MVA ICT at Bina (PG) on 220 kV lines emanating from Bina (MPPTCL) needs to be studied to ascertain the requirement of additional ICT at Bina (PG).
- 9.2. MPPTCL has already planned 4th 315 MVA ICT at Bina (MPPTCL) 400/22 kV substation. The studies considering the 4th ICT at Bina (MPPTCL) is enclosed at **Annexure-8**. The studies show there is no overloading on the 400/220 ICTs and 220 kV lines in case of outage 315 MVA ICT at Bina (PG) 400/220 kV substation.
- 9.3. MPPTCL may confirm the loadings observed in the studies and in view of the space constraint at Bina (PG), implementation of 2nd ICT may not be taken up.
- 9.4. Members may deliberate.
10. **Connectivity of 2x 660 MW Generation Project of M/s Lanco Vidarbha Thermal Power Ltd. (M/s LVTPL).**

- 10.1. 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. In the 21st Meeting of WR constituents regarding Connectivity / Open Access Applications held on 17.07.2015, the connectivity arrangement agreed earlier (i.e., LILO of Seoni - Wardha 765 kV S/C line at LVTPL TPS) for LVTPL was revised as below:

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

In the meeting, M/s LVTPL 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.

- 10.2. 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 765kV S/c line at LVTPPL TPS and subsequently a meeting was held in CEA on 2.9.2015 to discuss the connectivity issue. 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 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 LVTPPL to pay the transmission charges.
 - c. M/s LVTPL need to sign connectivity agreement and submit requisite bank guarantee.
- 10.3. In the 39th SCM of WR the issue was deliberated and it was agreed that connectivity to M/s LVTPPL may be granted through LVTPPL TPS Switchyard – Warora Pool 765kV D/c line. M/s LVTPPL would be required to sign requisite agreements for taking up the transmission scheme under Tariff Based Competitive Bidding route.
- 10.4. The revised intimation for grant of connectivity was issued by CTU to M/s LVTPL vide their letter dated 27.01.2016. M/s LVTPL vide their letter dated 15.02.2016 had conveyed their acceptance of permanent connectivity through LVTPL Switchyard – Warora 765 D/C line and its implementation through TBCB. But for the purpose of start-up and commissioning activities, M/s LVTPL had requested to permit the completion of earlier agreed connectivity (i.e. LILO of Seoni – Wardha 765 kV S/C at LVTPL) as an interim arrangement as the start power requirement for the project was June 2017. On request of M/s LVTPL a meeting was held in CEA on 18.03.2016 (minutes enclosed as **Annexure-9**), wherein the following was agreed:
- (i) The connectivity line (LVTPL Switchyard – Warora 765 D/C line) for M/s LVTPL would be put as agenda in the next Empowered Committee meeting, after signing of the transmission agreement (FORMAT CON 8) and submission of requisite bank guarantee by M/s LVTPL, for its implementation through tariff based competitive bidding route.
 - (ii) Considering the fact that the award of the scheme through bidding process by the BPC would be possible by December 2016, the implementation of the scheme in the time frame of June 2017 (startup power requirement as intimated by M/s LVTPL) would be difficult. In that case, interim arrangement for providing startup power and commissioning activities may be required for the project.
 - (iii) The requirement of the interim arrangement viz. LILO of Seoni – Wardha 765 kV S/C at LVTPL would be assessed after confirmation of firm schedule/requirement of start-up power by M/s LVTPL and commitment of payment of transmission charges of the connectivity line from its completion till the COD of the generation project. If the need is felt for the interim arrangement, the same may be implemented by M/s LVTPL separately,

which shall be bypassed/ dismantled after completion of the connectivity line (LVTPL Switchyard – Warora 765 D/C line). The requirement of the interim arrangement, scope and its implementation needs to be approved by the WR constituents in the SCM/LTA meeting of WR.

- 10.5. M/s LVTPL has already signed the Transmission Agreement with POWERGRID on 31.03.2016, Transmission Service Agreement with POWERGRID on 19.04.2016 and would be furnishing the Bank Guarantee in May 2016. As per the agreements, the generating units are scheduled to be commissioned by December 2017. Therefore, the startup power requirement would be by June 2017. Considering the fact that the award of the scheme (connectivity line - LVTPL Switchyard – Warora 765 D/C line) through tariff based competitive bidding process by the BPC would take substantial time and its implementation would not be possibly by June 2017 (for providing start power). Therefore, an interim arrangement for provision of startup power is required for the generation project. The following connectivity system is proposed:

Connectivity system for M/s LVTPL 1320 MW plant at Vidarbha

- (i) LVTPL TPS Switchyard – Warora Pool 765kV D/c line (ISTS line to be implemented through Tariff Base Competitive Bidding route) – already agreed by WR constituents.

Interim arrangement (to be implemented through M/s LVTPL)

- (i) LILO of Seoni - Wardha 765 kV S/C line at LVTPL TPS (Interim arrangement to be implemented by M/s LVTPL which shall be bypassed/ dismantled after completion of the connectivity line)

- 10.6. Members may deliberate.

11. Operational feedback by NLDC for the quarter October 2015 to December 2015

- 11.1. The operational feedback by NLDC on Transmission constraints in Western Region for the quarter October 2015 to December 2015 is summarized below :

Transmission Line Constraints

Sl. No	Corridor	Constraint	Deliberation in the 39 th SCM
1.	<p>Constraints in 400 kV Khandwa – Dhule - Bableshwar-Padghe corridor</p> <p>Antecedent Conditions With high Maharashtra Demand of the order of 18500-20000 during morning peak and no generation at Parli, low generation at</p>	400 kV Khandwa-Dhule - Bableshwar- Padghe corridors carrying more than 500 MW in each ckt. The corridor is N-1 non-compliant.	<p>Constraint observed when Maharashtra demand is high. 400 kV Tapthithanda-Bableswar 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 Bableshwar- Padghe D/C which is generally loaded above 550 MW each.</p> <p>Commissioning of 400 kV Bableshwar-Kudus D/C and Kudus Sub-station to be expedited by MSETCL.</p> <p>39th SCM Discussion: MSETCL-</p>

Sl. No	Corridor	Constraint	Deliberation in the 39 th SCM
	RGPPL, Jaigad and SSP.		<p>Forest Clearance (FC) still awaited (for about 120 locations) involved in the Bableshwar – Kudus 400 kV line. Expected completion time is six months after obtaining FC. Kudus substation expected by June 2016.</p> <p>MSETCL to furnish the status of implementation.</p>
2	<p>765/400 kV ICT at Tirora and 765/400 kV ICT at Akola II</p> <p>Antecedent Conditions When generation at Tirora is 1800-2400 MW.</p>	<p>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.</p>	<p>Single ICT at Tirora 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 APML and MEGPTCL.</p> <p>39th SCM Discussion: MSETCL-2nd ICT at Tiroda and Akola-II already planned.</p> <p>MSETCL to furnish the implementation schedule of 2nd ICTs.</p>
3	<p>Transmission system for Koradi 2 Generation</p>	<p>3 X 660 MW Generation is coming at Koradi 2 station, however transmission line for evacuation at present are LILO of 400 kV Wardha-Warora one ckt (interim arrangement as per SCM) and 765/400 kV Koradi2 ICT which will feed eventually into Akola2 ICT through 765 kV Koradi2-Akola2 D/C line.</p> <p>The present system will result in overloading of 400 kV Koradi2-Warora and 400 kV Koradi2-Wardha circuit. In case of Contingency of 400 kV Wardha-Koadri2 line, power will further increase on the 765 kV Koradi3-Akola2 D/C which is already N-1 non-compliant at present due to single 765/400 kV ICT at Akola2 and Tirora2.</p>	<p>The constraint is expected in near future.</p> <p>The Evacuation plan for 5 X 660 MW Tirora, 5 X 270 MW Rattan India, 2 X 500 MW Chandrapur2, 2 X 270 IEPL, 1 X 300 MW Dhariwal need to be studied by the STU in order to check whether the existing plan and available network will provide secure evacuation under various contingency during N-1 criteria.</p> <p>39th SCM Discussion: MSETCL-765/400 kV Ektuni substation expected to be commissioned by March 2016. 2nd ICT at Tiroda and Akola-II already planned.</p> <p>MSETCL to furnish the status of Ektuni and implementation schedule of 2nd ICTs.</p>

ICT Constraints

Sl. No	ICT	Constraint	Description of the constraints
1.	2 x 315 +1 x 500 MVA Bableswar ICTs Antecedent Conditions With Maharashtra demand above 18500 MW	It is observed that the Bableswar 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 Bableswar-Padghe D/c. 39th SCM Discussion: MSETCL- Some loads presently fed from Bableswar to be shifted to Lonikhand I/II to reduce ICT loading on Bableswar. For provision of new 1X500 MVA, 400/220 ICT at Bableswar tendering is under progress. MSETCL to furnish the status
2.	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	39th SCM Discussion: MSETCL- Additional ICT at Chakan under approval. MSETCL to furnish the status
3.	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.	39th SCM Discussion: MSETCL- Loads from Lonikhand I to be shifted to Lonikhand II to relieve loading on Lonikhand I. MSETCL to furnish the status
4.	3 X 315 MVA + 600 MVA Padghe ICTs Antecedent Conditions Maharashtra meeting high demand of above 18500 MW	It is observed that the Padghe ICTs are fully loaded and system is N-1 non-compliant. MSETCL has implemented load trimming scheme to take care of overloading.	These ICTs are heavily loaded with the increase in Maharashtra demand. 39th SCM Discussion: MSETCL- Kudus 400/220 kV substation is expected to be commissioned by June 2016. Also shifting of 1X315 MVA, 400/220 kV ICT from Warora (MSETCL) to Phadge has been planned. MSETCL to furnish the status

Sl. No	ICT	Constraint	Description of the constraints
5.	<p>2 x 315 +1 x 500 MVA Parli ICTs</p> <p>Antecedent Conditions Madhya Pradesh meeting high demand of above 9000 MW</p>	It is observed that loading on these ICTs are N-1 non-compliant	<p>Nanded Sub-station with its 400/220 kV ICTs and 220 kV lines to be commissioned on priority to shift load from Parli ICTs.</p> <p>In the 38th SCM, Installation of 2x500MVA, 400/220kV ICTs at Parli (PG) switching station along with provision of eight nos. of 220 kV bays was agreed.</p> <p>POWERGRID and MSETCL to furnish the status of implementation of ICTs and 220 kV outlets respectively.</p>
6.	<p>2 X 315 MVA Satna ICT</p> <p>Antecedent Conditions Madhya Pradesh meeting high demand of above 9000 MW</p>	It is observed that the loading on ICTs at Satna (2x315MVA) are above 200 MW and additional ICT has to be proposed.	<p>Discussed in 38th SCM of WR .500 MVA, 400/220kV ICT at Satna (PGCIL) S/s with provision of 2 Nos. 220kV bays approved.</p> <p>POWERGRID to furnish status of implementation.</p>
7.	<p>3 X 315 MVA Bhopal ICTs</p> <p>Antecedent Conditions Madhya Pradesh meeting high demand of above 9000 MW</p>	It is observed that the loading on ICTs at Bhopal (3x315MVA) are above 200 MW and additional ICT has to be proposed	<p>1X315 MVA, 400/220 kV ICT (4th) at Bhopal is under implementation by MPPTCL and was expected to be completed by December 2015.</p> <p>MPPTCL to furnish the status of implementation.</p>
8.	<p>2 X 315 MVA ICTs at Sujalpur</p> <p>Antecedent Conditions Madhya Pradesh meeting high demand of above 9000 MW</p>	It is observed that the loading on ICTs at Sujalpur (2 x 315 MVA) are above 200 MW and additional ICT has to be proposed	MPPTCL may comment on the ICT loading at Shujalpur.

Sl. No	ICT	Constraint	Description of the constraints
9	315 MVA Itarsi ICT Antecedent Conditions Gujarat meeting high demand and generation at Wanakbori being low.	Single ICT with loading above 200 MW for more than 20 % of the time.	1X500 MVA 400/220 kV ICT along with two nos. of 220 kV bays at Itarsi (PG) approved in 37 th SCM of WR. POWERGRID to furnish status of implementation
10.	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	39th SCM Discussion: One 1x500MVA, 400/220kV additional ICT approved. POWERGRID to furnish implementation schedule.
11.	2 X 315 MVA ICTs at Bhachau Antecedent Conditions Gujarat meeting high demand	It is observed that the loading on ICTs at Bhachau (2 x 315 MVA) are above 190 MW and additional ICT has to be proposed	39th SCM Discussion: Loading on Bachau ICTs expected to be reduced after commissioning of on-going and planned transmission schemes in the 2018-19 timeframe.

11.2. **Nodes Experiencing High Voltage:** 400 kV Nodes Bhadrawati, Lonikhand, Koradi, Karad, Kolhapur, Nagothane, GPEC, Korba West, RGPPL, Birsinghpur, Katni, Dhule, SSP, Wanakbori and 765 kV Nodes -Wardha, Aurangabad, Dharamjaigad, Durg, Champa, Raigarh Tamnar PS, Vadodara, Jabalpur PS, Solapur

11.3. NLDC may make presentation on the above issues.

Members may deliberate

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

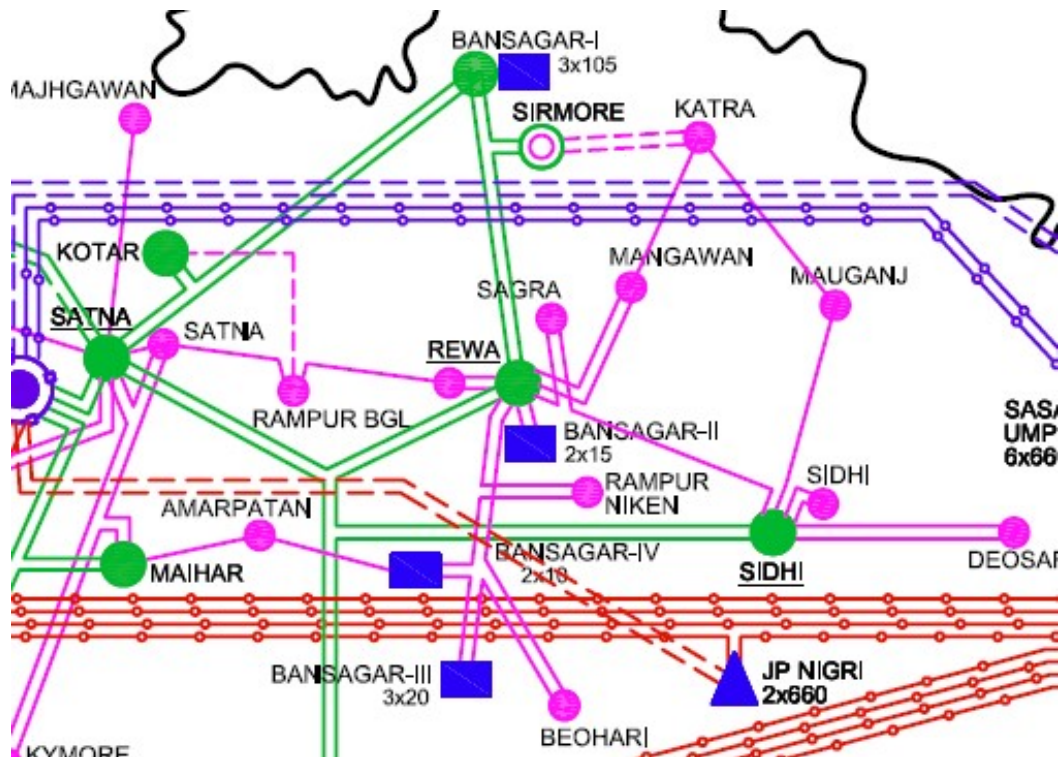
12.1. The following transmission system has been agreed by WR constituents for 750 MW Rewa Ultra Mega Solar Project (RUMSP) in Madhya Pradesh:

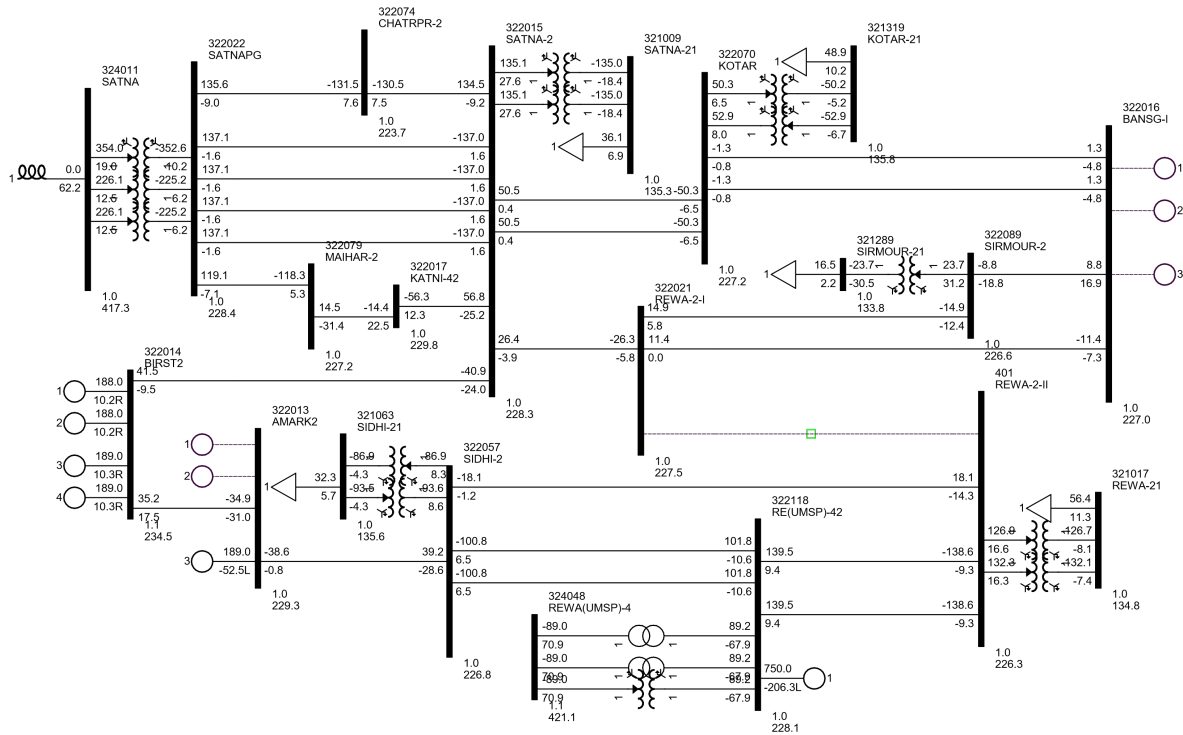
- (i) Establishment of 400/220kV, 3x500 MVA Pooling station at Rewa.
- (ii) LILO of Vindhyachal – Jabalpur 400kV 2nd D/c line (circuit-3&4) at Rewa Pooling Station – 59KM (2x27=54KM D/c portion + 5KM M/c portion).
- (iii) 1x125 MVA bus reactor at Rewa Pooling Station

(iv) 6 Nos. 220kV Line bays at Rewa Pooling station (for its interconnection with solar park)

12.2. In the 39th SCM of WR, MPPTCL has requested for provision of 4nos. of 220kV feeder bays at the proposed 400/220kV Rewa pooling station as intra state strengthening scheme for termination of two nos. of 220 kV D/C lines (one to Rewa and other to Sidhi 220 kV substation) to feed loads of Rewa and Sidhi area. The proposal was agreed with MPPTCL making the necessary arrangements at Rewa (existing) 220 kV substation (load segregation or radialisation) to restrict the loading on the proposed Rewa PS- Rewa 220 kV D/C line. The provision of 220 kV bus sectionaliser at Rewa PS was also agreed to take care of overloading on the proposed 220 kV lines. Further it was decided that the necessary switching arrangements/sequence for controlling the 220 kV lines overloading, if any, would be worked out by CEA, CTU, POSOCO and MPPTCL.

12.3. MPPTCL vide their letter dated 12.02.2016 has stated that Rewa 400/220 kV pooling station is being constructed with double main and transfer bus scheme, therefore any of the feeder or transformer can be connected on both bus separately and there shall not be any requirement of separate sectionaliser at this substation. Further to reduce the overloading on Rewa 400/220 – Rewa 220 kV D/C line, MPPTCL has proposed 220 kV bus splitting existing Rewa 220 kV substation. With bus splitting, the load of Rewa 220 kV substation would be fed from the supply received from Rewa UMSP and other loads being fed from Rewa 220 kV substation in this area would be fed from the supply received from Satna 220 kV substation. They would also resort to opening of 132kV lines such as Bansagar – Amarpatan 132kV S/c and Rewa 1 – Rampur BG 132kV S/c lines in case of any overloading. With the above measures in place, loading on Rewa (MPPTCL) – Rewa Pool 220kV D/c line falls to about 90MW/ckt with Bansagar Hydro support and about 140MW/ckt without Bansagar Hydro support





12.4. In view of the above, provision of bus sectionalisation at 220kV level of Rewa Pool substation may not be required as MPPTCL had planned to take measures such as (Rewa (MPPTCL) bus splitting / 132kV feeder opening) to control loading on Rewa (MPPTCL) - Rewa Pool 220kV D/c line. MPPTCL may intimate the implementation schedule. Members may deliberate.

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

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

13.2. In 39th SCM of WR, CSPTCL had confirmed that the two no. of unutilized 220 kV bays at Raipur (PG) would be used for termination of 220 kV D/C line from DOMA which was likely to be implemented in 9 months' time. Regarding implementation LILO of Khademara – Borjhara S/c line at Raipur (PG), CSPTCL had informed that they were facing RoW problems in its implementation. In the meeting CSPTCL was advised to explore the option of laying cables for implementation of LILO of Khademara – Borjhara S/c line at Raipur (PG).

13.3. CSPTCL may furnish the status.

14. Measures to control High fault levels observed in Korba STPS (3x200MW + 4x500MW)

14.1. NLDC in their operational feedback report for the quarter July to September 2015 has reported large fault current of 45 kA at Korba STPS switchyard end for a Y phase to earth fault occurred on Korba STPS - Raipur 400kV line 3. As per their offline studies, NLDC has reported a 3-phase fault current of 53 kA. Such high fault currents are detrimental to switchyard equipment which may leads to the failures of CT connectors, isolator contacts, etc. during faults.

14.2. In the 39th SCM of WR, the issue of high fault level in Vindhyachal generation complex was discussed. In the meeting it was agreed that few interconnections with Vindhyachal generation complex (as given below), which has already been agreed in previous SCMs of WR, needs to be normally kept in open condition to contain the high fault levels:

- (i) LILO of Vindhyachal STPS – Jabalpur 400kV S/c line at Sasan UMPP has been agreed to be delinked at Sasan UMPP in order to reduce SC levels in Sasan UMPP and Vindhyachal STPS (agreed in 29th WR SCM held on 10.09.2009)
- (ii) Vindhyachal STPS I, II, III – Vindhyachal STPS IV, V interconnection was agreed as an interim arrangement till the commissioning of Vindhyachal STPS IV Transmission System (agreed in the 33rd WR SCM held on 21.10.2011)

14.3. Even with opening of above interconnections in short circuit studies, no significant effect was found on fault levels at Korba STPS switchyard. Therefore, it was decided in the 39th meeting of Standing Committee in WR held on 30.11.2015 to carry out further studies for reducing fault level at Korba STPS switchyard. The revised fault level study results are tabulated below:

Sl. No.	Case Description	3-ph Fault Level (kA)		
		Korba STPS (314001)	Korba West (314003)	Sipat STPS (314008)
1	Korba STPS - Korba West (Normally Open)	43	18	40
2	Case 1 + Korba STPS - Sipat (Normally Open)	37	18	33
3	Case 1 + Korba STPS - Sipat STPS- Raipur (bypassing Sipat STPS) (217.77KM)	38	18	30
4	Korba West - Korba STPS - Sipat STPS (bypassing Korba STPS) (82.65KM)	37	24	39

5	Korba West - Korba STPS - Sipat STPS -Raipur (bypassing both Korba STPS & Sipat STPS) (231.77KM)	36	20	30
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From the above studies the option 3 is found to be the most suitable alternative amongst all studied options.

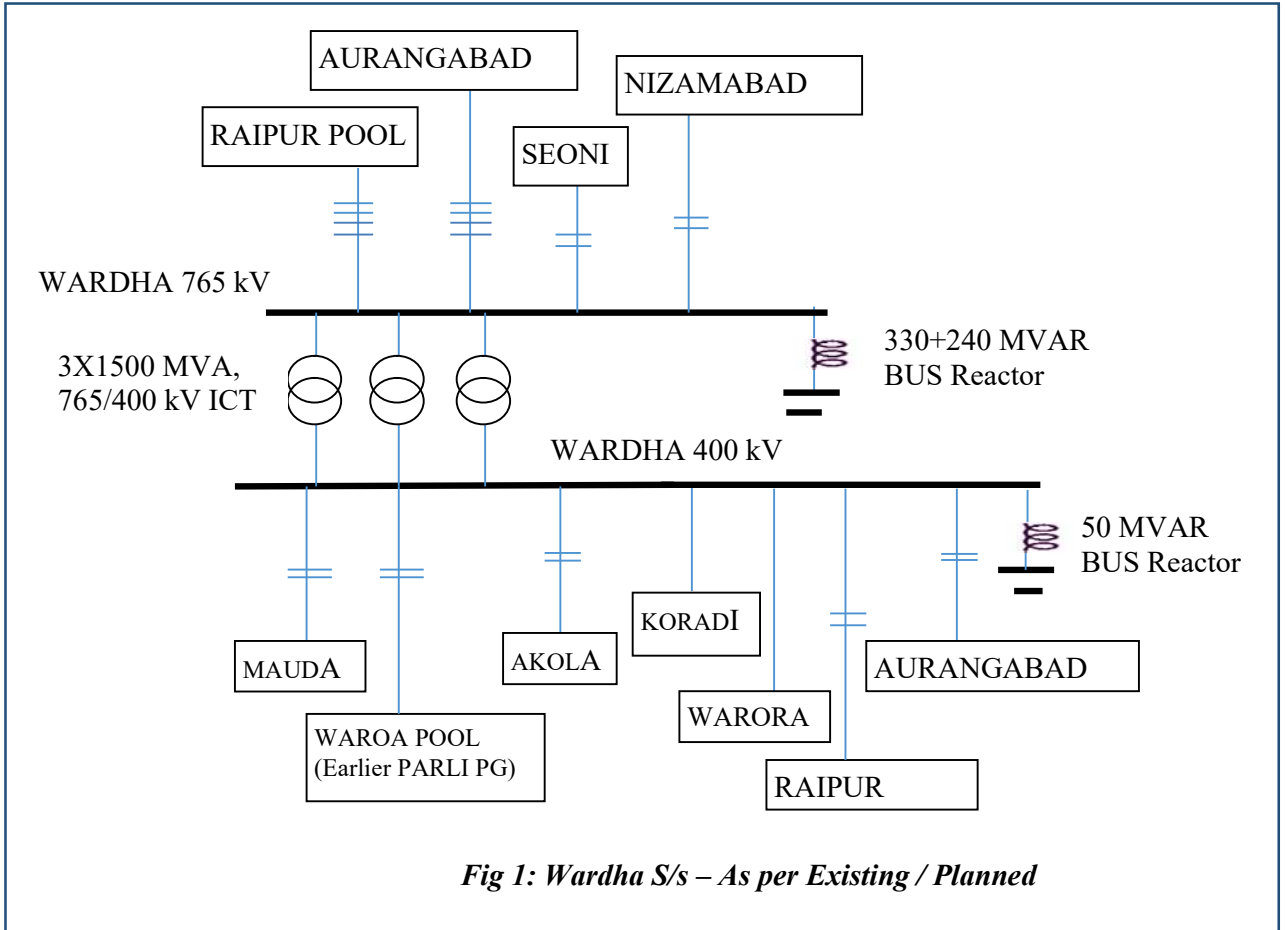
14.4. Members may deliberate and NLDC/ WRLDC may update the status of opening of the following elements in their respective switchyards:

- (i) LILO of one ckt of Vindhyachal STPS – Jabalpur 400kV D/c line at Sasan UMPP.
- (ii) Vindhyachal STPS I, II, III – Vindhyachal STPS IV, V 400kV interconnection

15. Measure to control fault level at Wardha Substation

15.1. The issue of high fault level at Wardha 765/400 kV has been under deliberation in the previous SCMs of WR discussed. The control measures such as bus splitting at Dharamjaygarh, Raigarh pool (Kotra) and Champa pool in Chhattisgarh and re-arrangement proposals (bypassing of Mauda-Wardha 400 kV D/C line and Koradi- Wardha 400 kV S/C line from Wardha and connecting to Warora pool and Warora respectively) could not contain the high fault levels at Wardha (PG). The fault level observed at Koradi I &II and Chandrapur I & II 400 kV substations of MSETCL are above design ratings. In the 39th SCM of WR it was decided that additional measures to contain the fault levels needs to be further studied by CEA, CTU and MSETCL and proposal would be put in the next SCM of WR.

15.2. The single line diagram of Wardha substation is as shown below:



System Study to control high SC fault level of Wardha S/s

Single Line Diagram of Wardha S/s is shown below.

15.3. The major SC Fault contributor at 400kV Wardhs S/s (90.7 kA):

- (i) 765/400 kV ICTs : 25 kA
- (ii) Koradi II – Wardha 400 kV (Quad) line : 20 kA
- (iii) Warora Pool - Wardha 400 kV D/C (Quad) line : 15 kA
- (iv) Warora – Wardha 400 kV SC/DC (Quad) line : 9 kA

As Symmetrical SC fault level of the Wardha 400kV substation is 90 kA therefore it become imperative to split the BUS into two sections, 400kV BUS Section A and BUS Section B. Further to maintain reliability and redundancy of Wardha 400 kV system along with lower fault level than designed limit of the substation, use of fault limiting reactor to join BUS Section A and BUS Section B at 400kV Wardha BUS along with rearrangement and disconnection of the Ckt./lines have become necessity.

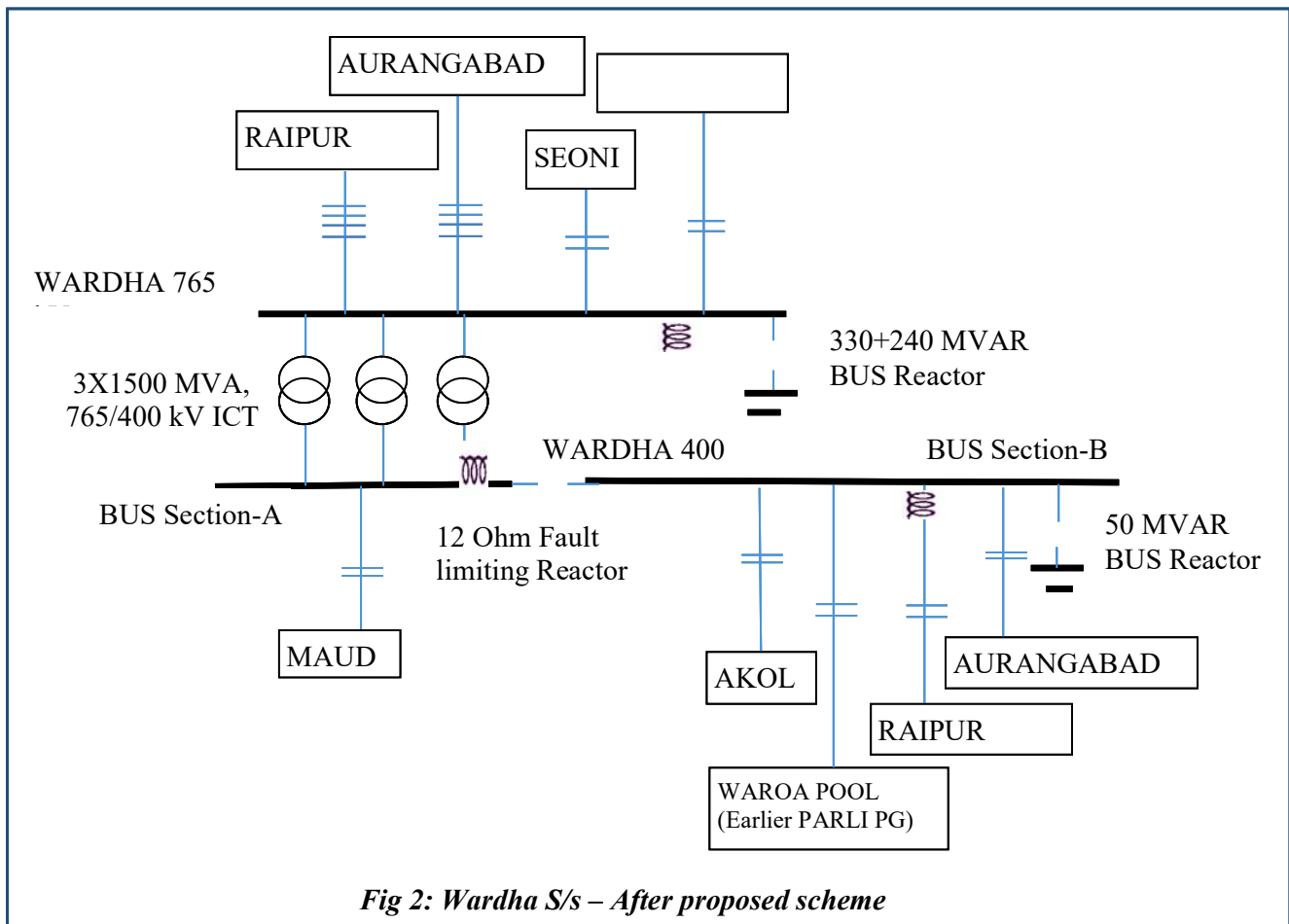
It may be mentioned that Wardha 765/400 kV S/s was designed for 40kA Symmetrical SC fault current for 1 Sec however it has been confirmed by Engineering department, POWERGRID that contractor has supplied all 765kV equipment and 400kV CBs and CTs for 50kA designed fault level.

15.4. Keeping in view the fact that Koradi II and Warora(MSETCL) feeders are the major SC Fault contributory at Wardha S/s, step by step study has been carried out with following arrangements.

- (i) Split of 400 kV Wardha substation into two sections, Section –A and Section-B.
- (ii) Disconnection of Koradi-II –Wardha 400kV (Quad) line from wardha end and connecting it to Warora – Wardha 400 kV (Quad) line at outskirts of Wardha substation. This arrangement will result in Warora – Koradi II 400 kV (Quad) line
- (iii) Change in termination of Warora Pool - Wardha 400 kV D/C (Quad) line by disconnecting it from Wardha 400kV BUS Section A and terminating in vacant 400kV bays of Warora and Koradi II 400 kV (Quad) lines at Wardha 400kV BUS Section B.
- (iv) Joining of Wardha 400 kV BUS Section –A with BUS Section –B through BUS Fault limiting reactor.

Layout of Wardha 765/400 kV S/s is I type with two main BUS. BUS section A and B of one main BUS will be connected through 12 Ohm fault limiting reactor and BUS Section A and B in second main BUS will remain disconnected.

The single line diagram of Wardha substation after the above arrangement is shown below:



15.5. Accordingly, system study has been carried out in for the time frame of 2018-19 following steps to control high fault level of Wardha S/s with above mentioned arrangements:

1. Case A : With Existing/ planned transmission system.
2. Case B : 400kV bus split on Case A.
3. Case C : Disconnection of Koradi II and Warora 400 kV (Quad) lines from Wardha S/s and connecting them to form Koradi – Warora 400kV line.
4. Case D : Shifting of Warora Pool –Wardha 400 kV (Quad) D/C lines from 400 kV BUS Section A into vacant bays (as considered in Case 'C') in 400 kv BUS Section B
5. Case E : Shifting Aurangabad –Wardha 400kV (1200kV charged at 400kV) line in BUS Section A from BUS Section B.
6. Case F : Considering 12ohm fault limiting reactor Between BUS Section - A & Section - B on 'Case-D'.

Study results showing fault levels at Wardha substations are tabulated below.

Study results for Wardha S/s:

Connectivity at Wardha 400kV BUS		Symmetrical SC Fault level / power flow					
		As per Existing / planned	After 400 kV BUS Split only	Case-B + Connecting Kopradi-II and Warora line outside Wardha S/s	Case-C + terminating Warora Pool – Wardha 400kV (Quad) line in Warora and Koradi-II Bays at Wardha S/s	Case-D + Shifting Aurangabad – Wardha 400kV (1200kV charged at 400kV) line in BUS Section A from BUS Section B.	Considering 12ohm fault limiting reactor Between BUS Section - A & Section - B on 'Case-D'
		Case-A	Case-B	Case-C	Case-D	Case-E	Case F
400 kV BUS Section A	3X1500 MVA, 765/400 kV ICTs	25/970	28/585	28/605	29/810	29/267	28/630
	Muada – Wardha 400kV D/C (Quad) line	7/-760	7/-820	7/-833	8/-808	7/-878	7/-830
	Warora Pool – Wardha 400kV D/C (Quad) line	15/442	16/236	16/228	–	Aurangabad: 3/604	–
	Total SC Fault Current	–	51	51	37	39	Through Bus fault limiting reactor - 11.4 / 202 Total - 47
400 kV BUS Section B	Raipur Pool – Wardha 400kV D/C FSC line	4/-866	5/-780	5/-996	5/-996	5/-922	5/-974
	Warora – Wardha 400kV (Quad) line	9/-429	10/-299	–	Warora Pool – Wardha 400kV (Quad) D/C line: 17/ 46	Warora Pool – Wardha 400kV (Quad) D/C line: 17/305	Warora Pool – Wardha 400kV (Quad) D/C line: 17/60
	Koradi-II – Wardha 400kV line	20/-91	21/-648	–			
	Akola – Wardha 400kV D/C line	5/477	5/560	6/208	6/226	6/346	6/600
	Aurangabad – Wardha 400kV D/C [1200kV charged at 400kV] line	3/706	4/780	4/574	4/594	–	4/618
	2X315 MVA, 400/220 kV ICTs	2/364	2/390	3/210	3/222	3/272	3/236
	Total SC Fault Current	90	46	17	33	31	Through Bus fault limiting reactor - 12/-202 Total -45

Symmetrical SC Fault level of Wardha and surrounding substations with consideration of above proposal (as in Case 'F') are tabulated below:

Case	Wardha 765kV	Wardha 400 kV (Section A)	Wardha 400kV (Section B)	Warora MSET CL	Warora Pool	Koradi - II
Base Case [All interconnectors and lines connected as per existing/planned]	46	90*	-	43	55	74

After Study Case F	40	47	46	38	43	56
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*No split of Wardha 400 kV BUS in Base Case

Observation:

From the table it is clear that with considering all measures as in tabulated above (Case F), symmetrical fault level of Wardha (765kV and 400 kV), Warora Pool (400 kV) and Warora (400kV) reduced to less than design fault level of the BUSes /substations. Further symmetrical fault level of Koradi II 400 kV BUS reduced to 56 kA from 74 kA.

15.6. The overall proposal to control high symmetrical fault level of Wardha substation may be summarized as follows:

- (i) Split of 400 kV Wardha substation into two sections, Section –A and Section-B as per Fig.2, with necessary switching arrangement.
- (ii) Warora – Koradi II 400 kV (Quad) line [formed after disconnection of Koradi-II - Wardha 400 kV (Quad) line and connecting it with Warora – Wardha 400 kV (Quad) line at outskirts of Wardha substation].
- (iii) All necessary arrangement for Change in termination of Warora Pool - Wardha 400 kV D/C (Quad) line by disconnecting it from Wardha 400kV BUS Section A and terminating in vacant 400kV bays of Warora and Koradi II 400 kV (Quad) lines at Wardha 400kV BUS Section B.
- (iv) 12 Ohm fault limiting reactor to connect 400kV BUS Section A and BUS Section B of Wardha 400 kV BUS.

With above proposal over all connectivity (Existing and planned) at Wardha may be summarized as:

Wardha 765/400 kV S/s:

For 765kV side:

- (i) Raipur Pool – Wardha 765 kV 2XD/C line.
- (ii) Seoni – Wardha 765 kV D/C line.
- (iii) Wardha – Aurangabad PG 765 kV 2XD/C line.
- (iv) Wardha – Nizamabad 765 kV D/C line.
- (v) 1x330 + 1X240 MVAR BUS Reactors.
- (vi) 3X1500 MVA, 765/400 kV ICTs.

For 400 kV side:

12 Ohm Fault Limiting Reactor to join 400 kV BUS Section A and BUS Section B.

400 kV Section A:

- (i) Mauda – Wardha 400 kV D/C (Quad) line.
- (ii) 3X1500 MVA, 765/400 kV ICTs.

400 kV Section B:

- (i) Raipur – Wardha 400 kV D/C line.
- (ii) Warora Pool – Wardha 400 kV D/C (Quad) line.
- (iii) Wardha – Akola 400 kV D/C line.

- (iv) Wardha – Aurangabad PG 400 kV D/C line (1200 kV charged at 400 kV).
- (v) 1x50 MVAR BUS Reactor.

15.7. POWERGRID may intimate the estimated cost of implementation of the measures to control high fault levels at Wardha 765/400 kV substation. MSETCL may also take necessary step to contain high fault level at Koradi-II 400 kV substation.

Members may deliberate.

16. Additional 400kV feed to Goa – Reactive Compensation

16.1. In the 39th SCM of WR held on 30.11.2015, the following Transmission system strengthening was agreed for providing second 400kV feed to Goa:

- (i) Establishment of 2X500MVA, 400/200kV substation at Xeldem. The interconnection between the existing 220 kV Xeldem substation and the proposed 400/220kV Xeldem substation could be through bus extension or through 220kV interconnecting lines, as the case may be.
- (ii) LILO of one circuit of Narendra (existing) – Narendra (new) 400 kV D/C quad line at Xeldem.
- (iii) 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.

The above scheme has also been agreed in the 39th meeting of the Standing Committee on Power System Planning of Southern Region was held on 28th - 29th December, 2015.

16.2. The detailed scope of the transmission system along with reactive compensation is as given below:

Sl. No.	Scope of the Transmission Scheme	Capacity (MVA/KM)
A	Additional 400kV Feed to Goa	
	(i) LILO of one ckt. of Narendra (existing) – Narendra (New) 400kV D/c quad line at Xeldem	120KM
	(ii) Xeldem – Mapusa 400kV D/c (quad) line	40KM
	(iii) Establishment of 2x500MVA, 400/220kV substation at Xeldem	1000MVA
	<u>400kV</u>	
	<ul style="list-style-type: none"> • ICTs : 2x500MVA, 400/220kV • ICT bays: 2 nos. • Line bays: 4 nos (2 no. for Xeldem – Mapusa 400kV D/c (quad) line & 2 nos for LILO of one ckt of Narendra (existing) – Narendra (New) 400kV D/c quad line at Xeldem) • Bus Reactor: 1x125MVAR • Bus Reactor Bay: 1 no • Space for 2x500MVA, 400/220kV ICTs (future) 	

	<ul style="list-style-type: none"> • Space for ICT bays (future): 2 nos • Space for Line bays along with Line Reactors (future): 4 nos • 1x63MVAR switchable line reactor along with 500 Ohms NGR and its auxiliaries (for Narendra (existing) – Xeldem 400kV line formed after LILO of one ckt of Narendra (existing) – Narendra (New) 400kV D/c quad line at Xeldem) • 1x80MVAR switchable line reactor along with 500 Ohms NGR and its auxiliaries (for Narendra (New) – Xeldem 400kV (quad) line formed after LILO of one ckt of Narendra (existing) – Narendra (New) 400kV D/c quad line at Xeldem) <p><u>220kV</u></p> <ul style="list-style-type: none"> • 220kV Bus Extension of Xeldem (existing) substation • ICT bays: 2 nos • Line bays: 6 nos • Space for ICT bays (future): 2 nos • Space for Line bays (future): 6 nos <p>(iv) 2 nos of 400kV line bays at Mapusa s/s (for Xeldem – Mapusa 400kV D/c (quad) line)</p> <p>(v) 1x80MVAR switchable line reactor along with 500 Ohms NGR and its auxiliaries at Narendra (New) S/s (for Narendra (New) –Xeldem 400kV (quad) line formed after LILO of one ckt of Narendra (existing) – Narendra (New) 400kV D/c quad line at Xeldem)</p>	
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Note:

- a. *The line lengths mentioned above are approximate as the exact length shall be obtained after the detailed survey.*
- b. *Narendra (existing) – Narendra (New) 400kV D/c (quad) line: 178KM is without Line Reactor at both ends. After LILO of this line at Xeldem S/s (considering LILO length as 120KM), the length of modified sections i.e. Narendra (existing) - Xeldem 400kV (quad) line: 120KM (approx.) and Narendra (New) – Xeldem 400kV (quad) line: 298KM (approx.)*
- c. *It is understood that land for 400/220kV Xeldem S/s is available (adjacent to 220 kV Xeldem sub-station of GED) with GED. The same may be provided by GED to the Bidder at cost.*

Members may note.

17. Progress of downstream network whose terminating bays are under construction by POWERGRID

17.1. Given below is the list of ISTS sub-stations under various stages of implementation for which downstream network is to be implemented in matching

time-frame by respective state utilities. State utilities are requested to update the status and commissioning schedule of the same.

Sl.	ISTS Substation	Voltage ratio in use	kV level	220 kV bays	220kV Lines emanating from Substation	no of circuit	Status of 220kV lines
1	Parli (PG)	2x500MVA, 400/220kV	220	6	Parli(PG) - Hargul D/c 220kV D/c	2	UC
					Parli(PG) - Parli (MS) 220kV D/c	2	UC
					Parli(PG) - Parli (MS) 220kV S/c	1	UC
					Parli(PG) - Osmanabad (MS) 220kV S/c	1	UC
2	Raipur (PG)	3x315MVA, 400/220kV	220	2	3 Existing lines	3	Existing
					Raipur (PG) – Doma 220kV D/c	2	UC - By Sep'16
3	Mapusa (PG)	3x315MVA, 400/220kV	220	2	Mapusa - Tuem 220kV D/c	2	UC
					Mapusa - Tivim 220kV S/c	1	Existing
					Mapusa - Ponda 220kV S/c	1	Existing
4	Satna (PG)	2x315 + 1x500MVA, 400/220kV	220	2	Future	2	To be planned by MP
					Satna(PG) - Satna(MP) 220kV D/c	2	Existing
					Satna(PG) - Katni(MP) 220kV S/c	1	Existing
					Satna(PG) - Maihar 220kV S/c	1	Existing
5	Indore (PG)	2x500MVA, 400/220kV	220	6	Indore(PG) - Indore(MP) 220kV D/c	2	UC
					Indore(PG) - Ujjain(MP) 220kV D/c	2	UC
					Future	2	To be planned by MP
6	Itarsi (PG)	1x315MVA+ 1x500MVA, 400/220kV	220	2	Itarsi(PG)-Itarsi(MP) 220kV D/c	2	Existing
					Itarsi(PG)- Hoshangabad 220kV D/c	2	Existing
					Future	2	To be planned by MP
7	Navsari	2x315 +1x500MVA, 400/220kV	220	2	Navsari-Bhestan 220kV D/c	2	UC - By May'18
					Navsari-Navsari 220kV D/c	2	Existing
					Navsari – Kawas 220kV D/c	2	Existing
8	Rewa Pool	2x500MVA, 400/220kV	220	6	Rewa UMSPP - Rewa Pool 220kV 3xD/c	6	UC - Matching with dedicated line
					Rewa UMSPP – Rewa 220kV	2	Under Planning
					Rewa UMSPP – Siddhi	2	Under Planning

					220kV D/c		
9	Gwalior	3x315MVA, 400/220kV	220		Gwalior – Sitholi 220kV D/c	2	UC - Likely to be commissioned by Jun'16
					Gwalior – Mahalgaon 220kV D/c	2	Existing
					Gwalior – Malanpur 220kV D/c	2	Existing
10	Pirana	2x315MVA, 400/220kV	220		Pirana – Barjadi 220kV D/c	2	UC - No Update from STU
					Pirana – Bhat 220kV D/c	2	Existing
11	Boisar	2x315 +500MVA, 400/220kV	220		Boisar - STU Line 220kV S/c	1	UC - No Update from STU
					Boisar – Boisar (MS) 220kV D/c	2	Existing
					Boisar – Vasai 220kV S/c	1	Existing
					Boisar – Tarapur 220kV D/c		Existing
13	Magarwada	2x315MVA, 400/220kV	220		Magarwada – Ringanwada 220kV D/c	2	UC - By end of 2016 (Being built by POWERGRID under consultancy)
					Magarwada – Magarwada (DD) 220kV D/c	2	Existing
14	Wardha	2x315MVA, 400/220kV	220	4	Wardha - Wardha (MSETCL) 220kV S/c	1	Existing
					Wardha - Badnera 220kV S/c	1	Existing
					Wardha – Pusad 220kV S/c	1	Planned
					Wardha – Bhugaon 220kV S/c	1	Planned
					220kV 2 circuits	2	Spare-To be planned by MSETCL
16	Solapur	2x315 +1x500MVA, 400/220kV	220	4	Solapur – Kumbhari (MS) 220kV D/c	2	Existing
					Solapur – Bhale (MS) 220kV D/c	2	UC
					Solapur – Bhalwane (MS) 220kV D/c	2	UC
17	Kala	2x315MVA + 1x500 MVA, 400/220kV	220	2	Kala – Khadoli 220kV D/c	2	Existing
					Kala – Kharadpada 220kV D/c	2	Existing
					Future	2	To be planned by DNH

17.2. POWERGRID to intimate the commissioning dates of the 220 kV bays.

Members may deliberate.

18. Progress of dedicated line under construction by Generation Developer who are connected through interim arrangement

18.1. The Transmission System of IPPs generation projects coming up in Raigarh and Champa generation complex of Chhattisgarh was finalized the 30th Standing Committee on Power System Planning in WR held on 8th July 2010. The transmission system included dedicated transmission system up to pooling stations at Champa, Raigarh (Kotra), Raigarh (Tamnar) under the scope of project developer and HIGH CAPACITY TRANSMISSION CORRIDOR – V associated with Chhattisgarh IPPs under the scope of POWERGRID and M/s BDTCL (Bhopal Dhule Transmission Company Limited). Interim arrangement for connectivity of some of the generation projects coming prior to availability of transmission system was also agreed. The interim arrangement agreed was purely a temporary transmission arrangement to be carried out by the respective IPP. The LILO was to be removed and the line was to be restored in its original configuration by the respective developer, after interconnection of the generation project at the identified Pooling Station. Subsequently, the pooling station for M/s BALCO and M/s Vandan Vidhyut Limited was changed from Champa to Dharamjaygarh without any change in the interim arrangement.

18.2. The list of generation projects developers (1 to 5 – IPPs in Chhattisgarh and no. 6- IPP in Madhya Pradesh) who were granted interim arrangement are listed below. In-spite of considerable time, the dedicated transmission line is not yet to be completed by Generation Developer. The generation project is still connected through interim arrangement which is continuously endangering the grid security.

Sl. No.	Name of IPP	Ownership	Dedicated Connectivity line	Interim Connectivity Arrangement
1	RKM Powergen Pvt. Ltd. (RKMPPL) (4x360MW)	RKMPPL	RKMPPL- Raigarh PS (Near Kotra) 400kV D/c (Quad) line	LILO of 3 rd ckt of Raigarh - Raipur 400kV 2 nd D/c line (Presently Raigarh-RKM-KMPCL-Raipur)
2	Korba West Power Co. Ltd. (KWPCCL) (1x600MW)	Avantha Power & Infrastructure Ltd.	KWPCCL - Raigarh PS (near Kotra) 400kV D/c line	LILO of 2 nd ckt of Raigarh - Raipur 400kV 1 st D/c line (Presently Raigarh –KWPCCL-Raipur)
3	KSK Mahanadi Power Co. Ltd. (KMPCL) (6x600MW)	KMPCL	KMPCL – Champa PS 2xD/c (Quad) line	LILO of Raigarh - Raipur 400kV 2 nd D/c line
4	Bharat Aluminium Co. Ltd. (BALCO) (4x300MW)	Vedanta	BALCO – Dharamjaygarh PS 400kV D/c (Triple / Quad) line	LILO of 2 nd ckt of Korba - Birsinghpur 400kV D/c line
5	Vandana Vidhyut Ltd. (VVL) (2x135+270MW)	M/s VVL	VVL – Dharamjaygarh PS 400kV D/c line	LILO of 1 st ckt of Korba - Birsinghpur 400kV D/c line
6	Essar Power M.P. Ltd (EPMPL) (2x600MW)	Essar Power Ltd.	EPMPL - Bilaspur PS 400kV D/c (triple) line	LILO of 1 st ckt of Korba STPS – Vindhyachal STPS 400kV D/c line

18.3. Bilaspur pooling station along with its associated transmission system has already been commissioned. Most of the transmission elements of the HIGH CAPACITY TRANSMISSION CORRIDOR – V associated with Chhattisgarh IPPs has been commissioned. The status is as given below:

Transmission System under the Scope of POWERGRID

A. Establishment of Pooling Stations at Raigarh (Near Kotra) and Raipur for IPP Generation Projects in Chhattisgarh Part-1

Sl. No.	Transmission System	Status
1	Raigarh Pooling Station (Near Kotra) – Raipur Pooling Station 765kV D/c 2x240 MVAR line reactors at each end on both circuits	Commissioned
2	Raigarh Pooling Station (Near Kotra) – Raigarh 400kV D/c	Commissioned
3	Raipur Pooling Station – Raipur 400kV D/c	Commissioned
4	Establishment of 765/400kV 4x1500MVA Raigarh Pooling Station (near Kotra) (1x240 MVAR B/R) at 765kV, 1x80 MVAR bus reactor at 400kV	Commissioned
5	Establishment of 765/400kV 1x1500MVA Raipur Pooling Station (1x240 MVAR B/R)	Commissioned

B. Establishment of Pooling Stations at Champa and Raigarh (Near Tamnar) for IPP Generation Projects in Chhattisgarh Part-2

Sl. No.	Transmission System	Status
1	Champa Pooling Station – Raipur Pooling Station 765kV D/c -150 KM - 2x240 MVAR line reactors at Raipur	Commissioned
2	Raigarh Pooling station(near Kotra) – Raigarh pooling station(near Tamnar) 765kV D/c	Commissioned
3	Champa Pooling Station – Dharamjaygarh / Korba 765kV S/c	Commissioned
4	Raigarh Pooling Station (near Kotra) – Champa Pooling Station 765kV S/c	Commissioned
5	Establishment of 765/400kV 6x1500MVA Champa Pooling Station (1x240 MVAR B/R) 1x80 MVAR bus reactor when charged at 400kV)	Commissioned
6	Establishment of 765/400kV 3x1500MVA Raigarh Pooling Station(near Tamnar) (1x240 MVAR B/R)	Commissioned

C. Integration of Pooling Stations in Chhattisgarh with Central part of WR for IPP Generation Projects in Chhattisgarh Part-3

Sl. No.	Transmission System	Status
1	Raipur Pooling Station – Wardha 765kV D/c - 2x240 MVAR line reactor at Raipur Pooling Station and 2x330 MVAR line reactor at Wardha	Commissioned

2	Wardha bus reactor – 1x330 MVAR	Commissioned
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D. Transmission System strengthening in Western part of WR for IPP Generation Projects in Chhattisgarh Part-4

Sl. No	Transmission System	Status
1	Wardha – Aurangabad (PG) 765kV D/c - 2x330 MVAR line reactors at Wardha and 2x240 at Aurangabad	Commissioned
2	Aurangabad(PG) – Boisar 400kV D/c (Quad)-300 km - 2x63 MVAR line reactors at each end on both circuits	Jun'16
3	Establishment of 765/400kV 2x1500MVA Aurangabad (PG) S/s (1x240 MVAR B/R)	Commissioned
4	Augmentation of transformation capacity at Boisar by 1x500MVA	Commissioned

E. System strengthening in North/West part of WR for IPP Projects in Chhattisgarh Part-5

Sl. No.	Transmission System	Status
1	Kudus – Padghe(PG) 400kV D/c (Quad)-25 km	Mar'17
2	Vadodara – Asoj 400kV D/c(Quad)-15 km -	Commissioned
3	Aurangabad (PG) – Padghe(PG) 765kV 1xD/c - 2x240 MVAR line reactors at each end on both circuits	Mar'17
4	Establishment of 765/400kV 2x1500MVA Padghe (PG) S/s [GIS] (1x240 MVAR B/R)	Mar'17

F. System strengthening in Raipur-Wardha corridor for IPP Projects in Chhattisgarh Part-6

Sl. No	Transmission System	Status
1	Raipur Pooling Station – Wardha 765kV 2nd D/c-380 km - 2x240 MVAR line	Oct'16
2	Reactor at Raipur Pooling Station and 2x330 MVAR line reactor at Wardha	

G. System strengthening in Wardha - Aurangabad corridor for IPP Projects in projects in Chhattisgarh Part-7

Sl. No	Transmission System	Status
1	Wardha – Aurangabad (PG) 765kV 2nd D/c – 2x330 MVAR line reactor at Wardha and 2x240 line reactor at Aurangabad	Commissioned

H. WR-NR HVDC interconnector for IPP Projects in Chhattisgarh Part-9

Sl. No	Transmission System	Status
1	Establishment of 3000MW 800KV HVDC bipole terminal each at Champa Pooling station and Kurukshetra (NR)	1500 MW - Sep'16 1500 MW - Dec'16
2	Kurukshetra(NR) - Jalandhar 400kV D/c(Quad) one ckt. via 400/220kV Nakodar S/s	Commissioned
3	LILO of Abdullapur – Sonapat 400kV D/c(triple) at Kurukshetra	Commissioned
4	Establishment of 3000MW 800KV HVDC bipole terminal each at Champa Pooling station and Kurukshetra(NR) respectively: to be upgraded to 6000MW	1500 MW - Sep'16 1500 MW - Dec'16
5	Establishment of 400/220kV 2x500 MVA S/s at Kurukshetra	Commissioned

I. Transmission elements being implemented by transmission licensee through tariff based competitive bidding process. Part-10

Sl. No	Transmission System	Status
1	Aurangabad(PG) – Dhule (IPTC) 765kV S/c line	Commissioned
2	Dhule (IPTC) – Vadodara (PG) 765kV S/c line	Commissioned
3	Dhule (IPTC) – Dhule (MSETCL) 400kV D/c Quad line	Commissioned
4	Establishment of 765/400kV, 2x1500MVA Dhule(IPTC) S/s	Commissioned

- 18.4. Recently, Hon'ble CERC in Petition No.112/TT/13 (Tariff order w.r.t. Orissa High Capacity Corridor-I) has passed the order dated 07.10.15 wherein the following direction has been given in para 65 and para 66 of the order:

Para 65

"The associated transmission lines were to be constructed by the generation developer matching with the transmission system to be developed by the petitioner and the LILOs constructed by generation developers which were temporary arrangement were to be replaced by the associated transmission system. It is noticed that some of the generation developers have not commissioned the dedicated lines and are continuing to evacuate power through the temporary LILO arrangements. We direct the petitioner to discuss the issue in the Standing Committee Meeting on Transmission and finalize the timeline for replacement of the LILOs of generation developer by dedicated transmission lines within a period of six months from the date of connection of LILO of the petitioner."

Para 66

"Since the generation developers have failed to construct the dedicated transmission lines due to which assets created by the petitioner covered under the present petition are not serving the intended purpose, we are of the view, that

the tariff for these assets shall be borne by the generators till operationalisation of their LTA as required under Regulation 8(5) of the 2010 Sharing Regulations as stated in para 60 herein. Till such time, the tariff for the assets shall be excluded from PoC pool.”

- 18.5. In view of the above, the agenda has been taken up for discussion in the SCM of WR. POWERGRID vide their letter date 26.02.2016 has already written letters to the generation developer requesting them to expedite the construction of dedicated connectivity line and also provide the monthly progress of construction of dedicated connectivity line to CEA and CTU as per format circulated with the letter.
- 18.6. M/s BALCO vide their letter dated 07.03.2016 has requested to retain the existing interim connectivity arrangement (LILO of 2nd ckt of Korba - Birsinghpur 400kV D/c line at BALCO switchyard) permanently for power evacuation as a redundant transmission line in case of any exigency condition. BALCO has further intimated that the final stage forest approval for their dedicated transmission line (BALCO- Dharamjaygarh 400 kV D/C line) is expected by February 2016 and the line was expected to be commissioned by March 2016.

Members may deliberate.

19. **Requirement of new substation near Vapi / Ambethi area and Kosamba-Vapi 400 kV D/C line.**
 - 19.1. In the 38th WR SCM held on 17.07.2015, it was decided that the proposal of 400 kV Kosamba – Vapi D/C needs to be reviewed through joint studies of CEA, CTU & GETCO after considering the augmentation of 400kV network in southern Gujarat to be implemented by GETCO. Further in the 39th WR SCM, it was suggested that instead of augmenting transformation capacity at both the substations (Kala and Vapi), a new substation may be proposed near Vapi / Ambethi area to cater to the demand of DNH and Daman & Diu as there is no space available for putting additional transformers at existing Vapi 400/220 kV substation.
 - 19.2. Accordingly, a meeting notice was issued for joint system studies on 28-29th April 2016 (by CEA, CTU and GETCO) for transmission proposals in Gujarat (Kosamba- Vapi 400 kV D/C line, New substation in Vapi area and utilization of Essar- Bachau 400 kV D/C line). In reply to the meeting notice, GETCO instead of participating in the joint studies had given their views and had requested to evolve the proposal and put up for further deliberations in the standing committee meeting.
 - 19.3. POWERGRID had carried out comprehensive transmission system studies, as a part of consultancy, for UT of Dadra and Nagar Haveli (DNH) as well as Daman and Diu (D&D) for 2021-22 time- frame. In their studies requirement of an additional substation near Vapi / Ambethi area has been assessed (**Annexure – 10**). The current / planned capacity at Vapi Substation is 945MVA (3x315) and that at Kala is 1130MVA (2x315+500). However, both the substations are found to be operating near their capacity limits and do not satisfy n-1 condition in 2021-22 time frame. In order to provide adequate transformation capacity at ISTS level for power drawl by UT of DNH, the following transmission system has been proposed by POWERGRID:

- (i) Establishment of a New 2x500MVA, 400/220kV Substation near Vapi / Ambheti
- (ii) LILO of KAPP – Vapi 400kV D/c line at Vapi / Ambheti (New) Substation
- (iii) Vapi / Ambheti (New) – Sayali (DNH) 220kV D/c line (high capacity)
- (iv) Vapi / Ambheti (New) – New Kharadpada (DHN) 220kV D/c line (high capacity)

19.4. The utility of Kosamba – Vapi 400kV D/c line was also checked after considering Chikhli and Vav substations of GETCO in Southern Gujarat as well as the above proposed new substation near Vapi / Ambheti. Study results (attached at **Annexure – 11.0**) indicate a very small power flow on this line (about 150MVA per circuit). The line remains under loaded even under outage of all units at Sugan TPP.

19.5. GETCO may present their studies/views regarding the above transmission proposals.

Members may deliberate.

20. **Alternative utilization of Essar Power Gujarat Ltd. (EPGL) - Bhachau 400kV D/c (Triple) line of POWERGRID**

20.1. M/s EPGL had planned to develop coal based power plant at Salaya, Gujarat in three phases (2x600+4x660MW+4x150MW). Presently, first phase of generation i.e. 2x600MW is commissioned and is connected to the GETCO network through EPGL Phase-I – Rajkot 400kV D/c line. The second evacuation line (EPGL Phase-I – Amreli 400kV D/c line) is currently under implementation by GETCO. From the second and third phase of generation at M/s EPGL i.e. out of 3040MW (after auxiliary consumption), PPA for 800MW was signed with Gujarat, for which GETCO had planned EPGL – Halvad 400kV D/c line and for remaining capacity of 2240MW, M/s EPGL had applied for connectivity and same was granted through EPGL – Bhachau 400kV D/c (Triple) line. EPGL – Halvad 400kV D/c line is yet to be implemented by GETCO. However, EPGL – Bhachau 400kV D/c (Triple) line is almost completed by POWERGRID and balance 9 nos tower foundation, 10 nos tower erection and 3.5KM stringing is held up due to non-finalization of gantry by M/s EPGL.

20.2. It may be noted that EPGL – Bhachau 400kV D/c (Triple) line shall remain unutilized in absence of EPGL project. In this regard, M/s EPGL has forwarded a proposal to CEA, POWERGRID and GETCO for utilization of EPGL - Bhachau 400kV D/c (Triple) line involving interconnection of this line with Bhogat S/s and Kalvad S/s of GETCO.

20.3. In view of above proposal and other discussions between CTU and CEA, the following is proposed in order to facilitate utilization of EPGL – Bhachau 400kV D/c (Triple) line:

Stage - 1:

Currently, 2x600MW power from phase 1 of the generation project is being evacuated only through single 400kV D/c line to Rajkot (Hadala) and the second evacuation line i.e. EPGL Phase-I – Amreli 400kV D/c line is under execution by

GETCO. Hence, in order to enhance reliability of power supply, the EPGL – Bhachau 400kV D/c (Triple) line may be extended upto phase 1 of the generation project in order to form EPGL Phase-I – Bhachau 400kV D/c (Triple) line.

Stage - 2:

It is understood that GETCO has planned for construction of 400 kV Bhogat S/S and Kalavad S/S along with associated 220 kV network in Saurashtra region to tap the power available at 400 kV level (from Mundra UMPP, Adani and EPGL generations). Location of Bhogat is about 60km from EPGL site. As per the report mentioned above, Bhogat sub-station is to be utilized for stepping up power during peak wind generation season and to cater the demand during off peak wind season.

In order to utilize EPGL - Bhachau 400kV D/c line, following arrangement is proposed:

- (i) Disconnection from EPGL Phase-I generation project
- (ii) LILO of EPGL – Bhachau 400kV D/c (triple) line at Halvad substation of GETCO
- (iii) Extension of EPGL – Halvad - Bhachau 400kV D/c (triple) line from EPGL end to Bhogat S/s

Further, EPGL Phase-I - Rajkot(Hadala) 400kV D/c line of GETCO may be LILOed at Kalavad S/s

The above arrangement shall ensure utilization of EPGL – Bhachau 400kV D/c (Triple) line and would also provide additional source of power to Bhogat and Kalavad substations.

Members may discuss.

21. Open Access Meeting.

21.1. The 23rd meeting of WR constituents regarding connectivity/ open access applications would be held after Standing Committee meeting. The agenda would be circulated by POWERGRID separately.

22. Any other item with the permission of the chair.

Annexures

Annexure-1

Status of TBCB Tr. Projects - Western Region

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

S.N.	Name of the Project	BPC / Implementing Agency / Milestones	Scope of works	Current Status
	Estimated Cost 2900 cr	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) Bhopal-Indore 765 kV S/C line (iii) 2x1500 MVA 765/400 kV substation at Bhopal (iv) Bhopal-Bhopal (MPPTCL) 400 kV D/c quad line. (v) Aurangabad-Dhule 765 kV S/C line (vi) Dhule-Vadodara 765 kV S/C line (vii) 2x1500 MVA, 765/400 kV substation at Dhule (viii) Dhule - Dhule(Msetcl)400 kV D/C Line	Line commissioned in 10/14 Commissioned in 7/2014 Commissioned in 7/2014 Line commissioned in 10/14 Line ready for commissioning on 02/15 commissioned Line ready for commissioning since 9/2014 (400 kV bays by MSETCL at Dhule s/s is ready and expected to be charged by December 2015)
5	Transmission System associated with DGEN TPS (1200 MW) of Torrent Power Ltd. 275 cr	PFC M/s Instalaciones Inabensa, S.A. Spain Milestones: (i) Lol issued on 19.05.2014 (ii) Approval under section 68 on 30.01.2014.	(i) DGEN TPS – Vadodara 400 kV D/C, Twin Moose line. (ii) Navsari – Bhestan 220 kV D/C line	
6	Transmission System associated with Gadawara STPS (2x800 MW) of NTPC (Part-A)	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).	SPV transferred
7	Transmission System associated with Gadawara STPS (2x800 MW) of NTPC (Part-B).	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).	SPV transferred

S.N.	Name of the Project	BPC / Implementing Agency / Milestones	Scope of works	Current Status
8	Transmission System Strengthening associated with Vindhyachal- V	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 SPV transferred
9	System strengthening for IPPs in Chhattisgarh and other generation projects in Western Region	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 24.12.2014 (iii) RFQ notice published on 29.12.2015. (iv) Lol issued to the successful bidder Adani Power Ltd on 28.07.2015.	(i) Gwalior 765/400 kV – Morena 400 kV D/C line 400 kV D/C Length- 50 km (ii) Establishment of substation at Morena 400/ 220 kV 2X315 MVA (iii) Vindhyachal-IV & V STPP – Vindhyachal Pool 400 kV D/C (Quad) 2nd line 400 kV D/C Length-15 km (iv) Sasan UMPP – Vindhyachal Pooling station 765 kV S/C line 765 KV S/C Length-8 km (v) LILO of one circuit of Aurangabad – Padghe 765 kV D/C line at Pune 765 kV D/C Length-50 km	SPV transferred on 23.11.2015
10	Additional System Strengthening for Sipat STPS	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) Lol 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	SPV transferred on 23.11.2015
11	Additional System Strengthening Scheme for Chhattisgarh IPPs – Part B	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) Lol issued to the successful bidder Adani Power Ltd on 28.07.2015	(i) Raipur (Pool) – Rajnandgaon 765 kV D/C line 765 KV D/C Length-60 KM (ii) Rajnandgaon – New Pooling station near Warora 765 kV D/C line 765 KV D/C Length- 270 KM (iii) Establishment of new substation near Rajnandgaon 765/400kV 2x1500 MVA	SPV transferred on 23.11.2015

S.N.	Name of the Project	BPC / Implementing Agency / Milestones	Scope of works	Current Status
12	Additional inter-Regional AC link for import into Southern Region i.e. Warora – Warangal and Chilakaluripeta - Hyderabad - Kurnool 765kV link	<p>PFCCL</p> <p>Milestones:</p> <p>(i) MoP vide Gazette Notification dated 06.02.15 appointed PFCCL as BPC.</p> <p>(ii) SPV incorporated on 20.04.2015 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>	<p>Under Bidding process</p> <p>RfP scheduled for 30.11.2015</p> <p>LoI issued</p>
13	Common Transmission System for Phase-II Generation Projects in Odisha and Immediate Evacuation System for OPGC (1320 MW) Project in Odisha	<p>PFCCL</p> <p>Milestones:</p> <p>(i) MoP vide Gazette Notification dated 06.02.15 appointed PFCCL 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>	<p>Under Bidding process</p> <p>Approval of MoP awaited for Transfer of SPV</p>

Annexure- 2

**STATUS OF TRANSMISSION SCHEMES UNDER IMPLEMENTATION BY POWERGRID
IN WESTERN REGION**

Sl. No	Description of Scheme	Estimated Cost (Rs. Cr)	Date of firming up in WR SCM	investment approval	Target date as of now	Remarks
1	Western Region System Strengthening Scheme -II	5222	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

	<p>c) Establishment of 400/220 kV, 2 x 315 MVA new S/s (GIS) at Navi Mumbai</p> <p>d) 220 kV Vapi- Khadoli D/c.</p>				Commissioned	Substation is ready and shall be commissioned matching with line
3	<p>Tr. System of Mundra Ultra Mega Power Project (4000 MW)</p> <p>a) Mundra – Bachchau - Ranchodpura 400 kV (Triple) D/c</p> <p>b) Mundra – Jetpur 400 kV (Triple) D/c</p> <p>c) Mundra – Limbdi 400 kV (Triple) D/c</p> <p>d) Gandhar-Navsari 400 kV D/c</p> <p>e) Navsari - Boisar 400 kV D/c</p> <p>f) LILO of both circuits of Kawas-Navsari 220 kV D/c at Navsari (PG)</p> <p>g) Wardha-Aurangabad 400 kV(Quad) D/c (with provision to upgrade at 1200 kV at later date)</p> <p>g) Aurangabad (PG) - Aurangabad I (Waluj) 400 kV(Quad)</p>	4824	26th (23.02.07)	Oct'08	<p>Commissioned</p> <p>Commissioned</p> <p>Commissioned</p> <p>Commissioned</p> <p>Mar'16</p> <p>Commissioned</p> <p>Dec'16</p> <p>Commissioned</p>	<p>Under implementation</p> <p>Severe ROW & Forest issue. Forest Clearance awaited.</p> <p>Both Contracts terminated due to unsatisfactory performance. Tender awarded for 1 package and fresh tender being taken up for the other package.</p>
	<p>Substations</p> <p>a) 40% Fixed Series Compensation each on Wardha - Aurangabad 400 kV D/c at Wardha end</p>				Jun'16	Commissioning matching with the line

	<p>b) Establishment of new 400/220 kV, 2x315 MVA substation at Navsari & Bachchau</p> <p>c) Establishment of new 765/400 kV, 3x1500 MVA, substation at Wardha for charging of Seoni - Wardha 2xS/c lines at 765 kV level</p>				<p>Commis sioned</p> <p>Commis sioned</p>	
4	<p>Transmission system associated with Krishnapatnam (5x800 MW) (WR Portion)- now delinked from Krishnapatnam UMPP</p> <p>a) Raichur – Solapur (PG) 765 kV S/c</p> <p>b) Solapur(PG) – Pune 765 kV S/c</p> <p>c) LILO of 400kV Aurangabad I (Waluj) - Pune (PG) D/c & Parli (PG) - Pune (PG) D/c lines at Pune(GIS)</p> <p>d) Establishment of new 765/400 kV substations at Pune (GIS) with 2x1500 MVA transformation capacity</p>	1928	27 th (30.07.07)		<p>Commis sioned</p> <p>Commis sioned</p> <p>Jan'16</p> <p>Commis sioned</p>	<p>Under implementation</p> <p>LILO of Parli (PG)-Pune (PG) at Pune (GIS) commissioned</p>
5	<p>Associated transmission system of VSTPP-IV and Rihand-III</p> <p>a) Rihand III- Vindhyachal Pool 765 kV D/c (initially to be op. at 400kV)</p> <p>b) Vindhyachal IV - Vindhyachal Pool 400kV D/c(Quad)</p> <p>c) Vindhyachal Pool - Satna 765 kV 2xS/c</p> <p>d) Satna -Gwalior 765 kV 2xS/c</p> <p>e) Gwalior – Jaipur(South) 765 kV S/c</p> <p>f) Vindhyachal Pool-Sasan 765 kV S/c</p> <p>g) Vindhyachal Pool-Sasan 400 kV D/c</p>	4673	29 th (10.09.09)	Mar'10	<p>Ready for commis sioning</p> <p>Commis sioned</p> <p>Commis sioned</p> <p>Commis sioned</p> <p>Commis sioned</p> <p>Commis sioned</p> <p>Commis sioned</p>	<p>Under implementation</p> <p>Ckt-I charged on 26.06.14. Ckt-II ready for commissioning in Aug'15</p>

	h) Establishment of 765/400kV, 2x1500 MVA substation at Vindhyachal Pool				Commis sioned	
6	Solapur STPP(2x660MW) transmission system a) Solapur STPP – Solapur (PG) 400kV D/c (Quad) b) Augmentation of 400/220kV ICT by 1x500MVA transformer (3 rd) at Solapur (PG)	63.32	30th (08.07.10)	Oct'13	Commis sioned Commis sioned	Under implementation Line completed in Apr'15
7	Solapur STPP (2x660MW) transmission system (Part-A) a) Solapur STPP – Solapur (PG) 400kV 2nd D/c (Quad)	50.52	36th (29.08.13)	Mar'15	Mar'17	Award placed in May'15 Foundation commenced from Nov'15
8	Transmission system for evacuation of Kakrapar Atomic Power Project unit 3 &4 (2x700 MW) a) Kakrapar NPP – Navsari 400kV D/c – 38 km b) Kakrapar NPP – Vapi 400kV D/c - 104 km	378.71	31 st (27.12.10)	Feb'14	Oct'16 Oct'16	Under Implementation
9	Transmission System associated with Mauda Stage-II (2x660 MW) a) Mauda II – Betul 400KV D/c (Quad)-210 km b) Betul– Khandwa 400KV D/c (Quad)-180 km c) Khandwa – Indore(PG) 400kV D/c -215 km d) Establishment of 400/220kV 2x315MVA substation at Betul	1575.3	32 nd (13.05.11)	Sep'13	May'16 May'16 May'16 May'16	Under Implementation
10	Provision of 1x315MVA ICT & Spare Converter Trf for reliable auxlliary power supply at HVDC back to back station at Bhadravati	143	33 rd (21.10.11)	-	Sep'16	ICT commissioned in Mar'15. Balance work under progress.

11	<p>Establishment of Pooling Station at Champa and Raigarh (Near Tamnar) for IPP Generation Projects in Chhattisgarh</p> <p>a) Champa Pooling Station - Raipur Pooling Station 765kV D/c</p> <p>b) Raigarh Pooling Station (near Kotra) - Raigarh pooling (near Tamnar) 765kV D/c</p> <p>c) Champa Pooling Station - Dharamjaygarh Pooling Station 765kv S/c</p> <p>d)Raigarh Pooling Station (near Kotra) - Champa pooling 765kV S/c</p> <p>e) Establishment of 765/400kV 6x1500MVA Champa Pooling Station</p> <p>f)Establishment of 765/400kV 3x1500MVA Raigarh Pooling Station (near Tamnar)</p>	2066.85	29th (10.09.09)	May'11	<p>One ckt commissioned</p> <p>Commissioned</p> <p>Commissioned by-passing Champa Pool</p> <p>Commissioned</p> <p>Jun'16</p> <p>Commissioned</p>	<p>Under Implementation</p> <p>Other ckt terminated at D'jaygarh bypassing Champa</p> <p>ICTs to be commissioned with C-K HVDC Link</p>
12	<p>Transmission system strengthening in Western Part of WR for IPP generation projects in Chhattisgarh</p> <p>a) Aurangabad(PG) – Boisar 400kV D/c (Quad)</p> <p>b) Wardha - Aurangabad (PG) 765kV D/c</p> <p>c) Establishment of 765/400kv 2x1500MVA auraganbad (PG) S/s</p> <p>d) Augmentation of transformation capacity at Boisar by 400/220kV, 1x500MVA</p>	2127.51	29th (10.09.09)	Nov'11	<p>Jun'16</p> <p>Commissioned</p> <p>Commissioned</p> <p>Commissioned</p>	<p>Under Implemetation</p> <p>Stage-I Forest Clearance received in Aug'15</p>

13	<p>System strengthening in North/West part of WR for IPP Projects in Chhattisgarh</p> <p>a) Aurangabad (PG) – Padghe(PG) 765kV D/c</p> <p>b) Vadodara – Asoj 400kV D/c(Quad)</p> <p>c) Padghe – Kudus 400kV D/c (Quad)</p>	2073.26	29th (10.09.09)	Dec'11	<p>Under Implementation</p> <p>Jun'16 Forest clearance awaited</p> <p>Commissioned</p> <p>Jun'16 Matching with Kudus S/s of MSETCL & A'bad-Padghe line</p>
14	<p>System Strengthening in Raipur-Wardha Corridor for IPP projects in Chhattisgarh (DPR-6)</p> <p>a) Raipur Pooling station - Wardha 765kV 2nd D/c</p>	1422.85	29th (10.09.09)	Jan'12	<p>Under Implementation</p> <p>Jun'16 Stage-I Forest Clearance received in Jun'15</p>
15	<p>WR-NR HVDC interconnector for IPP Projects in Chhattisgarh</p> <p>a) A ± 800kV, 3000Mw HVDC bipole between Champa Pooling Station-Kurukshetra (NR) (provision to upgrade to 6000MW at a latter date)</p> <p>b) Kurukshetra(NR) - Jalandhar 400kV D/c(Quad) one ckt. via 400/220kV Nakodar</p> <p>c) LILO of Abdullapur – Sonapat 400kV D/c(triple) at Kurukshetra</p> <p>d) Establishment of 3000MW 800KV HVDC bipole terminal each at Champa Pooling station and Kurukshetra(NR) respectively: to be upgraded to 6000MW.</p>	9569.76	29th (10.09.09)/ 30th (08.07.10)	Mar'12	<p>Under Implementation</p> <p>Jun'16 Completion matching with HVDC Champa Station.</p> <p>Nov'15 Ckt-I ready for commissioning in Nov'15</p> <p>Nov'15 Line ready for commissioning</p> <p>Jun'16</p>

	e) Establishment of 400/220kV 2x500 MVA S/s at Kurukshetra (GIS) 2x500MVA				Dec'15	400kV bays ready for commissioning in Nov'15. Balance work under progress
16	Inter-regional system strengthening scheme for WR and NR-Part A a) Solapur - Aurangabad 765kV D/c	1315.9	36 th (29.08.13)	Oct'13	Commis sioned	Completed
17	Transmission System Associated with Lara STPS-I (2x800MW) a) Lara STPS-I – Raigarh (Kotra) Pooling Station 400 kV D/c line – 18km b) Lara STPS-I – Champa Pooling Station 400 kV D/c (quad) line.- 112km	400.47	17 th LTA (03.01.13)	Jun'14	Jan'16 Apr'17	Under Implementation Severe ROW being faced Tower erection commenced in Oct'15
18	Transmission System Strengthening in WR-NR Transmission Corridor for IPPs in Chattisgarh a) Up-gradation of + 800kV, 3000MW HVDC bipole between Champa Pooling Station – Kurukshetra (NR) to 6000MW b) Kurukshetra (NR) – Jind 400kV D/c (Quad)	5151.37	35 th (03.01.13)	Jun'14	Mar'18 Mar'18	Award under progress
19	Inter-regional system strengthening scheme for WR and NR-Part B (a) 765KV D/C Jabalpur Pooling Station - Orai line (b) 765KV D/C Orai - Aligarh line (c) 400KV D/C Orai - Orai line (Q) (d) LILO of one ckt of Satna-Gwalior 765KV 2x S/C line at Orai (e) LILO of Agra - Meerut 765KV S/C at Aligarh	6517.36		Dec'14	Apr'18 Apr'18 Apr'18 Apr'18 Apr'18	Award placed in Mar'15

	(f) LILO of Kanpur - Jhatikara 765KV S/C at Aligarh				Apr'18	
20	Wardha - Hyderabad 765kV Links (a) 765KV D/C Wardha - Hyderabad line (b) 400KV D/C Nizamabad - Dichpali line	3662.02		Jan'15	May'18 May'18	Award placed in Mar'15
21	GREEN ENERGY CORRIDORS:- Inter State Transmission Scheme (ISTS) - Part B (a) 765KV D/C Banaskanta - Chittorgarh (New) line (b) 765KV D/C Chittorgarh (New) - Ajmer (New) line (c) 400KV D/C Banaskanta - Sankhari line (d) Establishment of 765/400/220kV (765/400kV - 2x1500 MVA & 400/220kV - 2x500MVA) substation at Banaskanta	3705.61	36 / 37 th (29.08.13/05.09.14)	Apr'15	Apr'18 Apr'18 Apr'18 Apr'18	Award placed in July'15
22	GREEN ENERGY CORRIDORS:- Inter State Transmission Scheme (ISTS) - Part C (a) 765KV D/C Bhuj Pool - Banaskanta line (d) Establishment of 765/400/220kV (765/400kV - 2x1500 MVA & 400/220kV - 2x500MVA) pooling station at Bhuj	2247.37	36 / 37 th (29.08.13/05.09.14)	July'15	July'18 July'18	Award under progress.
23	Transmission System Strengthening Associated with Vindhyachal V - Part A (a) 1x1500MVA, 765/400kV ICT at Vindhyachal Pooling Station		34 th (09.05.12)	Feb'15	July'17	Award placed in Aug'15
24	Transmission System Strengthening Associated with Vindhyachal V - Part B		34 th (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}					

28	<p>Powergrid works associated with Part-B of Transmission system for Gadawara STPS of NTPC i.e. WRSS XV</p> <p>(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}</p> <p>(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)}</p>		36/37th (29.08.13 / 05.09.14)			Matching with TBCB Schedule
29	<p>Powergrid works associated with System Strengthening for IPPs in Chhattisgarh and other generation projects in Western Region</p> <p>(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}</p> <p>(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)}</p> <p>(c) 2 no. 400 kV line bays at Gwalior Substation {for Gwalior - Morena 400 kV D/c (quad)}</p> <p>(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)}</p>		36th (29.08.13)			Matching with TBCB Schedule

	<p>(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}</p> <p>(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}</p> <p>(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}</p>					
30	<p>Powergrid works associated with Additional System Strengthening Scheme Chhattisagrh IPPs Part-B</p> <p>(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}</p>		36/37th (29.08.13 / 05.09.14)			DPR under Preparation
30	<p>Powergrid workds associated with Additional System Strengthening for Sipat STPS</p> <p>(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)</p>		36/37th (29.08.13 / 05.09.14)			DPR under Preparation

	(b) 2 nos. 240 MVAR, 765 kV switchable line reactors at 765/400kV Bilaspur PS end for Bilaspur PS(PG) - Rajnandgaon(TBCB) 765 kV D/c					
31	Transmission System Strengthening associated with Mundra UMPP- Part A (a) LILO of both circuits of Mundra UMPP-Limbdi 400kV D/c (triple snowbird) line at Bachau	266.19	36th (29.08.13)		30 months from date of investment approval	
32	Transmission System Strengthening associated with Mundra UMPP- Part B (a) Mundra UMPP - Bhuj Pool 400kV D/c line (triple snowbird)		36/38th (29.08.13/17.07.2015)			DPR under Preparation
33	Bays for Transmission System Associated with DGEN Torrent Energy Ltd (1200MW) (a) 2nos 400kV Bays at Vadodara (GIS) (b) 2nos 220kV Bays at Navsari (GIS)		13/14th LTA (27.12.10/13.05.2011)			DPR under Preparation
34	Western Region System Strengthening -16		38th (17.07.15)			DPR under preparation
	(a) Installation of 2x500MVA, 400/220kV ICTs with associated bays at Parli (PG) switching station along with provision of six nos. of 220 kV bays (b) Provision of two nos. of 220kV bays at Raipur (PG) S/s (c) Provision of two nos. of 220kV bays at Mapusa (Colvale) 400/220 kV substation (d) Installation of 500MVA, 400/220kV (3rd) ICT with associated bays at Satna (PG) S/s with provision of two nos. 220kV line bays (e) Provision of two nos. of 400 kV bays at 765/400kV Indore(PG) substation					

Annexure-3

REPORT ON UTILIZATION OF NAVI MUMBAI SUBSTATION

1.0 Background

In the 25th SCM of WR held on 30.09.2006 following scope of works were agreed to be implemented under Western Regional system strengthening scheme (WRSS –V) by PGCIL:

- (i) Establishment of 400/220kV, 2X315MVA new (GIS) at Navi Mumbai.
- (ii) 400kV Vapi – Navi Mumbai D/C line.
- (iii) LILO of 400kV Lonikand/Pune – Kalwa line at Navi Mumbai.
- (iv) 220kV Vapi – Khadoli D/C line.

In 27th SCM of WR held on 30.07.2007, Pune (PG) – Navi Mumbai (PG) 400kV D/C line was also agreed as a regional system strengthening scheme in Western Region to be implemented in time frame of Krishnapatnam UMPP. In the 32nd SCM of WR held on 13.05.2011, PGCIL requested for reconsideration of Pune (PG) – Navi Mumbai (PG) 400kV D/C line in view of severe RoW constraints envisaged during implementation and it was agreed that MSETCL could suggest alternative location for termination of line from Pune for onward dispersal of power.

In the 35th SCM of WR held on 3/1/2013, LILO of Kharghar – Padghe section of Lonikhand – Kalwa line-1 at Navi Mumbai was agreed instead of LILO of Lonikhand/ Pune – Kalwa 400kV S/C line-2 as agreed under WRSSS-V. It was also agreed to lay 1.5km of 400kV underground cable near gantry of Navi Mumbai sub – station to expedite the implementation of LILO arrangement which was held up due to severe RoW issues. Further, in the same SCM, in view of severe RoW problem near Navi Mumbai, termination of 400kV Vapi – Navi Mumbai D/C line at Kudus S/s of MSETCL was agreed and PGCIL was requested to continue their efforts for completing the balance portion of the Vapi – Navi Mumbai 400kV D/C line.

In the 38th SCM of WR held on 17/7/2015, MSETCL requested to review the 400kV Navi Mumbai (PG) S/s. In the meeting, it was agreed that CEA, CTU and MSETCL would carry out joint study for exploring effective utilization of Navi Mumbai 400 kV substation. The matter was further discussed with MSETCL and CEA. System studies have been carried out for better utilization of Navi Mumbai S/s and additional 400kV ISTS feed to Navi Mumbai S/s.

2.0 System Study for additional 400kV ISTS feed to Navi Mumbai S/s

The system study has been carried out for better utilization of Navi Mumbai substation by providing additional ISTS feed and shifting 220 kV and 33 kV loads, thereby relieving the nearby highly loaded Kalwa and Kharghar substations in the Mumbai area.

The time frame of the study has been considered as 2018-19.

Transmission system considered for study:

220kV Interconnection at Navi Mumbai:

The following 220kV interconnections have been considered for drawal of power from Navi Mumbai substation at 220kV by MSETCL:

- LILO of Apta Kalwa 200 kV S/c line
- Kharghar- Kandalgaon 220 kV S/C line at Navi Mumbai

400kV Interconnection at Navi Mumbai:

At present, the following 400kV interconnection is under implementation:

- LILO of Padghe (MSETCL) - Karghar 400 kV S/C line at Navi Mumbai

General power map for Mumbai and surrounding areas has been enclosed as Annexure – 1.

In order to provide additional power feed to Navi Mumbai, the following has been considered:

- Padghe PG - Navi Mumbai 400kV D/C (Quad) line (60 km)

The study results are tabulated below:

S no	Power Flows in major lines feeding power to Mumbai/Navi Mumbai area	Base Case (W/o Navi Mumbai) (EXHIBIT- A)	1 + LILO of Padghe - Karghar 400 kV S/C line at Navi Mumbai + LILO of Apta-Kalwa 200 kV S/c line and Kharghar-Kandalgaon 220 kV S/C line at Navi Mumbai (EXHIBIT – A1)	2 + Padghe PG - Navi Mumbai 400kV D/C (Quad) line (New -Alt-1) (EXHIBIT-B)
		1	2	3
a	Padghe(MSETCL)-Kalwa 400kV 2xS/C line *	1306	1306	1079
b	Padghe(MSETCL)-Kharghar 400kV S/C line *	545	-	-
c	Padghe(MSETCL)-Navi Mumbai 400kV S/C line *	-	651	147
d	Navi Mumbai-Kharghar 400kV S/C line*	-	324	1028
e	Kalwa-Kharghar 400kV S/C line *	105	232	-294.5
f	Pune PG AIS-Kalwa 400kV S/C line*	842	854	636
g	Padghe PG - Navi Mumbai 400kV D/C (Quad)	-	-	1414

h	Pune PG - Navi Mumbai 400kV D/C (Quad)	-	-	-
I	Apta – Kalwa 220 kv S/C line	45	-	-
J	Kandalgaon - Kharghar 220 kV S/C line	45	-	-
K	Navi Mumbai – Apta 220 kV S/C line	-	57	100
L	Navi Mumbai – Kalwa 220 kv S/C line	-	236	332
M	Navi Mumbai – Kharghar 220 kv S/C line	-	56	75
N	Kandalgaon - Navi Mumbai 220 kv S/C line	-	27	-20

* Thermal limit of 400 kV lines - 852 MVA.

Observations :

Outage of any 400kV S/C line connecting Kalwa 400kV S/S to Pune PG or Padghe 400kV substations in Case-1 will cause overloading (crossing of thermal limit) on remaining 400 kV emanating from Kalwa. For example, loading on Padghe(MSETCL)-Kalwa 400kV S/c and Pune PG - Kalwa 400kV S/c in case of outage of one ckt. of Padghe(MSETCL)-Kalwa 400kV 2XS/c line will be approximately 875 MVA and 975 MVA respectively. Similarly, loading on Padghe(MSETCL)-Kalwa 400kV S/c and Pune PG-Kalwa 400kV S/c in case of outage of Padghe(MSETCL) – Kharghar will be 800MVA and 890 MVA respectively.

From above, it may be noted that system connecting to Kalwa 400 kV substation is not complying with 'N-1' criterion. Therefore, additional feed to Navi Mumbai sub-station is required to ensure reliable power supply to Mumbai and surrounding area.

From power flow results it may be observed that injection of power to Navi Mumbai through Padghe PG – Navi Mumbai 400 kV D/C (Quad) line is 1414 MW. However it may be mentioned that power flow on Navi Mumbai – Kharghar 400 kV S/C line (approximately 20 km in length), formed after LILO of Padghe – Kharghar 400kV S/C line at Navi Mumbai, is about 1025 MW. This loading may be reduced with shifting of load from Kharghar and Kalwa area to Navi Mumbai.

Further, it may be seen from study result that the loading on ICTs at Navi Mumbai is 527 MVA and the same is not complying the 'N-1' criterion (330 MVA under 'N-1' contingency). Therefore a new ICT is required at Navi Mumbai S/s. In view of above, following system strengthening is proposed.

- Padghe PG – Navi Mumbai 400kV D/C (Quad) line.
- 1X500 MVA, 400/220 kV ICT (3rd) at Navi Mumbai S/s.

Note : Shifting of loads from Kalwa and Kharghar areas to Navi Mumbai S/s in order to reduce the loading on Navi Mumbai – Kharhar 400 kV S/C line.

More load can be fed at 33kV level in the Navi Mumbai substation by installation of 220/33kV Transformers alongwith 33kV outlets in coordination with DISCOMs/MSEDCL. With this arrangement, about 100-200MW power may be directly fed from 400/220/33kV transformers at 33kV distribution system in Navi Mumbai area. This shall improve the efficiency of 33kV distribution level and reduce losses. It shall also solve problem of ROW issues that may be encountered in laying more 33kV distribution system in the area.

3.0 Proposal

The total transmission system associated with the Navi Mumbai S/s including the proposed additional interconnection may be summarized as below :

➤ 400kV System (under implementation)

- LILO of Padghe (MSETCL) – Kharghar 400kV line at Navi Mumbai.
- Establishment of 2X315MVA, 400/220kV new (GIS) at Navi Mumbai.

➤ 400kV System (New)

- Padghe PG – Navi Mumbai 400kV D/C (Quad) line for additional ISTS feed to Navi Mumbai S/s.
- 1X500 MVA, 400/220 kV ICT (3rd) at Navi Mumbai S/s.

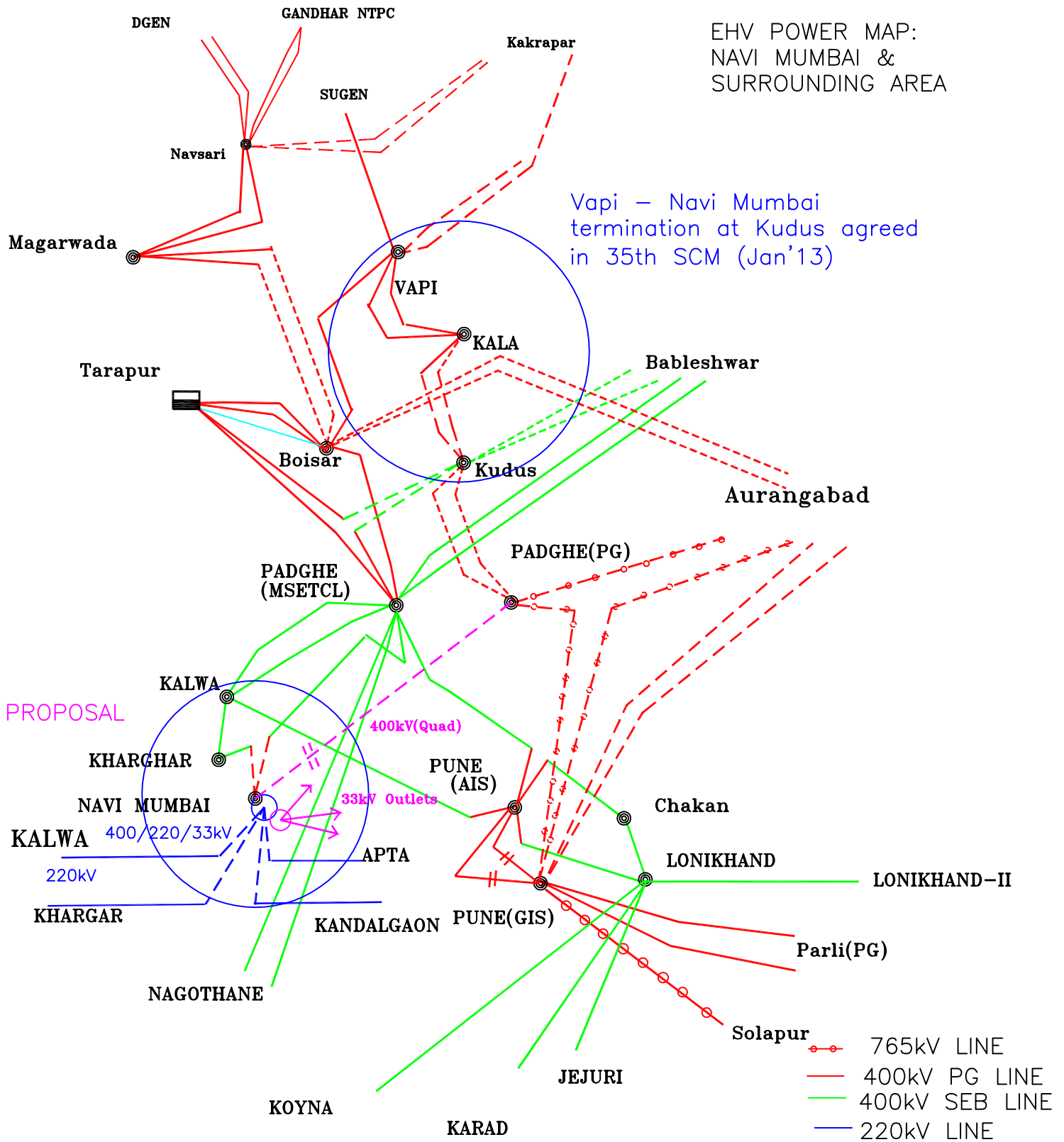
Note : Shifting of loads from Kalwa and Kharghar areas to Navi Mumbai S/s in order to reduce the loading on Navi Mumbai – Kharghar 400 kV S/C line.

➤ 220kV System

- LILO of Apta – Kalwa 220kV S/C line at Navi Mumbai S/s. (approved)
- LILO of Kandalgaon– Kharghar 220kV S/C line at Navi Mumbai S/s. (approved)
- Installation of 220/33kV Transformers at Navi Mumbai substation and plan 33kV outlets from Navi Mumbai substation in coordination with DISCOMs/MSEDCL. (New)

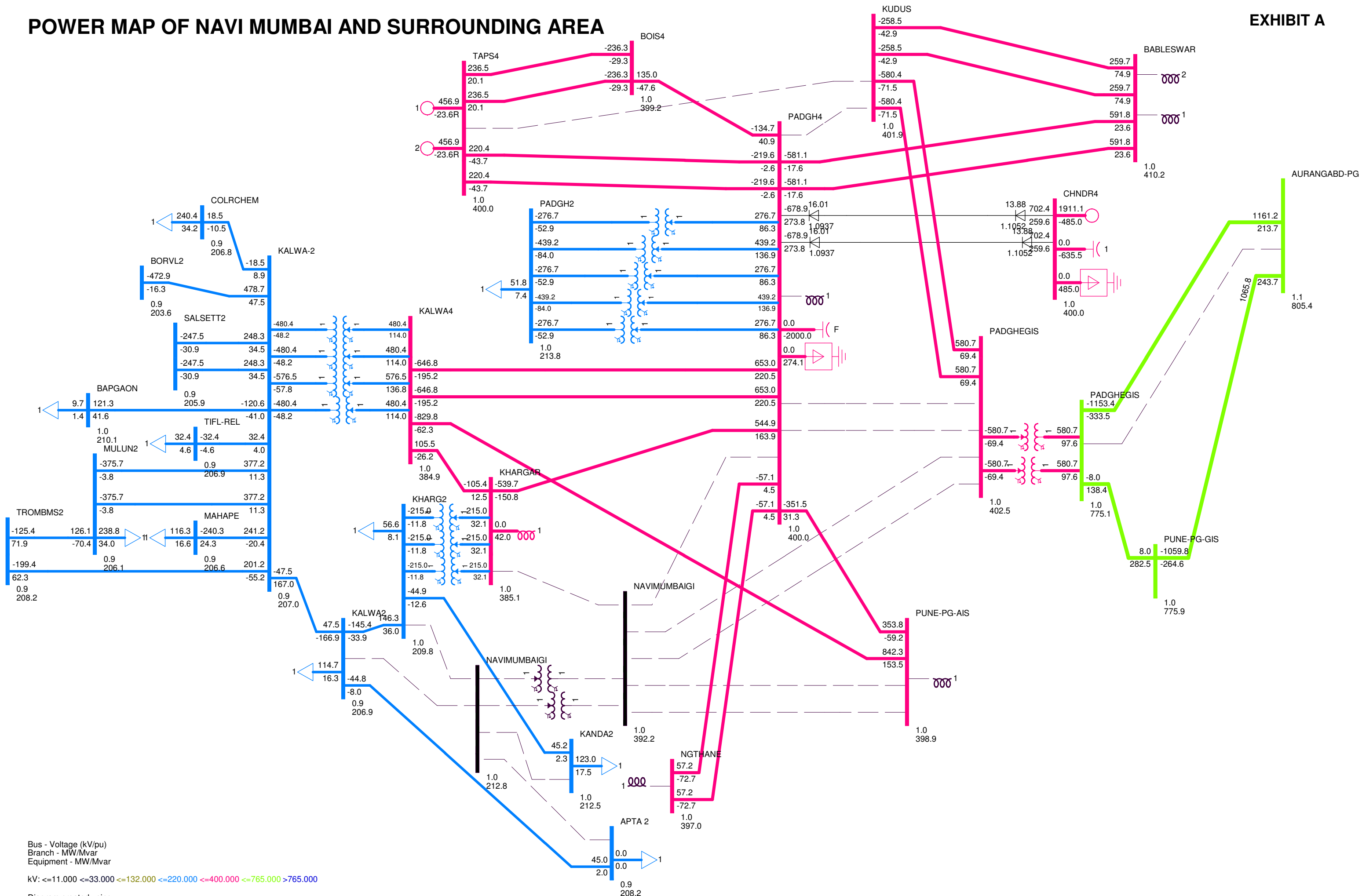
**EHV POWER MAP:
NAVI MUMBAI &
SURROUNDING AREA**

Vapi – Navi Mumbai
termination at Kudus agreed
in 35th SCM (Jan'13)



POWER MAP OF NAVI MUMBAI AND SURROUNDING AREA

EXHIBIT A



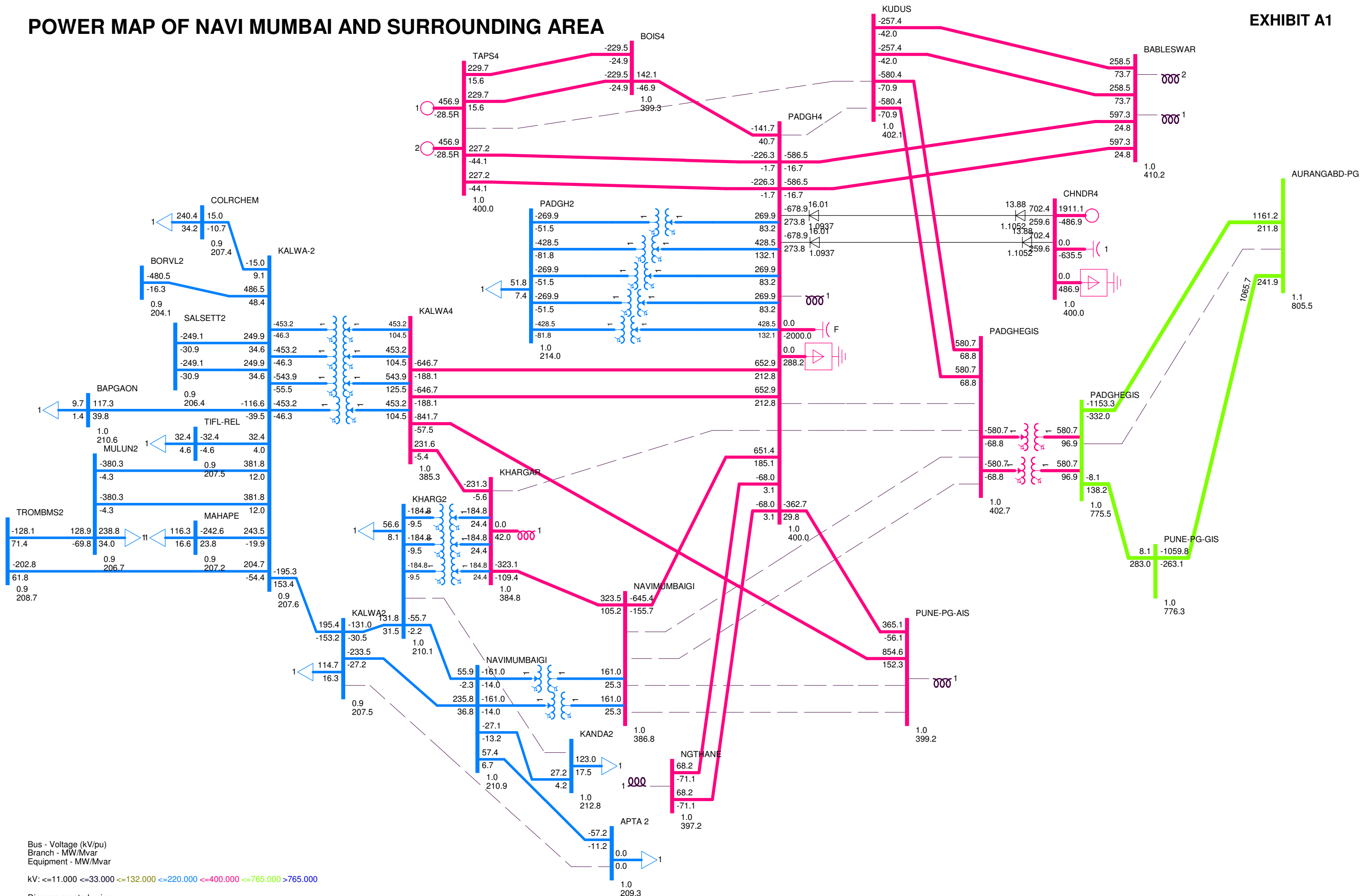
Bus - Voltage (kV/pu)
 Branch - MW/Mvar
 Equipment - MW/Mvar

kV: <=11.000 <=33.000 <=132.000 <=220.000 <=400.000 <=765.000 >765.000

Diagram created using
 'Z:\Study\Planning\Navi Mumbai utilisation study\Study File Rev 1\All India 2018-19 Peak File_NR-27000MW_WR-NR-New Applications-Low ren-with HVDC-extreme-m-wo line R2.sav'
 'Z:\Study\Planning\Navi Mumbai utilisation study\Study File Rev 1\Navi Mumbai R1-with revised LGB file.sld'

POWER MAP OF NAVI MUMBAI AND SURROUNDING AREA

EXHIBIT A1



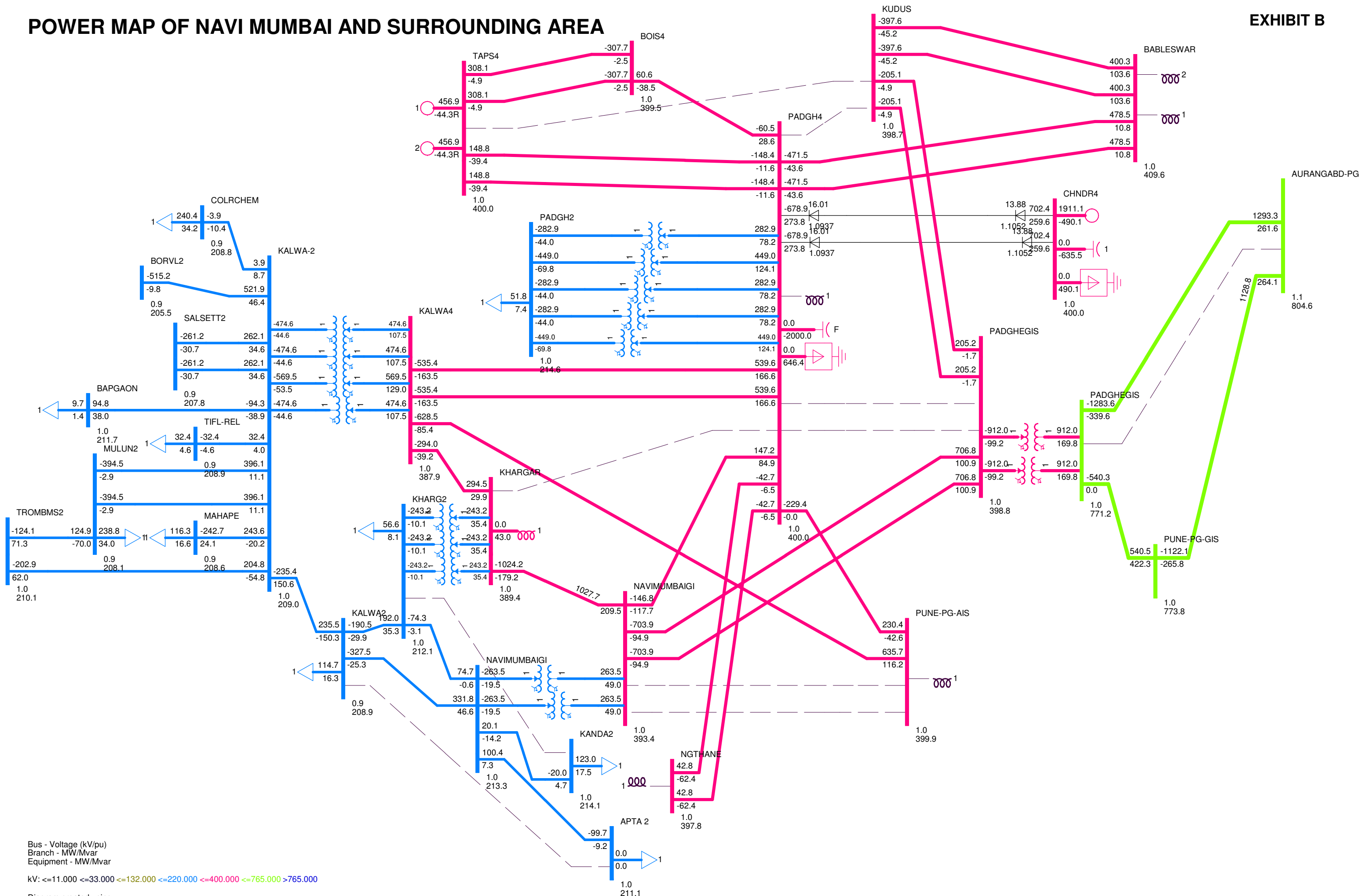
Bus - Voltage (kV/pu)
 Branch - MW/Mvar
 Equipment - MW/Mvar

kV: <=11.000 <=33.000 <=132.000 <=220.000 <=400.000 <=765.000 >765.000

Diagram created using
 'Z:\Study\Planning\Navi Mumbai utilisation study\Study File Rev 1\All India 2018-19 Peak File_NR-27000MW_WR-NR-New Applications-Low ren-with HVDC-extreme-m-wo line R2.sav'
 'Z:\Study\Planning\Navi Mumbai utilisation study\Study File Rev 1\Navi Mumbai R1-with revised LGB file.sld'

POWER MAP OF NAVI MUMBAI AND SURROUNDING AREA

EXHIBIT B



Bus - Voltage (kV/pu)
 Branch - MW/Mvar
 Equipment - MW/Mvar

kV: <=11.000 <=33.000 <=132.000 <=220.000 <=400.000 <=765.000 >765.000

Diagram created using
 'Z:\Study\Planning\Navi Mumbai utilisation study\Study File Rev 1\All India 2018-19 Peak File_NR-27000MW_WR-NR-New Applications-Low ren-with HVDC-extreme-m-wo line R2.sav'
 'Z:\Study\Planning\Navi Mumbai utilisation study\Study File Rev 1\Navi Mumbai R1-with revised LGB file.sld'

Annexure-4



भारत सरकार / Government of India
विद्युत मंत्रालय / Ministry of Power
केंद्रीय विद्युत प्राधिकरण / Central Electricity Authority
विद्युत प्रणाली योजना एवं परियोजना मूल्यांकन विभाग
Power System Planning & Project Appraisal Division - I
सेवा भवन आर के पुरम / Sewa Bhawan, R.K. Puram
नई दिल्ली / New Delhi - 110 066



[ISO : 9001 : 2008]

No.26/10/2015-SP&PA/251-256

Dated: 2nd March 2016

To

1	COO (CTU), Power Grid Corp. of India Ltd., "Saudamini", Plot No. 2, Sector-29, Gurgaon-122001 Fax 0124-2571760/2571932	4	The Managing Director, GETCO, Sardar Patel Vidyut Bhawan, Race Course, Baroda-390007 Fax 0265-2338164
2	The Member Secretary, Western Regional Power Committee, MIDC Area, Marol, Andheri East, Mumbai Fax 022 28370193	5	Uday Trivedi, Associate Vice president - Protection and Metering Adani Power Ltd, 8-A, 'sambhav', opp. Judge's Bungalow, bodakdev, Ahmedabad - 380015
3	GM, WRLDC Plot no F-3, MIDC Area, Msarol, Andheri(East) Mumbai-400093 Fax no 022-28235434	6	Alok Uppal, Group Head-EMD Coastal Gujarat Power Limited, UMPP Tunda Vandh road, Tunda village Mundra Kutch 370435

Sub: Interconnection of CGPL UMPP and Adani Mundra generation plants -
Minutes of the meeting held at Adani TPS, Mundra on 17.02.2016.

Sir,

The minutes of the meeting held on 17-02-2016 at Adani TPS, Mundra to discuss the possible interconnections between Mundra UMPP and Adani Mundra TPS is enclosed.

Yours faithfully,


(Awdhesh Kumar Yadav)
Director, PSP&PA-I

Minutes of Meeting held on 17.02.2016 at Adani Mundra TPS Gujarat to discuss the possible interconnection between Mundra UMPP and Adani Mundra TPS.

The issue of interconnection between M/s CGPL UMPP and M/s Adani Mundra generation plant was discussed in 38th SCM of WR held on 17.07.2015 wherein it was decided that the issue would be studied jointly by CEA, CTU and GETCO. A meeting was held in CEA on 09.10.2015 to discuss the possible interconnection between Mundra UMPP and Adani Mundra TPS, wherein, it was agreed to hold the next meeting at Adani Mundra TPS / Mundra UMPP so that physical feasibility of the possible interconnection may also be examined.

Accordingly, a meeting was held on 17.02.2016 at Adani Mundra TPS Gujarat. The list of participants is enclosed as **Annexure-I**.

Preliminary discussions were held at conference hall of Adani Mundra TPS and after that field visit of APL switchyard, CGPL switchyard and tower locations of the lines emanating from APL switchyard were done. The observations made by the participants are as given below:

1. M/s CGPL Switchyard:

- (i) The 400 kV switchyard has got Breaker and a half bus scheme with I Type bay arrangement. The orientation of the switchyard is North- South. There are ten Ties. Out of the 10 nos. of bays on the line side, 6 nos. of bays associated with Tie 1 to 6 from north side of the 400 kV switchyard are equipped as line bays for CGPL- Bachau line-1 & 2, CGPL- Jetpur line-1 & 2 and CGPL-Limdi line-1&2 respectively. The remaining 4 nos. of bays (Tie 7 to 10) are not equipped and space is available for future 4 nos. of 400 kV bays towards the south side of the switchyard. Out of the 10 nos. of bays on the GT side, 6 nos. of bays associated with Tie 1,4,5,6,8,10 have been used for Generator Transformer (GT-5), GT-4, Bus reactor, GT-3, GT-2 and GT-1 respectively.
- (ii) On the south side of the 400 kV switchyard, there is 220 kV switchyard with one 220 kV line bay and two nos. of 220/11.5 kV, 45 MVA transformers. The line bays have been provided for CGPL - Nani Khakhar 220 kV S/C line (GETCO) strung on D/C towers. The 220 kV switchyard was constructed for providing construction power to M/s CGPL at 11 kV from Nani khakhar 220 kV substation of GETCO. At present the CGPL- Nani Khakhar 220 kV S/C line is charged from Nani Khakhar end up to the gantry of 220 kV switchyard. The two nos. of 220/11.5 kV, 45 MVA transformers are not in use.

2. M/s APL Mundra Switchyard:

- (i) APL Mundra switchyard consists of 220 kV switchyard, 400 kV switchyard 1 and 400 kV switchyard 2. The 220 kV switchyard has got Double Main and Transfer scheme and the 400 kV switchyard has got Breaker and a half bus scheme with I Type bay arrangement. The orientation of the switchyard is West- East.
- (ii) The 220 kV switchyard is located on the western side with six nos. of 220 kV lines namely, MRSS line-2, MRSS line-1, Nanikhakhar line-2 & 1 and Tappar line - 2 & 1 (Bays arrangement is MRSS-1(Bay201), Nanikhakar -2 (Bay 202) & 1(Bay 203), Tappar # 1 (Bay 204) & 2(Bay 205) & MRSS-2 (Bay -212) from

west towards east). There is no space for provision of additional 220 kV bays in the switchyard.

- (iii) The 400 kV switchyard 1 consists of 9 Ties (Tie 1 to 9 from west to east). The line side bays of Tie 1 to 9 has been used for Varsana line-1, Hadala line, Dehgam line-2&1, Zerda Line 1&2 (future line), Varsana line- 2 & 3 and Bus reactor 2 respectively. The generator side bays of Tie 1,2,3,4,5,6,8,9 has been used for GT-3 (420/24 kV), ICT-1 (400/220 kV), ICT-2 (400/220 kV), GT-4, GT-5, spare bay (equipped), GT-6 and Bus Reactor 1 respectively. Line side of Tie 5 and 6 is vacant for termination of Zerda (Kansari) line-1 & 2. Adani- Zerda (Kansari) line -3 & 4 has been terminated at Varsana as an interim arrangement and has been designated as Varsana line-2&3. There is no space for provision of additional bays in the 400 kV switchyard 1.
- (iv) The 400 kV switchyard 2 consists of 6 Ties (Tie 10 to 15 from west to east). The line side bays of Tie 10 to 15 has been used for 400 kV Line-1 to 6 feeding HVDC. The generator side bays of Tie 10 to 15 have been used for Bus Reactor 3, GT-7, ST-7, ST-8, GT-8 and GT-9 respectively. There is space for two nos. of 400 kV bays (Tie no. 16) on the eastern part of the 400 kV switchyard but there are constraints in taking out the lines from the switchyard.

3. 400 kV line crossings of CGPL UMPP and APL Mundra TPS

- (i) At present Adani – Zerda 400 kV line-2 and Adani – Varsana/ Hadala 400 kV D/C line crosses the CGPL- Bachau 400 kV D/C line (between tower location nos. 247-248 and 249 – 250 respectively) which is about 88 km away from CGPL switchyard.

4. Possible Interconnection between CGPL Mundra UMPP and Adani Mundra TPS (Interconnection would be normally in open condition)

- (i) Provision of 400/220 kV, 315 or 500 MVA transformer along with one no. of 400 kV bay and one no. of 220 kV bay at M/S CGPL 400 kV / 220 kV switchyard. The space for provision of transformer and bays are available at CGPL switchyard. The transformer would be normally kept disconnected either at 400 kV side or 220 kV side. In case of emergency start up power could be extended from Nanikhakar 220 kV substation to 400 kV CGPL bus.
- (ii) LILO of Adani-Varsana 400 kV S/C line-1 at CGPL Mundra UMPP 400 kV switchyard. Implementation of this alternative would require one or two nos. of 400 kV bays at CGPL switchyard. The LILO line has to cross two nos. of 220 kV D/C lines emanating from Adani switchyard and three nos. of 400 kV D/C lines emanating from CGPL switchyard.
- For termination of line at CGPL switchyard, two nos. of 400 kV bays in D arrangement would be required. The 400 kV switchyard has got Breaker and a half bus scheme with I Type bay arrangement, therefore termination of LILO line at CGPL switchyard would require more space. Normally the tie circuit breaker would be closed and the bus circuit breakers would be normally open. (CGPL opined that additional breaker/isolators associated with tie breaker may be installed outside CGPL switchyard so that during normal condition these isolators and breaker will be in closed condition thereby external power will not enter in CGPL 400KV switchyard).

- For interconnection of the line with CGPL switchyard in T arrangement would require only one no. of 400 kV bay. The bay circuit breaker would normally be in open position. Adani- Varsana 400 kV S/C line via CGPL switchyard would be continuous line in normal operating conditions. In case of emergency, start up power could be availed (by closing the T section) either from Adani Mundra TPS or from Varsana.
 - CGPL – Bhuj pool 400 kV D/C line has already been agreed and is under implementation by POWERGRID. The walk over survey of this line has already been done by POWERGRID. The common route of the CGPL-Bhuj 400 kV D/C line and LILO of Adani-Varsana 400 kV S/C line at CGPL from the CGPL 400 kV switchyard could be implemented on multi circuit towers to conserve RoW.
- (iii) A direct 400 kV interconnection between CGPL Mundra UMPP and Adani Mundra TPS. For implementation of this 400 kV S/C line one 400 kV bay each at Adani Mundra TPS and CGPL UMPP is required. Space for bays are available at both the switchyard but there are constraints in taking out the line from the APL Mundra 400 kV switchyard. This line has to cross Mundra-Mohindergarh HVDC line, Mundra to Earth electrode station line, three nos. of 400 kV D/C lines and two nos. of 220 kV lines emanating from Adani switchyard, three nos. of 400 kV D/C lines emanating from CGPL switchyard.
5. For LILO of Adani-Varsana 400 kV S/C line-1 at CGPL Mundra UMPP, the LILO point could be second or third tower from the APL switchyard. POWERGRID was requested to provide the approximate length of the LILO section and the intersection point with the route of CGPL- Bhuj 400 kV D/C line. GETCO was requested to provide the SLD of Nanikhakhar 220 kV substation.
 6. M/s CGPL informed that repercussions of inrush current needs to be studied in case start up power supply is availed directly from M/s APL.

The three alternatives as listed above would be put as agenda in the next Standing Committee Meeting on power System planning in WR.

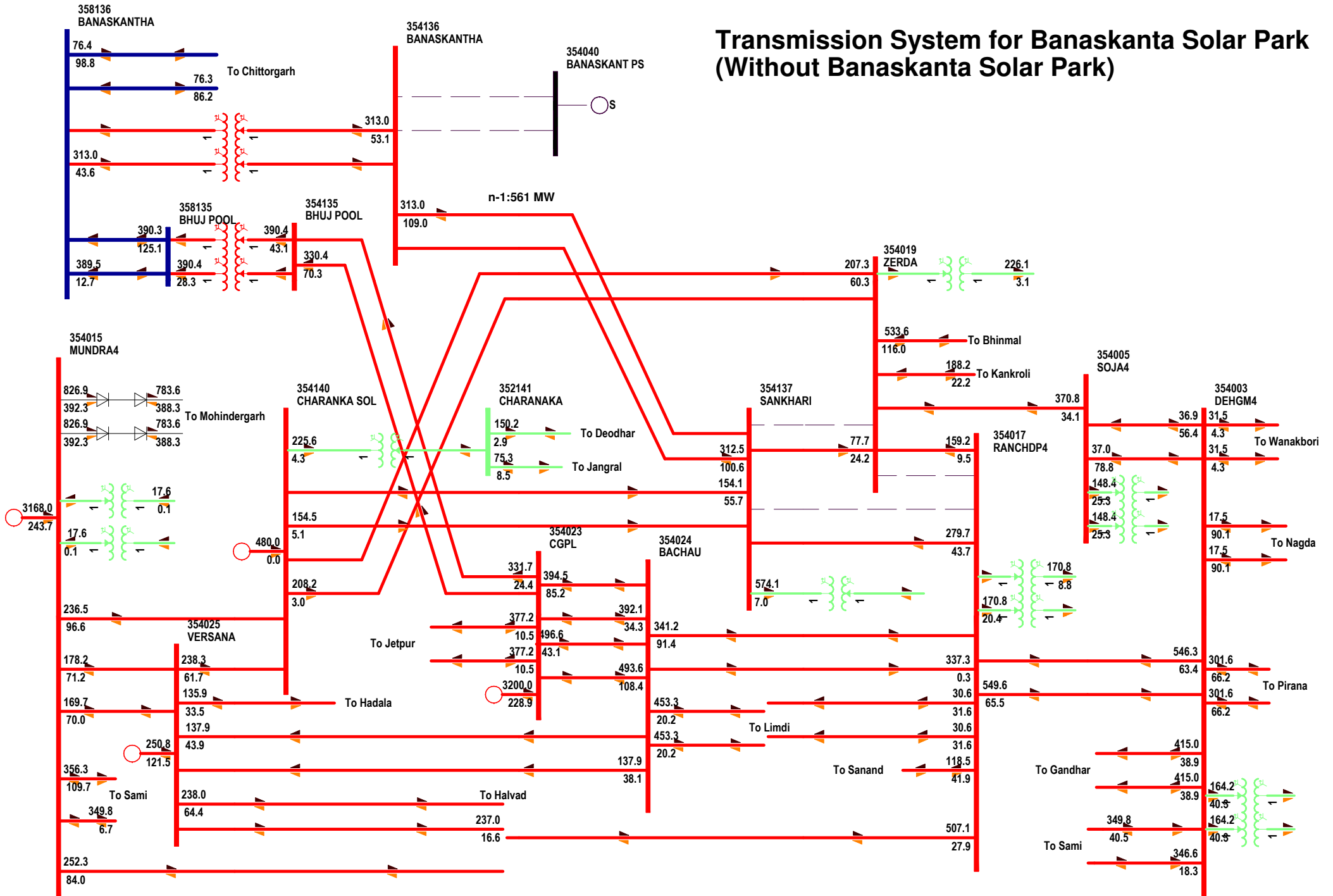
Annexure – I

List of Participants of the meeting held on 17.02.2016 Adani Power Limited TPS, Mundra, Gujarat

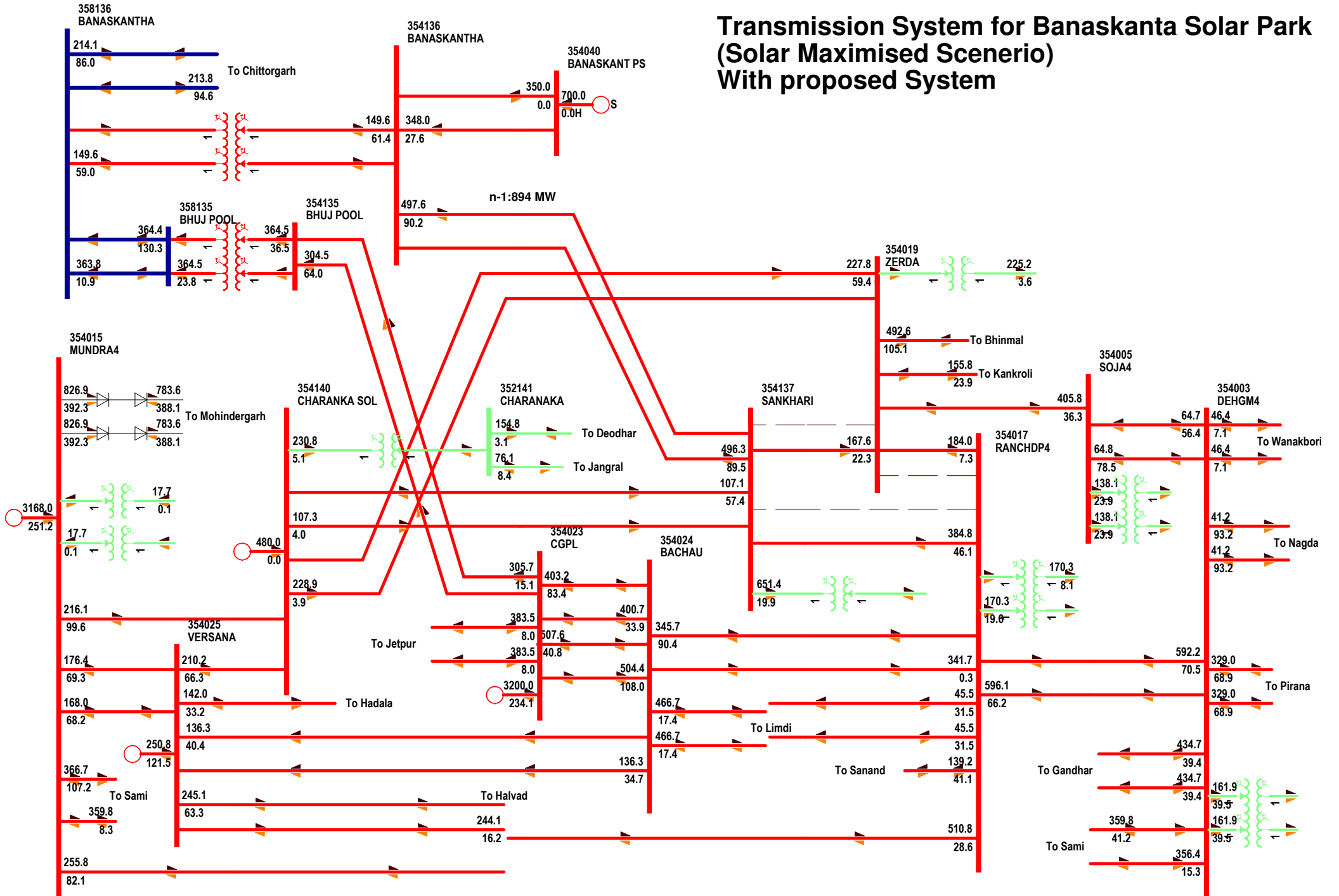
S.No.	Name (S/Sh)	Designation	Contact No
CEA			
1.	Awdhesh Kumar Yadav	Dir(PSP&PA-I)	9868664087
WRPC			
2.	S. Satyanarayan	SE	9223399938
CTU			
3.	Ramchandra	DGM	9910378128
POWERGRID			
4.	Roopesh K P	Manager, Rajkot	9429198136
5.	Siva Kumar	Chief Manager, Bachau	9429198025
6.	Tejas Parmar	JE, Bachau	9574740222
GETCO			
7.	N.M. Nakum	Superintending Engineer	9925209607
CGPL			
8.	K N Athavale	Head – EMD	9227295358
9.	Alok Uppal	Group Head – EMD	9099006430
APL			
10.	Pramod Saxena	Head – Mtce	9687660279
11.	Vijaya Kumar A	Sr. Manager	9979847667
12.	Brijesh Ghunjaria	Manager	9687660940
13.	Rasikbhai Rathwa	Manager	9979847594

Annexure-5

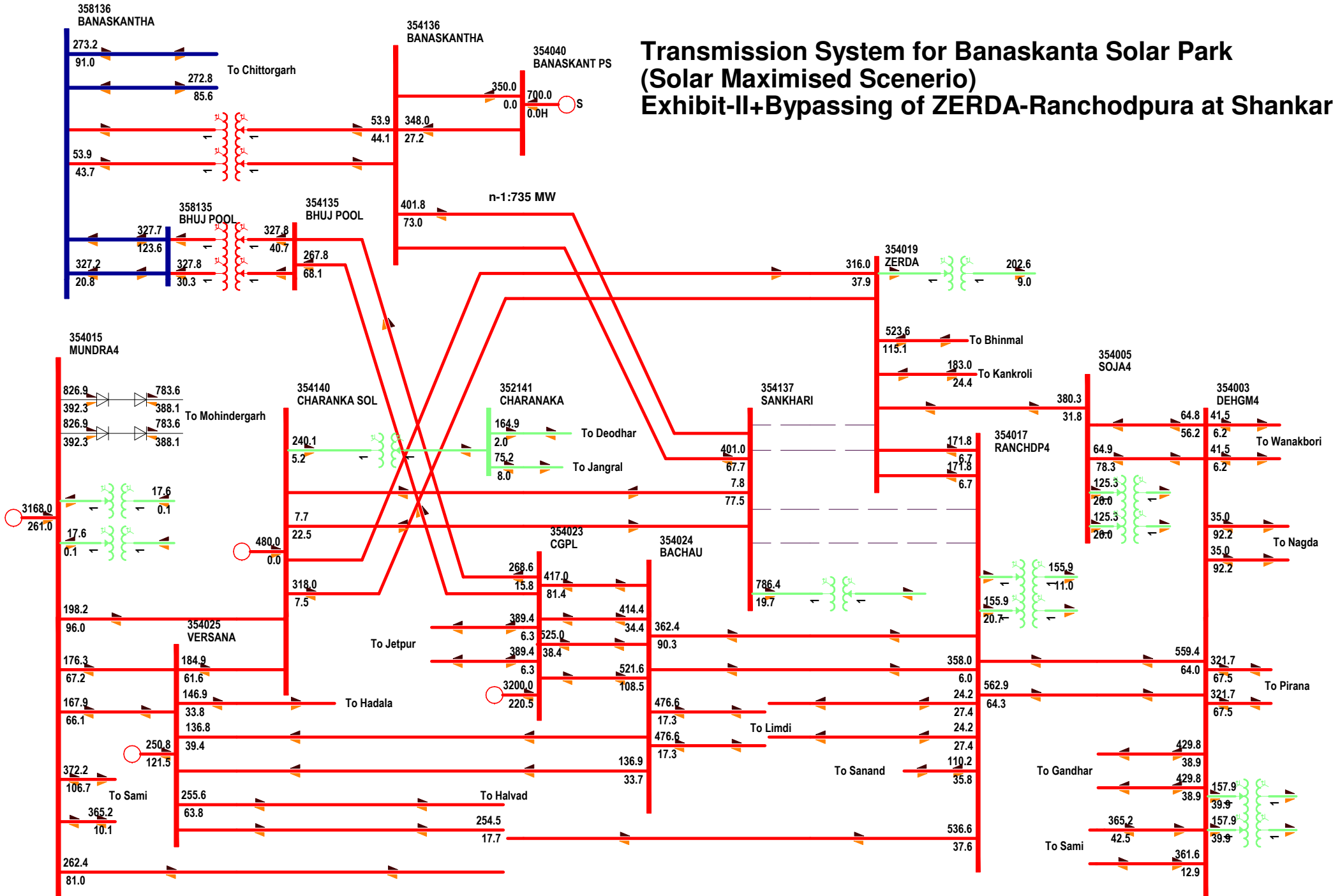
Transmission System for Banaskanta Solar Park (Without Banaskanta Solar Park)



Transmission System for Banaskanta Solar Park (Solar Maximised Scenerio) With proposed System



Transmission System for Banaskanta Solar Park (Solar Maximised Scenerio) Exhibit-II+Bypassing of ZERDA-Ranchodpura at Shankari



Annexure-6



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 आर के पुरम नई दिल्ली-110066
Sewa Bhawan, R. K. Puram, New Delhi-110066
वेबसाइट / Website: www.cea.nic.in



[ISO: 9001:2008]

पत्र संख्या : 26/10/2016-PSP&PA-I/ 147-154

दिनांक : 08.02.2016

सेवा मे,

1. Chairman and Managing Director, MPPTCL, Shakti Bhawan, Rampur, Jabalpur-482008
2. MD, GETCO, Sardar Patel Bhawan, Race Course, Vadodara - 390007
3. COO, CTU (Planning), PGCIL, Saudamini, Plot No. 2, Sector - 29, Gurgaon -122001
4. ED (Smart Grid), PGCIL, Saudamini, Plot No. 2, Sector - 29, Gurgaon -122001
5. Director, NSM, Ministry of New and Renewable Energy, Block - 14, CGO Complex, Lodhi Road, New Delhi -110003
6. General Manager (Solar), Solar energy Corporation of India, 1st floor, D - 3, wing - A, Religare Building, District Centre, Saket, New Delhi - 110017
7. Director, Rewa Ultra Mega Solar (RUMS) Limited, Urja Bhawan, Link Road 2, Shivaji Nagar, Bhopal Madhya Pradesh - 462016
8. Chief Project Officer, Gujarat Power Corporation Limited (GPCL), Block No. 6 & 8, Udyog Bhavan, Sector 11, Gandhi Nagar, Gujarat -382011

विषय :- **Minutes of the meeting held on evolution of transmission schemes for solar parks held on 02.02.2016**

महोदय \ महोदया,

उपरोक्त विषय पर हमारा पत्र उचित कार्यवाही हेतु संलग्न है।

संलग्न :- यथोपरि

भवदीय
केकेआर्या
(के.के. आर्या)
मुख्य अभियन्ता

१८



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 आर के पुरम नई दिल्ली-110066
Sewa Bhawan, R. K. Puram, New Delhi-110066 [ISO: 9001:2008]
वेबसाइट / Website: www.cea.nic.in



No. 26/10/2016/PSP&PA-I/

Date: 08.02.2016

1. Chairman and Managing Director, MPPTCL, Shakti Bhawan, Rampur, Jabalpur-482008
2. MD, GETCO, Sardar Patel Bhawan, Race Course, Vadodara - 390007
3. COO, CTU (Planning), PGCIL, Saudamini, Plot No. 2, Sector - 29, Gurgaon -122001
4. ED (Smart Grid), PGCIL, Saudamini, Plot No. 2, Sector - 29, Gurgaon -122001
5. Director, NSM, Ministry of New and Renewable Energy, Block - 14, CGO Complex, Lodhi Road, New Delhi -110003
6. General Manager (Solar), Solar energy Corporation of India, 1st floor, D - 3, wing - A, Religare Building, District Centre, Saket, New Delhi - 110017
7. Director, Rewa Ultra Mega Solar (RUMS) Limited, Urja Bhawan, Link Road 2, Shivaji Nagar, Bhopal Madhya Pradesh - 462016
8. Chief Project Officer, Gujarat Power Corporation Limited (GPCL), Block No. 6 & 8, Udyog Bhavan, Sector 11, Gandhi nagar, Gujarat -382011

Sub: Minutes of the meeting held on evolution of transmission schemes for solar parks held on 02.02.2016 - reg.

Sir / Madam,

Please find herewith an enclosure of minutes of the meeting held on 02.02.2016 at CEA, New Delhi on evolution of transmission schemes for solar parks in Madhya Pradesh and Gujarat.

Enclosure: As above

Yours faithfully,

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

Minutes of the meeting held on 02.02.2016 at CEA on transmission schemes for Solar Parks in Madhya Pradesh & Gujarat

Member (PS), CEA welcomed all the participants for the meeting on evolution of transmission schemes for solar parks in Madhya Pradesh and Gujarat. He stated that the transmission system for the solar parks needs to be evolved in an integrated and optimal manner as injection of power from solar parks would be there only during the day time.

Chief Engineer (PSP&PA-I) stated that MNRE has identified 27 solar parks in 21 states with total capacity of 18418 MW. MoP has assigned POWERGRID for implementation of transmission system of 9 solar parks as a part of Inter State Transmission System (ISTS). In the meeting held on 31.12.2015 and 01.01.2016 in Ministry of Power with participation from CEA, MNRE and CTU/PGCIL it was decided that the transmission system for solar parks in Gujarat (700 MW), Madhya Pradesh (2000 MW), Arunachal Pradesh (100 MW), Nagaland (60 MW), Himachal Pradesh (1000 MW), J&K (100 MW) and Telangana (500 MW) would be evolved jointly by CEA and POWERGRID within fortnight. This meeting has been convened to discuss the transmission system for solar parks in Madhya Pradesh and Gujarat. The transmission schemes of these solar parks shall be taken up in the Standing Committee Meeting on Power System Planning in Western Region for approval.

The list of participants is enclosed at Annexure-I.

Transmission system for Solar Parks in Madhya Pradesh

1. The Madhya Pradesh Power Transmission Company Limited (MPPTCL) proposal namely, **Development of infrastructure for Transmission System Strengthening for evacuation of power from New and Renewable energy based power projects in Madhya Pradesh** has already been approved by CEA in February 2015. The salient features of the proposal are :
 - (i) The MPPTCL proposal was for evacuation of power from Renewable energy based power projects of about 5850 MW capacity (Wind- 2704 MW, Solar- 2588 MW, Hydrel – 283 MW and Biomass – 272 MW) and its absorption into Madhya Pradesh intra state grid.
 - (ii) The estimated cost of the proposal is around Rs. 4700 crores which includes inter connection of renewable energy sources to the grid (Rs. 1125 Crores) and transmission system strengthening (Rs. 3575 Crores). The transmission system strengthening scheme for renewable energy sources has two phases i.e. Phase – I (Rs. 2100 Crores) and Phase – II (Rs. 1475 Crores). The transmission system strengthening scheme for renewable energy sources under phase-I for estimated cost of Rs 2100 has already been included in GEC-I for kFw funding.
 - (iii) The solar projects of about 2600 MW capacity included solar parks of 1600 MW capacity namely, Rewa (600 MW), Neemuch (500 MW), Mandsaur (200 MW), Rajgarh (100 MW) and Shajapur (200 MW). The transmission scheme for

RUMS (Rewa Ultra Solar Mega Park) has already been agreed in 39th Standing Committee Meeting of WR held on 30.11.2015 as ISTS (Establishment of Rewa pooling station along with LILO of Vindiyachal – Jabalpur 400 kV D/C line at Rewa pooling station). Further to increase the utilization of Rewa pooling station two nos. of 220 kV D/C lines (one to Rewa and other to Sidhi, both existing 220 kV substations of MPPTCL) to load centers has also been agreed (under scope of MPPTCL).

2. The solar parks of 2000 MW capacity proposed are located at Neemuch (500 MW), Mandsaur (250 MW), Shajapur (250 MW), Rajgarh (250 MW), Chhattarpur (250 MW), Morena (250 MW) and Agar (250 MW) districts of Madhya Pradesh. Madhya Pradesh was requested to clarify whether the solar parks proposed at Neemuch, Mandsaur, Rajgarh and Shajapur are in addition to the solar parks already considered in the Renewable energy generation projects of 5850 MW capacity or are the same with enhanced capacity.
3. Representative of Madhya Pradesh clarified that
 - (i) 2000 MW of solar parks proposed in Madhya Pradesh includes the solar parks of 1000 MW capacity already considered in the intra state transmission system strengthening scheme for 5850 MW capacity of renewable energy generation projects.
 - (ii) The capacity of the solar park at Neemuch (500 MW) is same whereas the solar park capacity at Mandsaur, Rajgarh and Shajapur has been increased to 250 MW each.
 - (iii) At Agar, Chhattarpur and Morena new solar parks of 250 MW each has been proposed. Further, at Chhattarpur, the potential for solar power was about 500 MW but at present only 250 MW solar park has been proposed.
 - (iv) The wind generation projects coming up in Madhya Pradesh is more than the capacity of wind generation project considered in the intra state transmission system strengthening scheme for 5850 MW capacity of renewable energy generation projects.
 - (v) At present, MPPTCL has taken up the implementation of the phase-I of the intra state transmission system strengthening scheme only which is included in the GEC-I. Phase-II of the intra state transmission system strengthening scheme for renewable energy projects would be taken up after implementation of phase-I and review of the renewable energy generation projects in Madhya Pradesh.
4. The transmission system for solar parks at
 - (i) Morena (250 MW): A 400/220 kV substation at Morena under ISTS has already been planned and is under implementation through tariff based competitive bidding route. The power from Morena solar park could be injected at Morena 400/220 kV substation.

- (ii) Chhattarpur (250 MW): The transmission system for evacuation of power from Barethi generation project is under finalization. To feed the Chhattarpur and Tikamgarh area a 400 kV substation is being planned in this area associated with the Barethi generation project. Depending on the time frame of the implementation of the Chhattarpur solar park, it could be initially integrated with the 220 kV network of MPPTCL and later with the 400/220 kV substation under ISTS. The 400 kV substation could also be implemented as a part of Barethi generation project or as system strengthening scheme depending on the implementation time frame of the solar park.
- (iii) Neemuch (500 MW), Agar (250 MW), Mandsaur (250 MW), Rajgarh (250 MW) and Shajapur (250 MW) :
- Out of total solar park capacity of 1500 MW at these locations, 1000 MW capacity of solar parks has already been considered in the intra state transmission system strengthening scheme for 5850 MW capacity of renewable energy generation projects in Madhya Pradesh.
 - POWERGRID has also proposed the transmission system for Neemuch and Agar (750 MW) solar parks in Madhya Pradesh under ISTS as a part of (Green Energy Corridor-II) GEC-II for solar parks.
 - A revised studies needs to be carried out for evolving the transmission scheme for evacuation of power from these solar parks.
 - MPPTCL would provide the updated PSSe file of Madhya Pradesh to POWERGRID incorporating the transmission system strengthening scheme for 5850 MW capacity of renewable energy generation projects for carrying out the revised studies.

5. Madhya Pradesh was requested to:

- (i) Provide updated PSSe file in 10 days time.
- (ii) Take-up with MNRE regarding the capacity of solar park at Chhattarpur. At present it is 250 MW, but land that has been identified has potential of 500 MW capacity.
- (iii) Provide the time frame of the development of solar parks in Madhya Pradesh along with the details of location.

Transmission system for Solar Parks in Gujarat

6. M/s GPCL (Gujarat Power Corporation Limited) is the implementing agency for the 700 MW Radhanesha Ultra Mega Solar Park in Gujarat (Banaskanta). M/s GPCL has

already applied for connectivity and LTA to the CTU. The LTA has been sought for 700 MW with Gujarat (140 MW) and WR (560 MW) as the drawing entity.

7. Regarding the transmission system for 700 MW Radhanesha Ultra Mega Solar Park GETCO vide their e-mail dated 01.02.2016 has conveyed that presently GUVNL have no share from the proposed Solar Park to be developed at Banaskantha. Therefore, GETCO will not develop any system for evacuation of power from proposed solar park. It is suggested that transmission scheme shall be planned for entire power evacuation through ISTS system.
8. CEA stated that for evacuation of power from Renewable Energy Generation projects in WR, Bhuj Pooling Station – Banaskantha – Chittorgarh 765 kV D/C line along with 765/400/220kV (765/400 kV-2x1500 MVA & 400/220kV-2x500MVA) sub-station each at Bhuj Pool and Banaskantha has been planned as ISTS and are already under implementation. The 3 voltage levels (765kV, 400 kV and 220 kV) were provided at Banaskantha to enable Renewable Energy Generation projects to inject the power at 400 kV or 220 kV voltage level depending upon the their quantum of injection. Therefore, Banaskantha solar park can get connected with Banaskantha 765/400/220 kV substation through 220 kV or 400 kV lines. M/s GPCL needs to intimate the voltage level so that POWERGRID may take up the implementation of 400 kV bays (in case GPCL injects at 400 kV voltage level) / 220 kV bays along with 400/220 kV ICTs (in case GPCL injects at 220 kV voltage level) for termination of the lines from the solar park.
9. Representative of M/s GPCL informed that at present the step up voltage of 220 kV has been planned at Banaskantha solar park and Banaskantha 765/400/220 kV substation is around 80 km away from the solar park. Therefore, it may not be commercially viable for the solar project to construct 220 kV transmission lines for injecting power at Banaskantha (PG) 400/220 kV substation. He opined that the pooling station may be developed near to the solar park.
10. Representative of POWERGRID informed that the land for Banaskantha 765/400/220 kV substation was given by Government of Gujarat and the same is under implementation, therefore, the change in location of Banaskantha 765/400/220 kV substation is not possible.
11. For evacuation of power from Banaskantha solar park, it was suggested that if step up voltage of 400 kV was made available at solar park, then a 400 kV D/C line from Banaskantha 765/400/220 kV to the solar park could be planned subject to the approval by SCM of WR. Otherwise, Banaskantha solar park needs to get connected with Banaskantha 765/400/220 kV substation through 220 kV lines or 400 kV lines for evacuation of power. Representative of M/s GPCL said that they would revert back on the issue.
12. Representative of M/s GPCL was requested to reply within 10 days time.

Meeting ended with thanks to the Chair.

Annexure I

List of participants of the meeting held on 02.02.2016 at CEA on transmission schemes for Solar Parks in Madhya Pradesh & Gujarat

S.No.	Name (S/Sh)	Designation	Contact No	E-mail
CEA				
1.	Shri. S. D. Dubey	Member (PS)		
2.	Shri. K. K. Arya	CE	011-26732305	
3.	Shri. Awdhesh Kr. Yadav	Dir (PSP&PA-I)	011-26732343	awd.cea@gmail.com
4.	Ms. Manjari Chaturvedi	Dy Dir (PSP&PA-I)	011-26732310	Manjari.cea@gmail.com
5.	Shri. Shiva Suman	Dy. Dir. (PSP&PA-I)	011-26732311	shivvasumanmedak@gmail.com
6.	Ms. Priyam Srivastava	AD –I (PSP&PA-I)	011-26732330	priyam.cea@gmail.com
7.	Shri. Satya Prakash	AD –II (PSP&PA-I)	011-26732317	satyaprakash.cea@gmail.com
POWERGRID / CTU				
8.	Shri. Kashish Bhambhani	Chief Manager	9971399117	kashish@powergridindia.com
9.	Shri. Chinmay Sharma	Engineer	8826094869	chinmays@powergridindia.com
10.	Shri. Raghavendar K	Engineer	8527391638	raghavendrak@powergridindia.com
MPPTCL				
11.	Shri. Anand Tiwari	SE	9425805718	babloo.tiwari@gmail.com
MPNRED				
12.	Shri. Mridul Khare	Dy. Commissioner	9425003666	mridulkhare@gmail.com
NRED				
13.	Shri. Sanjay Verma	AEE	9425647080	Aee3.mpurn1982@gmail.com
GPCL				
14.	Shri. Rajendra Mistry	CPO	9978407405	gpclprojects@gmail.com
NTPC Ltd.				
15.	Shri. B. Kamath	AGM	9650990801	kamathb@ntpc.co.in
16.	Shri. S.S. Mishra	AGM	9650991145	ssmishra@ntpc.co.in
SECI				
17.	Shri. Harendra Tomar	Manager	9560133288	hktomar@seci.gov.in

Annexure-7

	Solar Park in MP			Capacity
1	District	Neemuch		150 MW
	Tehsil	Rampura		
		Longitude	Latitude	
	Top Left	75.185217	24.535698	
	Top right	75.520757	24.541663	
	Lower left	75.190912	24.324372	
	Lower Right	75.525889	24.330556	
2	District	Neemuch		200 MW
	Tehsil	Singoli		
		Longitude	Latitude	
	Top Left	75.180612	25.051234	
	Top right	75.2783	25.053332	
	Lower left	75.18243	24.988668	
	Lower Right	75.279892	24.990756	
3	District	Neemuch		150 MW
	Tehsil	Jeeran		
		Longitude	Latitude	
	Top Left	74.723035	24.291187	
	Top right	74.812102	24.293328	
	Lower left	74.72476	24.234418	
	Lower Right	74.813878	24.236253	
			500 MW	
4	District	Mandsaur		250 MW
	Tehsil	Suwasara		
		Longitude	Latitude	
	Top Left	75.715776	24.117763	
	Top right	75.845258	24.119998	
	Lower left	75.717719	24.036552	
	Lower Right	75.847005	24.038444	
5	District	Agar		125 MW
	Tehsil	Agar		
		Longitude	Latitude	
	Top Left	76.10084	23.777412	
	Top right	76.148045	23.777951	
	Lower left	76.10186	23.719739	
	Lower Right	76.149131	23.720357	
	District	Agar		
	Tehsil	Susner		

6		Longitude	Latitude	125 MW
	Top Left	75.962091	24.100185	
	Top right	76.294389	24.104539	
	Lower left	75.966505	23.86716	
	Lower Right	76.298885	23.871468	
				250 MW
7	District	Shajapur		250 MW
	Tehsil	Mamonbadodiya		
		Longitude	Latitude	
	Top Left	76.158286	23.769781	
	Top right	76.404863	23.77319	
	Lower left	76.163854	23.444349	
	Lower Right	76.410268	23.448554	
8	District	Rajgarh		150 MW
	Tehsil	Jeerapur		
		Longitude	Latitude	
	Top Left	76.235586	24.21015	
	Top right	76.541691	24.213272	
	Lower left	76.242265	23.844615	
	Lower Right	76.545938	23.848601	
9	District	Rajgarh		100 MW
	Tehsil	Khilchipur		
		Longitude	Latitude	
	Top Left	76.411185	24.209445	
	Top right	76.58111	24.211893	
	Lower left	76.414299	23.987894	
	Lower Right	76.584261	23.99063	
				250 MW
10	District	Chatarpur		250 MW
	Tehsil	Bijawar		
		Longitude	Latitude	
	Top Left	79.782954	24.489615	
	Top right	79.895186	24.488452	
	Lower left	79.782186	24.418411	
	Lower Right	79.894127	24.417359	
11	District	Morena		250 MW
	Tehsil	Morena		
	Village	Jakhona		
		Longitude	Latitude	
		78° 04' 55.68"	26° 39' 08.28"	

GT

2000 MW

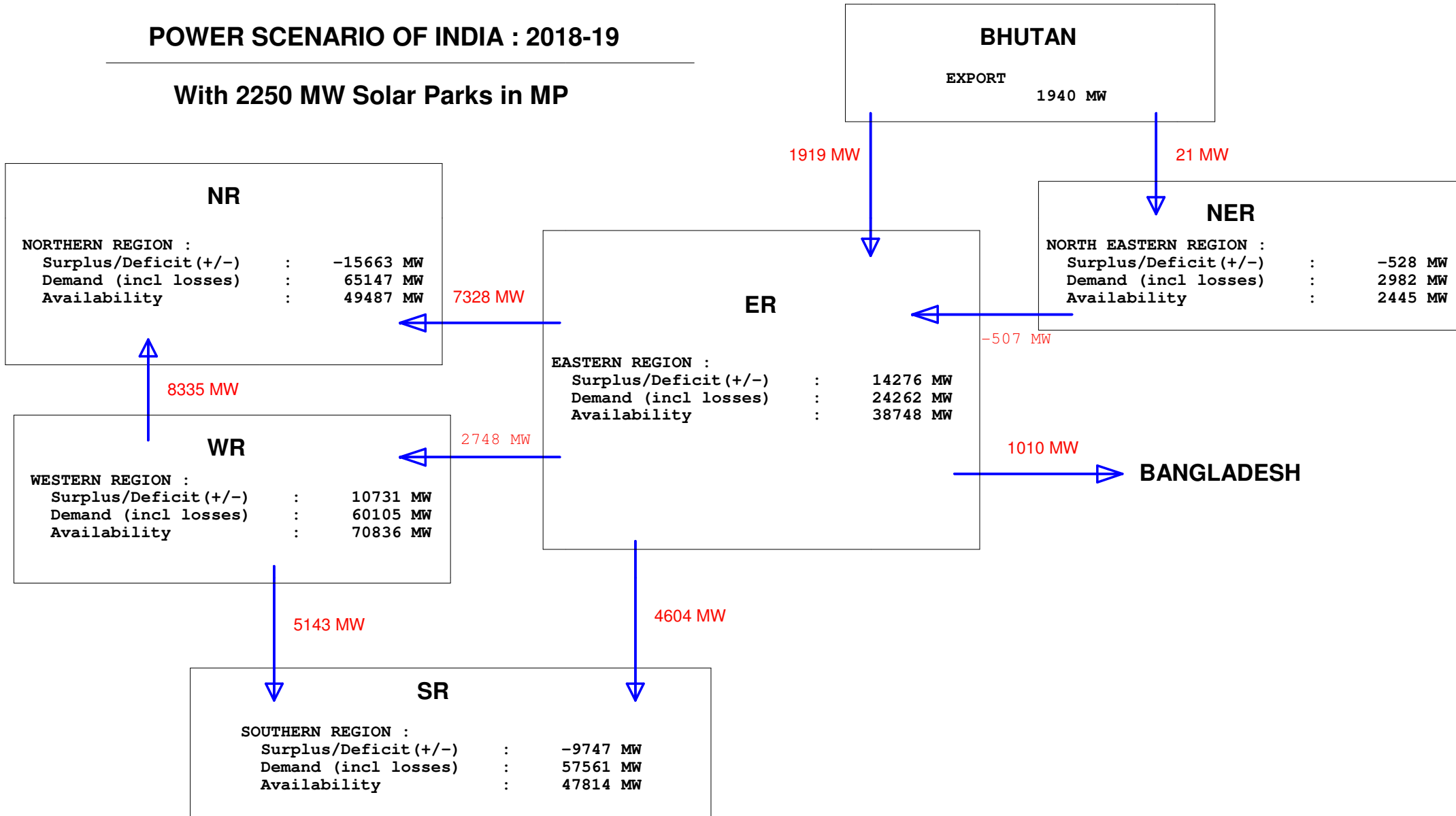


Google earth



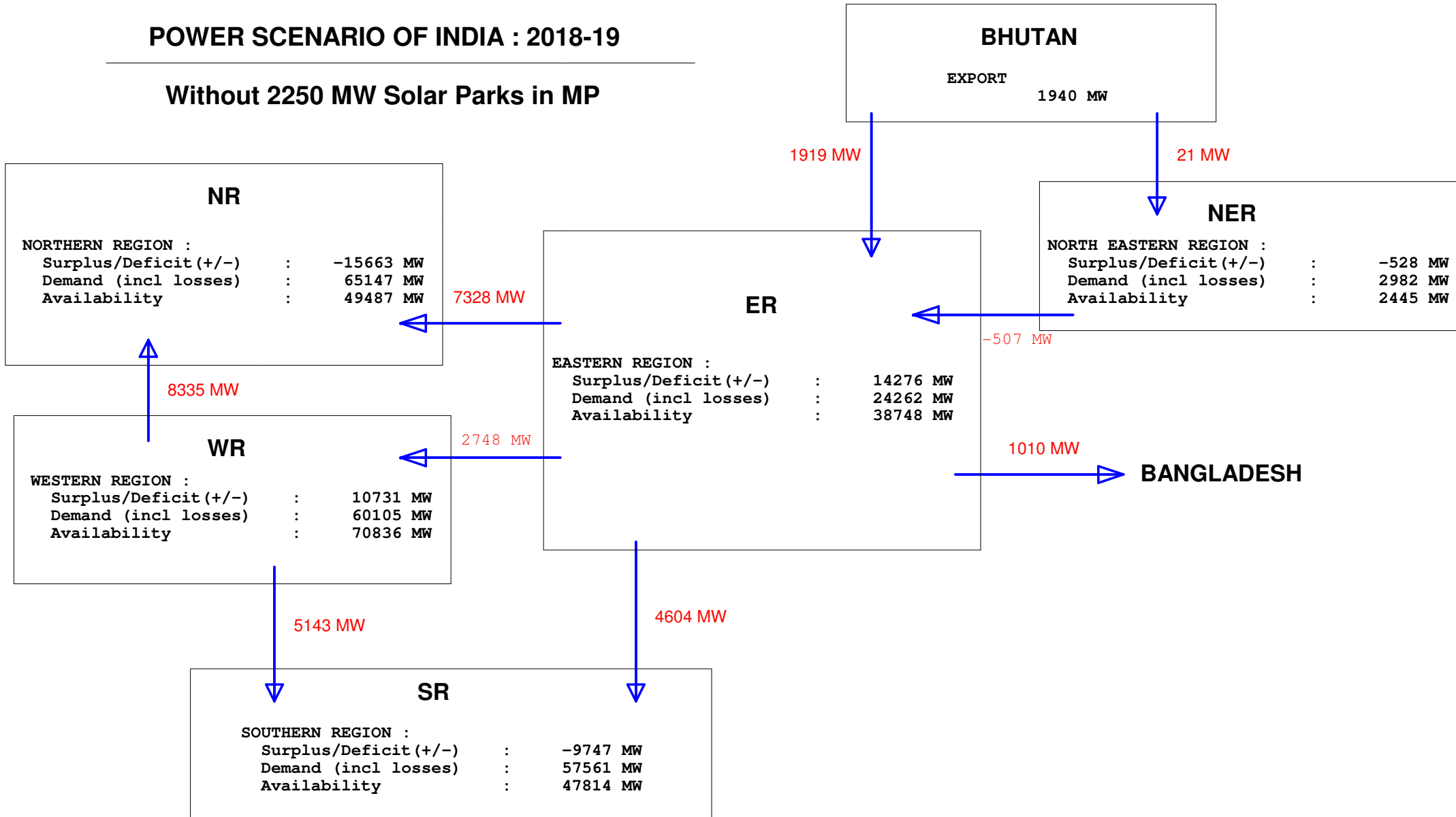
POWER SCENARIO OF INDIA : 2018-19

With 2250 MW Solar Parks in MP

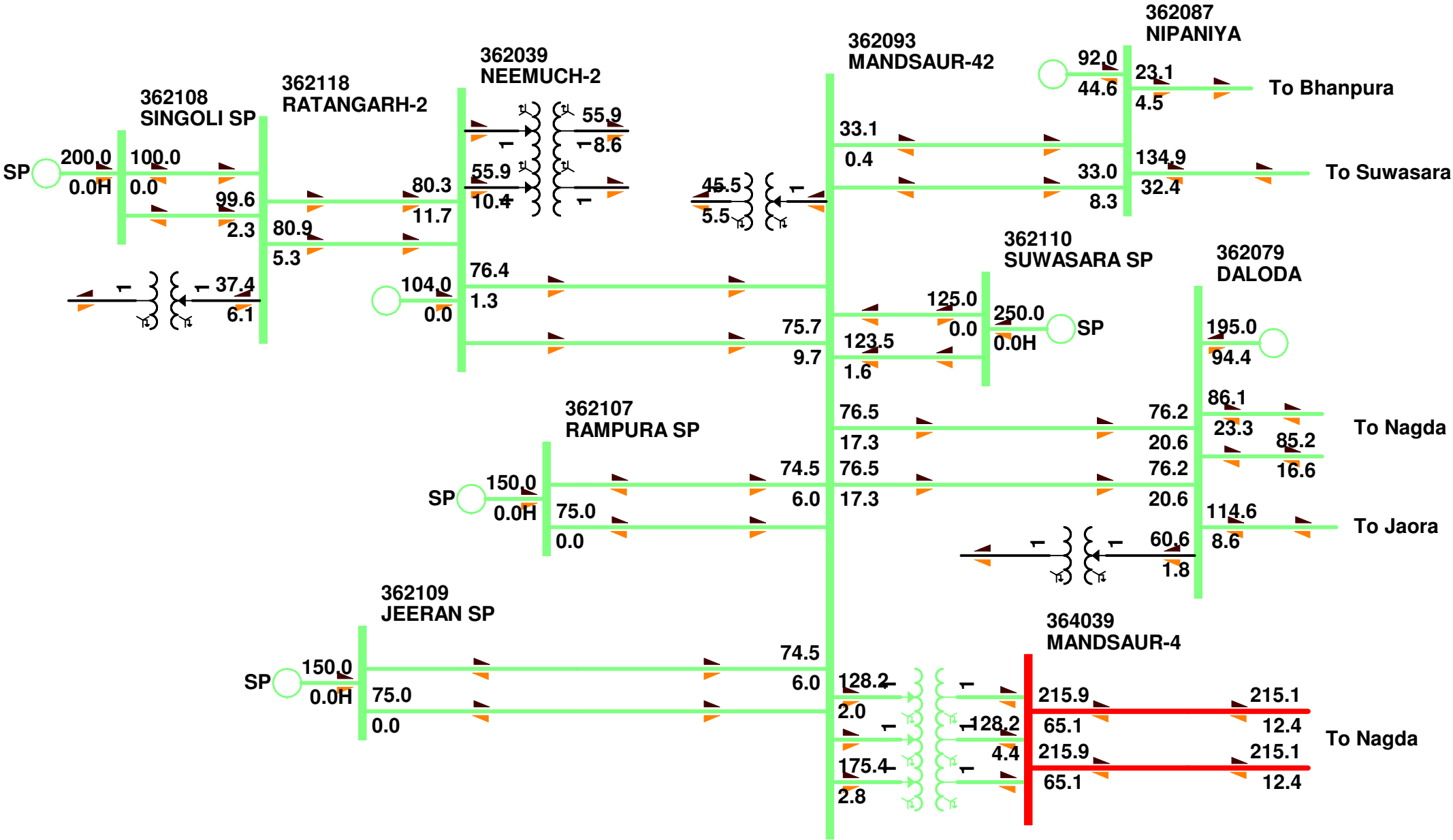


POWER SCENARIO OF INDIA : 2018-19

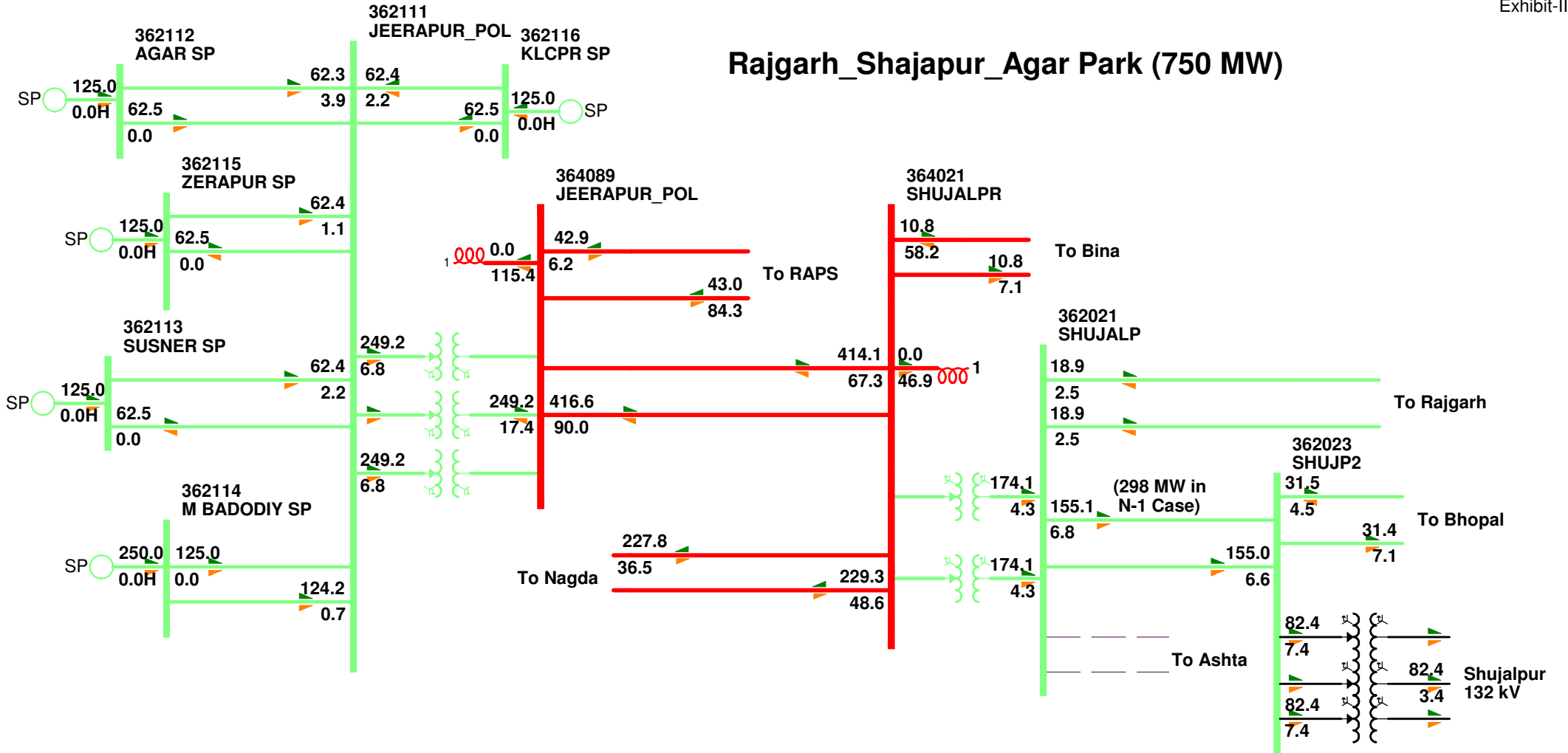
Without 2250 MW Solar Parks in MP



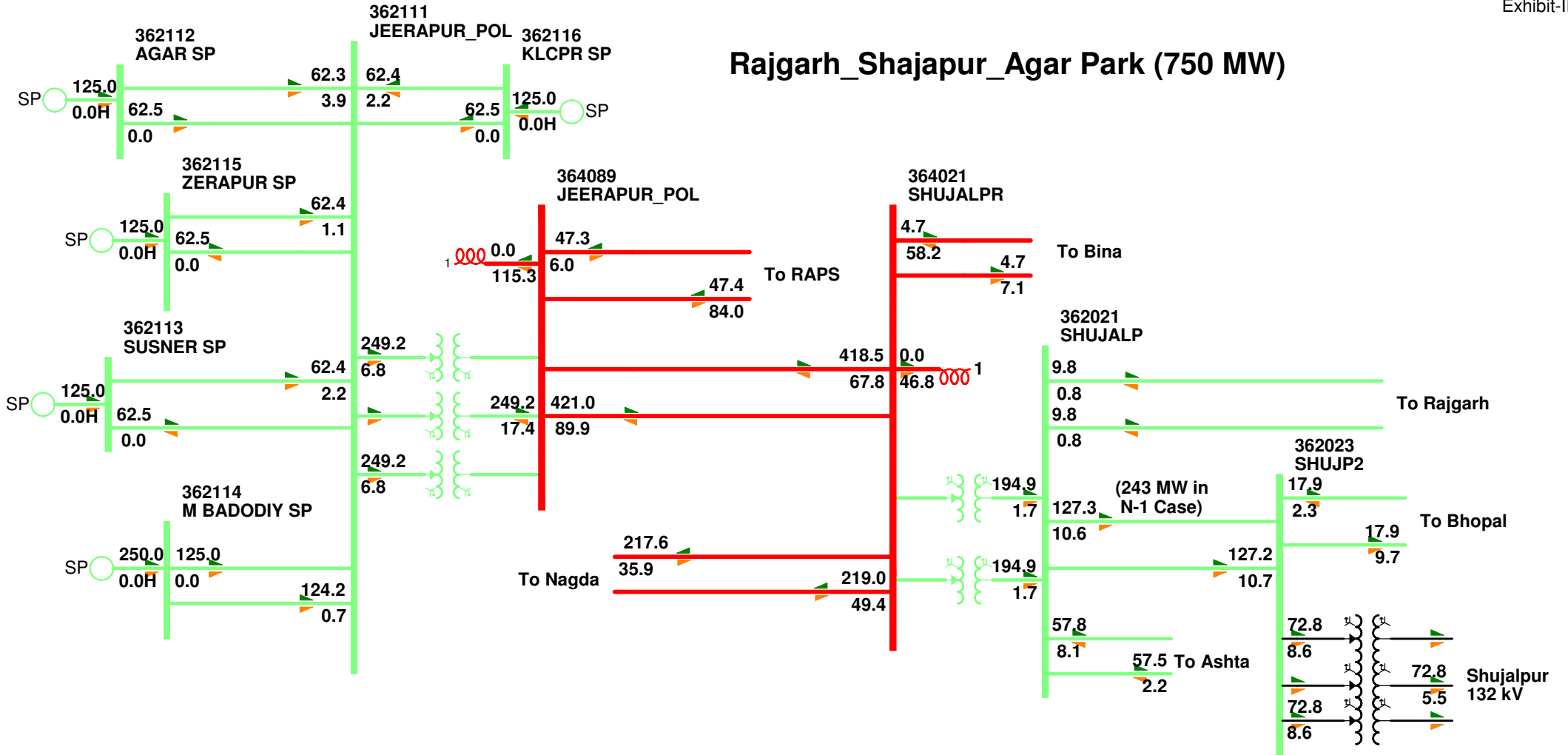
Neemuch_Mandsour Solar Park SLD (750 MW)



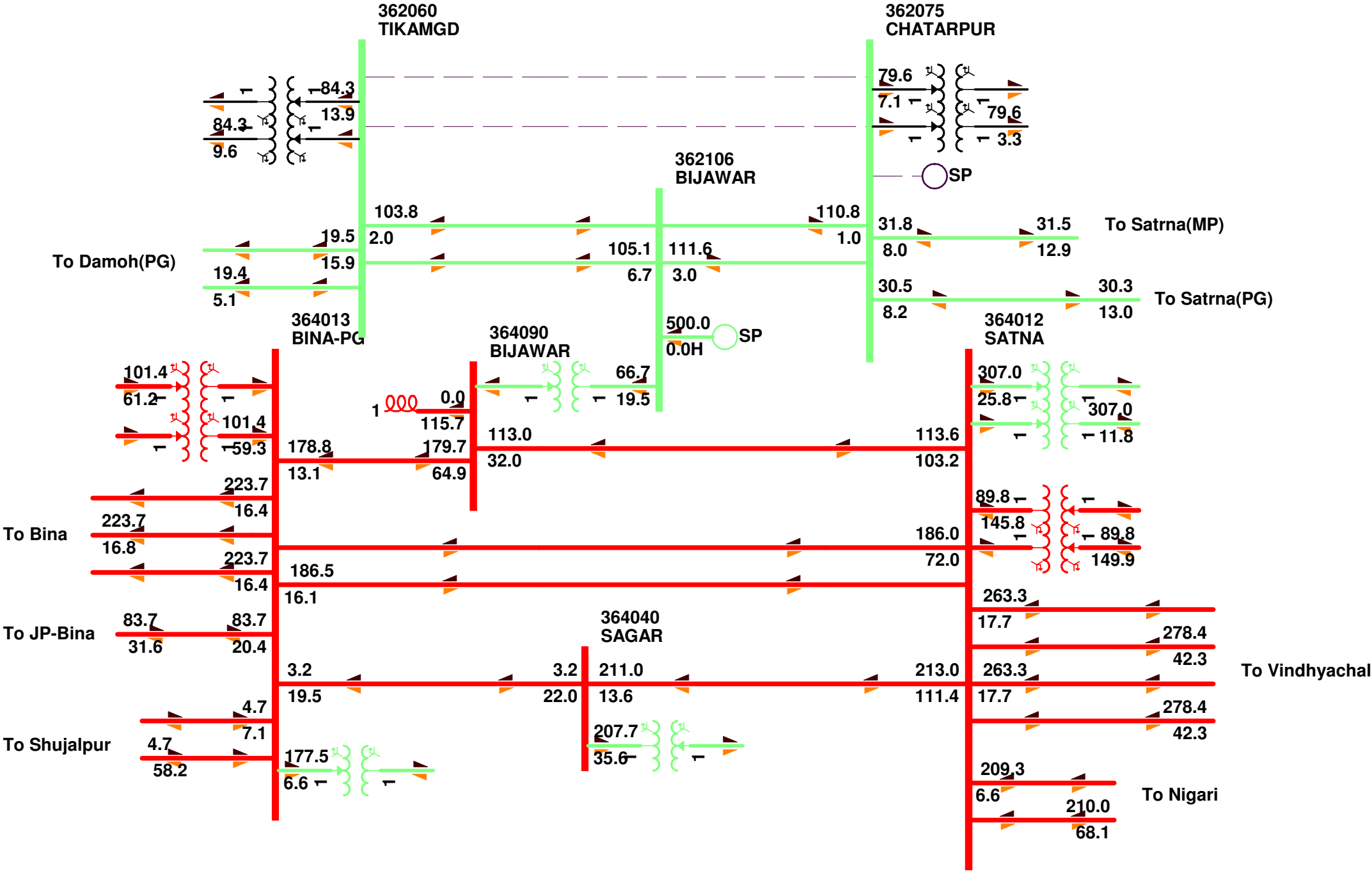
Rajgarh_Shajapur_Agar Park (750 MW)



Rajgarh_Shajapur_Agar Park (750 MW)

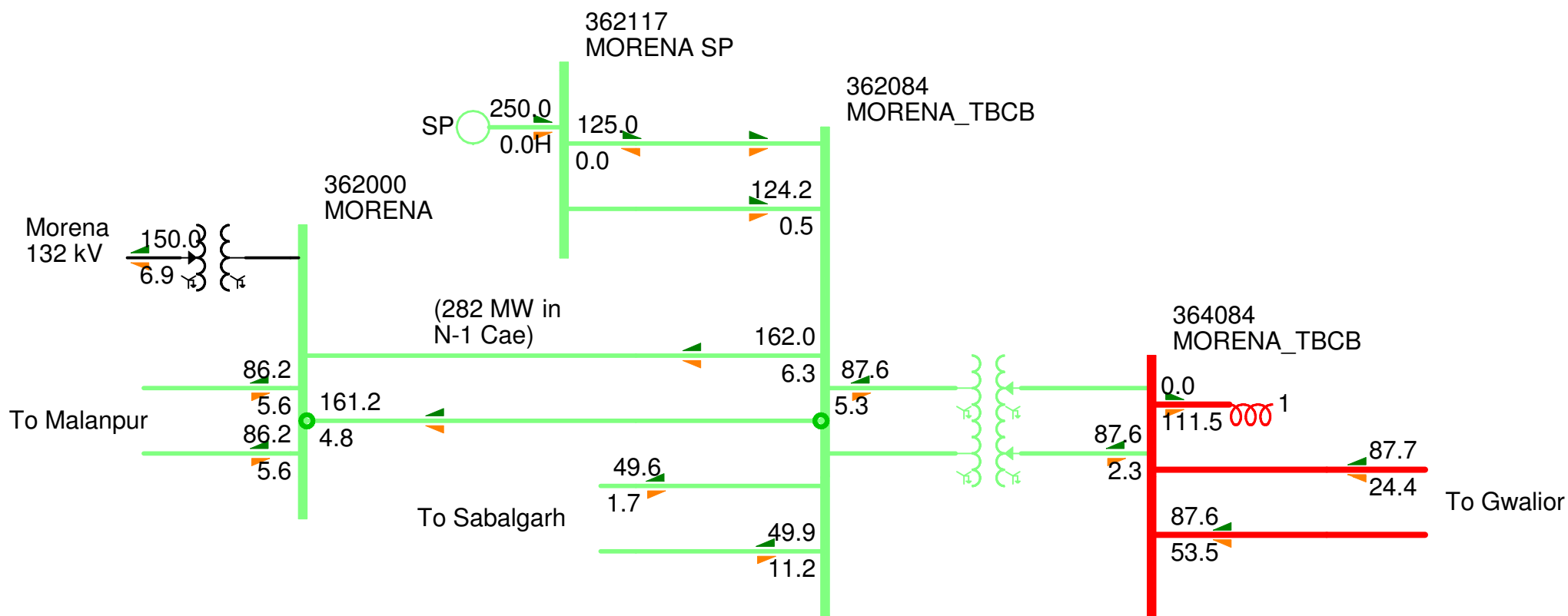


Chattarpur Solar Parks (500 MW)



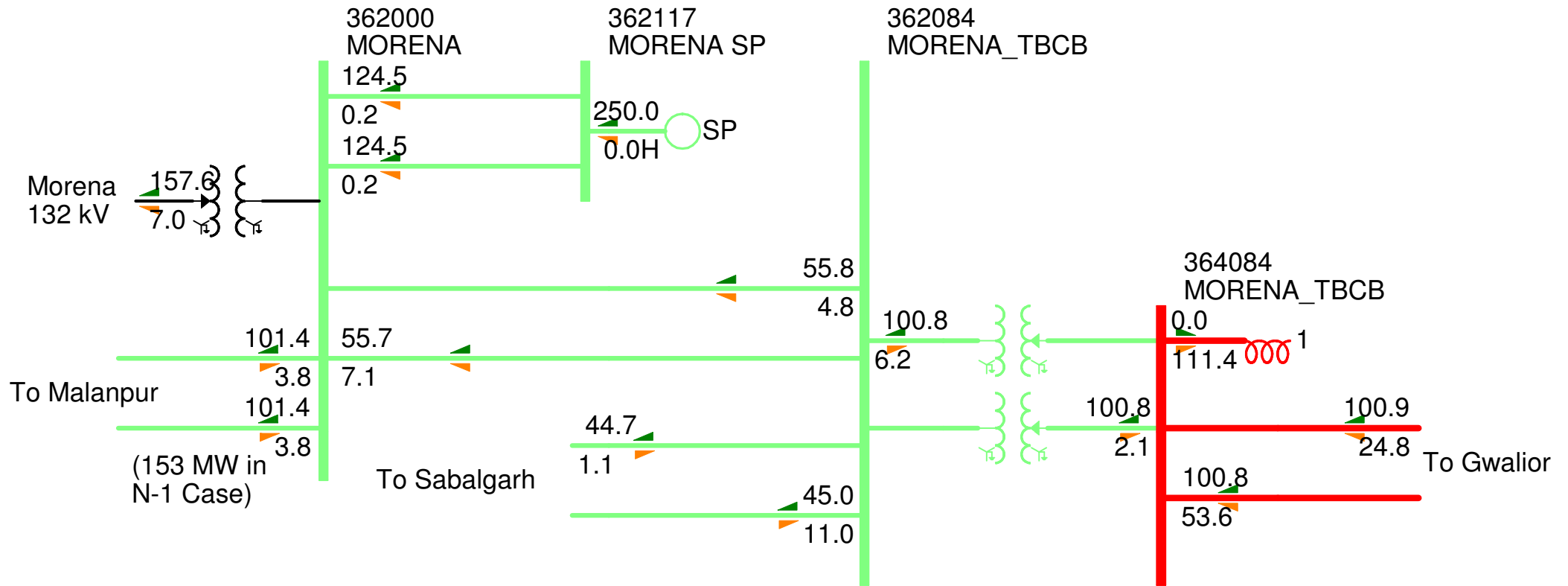
Chattarpur_Morena Solar Parks (750 MW)

Exhibit-IV(a)



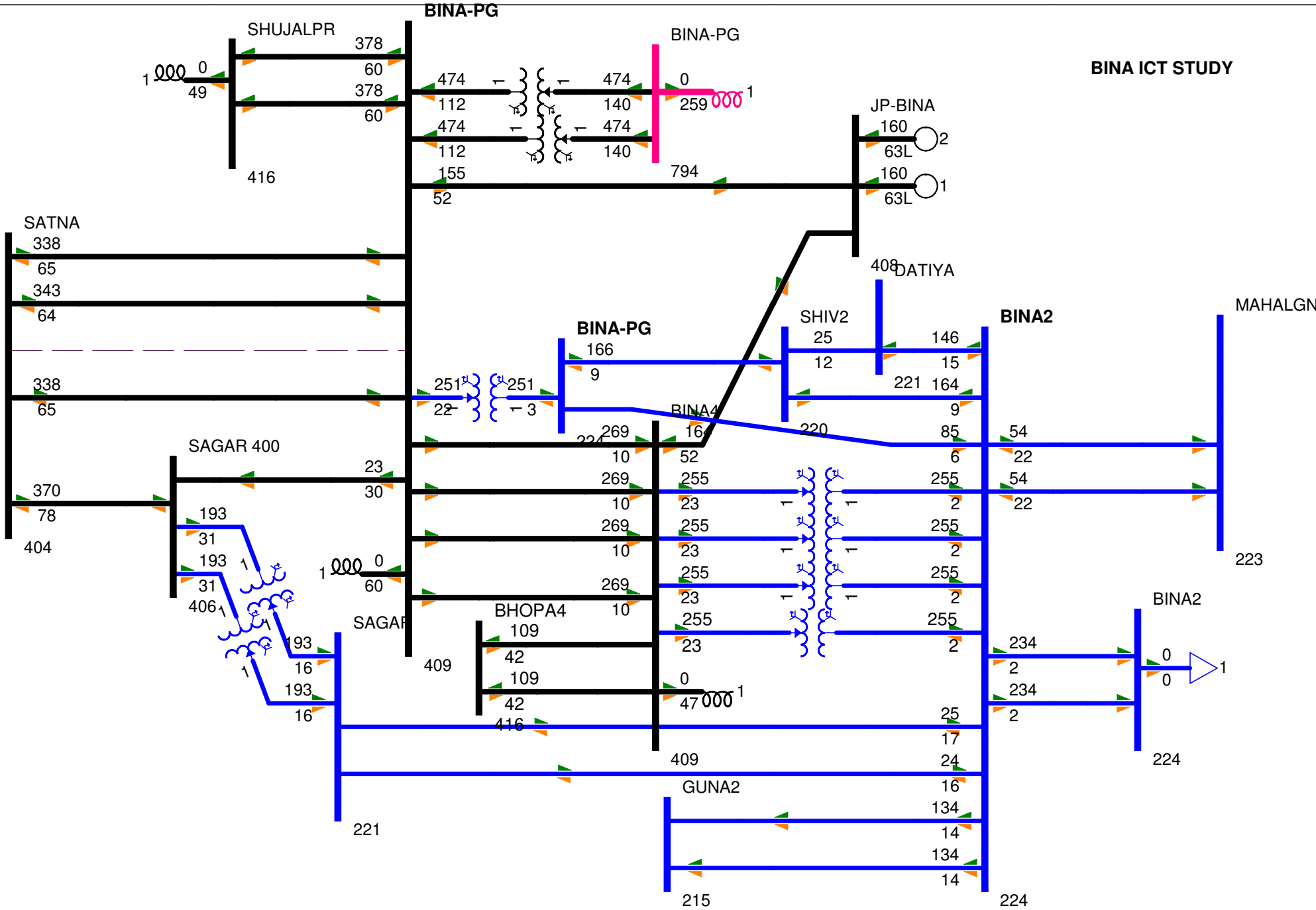
Chattarpur_Morena Solar Parks (750 MW)

Exhibit-IV(b)

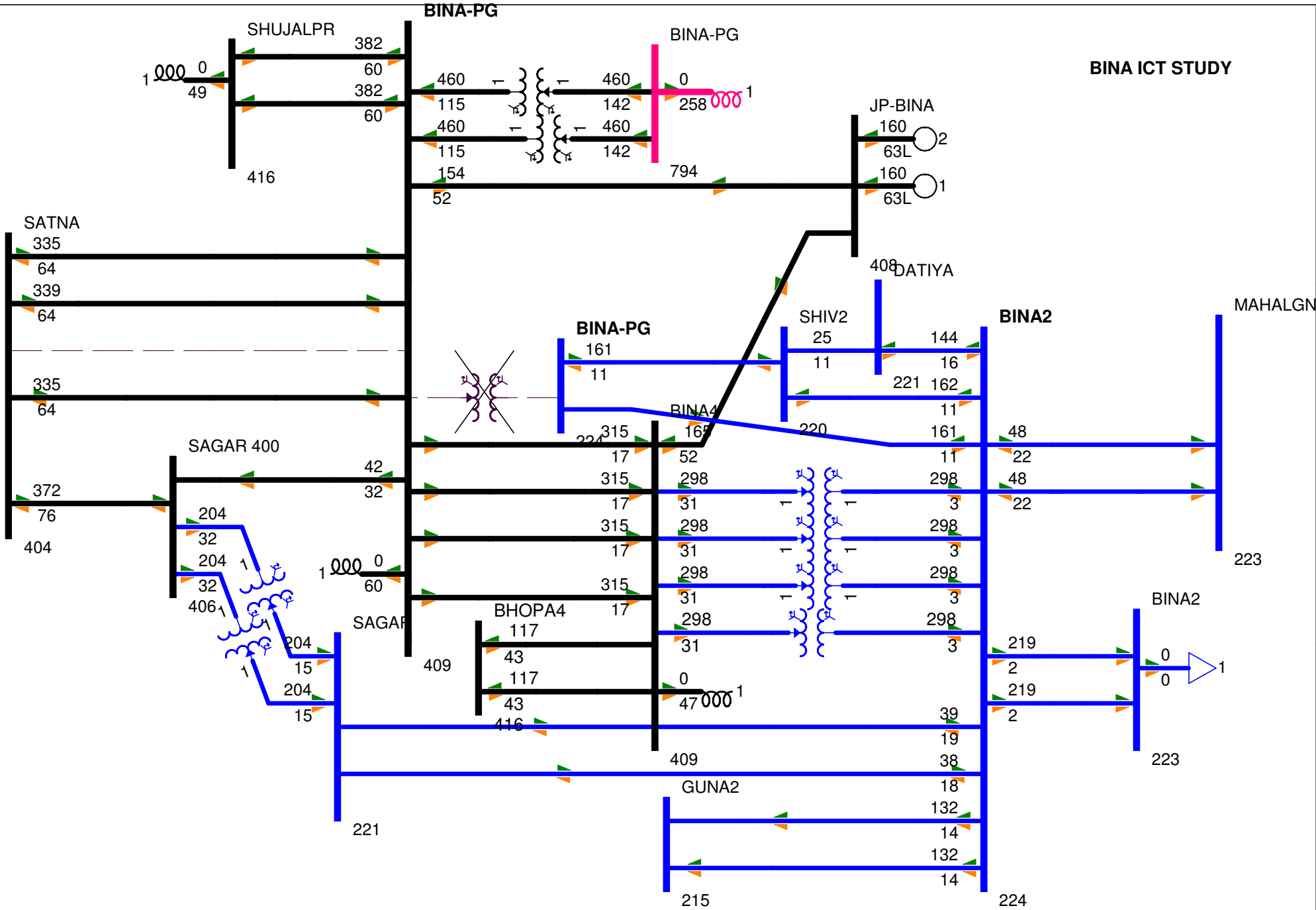


Annexure-8

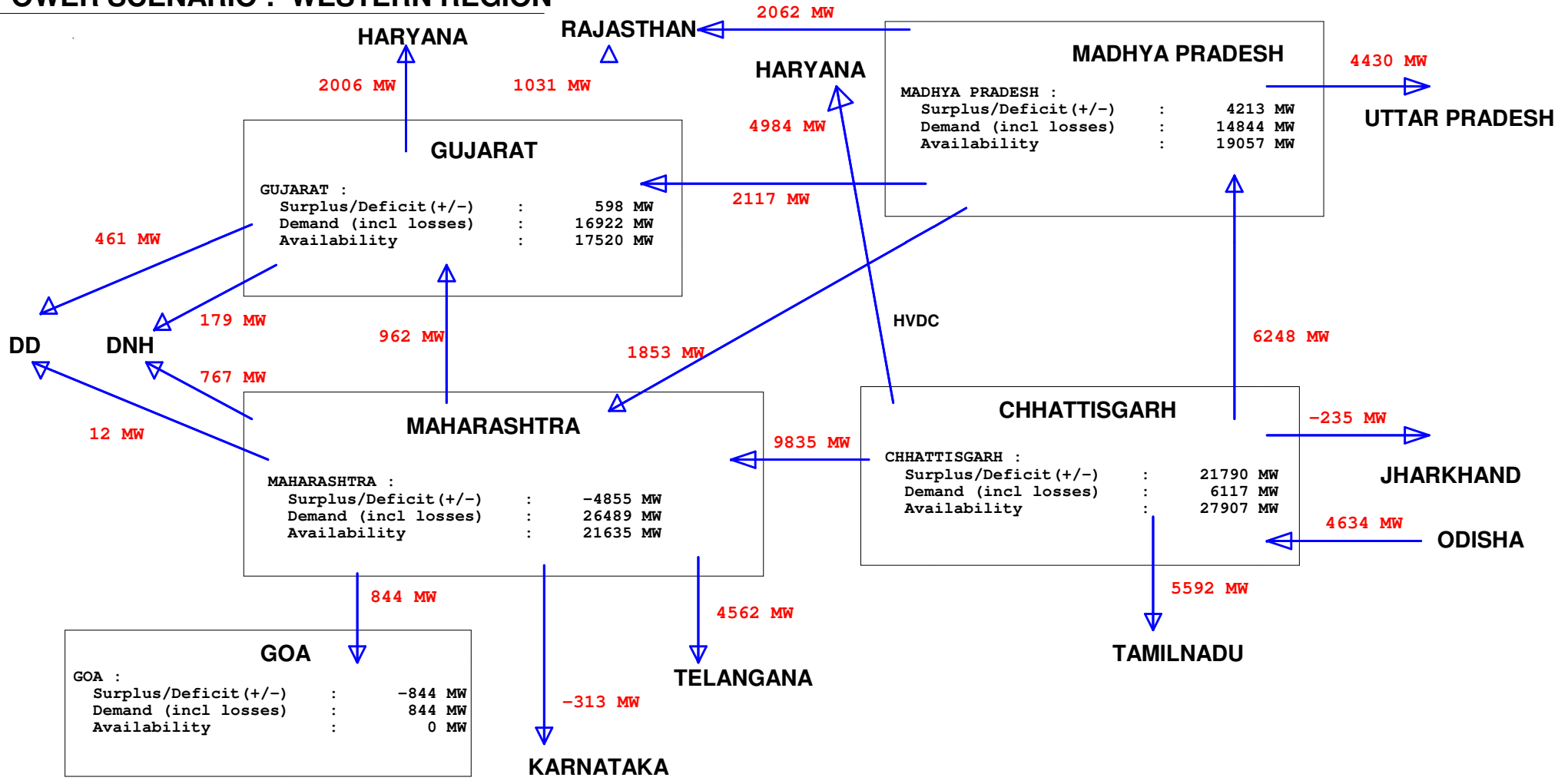
BINA ICT STUDY



BINA ICT STUDY



POWER SCENARIO : WESTERN REGION



Annexure-9



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/2016/375377

Dated: 29.03.2016

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 2 X 660 MWs
LVTPL – reg.**

Sir / Madam,

The minutes of the meeting held on 18.03.2016 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 18.03.2016 on issue related to connectivity of
2x 660 MW Generation Project of M/s Lanco Vidarbha Thermal Power Ltd.
(LVTPL)**

The connectivity arrangement for 2x660 MW generation project of M/s LVTPL through LILO of Seoni - Wardha 765 kV S/C line at LVTPL TPS 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 DC 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. In the 39th SCM of WR held on 30.11.2015, the connectivity to M/s LVTPL through LVTPL Switchyard – Warora Pool 765 kV D/C line and its implementation through TBCB route was agreed. Subsequently, CTU vide their letter dated 27.01.2016 had issued the revised intimation for grant of connectivity to M/s LVTPL. M/s LVTPL vide their letter dated 15.02.2016 had conveyed their acceptance of permanent connectivity through LVTPL Switchyard – Warora 765 D/C line and its implementation through TBCB. But for the purpose of start-up and commissioning activities, M/s LVTPL had requested to permit the completion of earlier agreed connectivity (i.e. LILO of Seoni – Wardha 765 kV S/C at LVTPL). The meeting was held to discuss the request made by M/s LVTPL.

The list of participants is enclosed at **Annexure-I**.

1. M/s LVTPL informed that 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). The work at site had restarted since April 2015 and now the project is making good progress. The scheduled completion is May 2017 and September 2017 (for Unit 1 and Unit 2 respectively), however the project is likely to be commissioned by December 2017 (Unit 1) and March 2018 (Unit 2). The start-up power requirement would be six months prior to commissioning of Unit 1 i.e., by June 2017. It is unlikely that the LVTPL Switchyard – Warora 765 D/C line would be completed in this time frame. Therefore, implementation (by M/s LVTPL) of LILO of Seoni – Wardha 765 kV S/C at LVTPL may be permitted as an interim arrangement for availing the startup power for the project.
2. CTU representative informed that the revised intimation for grant of connectivity has been already issued to M/s LVTPL on 27.01.2016. As per Connectivity Intimation, M/s LVTPL were required to sign the transmission agreement

(FORMAT CON 8) within one month of the grant of connectivity in default of which the connectivity is liable for cancellation. The same has not been signed till date. Again vide letter dated 11.03.2016, M/s LVTPL has been requested to sign the transmission agreement by 25.03.2016. Further, for taking up the implementation of the connectivity line as an ISTS line, requisite Bank Guarantee has also to be provided. Unless there is commitment from M/s LVTPL regarding signing of the transmission agreement, furnishing of requisite bank guarantee and the commissioning schedule of the generation project, the requirement of interim agreement cannot be ascertained.

3. M/s LVTPL representative stated they have already conveyed their acceptance for implementation of the LVTPL Switchyard – Warora 765 D/C line through tariff based competitive bidding route and they would sign the transmission agreement (FORMAT CON 8) within the stipulated timeline. In view of the requirement of startup power by June 2017, an interim arrangement would be required for the project.
4. After further deliberations the following was agreed:
 - i) The connectivity line (LVTPL Switchyard – Warora 765 D/C line) for M/s LVTPL would be put as agenda in the next Empowered Committee meeting, after signing of the transmission agreement (FORMAT CON 8) and submission of requisite bank guarantee by M/s LVTPL, for its implementation through tariff based competitive bidding route.
 - ii) Considering the fact that the award of the scheme through bidding process by the BPC would be possible by December 2016, the implementation of the scheme in the time frame of June 2017 (startup power requirement as intimated by M/s LVTPL) would be difficult. In that case, interim arrangement for providing startup power and commissioning activities may be required for the project.
 - iii) The requirement of the interim arrangement viz. LILO of Seoni – Wardha 765 kV S/C at LVTPL would be assessed after confirmation of firm schedule/requirement of start-up power by M/s LVTPL and commitment of payment of transmission charges of the connectivity line from its completion till the COD of the generation project. If the need is felt for the interim arrangement, the same may be implemented by M/s LVTPL separately, which shall be bypassed/ dismantled after completion of the connectivity line (LVTPL Switchyard – Warora 765 D/C line). The requirement of the interim arrangement, scope and its implementation needs to be approved by the WR constituents in the SCM/LTA meeting of WR.

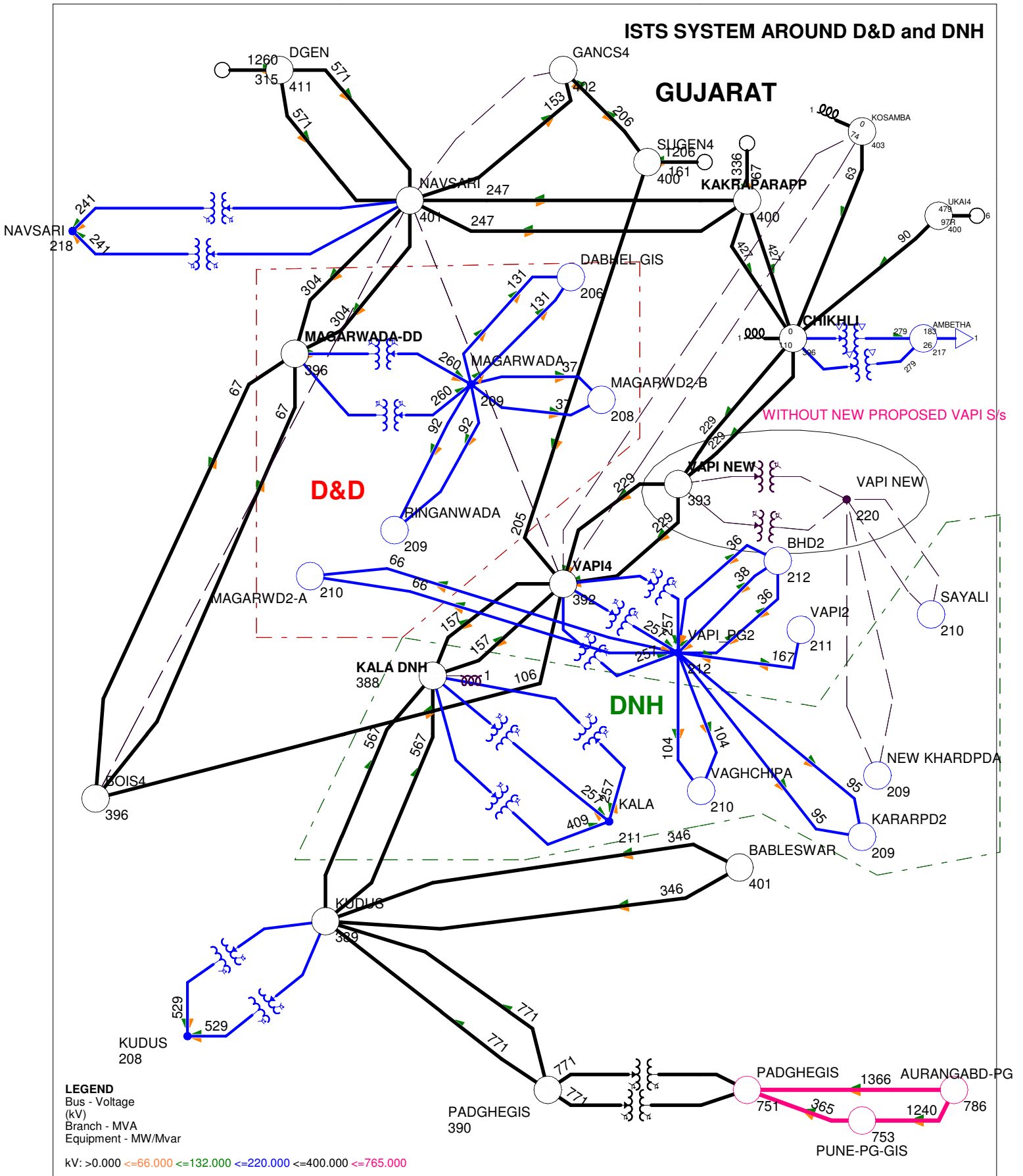
The meeting ended with thanks to the chair.

Annexure - I

List of Participants of the Meeting held on 18.03.2016 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 (PSP&PA-I)	CEA		awd.cea@gmail.com
4.	Shri. Shiva Suman	Deputy Director	CEA		
5.	Vikas Sachan	AD -I	CEA		
6.	Satya Prakash	AD -II	CEA		
7.	Shri. Ashok Pal	GM (CTU-P)	PGCIL	9910378105	ashok@powergridindia.com
8.	Shri. K.E. Prasad	Director	LVTPL	9650648844	keprasad@lancogroup.com
9.	Shri. Harpreet Walia	DGM	LANCO	9810707197	harpreet.walia@lancogroup.com

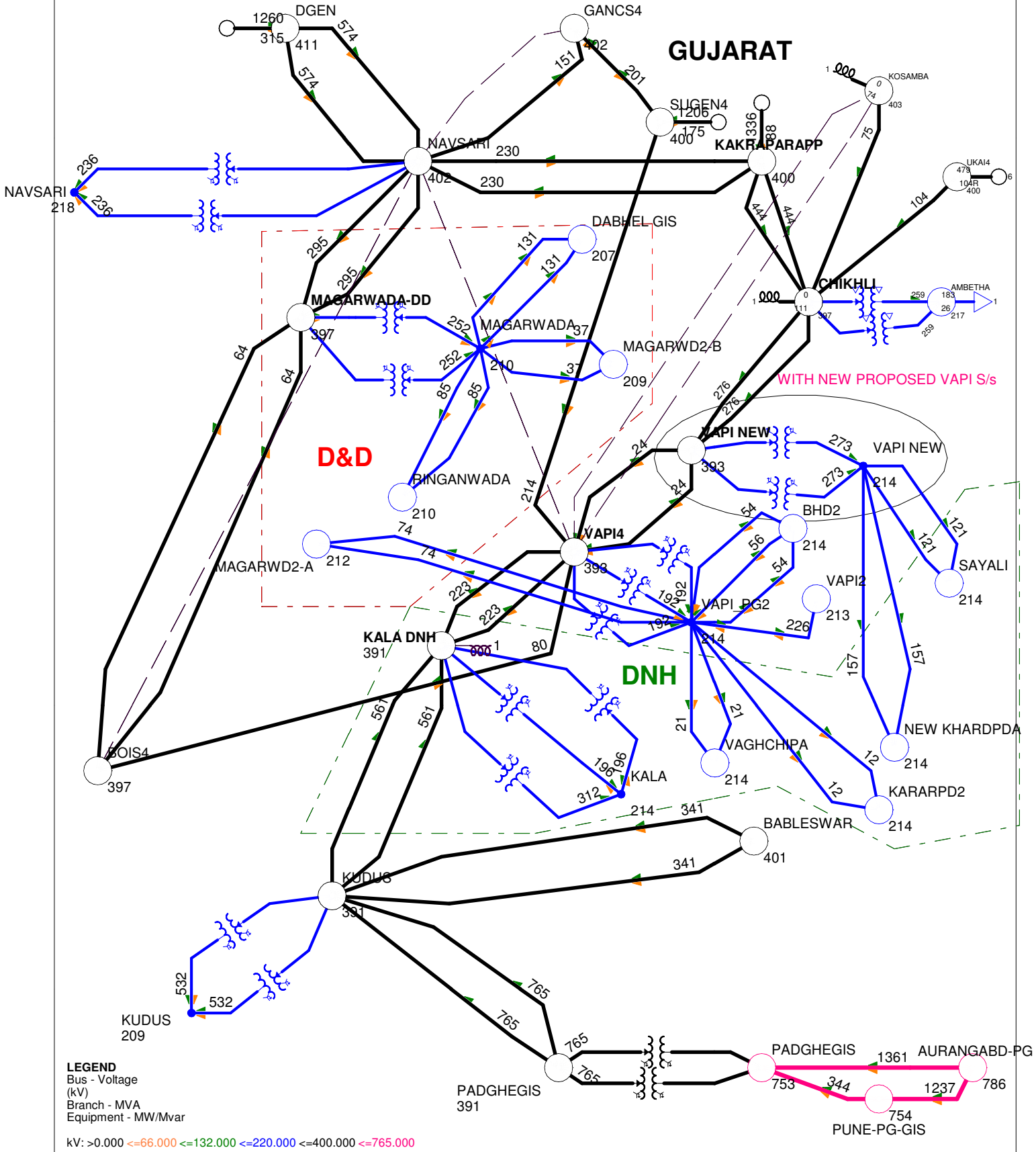
BASE CASE - Without New Proposed Vapi S/s



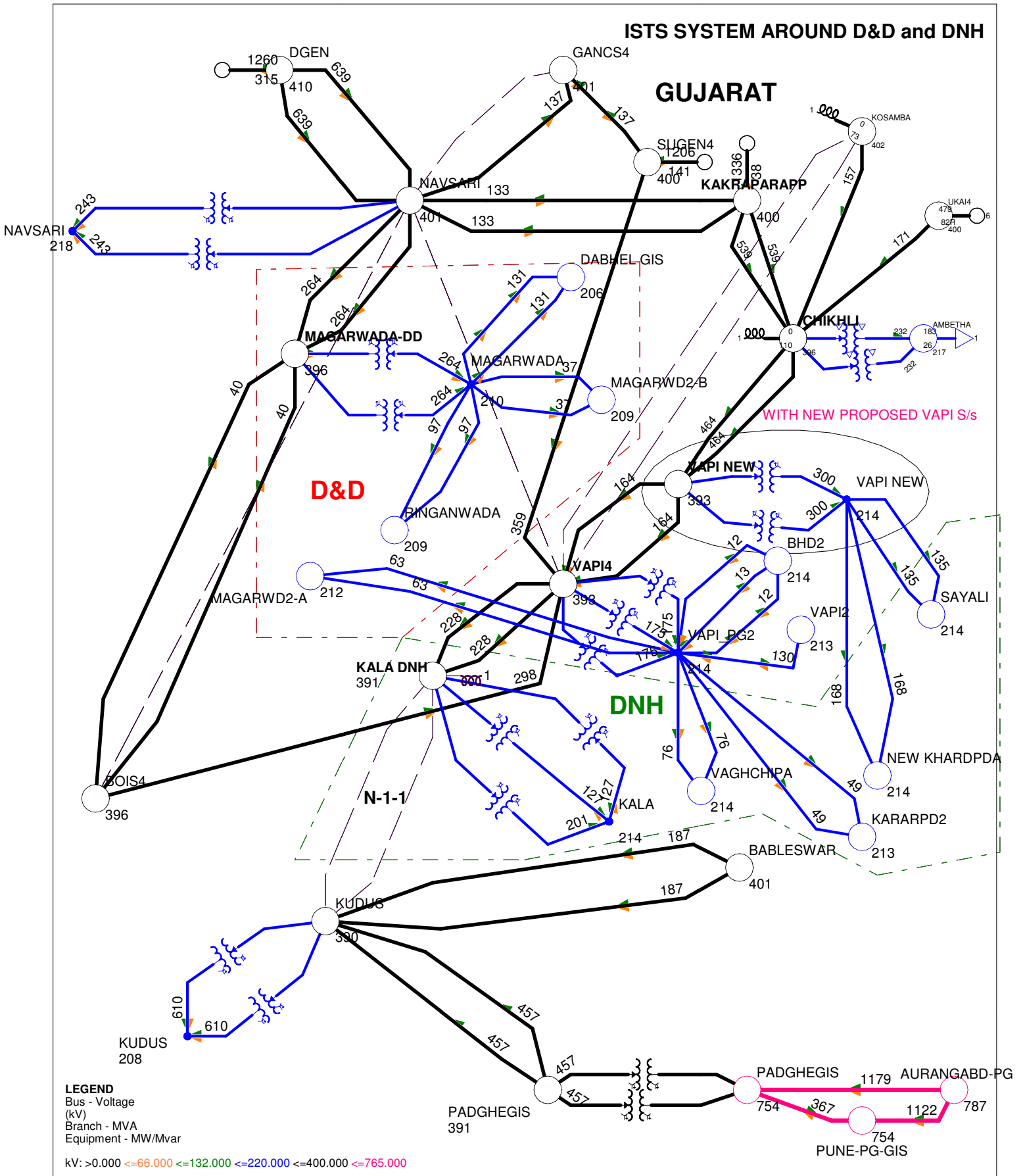
With New Proposed Vapi S/s

ISTS SYSTEM AROUND D&D and DNH

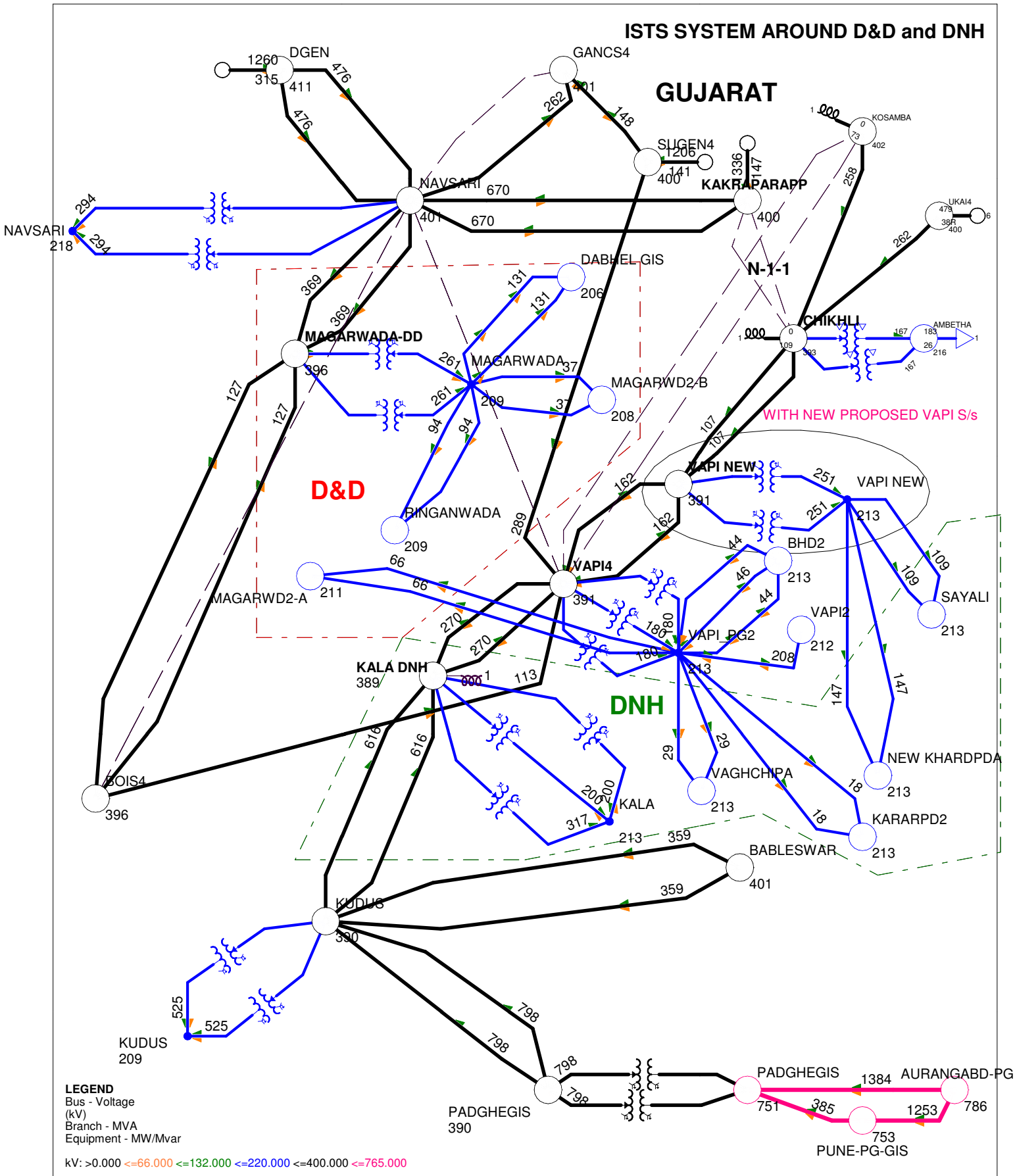
GUJARAT



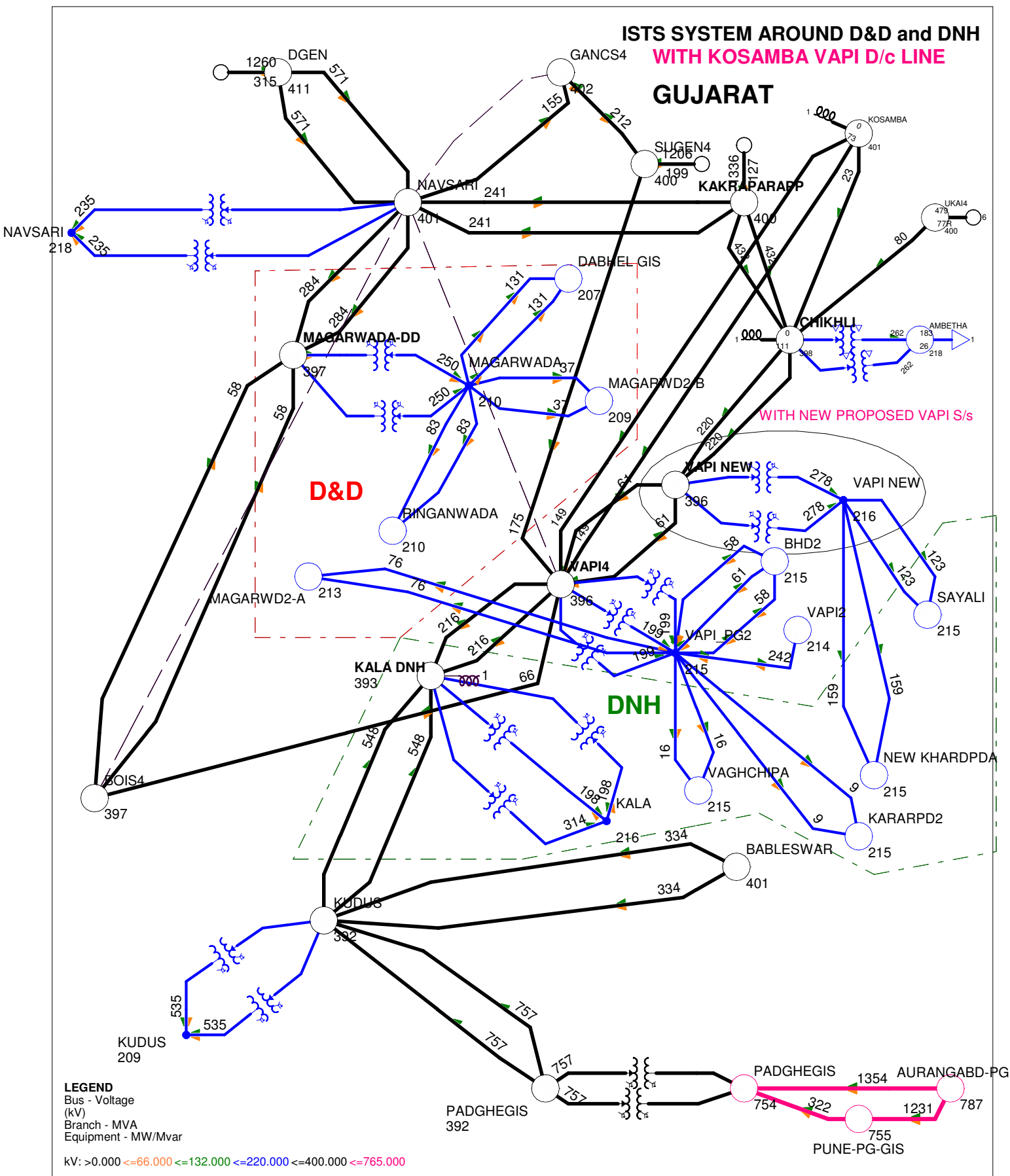
N-1-1 OF KALA-KUDUS 400kV D/c line - With New Proposed Vapi S/s



N-1-1 OF KAPP-Chikhli 400kV D/c line - With New Proposed Vapi S/s



**ISTS SYSTEM AROUND D&D and DNH
WITH KOSAMBA VAPI D/c LINE
GUJARAT**

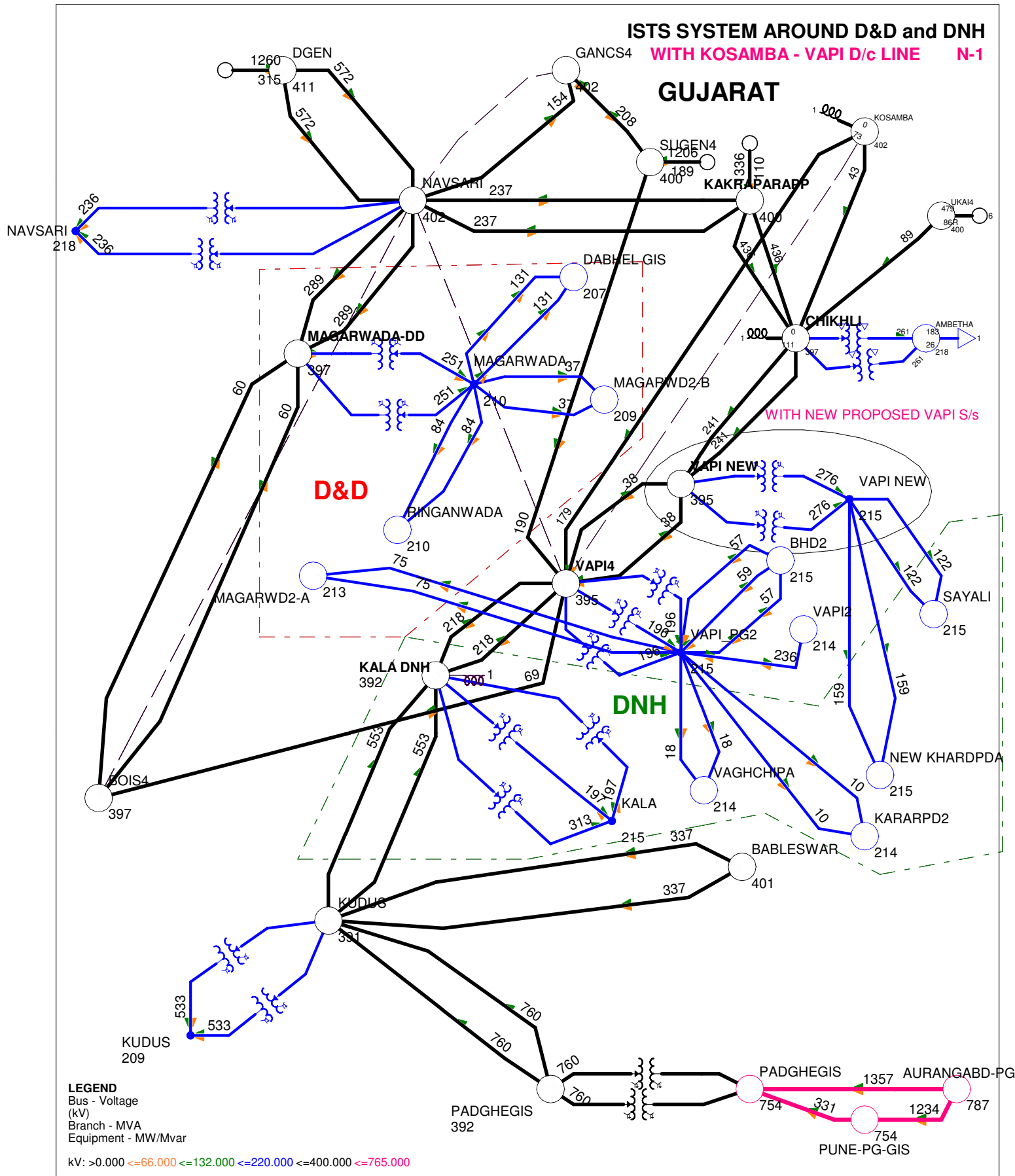


LEGEND
 Bus - Voltage (kV)
 Branch - MVA
 Equipment - MW/Mvar

kV: >0.000 <=66.000 <=132.000 <=220.000 <=400.000 <=765.000

ISTS SYSTEM AROUND D&D and DNH
WITH KOSAMBA - VAPI D/c LINE N-1

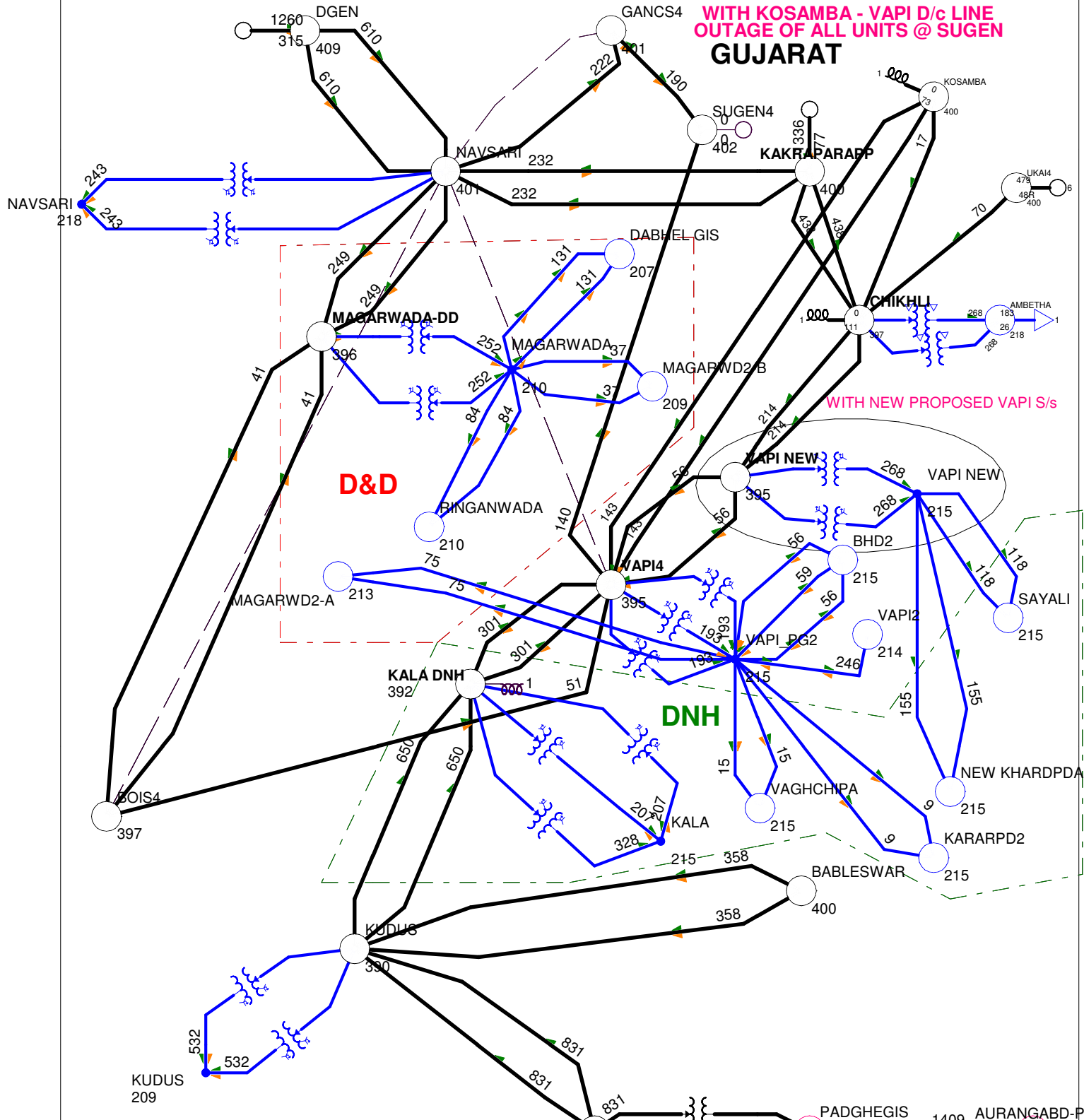
GUJARAT



LEGEND
 Bus - Voltage (kV)
 Branch - MVA
 Equipment - MW/Mvar

kV: >0.000 <=66.000 <=132.000 <=220.000 <=400.000 <=765.000

ISTS SYSTEM AROUND D&D and DNH
WITH KOSAMBA - VAPI D/c LINE
OUTAGE OF ALL UNITS @ SUGEN
GUJARAT



LEGEND
 Bus - Voltage (kV)
 Branch - MVA
 Equipment - MW/Mvar

kV: >0.000 <=66.000 <=132.000 <=220.000 <=400.000 <=765.000