

## Transmission system for evacuation of power from Pakaldul HEP in Chenab Valley

### A. Project at a Glance

1. Title (Name of Scheme)	Transmission system for evacuation of power from Pakaldul HEP in Chenab Valley
2. Objective / Justification	To establish Transmission infrastructure to facilitate interconnection of Pakaldul HEP (1000MW) and transfer of its power
3. Scope	<p><b>ISTS transmission system</b></p> <ol style="list-style-type: none"> <li>1. Establishment of 400 kV switching station at Kishtwar (GIS) along with 420kV, 125 MVAR Bus Reactor at Kishtwar Switching Station by LILO of one circuit of Kishenpur – Dulhasti 400kV D/c (Quad) line (Single Circuit Strung)</li> <li>2. LILO of one circuit of Kishenpur – Dulhasti 400kV D/c (Quad) line at Kishtwar Switching Station (LILO length : approx. 10 Km)</li> <li>3. Second(2<sup>nd</sup>) circuit(stringing) of Kishenpur – Dulhasti 400kV D/c (Quad) line (Kishtwar-Kishenpur Section) (approx. 130km)</li> <li>4. 2 nos. of 400 kV bays at Kishtwar (GIS) for LILO of one circuit of Kishenpur – Dulhasti 400kV D/c (Quad) line</li> <li>5. 1 no. of 400kV line bay at Kishtwar (GIS) for termination of 2<sup>nd</sup> ckt after stringing of Kishtwar-Kishenpur section</li> <li>6. 1 no. of 400kV line bay at Kishenpur for 2<sup>nd</sup> ckt stringing of Kishtwar - Kishenpur section</li> <li>7. Reconductoring of approx. 13 km Section (LILO tap Point of Dulhasti - Kishenpur 400 kV line) with Quad Moose conductor</li> </ol> <p><i>Location of Kishtwar pooling station (GIS) is yet to be finalized. Line length is tentative.</i></p> <p><b>Future Scope :</b> Provision at Kishtwar switching substation</p> <p>765/400 kV ICT along with bays – 3 nos.  400/220/132 kV ICT along with bays – 3 nos.  765 kV line bays along with switchable line reactor- 6 nos.  400 kV Line bays – 8 nos.  220/132 kV line bays – 6 nos.  765kV Bus Reactor along with bay– 1no.  400kV Bus Reactor along with bay– 1no.</p> <p><b>Note:</b> Further following connectivity transmission system shall be under the scope of M/s Chenab Valley Power projects Ltd (CVPPL)</p>

	<p>8. Implementation of Kiru-Kwar- Pakaldul- Kishtwar 400 kV D/C (Triple HTLS) connectivity line to be implemented by M/s CVPPL. M/s CVPPL to phase the implementation of the connectivity line as per the implementation timelines of the three HEPs i.e. Kiru, Kwar &amp; Pakaldul</p> <p>9. 2 nos. GIS bays at each end of Kishtwar and Pakaldul</p> <p>10. 420 kV, 1x125 MVAR Bus Reactor at Pakaldul HEP</p> <p>List of assumptions considered is given at <b>Annexure-I</b></p>
4. Estimated Cost	<b>About ₹ 384 Crore</b>
5. Estimated impact on tariff for next five years	<b>₹ 65 Crore/year*</b>
6. System Study	The study results are attached at <b>Exhibit-I</b> .
7. Approval of Scheme	<ul style="list-style-type: none"> <li>➤ Agreed in 1<sup>st</sup> meeting of NRPC(TP) held on 24/01/2020, extract of MoM attached at <b>Annexure-II</b>.</li> <li>➤ Agreed in 2<sup>nd</sup> meeting of NRPC(TP) held on 01/09/2020, extract of MoM attached at <b>Annexure-III</b>.</li> <li>➤ Agreed in 3<sup>rd</sup> meeting of NRPC(TP) held on 19/02/2021 (MoM awaited)</li> <li>➤ Agreed in 48<sup>th</sup> Northern Region Power Committee(NRPC) meeting held on 02/09/2020, extract of MoM attached at <b>Annexure-IV</b></li> <li>➤ Agreed in 3<sup>rd</sup> National Committee on Transmission (NCT) held on 26<sup>th</sup> and 28<sup>th</sup> May, 2020, extract of MoM attached at <b>Annexure-V</b></li> </ul>
8. Time frame	Feb 2024 (matching timeframe of Pakaldul HEP). In 16 <sup>th</sup> JCC meeting held on 29.12.20, M/s CVPPL has revised schedule to Apr'25.

\* Considering first year tariff @ 17% \*\* Levelised tariff may be in the range of 14 %

## Transmission system for evacuation of power from Pakaldul HEP in Chenab Valley

### 1.0 TITLE (NAME OF SCHEME)

Transmission system for evacuation of power from Pakaldul HEP in Chenab Valley

### 2.0 ESTIMATED COST

The estimated cost of the proposed transmission system: about ₹ 384Cr.

### 3.0 Transmission System for evacuation of power from Pakaldul Hydro Electric Power Plant (1000MW) in Chenab Valley

Proposed transmission system includes following elements:

1. Establishment of 400 kV switching station at Kishtwar (GIS) along with 420kV, 125 MVAR Bus Reactor at Kishtwar Switching Station by LILO of one circuit of Kishenpur – Dulhasti 400kV D/c (Quad) line (Single Circuit Strung)
2. LILO of one circuit of Kishenpur – Dulhasti 400kV D/c (Quad) line at Kishtwar Switching Station (LILO length :approx 10 Km)
3. Second(2<sup>nd</sup>) circuit(stringing) of Kishenpur – Dulhasti 400kV D/c (Quad) line (Kishtwar-Kishenpur Section) (approx. 130km)
4. 2 nos. of 400 kV bays at Kishtwar (GIS) for LILO of one circuit of Kishenpur – Dulhasti 400kV D/c (Quad) line
5. 1 no. of 400kV line bay at Kishtwar (GIS) for termination of 2<sup>nd</sup> ckt after stringing of Kishtwar-Kishenpur section
6. 1 no. of 400kV line bay at Kishenpur for 2<sup>nd</sup> ckt stringing of Kishtwar - Kishenpur section
7. Reconductoring of approx. 13 km Section (LILO tap Point of Dulhasti - Kishenpur 400 kV line) with Quad Moose conductor

*Location of Kishtwar pooling station (GIS) is yet to be finalized. Line length is tentative.*

#### **Future Scope** : Provision at Kishtwar switching substation

765/400 kV ICT along with bays – 3 nos.  
400/220/132 kV ICT along with bays – 3 nos.  
765 kV line bays along with switchable line reactor- 6 nos.  
400 kV Line bays – 8 nos.  
220/132 kV line bays – 6 nos.  
765kV Bus Reactor along with bay– 1 no.  
400kV Bus Reactor along with bay– 1 no.

**Note:** Further following connectivity transmission system is to be implementation by CVPPL.

1. Implementation of Kiru-Kwar- Pakaldul- Kishtwar 400 kV D/C (Triple HTLS) connectivity line to be implemented by M/s CVPPL. M/s CVPPL to phase the implementation of the connectivity line as per the implementation timelines of the three HEPs i.e. Kiru, Kwar & Pakaldul
2. 2 nos. GIS bays at each end of Kishtwar and Pakaldul
3. 420 kV, 1x125 MVAR Bus Reactor at Pakaldul HEP

However, for implementation of ISTS transmission System, scheme is further segregated in connectivity and LTA system as under:

### **Connectivity Transmission system under ISTS**

1. Establishment of 400 kV switching station at Kishtwar (GIS) along with 420kV, 125 MVAR Bus Reactor at Kishtwar Switching Station by LILO of one circuit of Kishenpur – Dulhasti 400kV D/c (Quad) line (Single Circuit Strung)

**Future Scope:** Provision at Kishtwar switching substation

765/400 kV ICT along with bays – 3 nos  
 400/220/132 kV ICT along with bays – 3 nos  
 765 kV line bays along with switchable line reactor- 6 nos  
 400 kV Line bays – 8 nos  
 220/132 kV line bays – 6 nos  
 765kV Bus Reactor along with bay– 1 no  
 400kV Bus Reactor along with bay– 1 no

2. LILO of one circuit of Kishenpur – Dulhasti 400kV D/c (Quad) line (LILO length : approx 10 Km)
3. 2 nos. of 400 kV bays at Kishtwar (GIS) for LILO of one circuit of Kishenpur – Dulhasti 400kV D/c (Quad) line
4. 1 no. of 400kV line bay at Kishtwar (GIS) for termination of 2<sup>nd</sup> ckt after stringing of Kishtwar-Kishenpur section

### **LTA Transmission System under ISTS**

1. Second(2nd) circuit of Kishenpur – Dulhasti 400kV D/c (Quad) line (Kishtwar-Kishenpur Section) (approx 130km)
2. 1 no. of 400kV line bay at Kishenpur for 2nd ckt stringing of Kishtwar - Kishenpur section

*\*Reconductoring of approx. 13 km Section (LILO tap Point of Dulhasti - Kishenpur 400 kV line) with Quad Moose conductor*

Schematic diagram is given at **Exhibit-II**

List of Assumptions considered is given at **Annexure-I**

#### 4.0 OBJECTIVE AND JUSTIFICATION

Chenab Valley Power Projects Limited (CVPPL) is implementing three major HEPs viz. Pakaldul(1000MW), Kiru (624 MW) and Kwar (540 MW) HEP in J&K. In the 1st meeting of Northern Region Power Committee- Transmission Planning (NRPC (TP)) held on 24/01/2020, Comprehensive system for connectivity was deliberated and agreed for evacuation of power from Pakaldul (1000MW), Kiru (624 MW) and Kwar (540 MW) HEPs of CVPPL. It was also agreed that the above projects would be connected to a common pooling station through 400kV dedicated transmission line to be implemented by the developer of these projects. Further, establishment of common pooling station at Kishtwar by LILO of one circuit of Kishenpur – Dulhasti 400kV D/c (Quad) line (Single Circuit Strung) was also agreed to be implemented under ISTS to provide connectivity to above projects in ISTS.

It was also deliberated that M/s CVPPL shall phase the implementation of the connectivity line matching with the implementation timelines of the three HEPs i.e. Kiru, Kwar & Pakaldul. CVPPL would first connect Pakaldul to Kishtwar PS and subsequently extend the same transmission line to Kiru and Kwar HEP as per matching time frame.

Subsequently, Transmission System for transfer of 1000 MW from Pakaldul HEP under Long-term Transmission Access(LTA) was also agreed for grant to NR (target region through Second (2nd) circuit of Kishenpur – Dulhasti 400kV D/c (Quad) line (Kishtwar-Kishenpur Section) in the 2<sup>nd</sup> meeting of NRPC (TP) held on 01/09/2020. Transmission system is to be implemented in matching timeframe of Pakaldul HEP.

The above identified scheme shall facilitate interconnection of Pakaldul HEP and transfer of its hydro power. Therefore, M/s CVPPL is granted connectivity & LTA in ISTS with above agreed system.

In the 3rd meeting of NRPC (TP) held on 19/02/2021, reconductoring of a portion of Dulhasti - Kishenpur 400 kV S/c Line (quad) was deliberated & agreed (minutes awaited). It was informed that, presently power from Dulhasti HEP (390 MW) is being evacuated through 400 kV Dulhasti- Kishenpur S/c line & D/c (quad) line (one circuit strung). Earlier, Ratle HEP (690 MW) was planned to be developed in the downstream of Dulhasti HEP and it was agreed that Dulhasti - Kishenpur D/c Quad (S/c strung) would be LILoed at Ratle HEP and 2nd quad circuit shall be strung from Kishenpur and terminated at Ratle HEP. Further, it was also agreed during 35th NRSCM that as outlet beyond Dulhasti is Dulhasti-Kishenpur 400kV line single circuit, the amount of power that can be exported/imported is limited. Therefore, Dulhasti - Ratle section would be optimized to the extent possible. Based on above considerations, POWERGRID implemented Dulhasti - Kishenpur 400kV S/c line (Quad) with Twin Moose conductor till Ratle LILo point. Beyond Ratle LILo point, line was implemented with Quad Moose conductor. However, LTA & Connectivity

application for Ratle HEP was revoked at later stage due to non-signing of requisite agreements. As location of proposed Kishtwar S/s is above Ratle location and towards Dulhasti, portion of Dulhasti-Ratle LILo tap Point of Dulhasti- Kishenpur 400 kV line (approx. 13 kms) implemented through twin moose conductor, needs to be reconducted with Quad moose conductor to cater to power transfer requirement from Pakaldul (1000 MW) HEP.

## 5.0 COST-BENEFIT ANALYSIS INCLUDING LONG TERM ECONOMIC ADVANTAGE

The annual transmission charges for the subject scheme at an estimated cost of about **Rs.384 Cr**, would be about **Rs. 65 Cr**. The above transmission system shall enable transfer of interstate power from **1000 MW** hydro power. Such quantum of power shall translate into annual energy of about **3500 MU** [ $Energy\ in\ MU = (1000 \times 0.40 \times 8760) / 10^3$ ]. If we consider average rate of energy as **Rs. 4.5 per unit** on the conservative side then the total annual energy cost works out to be about **Rs. 1577 Crs.**

In other words, the system proposed under the subject scheme whose annual transmission charges is **Rs.65 Crs** shall enable ISTS grid to handle energy whose cost is of the order of **Rs. 1577 Crs.** (i.e. **~24 times** the transmission cost). Hence the subject scheme shall be good proposition from Cost-benefit point of view.

*\* PLF@40% has been considered.*

## 6.0 TIME FRAME / PHASING OF THE IMPLEMENTATION OF THE SCHEME

Transmission system is to be implemented in matching timeframe of Pakaldul HEP, which was originally expected by Feb, 2024. Subsequently, in the 16<sup>th</sup> JCC meeting held on 29.12.20, CVPPL has revised schedule to Apr'25

## 7.0 CONSENT OF BENEFICIARIES

The transmission system was discussed, finalized in consultation with CEA, various state utilities in NR as well as CVPPL. The system was agreed and approved in 1<sup>st</sup> meeting of NRPC (TP) held on 24/01/2020, 2<sup>nd</sup> meeting of NRPC (TP) held on 01/09/2020, 3<sup>rd</sup> meeting of NRPC(TP) held on 19/02/2021 (MoM awaited), 48<sup>th</sup> NRPC meeting held on 02/09/2020 and 3<sup>rd</sup> NCT held on 26<sup>th</sup> and 28<sup>th</sup> May, 2020.

Results of the system studies carried out with the proposed scheme for various scenarios is enclosed at **Exhibit-I**. Assumption and inputs considered in above system studies is also enclosed in **Annexure -I**.

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**Study Assumptions**

1. Studies have been carried out for peak demand scenario (evening peak) for 2025 time frame of Monsoon season (Hydro peak). In this scenario, Hydro is fully dispatched. Therefore transmission system is evolved considering its maximum generation dispatch..
2. All India Peak Demand is considered as per the 19<sup>th</sup> EPS of CEA (2025) as well as based on NR constituents inputs.
3. In the studies, all India transmission network up to 220kV level has been simulated. This includes, existing as well as under construction transmission network
4. In evening peak demand scenario, no Solar generation is considered whereas wind generation dispatch is considered as 70% in all regions.
5. In peak demand scenario, NR, ER & NER hydro generation is considered to 90-95 % dispatch level whereas other regions hydro generation is considered to 60%. However, hydro dispatch of Pakaldul HEP and nearby hydro generations in J&K is considered to be fully dispatched.
6. Balance demand is to be met through thermal generation considering only those thermal units which were operating in noon time at lower dispatch level (up to 55% level)

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evaluating the LTA system.

- 6.11. CEA stated that the fault level reduces significantly with opening of Singrauli- Anpara 400 kV line.
- 6.12. CTU enquired about the time schedule of the proposal regarding opening of Singrauli-Anpara 400 kV line. In this regard, POSOCO stated that the line may be opened with the coming of Anpara D –Unnao line, which is expected by June 2020 as informed by UP; subject to the condition that with the opening of the line, the adjacent system is not affected. In the meeting, it was agreed that 400kV Singrauli-Anpara may be kept opened after commissioning of 765kV Anpara D-Unnao to restrict high short circuit level in Singrauli-Anpara complex, however, in case of any contingency the line may be required to be taken in service.
- 6.13. After deliberations, following was agreed:
- (i) The transmission system for evacuation of power from Singrauli III:
    - I. LILO of both circuits of Tie line (Vindhyachal Stage-IV to Vindhyachal Stage-V 400kV D/C Twin Moose line) at Singrauli Stage-III- under the scope of NTPC.
    - II. Reconductoring of Singrauli Stage-III - Vindhyachal stage-IV 400 kV D/C TM line (formed after above proposed LILO) with HTLS conductor - under the scope of NTPC
    - III. Singrauli-III–Rihand-III 400kV D/c line- under ISTS scope
    - IV. 2x125 MVAR Bus Reactor at Singrauli-III generation switchyard- under scope of NTPC
  - (ii) Singrauli- Anpara 400 kV line will be kept normally open (can be closed in emergency conditions) after commissioning of Anpara D –Unnao 765kV line to restrict high short circuit level in Singrauli-Anpara complex.
  - (iii) The short circuit level in Singrauli will again be studied by CEA and CTU and accordingly, would be discussed in the next NRPCTP meeting.

The above scheme may also be rectified in next NRPCTP meeting.

## **7.0 Transmission system for evacuation of power from Pakaldul (1000MW), Kiru (624 MW) and Kwar (540 MW) HEPs of CVPPL:**

7.1 CEA stated that CVPPL is implementing three major HEPs viz Pakaldul (1000MW), Kiru (624 MW) and Kwar (540 MW) HEP in J&K. Works on various components of PakalDul HEP are in progress. Works of Kiru and Kwar HEPs are in advanced stage of tendering. The power from these projects was planned to be pooled to Kishtwar S/s. In the 2<sup>nd</sup> meeting of NRSCT, following was agreed in regard of the connectivity of PakalDul HEP (1000 MW):

- i) 400 kV D/c (Triple HTLS Conductor) line from PakalDul HEP–Kishtwar Switching station along with associated bays at both ends – under scope of generation developer.



I/9225/2020

- ii) Establishment of 400 kV switching station at Kishtwar(GIS) by LILO one circuit of Kishenpur – Dulhasti 400kV D/c (Quad) line (Single Circuit Strung) –under ISTS.
- iii) GIS switchyard equipment, XLPE cables and other associated equipment may be designed for current carrying capacity of 4000 Amps - under scope of generation developer.
- iv) 420 kV, 125 MVAR Bus Reactor at PakalDul HEP -under scope of generation developer.
- v) 420 kV, 125 MVAR Bus Reactor at Kishtwar Switching Station - under ISTS.
- vi) One and a half breaker switching scheme for 400kV Generation switchyard - under scope of generation developer.

The matter was again deliberated in 3<sup>rd</sup> meeting of NRSCT wherein, it was suggested that, in view of limited space for laying the transmission line corridor in Chenab Valley, it would be better that CVPPL lay a dedicated line from PakalDul HEP to Kishtwar which could be extended to Kwar and Kiru HEPs, Kirthai I and Kirthai II HEP so that beside about 2400 MW power from Pakaldul, Kwar and Kiru HEPs additional 1420 MW power from Kirthai I and Kirthai II HEP could also be evacuated from the PakalDul HEP–Kishtwar corridor. CVPPL agreed with the suggestion given by CEA to use quad HTLS for PakalDul HEP–Kishtwar line instead of triple HTLS conductor.

Subsequently, CVPPL intimated that they are facing some difficulties in implementation of PakalDul HEP–Kishtwar line with quad HTLS conductor. If 1300 MW power from Kirthai I and Kirthai II projects in Jammu & Kashmir would also be evacuated through the PakalDul HEP–Kishtwar line, current would be of the order of 5000 Amps. CVPPL also mentioned that earlier it was agreed that the GIS switchyard equipment, XLPE cables and other associated equipment may be designed for current carrying capacity of 4000 Amps, therefore, the same has been mentioned in the tender documents and works of Pakaldul HEP switchyard has been awarded accordingly. The works on various components of PakalDul HEP are already under progress. CVPPL therefore requested to plan a separate corridor for evacuation of power from Kirthai I and Kirthai II projects in Jammu & Kashmir and for evacuation of power from CVPPL projects (i.e. Pakaldul, Kiru & Kwar HEPs), the dedicated line to Kishtwar may be implemented with triple HTLS conductor.

**7.2** To deliberate on the issue further, a meeting was held in CEA on 26.09.2019, wherein, CTU informed that survey was conducted in the Chenab basin and it was found two corridor are possible in that valley and the same has accordingly been reflected in the master plan i.e one corridor for 1500 MW power coming from HP in addition to Kirthai I & II and 2nd corridor for Kiru, Kwar and Pakaldul projects. Accordingly, after deliberations, following was agreed in- principle:

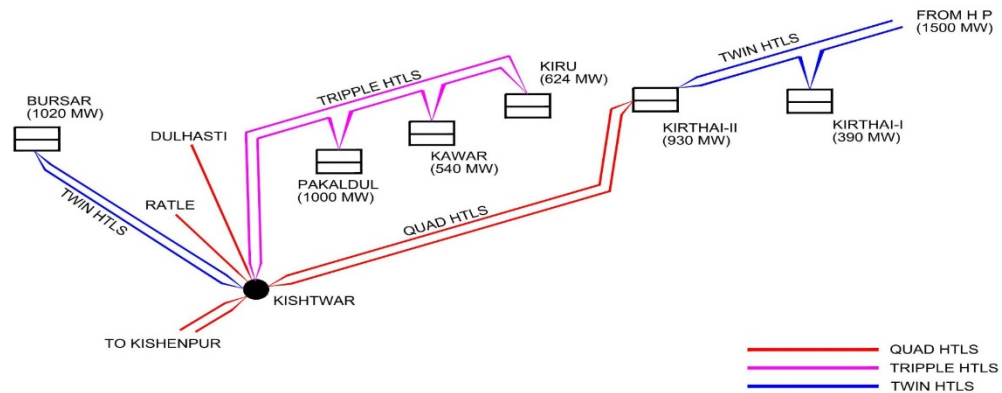
- i. Implementation of Kiru-Kwar-Pakaldul to Kishtwar 400 kV D/c line with triple HTLS conductor instead of quad HTLS conductor was agreed subject to ratification from the NRSCT.
- ii. The possibility of 2<sup>nd</sup> corridor in Chenab basin need to be discussed with JKPDD.

**7.3** CEA also mentioned that for grant of connectivity/LTA to Pakaldul HEP, the transmission system (mentioned at 7.1 above) was agreed, which involves establishment of 400 kV

I/9225/2020

switching station at Kishtwar(GIS) by LILO one circuit of Kishenpur – Dulhasti 400kV D/c (Quad) line (Single Circuit Strung) as ISTS work and depending on the progress and requirement of the Generation developer, the system needs to be taken up for implementation through ISTS.

### POWER EVACUATION ARRANGEMENT FROM PROJECTS IN JAMMU & KASHMIR



- 7.4 CTU enquired about the timeframe of all the three projects in order to take up with the implementation of Kishtwar S/s. In this regard, CVPPL informed that Pakaldul and Kiru are expected by Dec 2024 and the timelines for Kwar are not yet defined. Further, they have received the Cabinet Approval for Pakaldul and Kiru. Pakaldul has been awarded and construction is in process. PPA is yet to be signed between Govt. of J&K and NHPC wherein, 49% of the power will be purchased by J&K and the remaining power will be sold by NHPC. Kiru is expected to be awarded by April 2020.
- 7.5 CTU further enquired about the transmission line length. In this regard, CVPPL replied that line length from Kishtwar to Kiru is 30 kms and from Pakaldul to Kishtwar is 15 km. CTU expressed the concern that since timelines of Kwar is not defined and date of award of Kiru and Kwar are yet to be finalised, therefore there will be difficulty in getting the prior approval under Section -68 of the LILO of one circuit of Kiru-Kishtwar line at Pakaldul and Kwar. For this, CVPPL replied that LILO will be implemented only when the timelines of the generations are confirmed.
- 7.6 CTU opined that since Kishtwar S/s will be implemented as an ISTS S/s, therefore the transmission system pertaining to Kishtwar should match with the timeframe of the first generations project in the Chenab basin.
- 7.7 POSOCO suggested that the rating of switchgears as well as bays may be planned considering the plan of evacuation of Pakaldul, Kiru and Kwar (2164MW) as well as Kirthai I and II (1300MW) and other generation from Kishtwar Pooling substation. As the capacity of the Kishtwar S/s will be around 6000 MW, therefore for shutdown and maintenance purpose, possibility of providing bus sectionalizers at Kishtwar S/s may be explored. Also, instead of LILO of one circuit of Kiru - Kishtwar 400 kV D/c line at Pakaldul and Kwar, LILO of both circuits could be done for reliability purpose.

I/9225/2020

7.8 In this regard, CEA stated that since timelines for Bursar, Kirthai-I and Kirthai-II are not yet confirmed, therefore as of now, Kishtwar S/s is being planned only for about 2400 MW (considering 10% overload). POSOCO added that in near future, with the coming up of new upstream generations, a new substation could be planned in that area.

7.9 After deliberations, the following was agreed:

- i) Implementation of of Kiru-Kwar- Pakaldul- Kishtwar 400 kV D/C Triple HTLS connectivity line to be implemented by M/s CVPPL. M/s CVPPL to phase the implementation of the dedicated line as per the implementation timelines of the three HEPs ie. Kiru, Kwar & Pakaldul
- ii) One and a half breaker switching scheme at 400kV Generation switchyard.
- iii) 2 bays at each end of Kishwar and Pakaldul - under the scope of generator.
- iv) 420 kV, 125 MVAR Bus Reactor at PakalDul HEP -under scope of generation developer
- v) Establishment of 400 kV switching station at Kishtwar (GIS) by LILO one circuit of Kishenpur – Dulhasti 400kV D/c (Quad) line (Single Circuit Strung) –under ISTS

#### 8.0 Establishment of 400 kV switching station at Kishtwar(GIS) under ISTS:

8.1 CEA stated that in the 2<sup>nd</sup> meeting of NRSCT, transmission system was agreed for grant of Connectivity/LTA to PakalDul HEP (1000 MW) which included establishment of Kishtwar GIS 400 kV switching station by LILO one circuit of Kishenpur – Dulhasti 400kV D/c (Quad) line (Single Circuit Strung) and Stringing of second circuit from Kishtwar to Dulhasti on Kishenpur – Dulhasti 400kV D/c line(single circuit strung)

8.2 CEA enquired about the finalization of location for Kishtwar S/s. In this regard, CVPPL replied that POWERGRID is Consultant for preparation of DPR of the scheme and POWERGRID has identified a tentative location and for the finalization of location, a committee needs to be formed.

8.3 CTU opined that future provisions needs to be taken up adequately for Kishtwar S/s at both 765 kV and 400 kV end. After deliberations, it was decided that a committee will be formed consisting of CEA, CTU, JKPDD and CVPPL for finalizing the location of Kishtwar Pooling station and accordingly, the proposal would be deliberated in the next NRPCTP meeting.

#### 9.0 RVPN's proposal regarding uprating, updating and strengthening intra-State transmission schemes for Renewable Energy Evacuation in Western Rajasthan to be implemented by RVPN:

9.1 Director CEA stated that RVPN vide letter no. RVPN/SE(P&P)/XEN-2(P&P)/AE-2/F/D/974 dated 22.10.2019 has submitted a proposal for the Transmission System regarding Uprating, Upgrading and Strengthening of Intra-State Transmission Schemes for

- ii) LILO of 400 kV D/c Amargarh (Kunzer)- Samba line at 400/220 kV Akhnoor/ Rajouri S/s

Works proposed under Intra-State Transmission works:

- iii) 220 kV D/c line from 400/220 kV Akhnoor/ Rajouri to 220/132 kV Akhnoor-II  
 iv) 220 kV D/c line from 400/220 kV Akhnoor/ Rajouri to 220/132 kV Rajouri  
 v) 220 kV D/c line from 400/220 kV Akhnoor/ Rajouri to 220/132 kV Katra-II

- 2.2** She further stated that as per the system studies carried out by CEA, it has been observed that the load flow study seems to be in order except the line from Akhnoor to Katra-II remains floating. She then requested Chief Engineer, Jammu to put some light into the matter.
- 2.3** CE, JKPDD stated that Rajouri is a border area and is at a distance of 150 km from Jammu, wherein 132 kV network is present. In that same corridor, there is resentment amongst people that a 400 kV line is passing in the vicinity and they are not getting quality power due to the interruptions on the 132 kV network because of long distance, plus the downstream network of capacity 320 MVA is having a loading of 500 MVA, feeding grids are getting overloaded and load shedding is being enforced. Therefore, in order to improve the system profile in that area, 400/220 kV Akhnoor/Rajouri S/s is proposed with the LILO of Amargarh – Samba 400 kV D/c line passing through the same corridor.
- 2.4** CE, PSPA-1 enquired about the distance of the proposed ISTS S/s from 220/132 kV Akhnoor-II(Jammu), Rajouri, Katra-II S/s. With this, JKPDD stated that for 400/200 kV ISTS, land is available at Siot (mid way between Akhnoor and Rajouri) which is at a distance of approx. 60 km from Akhnoor-II, 60 km from Rajouri and 40 km from Katra-II. Regarding the connectivity of Katra-II, JKPDD stated that instead of LILO of Salal-Kishenpur at Katra-II, 220kV D/c line from Nagrota-Katra-II may be considered. This would create a 220 kV ring around Jammu region, which will also serve the reliability purpose. The same proposal will be sent to CEA for approval under Intra-State works.
- 2.5** Chairperson, CEA enquired about the timeframe considered in the studies. In this regard, CEA stated that 2023-24 timeframe is considered. With this, Chairperson, CEA stated that longer timeframe could have been taken as the construction activities in J&K usually takes a lot a time.
- 2.6** COO, CTU agreed that revised studies needs to be done with the demand requirement along with the confirmation of 220 kV outlets from this substation. Further, he stated that usually there is mismatch in the timeframe of substation and transmission lines, therefore first the 200 kV outlets needs to be confirmed, then substation could be planned. Also, he suggested to plan 500 MVA transformers instead of 315 MVA at the proposed Akhnoor/Rajouri S/s.
- 2.7** Member Secretary, NRPC stated the downstream system is always delayed in case of J&K, particularly in Kashmir. Therefore, while confirming the ISTS Works, first the downstream system needs to be matched with the timeframe of ISTS Transmission system, for proper absorption of power.
- 2.8** Chairperson, CEA suggested that revised studies could be done for J&K by CEA and CTU and accordingly, the proposal would be deliberated in the next NRPCTP meeting. Members agreed with the same.
- 3.0** **Transmission system for evacuation of power from Pakaldul (1000MW), Kiru (624 MW) and Kwar (540 MW) HEPs:**
- 3.1** Director, PSPA-1 stated that the transmission system for evacuation of power from Pakaldul (1000MW), Kiru (624 MW) and Kwar (540 MW) HEPs of CVPPL was discussed during 1<sup>st</sup>

I/12271/2020

Northern Region Power Committee (Transmission Planning) held on 24.01.2020 & following system was agreed:

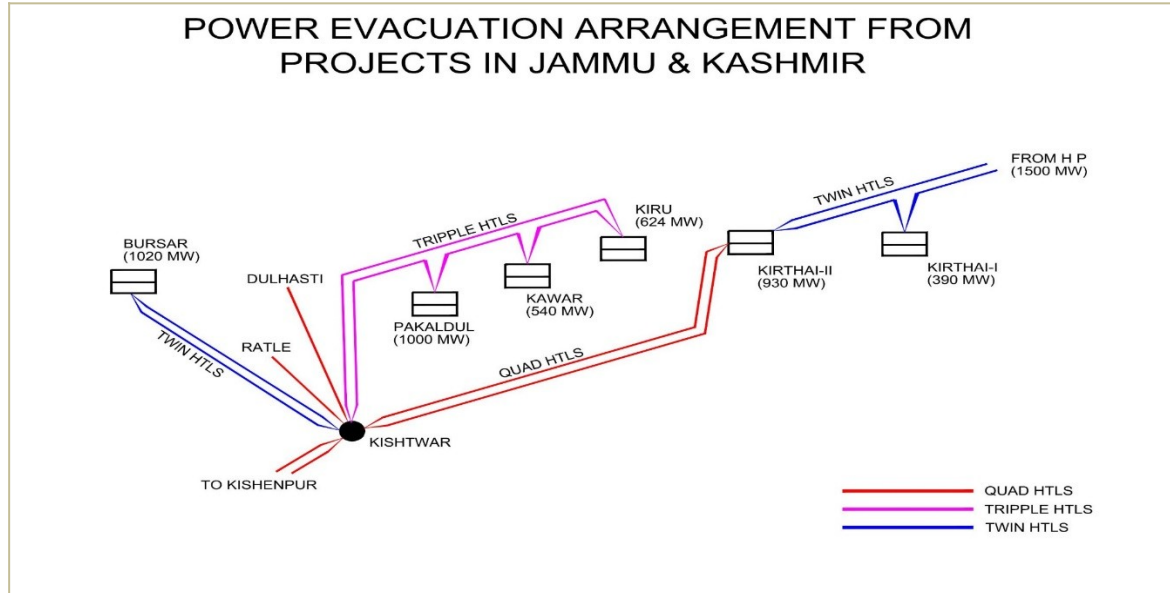
**a) Connectivity Transmission system**

1. Implementation of Kiru-Kwar- Pakaldul- Kishtwar 400 kV D/C Triple HTLS connectivity line to be implemented by M/s CVPPL. M/s CVPPL to phase the implementation of the connectivity line as per the implementation timelines of the three HEPs ie. Kiru, Kwar & Pakaldul.
2. One and a half breaker switching scheme at 400kV Generation switchyard- under the scope of M/s CVPPL
3. 2 GIS bays at each end of Kishtwar and Pakaldul- under the scope of M/s CVPPL
4. 420 kV, 125 MVAR Bus Reactor at Pakaldul HEP- under the scope of M/s CVPPL:
5. Establishment of 400 kV switching station at Kishtwar (GIS) by LILO one circuit of Kishenpur – Dulhasti 400kV D/c (Quad) line (Single Circuit Strung) –under ISTS
6. 420 kV, 125 MVAR Bus Reactor at Kishtwar switching station- under ISTS

**b) LTA system for Pakaldul HEP:**

CVPPL has also applied for LTA for transfer of 1000 MW from Pakaldul HEP to NR (target region). The application was discussed in 24<sup>th</sup> Meeting of Northern Region Constituents regarding Connectivity and LTA applications in NR held on 26.06.2019 wherein following transmission system for LTA was agreed:

1. Kishtwar switching station - Kishenpur400kV S/c (Quad) line (stringing of second circuit of Dulhasti–Kishenpur400kV from Kishtwar upto Kishenpur) along with bays at both ends - **Under ISTS**



**c) Connectivity Transmission system for Kiru HEP:**

CVPPL has also applied on 25.06.2020 for grant of Connectivity to Kiru HEP (624MW) w.e.f. 01.04.2024 and was discussed and agreed in 36<sup>th</sup> NR LTA/Connectivity meeting with the following transmission system:

1. 400 kV D/c (Triple HTLS Conductor –Equivalent to about 2400MW-considering 10% overload) line from Kiru HEP – Pakaldul generation switchyard along with bays at both ends, forming one direct 400 kV ckt. from Kiru – Kishtwar PS(GIS) and other 400 kV ckt. LILOed at Kwar & Pakaldul HEP.

I/12271/2020

2. Switchyard Capacity must be able to handle about 2400MW power generated by the generation projects located in downstream of the Kiru HEP. GIS switchyard equipment and XLPE cables provided may be designed for carrying 4000 Amps current.
3. 400 kV, 125 MVAR Bus Reactor at Kiru generation switchyard.

She further stated that the transmission system to be implemented under ISTS has been discussed in the 3rd meeting of the "National Committee on Transmission" (NCT) held on 26th and 28th May, 2020 and has been agreed for taking up for implementation.

**3.2** CE, CEA asked CTU to intimate the present status and the timeframe of the stringing of second circuit from Kishenpur to Kishtwar. On that CTU replied that the length of the line is approx. 130 km, which will take around 18-24 months considering the hilly region and would be done matching with the timeframe of the generation at Pakaldul, i.e February, 2024. CTU also stated that in the 1<sup>st</sup> meeting of NRPCTP, it was decided to finalise the location of Kishtwar S/s with the committee consisting of CEA, CTU, JKPDD and CVPPL, along with the confirmation of space. In this regard, CE, CEA stated that the same could not be planned due to COVID, however site visit will be planned soon.

**3.3** Members noted the same.

**3.4** CVPPL stated that as per the connectivity system CVPPL has to construct two number of bays at Kishtwar S/s for termination of their 400kV lines. However, as agreed in the earlier Standing Committee, the two circuits of the line is required should not be terminated in the same dia for reliability consideration and in the GIS S/s, the complete dia is to be implemented in the beginning itself. Therefore, CVPPL has to implement two complete dia with 6 circuit breaker bays out of which two bays are in their scope. CVPPL purposed that these 2 nos. of 400kV bays at the Kishtwar S/s may be implemented under ISTS and cost of two nos. of 400kV bays(CVPPL scope) shall be reimbursed by CVPPL.

**3.5** *After deliberations, it was agreed that a separate meeting would be convened among CEA, CTU and CVPPL to discuss the issue of providing two numbers of 400kV bays at Kishtwar Switching Station.*

**4.0 Implementation of 400/132kV transformer at Kishtwar Pooling Station:**

**4.1** Director, PSPA-1 stated that JKPDD has requested to take up the implementation of 315 MVA, 400/132kV transformer at 400kV pooling station at Kishtwar. JKPDD has intimated that they have existing 132kV line network at Kishtwar and 132kV RKKTL line from Ramban S/s is under construction. At present, they have three no. of 132/33kV GSS in vicinity i.e. 40MVA Kishtwar JKPDD, 20 MVA Kishtwar (NHPC) and 70 MVA Khellani S/S with further connectivity at sub- transmission level. In order to provide reliable power to the area, JKPDD has requested for implementation of 315 MVA, 400/132kV transformer along with 132kV line bays at Kishtwar pooling station under ISTS.

**4.2** Chairperson, CEA suggested to plan 220 kV network instead of 132 kV considering the load growth. CE, JKPDD replied that there is no 220kV network in that area. At present, the local 132 kV load is being fed through the 132 kV line of NHPC. Two 50 MVA substations are proposed at Bhaderwah and Patan area under intra-state transmission works which will be sufficient for reliability purpose for the next 10-15 years. Considering that, the proposed 400/132 kV transformer along with along with 132kV line bays at Kishtwar pooling station under ISTS would be adequate.

I/12271/2020

- 4.3** CTU stated that minimum two transformers would be required in order to meet n-1 criteria. Therefore, 2x200 MVA transformation capacity may be considered instead of 1x315 MVA.
- 4.4** CE, CEA enquired about the 132 kV network with the Kishtwar PS. In this regard, JKPDD replied total 4no. of 132 kV bays are required, two each for their 132/33 kV Khellani and local Kishtwar S/s. The same would be implemented matching with timeframe of Kishtwar ISTS.
- 4.5** CTU stated that this work has to be proposed in the strengthening scheme as when this project would be implemented under TBCB, for 400 kV LTTC will be generators and for 400/132 kV system, LTTC's will be Discoms. Therefore for the same bidding, two separate TSA would be signed. Also, regarding the timeframe of the scheme, JKPDD stated that the scheme may be implemented in matching timeframe of Kishtwar S/s.
- 4.6** *After deliberations, members agreed with the implementation of 2x200 MVA, 400/132 kV transformer at Kishtwar Pooling Station along with 4 no. of 132 kV line bays to be taken up as system strengthening scheme.*
- 5.0 Transmission works to be implemented in Jammu and Kashmir Region under Intra – State transmission system**
- 5.1** Director, PSPA-1 stated that JKPDD has submitted the DPR for the transmission projects in Jammu region to CEA, which are required to be implemented during the 13<sup>th</sup>/14<sup>th</sup> plan. The same have been agreed technically in the 1<sup>st</sup> meeting of Northern Region Power Committee (Transmission Planning) held on 24.01.2020. Apart from these works, JKPDD has also submitted some additional intra-state works to be included along with this DPR. The details of the additional transmission works proposed by PDD, Jammu is listed as **Annexure-II**. JKPDD has also submitted DPR for Kashmir region in January, 2020 to be implemented during 13<sup>th</sup> and 14<sup>th</sup> plan period. The same is under examination.
- 5.2** She further stated that following works proposed by JKPDD in the DPR's requires interconnection with the ISTS elements:

**a) Jammu Region**

1	Laying of 220 kV D/c Jatwal-Chawdhi line (45 kms)	Two no. of bays are required at Samba(Jatwal) (to be implemented by JKPDD)
2	Thickening of S/C 220KV Jatwal-Gladni Trans. Line from ACSR Zebra to HTLS conductor(40 kms)	Jatwal-Gladni Trans. Line is an ISTS line. Therefore work required to be taken up under ISTS

**b) Kashmir Region**

1	LILO of 220kV Wagoora - Kishenganga line at Khansahib (Beerwah)	Kishanganga - Wagoora 220kV D/C line is an ISTS line
2	LILO of one ckt of Alusteng- Leh 220kV S/c line on D/c towers at Gangangeer (Sonamarg) (5km)	Alusteng- Leh 220kV S/c line is an ISTS line
3	220kV Kunzer - Gulmarg S/C line (15 km)	Amargarh (Kunzer) is an ISTS S/s, Out of 6 no.s of 220kV bays, 4 bays have been utilized for LILO of
4	220kV D/C line from 400/220kV Kunzar - 220/33kV Sheeri (40km)	Delina –Zeinkote at Amargarh (Kunzer), 2 nos. of bays are proposed to be utilized through Amargarh –Sheeri 220kV D/c line, space for additional 2 nos.
5	220kV Amargarh (Kunzar) - Lollipopa S/C line (4 kms)	of bays are required. Implementation of bays is proposed to be taken up by JKPDD.

B.9.4 CTU informed that 4<sup>th</sup> ICT of 800MVA is to be covered as part of transmission system associated with Tehri PSP along with Tehri PSP – Tehri Pooling Stn. 400 kV (Quad) line and augmentation of 765/400 transformation capacity by 1x1500 MVA at Meerut.

**B.9.5 TCC recommended the scheme for approval of NRPC.**

**NRPC Deliberations**

B.9.6 NRPC approved the scheme as per the deliberations held in TCC.

**B.10 Charging of Fatehgarh-II – Bhadla Section (After LILO of Fatehgarh – Bhadla 765kV D/c line (to be operated at 400kV) at Fatehgarh-II) under ISTS (agenda by POWERGRID)**

**TCC Deliberations**

B.10.1 POWERGRID representative stated that Fatehgarh – Bhadla 765kV D/c line (to be operated at 400kV) is under implementation by Fatehgarh Bhadla Transmission Ltd. (FBTL) under TCB and expected to be completed by December, 2020. Further, LILO of this line at Fatehgarh-II PS along with charging of Fatehgarh-II - Bhadla Section at 765 kV is also under implementation with completion schedule as March, 2021.

B.10.2 Initially, Fatehgarh – Bhadla 765kV line will be terminated at 400kV switchyard of Bhadla S/s and later on it would be required to terminated at 765kV switchyard of Bhadla S/s. However, 400kV Switchyard and 765kV Switchyard are at two extreme ends of the substation. Thus, to facilitate charging of Fatehgarh-II – Bhadla Section at 765kV re-routing of the line for about 2-3 km shall be required. The proposal was agreed during 1<sup>st</sup> NRPCTP meeting held on 24.01.2020 at Jaisalmer, Rajasthan.

B.10.3 POWERGRID informed that to facilitate charging of Fatehgarh-II – Bhadla section at 765kV, re-routing of the line for about 2-3 km shall be required.

B.10.4 TCC recommended the scheme for approval of NRPC.

**NRPC Deliberations**

B.10.5 NRPC approved the scheme as per the deliberations held in TCC.

**B.11 Transmission system for evacuation of power from Pakaldul (1000MW), Kiru (624 MW) and Kwar (540 MW) HEPs of CVPPL (agenda by POWERGRID)**

**TCC Deliberations**

B.11.1 POWERGRID representative stated that Transmission system for evacuation of power from Pakaldul (1000MW), Kiru (624 MW) and Kwar (540 MW) HEPs of CVPPL was discussed during 1st Northern Region Power Committee (Transmission Planning) held on 24/01/2020 at Jaisalmer, Rajasthan & following system was agreed.

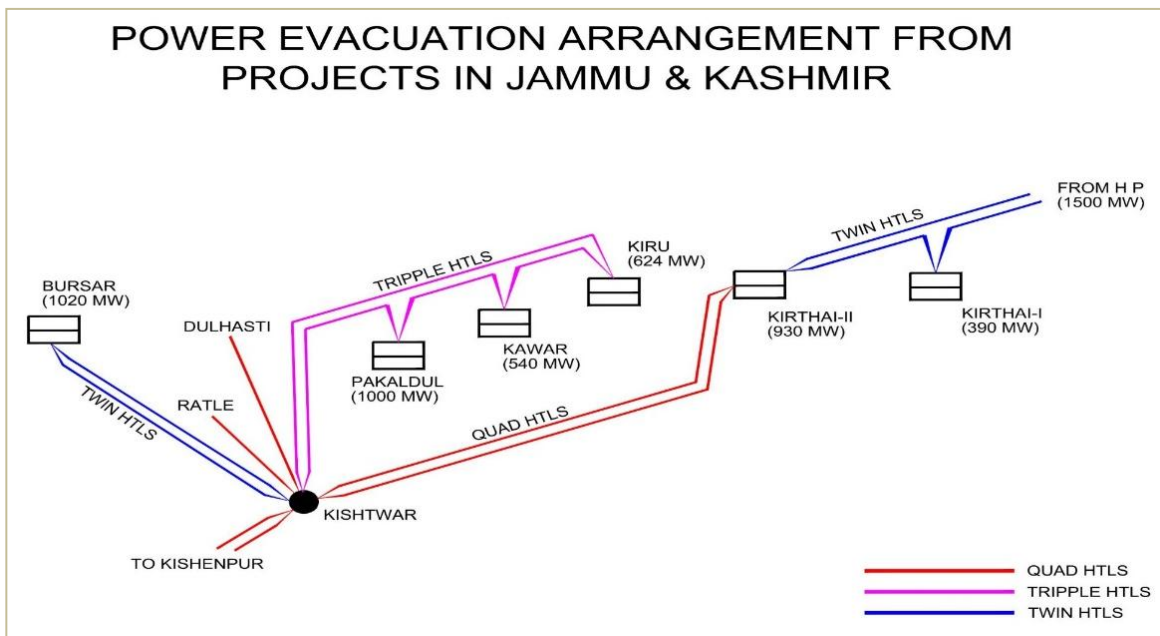


### B.11.2 **Connectivity Transmission system**

- i) Implementation of Kiru-Kwar- Pakaldul- Kishtwar 400 kV D/C Triple HTLS connectivity line to be implemented by M/s CVPPL. M/s CVPPL to phase the implementation of the dedicated line as per the implementation timelines of the three HEPs ie. Kiru, Kwar&Pakaldul.
- ii) One and a half breaker switching scheme at 400kV Generation switchyard- under the scope of M/s CVPPL:
- iii) 2 bays at each end of Kishwar and Pakaldul- under the scope of M/s CVPPL
- iv) 420 kV, 125 MVAR Bus Reactor at PakalDul HEP- under the scope of M/s CVPPL.
- v) Establishment of 400 kV switching station at Kishtwar (GIS) by LILO one circuit of Kishenpur – Dulhasti 400kV D/c (Quad) line (Single Circuit Strung) – **under ISTS**

B.11.3 Further, CVPPL had applied for LTA for transfer of 1000 MW from Pakaldul HEP to NR (target region). The application was discussed in 24th Meeting of Northern Region Constituents regarding Connectivity and LTA applications in NR held on 26.06.2019 wherein following transmission system for LTA was agreed:

- Kishtwar - Kishenpur 400kV S/c (Quad) line (by utilizing towers of Kishenpur – Dulhasti 400kV D/c (Quad) line (Single Circuit Strung) - **Under the scope of ISTS**



B.11.4 NRLDC highlighted that considering reliability of the system, LILO of both circuits may be envisaged, as outage of LILO line in current scheme may lead to generation loss at Pakaldul and Kwar.

B.11.5 CTU stated that option was explored; however, limitation of space for towers in hilly region and huge RoW issue were found during site visit by CEA, CVVPL,

CTU, J&K officials. Hence, LILO of only one line is feasible.

B.11.6 TCC recommended the scheme for approval of NRPC.

### **NRPC Deliberations**

B.11.7 NRPC approved the scheme as per the deliberations held in TCC.

## **B.12 Connectivity to Luhri St-I, II and Sunni Dam HEPs of SJVNL (agenda by POWERGRID)**

### **TCC Deliberations**

B.12.1 CTU representative informed that 3 nos. of Hydro Projects viz. Luhri HEP St-I (210 MW), Luhri HEP St-II (207 MW) and St-III (363 MW) are proposed to be developed by SJVNL in Kullu & Mandi District of Himachal Pradesh. Connectivity to Luhri HEP Stage-I was discussed in 2<sup>nd</sup> meeting of SCT held on 13.11.2018, wherein it was informed that a team of officers from CEA, SJVNL HPPTCL, HPSEB and CTU visited 3 sites of Luhri-I, II and III on 14-06-2018. The team proposed that power from all the three stages of Luhri HEP would be evacuated at 220 kV level and would be pooled at 400/220 kV proposed ISTS pooling station tentatively identified at a place 'Nange' located near Luhri-II HEP and further evacuated to Koldam through 400 kV D/C line. System beyond Koldam sub-station shall be finalized after system studies. For taking up the implementation of the associated transmission system, SJVNL was advised to apply for Connectivity/LTA at the earliest for all the three stages. During the meeting, it was also informed that SJVN has applied for grant of Connectivity for all the three stages.

B.12.2 It was further informed that the following transmission system was agreed for connectivity to Luhri St-I, II and Sunni Dam HEPs subject to confirmation from NTPC Ltd. for availability of space at Koldam switchyard for construction of 2 nos. of 400kV bays:

### **B.12.3 Connectivity System:**

**a. Connectivity system for Luhri Stage-I 210MW:** Under the scope of Generation Developer – w.e.f. 15.06.2025 or availability of following system whichever is later:

Luhri Stage-I – 400/220kV Nange Pooling Station 220kV D/c line along with associated bays at both ends

**b. Connectivity system for Luhri Stage-II 172MW:** Under the scope of Generation Developer- w.e.f. 31.10.2026 or availability of following system whichever is later:

Luhri Stage-II – 400/220kV Nange Pooling Station 220kV D/c line along with associated bays at both ends



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

-As per enclosed list-

विषय: "ट्रांसमिशन पर राष्ट्रीय समिति" (एनसीटी) की तीसरी बैठक - बैठक के कार्यवृत्त

Subject: 3<sup>rd</sup> meeting of "National Committee on Transmission" (NCT) – Minutes of Meeting

Sir/Madam,

The 3<sup>rd</sup> meeting of the "National Committee on Transmission" (NCT) was held through Video Conferencing on 26<sup>th</sup> and 28<sup>th</sup> May, 2020 under the Chairmanship of Shri P. S. Mhaske, Chairperson, CEA. The Minutes of the meeting are enclosed herewith.

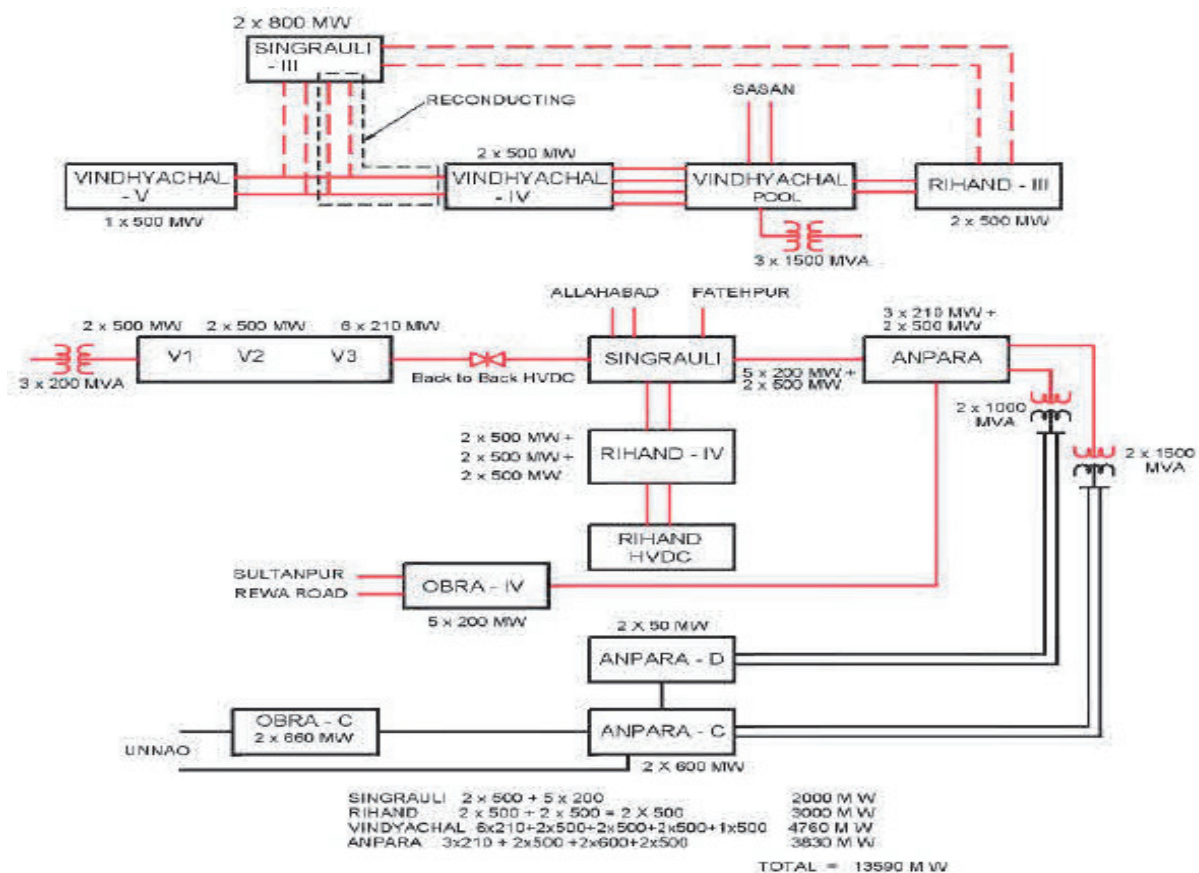
Yours faithfully,  
Signature Not Verified  
Digitally signed by GOUTAM ROY  
Date: 2020.07.17 17:16:05 IST  
(Goutam Roy)

Chief Engineer (PSPA-I) & Member Secretary (NCT)

**Copy to:**

- (i) Joint Secretary (Trans), Ministry of Power, Shram Shakti Bhawan, New Delhi-110001
- (i) Chief Engineer (PSPA-II), CEA
- (ii) CMD (POSOCO), B-9, Qutub, Institutional Area, Katwaria Sarai, New Delhi - 110010
- (iii) CEO, RECTPCL, ECE House, 3rd Floor, Annexe - II, [28A, KG Marg, New Delhi - 110001](#)
- (iv) VP, PFC Consulting Ltd, First Floor, "Urjanidhi", 1, Barakhmba Lane, Connaught Place, New Delhi-110001

I/10573/2020



5.2.2. On query from Chairman, NCT regarding the timeframe of Singrauli Stage-III, CEA representative informed that the time frame of the project is Dec 2024.

5.2.3. CTU informed that no Connectivity or LTA application has been received yet from NTPC. CTU added that evacuation system of Singrauli Stage III would be connected to Western Region and the scheme has not yet been deliberated in the WRPC (TP).

5.2.4. Member (E&C), CEA stated that as the transmission system has been agreed in the NRPC(TP) meeting and not yet discussed in the WRPC(TP), the scheme may be given in-principle approval.

5.2.5. Expert member, NCT stated that the transmission system may be agreed in-principle for implementation under ISTS.

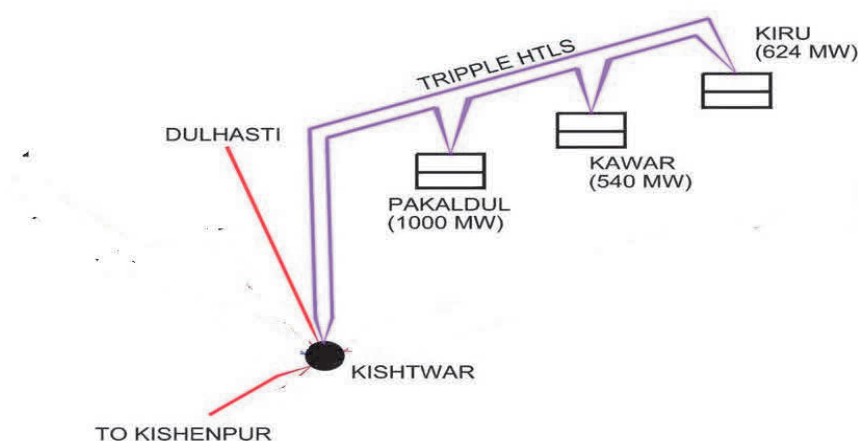
5.2.6. Although members were in agreement for in-principle approval of the scheme, it was agreed that the scheme may be deferred and may be put up to NCT after deliberations in WRPC(TP) and grant of connectivity/LTA to Singrauli stage-III TPS.

### 5.3. Name of Scheme: Establishment of 400 kV switching station at Kishtwar (GIS) under ISTS

I/10573/2020

**5.3.1.** CE (PSPA-1), CEA stated that CVPPL is implementing three major HEPs viz Pakaldul (1000MW), Kiru (624 MW) and Kwar (540 MW) HEP in J&K. In the 1<sup>st</sup> NRPCTP meeting held on 24.01.2020, following Connectivity system was agreed for evacuation of power from Pakaldul (1000MW), Kiru (624 MW) and Kwar (540 MW) HEPs of CVPPL :

- i. Implementation of Kiru-Kwar-Pakaldul - Kishtwar 400 kV D/C Triple HTLS connectivity line to be implemented by M/s CVPPL. M/s CVPPL to phase the implementation of the dedicated line as per the implementation timelines of the three HEPs ie. Kiru, Kwar & Pakaldul.
- ii. One and a half breaker switching scheme at 400kV Generation switchyard.
- iii. 2 bays at each end of Kishtwar and Pakaldul - under the scope of generator.
- iv. 420 kV, 125 MVAR Bus Reactor at Pakaldul HEP - under scope of generation developer
- v. 420 kV, 125 MVAR Bus Reactor at Kishtwar Switching Station - under ISTS.
- vi. Establishment of 400 kV switching station at Kishtwar (GIS) by LILO of one circuit of Kishenpur – Dulhasti 400kV D/c (Quad) line (Single Circuit Strung) – under ISTS.



**5.3.2.** System at (i),(ii),(iii) and (iv) above are in the scope of generation developers and the location of Kishtwar pooling Station (GIS) is yet to be finalized.

**5.3.3.** CTU informed that Connectivity and LTA for Pakaldul HEP has already been granted. LTA has been granted alongwith stringing of 2<sup>nd</sup> circuit of Kishenpur – Dulhasti 400kV D/c (Quad) line .But the LTA grant is yet to be deliberated in the NRPC-TP meeting. Further no Connectivity/LTA has been received for Kiru and Kwar HEPs. CTU added that it was agreed that CVPPL would first connect Pakaldul to Kishtwar PS and subsequently extend the same transmission line to Kiru and Kwar HEP as per matching time frame.

I/10573/2020

**5.3.4.** NCT Members agreed and approved the following system to be implemented as ISTS under Transmission system for evacuation power from Pakaldul HEP in Chenab Valley HEPs:

- i) Establishment of 400 kV switching station at Kishtwar (GIS) along with 420 kV, 125 MVAR Bus Reactor at Kishtwar Switching Station by LILO of one circuit of Kishenpur – Dulhasti 400kV D/c (Quad) line (Single Circuit Strung)-Connectivity system
- ii) 2<sup>nd</sup> circuit of Kishenpur – Dulhasti 400kV D/c (Quad) line ( NRPC-TP to ratify in its next meeting) – LTA system

**5.4. Transmission system strengthening scheme for evacuation of power from solar energy zones in Rajasthan (8.1 GW) under Phase-II-Part B1 and Part G1**

**5.4.1.** CE (PSPA-1), CEA stated that the transmission scheme for evacuation of power from solar energy zones in Rajasthan (8.1 GW) was agreed in the 6<sup>th</sup> meeting of NCT and is being taken up in various parts. Ministry of Power vide OM dated 23/01/2020 has allocated Part B1 and G1 of the overall scheme to POWERGRID for implementation under RTM.

**Part B1**

**5.4.2.** He stated that Part B1 of the scheme inter alia includes  $\pm$  600 MVAR STATCOM along with 4x125 MVAR MSC & 2x125 MVAR MSR each at Fatehgarh-II & Bhadla-II S/s. CTU had requested to split the total STATCOM capacity into two equal set of STATCOM ( $\pm$ 300MVAR STATCOM; 2x125MVAR MSC; 1x125MVAR MSR) one on each side of 400kV Bus Section for both Fatehgarh-II & Bhadla-II S/S and was agreed in the 1<sup>st</sup> NRPC (Transmission Planning) meeting held on 24.01.2020.

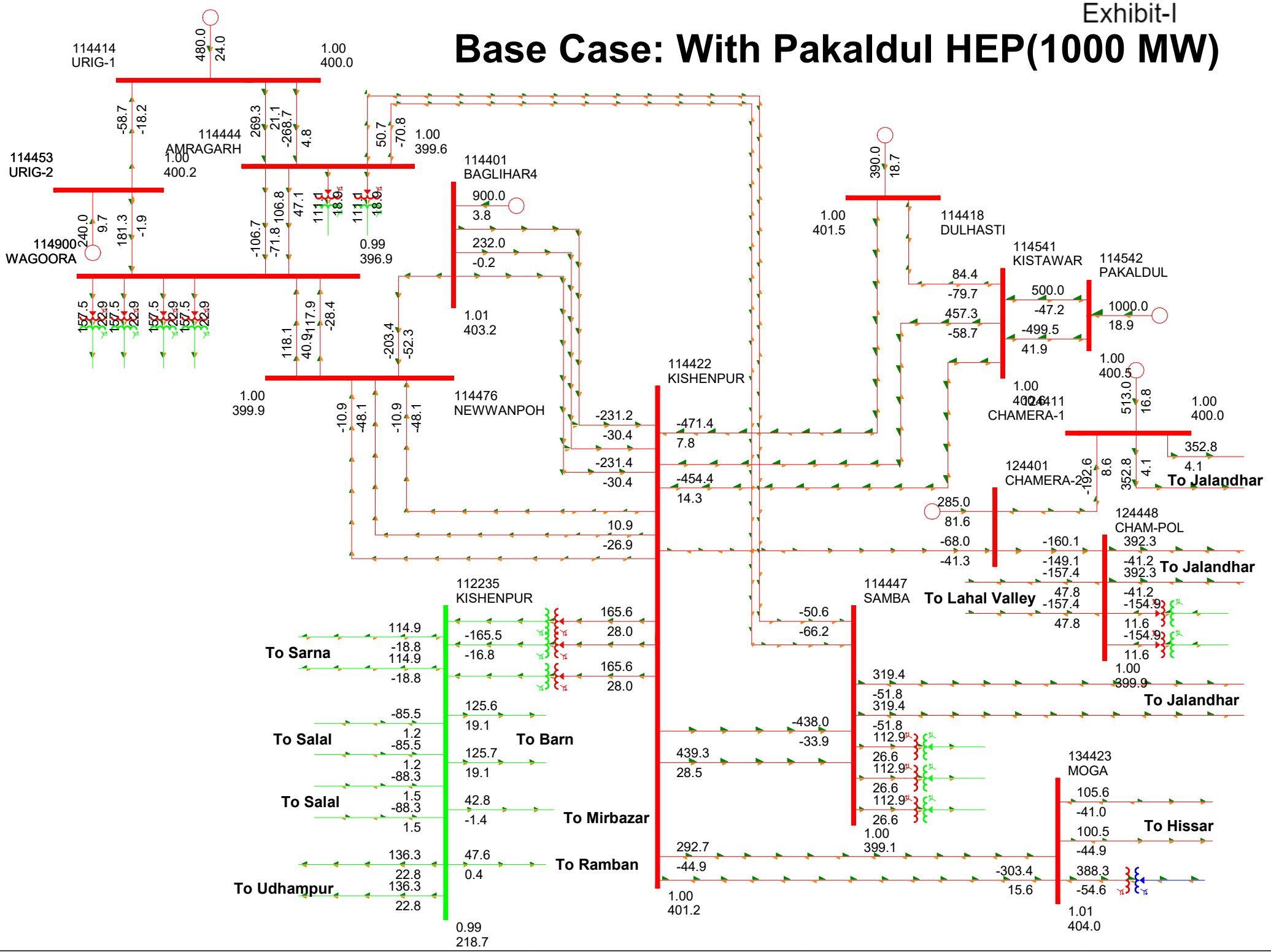
**Part G1**

**5.4.3.** He further stated that Part G1 of the scheme includes Removal of LILO of Bawana – Mandola 400kV D/c (Quad) line at Maharani Bagh (LILO of Maharani Bagh- Bawana section at Gopalpur S/s has also been agreed) and Extension of above LILO section upto Narela S/s so as to form Maharani Bagh – Narela 400kV D/c (Quad) and Maharani Bagh-Gopalpur-Narela 400kV D/c (Quad) lines.

**5.4.4.** CE (PSPA-I), CEA stated that in the 1<sup>st</sup> NRPC (Transmission Planning) meeting held on 24.01.2020, CTU has intimated that LILO of Bawana-Mandola 400kV D/c (Quad) at Maharani Bagh is under implementation using Twin HTLS conductor on Multicircuit tower. Considering that LILO is already being constructed with twin HTLS conductor, it was agreed during the 1<sup>st</sup> NRPC (Transmission Planning) to construct extension of LILO section with Twin HTLS conductor instead of Quad conductor. Further, considering RoW issues in Delhi area, it was also agreed to construct extension of LILO section too on multi-circuit towers.

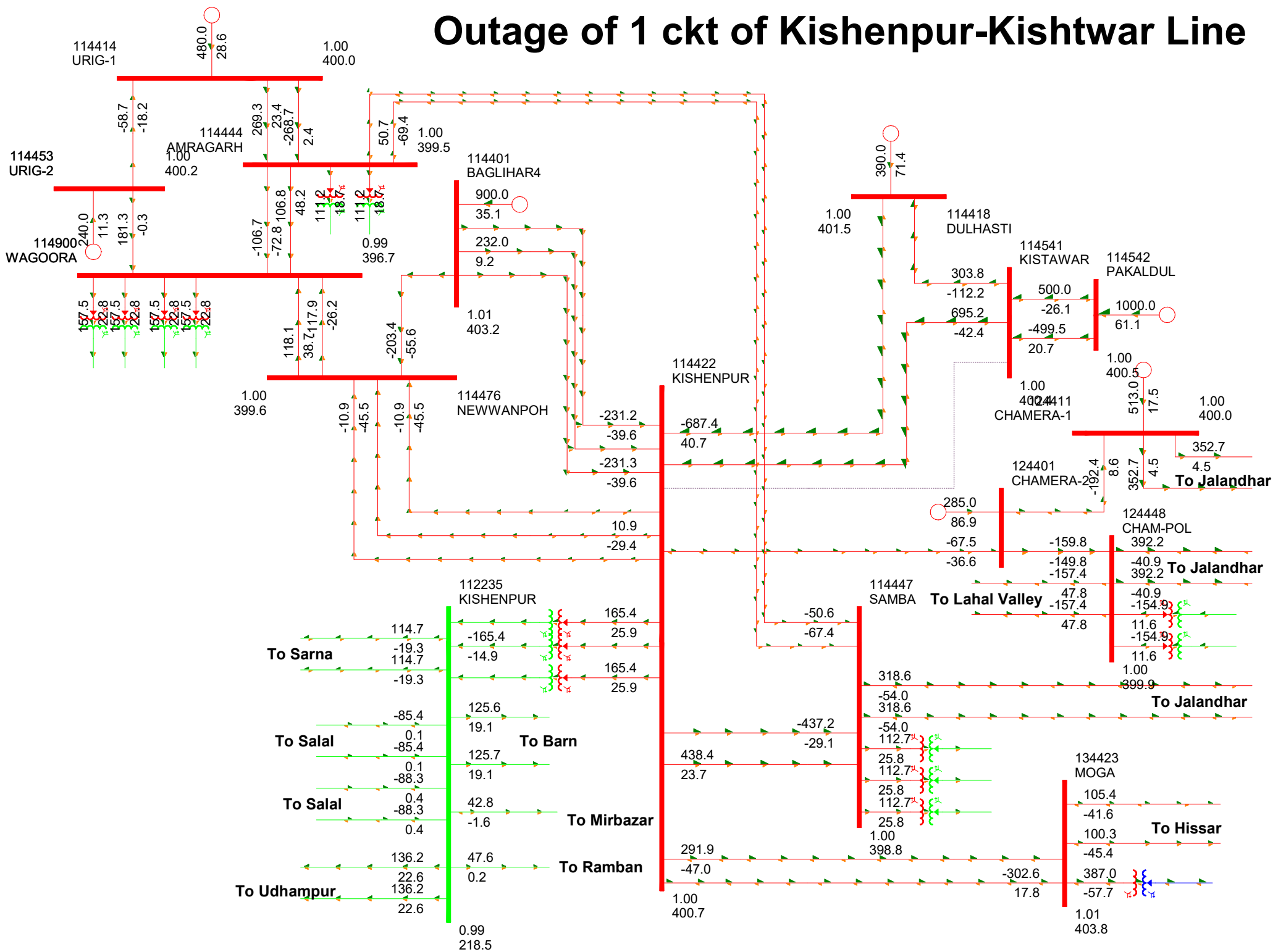
<b>Cost Estimate</b>		
<b>S No</b>	<b>Item</b>	<b>Total</b>
<b>1</b>	Establishment of 400 kV switching station at Kishtwar (GIS) along with 420 kV, 125 MVAR Bus Reactor and Space for future provision.	
	125 MVAR Bus Reactor-1 no	<b>8.11</b>
	400kV line GIS bays- 3 no	<b>41.84</b>
	400kV Bus reactor GIS bay-1 no.	<b>13.95</b>
	Establishment Cost -LS	<b>20.00</b>
<b>2</b>	LILO of one circuit of Kishenpur – Dulhasti 400 kV D/c (Quad) line(10km)	<b>39.08</b>
<b>3</b>	Second(2nd) circuit stringing on Kishenpur – Dulhasti 400kV D/c (Quad) line (Kishtwar-Kishenpur Section)	<b>241.63</b>
<b>4</b>	1 no. of 400kV line bay(AIS) at Kishenpur for 2nd ckt stringing of Kishtwar - Kishenpur section	<b>9.79</b>
<b>5</b>	Reconductoring of approx 13 km section (LILO tap Point of Dulhasti - Kishenpur 400 kV line) with Quad Moose	<b>9.43</b>
	<b>Total (Rs Cr)</b>	<b>384</b>

# Base Case: With Pakaldul HEP(1000 MW)

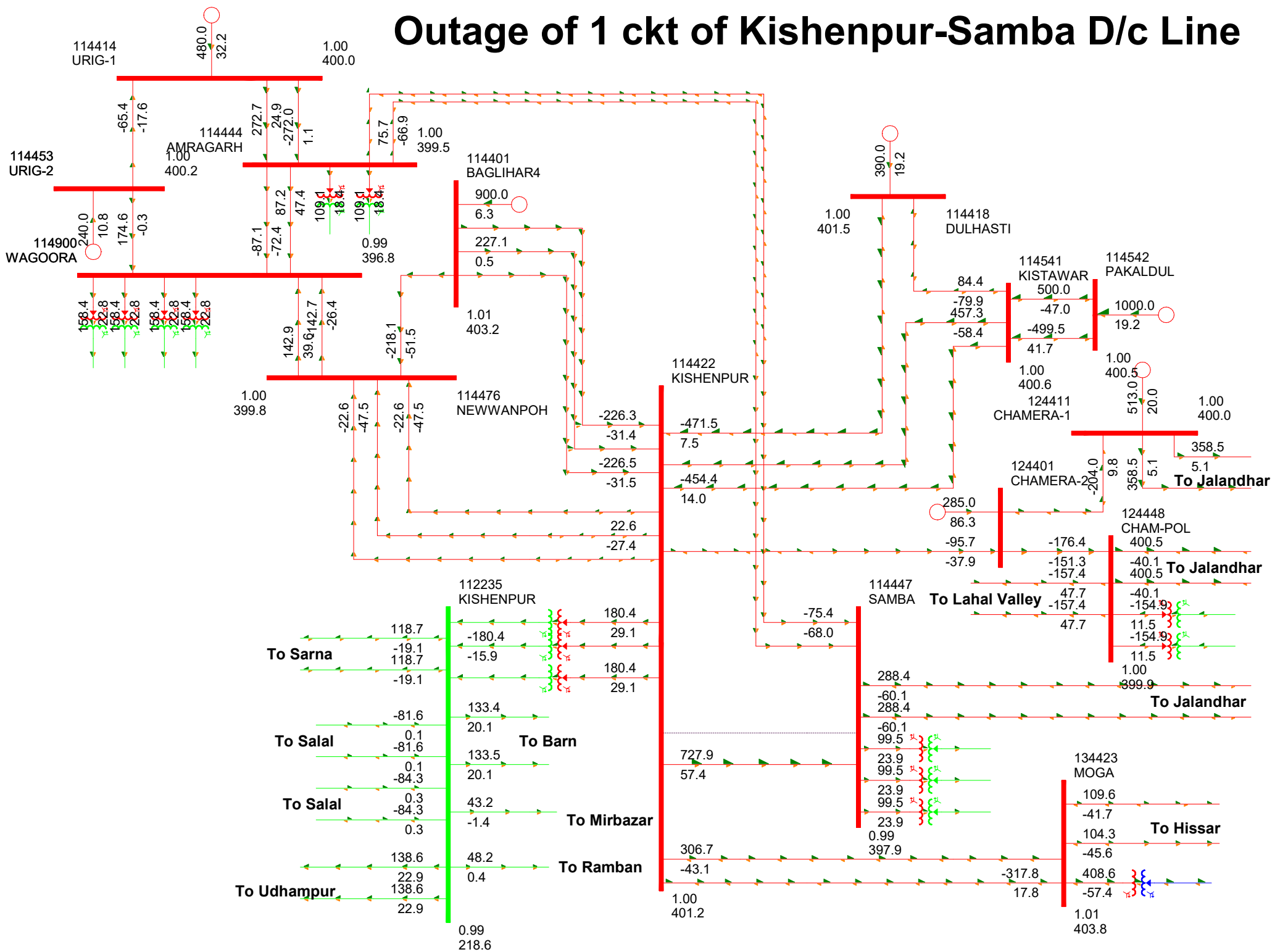




# Outage of 1 ckt of Kishenpur-Kishtwar Line



# Outage of 1 ckt of Kishenpur-Samba D/c Line



## Transmission system for transfer of power from Pakaldul HEP in Chenab Valley

