



सत्यमेव जयते  
भारत सरकार

**Government of India**

विद्युत मंत्रालय

**Ministry of Power**

केन्द्रीय विद्युत प्राधिकरण

**Central Electricity Authority**

विद्युत पूर्णाली योजना एवं मूल्यांकन-I पृभाग

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**Sub: 43<sup>rd</sup> meeting of the Standing Committee on Power System Planning of Western Region**

**Sir / Madam,**

The 43<sup>rd</sup> Meeting of Standing Committee on Power System Planning of Western Region is proposed to be held on 11.05.2018. The agenda notes of the same is available on CEA website ([www.cea.nic.in](http://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). The venue details of the meeting and additional agenda, if any, would be intimated in due course.

Yours' faithfully,

Enclosures: as above

(Awdhesh Kumar Yadav)  
Director

## **Agenda notes for the 43<sup>rd</sup> Meeting of Standing Committee on Power System Planning in Western Region**

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### **1. Confirmation of the minutes of 42<sup>nd</sup> meeting of the Standing Committee on Power System Planning in Western Region (SCPSPWR) held on 17.11.2017 at Mumbai**

1.1. The minutes of the 42<sup>nd</sup> meeting of SCPSPWR were issued vide CEA letter No. 26/10/2017/PSP&PA-I/ 32 – 47 dated 10.01.2018.

1.2. WRLDC vide its letter WRLDC/SO – II/ SCM/1610 – A / 2018 / 59 dated 19.01.2018 ( enclosed as Annexure-1) has requested the following modification in point no. 15.5 on page no. 28 of minutes of 42<sup>nd</sup> meeting of Standing Committee on Power System Planning of Western Region

“15.5 WRLDC representative stated ..... which is ‘n – 1’ non-compliant. In order to carryout full trial run operation, an SPS was required to be implemented for backing down of generation in case of high line loadings. Therefore, further time extension of charging 400 kV Sholapur (PG) – Karad S/C on 220 kV level may not be considered”

to be modified as

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

1.3. Members may deliberate the above and confirm the minutes of 42<sup>st</sup> meeting of SCPSPWR.

### **2. Reviewing the Progress of Earlier Agreed Transmission Schemes**

2.1. The status of implementation of transmission projects under tariff based competitive bidding in Western Region are enclosed at Annexure – 2.1. The status of transmission schemes under implementation by POWERGRID in Western Region is enclosed at Annexure – 2.2.

2.2. **Members may deliberate this.**

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

3.1. MPPTCL vide its letter no. 04-02/N-171/662 dated 26.03.2018 intimated that Govt. of Madhya Pradesh has planned to set up a textile hub in Budhni, Dist: Sehore and the anticipated demand of this area is around 100 MVA. In order to meet this load, MPPTCL has proposed a 1 x 160 MVA, 220/132 kV S/s at Budhni S/s, however due to transmission / transformation capacity constraints in existing nearby S/s of

MPPTCL, the interconnection of 220 kV Budhni S/s is proposed with Itarsi (PG) through 220 kV Itarsi (PG) – Budhni DCDS (about 35 km).

3.2. POWERGRID may confirm availability of 2 nos. of 220 kV line bays at Itarsi 400/220 kV substation.

3.3. Members may deliberate.

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

4.1. MPPTCL vide its letter no. 04-02/N-171/662 dated 26.03.2018 has intimated that presently existing 132 kV Bhind S/s is fed through 132 kV Mehgaon – Bhind S/C line and in the outage of above transmission line supply to this area is interrupted. The transformation capacity of Mehgaon 220 kV S/s is 320 MVA (2 x 160 MVA), the loading on this ICTs is high and the maximum load recorded at Mehagon S/s is 245 MVA (77 %).

4.2. Considering the prospective load growth of Bhind area and space constraints for augmentation of the existing 132 kV Mehgaon substation, MPPTCL has proposed the transmission system as a part of their intra-state system , to be implemented through Tariff Based Competitive Bidding (TBCB) route:

i) Establishment of new 2X160 MVA, 220/132 kV substation at Bhind

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

4.3. MPPTCL has requested 2 no. of 220 kV line bays Morena (TBCB) for interconnection of Bhind substation with Morena (TBCB) S/s.

4.4. Members may deliberate.

**5. LILO of Badod – Kota line at Bhanupura S/s**

5.1. MPPTCL vide its letter no. 04 – 02 / N – 171 / 90 dated 10.01.2018 has intimated that they have recently completed the works associated with LILO of Badod–Kota 220 kV S/C line at Bhanupura 220 kV S/s (MPPTCL) and the same was yet to be interconnected with 220 kV Bhanupura S/s. NLDC / WRLDC has desired that the consent of Standing Committee on Power System Planning / CEA may be obtained for the proposed LILO of Badod–Kota 220 kV S/C line at Bhanupura 220 kV S/s. Accordingly, MPPTCL has sought the ‘in principle’ approval of CEA for interconnection of above LILO of Badod–Kota 220 kV S/C at Bhanupura 220 kV.

5.2. To discuss the proposal of MPPTCL, a meeting was held with MPPTCL, NLDC, CTU and Rajasthan on 23.01.2018 at CEA, New Delhi. The minutes of the meeting is enclosed as Annexure-3. In the meeting the following was agreed:

i) The LILO of Badod – Kota 220 kV S/C at Bhanupura S/s is agreed in principle and the same would be taken up in the next meeting of SCPSWR and SCSPNR.

ii) The ISTS metering points shall change from Badod S/s to Bhanupur S/s.

iii) MPPTCL was requested to expedite the implementation of Mandsaur 400 kV S/s and restore the LILO of Badod – Maruti Shakti at Suwasra Solar Park at the earliest.

- iv) MPPTCL was requested to examine the feasibility of restoration of LILO of Badod – Bhanupura at Maruti Shakti, after completion of Mandsaur S/s and Maruti Shakti – Mandsaur 220 kV D/C line.
- 5.3. Subsequently, CEA vide its letter No. 29/1/2018/PSP&A-I/202 – 205 dated 01.02.2018 has given in principle approval to the above proposal.
- 5.4. Members may concur the MPPTCL proposal of LILO of Badod – Kota 220 kV S/C at Bhanupura substation.
- 5.5. MPPTCL may update on implementation status of the proposal and point no. (iii) & (iv) of 5.2.
- 6. Transmission System plan for potential wind energy zones (WEZs) in Western Region – Bhuj, Bhachau, Dwarka (in Gujarat) and Osmanabad (in Maharashtra)**
- 6.1. In 36<sup>th</sup> meeting of SCPSPWR held on 29.08.2013, the transmission system for evacuation of power from 32 GW of RE power that was envisaged by the end of 12<sup>th</sup> five year plan in 8 RE rich states i.e. Rajasthan, Himachal Pradesh, J&K, Gujarat, Maharashtra, Andhra Pradesh, Karnataka and Tamil Nadu was discussed. For transfer of RE power from RE rich states to RE deficit states the following inter – state transmission system was agreed:
- Western Region (Gujarat):**
- i) Bhuj Pool – Banaskantha 765 kV D/C
  - ii) Banaskantha – Chittorgarh 765 kV D/C
  - iii) Banaskantha – Sankhari 400 kV D/C
  - iv) 765/400/220kV (765/400 kV-2x1500 MVA & 400/220kV-2x500MVA) sub-station each at Bhuj Pool and Banaskantha.
  - v) Associated reactive compensation (Bus reactors & line reactors)
- Northern Region (Rajasthan):**
- i) Chittorgarh – Ajmer (New) 765 kV D/C
  - ii) Ajmer (New) – Suratgarh (New) 765 kV D/C
  - iii) Suratgarh (New) – Moga (PG) 765 kV D/C
  - iv) Chittorgarh – Chittorgarh (RVPN) 400 kV D/C (Quad)
  - v) Ajmer (New) – Ajmer (RVPN) 400 kV D/C (Quad)
  - vi) Suratgarh (New) – Suratgarh 400 kV D/C (Quad)
  - vii) 2x1500 MVA, 765/400 kV sub-station each at Chittorgarh, Ajmer (New) and Suratgarh (New)
  - viii) Associated reactive compensation (Bus reactors & line reactors).
- 6.2. The above scheme was phased out in 4 parts for implementation purpose and the same is being implemented by POWERGRID as a part of Green Energy Corridor-I. 765/400 kV Bikaner PS is being implemented in place of 765/400 kV Suartgarh PS. Part A, B & C is being implemented with soft loan from kfW and D is being implemented with loan from ADB.

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

**Rajasthan (Northern region)**

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

**Tamil Nadu (Southern region)**

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

**(b) Green Energy Corridors-ISTS-Part-B (Tranche - II)****Gujarat (Western Region)**

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

**Rajasthan (Northern region)**

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

**(c) Green Energy Corridors – ISTS – Part – C (Tranche – III)****Gujarat (Western Region)**

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

**(d) Green Energy Corridors – ISTS – Part – D****Rajasthan (Northern Region)**

- i) Ajmer – Bikaner 765 kV D/C
- ii) Bikaner – Moga 765 kV D/C
- iii) Establishment of 765/400 (765/400 kV – 2 x 1500 MVA) sub-station at Bikaner
- iv) LILO of one Ckt of 400 kV Bikaner (RVPNL) – Badla (RVPNL) D/C at Bikaner 765 / 400 kV S/s.

- 6.3. GoI has taken an initiative to establish 175 GW power from RE sources (100 GW – Solar, 60 GW – Wind; 10 GW – Biomass and 5 GW – Small Hydro) by 2022.

A meeting was held on 25<sup>th</sup> January, 2018 in MNRE, New Delhi to assess the evacuation and transmission requirement for achieving wind power capacity target of 60 GW by 2022. The meeting was attended by officials of MNRE, POWERGRID, NIWE, SNAs of wind resource rich states and Wind IPPs/Developers & IWTMA. It was discussed during the meeting that out of total envisaged 60 GW wind capacity by 2022, 33 GW capacity is existing and balance 27 GW is to be established. Out of remaining 27 GW, based on SNA/STU data, it was estimated that about 15 GW capacity is already sanctioned in Intra state and balance 12 GW or more may come up in ISTS.

During the meeting, based on the SNA/STU inputs and information provided by various wind IPPs/Developers, the following wind energy zones in Western Region were agreed as prioritized wind energy zones for planning/development of additional ISTS infrastructure:

Sl.	State	District	Quantum
1	Gujarat	Dwarka	2000 MW
2	Maharashtra	Osmanabad	2000 MW

It was also noted in the meeting (in the form of developer inputs) that Kutch distt possesses about 8000 MW wind potential, which can be further segregated into two wind complexes one of around 6000 MW towards west of Bhuj and around 2000 MW in Northeast of Bachau.

- 6.4. As on date, Solar Energy Corporation of India (SECI) has conducted bidding for about 6050 MW of wind power projects across India and out of this 4050 MW (Tranche 1, 2 & 3) has already been awarded and remaining 2000 MW (Tranche 4) has been bid out and will be awarded shortly. Though the bidding was carried out pan India, the bidders have opted to establish 4500 MW (3900 MW at Bhuj PS & 600 MW at Bhachau S/s) of wind power in Gujarat and 1550 MW (950 MW at Tirunelveli, 300 MW at Pugalur & 300 MW at Palakkad) in Tamil Nadu.
- 6.5. A meeting was taken by Member (PS), CEA on 16.04.2018 to discuss the evacuation system for wind power plants, which have been awarded and bid out by SECI recently, wherein the following was decided:
- i) MNRE / SECI would make a presentation on their road map for development of RE power in India.
  - ii) A meeting would be held on 23.04.2018 with successful wind project developers of SECI bids to know the location of their wind farms, individual wind farm capacity, connectivity voltage etc. SECI to coordinate in this regard.
  - iii) CTU to carry out studies to identify additional system required for evacuation of power from successful wind power projects developers in SECI bids in Gujarat in coordination with CEA considering GETCO intra-state proposals for RE evacuation.

Minutes of the meeting enclosed as Annexure -4

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

S. No.	State	Area	Potential (MW)
1	Gujarat	Bhuj	4000

		Amreli	2000
		Jam Nagar	2000
		Bhav Nagar	2000
		Sub Total	10000
2	Tamil Nadu	Karur	2000-2500
		Kanya Kumari	1000-2000
		Udamalpet	2000
		Other Areas in TN	20000
		Sub Total	25000-29500
3	Karnataka	Munirabad	2000-2500
		Gadag	2000-2500
		Chitra Durg	1000-1700
		B Bagewadi	2000
		Chikkodi	1000-1500
		Other Areas in Kar	31000-39200
		Sub Total	39000
4	Andhra Pradesh	Kurnool & Anantapur	3000

To facilitate the advance planning and implementation of the transmission system following was suggested:

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

Minutes of the meeting enclosed as Annexure-5.

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

**Bhuj 765/400/220 kV Pooling Station**

S. No.	Developer / Tranche	1	2	3	4	Total
1	Inox wind	250	250	200	100	800
2	Adani Green	50	50	250	300	650
3	Ostro Kutch					0

4	Green Infra		250	300		550
5	Renew			300	265	565
6	Srijan				250	250
7	Torrent			499.8		499.8
8	BLP				285	285
9	Alfanar			300		300
	Total	300	550	1849.8	1200	3899.8

#### **Bachau 400/220 kV Sub Station**

S. No.	Developer / Tranche	1	2	3	4	Total
1	Ostro Kutch	250				250
2	Renew		250	100		350
	Total	250	250	100	0	600

#### **Tirunelveli 400/220 Pooling Station**

	Developer / Tranche	1	2	3	4	Total
1	Mytrah	250				250
2	Green Infra	249.9				249.9
3	Orange Sironge		200			200
4	Betam Wind			50.2		50.2
5	Betam Wind				200	200
	Total	499.9	200	50.2	200	950.1

#### **Pugalur Sub Station**

	Developer / Tranche	1	2	3	4	Total
1	Spring Energy	0	0	0	300	300
	Total	0	0	0	300	300

#### **Palakkad Sub Station**

	Developer / Tranche	1	2	3	4	Total
1	Mytrah	0	0	0	300	300
	Total	0	0	0	300	300

In the meeting held with the developers it emerged that in general, the developers are interested to get connectivity at 220 kV level of the ISTS pooling station. The wind farms of the developers, who have won more than one bid were not contiguous and they were dispersed. It also emerged that one of the developer has also won the bidding carried out by Maharashtra government with injection point at Bhuj pooling station. Therefore, the transformation capacity augmentation at Bhuj pool was not only required for accommodating the wind power developers of SECI bids but also bidding carried out by other agencies like Maharashtra.



- 6.7. From above it can be seen that in Western Region, in addition to the 4000MW wind potential in Bhuj area for which bidding have already been completed by SECI, potential to the tune of 4000MW exists in the North Bhuj area.

Bhuj PS is under implementation with transformation capacity 1000 MVA (2 x 500 MVA, 400 / 220 kV) and 3000 MVA (2 x 1500 MVA, 765 / 400 kV). As on date, LTA has been already been granted to 800 MW at 220 kV level (Inox – 500 MW & Srijan – 300 MW) and 2250 MW at 400 kV level (Adani Green Khavda – 1000 MW, 750 MW & 500 MW).

Therefore, additional augmentation of transformation capacity at Bhuj pool along with transmission system strengthening needs to be planned and implemented for accommodating all the wind power developers of already completed SECI bids and also to accommodate future injections at Bhuj pool.

- 6.8. Accordingly, system studies were carried out by CEA and CTU to identify the additional transmission system for the high potential wind energy zones in WR such as Bhuj & Bhachau in Kutch area, Dwarka (Khambhaliya) and Osmanabad (Maharashtra). The summary of the transmission infrastructure required for the wind energy zones is enclosed as Annexure- 6.
- 6.9. The additional transmission system required evacuation of power from the high potential wind energy zones in WR is as given below:

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

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

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

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

**Alt-I**

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

**Alt-II**

- i) Establishment of 3x1500MVA (765/400kV) 7x500MVA (400/220kV) Bhuj-II PS (GIS) along-with 12 nos. 220kV bays for wind farms' integration
- ii) Establishment of 3x1500MVA & 5x500MVA, 765/400/220kV Lakadia PS (GIS) along-with 8 nos. 220kV bays for wind farms' integration

- iii) Interconnection of 765kV Bhuj S/s with the proposed Bhuj-II (GIS) S/s through bus extension or 765kV D/c line
- iv) Bhuj-II – Lakadia PS 765kV D/c line (~120km)
- v) Lakadia PS – Vadodara 765kV D/c line (~300km)
- vi) Lakadia PS – Banaskantha 765kV D/c line (~150km)

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

**Alt-I**

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

**Alt-II**

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

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

- i) Establishment of 3x1500MVA, 765/400/220kV Kallam PS (GIS)
- ii) Kallam – Parli (New) 765kV D/c line (~70km) OR LILO of one circuit of Parli (New) – Solapur 765kV D/c line at Kallam (GIS)

6.10. Members may deliberate the above proposed schemes. Transmission schemes under A and B is required for evacuation of power from the wind generation projects under SECI bids (3900 MW) at Bhuj pooling station. The above proposed schemes may be agreed in principle so that implementation of the same may be taken up on priority basis as and when LTA applications are received for power transfer in these corridors. The connectivity and LTA application would be processed as per Procedure for grant of Connectivity to project based on renewable energy sources to inter-State Transmission System that would be finalized by CERC.

पावर सिस्टम ऑपरेशन कारपोरेशन लिमिटेड  
(पावरग्रिड की पूर्ण स्वामित्व प्राप्त सहायक कंपनी)  
**POWER SYSTEM OPERATION CORPORATION LIMITED**  
(A Wholly owned subsidiary of POWERGRID) ISO 9001:2008



पश्चिम क्षेत्र भार प्रेषण केन्द्र

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संदर्भ संख्या / Ref. No.

WRLDC/SO-II/SCM/1610-A/2018 /59

19.01.18

To,

Chief Engineer (PSP & PA-I)  
Central Electrical Authority,  
Sewa Bhavan, RK Puram  
New Delhi-110066.

Sub: 42<sup>nd</sup> Standing Committee Meeting minutes-Corrigendum

Sir,

This is with reference to Minutes of Meeting dt 10.1.18 of 42<sup>nd</sup> Standing Committee held on 17.11.17. The views of WRLDC in Agenda 15- Charging of 400 kV Solapur PG – Karad line on 220 kV Level for resolving low voltage problems in Solapur District' need some correction. It is mentioned that

**Quote**

“WRLDC representative stated the interim arrangement has been useful and has improved the voltage profile and grid conditions. However, Unit-1 of Sholapur TPP of NTPC (1320 MW – 2 x 660 MW) was synchronized in April, 2017 and its COD was done on 25.09.2017 and unit-2 is expected to synchronize shortly. As the Sholapur (PG)–Karad 400 kV S/C line charged on 220 kV level, during 72 hours trial run operation of the Unit-1 of Solpaur, evacuation constraints were observed as only Sholapur (PG)–Kolhapur 400 kV D/C was available i.e. the power flow through each of this was 550 MW, which is ‘n – 1’ non-compliant. In order to carryout full trial run operation, **an SPS was required to be implemented for backing down of generation in case of high line loadings.** Therefore, further time extension of charging 400 kV Sholapur (PG)–Karad S/C on 220 kV level may not be considered.”

**Unquote**

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Save Energy for Benefit of Self and Nation

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WRLDC has not mentioned about the SPS requirement for backing down of generation at Sholapur (NTPC) in case of high loadings of 400kV Kolhapur-Sholapur D/C, but has requested for early restoration of 400kV Sholapur (PG)-Karad S/C. Hence the above recorded views may be modified as mentioned below:

'WRLDC representative stated that the interim arrangement has been useful and has improved the voltage profile and grid conditions at Sholapur. However, Unit-1 of Sholapur TPP of NTPC (1320 MW – 2 x 660 MW) was synchronized in April, 2017 and its COD was done on 25.09.2017 and unit-2 is expected to be synchronized shortly. As the Sholapur (PG)-Karad 400 kV S/C line is presently charged on 220 kV level, during 72 hours trial run operation of the Unit-1 of Sholapur, evacuation constraints were observed as only Sholapur (PG)-Kolhapur 400 kV D/C was available for evacuation and the power flow through on each of this line was 550 MW, which is 'n – 1' non-compliant. **Therefore, further time extension of charging 400 kV Sholapur (PG)-Karad S/C on 220 kV level may not be considered and SLDC Maharashtra is requested for early restoration of 400kV Sholapur-Karad.**

Yours Sincerely,

  
(Abhimanyu Gartia)

General Manager, WRLDC  
19/1/18

**Annexure - 2.1**

**Status of TBCB Transmission Projects - Western Region**

S. No.	Name of the Project	BPC / Implementing Agency / Milestones	Scope of works	Current Status
1	<p>System Strengthening in NR for import of power from North Karanpura and other projects outside NR and System Strengthening in WR for import of power from North Karanpura and other projects outside Western Region and also for projects within Western Region.</p> <p>Estimated Cost Rs. 2700 Cr</p>	<p>REC</p> <p>NKTCL (Reliance Power Transmission Company Ltd)</p> <p><b>Milestones:</b></p> <p>(i) SPV acquired by Reliance on 20-05-2010 (ii) Approval u/s 164 received on 12.08.2013.</p>	<p>(i) Sipat/Korba (Pooling) - Seoni 400 kV D/C line (ii) Lucknow - Bareilly 765 kV D/C line (iii) Bareilly - Meerut 765 kV D/C line (iv) Agra - Gurgaon(ITP) 400 kV D/C line (v) Gurgaon (ITP) - Gurgaon (PG) 400 kV D/C line (vi) Gurgaon (ITP) 400/220 kV GIS Substation</p>	<p>Matter was in CERC for revision of tariff and extension of date of commissioning. NKTCL filed an appeal in appellate tribunal challenging CERC order of 9.5.2013. Appellate Tribunal has given final judgment on 2.12.13 setting aside CERC order and allowing the appeal. NKTCL is initiating steps for implementing of order. The judgment of Appellate Tribunal accepts delay in clearance under section-164 as force majeure. According NKTCL have requested MoP to extend the validity of section 68 clearance vide their letter dated 14.1.2014.</p> <p>Beneficiaries have appealed SC. SC on 12th August has disposed of the appeal and directed ATE to decide on the appeal. The hearing would be held at ATE on 23.04.2018.</p> <p><b>Work Yet to start.</b></p>
2	<p>Transmission System Associated with Krishnapattnam UMPP-Synchronous interconnection between SR and WR (Part-B)</p> <p>Estimated Cost Rs. 440 Cr</p>	<p>REC</p> <p>RSTCL (Consortium of Patel-Simplex- BS Transcomm)</p> <p><b>Milestones:</b></p> <p>(i) LoI placed on 16.12.2010 (ii) SPV acquired on 07.01.2011 (iii) Trans. license received on 24.08.2011 (iv) Approval u/s 164 received on 29.08.2011</p>	<p>(i) Raichur - Sholapur 765 kV S/C line-1 (208 ckm)</p>	<p><b>Commissioned in 06/2014</b></p>

S. No.	Name of the Project	BPC / Implementing Agency / Milestones	Scope of works	Current Status
		Tariff adoption on 12.8.2011		
3	System strengthening common for WR and NR  Estimated Cost Rs. 1720 Cr	PFC  Jabalpur Transmission Company Limited (Sterlite Grid)  <b>Milestones:</b> (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  (ii) Jabalpur - Bina 765 kV S/C line	<b>Line commissioned in 09/2015</b>  <b>Line commissioned in 06/2015</b>
4	System strengthening for WR  Estimated Cost Rs. 2900 Cr	PFC  BDTCL(Sterlite Grid)  <b>Milestones:</b> (i) Lol placed on 19.1.2011 (ii) SPV acquired on 31.3.2011 (iii) Trans. license received on 12.10.2011 (iv) Approval u/s 164 received on 29.01.2013 (v) Tariff adoption on 28.10.2011 (vi) Original COD : Mar2014	(i) Jabalpur-Bhopal 765 kV S/C line (ii) Bhopal-Indore 765 kV S/C line (iii) 2x1500 MVA 765/400 kV substation at Bhopal (iv) Bhopal-Bhopal (MPPTCL) 400 kV D/c quad line. (v) Aurangabad-Dhule 765 kV S/C line (vi) Dhule-Vadodara 765 kV S/C line (vii) 2x1500 MVA, 765/400 kV substation at Dhule (viii) Dhule - Dhule(Msetcl)400 kV D/C Line	<b>Line commissioned in 06/2015</b> <b>Line commissioned in 10/2014</b> <b>Commissioned in 07/2014</b>  <b>Line Commissioned in 07/2014</b>  <b>Line commissioned in 10/2014</b> <b>Line commissioned in 02/2015</b> <b>Commissioned in 11/2014</b>  <b>Line Commissioned in 11/2014</b>

S. No.	Name of the Project	BPC / Implementing Agency / Milestones	Scope of works	Current Status
5	Transmission System associated with DGEN TPS (1200 MW) of Torrent Power Ltd.  Estimated Cost Rs. 275 Cr	PFC  M/s Instalaciones Inabensa, S.A. Spain  <b>Milestones:</b> (i) LoI issued on 19.05.2014 (ii) Approval under section 68 on 30.01.2014. (iii) Approval under Sec 164 of EA,2003 on 24.04.2016	(i) DGEN TPS – Vadodara 400 kV D/C, Twin Moose line. (ii) Navsari – Bhestan 220 kV D/C line	Project authority had not started construction activity as per execution plan. Matter was taken up with the project authority and notice served in August/Sept 2016 but project authority did not respond.  Member(PS), CEA took a meeting on 26.04.2017 to review the progress of Tr. project wherein project authority informed to close the project due to financial constraints in parent company. CEA vide letter dated 14.06.2017 informed CERC to take appropriate action.
6	Transmission System associated with Gadarwara STPS (2x800 MW) of NTPC (Part-A)	REC  Powergrid Warora Transmisson Limited (A subsidiary of PGCIL)  <b>Milestones:</b> (i) LoI issued on 11.03.2015 (ii) Approval under section 68 on 26.11.2014 (iii) Approval under Sec 164 of EA,2003 on 24.04.2017	(i) Gadarwara STPS - Jabalpur Pool 765kV D/C line (ii) Gadarwara STPS - Warora P.S. (New) 765 kV 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 Pooling Station (2x1500 MVA).	<b>Completion Target: April, 2018</b>
7	Transmission System associated with Gadarwara STPS (2x800 MW) of NTPC (Part-B).	REC  Powergrid Parli Transmisson Limited (A subsidiary of PGCIL)  <b>Milestones:</b> (i) LoI issued on 11.03.2015 (ii) Approval under section 68 on 10.12.2014	(i) Warora P.S.- Parli (New) 765 kV D/C line (ii) Parli (New) - Solapur 765 kV D/c line (iii) Parli (New) - Parli (PG) 400 kV D/C (Quad) line (iv) 765/400 kV Parli (New) Sub-station (2x1500 MVA)	<b>Completion Target: April, 2018</b>

S. No.	Name of the Project	BPC / Implementing Agency / Milestones	Scope of works	Current Status
		(iii) Approval under Sec 164 of EA,2003 on 28.06.2017		
8	Transmission System Strengthening associated with Vindhyachal- V	REC Powergrid Jabalpur Transmisson Limited (A subsidiary of PGCIL)  <b>Milestones:</b> (i) LoI issued on 10.02.2015 (ii) SPV has been acquired by the successful bidder on 26.02.2015 (iii) Approval u/s 164 of EA,2003 on 19.09.2016	(i) Vindhyachal P. S- Jabalpur P. S. 765 kV D/C line.	<b>Completion Target: June, 2018</b>
9	System strengthening for IPPs in Chhattisgarh and other generation projects in Western Region	PFC Chhattisgarh - WR Transmission Ltd. (A subsidiary of Adani Power Limited)  <b>Milestones:</b> (i) LoI issued on 28.07.2015 (ii) SPV acquisition on 23.11.2015 (iii) Approval u/s 68 of EA,2003 on 24.04.2015 (iv) Approval u/s 164 of EA,2003 on 20.10.2016	(i) Gwalior 765/400 kV – Morena 400 kV D/C line 400 kV D/C Length- 50 km (ii) Establishment of 400/220 kV S/s at Morena, 2X315 MVA (iii) Vindhyachal-IV & V– Vindhyachal Pool 400 kV D/C (Quad) line Length-15 km (iv) Sasan UMPP – Vindhyachal Pooling station 765 kV S/C (Q) line 7 Length-8 km (v) LILO of one circuit of Aurangabad – Padghe 765 kV D/C line at Pune Length-50 km (vi) Raigarh (Kotra) – Champa (Pool) 765kV S/C (Q) line (vii) Champa (Pool) – Dharamjaygarh 765kV S/C (Q) line	<b>Scheduled Date of Completion: March, 2019</b>  <b>Anticipated Date of Completion: Oct, 2018</b>



S. No.	Name of the Project	BPC / Implementing Agency / Milestones	Scope of works	Current Status
10	Additional System Strengthening for Sipat STPS	PFC Sipat Transmission Ltd (A subsidiary of Adani Power Limited)  <b>Milestones:</b> (i) SPV acquisition on 23.11.2015 (ii) LoI issued on 28.07.2015 (iii) Approval u/s 164 of EA,2003 on 05.08.2016	(i) Sipat – Bilaspur Pooling Station 765 kV S/C line Length-25 km (ii) Bilaspur PS – Rajnandgaon 765 kV D/C line Length-180 km	<b>Scheduled Date of Completion: March, 2019</b>  <b>Anticipated Date of Completion: April, 2018</b>
11	Additional System Strengthening Scheme for Chhattisgarh IPPs – Part B	PFC Raipur - Rajnandgaon - Warora Transmission Ltd (A subsidiary of Adani Power Limited)  <b>Milestones:</b> (i) SPV acquisition on 23.11.2015 (ii) LoI issued on 28.07.2015 (iii) Approval u/s 164 of EA,2003 on 15.06.2016	(i) Raipur (Pool) – Rajnandgaon 765 kV D/C line Length - 60 KM (ii) Rajnandgaon – New Pooling station near Warora 765 kV D/C line Length - 270 KM (iii) Establishment of new 765/400 kV substation near Rajnandgaon 2x1500 MVA	<b>Scheduled Date of Completion: Nov, 2018</b>  <b>Anticipated Date of Completion: Nov, 2018</b>
12	Additional inter-Regional AC link for import into Southern Region i.e. Warora – Warangal and Chilakaluripeta - Hyderabad - Kurnool 765 kV link	PFC Warora Kurnool Transmission Ltd (A subsidiary of Essel Infraprojects Limited)  <b>Milestones:</b> (i) LoI issued on 29.02.2016 (ii) SPV acquisition on 06.07.2016 (iii) Approval u/s 164 of EA,2003 on 27.06.2017	(i) Establishment of 765/400 kV S/s at Warangal (New) with 2x1500 MVA ICTs and 2x240 MVAR bus reactors (ii) Warora Pool – Warangal (New) 765kV D/c line with 240 MVAR switchable line reactor at both ends Length - 350 KM (iii) Warangal (New) – Hyderabad 765 kV D/c line with 330 MVAR switchable line reactor at Warangal end	<b>Scheduled Date of Completion : Nov, 2019</b>

S. No.	Name of the Project	BPC / Implementing Agency / Milestones	Scope of works	Current Status
			Length- 160 KM (iv) Warangal (New) – Warangal (existing) 400 kV (quad) D/c line Length-10 KM (v) Hyderabad – Kurnool 765 kV D/c line with 240 MVAR switchable line reactor at Kurnool end Length- 170 KM (vi) Warangal (New) – Chilakaluripeta 765kV D/c line with 240 MVAR switchable line reactor at both ends Length – 250 KM (vii) Cuddapah – Hoodi 400kV (quad) D/c line with 63 MVAR switchable line reactor at both ends Length-200 KM	
13	Common Transmission System for Phase-II Generation Projects in Odisha and Immediate Evacuation System for OPGC (1320 MW) Project in Odisha	PFC Orissa Generation Phase-II Transmission Limited (A subsidiary of Sterlite Grid Limited) <b>Milestones:</b> (i) LoI issued on 06.01.2016 (ii) SPV acquisition on 08.04.2016 (iii) Approval u/s 164 of EA,2003 on 07.03.2017	(i) OPGC (IB TPS) – Jharsuguda (Sundargarh) 400 kV D/C line with Triple Snowbird Conductor Length - 50 KM (ii) Jharsuguda (Sundargarh) – Raipur Pool 765 kV D/C line Length - 350 KM	<b>Scheduled Date of Completion: August, 2019</b> <b>Anticipated date of completion: May, 2018</b>
14.	Transmission System Strengthening in WR associated with Khargone TPP (1320 MW)	REC Khargone Transmission Limited (Sterlite Grid Ltd.)	<b>A. Connectivity system for Khargone TPP</b> (i) LILO of one ckt of Rajgarh - Khandwa 400 kV D/C line at Khargone TPP	<b>Scheduled Date of Completion: July, 2019</b> <b>Anticipated Date of Completion: Feb, 2018</b>

S. No.	Name of the Project	BPC / Implementing Agency / Milestones	Scope of works	Current Status
		<b>Milestones:</b> (i) LoI issued on 26.05.2016 (ii) SPV acquisition on 22.08.2016 (iii) Approval u/s 164 of EA,2003 on 05.07.2017	(ii) Khargone TPP Switchyard – Khandwa pool 400 kV D/C (Quad) line  <b>B. System strengthening in WR in time frame of Khargone TPP</b> (i) Khandwa Pool – Indore 765 kV D/C line. (ii) Khandwa Pool – Dhule 765 kV D/C line. (iii) Establishment of 765/400 kV, 2x1500 MVA pooling station at Khandwa pool	
15.	New WR- NR 765 kV Inter-regional corridor	REC  <b>Milestones:</b> (i) MoP vide Gazette Notification dated 28.10.2016 appointed RECTPCL as BPC (ii) Request for Qualification : 28.12.2016 (iii) Request for Proposal : 28.03.2017	(i) Vindhyanchal Pooling Station-Varanasi 765 kV D/C line	<b>The project was awarded to PGCIL and SPV acquired on 27.03.2018</b>
16.	A. Additional 400kV feed to Goa  B. Additional System for Power Evacuation from Generation projects pooled at Raigarh (Tamnar) Pool	PFC  <b>Milestones:</b> (i) MoP vide Gazette Notification dated 28.10.2016 appointed PFCCCL as BPC (ii) Request for Qualification : 01.02.2017 (iii) Request for Proposal : 01.05.2017	<b>A. Additional 400kV feed to Goa</b> (i) LILO of one ckt. of Narendra (existing) – Narendra (New) 400 kV D/c quad line at Xeldem (ii) Xeldem – Mapusa 400 kV D/c (Q) line (iii) Establishment of 2x500MVA, 400/220kV substation at Xeldem  <b>B. Additional System for Power Evacuation from Generation Projects pooled at Raigarh (Tamnar) Pool</b>	<b>SPV acquired by SPTL on 14.03.2018</b>

S. No.	Name of the Project	BPC / Implementing Agency / Milestones	Scope of works	Current Status
			(i) Dharamjaygarh Pool section B - Raigarh (Tamnar) Pool 765 kV D/c line	
17.	A. Connectivity System for Lanco Vidarbha Thermal Power Ltd. (LVTPL)  B. Inter State Transmission system strengthening in Chhatarpur area in Madhya Pradesh	PFC  Milestones: (i) MoP vide Gazette Notification dated 28.10.2016 appointed PFCCL as BPC	<b>A. Connectivity System for Lanco Vidarbha Thermal Power Ltd. (LVTPL)</b> (i) LVTPL TPS switchyard – Warora Pool 765kV D/c line  <b>B. Inter State Transmission system strengthening in Chhatarpur area in Madhya Pradesh</b> (i) LILO of both circuits of Satna – Bina 400kV (1st) D/c line at Bijawar. (ii) Establishment of 2x500MVA, 400/220kV substation at Bijawar	<b>Bidding process is kept in abeyance</b>
18	Part ATS for RAPP U-7&8 in Rajasthan	PFC  SPV: RAPP Transmission Company Limited (subsidiary of Sterlitre Power Transmission Ltd)  Milestones (vii) LoI placed on 17.09.2013 (viii) SPV acquired on 12.03.2014 (ix) Trans. license received on 31.07.2014 (x) Approval u/s 164 received on 07.01.2015 (xi) Tariff adoption on 23.07.2014	RAPP - Shujalpur 400kV D/C line- (Length: 402 Ckm; Locations: 521)	<b>Completed in Nov, 2016</b>

**Annexure-2.2**

<b>STATUS OF TRANSMISSION SCHEMES UNDER IMPLEMENTATION BY POWERGRID IN WESTERN REGION (as on 31.03.2018)</b>						
<b>Sl. No.</b>	<b>Description of Scheme</b>	<b>Estimated Cost (Rs. Cr)</b>	<b>Date of firming up in WR standing committee</b>	<b>Date of investment approval</b>	<b>Target date as of now</b>	<b>Remarks</b>
1	<b>Western Region System Strengthening Scheme -II</b>	5222	20 <sup>th</sup> (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 <b>(100 % private)</b>	1050			Commissioned	
	Set-C: For regional strengthening in Gujarat <b>(100 % private)</b>	600			---	Implementation by Reliance
	a) Rajgarh – Karamsad 400kV D/c				commissioned	
	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 <b>(POWERGRID)</b>	1050			commissioned	

2	<p><b>Western Region System Strengthening -V</b></p> <p>a) 400 kV Vapi- Kala - Kudus D/c</p> <p>b) LILO of 400 kV Lonikhand - Kalwa line at Navi Mumbai</p> <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>	722	25 <sup>th</sup> (30.09.06)	Dec'07	<p>commissioned</p> <hr/> <p>Dec'18</p> <p>Substation is ready and shall be commissioned matching with line Commissioned</p>	<p>Under implementation</p> <p>Contingency arrangement to connect Vapi-Navi Mumbai with Navsari-Boisar line by passing ROW area, to from Vapi - Navsari line (24 Ckm) commissioned in Mar'13. 400KV D/C Vapi-Kala portion commissioned in Mar'14 (61 Ckm). Balance portion commissioned in Dec'17.</p> <p>Cable work in progress (2km.) Critical ROW issues</p>
3	<b>Tr. System of Mundra Ultra Mega Power Project (4000 MW)</b>	4824	26 <sup>th</sup> (23.02.07)	Oct'08		Under implementation

<ul style="list-style-type: none"> <li>a) Mundra – Bachchau -Ranchodpura 400 kV (Triple) D/c</li> <li>b) Mundra – Jetpur 400 kV (Triple) D/c</li> <li>c) Mundra – Limbdi 400 kV (Triple) D/c</li> <li>d) Gandhar-Navsari 400 kV D/c</li> <li>e) Navsari - Boisar 400 kV D/c</li> <li>f) LILO of both circuits of Kawas-Navsari 220 kV D/c at Navsari (PG)</li> <li>g) Wardha-Aurangabad 400 kV(Quad) D/c (with provision to upgrade at 1200 kV at later date)</li> <li>g) Aurangabad (PG) -Aurangabad I (Waluj) 400 kV(Quad)</li> </ul>				<p>Commissioned</p> <p>Commissioned</p> <p>Commissioned</p> <p>Commissioned</p> <p>Commissioned</p> <p>Commissioned</p> <p>Dec'18</p> <p>Commissioned</p>	<p></p> <p></p> <p></p> <p>Severe ROW &amp; Forest issue.</p> <p>Both Contracts terminated due to unsatisfactory performance. Tender awarded for both the packages.</p>
<p><b>Substations</b></p> <ul style="list-style-type: none"> <li>a) 40% Fixed Series Compensation each on Wardha - Aurangabad 400 kV D/c at Wardha end</li> <li>b) Establishment of new 400/220 kV, 2x315 MVA substation at Navsari &amp; Bachchau</li> </ul>				<p>Dec'18</p> <p>Commissioned</p>	<p>Commissioning matching with the line</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				Commissioned	
4	<b>Transmission system associated with Krishnapatnam (5x800 MW) (WR Portion)- now delinked from Krishnapatnam UMPP</b>  a) Raichur – Solapur (PG) 765 kV S/c b) Solapur(PG) – Pune 765 kV S/c  c) LILO of 400kV Aurangabad I (Waluj) - Pune (PG) D/c & Parli (PG) - Pune (PG) D/c lines at Pune(GIS)  d) Establishment of new 765/400 kV substations at Pune (GIS) with 2x1500 MVA transformation capacity	1928	27 <sup>th</sup> (30.07.07)		Commissioned Commissioned  Commissioned  Commissioned	
5	<b>Associated transmission system of VSTPP-IV and Rihand-III</b>  a) Rihand III- Vindhyachal Pool 765 kV D/c (initially to be op. at 400kV) b) Vindhyachal IV - Vindhyachal Pool 400kV D/c(Quad)  c) Vindhyachal Pool - Satna 765 kV 2xS/c d) Satna -Gwalior 765 kV 2xS/c e) Gwalior – Jaipur(South) 765 kV S/c f) Vindhyachal Pool-Sasan 765 kV S/c	4673	29th (10.09.09)	Mar'10	Commissioned  Commissioned  Commissioned Commissioned Commissioned Commissioned	



	g) Vindhyachal Pool-Sasan 400 kV D/c				Commissioned	
	h) Establishment of 765/400kV, 2x1500 MVA substation at Vindhyachal Pool				Commissioned	
6	<b>Solapur STPP(2x660MW) transmission system</b>  a) Solapur STPP – Solapur (PG) 400kV D/c (Quad)  b) Augmentation of 400/220kV ICT by 1x500MVA transformer (3 <sup>rd</sup> ) at Solapur (PG)	63.32	30th (08.07.10)	Oct'13	Commissioned  Commissioned	Line completed in Apr'15
7	<b>Solapur STPP (2x660MW) transmission system (Part-A)</b>  a) Solapur STPP – Solapur (PG) 400kV 2nd D/c (Quad)	50.52	36th (29.08.13)	Mar'15	Commissioned	Award placed in May'15
8	<b>Transmission system for evacuation of Kakrapar Atomic Power Project unit 3 &amp;4 (2x700 MW)</b>  a) Kakrapar NPP – Navsari 400kV D/c – 38 km  b) Kakrapar NPP – Vapi 400kV D/c - 104 km	378.71	31 <sup>st</sup> (27.12.10)	Feb'14	Commissioned  Commissioned	Stringing commenced from Mar'16
9	<b>Transmission System associated with Mauda Stage-II (2x660 MW)</b>	1575.3	32 <sup>nd</sup> (13.05.11)	Sep'13		

	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				Commissioned Commissioned Commissioned Commissioned	
10	<b>Provision of 1x315MVA ICT &amp; Spare Converter Trf for reliable auxlliary power supply at HVDC back to back station at Bhadravati</b>	143	33 <sup>rd</sup> (21.10.11)	-	Commissioned	ICT commissioned in Mar'15. Balance work under progress.
11	<b>Establishment of Pooling Station at Champa and Raigarh (Near Tamnar) for IPP Generation Projects in Chhattisagrh</b>  a) Champa Pooling Station - Raipur Pooling Station 765kV D/c b) Raigarh Pooling Staiton (near Kotra) - Raigarh pooling (near Tamnar) 765kV D/c c) Champa Pooling Station - Dharamjaygarh Pooling Station 765kv S/c d)Raigarh Pooling Staiton (near Kotra) - Champa pooling 765kV S/c e) Establishment of 765/400kv 6x1500MVA Champa Pooling Station	2066.85	29th (10.09.09)	May'11	Commissioned Commissioned Commissioned Commissioned Commissioned	

	f) Establishment of 765/400kV 3x1500MVA Raigarh Pooling Station (near Tamnar)				Commissioned	
12	<b>Transmission system strengthening in Western Part of WR for IPP generation projects in Chhattisgarh</b>  a) Aurangabad(PG) – Boisar 400kV D/c (Quad)  b) Wardha - Aurangabad (PG) 765kV D/c  c) Establishment of 765/400kV 2x1500MVA Aurangabad (PG) S/s  d) Augmentation of transformation capacity at Boisar by 400/220kV, 1x500MVA	2127.51	29th (10.09.09)	Nov'11	Commissioned  Commissioned  Commissioned  Commissioned	
13	<b>System strengthening in North/West part of WR for IPP Projects in Chhattisgarh</b>  a) Aurangabad (PG) – Padghe(PG) 765kV D/c  b) Vadodara – Asoj 400kV D/c(Quad)  c) Padghe – Kudus 400kV D/c (Quad)	2073.26	29th (10.09.09)	Dec'11	Commissioned  Commissioned  Commissioned	
14	<b>System Strengthening in Raipur-Wardha Corridor for IPP projects in Chhattisgarh (DPR-6)</b>	1422.85	29th (10.09.09)	Jan'12		

	a) Raipur Pooling station - Wardha 765kV 2nd D/c				Commissiomed	
15	<p><b>WR-NR HVDC interconnector for IPP Projects in Chhattisgarh</b></p> <p>a) A <math>\pm</math> 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> <p>e) Establishment of 400/220kV 2x500 MVA S/s at Kurukshetra (GIS) 2x500MVA</p>	9569.76	29th (10.09.09)/30th (08.07.10)	Mar'12	<p>Commissioned</p> <p>Commissioned</p> <p>Commissioned</p> <p>Commissioned</p> <p>Commissioned</p>	<p>Under Implementation</p> <p>400kV bays ready for commissioning in Dec'15. ICT-II under progress.</p>
16	<p><b>Inter-regional system strengthening scheme for WR and NR-Part A</b></p> <p>a) Solapur - Aurangabad 765kV D/c</p>	1315.9	36 <sup>th</sup> (29.08.13)	Oct'13	<p>Commissioned</p>	Completed

17	<b>Transmission System Associated with Lara STPS-I (2x800MW)</b>  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 <sup>th</sup> LTA (03.01.13)	Jun'14	Commissioned  Commissioned	Tower erection commenced in Oct'15
18	<b>Transmission System Strengthening in WR-NR Transmission Corridor for IPPs in Chattisgarh</b>  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 <sup>th</sup> (03.01.13)	Jun'14	Mar'19  Commissioned	Under Implementation
19	<b>Inter-regional system strengthening scheme for WR and NR-Part B</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	Commissioned  Apr'18 Commissioned  Commissioned  Commissioned	Under Implementation

	(f) LILO of Kanpur - Jhatikara 765KV S/C at Aligarh				Commissioned	
20	<b>Wardha - Hyderabad 765kV Links</b>  (a) 765KV D/C Wardha - Hyderabad line  (b) 400KV D/C Nizamabad - Dichpali line	3662.02		Jan'15	Commissioned  Commissioned	
21	<b>GREEN ENERGY CORRIDORS:- Inter State Transmission Scheme (ISTS) - Part B</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 <sup>th</sup> (29.08.13/05.09.14)	Apr'15	Sep'18  Commissioned  Sep'18  Sep'18	Under Implementation
22	<b>GREEN ENERGY CORRIDORS:- Inter State Transmission Scheme (ISTS) - Part C</b>  (a) 765KV D/C Bhuj Pool - Banaskanta line	2247.37	36 / 37 <sup>th</sup> (29.08.13/05.09.14)	July'15	July'18	Under Implementation

	(d) Establishment of 765/400/220kV (765/400kV - 2x1500 MVA & 400/220kV - 2x500MVA) pooling station at Bhuj				July'18	
23	<b>Transmission System Strengthening Associated with Vindhyachal V - Part A</b>  (a) 1x1500MVA, 765/400kV ICT at Vindhyachal Pooling Station		34th (09.05.12)	Feb'15	Commissioned	
24	<b>Transmission System Strengthening Associated with Vindhyachal V - Part B</b>  (a) 2 nos of 765kV Line bays alongwith 2x330MVAR Line Reactor at Vindhyachal Pooling Station  (a) 2 nos of 765kV Line bays alongwith 2x330MVAR Line Reactor at Jabalpur Pooling Station		34th (09.05.12)		Jun'18  Jun'18	Under Implementation
25	<b>STATCOMs in Western Region</b>  (a) Aurangabad (b) Gwalior (c) Solapur (d) Satna		36th (29.08.13)	Mar'15	Apr'18 Sep'18 Apr'18 commissioned	
26	<b>Western Region System Strengthening Scheme XIV</b>	93.96	37th (05.09.14)	Jan'16		

	<p>(a) 2x500MVA, 400/220kV transformer alongwith six nos of 220kV bays at Indore (PG) 765/400kV Substation</p> <p>(b) 1x500MVA, 400/220kV transformer alongwith two nos of 220kV bays at Itarsi (PG) 400/220kV S/s</p>				<p>July'18</p> <p>Commissioned</p>	
27	<p><b>Powergrid works associated with Part-A of Transmission system for Gadarwara STPS of NTPC</b></p> <p>(a) 2 nos. 765 kV line bays at 765/400kV Jabalpur Pooling Station of POWERGRID {for Gadarwara STPS (NTPC) - Jabalpur PS 765 kV D/c}</p>		<p>36/37th (29.08.13 / 05.09.14)</p>	<p>Apr'16</p>	<p>Commissioned in May'17</p>	
28	<p><b>Powergrid works associated with Part-B of Transmission system for Gadarwara STPS of NTPC i.e. WRSS XV</b></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>		<p>36/37th (29.08.13 / 05.09.14)</p>	<p>Apr'16</p>	<p>Matching with TBCB schedule</p> <p>Apr'18</p> <p>Apr'18</p>	



29	<p><b>Powergrid works associated with System Strengthening for IPPs in Chhattisgarh and other generation projects in Western Region</b></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)	Jul'16	<p>Matching with TBCB schedule</p> <p>Mar'18</p> <p>commissioned</p> <p>May'18</p> <p>Mar'19</p>	<p>Bay ready for commissioning. Commissioning matching with line (Adani).</p>
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	<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>				Nov'18	
30	<p><b>Powergrid works associated with Additional System Strengthening Scheme Chhattisagrh IPPs Part-B</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)	Jul'16	Matching with TBCB schedule	
30	<p><b>Powergrid workds associated with Additional System Strengthening for Sipat STPS</b></p>		36/37th (29.08.13 / 05.09.14)	Jul'16	Matching with TBCB schedule	

	(a) 3 nos. 765 kV line bays at 765/400kV Bilaspur Pooling Station of POWERGRID (1 no. for Sipat STPS(NTPC) - Bilapur PS(PG) 3rd 765kV S/c, 2 nos. for Bilaspur PS(PG)-Rajnandgaon(TBCB) 765 kV D/c)				Apr'18	
	(b) 2 nos. 240 MVAR, 765 kV switchable line reactors at 765/400kV Bilaspur PS end for Bilaspur PS(PG) - Rajnandgaon(TBCB) 765 kV D/c				Apr'18	
31	<b>Transmission System Strengthening associated with Mundra UMPP- Part A</b>  (a) LILO of both circuits of Mundra UMPP-Limbdi 400kV D/c (triple snowbird) line at Bachau	266.19	36th (29.08.13)	Jul'16		commissioned
32	<b>Transmission System Strengthening associated with Mundra UMPP- Part B</b>  (a) Mundra UMPP - Bhuj Pool 400kV D/c line (triple snowbird)		36/38th (29.08.13/17.07.2015)			Dec'18
33	<b>Bays for Transmission System Associated with DGEN Torrent Energy Ltd (1200MW)</b>  (a) 2nos 400kV Bays at Vadodara (GIS) (b) 2nos 220kV Bays at Navsari (GIS)		13/14th LTA (27.12.10/13.05.2011)	Jul'16		Execution of TBCB scheme critical  May'18 May'18

34	<p><b>Western Region System Strengthening -16</b></p> <p>(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</p> <p>(b) Provision of two nos. of 220kV bays at Mapusa (Colvale) 400/220 kV substation</p> <p>(c) Installation of 500MVA, 400/220kV (3rd) ICT with associated bays at Satna (PG) S/s with provision of two nos. 220kV line bays</p> <p>(d) Provision of two nos. of 400 kV bays at 765/400kV Indore(PG) substation</p>		38th (17.07.15)	Jul'16	<p>July'18</p> <p>July'18</p> <p>commissioned</p> <p>July'18</p>	
35	<p><b>Western Region System Strengthening -17</b></p> <p>1. Provision of 1x240 MVAR switchable line reactor at Pune GIS S/s end {for Aurangabad (PG) – Pune GIS 765kV S/C line, formed after LILO of one ckt of Aurangabad (PG) – Padghe (PG) 765kV D/C line at Pune GIS}.</p>		39th (30.11.15)	Feb'17	Sep'19	

2. Conversion of followings Fixed Line Reactor into Switchable Line Reactors / BUS Reactor.

a. Itarsi – Indore (MPPTCL) 400kV 2xS/C lines: 420kV 50 MVAR fixed line reactors at both ends of each line are to be converted into switchable line reactors.

b. Bina (PG) – Shujalpur 400kV D/C line: 420kV 50 MVAR fixed line reactor at Shujalpur end is to be converted into switchable line reactor. The 420kV 63 MVAR line reactor installed at Bina (PG) end is already switchable.

c. 1x63 MVAR BUS Reactor at Bhadravati S/s: 420kV

3. Installation of ICTs along with associated bays at following substations of POWERGRID:

a. Khandwa 400/220kV Substation: 1x500 MVA, 400/220kV 3rd ICT.

b. Boisar 400/220kV Substation: 1x500 MVA, 400/220kV 4th ICT.

c. Kala 400/220kV Substation: 1x500 MVA, 400/220kV 3rd ICT.

d. Dehgam 400/220kV Substation: 1x500 MVA, 400/220kV 3rd ICT.

36	<p><b>Western Region System Strengthening -18</b></p> <p>1. Splitting of following substation along with necessary switching arrangement.</p> <p>a. Dharamjaygarh Pool 765kV BUS</p> <p>b. Raigarh Pool (Kotra) 400kV &amp; 765kV BUS</p> <p>c. Champa Pool 400 kV &amp; 765kV BUS</p> <p>2. Installation of Reactors:</p> <p>a. 1X125 MVAR BUS Reactor at 400kV BUS Section A of Dharamjaygarh Pool.</p> <p>b. 1X125 MVAR BUS Reactor at 400kV BUS Section A of Raigarh Pool (Kotra).</p> <p>c. 1X240 MVAR BUS Reactor at 765kV BUS Section A of Raigarh Pool (Kotra).</p> <p>d. 1X240 MVAR BUS Reactor at 765kV BUS Section A of Champa Pool.</p> <p>e. 1X330 MVAR BUS Reactor at 765kV BUS Section B of Dharamjaygarh Pool.</p>		39th (30.11.15)	Feb'17	Feb'20	
37	<p><b>PG Works associated with Transmission System for Khargone TPP</b></p>		38th & 39th (17.07.15 & 30.11.15)	Feb'17		

	<p>1. 63 MVAR switchable line reactor along with 500Ω NGR at Rajgarh(PG) end of Khargone TPS – Rajgarh (PG) 400kV line <i>{formed after LILO of one circuit of Khandwa - Rajgarh 400 kV D/C line at Khargone TPS, being implemented under TBCB}</i></p> <p>2. 2 nos. of 765 kV line bays at 765/400kV Indore Substation of POWERGRID <i>{for termination of Khandwa PS – Indore 765 kV D/C line, being implemented under TBCB }</i></p> <p>3. 240 MVAR Switchable Line Reactors along with 700Ω NGR at Indore (765/400kV S/s) end of each circuit of Khandwa Pool – Indore 765kV D/c line (Line being implemented under TBCB)</p>				Feb'18	Ready for commissioning. Commisisioning matching with TBCB line.
					July'19	
					July'19	
38	<p><b>POWERGRID Works associated with New WR - NR 765kV Inter-regional corridor</b></p> <p>a. 2 nos. of 765kV Line Bays at Vindhyachal 765/400 kV Pooling Station;</p> <p>b. 2 nos. of 765kV Line Bays along with 765kV, 1x330 MVAR line reactor in each bay at Varanasi 765/400 kV GIS sub-station</p>		40th (01.06.2016)		Matching with TBCB Line	

39	<p><b>POWERGRID Works associated with Additional 400kV feed to Goa</b></p> <p>2 nos of 400kV line bays at Mapusa s/s for termination of Xeldem – Mapusa 400kV D/c (quad) line &amp; 1x80MVAR LR at Narendra (New) S/s for Narendra(New) - Xeldam 400kV line</p>		<p>40th (01.06.2016) 41st (21.12.2016)</p>		<p>Matching with TBCB works</p>	
40	<p><b>POWERGRID Works associated with Additional System for Power Evacuation from Generation Projects pooled at Raigarh (Tamnar) Pool</b></p> <p>2 nos. of 765kV Line Bays each at Dharamjaygarh Pool and Raigarh (Tamnar) Pool</p>		<p>40th (01.06.2016)</p>		<p>Matching with TBCB works</p>	
41	<p><b>Transmission system for Ultra Mega Solar Power Park (700MW) at Banaskantha (Radhanesda), Gujarat</b></p> <p>400KV D/C Banaskantha PS - Banaskantha (PG) line</p> <p>765/400kV Banaskantha (PG) 2 nos line bays</p>	<p>118</p>	<p>40th (01.06.2016)</p>	<p>May'17</p>	<p>Matching with Banaskantha (Radhanesda) Solar Park</p> <p>Sep'18</p> <p>Sep'18</p>	



42	<p><b>Supplementary Transmission system for Ultra Mega Solar Power Park (700MW) at Banaskantha (Radhanesda), Gujarat</b></p> <p>Establishment of 2x500MVA, 400/220kV pooling station at Banaskantha (Radhanesda) [GIS] along with 1x125MVAR bus reactor</p> <p>4 nos. 220kV line bays at 400/220kV at Banaskantha (Radhanesda) pooling station for Solar Park Interconnection.</p>		41st (21.12.2016)		<p>Matching with Transmission system for Ultra Mega Solar Power Park (700MW) at Banaskantha (Radhanesda) Gujarat</p> <p>Jun'19</p> <p>Jun'19</p>	
43	<p><b>Transmission System for Ultra mega Solar Park in Rewa District, Madhya Pradesh .</b></p> <p>Establishment of 3x500MVA, 400/220kV substation at Rewa Pooling Station</p> <p>LILO of Vindhyachal - Jabalpur 40kV D/c (both circuits) at Rewa Pooling Station</p>		38th (17.07.2015)	Jan'16 / Mar'17	<p>Matching with Rewa UMSP</p> <p>Sep'18</p> <p>Mar'18</p>	<p>Sub station alongwith ICT I &amp; II completed &amp; charged in Mar'18. balance work under progress.</p> <p>Line completed &amp; charged in Mar'18.</p>

	6 nos. 220kV line bays at Rewa Pooling Station			Sep'18	Sub station alongwith ICT I & II completed & charged in Mar'18. balance work under progress.
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सत्यमेव जयते

भारत सरकार

Government of India

विद्युत मंत्रालय

Ministry of Power

केन्द्रीय विद्युत प्राधिकरण

Central Electricity Authority

विद्युत प्रणाली योजना एवं मूल्यांकन-I प्रभाग

Power System Planning &amp; Appraisal-I Division

सं No. 29/1/2018/PSP&amp;A-I/ 173 - 176

दिनांक / Date: 31.01.2018

सेवा में / 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 - 110 016
3. Chairman and Managing Director, MPPTCL, Shakti Bhawan, Rampur, Jabalpur - 482008
4. Director (Trans.), RVPNL, Vidhyut Bhawan, Janpath, Jyothi Nagar, Jaipur Rajasthan

विषय : बडोड - कोटा (राजस्थान) 220 के वी लाइन को 220 के वी भानुपुरा S/s में LILO करने के सम्बंध में 23.01.2018 को के वि प्रा, नई दिल्ली में हुई बैठक के कार्यवृत्त।

**Subject:** Minutes of the meeting held on 23.01.2018 in CEA, New Delhi regarding LILO of Badod (Madhya Pradesh) – Kota (Rajasthan) 220 kV D/C line at Bhanupura 220 kV S/s of MPPTCL – Reg

Madam / Sir / महोदया / महोदय,

Please find enclosed minutes of the meeting held on 23.01.2018 in CEA, New Delhi regarding LILO of Badod – Kota at Bhanupura S/s of MPPTCL.

Thank you,

Enclosures: As above

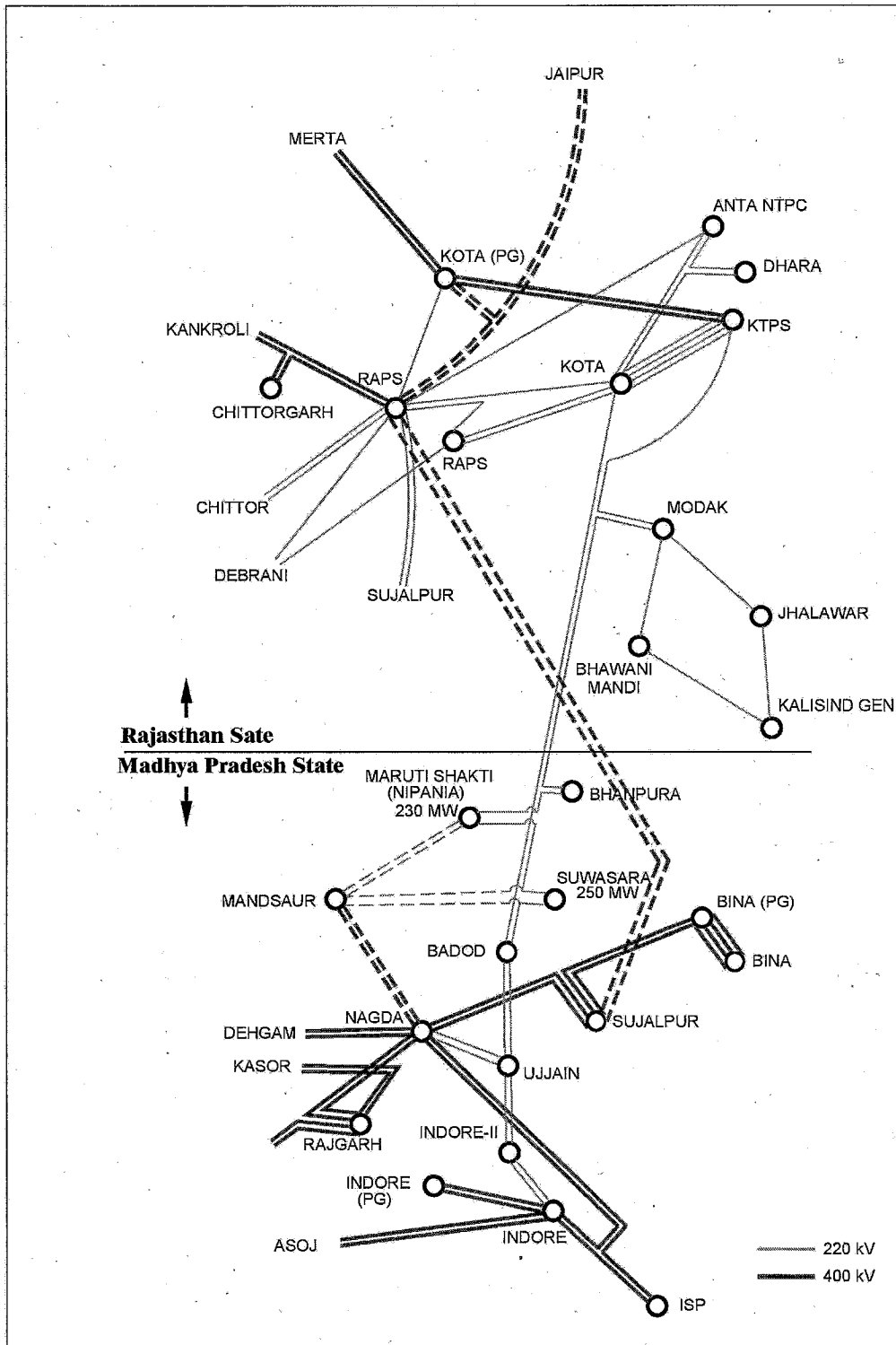
भवदीय / Yours faithfully,

(अवधेश कुमार यादव / Awdhesh Kr. Yadav)

निदेशक / Director

**Minutes of the meeting held on 23.01.2018 in CEA, New Delhi regarding LILO of Badod – Kota 220 kV S/C at Bhanupura S/s**

- 1.0 A meeting was held in CEA to discuss the MPPTCL proposal for LILO of Badod – Kota 220 kV S/C at Bhanupura S/s. The list of participants is enclosed at Annexure –I.
  - 2.0 CEA stated that Ujjain–Kota 220 kV D/C inter-state line was implemented jointly by Madhya Pradesh (up to Madhya Pradesh border) and Rajasthan (up to Rajasthan border) for exchange of power between these states. LILO of this line has been subsequently done by MP and Rajasthan at multiple locations, as given below:
    - i) LILO of one circuit of Ujjain–Kota 220 kV D/C was done at Modak 220 kV S/s in Rajasthan resulting in Ujjain–Kota 220 kV line and Ujjain – Modak 220 kV line as inter-state lines
    - ii) LILO of both circuits of reconfigured Ujjain–Kota 220 kV D/C line at Badod S/s in MP by MPPTCL, thus forming Badod-Modak and Badod-Kota 220 kV S/C lines as inter-state lines.
    - iii) Hon'ble CERC order dated 14.03.2012 in the petition no. 15/Suo–Motu/2012 for determination of tariff of inter-state transmission lines connecting two states interalia, included Badod–Kota 220 kV S/C and Badod–Modak 220 kV S/C as inter-state lines.
    - iv) LILO of 220 kV Badod–Modak 220 kV S/C line at Bhanupura S/s in MP on 26.02.2015 by MPPTCL, thus forming Badod-Bhanupura- Modak 220 kV S/C line.
    - v) LILO of Badod–Bhanupura 220 kV S/C line at Maruti Shakti (Nipaniya) 230 MW wind generation project in MP by MPPTCL, thus forming Badod-Nipaniya-Bhanupura 220 kV S/C line.
    - vi) MPPTCL has also interconnected Suwasara 250 MW Solar Park through LILO of Maruti Shakti–Badod 220 kV line at Suwasara, as an interim arrangement.
- With the above LILO, Badod–Kota 220 kV S/C and Bhanupura–Modak 220 kV S/C traverses two states and are inter- state lines. The network configuration is as shown below:



3.0 MPPTCL stated that they have recently completed the works associated with LILO of Badod-Kota 220 kV S/C line at Bhanupura 220 kV S/s (MPPTCL) and the same is yet to be interconnected with 220 kV Bhanupura S/s. NLDC / WRLDC has desired that the

consent of Standing Committee on Power System Planning / CEA may be obtained for the proposed LILO of Badod-Kota 220 kV S/C line at Bhanupura 220 kV S/s. Accordingly, MPPTCL has sought the 'in principle' approval of CEA for interconnection of above LILO of Badod-Kota 220 kV S/C at Bhanupura 220 kV S/s.

- 4.0 On a query about the requirement of above proposal, MPPTCL stated that with its implementation, LILO of 2<sup>nd</sup> circuit (of Badod- Kota/Modak 220 kV D/C line) would also be established at Bhanupura substation and the power flows on 220 kV lines from Bhanupura substation would be balanced. As the Bhanupura S/s is located near the boundary of Madhya Pradesh, the ISTS point would be shifted to Bhanupura from Badod. This would provide operational flexibility to MPPTCL for the intra-state network upto Bhanupura.
- 5.0 NLDC representative stated that this being an inter-regional line, the power flow on the line should be such that enough margins are there to cater to any unforeseen contingency. Further, Bhanupura is wind / RE potential area, and about 500 MW RE injection is envisaged, which may lead to high loading of ISTs lines i.e. Bhanupura-Kota 220 kV S/C and 220 kV Bhanupura-Modak S/C lines.
- 6.0 MPPTCL representative intimated that under GEC-I proposal of Madhya Pradesh, Suwasara Solar Park-Mandsaur 220 kV D/C line is under implementation. After completion of this line, the interim arrangement i.e. LILO of Maruti Shakti-Badod 220 kV S/C line at Suwasara Solar Park would be removed. Further, Maruti Shakti-Mandsaur 220 kV D/C line is also under implementation as intra state transmission system for evacuation of wind power at Maruti Shakti. Thus, the power of Suwasra Solar Park and Maruti Shakti wind generation project would be pooled at 400/220 Mandsaur S/S and evacuated to Nagda over Mandsaur-Nagda 400 kV D/C line. Also the solar and wind generation would not be simultaneous. Further, the power flow through Badod-Kota / Modak 220 kV line is in the range of 70-80 MW/Circuit and is bidirectional in nature i.e. during the peak load period (Oct - Jan) of Madhya Pradesh, power flows from Rajasthan to Madhya Pradesh and during peak load conditions of Rajasthan / Northern Region (Jan - April), the power flows from Madhya Pradesh to Rajasthan.
- 7.0 CEA stated that to discuss the MPPTCL proposal, Rajasthan was also invited to the meeting. On MPPTCL proposal, RVPNL (STU of Rajasthan) vide their letter no. RVPN/SE (P&P)/XEN-2/AE-II/F/D 1484 dated 23.01.2018 has intimated that metering point may be shifted from Badod to Bhanupura and shutdown of Badod-Kota 220 kV S/C may be allowed by NRLDC after having consultation with SLDC of Rajasthan.
- 8.0 After deliberations, the following was agreed
  - i) The LILO of Badod-Kota 220 kV S/C at Bhanupura S/s is agreed in principle and the same would be taken up in the next meetings of SCSPWR and SCSPNR for formalisation.
  - ii) The ISTS metering points shall be shifted from Badod S/s to Bhanupura S/s.

- iii) MPPTCL to expedite the implementation of Mandsaur 400 kV S/s and Mansaur-Nagda 400 kV D/C line and remove the interim arrangement i.e. LILO of Badod-Maruti Shakti at Suwasra Solar Park at the earliest.
- iv) MPPTCL was requested to examine the feasibility of restoration of LILO of Badod – Bhanupura at Maruti Shakti, after completion of Mandsaur S/s and Maruti Shakti – Mandsaur 220 kV D/C line.

The meeting ended with thanks to the chair.

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## Annexure – I

**List of Participants a meeting held on 23.01.2018 at New Delhi regarding LILO  
of 220 kV Badoa – Kota line at Bhanupura S/s**

S. No	Name Shri / Ms.	Designation	Contact No.	Email ID
<b>CEA</b>				
1	Shri. Ravindra Gupta	Chief Engineer	9968286184	<a href="mailto:ravindergupta_cea@nic.in">ravindergupta_cea@nic.in</a>
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3	Shri. Shiva Suman	Dy. Director	011 26732330	<a href="mailto:shivvasuman@nic.in">shivvasuman@nic.in</a>
4	Vikas Sachan	Asst. Director	011 26732336	<a href="mailto:vikas.cea@gov.in">vikas.cea@gov.in</a>
<b>POWERGRID</b>				
5	Mukesh Khanna	GM (CTU.Plg.)	9910378098	
6	Rashmi Pant Joshi	Manager	9999883617	<a href="mailto:rashmi4pg@gmail.com">rashmi4pg@gmail.com</a>
7	Pratyush Singh	Sr. Engr. (CTU. Plg)	8826094863	<a href="mailto:Pratyush.singh@powergridrediffmail">Pratyush.singh@powergridrediffmail</a>
<b>POSOCO</b>				
8	N Nallarasan	DGM	8527077022	<a href="mailto:nallarasan@posoco.in">nallarasan@posoco.in</a>
9	Pradeep Kumar	Sr. Engr.	8452045338	<a href="mailto:psanodiya@posoco.in">psanodiya@posoco.in</a>
<b>MPPTCL</b>				
10	M.M. Dhokey	Ex. Engr.	9425805237	<a href="mailto:ceps321@yahoo.com">ceps321@yahoo.com</a>





भारत सरकार  
 Government of India  
 विद्युत मंत्रालय  
 Ministry of Power  
 केन्द्रीय विद्युत प्राधिकरण  
 Central Electricity Authority  
 विद्युत प्रणाली योजना एवं मूल्यांकन-I प्रभाग  
 Power System Planning & Appraisal-I Division

सेवा में / To

1. Joint Secretary, MNRE, Block 14, CGO Complex, Lodhi Road, New Delhi – 110003
2. COO, CTU, PGCIL, Saudamini, Plot No. 2, Sector – 29, Gurgaon - 122001
3. Director (PS), SECI, 1<sup>st</sup> floor, D – 3, A Wing, Religare building, District Centre, Saket, New Delhi 110017

विषय : कच्छ क्षेत्र, गुजरात में मौजूदा और प्रस्तावित पवन ऊर्जा परियोजनाओं के लिए पारेषण प्रणाली - सम्बंधित

**Sub: Transmission evacuation system for existing and proposed wind power projects in Kutch area, Gujarat - Reg**

महोदय / महोदया / Sir / Madam,

Please find enclosed minutes of the meeting held on 16.04.2018 in CEA, New Delhi regarding evacuation system for wind power projects awarded / to be awarded by SECI for capacity of 6050 MW in tranche 1, 2, 3 & 4.

भवदीय / Yours faithfully,

(अवधेश कुमार यादव / Awdhesh Kr. Yadav)

निदेशक / Director, PSP & A – I

**Minutes of a meeting held on 16.04.2018 in CEA, New Delhi regarding evacuation system  
for wind power projects awarded / to be awarded by SECI**

A meeting was taken by Member (PS), CEA on 16.04.2018 to discuss the evacuation system for wind power plants, which have been awarded and bid out by SECI recently. The list of participants is enclosed at Annexure – I.

- 1.0 Chief Engineer, PSPA – I, CEA welcoming the participants stated that SECI has conducted bidding for about 6050 MW of wind power projects across India and out of this 4050 MW (Tranche 1, 2 & 3) has already been awarded and remaining 2000 MW (Tranche 4) has been bid out and will be awarded shortly. It was mentioned that though the bidding was carried out pan India, the bidders have opted to establish 4500 MW (3900 MW at Bhuj PS & 600 MW at Bhachau S/s) of wind power in Gujarat and 1550 MW (950 MW at Tirunelveli, 300 MW at Pugalur & 300 MW at Palakkad) in Tamil Nadu. He added that as per information available with CEA, CTU has already granted LTA to the tune of 800 MW and 2250 MW at 765/400/220 kV Bhuj pool sub-station at 220 kV and 400 kV respectively.
- 2.0 SECI informed that out of 60 GW capacity envisaged to be set up by 2021-22 through wind power projects, it has carried out bidding for total quantum of 6,050 MW in four tranches, till date. These wind power projects would be set up on pan India basis and would be connected to ISTS network. As per the bid conditions, the developers are responsible for obtaining connectivity and LTA with the ISTS network. These wind power projects would be set up in Kutch region of Gujarat (4500 MW) and Tamil Nadu (1550 MW). Out of this 3900 MW of wind generation would be injected at Bhuj Pooling Station at 220 kV level, which is currently under implementation by PGCIL and 600 MW is to be injected at Bachau S/s. The details of wind power injection and beneficiary region is enclosed at Annexure-II. The majority of the wind power project developers have proposed connectivity at 220 kV level at Bhuj pooling sub-station, whereas POWERGRID is implementing only 1000 MVA (2x500 MVA, 400/220 kV) transformation capacity at Bhuj PS. Keeping in view, the commissioning schedule of Oct., 2018, May 2019 and Nov., 2019 of wind power projects in Tranche-I, II and III respectively, there is urgent need of augmentation of transformation capacity at Bhuj pooling sub-station and system strengthening, if any for evacuation of power.
- 3.0 CTU stated that POWERGRID is implementing Bhuj PS with transformation capacity of 2x1500 MVA, 765/400 kV ICTs and 2x500 MVA, 400/220 kV ICTs. As on date, LTA has been granted to 3050 MW of RE power at Bhuj Pool, out of which 2250 MW is at 400 kV level and 800 MW (IWISL- 500 MW & SESPL-300 MW) at 220 kV level. For the LTA of 2250 MW granted to M/s Adani at 400 kV level, the TSA/LTAA has not yet been signed and the matter is sub judice at CERC.

CTU further stated that (without considering the 2250 MW LTA to M/s Adani) for accommodating wind power projects at Bhuj in Tranche I & II, an additional 1x600 MVA,

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400/220 kV transformer would be required considering normative injection from wind power projects. For accommodating Tranche III wind power projects additional 2x600 MVA, 400/220 kV and 1x1500 MVA, 765/400 kV ICT would be required. For accommodating Tranche IV wind generation projects additional 400/220 kV ICTs would be required at Bhuj for which there is no space available. Therefore, a new pooling station is required to be proposed in that area. Further, with increasing injections at Bhuj, transmission constraints would also be there on Banaskantha–Zerda 400 kV line and Bachau–Varsana 400 kV D/C line. Therefore, 400/220 kV transformation capacity augmentation at Bhuj pool, new pooling station in Bhuj area as well transmission strengthening is required for accommodating all the wind power projects (Tranche I to IV) in Bhuj area.

- 4.0 CEA stated that from the list of wind power generation projects furnished by SECI, it can be seen that, out of 3900 MW (2700 MW in Tranche 1, 2 & 3 + 1200 MW in Tranche 4) of wind power proposed to be injected at Bhuj PS, LTA has already been granted to only 800 MW capacity. Therefore, additional injection of 3100 MW also needs to be accommodated at Bhuj PS. This requires augmentation of transformation capacity Bhuj PS (AIS / GIS) and / or may need to establish another pooling station near Bhuj PS. This would only take care of injection needs of the power from wind generation projects. But for actual transfer of power, the adequacy of network to deliver the power to the identified beneficiaries, also need to be seen. As per the information furnished by SECI, the beneficiaries of the 2700 MW of wind power to be injected at Bhuj PS are located in NR (1350 MW), WR (650 MW) and ER (700 MW). CEA requested SECI to ask successful bidders to immediately apply for connectivity and LTA, so as to plan requisite augmentation of transmission system at Bhuj pooling station. The implementation of which would be taken up after finalization of detailed procedure for grant of connectivity to project based on renewable energy sources by CERC.
- 5.0 Considering the participation of developers in bidding of 4 tranches, it is observed that the above wind firms are expected to be commissioned within 6 months to 18 months, however, establishment of requisite transmission system requires around 3–4 years. In view of this, it was opined that the bidding, development of wind power projects, planning & implementation of transmission system etc., should be carried out in coordinated manner, so that evacuation system can be made available in matching time frame of wind power generation. In order to have clarity about point of injection, it was suggested that SECI should carry out site specific bidding, instead of pan India bidding. It was also suggested that as the gestation period of renewable generation projects (18-20 months) is short compared to that required for implementation of transmission system (3-4 years), a mechanism needs to be evolved to plan and implement the transmission system based on potential sites of renewable generation addition.
- 6.0 SECI representative requested CTU to furnish the details regarding spare / margins available in transformation capacity etc., at various existing / under implementation ISTS substations, so that the next bidding can be carried out accordingly.

In this regards, CEA mentioned that recently, GETCO has submitted a proposal for evacuation of RE power through intra state transmission system. Therefore, to assess the requirement of transmission system for evacuation of power from Kutch region in Gujarat,

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detailed studies for evacuation of RE power from Gujarat need to be carried out among CTU, GETCO and CEA.

7.0 After further deliberations the following was decided:

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

Meeting ended with thanks to the chair.

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## List of participants of meeting held on 16.04.2018 regarding evacuation system for wind power projects awarded by SECI

S. No.	Name	Designation	Organization	Contact No.	email
1	P S Mhaske	Member (PS)	CEA	26732301	memberspscea@nic.in
2	Ravinder Gupta	CE	CEA	26732305	ravindergupta_cea@rediffmail.com
3	Girish Kumar	Director	MNRE	9717493267	gkumar.mnre@nic.in
4	Awdhesh Kumar Yadav	Director	CEA	26732343	awd.cea@gmail.com
5	B S Bairwa	Director	CEA	26732347	bhagwan02@gmail.com
6	Shiva Suman	Dy. Director	CEA	26732330	shivvasuman@nic.in
7	S K Mishra	Director	SECI	9717890222	sk.mishra@seci.co.in
8	Pratik Prasun	Dy. Mgr	SECI	9891768303	pratikpr@seci.co.in
9	P S Das	DGM	CTU	9433041837	psdas@powergridindia.com
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Issue No. I/561/2018

## Annexure – II

Tranche	Quantum	SCOD	Status	Connectivity at					PPA for				
				Bhuj PS	Bachau S/s	Tirunelveli S/s	Palakkad S/s	Pugalur S/s	NR	WR	SR	ER	NER
1	1050	05.10.2018	Awarded	300	250	500			550	0	0	450	50
2	1000	03.05.2019	Awarded	550	250	200			600	50	50	250	50
3	2000	23.11.2019	Awarded	1850	100	50			800	650	0	550	0
4	2000	20.01.2020	Bidding completed & LoA would be issued shortly	1200	0	200	300	300	Not Available				
Total	6050			3900	600	950	300	300	1950	700	50	1250	100

I/664/2018



भारत सरकार

Government of India

विद्युत मंत्रालय

Ministry of Power

केन्द्रीय विद्युत प्राधिकरण

Central Electricity Authority

विद्युत प्रणाली योजना एवं मूल्यांकन-I प्रभाग

Power System Planning &amp; Appraisal – I Division

सेवा में / To

1. Joint Secretary, MNRE, Block 14, CGO Complex, Lodhi Road, New Delhi – 110003
2. Chief Engineer, PSP & A – II, CEA
3. COO, CTU, PGCIL, Saudamini, Plot No. 2, Sector – 29, Gurgaon - 122001
4. Director (PS), SECI, 1<sup>st</sup> floor, D – 3, A Wing, Religare building, District Centre, Saket, New Delhi 110017

विषय : भारत में आरई शक्ति के विकास के लिए रोड मैप - सम्बंध में ।

**Sub: Road map for development of RE power in India – Reg**

महोदय / महोदया / Sir / Madam,

Please find enclosed minutes of the meeting held on 23.04.2018 in CEA, New Delhi at 15:00 Hrs among MNRE, CEA, CTU & SECI regarding road map for development of RE power in India.

भवदीय / Yours faithfully,

(अवधेश कुमार यादव / Awdhesh Kr. Yadav)

निदेशक / Director, PSP &amp; A – I

**Minutes of a meeting held on 23.04.2018 in CEA, New Delhi regarding road map for development of RE power in India**

In a meeting taken by Member (PS), CEA on 16.04.2018 to discuss the evacuation system for wind power projects, which have been awarded / bid out by SECI, it was agreed that MNRE / SECI would make a presentation on the road map for development of RE power in India. Accordingly, a meeting was held on 23.04.2018 in CEA, New Delhi regarding RE power potential in India. The list of participants is enclosed at Annexure-I.

In this regard, a copy of the presentation made by SECI is enclosed as Annexure-II. SECI stated that GoI has an ambitious target to set up 175 GW RE power by 2021–22, which consists of 100 GW Solar, 60 GW wind, 10 GW Biomass and 5 GW of Small Hydro. In order to achieve this in time, it is proposed to complete the bidding process by 2019–20. As on 31.03.2018, the installed capacity of wind power projects is around 34 GW and capacity under implementation is around 3 GW. The installed capacity of solar power projects is around 22 GW and around 10 GW capacity is under implementation.

Regarding target of future bidding, SECI informed that they have set a target of 10 GW of wind power projects to be bid out in each financial year (FY) of 2018–19 and 2019–20 in inter-state and about 6 GW is envisaged in intra state. As on date, for FY 2018–19, bidding has been completed for 6000 MW (4000 MW has been awarded and 2000 MW is to be awarded shortly). For solar power in FY 2018–19, SECI has set a target to bid out about 18 GW and NTPC has a target to bid out 12 GW. Thus, around 40 GW need to be bid out in FY 2019–20 (quantum to be bid out in intra state and inter – state yet to be decided).

Regarding the wind power potential, SECI intimated that based on their interactions with various wind power project developers, they have estimated the state wise wind power potential which is tabulated below:

S. No.	State	Area	Potential (MW)
1	Gujarat	Bhuj	4000
		Amreli	2000
		Jam Nagar	2000
		Bhav Nagar	2000
		Sub Total	10000
2	Tamil Nadu	Karur	2000-2500
		Kanya Kumari	1000-2000
		Udamalpet	2000
		Other Areas in TN	20000



		Sub Total	25000-29500
3	Karnataka	Munirabad	2000-2500
		Gadag	2000-2500
		Chitra Durg	1000-1700
		B Bagewadi	2000
		Chikkodi	1000-1500
		Other Areas in Kar	31000-39200
		Sub Total	39000
4	Andhra Pradesh	Kurnool & Anantapur	3000

It was opined that as per Government of India tariff policy, all future inter-state transmission projects shall ordinarily to be developed through tariff based competitive bidding, the implementation of which takes about 3-4 years, whereas gestation period of projects based on renewable generation is about 22 to 24 months. Therefore, there is inherent mismatch of about 12 to 24 months. In order to avoid mismatch between commissioning of renewable generation projects and availability of transmission system required for evacuation and disbursal advance action need to be taken with regard to identification of requisite transmission system.

To facilitate the advance planning and implementation of the transmission system following was suggested:

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

The meeting ended with thanks to the chair.

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## Annexure – I

**List of participants of meeting held on 23.04.2018 in CEA, New Delhi regarding road map  
for development of RE power in India**

S. No	Name	Designation	Organization	Contact No.	email
1	P S Mhaske	Member (PS)	CEA	26732301	memberspscea@nic.in
2	S K Mohaptra				
3	Ravinder Gupta	CE	CEA	26732305	ravindergupta_cea@rediffmail.com
4	Girish Kumar	Director	MNRE	9717493267	<a href="mailto:gkumar.mnre@nic.in">gkumar.mnre@nic.in</a>
5	Awdhesh Kumar Yadav	Director	CEA	26732343	awd.cea@gmail.com
6	B S Bairwa	Director	CEA	26732347	bhagwan02@gmail.com
7	Shiva Suman	Dy. Director	CEA	26732330	shivvasuman@nic.in
8	Kanchan Chauhan	Asst. Director	CEA		
9	Suyash Ayush Verma	Asst. Director	CEA		
10	Pranay Garg	Asst. Director	CEA		
11	S K Mishra	Director	SECI	9717890222	<a href="mailto:sk.mishra@seci.co.in">sk.mishra@seci.co.in</a>
12	Pratik Prasun	Dy. Mgr	SECI	9891768303	pratikpr@seci.co.in
13	P S Das	DGM	CTU	9433041837	psdas@powergridindia.com
14	Venkatesh Gorli	Sr. Engr	CTU	8527391646	venkateshgorli@powergridindia.com
15	Pratyush Singh	Sr. Engr	CTU	8826094863	Pratysh.singh@powergridindia.com

**Summary of Adequacy of transmission infrastructure for Priority Wind Energy Zones in WR**

Transfer Capacity		Substation / Trf Augmentation requirement	Limiting Constraint		Remedial Measures	Remarks	Exhibit #
SI.	MW	Status	ICT	Tr. System			
1	500 or 1000	<ul style="list-style-type: none"> <li>2x500 MVA Under Implementation</li> </ul>	400/220kV ICT under N-1 or under N-0	NONE			I
2	2600 (85% of 3000)	<ul style="list-style-type: none"> <li>2x500 MVA Under Implementation</li> <li>4x500 <i>to be planned</i></li> </ul>	400/220kV ICT under N-1	Banaskantha – Sankhari 400kV D/c line critically loaded with Radhanesda SP full capacity.	<ul style="list-style-type: none"> <li>4x500MVA 400/220kV (addl) ICTs at Bhuj PS*</li> <li>1x1500MVA 765/400kV ICT at Bhuj PS</li> <li>LILO of Zerda – Ranchhodpura 400kV S/c at Banaskantha (approved in 42<sup>nd</sup> WR SCM) to be expedited</li> </ul> <p>*On account of space constraints at Bhuj PS, all future 220kV line bays at Bhuj PS may need to be implemented as GIS</p>	<ul style="list-style-type: none"> <li>Space for 400/220kV transformers at Bhuj PS exhausted</li> <li>Bhachau – Varsana 400kV D/c line is critically loaded</li> </ul>	II
<b>Transmission System for RE Projects in Kutch area: Bhuj-II PS (3000MW) + Lakadia PS (2000MW)</b>							
3A	3000 (Bhuj) + 2000 (Bhachau)	<ul style="list-style-type: none"> <li>Bhuj-II 7x500MVA, 400/220kV (GIS) S/s</li> <li>Lakadia 3x1500MVA &amp; 5x500MVA, 765/400/220kV (GIS) <i>to be planned</i></li> </ul>	-	-	<ul style="list-style-type: none"> <li>Establishment of 7x500MVA, 400/220kV Bhuj-II PS (GIS) along-with 12 nos. 220kV bays for wind farms' integration</li> <li>Establishment of 5x1500MVA &amp; 5x500MVA, 765/400/220kV Lakadia PS (GIS) along-with 8 nos. 220kV bays for wind farms' integration</li> <li>Bhuj-II – Lakadia PS 400kV 2xD/c (Quad) line (~120km)</li> <li>Lakadia PS – Vadodara 765kV D/c line (~300km)</li> <li>Lakadia PS – Banaskantha 765kV D/c line (~150km)</li> </ul>	<ul style="list-style-type: none"> <li>Assuming that 80% quantum is to be transferred to NR &amp; balance to ER (to simulate worst case)</li> <li>Bhachau – Varsana 400kV D/c line is critically loaded</li> </ul>	III
3B		<ul style="list-style-type: none"> <li>Bhuj-II 3x1500MVA (765/400kV) 7x500MVA</li> </ul>	-	-	<ul style="list-style-type: none"> <li>Establishment of 3x1500MVA (765/400kV) 7x500MVA (400/220kV) Bhuj-II PS (GIS) along-with 12 nos. 220kV bays for wind farms' integration</li> </ul>	<ul style="list-style-type: none"> <li>Assuming that 80% quantum is to be transferred to NR &amp; balance to ER (to</li> </ul>	III B

Transfer Capacity		Substation / Trf Augmentation requirement	Limiting Constraint		Remedial Measures	Remarks	Exhibit #
Sl.	MW	Status	ICT	Tr. System			
		(400/220kV) S/s <ul style="list-style-type: none"> <li>Lakadia 3x1500MVA &amp; 5x500MVA, 765/400/220kV (GIS) to be planned</li> </ul>			<ul style="list-style-type: none"> <li>Establishment of 3x1500MVA &amp; 5x500MVA, 765/400/220kV Lakadia PS (GIS) along-with 8 nos. 220kV bays for wind farms' integration</li> <li>Interconnection of 765kV Bhuj S/s with the proposed Bhuj-II (GIS) S/s through bus extension or 765kV D/c line</li> <li>Bhuj-II – Lakadia PS 765kV D/c line (~120km)</li> <li>Lakadia PS – Vadodara 765kV D/c line (~300km)</li> <li>Lakadia PS – Banaskantha 765kV D/c line (~150km)</li> </ul>	simulate worst case)  <ul style="list-style-type: none"> <li>Bhachau – Varsana 400kV D/c line is critically loaded</li> </ul>	
<b>Transmission system for RE projects in Devbhumi Dwarka (2000MW)</b>							
4A (if option 3A is considered)	2000	<ul style="list-style-type: none"> <li>Jam Khambhaliya 5x500, 400/220kV S/s (GIS) to be planned</li> </ul>	-	Bhachau – Varsana 400kV D/c line	<ul style="list-style-type: none"> <li>Establishment of 5x500MVA, 400/220kV Jam Khambhaliya PS (GIS) along-with 8 nos. 220kV line bays</li> <li>Extension of Essar – Bhachau 400kV D/c (triple) line upto Jam Khambhaliya PS</li> <li>Jam Khambhaliya PS (GIS) – Kalavad (GETCO) 400kV D/c line</li> <li>Reconductoring of Bhachau – Varsana 400kV D/c line to HTLS conductor</li> </ul> <p><b>Alternatively</b>, LILO of Jam Khambhaliya PS – Bhachau 400kV D/c line at Halvad (GETCO) S/s may also be considered as it significantly helps to relieve loading on Bhachau – Varsana 400kV D/c line</p>	<ul style="list-style-type: none"> <li>Assuming that entire quantum is to be transferred to NR (to simulate worst case)</li> </ul>	<b>IV</b>
4B (if option 3B is considered)		<ul style="list-style-type: none"> <li>Jam Khambhaliya 5x500, 400/220kV S/s (GIS) to be planned</li> </ul>	-	Bhachau – Varsana 400kV D/c line	<ul style="list-style-type: none"> <li>Establishment of 5x500MVA, 400/220kV Jam Khambhaliya PS (GIS) along-with 8 nos. 220kV line bays</li> <li>Extension of Essar – Bhachau 400kV D/c (triple) line upto Jam Khambhaliya PS</li> <li>Jam Khambhaliya PS (GIS) – Kalavad (GETCO) 400kV D/c line (~75km)</li> </ul> <p>OR</p>	<ul style="list-style-type: none"> <li>Assuming that entire quantum is to be transferred to NR (to simulate worst case)</li> </ul>	<b>IV B</b>

Transfer Capacity		Substation / Trf Augmentation requirement	Limiting Constraint		Remedial Measures	Remarks	Exhibit #
Sl.	MW	Status	ICT	Tr. System			
					<p>Jam Khambhaliya PS (GIS) – Shapar (GETCO) 400kV D/c line (~130km)</p> <ul style="list-style-type: none"> <li>Reconductoring of Bhachau – Varsana 400kV D/c line to HTLS conductor</li> </ul> <p><b>Alternatively</b>, LILO of Jam Khambhaliya PS – Bhachau 400kV D/c line at Halvad (GETCO) S/s may also be considered as it significantly helps to relieve loading on Bhachau – Varsana 400kV D/c line</p> <ul style="list-style-type: none"> <li>Bhachau – Lakadia 400kV D/c (Quad) line OR LILO of Jam-Khambhaliya-Bhachau 400kV D/c (triple) line at Lakadia PS</li> </ul>		
<b>Transmission system for RE projects in Osmanabad area (2000MW)</b>							
5	2000	<ul style="list-style-type: none"> <li>Kallam 3x1500 &amp; 5x500MVA 765/400/220kV S/s (GIS) to be planned</li> </ul>	-	-	<ul style="list-style-type: none"> <li>Establishment of 3x1500MVA, 765/400/220kV Kallam PS (GIS)</li> <li>Kallam – Parli (New) 765kV D/c line (~70km) OR</li> <li>LILO of one circuit of Parli (New) – Solapur 765kV D/c line at Kallam (GIS)</li> </ul>	<ul style="list-style-type: none"> <li>Power dispersal beyond proposed Kallam S/s takes place on existing &amp; UC transmission system</li> </ul>	<b>V</b>

**Assumptions:**

1. Time-frame of the study has been considered as 2021-22
2. Demand has been considered on other than peak basis. Wind & Solar dispatch has been considered as 70% & 60% respectively on All India basis (except Rajasthan).
3. Radhanesda Solar park (700MW) has been considered in above studies.
4. N-1 condition has been considered for ICTs at pooling stations proposed above.
5. Bhachau –Varsana 400 kV contingency loading is considered around 1100 MVA.

**Note:**

The above studies are considering RE injection at Banaskantha to tune of 700MW which leads to critical loading on Banaskantha – Sankhari 400kV D/c line. Accordingly, the LILO of 1ckt of Zerda – Vadavi D/c at Banaskantha needs to be expedited.

Transfer Capacity		Substation / Trf Augmentation requirement	Limiting Constraint		Remedial Measures	Remarks	Exhibit #
Sl.	MW	Status	ICT	Tr. System			
1	500 or 1000	<ul style="list-style-type: none"> <li>2x500 MVA Under Implementation</li> </ul>	400/220kV ICT under N-1 or under N-0	NONE			I
2	2600 (85% of 3000)	<ul style="list-style-type: none"> <li>2x500 MVA Under Implementation</li> <li>4x500 to be planned</li> </ul>	400/220kV ICT under N-1	Banaskantha – Sankhari 400kV D/c line critically loaded with Radhanesda SP full capacity.	<ul style="list-style-type: none"> <li>4x500MVA 400/220kV (addl) ICTs at Bhuj PS*</li> <li>1x1500MVA 765/400kV ICT at Bhuj PS</li> <li>LILO of Zerda – Ranchhodpura 400kV S/c at Banaskantha (approved in 42<sup>nd</sup> WR SCM) to be expedited</li> </ul> <p>*On account of space constraints at Bhuj PS, all future 220kV line bays at Bhuj PS may need to be implemented as GIS</p>	<ul style="list-style-type: none"> <li>Space for 400/220kV transformers at Bhuj PS exhausted</li> <li>Bhachau – Varsana 400kV D/c line is critically loaded</li> </ul>	II
<b>Transmission System for RE Projects in Kutch area: Bhuj-II PS (3000MW) + Lakadia PS (2000MW)</b>							
3A	3000 (Bhuj) + 2000 (Bhachau)	<ul style="list-style-type: none"> <li>Bhuj-II 7x500MVA, 400/220kV (GIS) S/s</li> <li>Lakadia 3x1500MVA &amp; 5x500MVA, 765/400/220kV (GIS) to be planned</li> </ul>	-	-	<ul style="list-style-type: none"> <li>Establishment of 7x500MVA, 400/220kV Bhuj-II PS (GIS) along-with 12 nos. 220kV bays for wind farms' integration</li> <li>Establishment of 5x1500MVA &amp; 5x500MVA, 765/400/220kV Lakadia PS (GIS) along-with 8 nos. 220kV bays for wind farms' integration</li> <li>Bhuj-II – Lakadia PS 400kV 2xD/c (Quad) line (~120km)</li> <li>Lakadia PS – Vadodara 765kV D/c line (~300km)</li> <li>Lakadia PS – Banaskantha 765kV D/c line (~150km)</li> </ul>	<ul style="list-style-type: none"> <li>Assuming that 80% quantum is to be transferred to NR &amp; balance to ER (to simulate worst case)</li> <li>Bhachau – Varsana 400kV D/c line is critically loaded</li> </ul>	III
3B		<ul style="list-style-type: none"> <li>Bhuj-II 3x1500MVA (765/400kV) 7x500MVA (400/220kV) S/s</li> <li>Lakadia</li> </ul>	-	-	<ul style="list-style-type: none"> <li>Establishment of 3x1500MVA (765/400kV) 7x500MVA (400/220kV) Bhuj-II PS (GIS) along-with 12 nos. 220kV bays for wind farms' integration</li> <li>Establishment of 3x1500MVA &amp; 5x500MVA, 765/400/220kV Lakadia PS</li> </ul>	<ul style="list-style-type: none"> <li>Assuming that 80% quantum is to be transferred to NR &amp; balance to ER (to simulate worst case)</li> </ul>	III B

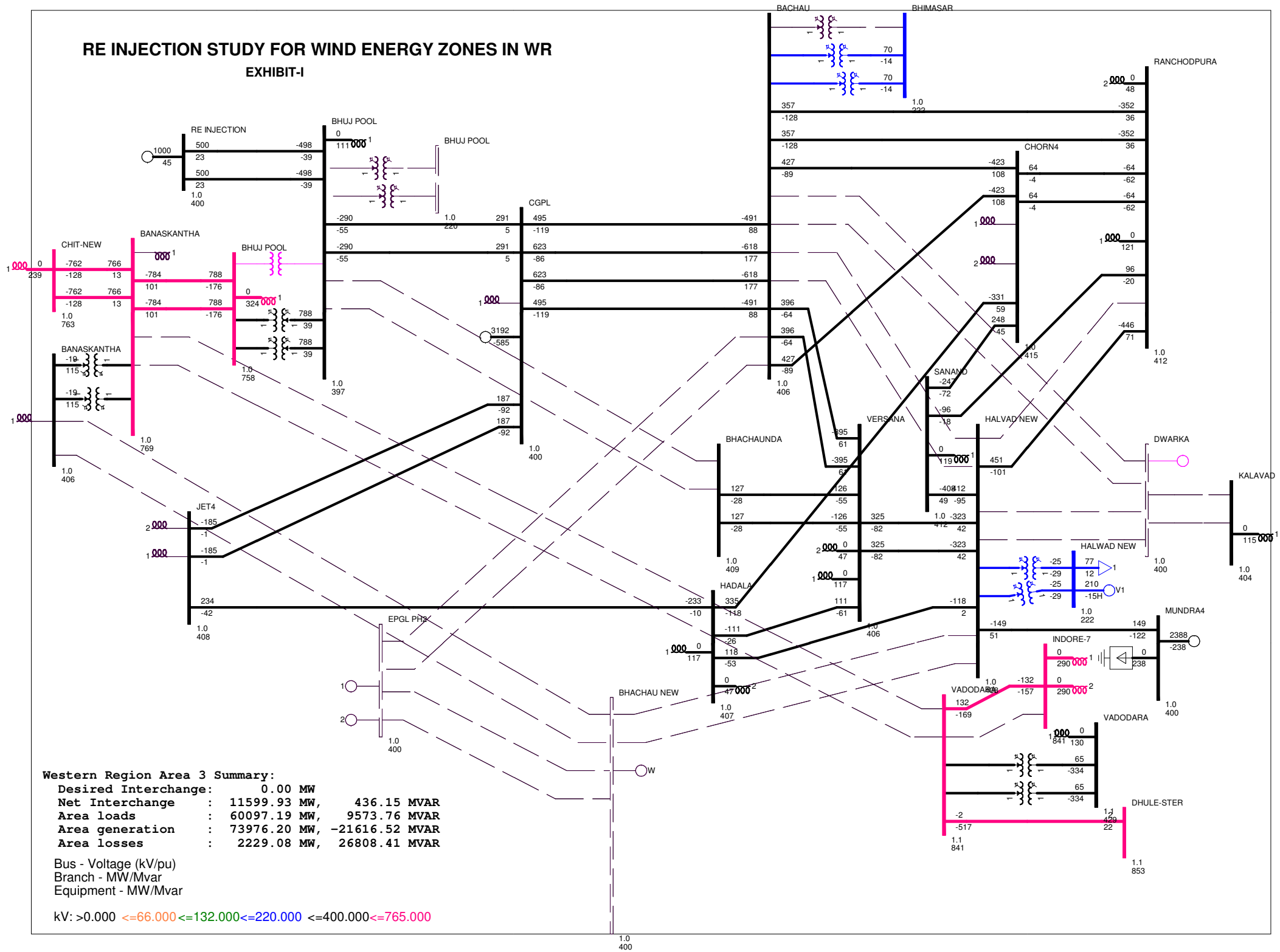
Transfer Capacity		Substation / Trf Augmentation requirement	Limiting Constraint		Remedial Measures	Remarks	Exhibit #
Sl.	MW	Status	ICT	Tr. System			
		3x1500MVA & 5x500MVA, 765/400/220kV (GIS) to be planned			(GIS) along-with 8 nos. 220kV bays for wind farms' integration <ul style="list-style-type: none"> <li>Interconnection of 765kV Bhuj S/s with the proposed Bhuj-II (GIS) S/s through bus extension or 765kV D/c line</li> <li>Bhuj-II – Lakadia PS 765kV D/c line (~120km)</li> <li>Lakadia PS – Vadodara 765kV D/c line (~300km)</li> <li>Lakadia PS – Banaskantha 765kV D/c line (~150km)</li> </ul>	• Bhachau – Varsana 400kV D/c line is critically loaded	
<b>Transmission system for RE projects in Devbhumi Dwarka (2000MW)</b>							
4A (if option 3A is considered)	2000	• Jam Khambhaliya 5x500, 400/220kV S/s (GIS) to be planned	-	Bhachau – Varsana 400kV D/c line	<ul style="list-style-type: none"> <li>Establishment of 5x500MVA, 400/220kV Jam Khambhaliya PS (GIS) along-with 8 nos. 220kV line bays</li> <li>Extension of Essar – Bhachau 400kV D/c (triple) line upto Jam Khambhaliya PS</li> <li>Jam Khambhaliya PS (GIS) – Kalavad (GETCO) 400kV D/c line</li> <li>Reconductoring of Bhachau – Varsana 400kV D/c line to HTLS conductor</li> </ul> <p><b>Alternatively,</b> LILO of Jam Khambhaliya PS – Bhachau 400kV D/c line at Halvad (GETCO) S/s may also be considered as it significantly helps to relieve loading on Bhachau – Varsana 400kV D/c line</p>	• Assuming that entire quantum is to be transferred to NR (to simulate worst case)	<b>IV</b>
4B (if option 3B is considered)		• Jam Khambhaliya 5x500, 400/220kV S/s (GIS) to be planned	-	Bhachau – Varsana 400kV D/c line	<ul style="list-style-type: none"> <li>Establishment of 5x500MVA, 400/220kV Jam Khambhaliya PS (GIS) along-with 8 nos. 220kV line bays</li> <li>Extension of Essar – Bhachau 400kV D/c (triple) line upto Jam Khambhaliya PS</li> <li>Jam Khambhaliya PS (GIS) – Kalavad (GETCO) 400kV D/c line (~75km)</li> </ul> <p>OR</p> <ul style="list-style-type: none"> <li>Jam Khambhaliya PS (GIS) – Shapar (GETCO) 400kV D/c line (~130km)</li> </ul>	• Assuming that entire quantum is to be transferred to NR (to simulate worst case)	<b>IV B</b>

Transfer Capacity		Substation / Trf Augmentation requirement	Limiting Constraint		Remedial Measures	Remarks	Exhibit #
Sl.	MW	Status	ICT	Tr. System			
					<ul style="list-style-type: none"> <li>Reconductoring of Bhachau – Varsana 400kV D/c line to HTLS conductor</li> </ul> <p><b>Alternatively</b>, LILO of Jam Khambhaliya PS – Bhachau 400kV D/c line at Halvad (GETCO) S/s may also be considered as it significantly helps to relieve loading on Bhachau – Varsana 400kV D/c line</p> <ul style="list-style-type: none"> <li>Bhachau – Lakadia 400kV D/c (Quad) line OR LILO of Jam-Khambhaliya-Bhachau 400kV D/c (triple) line at Lakadia PS</li> </ul>		
<b>Transmission system for RE projects in Osmanabad area (2000MW)</b>							
5	2000	<ul style="list-style-type: none"> <li>Kallam 3x1500 &amp; 5x500MVA 765/400/220kV S/s (GIS) to be planned</li> </ul>	-	-	<ul style="list-style-type: none"> <li>Establishment of 3x1500MVA, 765/400/220kV Kallam PS (GIS)</li> <li>Kallam – Parli (New) 765kV D/c line (~70km) OR</li> <li>LILO of one circuit of Parli (New) – Solapur 765kV D/c line at Kallam (GIS)</li> </ul>	<ul style="list-style-type: none"> <li>Power dispersal beyond proposed Kallam S/s takes place on existing &amp; UC transmission system</li> </ul>	<b>V</b>



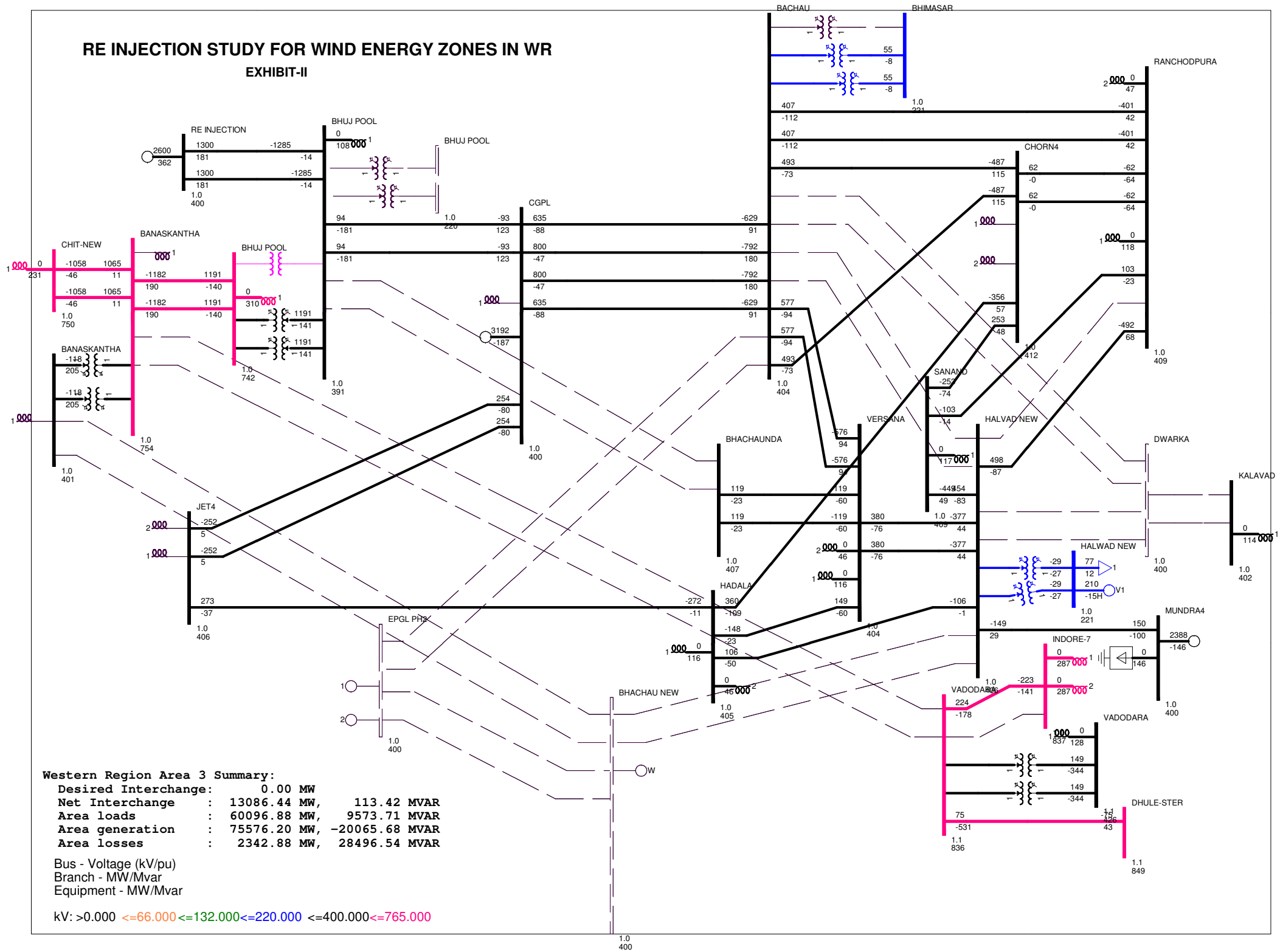
# RE INJECTION STUDY FOR WIND ENERGY ZONES IN WR

## EXHIBIT-I



# RE INJECTION STUDY FOR WIND ENERGY ZONES IN WR

## EXHIBIT-II



### Western Region Area 3 Summary:

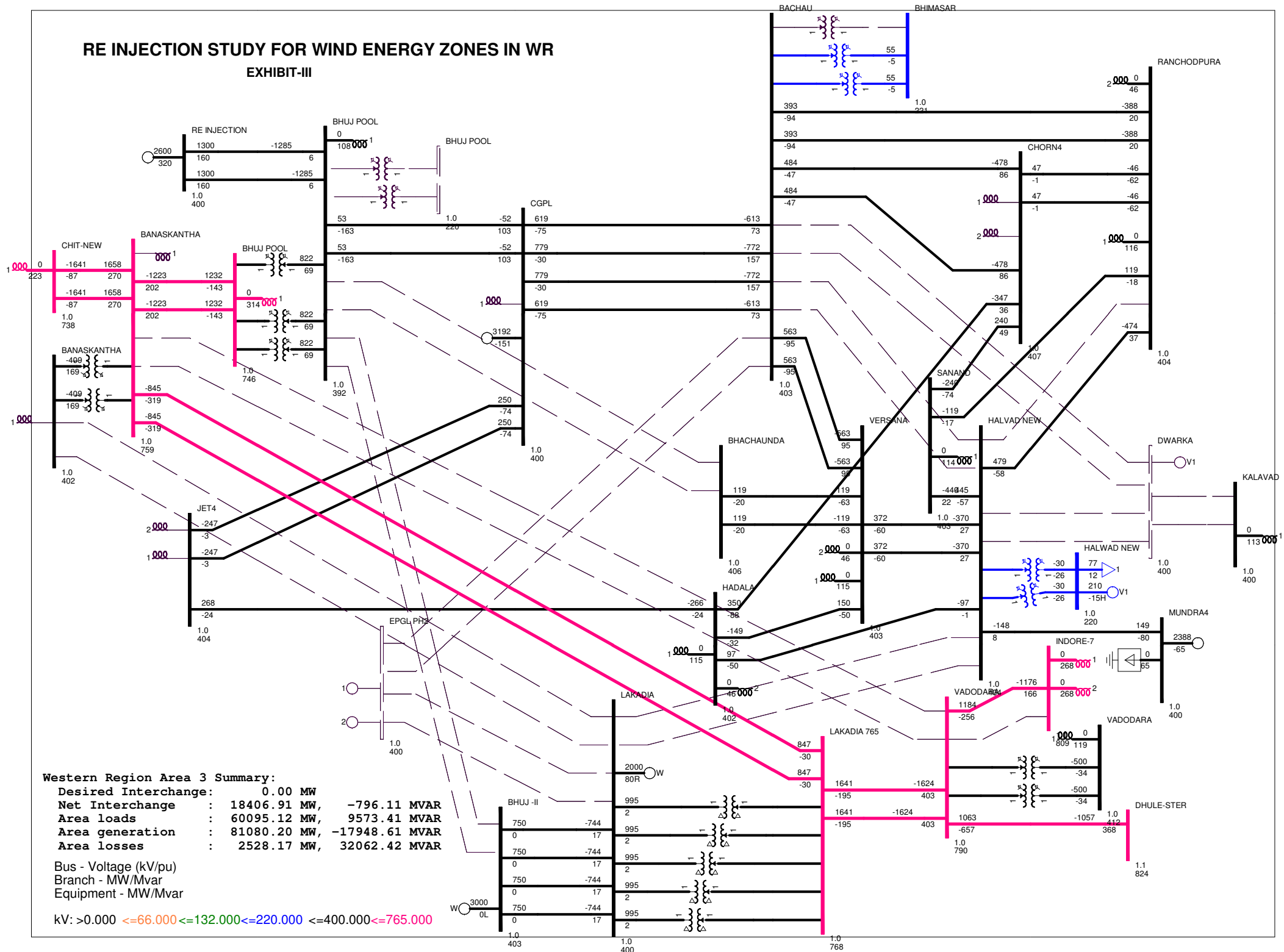
Desired Interchange: 0.00 MW  
 Net Interchange : 13086.44 MW, 113.42 MVAR  
 Area loads : 60096.88 MW, 9573.71 MVAR  
 Area generation : 75576.20 MW, -20065.68 MVAR  
 Area losses : 2342.88 MW, 28496.54 MVAR

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

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

# RE INJECTION STUDY FOR WIND ENERGY ZONES IN WR

EXHIBIT-III



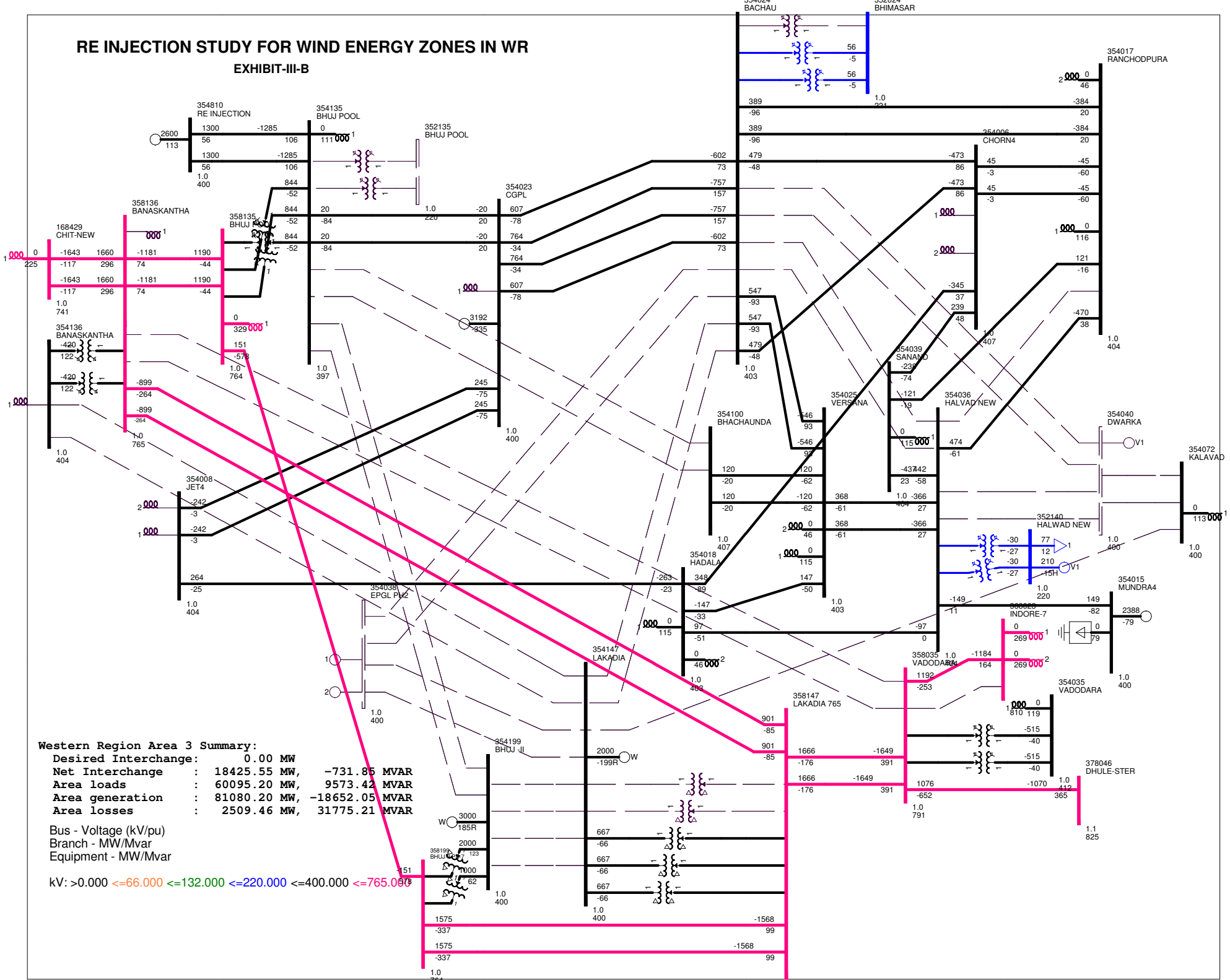
**Western Region Area 3 Summary:**  
 Desired Interchange: 0.00 MW  
 Net Interchange : 18406.91 MW, -796.11 MVAR  
 Area loads : 60095.12 MW, 9573.41 MVAR  
 Area generation : 81080.20 MW, -17948.61 MVAR  
 Area losses : 2528.17 MW, 32062.42 MVAR

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

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

# RE INJECTION STUDY FOR WIND ENERGY ZONES IN WR

## EXHIBIT-III-B



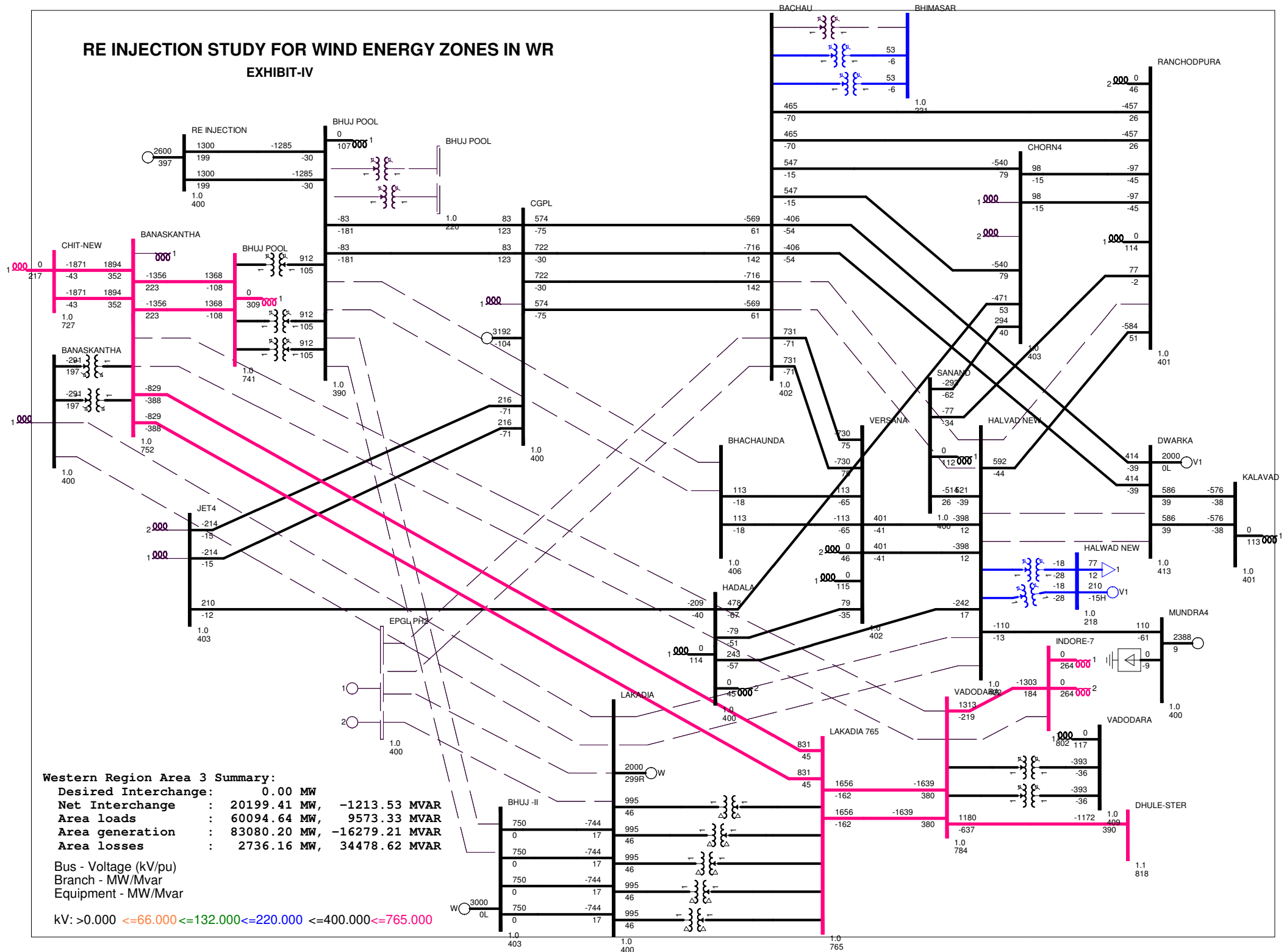
**Western Region Area 3 Summary:**  
 Desired Interchange: 0.00 MW  
 Net Interchange : 18425.55 MW, -731.85 MVAR  
 Area loads : 60095.20 MW, 9573.42 MVAR  
 Area generation : 81080.20 MW, -18652.05 MVAR  
 Area losses : 2509.46 MW, 31775.21 MVAR

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

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

# RE INJECTION STUDY FOR WIND ENERGY ZONES IN WR

## EXHIBIT-IV



### Western Region Area 3 Summary:

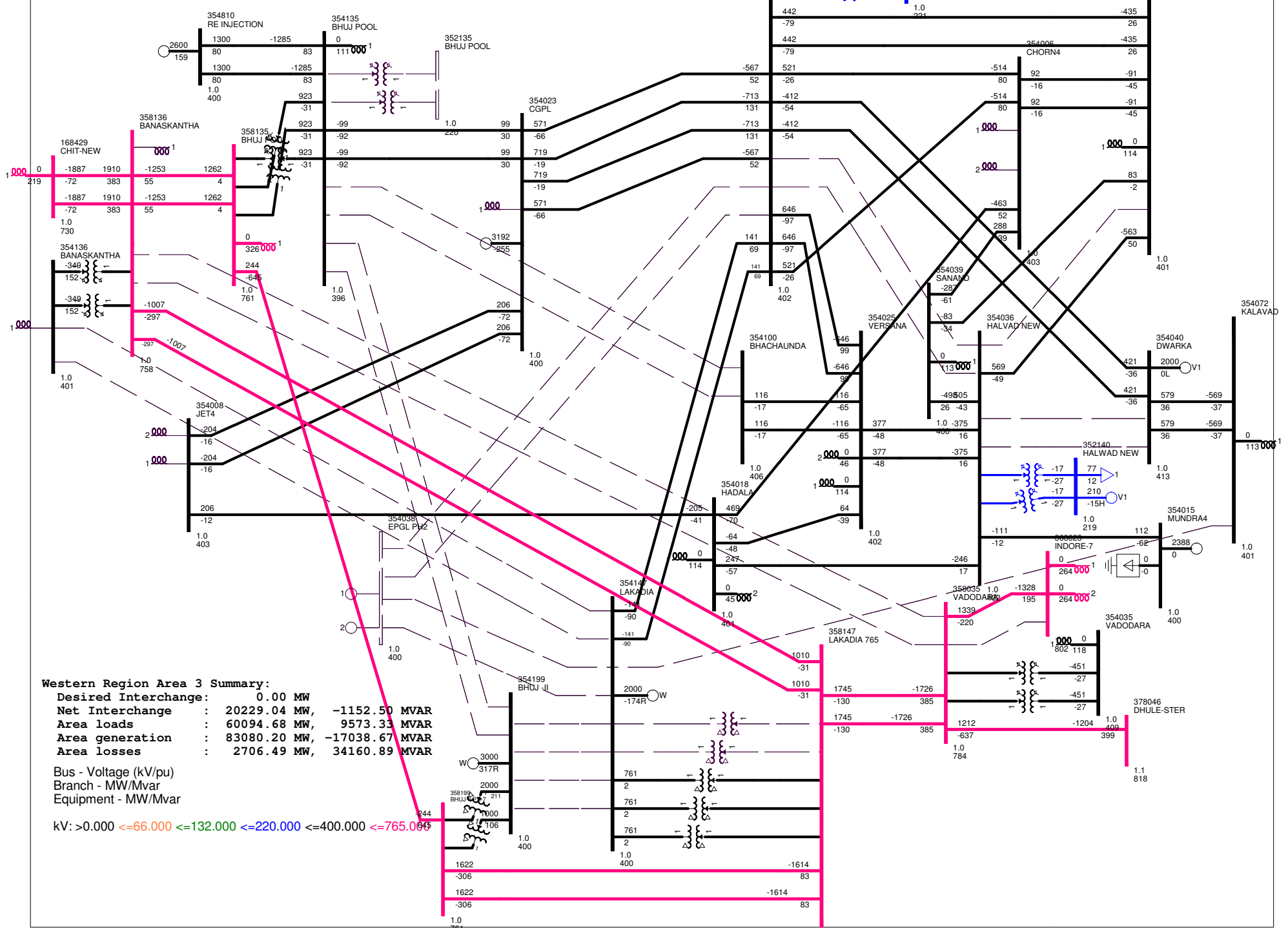
Desired Interchange: 0.00 MW  
 Net Interchange : 20199.41 MW, -1213.53 MVAR  
 Area loads : 60094.64 MW, 9573.33 MVAR  
 Area generation : 83080.20 MW, -16279.21 MVAR  
 Area losses : 2736.16 MW, 34478.62 MVAR

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

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

# RE INJECTION STUDY FOR WIND ENERGY ZONES IN WR

EXHIBIT-IV-B



**Western Region Area 3 Summary:**  
 Desired Interchange: 0.00 MW  
 Net Interchange : 20229.04 MW, -1152.50 MVAR  
 Area loads : 60094.68 MW, 9573.33 MVAR  
 Area generation : 83080.20 MW, -17038.67 MVAR  
 Area losses : 2706.49 MW, 34160.89 MVAR

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

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

## Transmission System for Wind Energy Zone at Osmanabad, Maharashtra EXHIBIT-V

