



Government of India  
Ministry of Power  
Central Electricity Authority  
System Planning & Project Appraisal Division  
Sewa Bhawan, R. K. Puram, New Delhi-110066 [ISO: 9001:2008]  
Website: www.cea.nic.in



No. 1/9/2013-SP&PA/

Dated: 7<sup>th</sup> July, 2015

-As per List Enclosed-

**Subject: The 36<sup>th</sup> Meeting of the Standing Committee on Power System Planning of Northern Region.**

Sir,

In continuation of earlier notice vide letter no.1/9/2013-SP&PA dated 29<sup>th</sup> June, 2015, it is to intimate that certain additional agenda items for 36<sup>th</sup> Meeting of the Standing Committee on Power System Planning of Northern Region have also been uploaded in the CEA website [www.cea.nic.in](http://www.cea.nic.in) (path to access- **Home page-wing specific documents/Power System Wing/Standing Committee/ Northern Region**). This is for your information and necessary action at your end please.

Yours sincerely,

(Gautam Roy)  
Director (SP&PA)

Copy for information to: 1) PPS to Member PS, CEA  
2) PS to Chief Engineer (SP&PA), CEA

|   |  |  |
|---|--|--|
| <p><b>1 - Member Secretary</b><br/> <b>NRPC, 18-A Shajeed</b><br/> <b>Jeet Singh Sansanwal</b><br/> <b>Marg, Katwaria Sarai,</b><br/> <b>New Delhi - 110016</b><br/> <b>(Fax-01 1-26865206)</b></p> | <p><b>2. Director (Projects)</b><br/> <b>NTPC, NTPC Bhawan,</b><br/> <b>Core 7,Scope complex-</b><br/> <b>6,Institutional Area,</b><br/> <b>Lodhi Road, New Delhi-</b><br/> <b>(Fax-01 1-24361018)</b></p>             | <p><b>3. CEO, POSOCO</b><br/> <b>B-9, Qutab Institutional</b><br/> <b>Area, Katwaria Sarai</b><br/> <b>New Delhi - 110016.</b><br/> <b>(Fax : 26852747)</b></p>  |
| <p><b>4. Director (T&amp;RE)</b><br/> <b>NHPC Office Complex,</b><br/> <b>Sector - 33, NHPC,</b><br/> <b>Faridabad - 121 003</b><br/> <b>(Fax-0129-2256055)</b></p>                                 | <p><b>5. Director (Projects)</b><br/> <b>POWERGRID,</b><br/> <b>Saudamini, Plot no. 2,</b><br/> <b>Sector - 29,</b><br/> <b>Gurgaon-122 001</b><br/> <b>Fax-0124-2571932'</b></p>                                      | <p><b>6. Member (Power)</b><br/> <b>BBMB, Sectot-19 B</b><br/> <b>Madya Marg,</b><br/> <b>Chandigarh-1 60019</b><br/> <b>(Fax-01 72-2549857)</b></p>   |
| <p><b>7. Director (W&amp;P)</b><br/> <b>UPPTCL, Shakti Bhawan</b><br/> <b>Extn, 3rd floor,</b><br/> <b>14, Ashok Marg,</b><br/> <b>Lucknow - 226 001</b><br/> <b>(Fax-0522-2287822)</b></p>         | <p><b>8. Director (Operations)</b><br/> <b>Delhi Transco Ltd.</b><br/> <b>Shakti Sadan, Kotla Marg,</b><br/> <b>New Delhi - 11 0 002</b><br/> <b>(Fax-01 1-23234640)</b></p>   | <p><b>9. Chief Engineer</b><br/> <b>(Transmission)</b><br/> <b>NPCIL, 9-S-30,</b><br/> <b>Vikram Sarabhai Bhawan,</b><br/> <b>Anushakti Nagar,</b><br/> <b>Mumbai - 400 094</b><br/> <b>(Fax-022-25993570,</b><br/> <b>25563350)</b></p> |
| <p><b>10 Director (Projects)</b><br/> <b>PTCUL, Urja Bhawan,</b><br/> <b>Campus, Kanwali Road</b><br/> <b>Dehradun- 248001.</b><br/> <b>Uttarakhand</b><br/> <b>(Fax-0135-2763431)</b></p>          | <p><b>11. Director (Technical)</b><br/> <b>Punjab State Transmission</b><br/> <b>corporation Ltd. (PSTCL),</b><br/> <b>Head Office: The Mall,</b><br/> <b>Patiala - 147 001</b><br/> <b>(Fax-0 1 75-230401 7 )</b></p> | <p><b>12. Chief Engineer</b><br/> <b>(Operation)</b><br/> <b>Ministry of Power, UT</b><br/> <b>Secretariat, Sector-9 D</b><br/> <b>Chandigarh - 161 009</b><br/> <b>(Fax-01 72-2637880)</b></p>  |
| <p><b>13. Director (Technical)</b><br/> <b>RRVPL, Vidyut Bhawan,</b><br/> <b>Jaipur- 302 005.</b><br/> <b>Fax 0141-2740794</b></p>  | <p><b>14. Director (Technical)</b><br/> <b>HVPL, Shakti Bhawan,</b><br/> <b>Sector-6, Panchkula-134\109</b><br/> <b>(Fax-01 72-2560640)</b><br/> <b>(Fax-01 77-2623415)</b></p>  | <p><b>15. Managing Director,</b><br/> <b>HP Power Transmission</b><br/> <b>Corporation Ltd.,</b><br/> <b>Barowalias, Khalini,</b><br/> <b>SHIMLA-171002</b></p>  |
| <p><b>16. Director (Technical)</b><br/> <b>HPSEB Ltd.</b><br/> <b>Vidyut Bhawan,</b><br/> <b>SHIMLA-171004</b><br/> <b>(Fax-01 77-2813554)</b></p>  | <p><b>17. Director (Technical)</b><br/> <b>THDC Ltd. Pragatipuram,</b><br/> <b>Bypass Road,</b><br/> <b>Rishikesh- 249201</b><br/> <b>Uttarakhand,</b><br/> <b>(Fx-0135-2431519)</b></p>                               | <p><b>18. Development</b><br/> <b>Commissioner (Power),</b><br/> <b>Power Development</b><br/> <b>Department, Grid</b><br/> <b>Substation</b><br/> <b>Complex, Janipur, Jammu</b><br/> <b>Fax No. 191-2534284</b></p>                    |
| <p><b>19. COO (CTU),</b><br/> <b>POWERGRID,</b><br/> <b>Saudamini, Plot no. 2,</b><br/> <b>Sector - 29,</b><br/> <b>Gurgaon-122 001</b></p>   | <p><b>20. Director (Trans)</b><br/> <b>Ministry of Power</b><br/> <b>Shram Shakti Bhawan</b><br/> <b>Rafi Marg,</b><br/> <b>New Delhi - 110001</b></p>   |  |

**Additional Agenda note for 36<sup>th</sup> Standing Committee Meeting on Power System Planning in Northern Region.**

**1. Operational Feedback on Transmission Constraint: January 2015 & October 2014**

| <b>S. No</b>                         | <b>Corridor</b>           | <b>Season/ Antecedent Conditions</b>                        | <b>Description of the constraints</b>   | <b>Remarks</b>   |
|--------------------------------------|---------------------------|---|---|--|
| <b>Transmission line Constraints</b> |                           |   |   |  |
| 1                                    | 400kV Dadri-Muradnagar    | High load in Western UP.<br><br>Winter (Low hydro scenario) | High MW loading along with MVA loading. | Re-conductoring /Additional substations such as Hapur and Greater Noida 765 kV (Planned by UPPTCL) are expected and their connectivity with the existing network will relieve this constraint.<br><br>UPPTCL may inform the status.  |
| 2                                    | 400kV Dadri-Greater Noida | All time  | High MW loading                         | The issue has been earlier discussed in 31 <sup>st</sup> & 33 <sup>rd</sup> NR Standing Committee meetings held on 2/1/13 & 31/8/2013 wherein 2*500MVA 400/220kV G.Noida(New) GIS substation & 400kV Ballabgarh- G.Noida(New) D/c were agreed.<br><br>UPPTCL had stated that |

|   |                            |                         |  |   |
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|   |                            |                         |  | <p>additional 400/220kV substation at Greater Noida is not required.</p> <p>UPPTCL may respond.</p>   |
| 3 | 400kV Meerut-Muzaffarnagar | High load in Western UP | During high load in Uttarakhand & UP and low hydro (at Vishnuprayag) in Uttarakhand  | <p>Bareilly- Kashipur- Roorkee-Saharanpur 400kV (Quad) D/c lines have been taken up by POWERGRID under NRSS-XXI to give relief.</p> <p>400kV Bareilly- Kashipur has been commissioned. Roorkee-Saharanpur is expected to be commissioned in Mar 16.</p>   |
| 4 | 400kV Singrauli-Anpara     | All time                | Due to low generation at Anpara and high generation at Rihand-Singrauli Complex, 400kV Singrauli-Anpara often gets overloaded. | <p>Severe Right Of Way constraints and availability of bays at Singrauli and Anpara.</p> <p>Rihand- Anpara 400kV D/c line was proposed for relieving the constraint in 34<sup>th</sup> SCM. However, UPPTCL did not agree with new proposal of 400kV D/c between Rihand &amp; Anpara.</p> <p>Alternate Suggestion by POSOCO: LILO of 400kV Singrauli- Allahabad or Singrauli- Fatehpur at</p> |

|          |  |  |   |   |
|----------|--|--|---|---|
|          |  |  |   | Anpara so that multiple connectivity would be available for Singrauli-Anpara OR uprating of existing 400kV Singrauli-Anpara   |
| 5        | 400kV<br>Unnao-<br>Panki   |  | Line loaded up to 600-700MW and connected to 765kV Anpara-C-Unnao which is usually loaded to 900-1000 MW depending upon Anpara-C generation | In 34 <sup>th</sup> SCM, a strong 400kV D/c inter-connection between Kanpur and Lucknow has been planned under NRSSXXXII. Kanpur - Lucknow 400kV D/c line is expected by June '16   |
| 6-<br>8- | 400kV<br>Anpara-Obra,<br>400kV<br>Anpara-Mau<br>& 400kV<br>Anpara-<br>Sarnath-I&II |  | Connected to generating station (Anpara-B & C)  | UPPTCL may respond.   |
| 9        | 400kV Rosa-<br>Bareilly  |  |   | Shahjahanpur S/s commissioned.  |
| 10       | 400kV<br>Singrauli-<br>Lucknow   |  | It is old and long line of 408.6 km of twin moose. Its loading remains in the range of 450-550 MW.  | POSOCO suggestion: Proposed LILO of Singrauli-Lucknow at Unchahar would decrease the line length of Singrauli- Lucknow and also enhance the connectivity of Unchahar.<br><br>Alternate Suggestion by CTU: LILO at 765/400kV |

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|----|---|--|--|--|
|    |   |  |  | Allahabad(New)   |
| 11 | HVDC<br>Mundra<br>Mahinder-<br>garh bipole<br>power order-<br>Mohinder-<br>garh Bhiwani |  |  | Already two more 400kV Mahindergarh-Bhiwani Lines have been approved. Commissioning of these lines needs to be expedited. It is being implemented under TBCB. RfP documents were issued in April 15. Only one bidder has purchased the RfP documents. RfP Bid submission date has been extended by 2 months. |
| 13 | Underlying<br>220kV<br>network of<br>Bhiwadi  |  | 400/220kV Bhiwadi has three ICTs(3×315 = 945 MVA).<br><br>Though 220kV network connectivity at Bhiwadi is:<br><br>1. 220kV Bhiwadi-Bhiwadi Raj D/c<br><br>2. 220kV Bhiwadi-Khuskhera D/c<br><br>3. 220kV Bhiwadi-Rewari (Bus split) & 220kV Bhiwadi-Mau.<br><br>Both circuit connected to Haryana and import | The issue has been discussed in 33 <sup>rd</sup> SCM of NR held on 23/12/13. RVPN stated that the load at Bhiwadi would soon be diverted to Neemrana & Alwar which are going to be commissioned.<br><br>RVPN may respond.  |

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|    |  |  | <p>of power from Haryana is restricted through bus split.</p> <p>220kV Bhiwadi-Bhiwadi Raj D/c always loaded ~200MW each. Any N-1 contingency at 220kV network would cause further tripping at 220kVBhiwadi.</p>  |                 |
| 14 | Non availability of downstream network of the listed substations and under utilization of ICTs |  | <p>220kV network not available.</p> <p>1) Haryana: Manesar, Bhiwani &amp; Jind</p> <p>2) Rajasthan: Kotputli, Neemrana &amp; Jaipur South</p> <p>3) UP: Sohawal, Shahjahanpur</p> <p>4) J&amp;K: NewWanpoh &amp; Samba</p> <p>5) Delhi: Mundka</p> <p>6) Haryana: Sonapat</p> <p>7) Punjab: Makhu</p> | STUs may update |

**Members of the Committee may deliberate and decide.**

**2. ICT Constraints in Northern Region: Add 500MVA new ICT or replace 315MVA by 500MVA ICTs or use earlier 4x315 MVA dismantled ICTs from Ballabgarh & Mandola**

| <b>S. No</b> | <b>Corridor</b> | <b>Season/ Antecedent Conditions</b> | <b>Description of the constraints</b>   | <b>Remarks</b>  |
|--------------|-----------------|--------------------------------------|---|---|
| 1            | Agra UP         | All time                             | Agra UP has three ICTs of 315 MVA each. One ICT has been replaced with 500 MVA. Total transformation capacity is now 1130MVA. Power flow over the three ICTs is in the order 950 MW (for three ICTs in parallel, Max. loading should be 70% of rated capacity) which is not N-1 compliant | 1X315 MVA, 400/220 kV ICT at Agra (PG) planned under NRSS XXXIV. Expected comm. Schedule: July '17  |
| 2            | Bhiwadi         | All time                             | Three ICTs of 315MVA each, loading is in range of 700 MW and underlying network of Bhiwadi is also constrained due to skewed loading at Bhiwadi Rajasthan   | The issue has been discussed in 33 <sup>rd</sup> SCM of NR held on 23/12/13. RVPN stated that the load at Bhiwadi would soon be diverted to Neemrana & Alwar which are going to be commissioned. RVPN may update. |
| 3            | Mandola &       | All time                             | Four ICTs of 315MVA   | Augmentation of   |



|   |                         |   |   |  |
|---|-------------------------|---|---|--|
|   | Ballabgarh              |   | each, total loading is 950-1000MW (for four ICTs in parallel,<br><br>Max. loading should be 80% of rated capacity) which is not N-1 compliant | transformation capacity at 400/220kV Mandola & Ballabgarh substations by replacing existing 4x315MVA ICTs with 4x500MVA ICTs planned under NRSS-XXXII. ICT Augmentation at Mandola & Ballabgarh is expected by Jun 16. |
| 4 | Srinagar (Wagoora)      | Winter  | In winter, Kashmir Valley load fed through Wagoora ICTs (4X315MVA) and Total loading of ICTs is in range of 1000 MW                           | STU may respond  |
| 5 | Muradnagar              | All time  | All the three ICTs(2X240 MVA &1X315 MVA) are fully loaded and not N-1 compliant. Total loading is in range of 800-900MW                       | Need for commissioning of additional substations at Saharanpur, Hapur etc. in Western UP. Saharanpur S/s is expected by Oct 15. UP may give status of Hapur S/s.   |
| 6 | 765/400kV ICTs of Unnao | Security issues of 765kV Anpara-Unnao on N-1 contingency of Unnao ICT | Evacuation of Anpara - C TPS through 765kV Anpara-Unnao under N-1 contingency of 765/400kV Unnao ICTs (2X1000 MVA)                            | STU may respond  |

|   |                                       |  |   |                 |
|---|---------------------------------------|--|---|-----------------|
| 7 | Single ICTs at following 400kV Nodes: |  | 1. Rajasthan: Bikaner, Barmer, Chhabra, Kalisindh & Rajwest<br><br>2. BBMB: Dehar & Bhiwani<br><br>3. UPPTCL: Gorakhpur | STU may respond |
|---|---------------------------------------|--|---|-----------------|

**Members of the Committee may deliberate and decide.**

**3. Establishment of new 400/220kV substations in Northern Region:**

Following new substations planned under various transmission schemes are under implementation:

| S.No. | Name of Substation                        | MVA Capacity | Expected Schedule | Progress |
|-------|---|--------------|-------------------|----------|
| 1     | 400/220KV Kurukshetra S/Stn. (GIS)        | 2x500        | Dec.'15           |          |
| 2     | 400/220KV Dehradun Sub station            | 2x315        | Mar'16            |          |
| 3     | 400/220KV Bagpat Gas Insulated Stn.       | 2x500        | Mar'16            |          |
| 4     | 400/220 KV Saharanpur Sub station         | 2x315        | Mar'16            |          |
| 5     | 400/220KV Rajghat Sub station (GIS)       | 4x500        | May'17            |          |
| 6     | 400/220KV Papankalan -I Sub station (GIS) | 4x500        | May'17            |          |

|    |  |       |   |  |
|----|--|-------|---|--|
| 7  | 400/220KV<br>Tughlakabad Sub<br>station (GIS)                | 4x500 | May'17  | .  |
| 8  | 220/66kV GIS S/s at<br>Sector 47, Chandigarh                 | 2x160 | 24<br>months<br>from<br>Investment<br>Approval. |  |
| 9  | 400/220kV S/s at Kala<br>Amb                                 | 7x105 | Oct.'18   |  |
| 10 | 400/220kV S/s at<br>Amargarh                                 | 7x105 | Oct.'18   |  |
| 11 | 400/220kV S/s at<br>Patran                                   | 2x500 | May'16  |  |
| 12 | 400/220kV Kadarapur<br>Sub station in Gurgaon<br>area (GIS)  | 2x500 | 38<br>months                                    | Approved in 34 <sup>th</sup><br>Empowered Committee<br>meeting of Northern<br>Region held on 13/4/15 |
| 13 | 400/220kV Sohna<br>Road Sub station in<br>Gurgaon area (GIS) | 2x500 | 38<br>months                                    | Approved in 34 <sup>th</sup><br>Empowered Committee<br>meeting of Northern<br>Region held on 13/4/15 |
| 14 | 400/220kV Prithala Sub<br>station in Palwal area<br>(GIS)    | 2x500 | 38<br>months                                    | Approved in 34 <sup>th</sup><br>Empowered Committee<br>meeting of Northern<br>Region held on 13/4/15 |
| 15 | 400/220kV<br>Baram(Jauljivi) S/s                             | 2x315 | 40<br>months                                    | Approved in 34 <sup>th</sup><br>Empowered Committee<br>meeting of Northern<br>Region held on 13/4/15 |

For above 400/220kV substations, implementation of down below 220kV system needs to be commissioned in the matching time frame for utilization of the system.

It is requested that the 220kV system also gets commissioned in the matching time frame.

STUs may note the above and inform the planned 220 kV system and their status from these substations to CEA and CTU.

***Members may deliberate.***

#### **4. Provision of 400/220 kV ICTs at Parbati Pooling Station**

Evacuation of power from Malana-II was discussed in the 31<sup>st</sup> Standing Committee Meeting and for reliable evacuation from the project following was agreed:

- HPPTCL to construct Chhaur – Parbati Plg Station 220kV D/c line as STU network
- POWERGRID to provide 2 nos. of 400/220 kV, 315 MVA ICTs (7x105 MVA single phase units) alongwith 2 nos. of 220 kV line bays.
- HPPTCL to take up the ownership of 132/220 kV Chhaur S/s from M/s EPPL to make it a part of their STU system.

The 2 nos. of 400/220kV, 315MVA ICTs (7x105 MVA single phase units) at Parbati Pooling Station alongwith 2 nos. of 220 kV line bays are expected to be commissioned by Jun.'16.

HPPTCL may please inform the status of 220kV connectivity.

***Members may discuss.***

#### **5. Overloading of Transformation Capacity:**

- a) Raebareli 220/132 kV substation:** Raebareli 220/132kV substation was established alongwith Unchahar-II transmission system. The present transformation capacity at Raebareli is 3x100 MVA. All the three transformers at Raebareli remains critically loaded in the range of 90 MW each. Considering the present loading of Raebareli ICTs. in 34th SCM, it was proposed to replace

two nos. of 100 MVA, 220/132 kV ICTs with two nos. of 200 MVA ICTs as space is not available for providing additional ICT. It was proposed that the two nos. of 100 MVA ICTs which would become surplus at Raebareli shall be kept as spare at Raebareli and Sitarganj 220/132 kV substation. However, in the 34<sup>th</sup> SCM, UPPTCL committed to divert the loads from Raebareli S/s. UP to update the status.

**b) Varanasi 765/400 kV substation:** As per the operational feedback from POSOCO, it has been observed that the existing 400/220 kV ICTs at Sarnath substation of UPPTCL is critically loaded. POWERGRID is establishing a 765/400 kV substation at Varanasi under the transmission scheme of IPPs of Jharkhand and West Bengal. In 34<sup>th</sup> SCM, it was proposed to provide 2 nos. of 500 MVA, 400/220 kV ICTs at Varanasi 765/400 kV substation. However, in the 34<sup>th</sup> SCM, UPPTCL committed to divert the loads from Varanasi S/s. UP to update the status.

**Members of the Committee may deliberate.**

## **6. Staggering of new 400kV Substations in Gurgaon area.**

In the 35<sup>th</sup> Standing Committee on Power System Planning in Northern Region held on 3/11/2014, three nos. of 400/220kV Substations at Prithala S/s in Palwal area & Sohna Road and Kadarapur in Gurgaon area have been approved as a part of ISTS in Haryana.

In the scope of works the 400 kV transmission lines were envisaged as Quad Bundle lines. However, considering the small length of the lines it is proposed that the lines may be constructed with HTLS conductor. In addition it is proposed to include 125MVAr Bus Reactor each at Kadarapur, Sohna Road & Prithala S/s.

In the 34<sup>th</sup> Empowered committee meeting held on 13/4/15, it was enquired whether the construction of the two substations proposed in Gurgaon area at Sohna Road and Kadarapur areas could be staggered. It was suggested that implementation of the 400/220kV, 2X500 MVA substation at Kadarapur in Gurgaon area may be staggered depending upon the demand & development of load in that area. HVPNL may intimate the requirement.

***Members may deliberate.***

#### **7. NRSS XXXI- B –Extn. of 400kV Malerkotla -Indoor GIS bays**

Kurukshetra – Malerkotla- Amritsar 400kV D/c line was planned as a part of system strengthening scheme under NRSS-XXXI-B in the 31<sup>st</sup> Meeting of Standing Committee on Power System Planning of Northern Region. The line is being implemented under Tariff Based Competitive Bidding and associated 400kV bays are to be implemented by POWERGRID.

While taking up the implementation of the 400kV bays at Malerkotla, it was observed that adequate space is not available for accommodation of 4 nos. of AIS bays at Malerkotla switchyard. Accordingly, in the 34<sup>th</sup> Meeting of Standing Committee on Power System Planning of Northern Region, the 4 nos. of 400kV GIS bays at Malerkotla were mentioned as outdoor GIS bays. However, based on environmental considerations, the 4 nos. of bays at Malerkotla are being implemented as indoor GIS bays.

**Members may note.**

#### **8. Standardisation of OPGW in lieu of One Earth wire in all Transmission lines.**

The Power System requirement for Communication is increasing multifold due to Special protection schemes:

- i) Ever increasing data reporting to Load Dispatch Centre.
- ii) Phasor measurements based data collection and reporting.
- iii) Remote monitoring/operation of sub-station/elements.
- iv) Differential protection on Lines

The practice of putting fibre in select lines lead to situation where station connectivity is held up due to either identified line delay, LILO of under construction line etc. OPGW installation on existing lines is taking long time/ delayed due to shut down, ROW issues as well as capacity constraints of executing agencies.

It is proposed to include one 24 Fibre (OPGW) in all transmission lines which will ensure availability of wideband communication from all substations to cater bandwidth for various power system application for which communication equipment (SDH–STM-16) shall be provided at all upcoming substations.

***Members may deliberate.***

**9. Transmission system for GHAVP Nuclear power plant (2X700MW) of M/s NPCIL in Haryana.**

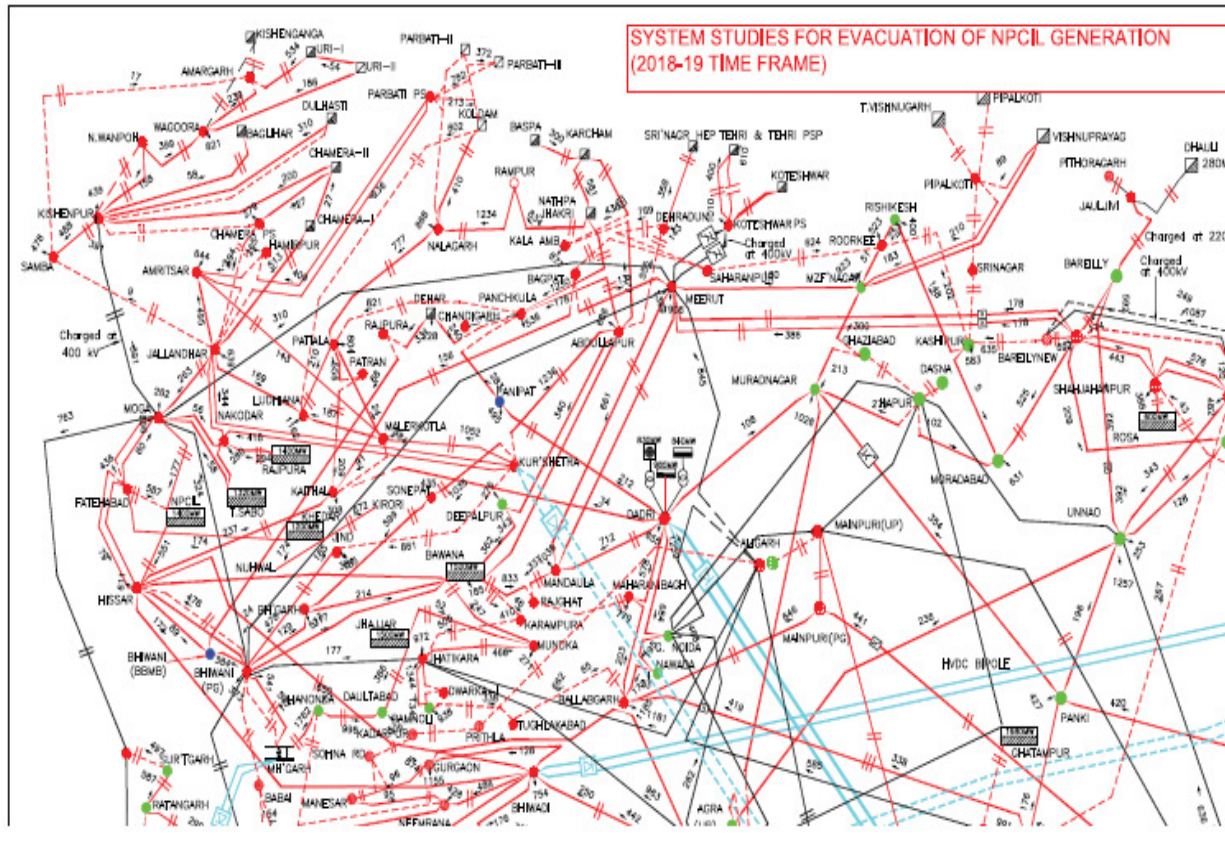
CTU, POWERGRID has received an application for connectivity as well as Long Term Access for 1400 MW from upcoming Nuclear power generator (2X700MW) of M/s NPCIL for Gorakhpur Haryana Anu Vidyut Pariyojna (GHAVP) located at Fatehabad, Haryana. Connectivity has been sought w.e.f. Sep.'2020. As indicated in the application, switchyard for evacuation will be at 400kV whereas the 220kV switchyard will be utilized to draw start-up power from the grid by 220/66kV transformation. No interconnection is proposed between the two switchyards.

GHAVP Nuclear plant (2X700MW) of M/s NPCIL is in proximity of Fatehabad 400/220 kV substation of POWERGRID. Hence, connectivity can be granted at Fatehabad. Presently, Fatehabad 400/220 kV S/s is connected with LILO of one circuit of Moga-Hissar 400 kV line. Transmission system for connectivity as well as for evacuation of power from NPCIL generation is proposed as:

- Fatehabad - NPCIL generation 400 kV D/c line
- LILO of second circuit of Moga-Hisar at Fatehabad
- LILO of both circuits of Moga-Hisar 400 kV D/c line at NPCIL generation switchyard

Through the proposed Transmission system, the 400 kV D/c line would help in evacuation of power from NPCIL generation & LILO would provide additional connectivity to the generation in case of contingency scenario.

System studies have been carried out with the above proposal. All line loadings are well within limits under normal as well as contingency situations. System studies are enclosed.



**Members of the Committee may deliberate and decide.**

### **10. Connectivity to Railway with CTU network**

Railways vide letter dated 11/6/2015, have informed that in the report of “Energy Plan for Indian Railways” by CEA, it has been recommended that ‘For connecting its existing or future TSS with the ISTS, Railways as deemed Transmission Licensee is not required to formally apply to CTU(A copy of the letter is enclosed. However, they would have to communicate their connectivity requirement to CEA and CTU for consideration in the integrated planning for ISTS. In view of above, Indian Railway has requested for connectivity to draw power from the following drawl points of ISTS network in Northern Region at 220kV level:

1. 400/220kV Agra(PG)
2. 400/220kV at Mainpuri(PG)
3. 400/220kV at Kanpur(PG)
4. 400/220kV at Fatehpur(PG) &



5. 400/220kV at Saharanpur(PG)

**Members may discuss.**



(iii) **Baroda to Mumbai section.** For this section the connectivity is required on following PGCIL network.

Connectivity required from 220 kV (PGCIL GSS) at **Navsari**.

Connectivity required from 220 kV (PGCIL GSS) at **Boisar**.

Connectivity required from 220 kV (PGCIL GSS) at **Parvel (Navi Mumbai)**.

(iv) **Paniajob to Raigarh section, in the State of Chhattisgarh.** For this section the connectivity is required on following PGCIL network.

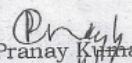
Connectivity required from 220 kV (PGCIL GSS) at **Kumhari (Raipur)**.

Connectivity required from 220 kV (PGCIL GSS) at **Raigarh**.

Connectivity required from 220 kV (PGCIL GSS) at **Bhatapara**.

**4. Railway being a licensee (Copy enclosed) requires ISTS connectivity to draw power for its own use.** It is requested to include the above proposals of Railways for connectivity as per the location of PGCIL ISTS substations as above as a part of Inter State Transmission System (ISTS), which are in the vicinity of proposed dedicated 132 kV Transmission System of Railways to cater to the load demand of the section for train operation.

It is requested that the above request for connectivity at Para 3 above may please be included in the Standing Committee Meeting of Power System & Planning and concurrence of the same may please be granted.

  
(Pranay Kumar)  
Director Elec. Engg./PS  
Railway Board

**Copy To:** Chief Operating Officer, CTU/Power Grid Corporation of India Ltd.



No-25/19/2004-R&R  
Government of India  
Ministry of Power

Shram Shakti Bhawan, Rafi Marg,  
New Delhi, 6<sup>th</sup> May, 2014

To

1. The Secretaries of the State Commissions/JERCs
2. The Secretaries in charge of Energy/Power Deptl. of States/UTs

**Subject:** Railways as deemed licensee under the Electricity Act, 2003- Issue of clarification reg.

Sir,

I am directed to refer to the Ministry of Railways (Railway Board) letter No. 2002//Elect(G)/161/21 Vol-II dated 13<sup>th</sup> March, 2014 and No. 2004//Elect(G)/152/3 Pt-1 dated 27<sup>th</sup> March, 2014 seeking clarification for deemed licensee status to Indian Railways.

2. The issue of granting deemed licensee status to Railways under the Electricity Act, 2003 has been examined by this Ministry in consultation with the Deptt. of Legal Affairs, Ministry of Law and Justice. It is clarified that Railways is a deemed licensee under the third proviso to section 14 of the Electricity Act, 2003.

3. This clarification may be read with other applicable provisions of the Electricity Act, 2003 and policies made thereunder.

4. This issues with the approval of Hon'ble Minister of Power(Independent Charge).

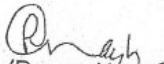
Yours faithfully

(Pranay Kumar)  
Director

Ph: 011-2371 5250

Copy for information to:

1. Chairperson, CEA, R.K. Puram, New Delhi
2. Secretary, CERC/FOR, SCOPE Complex, New Delhi
3. Ministry of Railways (Railway Boards), New Delhi.

  
(Pranay Kumar)  
Director

Ph: 011-2371 5250

## 11. DEVELOPMENT OF ISTS SYSTEM FOR EVACUATION OF POWER FROM NEW SOLAR PARKS AND SOLAR POWER PROJECTS IN RAJASTHAN.

The potential for Solar generation in Rajasthan is more than 200 GW and Govt. of Rajasthan is fully committed to tap the available solar potential and has set a target to achieve a capacity of 25000 MW in line with the Rajasthan Solar Energy Policy, 2014.

In order to achieve the set target, Govt. of Rajasthan has signed Joint Venture Agreements/ MOUs for development of 32000 MW Solar Parks and Solar Power Projects under Rajasthan Solar Policy 2014.

For implementation of aforesaid agreements/MoU, Rajasthan Renewable Energy Corporation Ltd. (RRECL), which is the nodal agency for Renewable Energy development in Rajasthan, has identified few of government land for setting up of Solar Parks & Solar Power Projects of capacity 13700 MW. The details of identified locations for Solar Parks are as under:

| S. No. | District                        | Location  | Area in hectare (Approx.) | Capacity of Solar Park (MW) |
|--------|---------------------------------|---|---------------------------|-----------------------------|
| 1      | Jodhpur                         | Bhadla Phase-II<br>Bhadla-Phase-III                             | 1600<br>2500              | 700<br>1000                 |
| 2      | Jaisalmer<br>(Tehsil Jaisalmer) | Isaniyon Ki Dhani, Kuhhdi, Sherwa, Joga, Parewar                | 12000                     | 5000                        |
| 3      | Jaisalmer<br>(Tehsil Fatehgarh) | Devda, Bhimsar, Rasla, Naya Achla, Achla, Naya Rosla, Neharajot | 6500                      | 3000                        |
| 4      | Jaisalmer<br>(Tehsil Pokaran)   | Nokh  | 2700                      | 1000                        |
| 5      | Bikaner<br>(Tehsil Pugal)       | Jhudkiya, Surasar, Ramsar Chhota, Siyasar Panchkosa             | 7000                      | 3000                        |
|        |                                 |   |                           | 13700 MW                    |

### Existing & Future Scenario of Renewable Energy Transmission in Rajasthan

The total installed capacity of Solar & Wind Projects in Rajasthan as on 31-3-2015 is 4232 MW (Solar: 910.6MW & Wind: 3321.4 MW), which is being evacuated with

constraint through two 400 kV GSS and nine 220 kV GSS. After the commissioning of additional four 400 kV GSS and eight 220 kV GSS by FY 2017-18, 8000 MW of Solar & Wind would be evacuated through the existing and under construction transmission system.

The anticipated load-generation of Rajasthan corresponding to FY 2016-17 & 2021-22 indicates that the state would be in surplus by 2907 MW and 5030 MW respectively.

Since Rajasthan State would not be able to absorb the quantum of envisaged solar and wind power generation, it would have to be transmitted to other parts of the country. This would require robust transmission infrastructure in Rajasthan and the development of inter-state transmission system be taken up by PGCIL.

**Proposed Transmission System in Rajasthan :** RRECL has planned a tentative year-wise generation schedule of 26500 MW Solar and 5500 MW Wind up to 2021-22.



**RAJASTHAN RENEWABLE ENERGY CORPORATION LIMITED**

(A Govt. of Rajasthan Undertaking)  
E-166, Yudhisthir Marg, C-Scheme, Jaipur  
CIN No. U40101RJ1995SGC009847

Tel: 2225859 / 2229341 / 2223966 & 223965 Fax: 0141-2226028

Email: [rrec\\_jai@yahoo.co.in](mailto:rrec_jai@yahoo.co.in)

Website - [www.rrecl.com](http://www.rrecl.com)

No.F.12(468)Solar/RREC/Power Evacuation/2010-11/D-5364 Dated: 12/1/15

The Joint Secretary,  
Ministry of New & Renewable Energy,  
Govt. of India,  
CGO Complex, Lodhi Road,  
New Delhi-110003.

Sub:- Information regarding Districtwise details of RE capacity addition plan and RE capacity proposed to be consumed within the State upto 2021-22.  
Ref:- E-mail dated 2.1.2015 received from Shri J.K. Jethani, Scientist-D, MNRE, New Delhi.

Sir,  
Kindly refer aforesaid E-mail in the subject matter. The RE generation/evacuation capacity perspective plan estimates in prescribed formats (Annexure-I and Annexure-II) is as under:-

**RE generation capacity perspective plan estimates:**

**Annexure-I**

| S. No. | State     | District            | Year    | RE Source   |            | Capacity targeted in MW |
|--------|-----------|---------------------|---------|-------------|------------|-------------------------|
|        |           |                     |         | Solar       | Wind       |                         |
| 1.     | Rajasthan | Jaisalmer/ Barmer   | 2014-15 | 200         | 400        | 600                     |
|        |           | Jodhpur/Bikaner     |         | 300         | -          | 300                     |
|        |           | Pratapgarh/Banswara |         | -           | 100        | 100                     |
|        |           | <b>Total</b>        |         | <b>500</b>  | <b>500</b> | <b>1000</b>             |
| 2.     | Rajasthan | Jaisalmer/ Barmer   | 2015-16 | 1000        | 400        | 1400                    |
|        |           | Jodhpur/Bikaner     |         | 1000        | -          | 1000                    |
|        |           | Pratapgarh/Banswara |         | -           | 100        | 100                     |
|        |           | <b>Total</b>        |         | <b>2000</b> | <b>500</b> | <b>2500</b>             |
| 3.     | Rajasthan | Jaisalmer/ Barmer   | 2016-17 | 2000        | 400        | 2400                    |
|        |           | Jodhpur/Bikaner     |         | 2000        | -          | 2000                    |
|        |           | Pratapgarh/Banswara |         | -           | 100        | 100                     |
|        |           | <b>Total</b>        |         | <b>4000</b> | <b>500</b> | <b>4500</b>             |
| 4.     | Rajasthan | Jaisalmer/ Barmer   | 2017-18 | 2000        | 500        | 2500                    |
|        |           | Jodhpur/Bikaner     |         | 2000        | -          | 2000                    |
|        |           | Pratapgarh/Banswara |         | -           | 120        | 120                     |
|        |           | <b>Total</b>        |         | <b>4000</b> | <b>620</b> | <b>4620</b>             |
| 5.     | Rajasthan | Jaisalmer/ Barmer   | 2018-19 | 2000        | 500        | 2500                    |
|        |           | Jodhpur/Bikaner     |         | 2000        | -          | 2000                    |
|        |           | Pratapgarh/Banswara |         | -           | 120        | 120                     |
|        |           | <b>Total</b>        |         | <b>4000</b> | <b>620</b> | <b>4620</b>             |

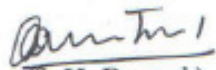
|                    |           |                     |         |              |             |              |
|--------------------|-----------|---------------------|---------|--------------|-------------|--------------|
| 6.                 | Rajasthan | Jaisalmer/ Barmer   | 2019-20 | 2000         | 600         | 2600         |
|                    |           | Jodhpur/Bikaner     |         | 2000         | -           | 2000         |
|                    |           | Pratapgarh/Banswara |         | -            | 250         | 250          |
|                    |           | <b>Total</b>        |         | <b>4000</b>  | <b>850</b>  | <b>4850</b>  |
| 7.                 | Rajasthan | Jaisalmer/ Barmer   | 2020-21 | 2000         | 600         | 2600         |
|                    |           | Jodhpur/Bikaner     |         | 2000         | -           | 2000         |
|                    |           | Pratapgarh/Banswara |         | -            | 300         | 300          |
|                    |           | <b>Total</b>        |         | <b>4000</b>  | <b>900</b>  | <b>4900</b>  |
| 8.                 | Rajasthan | Jaisalmer/ Barmer   | 2021-22 | 2000         | 700         | 2700         |
|                    |           | Jodhpur/Bikaner     |         | 2000         | -           | 2000         |
|                    |           | Pratapgarh/Banswara |         | -            | 300         | 300          |
|                    |           | <b>Total</b>        |         | <b>4000</b>  | <b>1000</b> | <b>5000</b>  |
| <b>Grand Total</b> |           |                     |         | <b>26500</b> | <b>5490</b> | <b>31990</b> |

#### Annexure-II

#### RE evacuation capacity perspective plan estimates:

| S. No.       | State     | Year    | Total RE capacity to be set up (MW) | Capacity targeted to be consumed within the State (MW) | Capacity proposed to be evacuated outside the State (MW) |
|--------------|-----------|---------|-------------------------------------|--|--|
| 1.           | Rajasthan | 2014-15 | 1000                                | 700  | 300  |
| 2.           | Rajasthan | 2015-16 | 2500                                | 1000   | 1500   |
| 3.           | Rajasthan | 2016-17 | 4500                                | 1000   | 3500   |
| 4.           | Rajasthan | 2017-18 | 4620                                | 1000   | 3620   |
| 5.           | Rajasthan | 2018-19 | 4620                                | 1000   | 3620   |
| 6.           | Rajasthan | 2019-20 | 4850                                | 1000   | 3850   |
| 7.           | Rajasthan | 2020-21 | 4900                                | 1400   | 3500   |
| 8.           | Rajasthan | 2021-22 | 5000                                | 1500   | 3500   |
| <b>Total</b> |           |         | <b>31990</b>                        | <b>8600</b>  | <b>23390</b>   |

Yours faithfully,

  
(S. K. Baswal)  
12/11/15  
Director (Tech.)

It is also envisaged that by 2021-22, Renewable Energy of capacity 8600 MW would be consumed inside Rajasthan and balance RE capacity of 23400 MW would be exported out of Rajasthan.

The details of proposed intra-state transmission system and inter-state transmission system have been discussed as under:

## **A. Intra-state Transmission System**

RVPNL has already planned a evacuation system of 8000 MW for Solar & Wind Power Projects and with the planning of additional two 765 kV GSS viz. Jaisalmer-2(Upgradation) & Jodhpur and two 400 kV GSS viz Kolayat & Pokaran along with associated lines under intra-state transmission system, RVPNL would be able to evacuate a total capacity of 13500 MW from RE source ends to load centres located in different parts of Rajasthan.

## **B. Inter-state Transmission System**

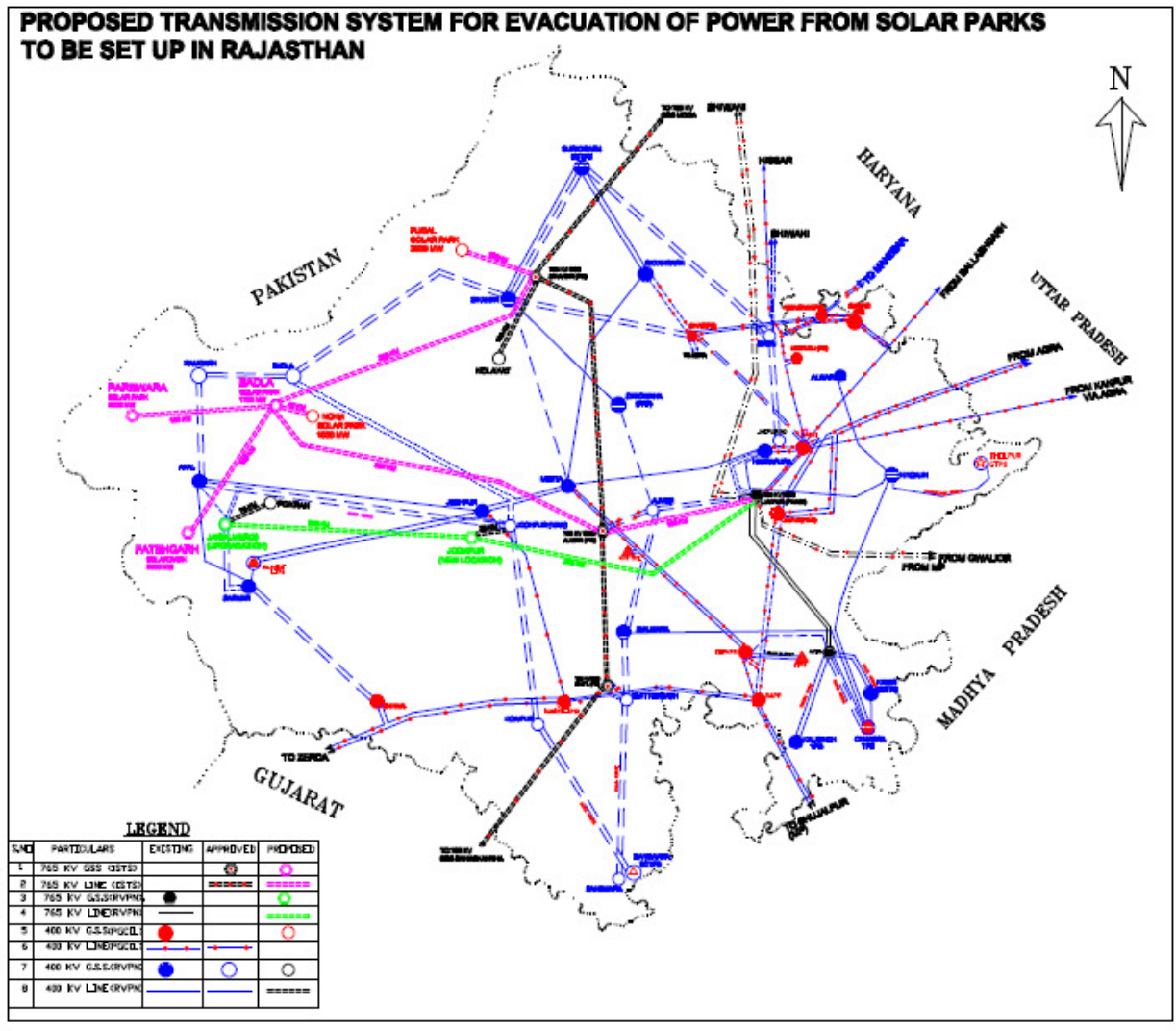
For export of envisaged 23400 MW of Solar capacity outside Rajasthan by 2021-22, it is envisaged that there would be a tentative requirement of five to seven 765/400 kV GSS. Out of the envisaged 23400 MW of Solar capacity, RRECL has identified the land for development of 13700 MW Solar Parks at Bhadla (Jodhpur), Pawarew (Jaisalmer), Fatehgarh(Jaisalmer), Pokaran(Jaisalmer) & Pugal(Bikaner).

Accordingly, following Inter-State Transmission System would be required for evacuation of power from the identified Solar Parks:-

- 150 km 765 kV D/C Pawarew-Bhadla line (Initially to be charged at 400 kV)
- 150 km 765 kV D/C Fatehgarh -Bhadla line (Initially to be charged at 400 kV)
- 350 km 765 kV D/C Bhadla - Ajmer(PG-765kV GSS) line (Initially to be charged at 400 kV)
- 200 km 765 kV D/C Bhadla – Bikaner (PG-765kV GSS) line (Initially to be charged at 400 kV)
- 40 km 765 kV D/C Nokh- Bhadla line (Initially to be charged at 400 kV)
- 100 km 765 kV D/C Pugal- Bhadla line (Initially to be charged at 400 kV)
- 150 km 765 kV D/C Ajmer (PG-765kV GSS)-Phagi (Jaipur) (RVPN 765 kV GSS) line
- 3x1500 MVA, 765/400 kV & 8x500 MVA, 400/220kV substation at Pawarew
- 2x1500 MVA, 765/400 kV & 5x500 MVA, 400/220kV substation at Fatehgarh
- 2x1500 MVA, 765/400 kV & 2x500 MVA, 400/220kV substation at Bhadla
- 5x500 MVA, 400/220kV substation at Pugal
- 2x500 MVA, 400/220kV substation at Nokh
- New 765 KV D/C Line from PGCIL's 765 kV GSS Suratgarh/Bikaner towards Northern India.
- Associated Reactive Compensations

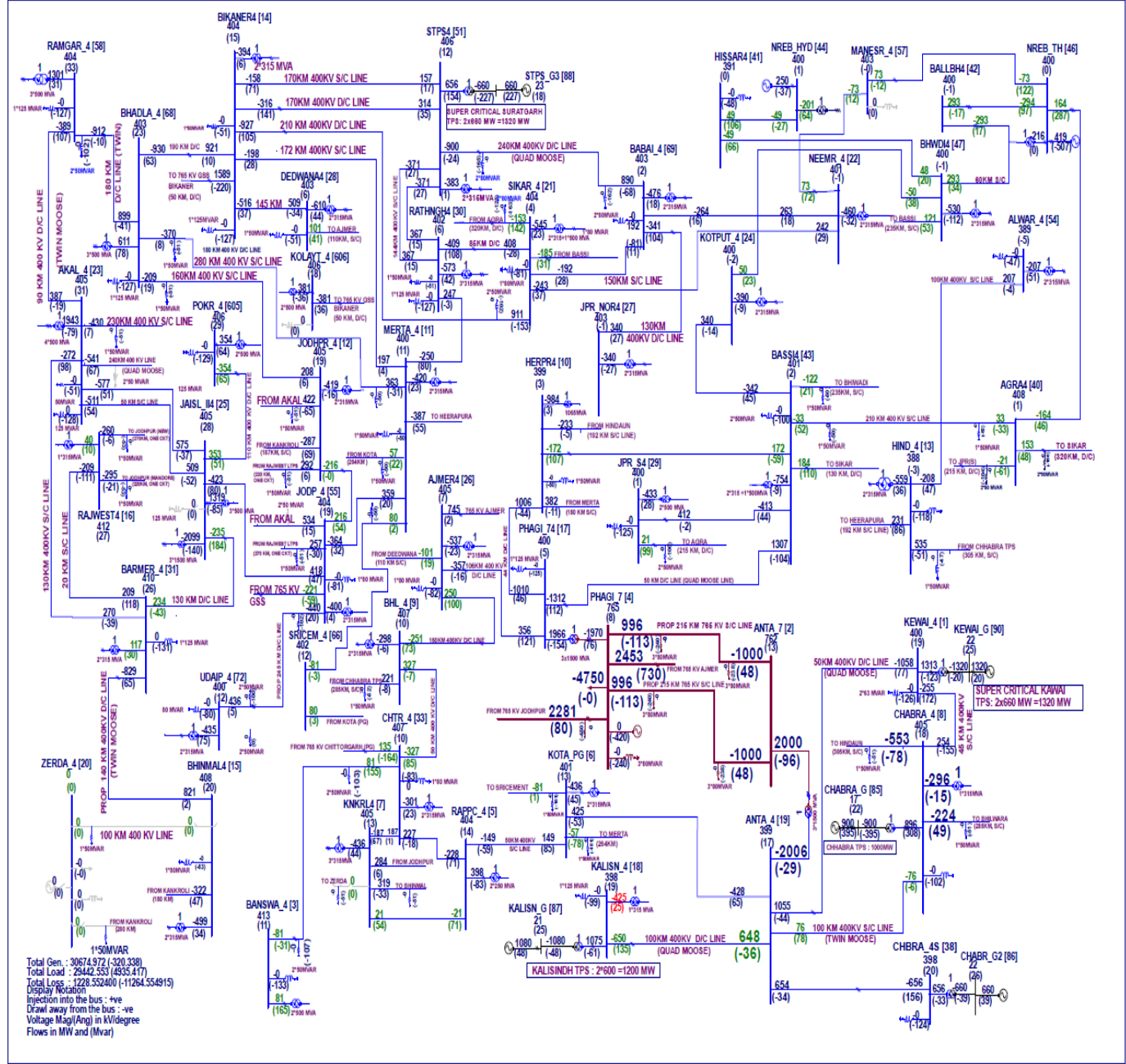


The Single line diagram of approved / under approval Inter State Transmission System is at **Annexure-I**.



For evacuation of balance 9700 MW Solar generation from western Rajasthan, either additional 765/400 kV GSS or 400/220 kV GSS would be required on the basis of finalization of location of solar parks. Aforesaid tentative transmission system may be commissioned initially on 400 kV voltage level based on the commissioning of Solar Parks and Solar Power Projects and later on be commissioned on 765 kV voltage level. The load flow studies carried out for evacuation of 13700 MW solar powers from the Western Part of Rajasthan are as under





The Members of Standing Committee is requested to deliberate on the proposal and in principle approve the following Inter State Transmission System for exporting Solar generation out of Rajasthan from five solar parks to be located inside Rajasthan

- 765 kV D/C Parewar-Bhadla line (Initially to be charged at 400 kV) 150 km
- 765 kV D/C Fatehgarh -Bhadla line (Initially to be charged at 400 kV) 150 km
- 765 kV D/C Bhadla - Ajmer(PG-765kV GSS) line (Initially to be charged at 400 kV) 350 km
- 765 kV D/C Bhadla – Bikaner (PG-765kV GSS) line (Initially to be charged at 400 kV) 200 km
- 765 kV D/C Nokh- Bhadla line (Initially to be charged at 400 kV) 40 km
- 765 kV D/C Pugal- Bhadla line (Initially to be charged at 400 kV) 100 km
- 765 kV D/C Ajmer (PG-765kV GSS)-Phagi (Jaipur) (RVPN 765 kV GSS) line 150 km
- 3x1500 MVA, 765/400 kV & 8x500 MVA, 400/220kV substation at Parewar
- 2x1500 MVA, 765/400 kV & 5x500 MVA, 400/220kV substation at Fatehgarh
- 2x1500 MVA, 765/400 kV & 2x500 MVA, 400/220kV substation at Bhadla
- 5x500 MVA, 400/220kV substation at Pugal
- 2x500 MVA, 400/220kV substation at Nokh
- Associated Reactive Compensations

Further there would be requirement for strengthening the Green Energy Corridor viz. 765 kV D/C Banaskanta-Chittorgarh-Ajmer-Bikaner-Moga line, CTU may furnish proposal on the same.

## **12 . Transmission system for Ultra Mega Solar Power Park in Jalaun, UP (370MW)**

Government of India has taken initiative for development of Ultra mega Solar Power parks in various parts of the country. As part of above initiative, an Ultra Mega solar Power park of 370MW capacity is envisaged in Jalaun district of Uttar Pradesh. Power from above project is envisaged to be transferred to its various beneficiaries including Uttar Pradesh.

As per the available information, Jalaun Ultra Mega Solar Power Park (370 MW) is being developed by JVC of SECI & UPNEDA & scheduled for commissioning in 12-15 months. Considering the time line for implementation of Solar Park as well as requirement for matching transmission system to evacuate/transfer of power, transmission scheme is to be developed in compressed time schedule.

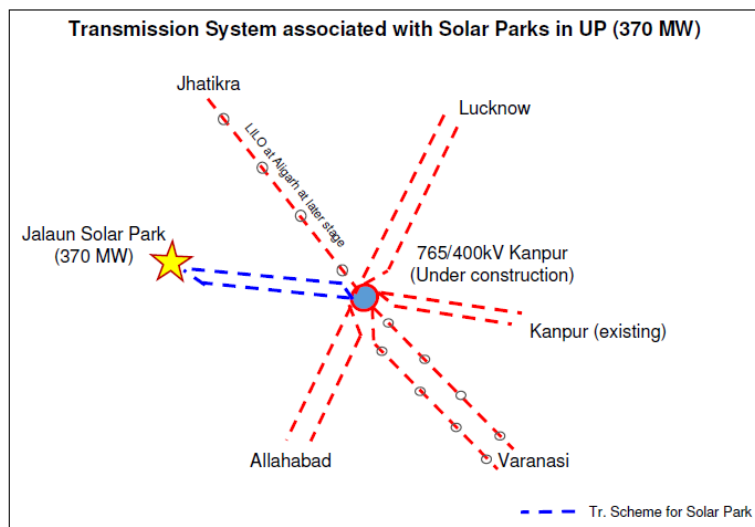
In view of the above, for evacuation of power from Jalaun solar park, it is proposed to establish a 400/220kV Pooling station at Jalaun, with 2x500 MVA transformation capacity and its interconnection with 765/400kV Kanpur(new) substation

Further, to address reactive power management issues especially during low / no generation periods like in evening/night hours, 1x125 MVAR Bus reactor at 400kV Jalaun Pool is proposed. In this way, proposed transmission system shall facilitate transfer of power from solar generation of Jalaun Ultra mega solar park with reliability.

Study Results with above proposed transmission system is enclosed at Exhibit-1-3. Results indicate that loading on all lines are within limits in normal as well as contingency scenarios. Accordingly, following transmission system is proposed for Jalaun Ultra Mega Solar park (370MW).

- Jalaun Pool – Kanpur(new) 400kV D/c Line
- Establishment of 400/220kV, 2x500 MVA Pooling station at Jalaun along with 1x125MVAR bus reactor
- 220kV Line bays at Jalaun Pooling station (for its interconnection with solar park)

Schematic for the above proposed transmission scheme is as below:



**Members may discuss.**

### **13. Evacuation system in respect of proposed 1x800MW supercritical unit at PTPS Panipat**

Haryana Power Generation Corporation Limited (HPGCL) has planned to setup supercritical 1x800MW (Unit-9). After its commissioning unit-1 to 4 (110MW each) at PTPS, Panipat are planned to be phased out. At present installed capacity of generators at PTPS Panipat is as under:

|             |            |
|-------------|------------|
| Unit-1 to 3 | 110MW each |
| Unit-4      | 117.8MW    |
| Unit-5 & 6  | 210MW each |
| Unit-7 & 8  | 250MW each |

*Note: 220kV bus of Unit-1 to 4 and Unit-5 to 8 have been split due to short-circuits capability constraints of Unit-1 to 4 equipments.*

Haryana Vidyut Prasaran Nigam Limited (HVPNL) has proposed the following transmission system for evacuation of power from the proposed 1x800MW supercritical unit at PTPS Panipat (Unit-9):

1. Provision of 2x500MVA, 400/220kV ICTs in the switchyard of PTPS Panipat (Unit-9) generating station
2. New 400kV at PTPS (Unit-9) – 400kV Jind (PGCIL) D/C twin moose line (approx. length 75km)

Besides aforesaid 400kV transmission system, following new and existing 220kV transmission system has also been envisaged for evacuation of power from PTPS Panipat unit-9:

1. New 220kV Lohari substation with 2x100MVA, 220/132kV transformers to be fed from 220kV bus-section-III<sup>##</sup> of PTPS switchyard through 220kV moose D/C line (approx. length 10km)
2. Existing 220kV Nissing and Karnal substation have to be fed from 220kV bus-section-III<sup>##</sup> of PTPS switchyard (Presently, Nissing and Karnal are being fed from 220kV bus-section-IIA<sup>##</sup>)
3. Existing 220kV Bastara substation to be fed from 220kV bus-section-III<sup>##</sup> of PTPS switchyard through new D/C line

4. Clubbing of bus-section-I, IIA and IIB of Unit-1 to 8 switchyard

*Note: ## 220kV PTPS Panipat Bus-section-I - Unit-1 to 4 connected*

*220kV PTPS Panipat Bus-section-IIA - Unit-5&6 connected*

*220kV PTPS Panipat Bus-section-IIB - Unit-7&8 connected*

*220kV PTPS Panipat Bus-section-III - Unit-9 connected through 2x500MVA,  
400/220kV ICTs*

Considering the above transmission system, load flow studies have been carried out and it was found that loading on various lines are generally in order and as such, there is no overloading on any line except in interconnecting line between Unit-1-4 and Unit-5-8 (about 310 MW). It was also found that the fault level at the 220kV Panipat bus-section connected to Unit-1 to 8 is 54 kA, which is higher than its maximum capacity of 30 kA and power flow through 400 kV PTPS – Jind D/C line was about 190 MW.

The high fault level at 220kV bus connected with Unit-1 to 8 was discussed with HVPNL official. Subsequently, the bus arrangement was revised by HVPNL to contain the fault current. The revised proposed bus arrangement at 220kV circuits is given as under:

| <b>220 kV Bus of PTPS Units</b> | <b>Bus-Section</b> | <b>Name of feeder</b>              |
|---------------------------------|--------------------|------------------------------------|
| Unit 1 to 4                     | I                  | 220 kV D/C BBMB Sewah (2 Sets)     |
|                                 |                    | 2x100 MVA, 220/132 kV transformers |
| Unit 5 to 6                     | IIA                | 220 kV S/C Sonapat                 |
|                                 |                    | 220 kV S/C Barhi                   |
|                                 |                    | 220 kV D/C Rohtak                  |
|                                 |                    | 220 kV D/C Safidon                 |
| Unit 7 to 8                     | IIB                | 220 kV D/C Safidon                 |
|                                 |                    | 220 kV D/C Jind                    |
| Unit 9                          | III                | 220 kV D/C Lohari                  |
|                                 |                    | 220 kV D/C Nissing                 |
|                                 |                    | 220 kV S/C Karnal                  |
|                                 |                    | 220 kV D/C Bastara                 |
|                                 |                    | 2x500 MVA, 400/220 kV transformers |

*Note: 220kV PTPS bus-section-I&IIA, IIA&IIB and IIB&III are interconnected through bus coupler(NO), bus coupler(NC) and bus coupler(NO) respectively.*

With above bus arrangement, the modified transmission system for evacuation of power from the proposed 1x800MW supercritical unit at PTPS Panipat (Unit-9) is as under:

1. 2x500MVA, 400/220kV ICTs
2. New 400kV at PTPS (Unit-9) – 400kV Jind (PGCIL) D/C twin moose line (approx. length 75km)

Besides aforesaid 400kV transmission system, following new and existing 220kV transmission system has also been envisaged for evacuation of power from PTPS Panipat generating station:

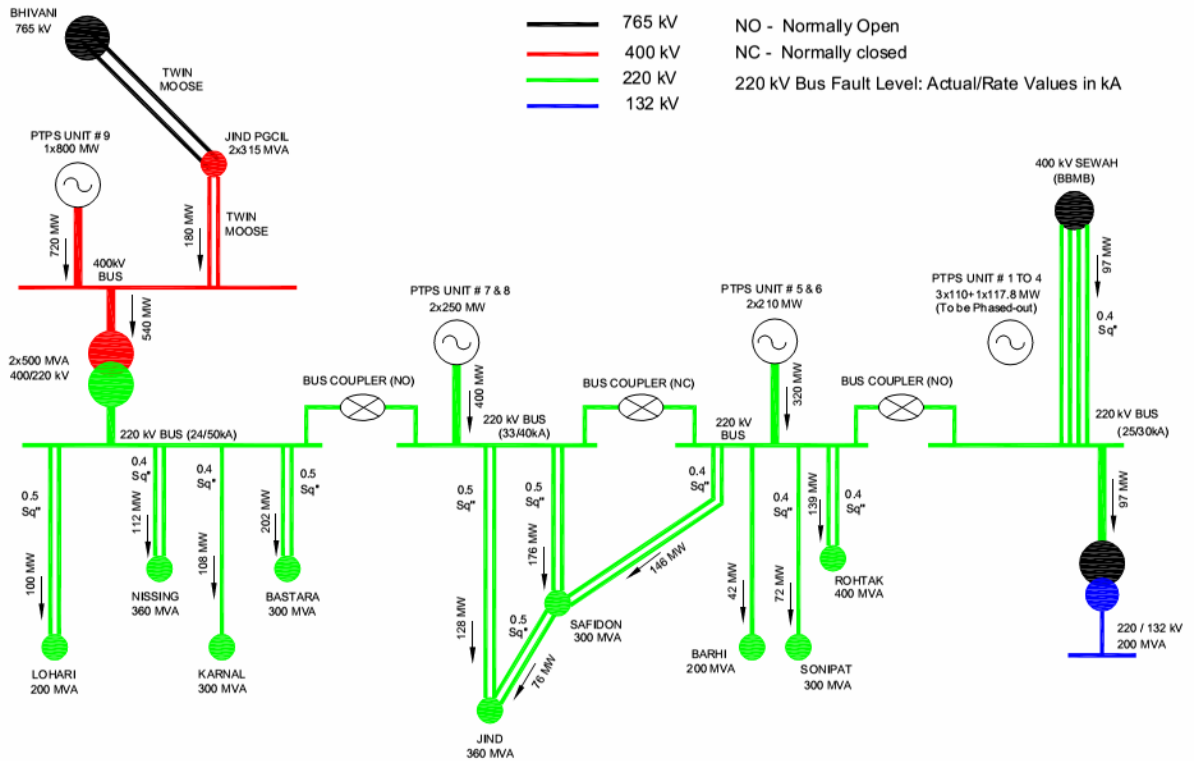
1. New 220kV Lohari substation (2x100MVA, 220/132kV ICTs) fed through 220kV PTPS – Lohari moose D/C line (approx. length 10km)
2. Existing 220kV Nissing and Karnal substation fed from 220kV bus-section-III<sup>##</sup> of PTPS
3. Existing 220kV Bastara substation fed from 220kV bus-section-III<sup>##</sup> of PTPS through new 220kV PTPS – Bastara D/C line
4. Existing 220kV Sonipat and Barhi substation to be fed from 220kV bus-section-IIA<sup>##</sup> of PTPS

➤ Further, in view of ageing of PTPS Unit-1 to 4, these may be de-commissioned.

With the above modified configuration, load flow study has been carried out. It was found that the loading on various lines are generally in order. Diagram for power evacuation system of 1x800 MW Unit-9 PTPS Panipat along with respective power flow and actual and rated fault level at each 220 kV PTPS bus is shown below:



## POWER EVACUATION SYSTEM OF 1x800 MW UNIT - 9 PTPS PANIPAT



SP & PA Div., CEA

The fault level at the various 220kV Panipat buses connected to Unit-1 to 4, Unit-5 to 8 and Unit-9 are 25kA (Maximum capacity 30kA), 33kA (Maximum capacity 40kA) and 24kA (Maximum capacity 50kA) respectively and power flow through 400 kV PTPS – Jind D/C line is about 180 MW.

As such, the proposed transmission system for evacuation of power from the proposed 1x800MW supercritical unit at PTPS Panipat (Unit-9) with the modified bus arrangement is in order.

However, HVPNL is suggested to request PGCIL for 2 nos. of 400kV line bays at its Jind sub-station for termination of 400 kV PTPS – Jind D/C line. It is also suggested that HVPNL may change the mode of bus coupler (i.e. from NO to NC or vice versa) between each 220kV bus-section of PTPS as per operational requirement to feed power to connected loads.

**Members of the committee may deliberate and concur the proposal..**

\*\*\*\*\*