सत्यमेव जयते

भारत सरकार
Government of India
विद्युत मंत्रालय
Ministry of Power
उत्तर क्षेत्रीय विद्युत समिति
Northern Regional Power Committee

सं. उक्षेविस/ वाणिज्यिक/ 209/ आर पी सी (57वीं)/2022/9162 - 9209 दिनाँक: 27,सितम्बर , 2022

सेवा में / To,

उ.क्षे.वि.स. के सभी सदस्य (संलग्न सूचीनुसार)
Members of NRPC (As per List)

विषय: उत्तर क्षेत्रीय विद्युत समिति की 57वीं बैठक का कार्यवृत ।
Subject: 57th meeting of Northern Regional Power Committee – MoM

महोदय / Sir,

उत्तर क्षेत्रीय विद्युत समिति की 57वीं बैठक दिनांक **31 अगस्त, 2022** को **1100** बजे विडियो कोंफ्रेंसिंग के माध्यम से आयोजित की गयी थी । बैठक का कार्यवृत संलग्न है। यह उ.क्षे.वि.स. की वेबसाइट (http://164.100.60.165/) पर भी उपलब्ध है।

The 57th meeting of Northern Regional Power Committee (NRPC) was held at **1100 Hrs** on **31st August, 2022** via video conferencing. MoM of the same is attached herewith. The same is also available on NRPC Sectt. website (http://164.100.60.165/).

भवदीय
Yours faithfully,

Naresh

(नरेश भंडारी) 27/9/22
(Naresh Bhandari)
सदस्य सचिव
Member Secretary

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उत्तरी क्षेत्रीय विद्युत समिति की 57वीं बैठक
57th MEETING OF NORTHERN REGIONAL POWER COMMITTEE

Time & Date of NRPC meeting: 11:00 HRS; 31st August, 2022

Venue: Video Conferencing

Minutes of Meeting

Shri Mukesh Sharma, Director (Operation), DTL & Chairperson, TCC welcomed all the participants. He highlighted that Delhi has successfully met its peak demand of 7695 MW on 29/06/2022. The country has witnessed peak demand of 211 GW on 10/06/2022. He appreciated efforts of despatch centres in this regard.

Shri Naresh Bhandari, Member Secretary, NRPC highlighted that month of September is crucial. It has been anticipated that demand may not come down in the month. Therefore, outages for September have been denied. He appreciated co-operation from generators in this regard.

A.1 Approval of MoM of 56th NRPC meeting

A.1.1 Forum was apprised that minutes of 56th NRPC meeting have been issued on 18.08.2022. No comment has been received till the date.

A.1.2 Forum approved the minutes as issued.

A.2 Connectivity of Shri Cement (Generator) to ISTS communication network (Agenda by CTU)

A.2.1 CTU apprised that Shri Cement (Generator) which is LILOed of 400kV Kota – Merta S/C line is presently connected with RLDC via GPRS & PLCC, there is no fibre connectivity with ISTS Communication Network.

A.2.2 To provide connectivity of Shri Cement on ISTS Communication Network it is proposed that OPGW can be installed alongwith terminal equipment on the following lines:

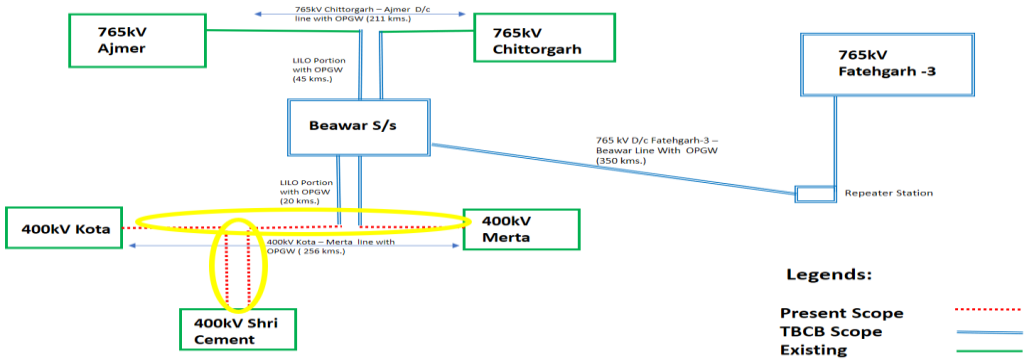
A. 400kV Kota – Merta S/C line (256kms.)
B. 400kV LILO of Kota – Merta line at Shri Cement (55 kms.)

A.2.3 Total Length 311 kms. approx. alongwith LILO portion with cost estimate Rs. 14 Crore (approx.)

A.2.4 It may also be mentioned that LILO of Kota- Merta line is also proposed at upcoming ISTS Station at Beawar under TBCB scheme "Transmission system for evacuation of power from REZ in Rajasthan (20 GW) Phase III –Part F"

A.2.5 OPGW on the existing Kota-Merta line shall also provide connectivity to proposed Beawar S/s. OPGW on the LILO portion of Beawar S/s was considered under the scope of RFP of said TBCB scheme. (Northern Region communication link map enclosed as Annexure – A.I of agenda)

Connectivity diagram of Shri Cement (Generator) to ISTS communication network



A.2.6 Director (Technical), UPPTCL enquired about liability of payment for the LILO portion work in the proposed scheme.

A.2.7 CTU stated that as per existing practice, for communication system planned on existing transmission which is non-incidental, they seek approval of NRPC/NCT. Thereafter, mode of implementation (RTM/TBCB) is decided by Govt.

A.2.8 POSOCO apprised that presently, data is communicated via GPRS/PLCC which is not reliable.

A.2.9 Forum members were requested to express their views.

A.2.10 UP stated that they charge from customers for OPGW work on such LILO.

A.2.11 PSTCL stated that cost of LILO OPGW work may be socialized.

A.2.12 DTL stated that they have no issue with CTU proposal.

A.2.13 Rajasthan stated that since Shree Cement data is required to be sent to RLDC, then cost is required to be borne by Shree Cement only.

A.2.14 Forum agreed on proposal of CTU for 400kV Kota – Merta D/C line (256kms.). However, there was no consensus on proposal w.r.t. LILO portion.

A.2.15 Shree Cement representative stated that they are merchant power plant. He requested that their existing communication infrastructure is working fine; therefore, they may not be given additional financial burden for OPGW.

A.2.16 MS, NRPC asked Shree Cement to bear cost w.r.t. LILO portion.

A.2.17 Shree Cement representative requested for some time to discuss the matter with their higher officials.

A.2.18 After deliberation, though forum approved proposal for OPGW alongwith terminal equipment on 400kV Kota – Merta S/C line (256kms.) but MS, NRPC opined that without decision of LILO portion, there is no point in laying OPGW on main line. Therefore, it would be prudent to get clarity on who would bear cost of laying fibre on LILO portion.

A.2.19 For 400kV LILO of Kota – Merta line at Shri Cement (55 kms.), forum decided that decision may be taken in upcoming NRPC meetings after Shree Cement inputs.

A.3 Redundant communication path for Dulhasti (NHPC) Generator to ISTS communication network in view of AGC operation (Agenda by CTU)

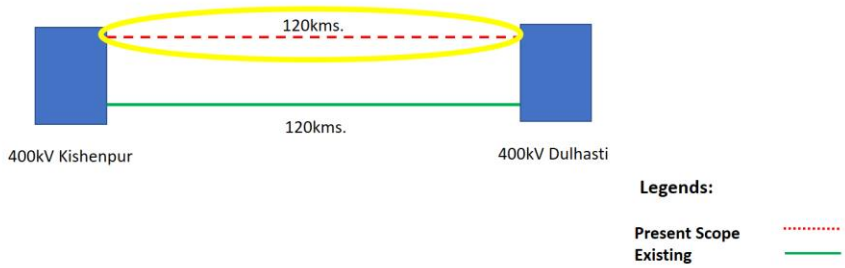
A.3.1 Presently Dulhasti (NHPC) generator is connected with single path via Kishenpur – Dulhasti S/s line with OPGW (on D/c Tower). As Dulhasti is radially connected and also on AGC operation it is proposed to provide redundant communication path.

A.3.2 A separate 400kV Kishenpur-Dulhasti S/c line is available where OPGW is not available. Therefore, it is proposed that OPGW can be installed alongwith terminal equipment on the following line for redundant path:

(i) Kishenpur-Dulhasti S/c line (120 kms.)

A.3.3 Total OPGW length 120 kms. with Cost Estimate Rs. 5.5 Crore (approx.).

Connectivity diagram for providing redundant communication to Dulhasti (Generator) to ISTS communication network in view of AGC



A.3.4 PSOCO confirmed that OPGW is required for redundancy.

A.3.5 POWERGRID informed that the line was initially 220 kV level which was later modified to 400kV. Top phase conductor is connected to cage of the tower and earth wire is directly above this conductor. There may be clearance issues on replacement of earth wire with OPGW due to snow loading in the area & this may also pose safety risks while carrying of T&Ps/Traction machine to tower peak due to induction from middle conductor. Therefore, this line is not safe for live Line OPGW installation due to special condition of towers. Further, before taking up the work, detailed survey of said line is needed so as to assess the tower conditions and major strengthening if required.

A.3.6 CTU stated that the scheme was duly discussed in rolling plan but POWERGRID never intimated above issues.

A.3.7 NHPC requested that outage of line, if required, may be taken in lean hydro season only.

A.3.8 Forum decided that POWERGRID may submit additional cost details, survey report and all relevant details to CTU and thereafter proposal may be discussed in upcoming NRPC meetings.

A.4 OPGW installation on existing 400kV Jallandhar (PG) – Kurukshetra (PG) line & 400kV Koldam (Indigrid) – Ludhiana (PG) line which are to be LILOed at Dhanansu & Ropar substations of PSTCL respectively (Agenda by CTU)

A.4.1 PSTCL has given their agenda to CTU in ISTS communication planning meeting of Northern Region to provide fibre connectivity of their two nos. of substations viz. Dhanansu & Ropar which are to be LILOed at following existing lines respectively:

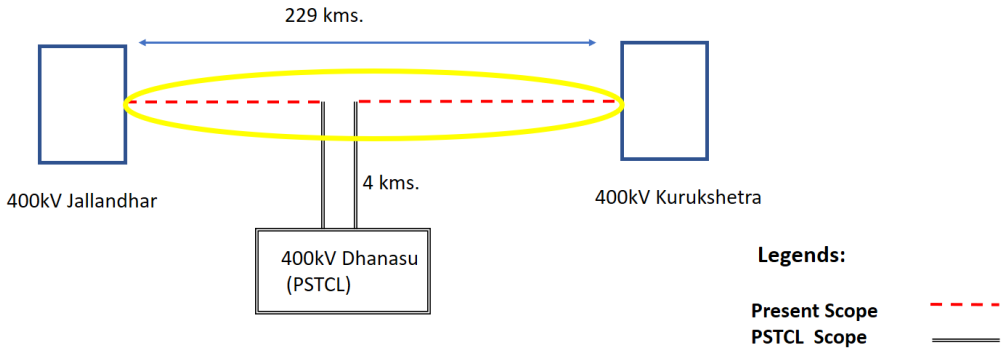
A. 400kV Jallandhar (PG) – Kurukshetra (PG) – 229 kms.
B. 400kV Koldam (Indigrid) – Ludhiana (PG) – 150 kms.

A.4.2 As these stations have no other connectivity to the ISTS/STU communication network. Therefore, it is proposed to install OPGW cable on above two ISTS lines.

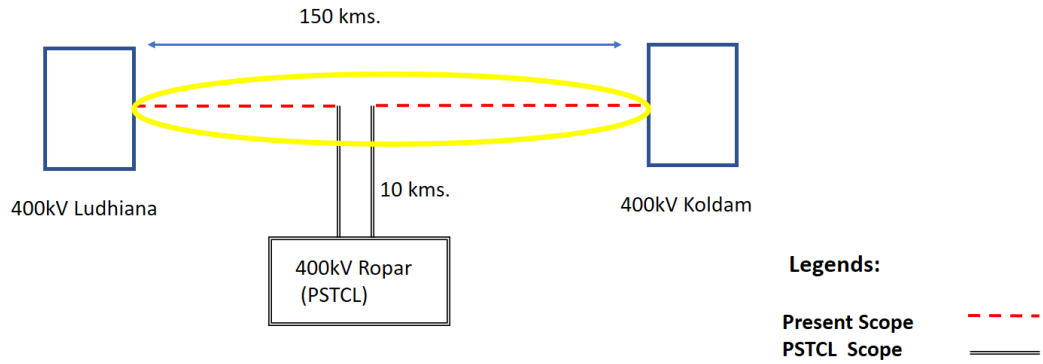
A.4.3 Total OPGW length is 379 kms. with cost estimate Rs. 17.0 Crore (approx.).

A.4.4 It may be mentioned that line mentioned at A above belongs to POWERGRID and B above belongs to Indigrid.

Connectivity diagram for providing communication to Dhanansu (PSTCL)



Connectivity diagram for providing communication to Ropar (PSTCL)



A.4.5 Regarding 400kV Koldam (Indigrid) – Ludhiana (PG), INDIGRID representative stated that a petition is pending in Hon'ble CERC regarding decision of ownership of assets by two different licensees. He requested that they are agreed to CTU proposal if Indigrid shall be given work for OPGW on LILO portion.

A.4.6 Punjab agreed to pay cost of OPGW installation to concerned parties i.e. POWERGRID/INDIGRID, as the case may be.

A.4.7 MS, NRPC stated that as there may be delay in decision of Hon'ble CERC, INDIGRID and Punjab may decide mutually regarding OPGW work on LILO portion of 400kV Koldam (Indigrid) – Ludhiana (PG) and NRPC forum may be apprised accordingly.

A.4.8 Forum approved the proposal of CTU to provide fibre connectivity at two nos. of substations viz. Dhanansu & Ropar which are to be LILOed at following existing lines respectively:

A. 400kV Jallandhar (PG) – Kurukshetra (PG) – 229 kms.
B. 400kV Koldam (Indigrid) – Ludhiana (PG) – 150 kms

A.5 Modalities for installation services for Special Energy Meters/Interface Energy Meters (IEMs) as per agreement between POWERGRID & CTUIL regarding Consultancy services to CTUIL (Agenda by CTU)

A.5.1 CTU apprised that as per Electricity Grid Code (IEGC) 2010 & Amendments {Clause no. 6.4 (21)}:

- ***The CTU shall install*** *Special energy meters on all inter connections between the regional entities and other identified points for recording of actual net MWh interchanges and MVArh drawls. The installation, operation and maintenance of special energy meters shall be in accordance with Central Electricity Authority (Installation and Operation of Meters) Regulations, 2006. All concerned entities (in whose premises the special energy meters are installed) shall take weekly meter readings and transmit them to the RLDC by Tuesday noon The SLDC must ensure that the meter data from all installations within their control area are transmitted to the RLDC within the above schedule.*

A.5.2 Central Electricity Authority (Installation and Operation of Meters) Regulations, 2006 and its amendment thereof

- **Ownership of meters {clause no 6.0 (1a)}**

  All interface meters installed at the points of interconnection with Inter-State Transmission System (ISTS) for the purpose of electricity accounting and billing shall be owned by CTU.

- **Operation, Testing and Maintenance of meters {clause no 10} –**

  The operation, testing and maintenance of all types of meters shall be carried out ***by the generating company or the licensee****, as the case may be.*

A.5.3 Accordingly, the procurement and installation of SEMs & DCD was being rendered by POWERGRID as CTU till 1st April 2021. Pursuant to Gazette Notification No.

CG-DL-E-09032021-225743 dated 09.03.2021, CTUIL is to undertake and discharge all functions of CTU w.e.f. 1st April 2021.

A.5.4 In this regard, POWERGRID & CTUIL have signed an agreement as per which CTUIL has authorized POWERGRID for procurement & installation of SEMs and DCD/necessary accessories on behalf of CTUIL on chargeable basis to concerned agency as per the terms of agreement.

A.5.5 In the meeting, CTU explained the charges for meter installation in detail. He stated that request has been received from NER and WR utilities to provide them option for supply of meters and installation of meters separately.

A.5.6 CTU highlighted the benefits of bulk procurement of meters such as reasonable rate, spare optimization, and storage management.

A.5.7 POSOCO observed that rates charged by CTU are on higher side.

A.5.8 MS, NRPC stated that for sake of uniformity among all regions of the country, CTU may discuss the issue as an agenda in upcoming NPC meeting.

A.6 Calibration of Interface Energy meters (Agenda by CTU)

A.6.1 Central Electricity Authority (Installation and Operation of Meters) Regulations, 2006 and its amendment thereof

❖ **Operation, Testing and Maintenance of meters {clause no 10} –**

*The operation, testing and maintenance of all types of meters shall be carried out **by the generating company or the licensee**, as the case may be.*

❖ **Calibration and periodical testing of meters {Clause no 18} –**

(b) All Interface Meters shall be tested on-site using accredited test laboratory for routine accuracy testing at least once in five years and recalibrated if required. Provided that these meters shall also be tested whenever the energy and other quantities recorded by the meter are abnormal or inconsistent with electrically adjacent meters.

(c) Testing and calibration of Interface Meters shall be carried out in the presence of the representatives of the supplier and buyer by giving the advance notice to the other party regarding the date of testing.

A.6.2 As per CEA metering regulation, Main/check and standby meters are being installed for each interconnection points. With this Main/Check and Standby arrangement of interface meters, the discrepancy of any meter is being identified by RLDC for validating meter data. Accordingly, instructions are being given by RLDC to respective agencies in whose premises the meter is installed for rectification of error or replacement of faulty meter.

A.6.3 As per regulation, the accuracy test is to be carried out on-site by the respective utilities using accredited test laboratory at least once in five years and in case of discrepancies, calibration is to be done.

A.6.4 Being the static meter without any moving part in it, as such no calibration is practically feasible for the present Interface Energy meters in case of discrepancies.

Only option is to get the meter replaced in case the error is more than permissible limit.

A.6.5 The cost of testing / calibration depends on the charges of the accredited testing laboratory or the agency and varies based on the number of meters and the location. The charges for on-site testing using accredited test laboratory & calibration are generally very high due to outstation travel involvement for the testing laboratory, whereas in comparison the cost of new meters is minimal (typically in the range of Rs. 10000 – 12000 per meter).

A.6.6 From the above, it is evident that testing / calibration of meters once in five years are not effective as the faulty meter needs to be replaced in case of any discrepancy in general. Further, the testing/replacement are to be done on the basis of feedback given by RLDC with the help of main/check and standby meters irrespective of the routine testing time line mentioned in the regulation.

A.6.7 Presently around 8500 Interface meters are installed across the country in approximately more than 1100 locations. These number will further increase with the National plan of 500 GW RE and 820 GW total installed capacity by 2030 from the present capacity of around 400GW as on June'2022.

A.6.8 The Routine tests/calibration of these many meters shall require a huge cost & manpower by RE developers/Gencos/Transmission Licensees in a not so fruitful activity.

A.6.9 Considering the above points and continuous monitoring of meter performance already in place through Main, Check & standby arrangement by RLDCs the suitable amendment is required in the regulation.

A.6.10 Proposals:

CEA may be approached to replace clause 18 (b) & (c) of the regulation with the following proposed clauses for better maintenance and replacement of the meters as per requirement:

a) The Interface Meter shall be tested on-site as and when discrepancies are observed by the respective RLDC depending on main/check & standby meter readings. All agencies shall keep one spare meter for testing purpose. Upon receiving instruction from RLDC, the respective agency in whose premises the meter is installed shall test the specific meter with the spare meter and replace the meter, if required, immediately with intimation to RLDC/CTU.
b) All the Interface meters shall be replaced in ten years in normal course (as life of meter has been defined 10 years in the standard technical specification finalized by Joint Committee chaired by Chief engineer, NPC CEA comprising members from all RPCs, CTU, POSOCO & POWERGRID).

A.6.11 CTU explained that presently calibration is not done by vendors as such. They only test the meter and inform whether it is working fine or not. POWERGRID endorsed the same.

A.6.12 Forum decided that agenda may be discussed in upcoming NPC meeting as there is need of amendment in CEA regulation here.

A.7 Unchahar#6 (St-IV U#1) FGD Unit PG Test (Agenda by NTPC)

A.7.1 NTPC apprised that PG Test of Unchahar#6 unit was scheduled from 00:00 hrs of 23.08.2022 to 24.00 Hrs of 25.08.2022 in compliance of MOEF Directives & strict Supreme court deadlines. Unit was to be Operated at full Load for above 72 Hrs, to meet the test conditions.

A.7.2 To ensure full load, major beneficiaries were approached to maintain full drawl schedule for above period. Rajasthan, J&K, Haryana have given their consent to maintain full drawl schedule. UP has not responded/ not given consent for maintaining schedule.

A.7.3 With assumptions that technical minimum of UP & Full schedule of rest beneficiaries and some quantum of over injection, test conditions can be achieved, and Test can be performed at 75% load with minor deviations.

A.7.4 In real time, UP has restricted their drawl schedule (to 15 MW), less than their share of Tech minimum, even though other beneficiaries were drawing full share of allocation. Therefore, ongoing PG test have to be suspended on 23.08.2022.

A.7.5 This issue has been discussed in 198th OCC but approval was not given on above dates in view of reservations from UP.

A.7.6 Meeting SOX emissions within limits as per MOEF Directives is a statutory requirement and compliance of above is mandatory. Moreover, in future all Units with FGD installation must have to prove above compliance by conducting PG Test, which is not possible under the circumstances as above.

A.7.7 NTPC stressed over need for requirement of full schedule for compliance of MOEF directives and stated they got the consent of other beneficiaries but UP has been resistant to provide the same. He added that after their request for full schedule, UP has further decreased the scheduling from 120 MW to 15 MW i.e. even below UP's share of TM.

A.7.8 A graphical presentation was also made by NRPC Sectt. regarding overdrawl and maket purchase by UP in first fortnight of Aug'22. It was highlighted that UP has taken energy from RTM and DAM in more than 60 time blocks of a day from 6th Aug'22 onwards.

A.7.9 UP claimed that deviations may be in peak only and power may have been purchased from open access consumers. UP has not found machine suitable for scheduling as per MOD. Further, UP requested that forum may press hard for necessary changes in CERC regulations for facilitating such shutdowns.

A.7.10 MS, NRPC stated that a letter may be sent to Chief Secretary, UP, MD, UPPCL with copy to Chairperson, CEA for apprising the issue. He opined that UP should cooperate with NTPC as FGD is a statutory requirement.

A.7.11 NRLDC was also requested to explore whether full schedule can be facilitated by them under any provisions of IEGC/CERC Regulation since it is a mandatory requirement.

A.8 Assessment and usability of the interstate lines i.e 220 KV S/C MIA (Alwar) – BTPS (Badarpur) line and 132 KV S/C Hisar-Sadulpur (Rajgarh) (Agenda by RRVPNL)

A.8.1 Forum was informed that RRVPNL vide letter dtd. 08/07/2022 (Annexure-A.II of agenda) has submitted that interstate lines i.e., 220 KV S/C MIA (Alwar)-BTPS (Badarpur) and 132 KV S/C Hisar-Sadulpur (Rajgarh) lines are very old and the-line condition is deteriorating day by day resulting in frequently breaking of the conductor and its accessories.

A.8.2 Yearly transmission charges (YTC) allowed by CERC in petition no. 362/TT/2019 for the line 220 KV S/C MIA (Alwar)-BTPS (Badarpur) is Rs.64.02 Lakh. The refurbishment work of line as R&M requires Rs.9.89 Cr and still after spending Rs.9.89 Cr, only half of the line is refurbished.

A.8.3 YTC allowed by CERC in petition no. 362/TT/2019 for the said line is Rs.37.94 Lakh. The YTC allowed is only towards O&M expenses and interest on working capital as useful life of 25 years has already been over. The work of replacement of line conductor with associated hardware, disc insulator, etc. requires estimated cost amounting Rs. 7.021 crores.

A.8.4 Based on above facts, following points need to be deliberated:

i. Assessment & usability of these Interstate lines i.e 220 KV S/C MIA (Alwar)-BTPS (Badarpur) line and 132 KV S/C Hisar-Sadulpur (Rajgarh) line.

ii. Recovery of capital expenditure on renovation and refurbishment through YTC for these Interstate lines, in case NRPC decides to retain these interstate line.

A.8.5 This issue was also deliberated in 198th OCC meeting held on 17.08.2022 wherein it was decided that agenda may be taken up in the NRPC meeting.

A.8.6 RVPN informed that Alwar-Badarpur line is 46 years old and Hisar-Sadulpur line is 63 years old.

A.8.7 CTU informed that there is no inter-state utilisation of theses line as such, considering very less power flow requirement. POSOCO may also supplement on the historical load profile of these lines. However, these 220kV lines may be upgraded to 400 kV depending on availability of RoW.

A.8.8 POSOCO stated that states may express their views on utility of lines and also confirmed no significant use of the lines from power flow point of view.

A.8.9 RVPN informed that these lines are not useful for them and they expressed their willingness that POWERGRID may acquire the line. It was also informed that Alwar-Badarpur line is charged from Alwar end only. On Hisar-Sadulpur, load comes rarely.

A.8.10 On request to comment on the issue, Haryana intimated that comment may be shared after consultation with planning wing.

A.8.11 No representative was available for comment from Delhi side.

A.8.12 Forum decided that Delhi and Haryana may intimate their comment in this regard to RVPN and NRPC/CTU and then the matter may be brought by RVPN to upcoming

NRPC meeting for decision. MS NRPC opined that RVPN may follow up with planning wing of HVPN and DTL for seeking comments.

A.9 Deemed Enhancement of ATC/TTC for Punjab due to unprecedented load growth of summer/paddy season. (Agenda by PSTCL)

A.9.1 The demand of the state during the current paddy season has been recorded as 14,208 MW by the SLDC which has been met successfully with ATC/TTC limits of 8500/9000 and full generation at 400 kV/220 kV/132kV generating nodes. In order to meet the state demand, ATC limit is required to be increased to at least 10,000 MW (for paddy 2023).

A.9.2 State distribution utility PSPCL has informed that there will be no significant addition of generation within the State in the coming year. State of Punjab has to deal with peculiar load profile wherein demand is nearly double during Paddy season i.e., June to September than that during the rest of the year.

A.9.3 The peak demand for next summer/paddy season is projected as 15,500 to 16,000 MW, which is likely to reach up to 18,000 MW by the year 2025. Hence, to meet the increasing power demand, immediate enhancement of ATC/TTC limits up to 10,000/10,500 MW and subsequently to 12,000 MW in the next 3 years is required.

A.9.4 Punjab is bringing the following 400 kV substations in the upcoming years:

Sr. No.	Substation name and installed capacity	ISTS connectivity	Approved in	Timeline (MM/YYYY)
1.	**400 kV Dhanansu** **Stage 1:** 1X315 MVA, 400/220 kV ICT	LILO of 1 circuit of 400 kV Jalandhar – Kurukshetra line	3rd NRSCT meeting held on 24.05.2019.	09/2023
	Stage 2: 1X315 MVA + 1X500 MVA, 400/220 kV ICTs	LILO of 1 circuit of 400 kV Nakodar – Kurukshetra line	Meeting held with CEA on 18.11.2021 through VC.	
2.	**400 kV Ropar** **Stage 1:** 2X500 MVA, 400/220 kV ICTs	LILO of 1 circuit of 400 kV Ludhiana – Koldam line	43rd TCC/46th NRPC meeting dated 24.09.2019.	12/2023
		Stage 2: LILO of 1 circuit of 400 kV Ludhiana – Koldam (via Nanje) line	Meeting to deliberate the transmission system for Luhri HEP dated 21.01.2022.	
3.	**400 kV Behman Jassa Singh** Switching station	LILO of 400 kV Talwandi Sabo – Moga line	40th meeting of Standing committee on	12/2025

Sr. No.	Substation name and installed capacity	ISTS connectivity	Approved in	Timeline (MM/YYYY)
	with 2X500 MVA, 400/220 kV ICTs	LILO of 400 kV Talwandi Sabo – Nakodar line	Power System Planning of Northern Region dated 22.06.2018	

A.9.5 In addition to the above, the 2 Nos. 315 MVA ICTs at 400 kV Nakodar shall be augmented to 500 MVA as per the following timeline (MM/YYYY):

1. Augmentation of 1st 315 MVA, 400/220 kV ICT: 05/2023
2. Augmentation of 2nd 315 MVA, 400/220 kV ICT: 09/2023

A.9.6 Moreover, Punjab is in the process of finalizing MYT for 3rd control period (2023 – 26) wherein the following new 400 kV projects are being proposed:

1. 400 kV substation Wadala Granthain with ISTS connectivity through LILO of 765 kV Moga – Kishanpur line (which is presently charged at 400 kV).
2. 4th 500 MVA, 400/220 kV ICT at 400 kV Rajpura.
3. Double circuit line between 400 kV Patran (TBCB) and 400 kV Dhuri after commissioning of 3rd 500 MVA ICT at 400 kV Patran in the year 2025.

A.9.7 Once these projects are approved by the PSERC, agenda will be submitted separately before the NRPC along with load flow studies.

A.9.8 It is pertinent to mention that the following works on the part of Punjab are also under execution/completed:

1. 400 kV Rajpura – 220 kV Gobindgarh HTLS (Already under execution and approved in MYT)
2. Shifting of 220 kV Patti and 220 kV Rashiana circuits from 220 kV Verpal to 400 kV Amritsar, already under execution.
3. 400 kV Ludhiana – 220 kV Lalton Kalan HTLS, already completed.
4. Bypassing of 220 kV Dhandari Kalan from 220 kV Lalton Kalan to 400 kV PGCIL Ludhiana which will further de-load the 400 kV PGCIL Ludhiana – 220 kV Lalton Kalan line.

A.9.9 For the upcoming paddy season 2023, load flow studies have been carried out and it is proposed to plan the following Transmission works at PGCIL sub-stations for enhancing ATC/TTC limits to 10,000/10,500MW (considering 1000 – 1500 MW annual load growth for FY 2022-23):

Sr. No.	Name of the substation	Description of Works	Timeline for completion
1.	400 kV PGCIL Ludhiana	Augmentation of 1 no. 315 MVA (3rd) 400/220 kV ICT to 500 MVA.	May, 2023

Sr. No.	Name of the substation	Description of Works	Timeline for completion
2.	400 kV PGCIL Ludhiana	Utilization of existing 220 kV bays for reorientation of 220 kV Lalton Kalan – Dhandari Kalan line to 400 kV PGCIL Ludhiana – Dhandari Kalan. Out of the 2 Nos. existing bays, 1 No.bay stands utilized for 220 kV substation Doraha. 2nd spare bay be utilized for Dhandari Kalan. PGCIL may confirm please.	May, 2023
3.	400 kV PGCIL Moga	Augmentation of 1 no. 250 MVA, 400/220 kV ICT to 500 MVA.	May, 2023
4.	400 kV PGCIL Patiala	2 Nos. 220 KV bays for evacuation of power to 220 KV Bhadson (which is being upgraded from 66 KV substation) Additional 500 MVA ICT is to be installed with a timeline of May, 2023. 2 Nos. 220 kV bays are existing at the PGCIL Patiala substation. PGCIL may confirm utilization of these bays for 220 kV Bhadson please.	May, 2023 Bay utilization by May,2024
5.	400 kV PGCIL Patiala	To control high loading of 220 KV PGCIL Patiala – Bhateri S/C line, it is proposed to terminate the 220 KV PGCIL Patiala – Rajpura S/C line at 220 KV Bhateri making it 220 KV PGCIL Patiala – Bhateri D/C Line	May, 2023
6.	400 KV Panchkula (Barwala)	2 Nos. 220 KV bays for 220 KV Dera Bassi to meet with unprecedented load growth in that area. PGCIL may confirm space for additional 2 Nos. bays please.	May, 2024
7.	400 KV Jalandhar	Two Nos. 220 KV bays for LILO of 220 KV Jalandhar – Butari Line. 2 Nos. bays are available at the substation. PGCIL may confirm please.	May, 2023

A.9.10 This issue was deliberated in 198th OCC meeting held on 17.08.2022 wherein POWERGRID agreed to the works for SI Nos. 2, 4, 5, 6 and 7 of para 10.9.

A.9.11 Further, it was decided that agenda may be taken up in the NRPC meeting for deliberation.

A.9.12 In the meeting, CTU stated that LILO of 765 kV Moga – Kishanpur line at 400 kV substation Wadala Granthain is feasible only if Wadala Granthain (PSTCL) substation is planned at 765kV level, else after LILO, 765 kV Moga – Kishanpur line will not be able to charge/operate at 765kV upon addition of upcoming Hydro Generation in J&K and HP. PSTCL agreed that in view of the above, they will

review their connectivity to Wadala Granthain (PSTCL) substation with other location.

A.9.13 Regarding augmentation of one no. 250 MVA, 400/220 kV ICT to 500 MVA at 400 kV Moga, POWERGRID stated that space is available at Moga, however, there is need to upgrade bay equipment.

A.9.14 Regarding 400 KV Panchkula (Barwala), POWERGRID confirmed that space is available for 220kV bays; however, new bays may be constructed.

A.9.15 CTU stated that PSTCL may also submit their consolidated proposal for ISTS works so that it can be taken up in ensuing CMETS-NR meeting for approval.

A.10 Adequacy augmentation of Transmission Capacity at 400/220 kV level (Agenda by JKPTCL)

A.10.1 The JKPTCL envisages Transmission Capacity of 4000 MVA for Kashmir valley by 2025. At present the available Transmission Capacity at 220/132 & 220/33 kV levels is around 2495 MVA thereby creating a shortfall of around 1500 MVA. For the purpose, various projects are at different stages of execution. The projects include capacity addition by way of augmentation and construction of Grid Sub-Stations at 220/132 kV level by 965 MVA and 220/33 kV level by 870 MVA. To bridge this shortfall, in the first instance it is proposed to augment the Transmission Capacity at 400/220 kV level as detailed below:

1. Augmentation of 400/220 kV GIS Amargarh (Indigrid) from existing 630 MVA to 1260 MVA by addition of another Transformer Bank of 630 MVA.
2. Augmentation of 400/220 kV GSS New Wanpoh (PGCIL) from existing 630 MVA to 1260 MVA by addition of another Transformer Bank of 630 MVA.

A.10.2 This issue was deliberated in 198th OCC meeting held on 17.08.2022 wherein JKPTCL was requested to share the study which they have carried out for transmission capacity augmentation at 400/220kV level with NRPC Sectt. and NRLDC. Further, it was decided that agenda may be taken up in the NRPC meeting.

A.10.3 Study result has not been received from JKPTCL.

A.10.4 CE, JKPTCL stated that they need 1 315 MVA ICT by July 2024 and other 315 MVA by July 2025 at New Wanpoh.

A.10.5 POWERGRID intimated that at New Wanpoh S/S, Space is available for installation of 01 no. 315MVA ICT Bank consisting of 03 No. single phase units of 105MVA each keeping in view challenges due to hilly terrain road as only 105MVA single-phase units can be transported.

A.10.6 CE, JKPTCL was requested to send comprehensive proposal to NRPC Sectt. within a week's time so that the matter may be discussed in next NRPC meeting.

A.11 Conversion of existing conductor to its equivalent HTLS conductor (Agenda by JKPTCL)

A.11.1 J&K apprised that presently Gladni Grid Sub-station with installed capacity of 710MVA, at 220/132 KV level is being fed at 220KV level through three Single Circuit Transmission lines viz. Salal-Gladni Circuit-I (ACSR Zebra), Salal-Gladni Circuit-II (ACSR Moose) and Jatwal-Gladni Circuit-I (ACSR Zebra), which are at present to cater the load demand of Gladni Grid Station.

A.11.2 It is further apprised that another 220/33 KV, l60MVA Grid Station is coming up at Chowadi under PMDP-15, for which 220 KV Jatwal Gladni single circuit transmission line shall be looped in and looped out and in that case, there will be very less power flow in this transmission line towards Gladni and thus Gladni would be dependent only on two no. 220 KV single circuits from Salal Generating Station which would not suffice to the demand of Gladni Grid Station. It is in line here to mention that all three above mentioned transmission lines are loaded to the optimum capacity and there is no further scope of loading these lines beyond the thermal limit of the conductor being used in these lines.

A.11.3 This issue was also deliberated in 198th OCC meeting held on 17.08.2022 wherein JKPTCL was requested to share the study for the three single circuit transmission lines at Gladni Grid Sub-station which they have carried out for transmission capacity augmentation at 400/220kV level with NRPC Sectt. and NRLDC.

A.11.4 Forum was apprised that study result has not been received from JKPTCL.

A.11.5 CE, JKPTCL was requested to send comprehensive proposal to NRPC Sectt. within a week's time so that the matter may be discussed in next NRPC meeting.

A.12 Issue of inclusion of LTA quantum for calculation of transmission charges for UPPCL share in UCH Stage-II (132 MW), UCH Stage-III (66 MW) & ROSA Stage-II (300 MW) (Agenda by UPPCL)

A.12.1 The issue was discussed in 52nd NRPC meeting held on 31st March 2022. Further, it was again discussed in 54th NRPC meeting held on 31st May, 2022, wherein, agenda was closed mentioning that UPPCL may again raise this issue in upcoming meetings, if required. MS, NRPC also instructed UPPCL to clear all pending dues. CTU was also asked to expedite the submission of revised bills accounting exemption of Unchahar Stage-I, NAPP, Tanda Stage-II to UPPCL. CTU stated that revised bills have already been raised accounting exemption for Unchahar Stage-I, NAPP, Tanda Stage-II for UP share.

A.12.2 UPPCL vide letter dated 30.07.2022 has again raised this issue (copy enclosed as Annexure-A.III of agenda) and requested that necessary instruction may kindly be issued to CTU for non-inclusion of LTA quantum for calculation of transmission charges for UPPCL share in case of UCH stage-II (132 MW), UCH stage-III (66MW) & ROSA stage-II (300 MW).

A.12.3 UP stressed that as per SRPC methodology, UP STU network is sufficient for evacuation of its own share from UCH-II & UCH-III. UP presented their study result also.

A.12.4 CTU observed that UP has not conducted study as per SPRC methodology. CTU presented their study results and stated that STU network is not sufficient to

evacuate UP share as per SRPC methodology as line loadings are not N-1 compliant.

A.12.5 Regarding, ROSA Stage-II, CTU apprised that LTA agreement has already been signed by UP in Mar'14 for bearing charges as per CERC regulations as amended.

A.12.6 After deliberation following was decided:

i. UP's request for exemption w.r.t. ROSA Stage-II is not tenable and UPPCL should pay applicable transmission charges, therefore the matter is considered closed now.

ii. For UCH-II & UCH-III, a separate meeting may be called at NRPC Secretariat in next month.

A.13 Modification Issues related to Power System Operation of J&K/Ladakh (Agenda by NRLDC)

A.13.1 Major issues related to Power system operation in J&K and Ladakh were discussed in detail in 47th TCC and 49th NRPC meetings and special meeting held on 28.07.2020 to deliberate on the issues related to UT of J&K and Ladakh. The issue was once again discussed in 198 OCC meeting held on 17.08.2022.

A.13.2 In 57th NRPC meeting, NRLDC representative stated that following issues still persist in J&K and Ladakh control areas:

i. Most of the 220 kV voltage level Substations of PDD-J&K, are being operated with only one Main and transfer bus scheme instead of double main transfer (DMT) bus as per CEA planning criteria and therefore bus shutdown requires shutdown of entire station which affects reliability of power supply.

On 29.05.2022, complete shutdown of 220/132kV Hiranagar substation was taken by JKPTCL as there is only single bus and transfer scheme. This led to loss of generation at Sewa-II and load loss in Kathua area which could have been avoided if there were double main and transfer scheme available at 220/132kV Hiranagar substation. Same was also communicated vide NRLDC letter dated 28.06.2022. Moreover, there have also been number of other such events previously.

In 198 OCC meeting, CE, JKPTCL Kashmir informed that in Kashmir area around 90% of substations have double main transfer scheme layout in substations.

CE, JKPTCL Jammu informed in the meeting as well as vide email dated 18.08.2022 that all of the 220/132 kV voltage level Sub Stations of PDD-JK are being operated with only one Main and Transfer bus scheme instead of double main transfer (DMT) bus as per CEA planning criteria. Also due to constraints of load shifting and space, the Bus arrangement of these GSS's at present cannot be changed. However, 02 No.s 220/66KV GSS recently Commissioned at Ghatti (Kathua) and IGC Samba and under Construction GSS's coming up at Nagrota (220/33 kV Level) and Chowadhi {220/132 KV Level) have double main and transfer scheme.

ii. As per the agreed quantum relief for NR, total target in respect of J&K for UFR and df/dt are 336 MW and 270 MW respectively. Confirmation on relief quantum is yet to be received from J&K. Moreover, in compliance of NPC decision, NR states/constituents agreed to raise the AUFR settings by 0.2 Hz in 47th TCC/49th NRPC meetings. Status is still pending from J&K end.

iii. Two stages (450 MW each) of Baglihar HEP (900 MW) operate on two different buses and are being evacuated through two 400 kV lines connected to two different buses operating in disconnected manner. As a result, although each line has capacity to evacuate power from both stages, under outage of one line, there is loss of one stage generation i.e 450 MW. UT-J&K to expedite the coupling of two buses of Baghlihar stage-1 & 2 to minimize the probability of generation loss

iv. Availability of automatic DR (disturbance recorder) and station event logger needs to be ensured for all the 220 kV and above stations. DR/EL and preliminary report needs to be submitted within the stipulated timelines as per IEGC. Same is also being requested regularly in OCC/ PSC meetings.

v. In order to make connectivity more reliable and for secure power supply to the valley, restoration of 220kV Kishenpur-Mirbazar and commissioning of underlying network at 400/220kV New Wanpoh to be expedited.

vi. Mock black start exercise of URI-I & URI-II HEP, Lower Jhelum HEP is yet to be conducted. In 198 OCC meeting, JKPTCL representative agreed that the issue is well known and important and the same would be taken up with SLDC

vii. Planned and under implementation reactive compensation i.e. reactor & capacitors details to be shared.

viii. Data for monthly PoC case to calculate transmission losses and charges to be shared with NRLDC/NLDC.

A.13.3 In 198 OCC meeting, representative from JKPTCL agreed to provide update on these issues in the upcoming 57th NRPC meeting in last week of August 2022.

A.13.4 In 57th NRPC meeting, J&K representative stated that:

- Revival of 220kV Kishenpur-Mirbazar line would be completed in nearly 2-3 months.
- No update is available on other agenda points.

A.13.5 NRLDC representative asked J&K representative that revival of 220kV Kishenpur-Mirbazar and mock black start exercise of Uri-I, Uri-II, Lower Jhelum may be completed before demand of J&K starts increasing in winter months .

A.13.6 MS NRPC stated that reply from J&K is not being received even after regular discussion on agenda points in OCC as well as NRPC meetings. J&K was asked to reply on these agenda points through mail on priority.

A.13.7 NRPC Forum agreed that issues related to grid operation need to be taken seriously and reply to the issues highlighted by NRLDC needs to be taken care on priority by J&K.

A.14 Transmission system for evacuation of power from Shongtong Karcham HEP (450MW) and Tidong HEP (150 MW) (agenda by CTU)

A.14.1 Forum was apprised that CTU has submitted the following proposal

S. No.	Items	Details
1.	**Name of Scheme**	Transmission system for evacuation of power from Shongtong Karcham HEP (450MW) and Tidong HEP (150 MW)
2.	**Scope of the scheme**	**Phase-1** • Shongtong Karcham generation switchyard - Wangtoo (HPPTCL) 400 kV D/c (Quad) line-25 km $^{\$}$ • Wangtoo (HPPTCL) - Panchkula (PG) 400 kV D/c (Twin HTLS*) Line along with 80 MVAr switchable line reactor at Panchkula end at each circuit -210 Km *** with minimum capacity of 2100 MVA on each circuit at nominal voltage** **$^{\$}$ Line capacity shall be 2500 MVA per circuit at nominal voltage** **Commissioning Sch :Dec'25** **Phase-2** • Establishment of 2x315 MVA (7x105 MVA 1-ph units) 220/400 kV GIS Pooling Station at Jhangi$^{\#}$ • 400kV Jhangi PS - Shongtong Karcham HEP (Quad) D/c line^-30 km • Bypassing one ckt of Shongtong Karcham HEP -Wangtoo (Quad) D/c line^ at Shangtong Karcham and connecting it with one of the circuit of Jhangi PS - Shongtong Karchham 400kV D/c line ^(Quad), thus forming Jhangi PS – Wangtoo one line (Quad)$^{\$}$ • 1x125 MVAR, 420kV Bus reactor at Jhangi PS (1-ph units along with one spare unit) **^Line capacity shall be 2500 MVA per circuit at nominal voltage** **$^{\$}$ After bypassing arrangement, configuration shall be 400kV Jhangi PS – Shongtong Karcham – Wangtoo one *line (Quad) and 400kV Jhangi PS – Wangtoo 2nd line (Quad). Therefore, connectivity may be established through 400kV Jhangi PS – Shangtong Karchham - Wangtoo one line (Quad) or 400kV Jhangi PS – Wangtoo 2nd line (Quad)*** **Commissioning Sch :Jul'26**

S. No.	Items	Details
3.	**Depiction of the scheme on Transmission Grid Map**	Attached at **Exhibit-I**
4.	**Upstream/downstream system associated with the scheme**	Connectivity of existing 400/220kV Wangtoo (HPPTCL) S/s includes 400kV D/c interconnection with Kala Amb (PG). 400kV Wangtoo S/s is also interconnected to Karcham Wangtoo S/s through 400kV D/c line.
5.	**Objective / Justification**	In the 50th NRPC Meeting, Transmission system for evacuation of power from Kaza Solar Power Project (880 MW) was discussed and agreed. The scheme broadly Included following transmission system: • Kaza-Wangtoo (HPPTCL)-Panchkula 400 kV D/c line • Establishment of 3x315 MVA (10x105 MVA single phase units including one spare), 400/132kV substation (GIS) at Kaza • Associated reactive compensation (Bus+line) Subsequently, in the 54th NRPC Meeting held on 31.05.22, CTU also informed that three hydro-electric power stations (880 MW Jangi Thopan HEP of SJVN, 150 MW Tidong HEP of Statkraft,450 MW Shongtong Karcham HEP of HPPCL) are getting connected to the same system near Wangtoo. Hence, this network will also be utilised both for solar and hydro. M/s HPPCL was earlier granted Connectivity & LTA in ISTS was granted for Shongtong HEP (450 MW) on 16/12/13 & 18/12/2015 respectively at Wangtoo S/s through 400 kV (Quad HTLS) D/c line. However, system development couldn't be progressed as CERC regulatory approval couldn't be accorded being

S. No.	Items	Details
		the only project in that complex utilising 400kV high capacity corridor as well as changes in the commissioning schedules of other hydro projects in the Satluj Basin, necessitating review of transmission plan. During the CEA meeting held on 12/07/2022 to review the Master Plan for the Hydro Projects and Kaza Solar Power Project in Himachal Pradesh, HPPCL informed that tentative commissioning schedule of Shongtong HEP generation is Nov'2025 (1st Unit). It was deliberated that when the transmission system for evacuation of power from Kaza Solar Park was planned, it was proposed that power from Shongtong Karcham HEP may be evacuated through LILO of one circuit of the 400 kV Kaza–Wangtoo D/c Line at Shongtong Karcham HEP. HPPCL informed that as Shongtong Karcham HEP is expected to be commissioned by Nov'25, therefore, the implementation of the transmission system for evacuation of power from Shongtong Karcham HEP needs to be started at the earliest so that the same could be completed in matching timeframe. Subsequently, based on discussions held in MOP meeting on 14.07.22, SJVNL vide email dated 19/08/2022 informed that the land involved in the park is a forest land which needs to be diverted and this additional financial implication for forest land diversion shall be huge and will make the Park unviable. SJVNL informed the revised commissioning schedule of Kaza Solar Park as Mar'26 (Unit-1) to Dec'26 (unit-7) (Progressively) and highlighted that some delay is anticipated in land acquisition activities of the project. Further, there is no St-II Connectivity/LTA application for Kaza Solar Park yet and commissioning schedule of Kaza generation had also been revised repeatedly by SJVNL. During the 9th CMETS-NR meeting held on

S. No.	Items	Details
		28/07/2022, it was deliberated that in case the Kaza Solar Park is not materialized in near future, this high-capacity line shall be taken up from Wangtoo S/s to Jhangi PS via Shongtong HEP for implementation considering the progress of Shongtong & Tidong HEP. In the above meeting, Grant of Connectivity to M/s Tidong Power Generation Private Limited (150 MW) in ISTS was agreed at Jhangi PS through following transmission system: **Interim Connectivity (through HPPTCL system)** ➢ LILO of one circuit of Kashang – Bhaba 220 kV D/c line (under the scope of applicant) *Interim Connectivity shall be through HPPTCL's system till Kashang-II & III generation commissioning, which is expected by June'26* **Final Connectivity:** **Transmission system for Connectivity (under ISTS)** ➢ Establishment of 2x315 MVA (7x105 MVA 1-ph units) 220/400 kV GIS Pooling Station at Jhangi# ➢ 400 kV Jhangi -Wangtoo (Quad) D/c line^ ➢ 1x125 MVAR, 420kV Bus reactor at Jhangi PS (1-ph units along with one spare unit) ***^Line capacity shall be 2500 MVA per circuit at nominal voltage*** **Transmission system for Connectivity (under scope of Applicant)** ➢ Tidong HEP generation switchyard-Jhangi PS 220 kV D/c line (along with associated 220 kV bays at both ends) Subsequently, in the 10th CMETS-NR meeting held on 30.08.22, review of Connectivity & LTA of Shongtong Karcham (450 MW) and LTA of Tidong (75 MW) in ISTS was also deliberated. In the meeting, it was deliberated that in view of email of SJVN reg. Kaza Solar Park, upcoming Hydro projects (Shongtong & Tidong

S. No.	Items	Details
		HEP) as well as considering ROW issues in that terrain, high-capacity line may be taken up from Wangtoo S/s to Jhangi PS via Shongtong HEP in first phase and this corridor shall be extended to Kaza Solar Park, in next phase, when commissioning schedule Kaza project is firmed up along with requisite applications. Results of System studies were also discussed in the meeting. In the meeting, it was mentioned that with Shongtong Karchham HEP, loading of Jhakri – Gumma – Panchkula D/c line (Triple snowbird) under N-1 contingency is about 940MW in studies, which reduces to 745MW with additional corridor beyond Wangtoo i.e. Wangtoo (HPPTCL) - Panchkula (PG) 400kV D/c line. It was also mentioned that POSOCO had earlier got SPS implemented on hydro generations in above complex (about 3500 MW) due to machine oscillations. Subsequently additional transmission corridors (towards Kala Amb etc) have also come up in that complex, however SPS is retained. NRLDC opined that in peak hydro season, all hydro projects generate at 110% level and Karcham Wangtoo Installed Capacity is also revised (up) recently by CEA. Therefore, in order to avoid outage of large chunk of hydro generation, N-1-1 condition is also complied w.r.t SPS implementation to maintain system reliability. Therefore considering huge quantum of hydro generation in above complex after additional generation (600 MW), it may be prudent to plan additional corridor beyond Wangtoo to maintain system reliability & security. Based on above deliberations, Transmission system for evacuation of power from Shongtong Karcham HEP (450MW) and Tidong HEP (150 MW) was agreed in 10th CMETS-NR meeting as per the scope mentioned in **S.No 2** .

S. No.	Items	Details
		The above Corridors shall be utilised for Hydro generation 1604 MW (Shongtong-450 MW; Tidong-150 MW & Jhangi Thopan -804 MW) as well as Kaza Solar Park (880 MW) after connectivity of Kaza PS with 400kV Jhangi PS. In this way, the identified corridors shall be utilised for 2284 MW envisaged RE generation including Hydro.
6.	**Estimated Cost**	**Ph-1 +Ph-2: Rs 2300 Cr.**
7.	**Need of phasing, if any**	The scheme is proposed to be implemented in two phases : • First Phase : 31st Dec'25 (Exact schedule to be re-confirmed by HPPCL for Shongtong HEP by 05.09.22) • Second phase : 01st Jul'26 (matching with *Kashang-II & III generation commissioning, which is expected by June'26)*
8.	**Implementation timeframe**	Progressively from 31st Dec'25
9.	**System Study for evolution of the proposal**	Studies discussed and agreed in the following meeting: • 10th CMETS-NR meeting held on 30.08.2022 (Minutes of meeting awaited)

A.14.2 Regarding, timeline of projects, it was decided that decisions of CMETS-NR shall be adopted in the MoM of meeting. The same shall also be apprised to forum by CTU in next NRPC meeting.

A.14.3 CTU vide mail 19.09.22 informed that in the 10th CMETS-NR meeting, HPPCL was asked to confirm the revised start date of Connectivity & LTA for Shongtong HEP. HPPCL indicated generation schedule of Shongtong HEP as Dec'25 in the meeting, however, desired to confirm again by 05/09/2022. They also re-confirmed the commissioning schedule of Kashang-II & III HEP as June'26. It was deliberated that the transmission system (400kV Jhangi-Wangtoo-Panchkula D/c Corridor) is agreed however same shall be phased after HPPCL confirmation on the commissioning schedule of Shongtong HEP, if required. Subsequently, HPPCL vide their email dated 08/09/22 confirmed the commissioning schedule of Shongtong HEP as 31st July'2026. With this, Transmission requirement for Tidong HEP (01st Jul'26) [based on Kashang-II schedule] came ahead of Shongtong (31.07.26) which necessitated re-phasing of transmission system.

A.14.4 Considering above schedule of HEPs, system studies were reviewed. Based on the studies, it also appeared that existing corridor beyond Wangtoo is adequate for only Tidong LTA (75 MW).

A.14.5 Accordingly, necessary phasing for transmission requirement was carried out for both the HEPs (Tidong & Shongtong) based on their respective schedules. Therefore, 400/220 kV Jhangi PS and 400 kV Jhangi-Wangtoo D/c corridor is decided to be taken up in first phase with Tidong HEP, whereas 400kV Wantgoo- Panchkula D/c line would be taken up in next phase with Shongtong HEP or other Hydro/Solar generation in that complex.

A.14.6 In view of above, Inter State Transmission system for Tidong HEP under Phase-I and for Shongtong HEP under Phase-2 is as below :

A. Phase-I with Tidong HEP [Schedule : 01st Jul'26]

- Establishment of 2x315 MVA (7x105 MVA 1-ph units) 220/400 kV GIS Pooling Station at Jhangi

  Future Scope at Jhangi PS:

  Space provision for:

- 5 nos. of 400kV line bays
- 6 nos. of 220 kV line bays for future projects
- 2 no. of 400/220 kV Transformer (1 phase units)
- 1 no. 420kV Bus Reactor along with bay (1 phase unit)
- 220kV Sectionalization bay: 1 set
- Bus Coupler: 1 no.

- 400kV Jhangi PS – Wangtoo (Quad) D/c line^
- 1x125 MVAR, 420kV Bus reactor at Jhangi PS (1-ph units along with one spare unit)

  ^Line capacity shall be 2500 MVA per circuit at nominal voltage

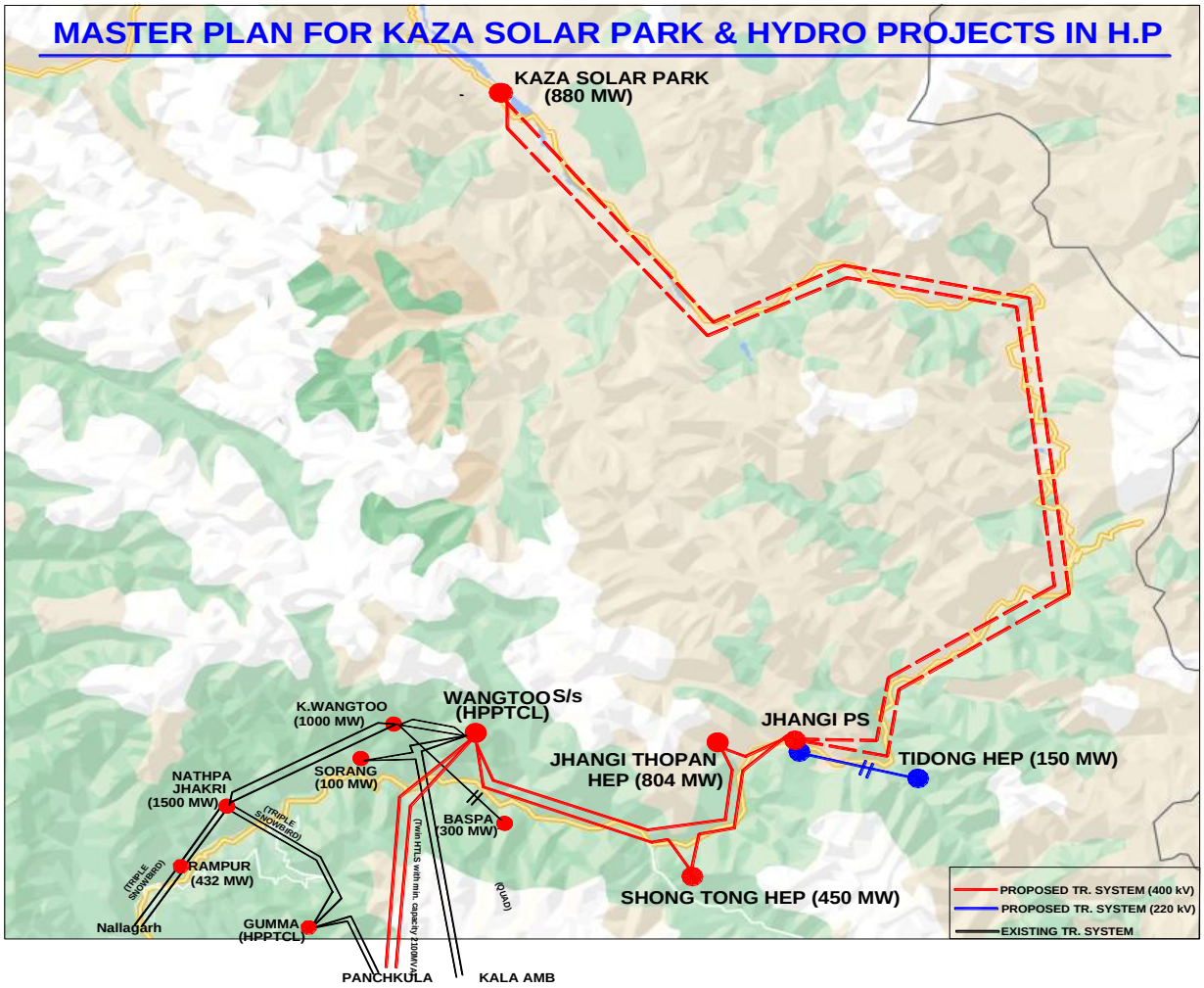
B. Phase-II with Shongtong HEP [Schedule : 31th Jul'26]

- LILO of one circuit of Jhangi PS - Wangtoo (HPPTCL) 400 kV D/c (Quad) line$ at generation switchyard of Shongtong HEP
- Wangtoo (HPPTCL) - Panchkula (PG) 400 kV D/c (Twin HTLS*) Line along with 80 MVAr switchable line reactor at Panchkula end at each circuit -210 km

  **** with minimum capacity of 2100 MVA on each circuit at nominal voltage***
  $Line capacity shall be 2500 MVA per circuit at nominal voltage

Estimated Cost (Ph-1 +Ph-2): Rs 2300 Cr.

Exhibit-I



MS NRPC stated that CTU proposal of phasing of Kaza Transmisison Scheme is agreeable. However it was also opined that CTU shall closely monitor progress of Kaza RE project and ensure that transmission system for Kaza Solar Park is planned & implemented matching with SJVN Kaza generation project to meet its evacuation requirement so that there is no loss of RE generation. .

A.15 Implementation of Late Payment Surcharge rule w.e.f. 06th August 2022

A.15.1 In the meeting, it was discussed that Ministry of Power has notified Electricity (Late Payment Surcharge and related matters) Rules 2022 on dt: 03.06.22. The rules were implemented from the 06.08.22. As per the Electricity (Late Payment Surcharge and related matters) Rules 2022, Distribution Company shall be liable to be debarred for sale and purchase through Power Exchange(s) or grant of Short Term Open Access (STOA) in case outstanding dues is more than two and half months overdue from the date of presentation of monthly bill. The same shall also be applicable on already approved short-term open access bilateral transaction.

The list of entities having outstanding dues and to be regulated shall be available at the link https://posoco.in/market/action-under-lpsc-rules-2022/ and PRAPTI Portal.

A.15.2 Since access to the STOA market is denied to the regulated Discoms, NRLDC representative requested to Distribution licensees to strictly adhere to the schedules

and avoid any deviations from the schedules during the period of such debarment from the STOA market.

A.15.3 HPPC representative requested that information may be shared by NRLDC with DISCOMs 48 hrs in advance to check any update or misrepresentation in status of LSC. This would also ensure checking of data even on holidays.

A.15.4 NRLDC representative stated that NRLDC is deriving information from PSA portal and as per information submitted by generators, default entities are being disbarred from trading in power exchange. NRLDC representative stated that in case of submission of documents by defaulting entity, the bar from trading in power exchange is being removed but without any clarification from generator/ defaulting entity NRLDC cannot allow trading in power exchange or award any grace period.

A.15.5 MS NRPC stated that defaulting entities should regularly take up the matter with generators on priority so that correct status is reported at PSA portal. NRLDC/ NLDC are only taking information as available in PSA portal which needs to be regularly monitored and any discrepancies on PSA portal needs to be taken up by defaulting entity. It is not practical to issue grace period to defaulting entities and regularly monitor grace period at NRLDC/ NLDC level. Thus, taking up the matter by defaulting entities with generators is the only way out.

A.16 NR-ISTS RE evacuation issues

A.16.1 NRLDC representative stated that more than 10GW of Renewable energy has been commissioned in Northern region, most of which is in Western Rajasthan. As on 10th Aug 2022, following capacities have been commissioned and approved under LTA/MTOA/STOA at different ISTS RE pooling stations in NR:

User Name	Capacity Approved under LTA/MTOA/STOA (MW)			Total Approved capacity (MW)	Total Contracted Capacity (MW)	Total Installed Capacity (MW)
	LTA	MTOA	STOA			
Bhadla(PG)	2637	0	450	3087	3087	3130
Bikaner(PG)	1950	240	483	2673	2673	2673
Fatehgarh-II(PG)	1890	0	600	2490	2490	2670
Fatehgarh-I(Adani)	296	0	657	953	953	1181
Bhadla-II(PG)	250	0	850	1100	1100	1100
Total RE at NR ISTS	**7023**	**240**	**3040**	**10303**	**10303**	**10754**

**In case of Hybrid plants, Contracted capacity is lesser than its Installed capacity.*

**In case of Solar plants, Contracted capacity is equal to Installed capacity.*

Out of this 10,303 MW around 3040 MW (30%) is being evacuated through short term open access as the planned transmission system for evacuation of RE from these stations is yet to be commissioned. Due to absence of complete planned transmission system, high loading of 400kV Bikaner(PG)-Bikaner(RS) line and voltage issues are being observed in real-time.

Additional 342MW at Bikaner(PG), 300MW at Bhadla-II(PG), 43MW at Bhadla(PG) and 43MW at Fatehgarh-I (Adani) would come soon as plants are already registered

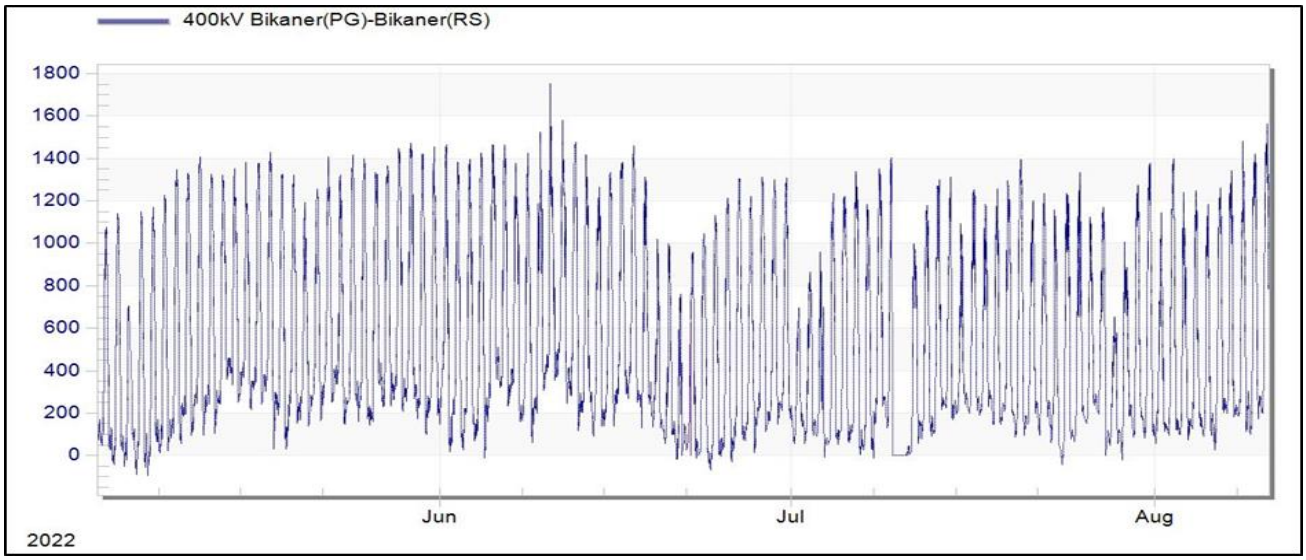
and commissioned their part capacity. Allowing further STOA with existing system would be difficult, same is summarized as follows:

A.16.2 High loading of 400kV Bikaner(PG)-Bikaner(RS) line:

Although 400kV Bikaner(PG)-Bikaner(RS) line is Quad moose having thermal loading limit of ~1750MW. Due to significant RE at Bikaner(PG), and low impedance path of 400kV Bikaner(PG)-Bikaner(RS) line, line loading of 400kV Bikaner(PG)-Bikaner(RS) remains high and reaching 1400-1500MW during peak solar generation period. As of now, 400kV Bikaner(RS)-Sikar D/C lines are being opened to manage loading of 400kV Bikaner(PG)-Bikaner(RS).

However opening of 400kV Bikaner(RS)-Sikar(PG) ckt-1 & ckt-2 has its own drawback,

- By opening 400kV Bikaner(RS)-Sikar(PG) ckt-1, voltage at 400kV Bikaner(PG) falls by 3kV.
- By opening 400kV Bikaner(RS)-Sikar(PG) ckt-1&2, voltage at 400kV Bikaner(PG) falls by 7kV.



At the time of peak RE generation of ISTS and Rajasthan, 400kV Bikaner(PG)-Bikaner(RS) line would be N-1 non-compliant (when line loading>1400MW) and in case of tripping of either 765kV Bikaner(PG)-Khetri or 400kV Bhadla(PG)-Bhadla(RS) line, loading of 400kV Bikaner(PG)-Bikaner(RS) may cross the thermal loading limit.

A.16.3 Voltage related issues during peak solar generation period:

With existing quantum of generation and existing network system, safe generation evacuation is nearing its limit and any N-1 contingency of 765kV Bikaner(PG)-Khetri ckt-1&2, 400kV Bikaner(PG)-Bikaner(RS), 765kV Fatehgarh-II(PG)-Bhadla(PG) ckt 1&2 and 765kV Fatehgarh-II(PG)-Bhadla-II(PG) ckt-1&2 may lead to generation loss or critical voltage issues in the complex.

From the analysis of past events it was seen that at the time of higher demand and high wind (7:30hrs-12:00hrs) in Rajasthan voltage was on lower side at Kankani & Jodhpur leading to low voltage at 400kV Akal, 400kV, Kankani, 400kV Barmer, and

400kV Ramgarh. At the same time solar generation ramped up and resulted in further MVAR drawl from Jodhpur and Kankani. Hence, significant low voltage at 400kV Akal, 400kV, Kankani, 400kV Barmer, 400kV Ramgarh and 400kV Bhinmal has also been observed in past. High reactive power demand in Rajasthan is also playing important role in low voltage and voltage oscillation of RE pocket of NR.

The above issues were also discussed in 198 OCC meeting. Deliberation held in 198 OCC meeting were presented in the meeting:

RE evacuation zone is on the limit of voltage stability at the time of Peak RE generation of ISTS and Rajasthan and any N-1 contingency of 765kV Bikaner(PG)-Khetri ckt-1&2, 400kV Bikaner(PG)-Bikaner(RS), 765kV Fatehgarh-II(PG)- Bhadla(PG) ckt-1&2 and 765kV Fatehgarh-II(PG)-Bhadla-II(PG) ckt-1&2 may lead to huge generation loss or serious voltage issues in the complex.

NRLDC representative stated that commissioning of Bikaner-II should be expedited and the commissioning of solar generators and transmission lines may be done in close timeframe so as to make sure RE can be safely evacuated without any issues.

POWERGRID representative had stated that STATCOMs under implementation at Bhadla-II and Fatehgarh-II are expected by Dec-2022.

CTU representative had stated that STATCOMs under implementation at Bhadla-II and Fatehgarh-II were earlier to be commissioned by August 2022 which is being delayed and are not expected by end of 2022 as per latest intimation by POWERGRID. POWERGRID was asked to commission these STATCOMs at the earliest considering various faced in western Rajasthan as well as recent grid disturbances.

Removal of LILO of 400kV Bhadla(RS)-Bikaner(RS) needs to be completed by its scheduled time i.e. Dec'2022 to ease loading of 400kV Bikaner(PG)-Bikaner(RS) and also facilitate generation evacuation from Bikaner complex.

CTU representative had stated that the solar generators planned have been coming up as their commissioning period is less however Ph-II transmission system is delayed dur to GIB clearance related issues.

A.16.4 NRPC forum expressed concern on the issues observed in RE evacuation. Following remedial measures were discussed and agreed in 57th NRPC meeting:

- Expediting removal of LILO of one circuit of Bhadla-Bikaner(RVPN) 400kV D/c(Quad) line at Bikaner(PG). Extension of above LILO section from Bikaner(PG) upto Bikaner-II PS to form Bikaner-II PS – Bikaner (PG) 400kV D/c(Quad) line)
- Commissioning of solar generators and transmission lines may be done in matching timeframe so as to make sure RE generation can be safely evacuated without any issues
- STATCOMs under implementation at Bhadla-II and Fatehgarh-II which are delayed to be commissioned at the earliest.
- If margin for additional short term open access is not available same may not be granted till the commissioning of planned transmission system
- Switchgear rating at Bikaner(RJ) end to be upgraded

- Managing N-1 non-compliance at 400/220kV Bikaner ICTs including exploring SPS requirement.
- Rajasthan SLDC in coordination with DISCOMs needs to improve the voltage profile at 400kV Akal, 400kV, Kankani, 400kV Barmer, 400kV Ramgarh and 400kV Bhadla by providing required reactive power compensation so as to avoid poor p.f. in the area and improve voltage profile.

A.16.5 6000 MW loss of solar generation on 11th Aug 2022

In the meeting, it was discussed that near-miss incident of 6000 MW loss of solar generation on 11th Aug 2022 was observed in which frequency had fallen to 49.46 Hz from a level of 50.16 Hz narrowly missing the first stage of UFR shedding. If the frequency had been slightly on the lower side i.e. below 50 Hz there would have been a major event including UFR load shedding.

PMU Plot of frequency at 765kV Agra(PG)

11:23hrs/11-Aug-22

Some key points of event are highlighted below:

- At 11:22:59hrs, R-B phase to phase fault occurred on 220kV Bhadla- Clean Solar Jodhpur ckt due to snapping of B-ph jumper which fell on R-ph. As per PMU, R-B phase to phase fault which cleared within 80ms is observed.
- As per PMU plots of phase voltage, MW & MVAr of RE stations, it is observed that during the voltage dip of fault, phase voltage at Bhadla, Fatehgarh2, Bhadla2 & Bikaner dropped to 0.59pu, 0.79pu, 0.8pu & 0.82pu respectively.
- **As per PMU plots of MVAR of RE station, MVAR support is also not observed from most of the RE inverters during voltage dip on fault.**
- **It is observed that even voltage recovered to its normal value after clearing of fault within 100ms, Active Power (MW)of RE stations didn't recover in defined time as per LVRT operation.**
- **Due to significant drop in MW and inadequate MVAR support from RE stations, rise in voltage is observed at ISTS RE pooling stations.**
- Further after approx. 5-6secs, all four (04) 765kV lines connected at Fatehgarh2 (PG) along with 765kV Ajmer- Bhadla2 D/C & 765kV Bhadla2-Bikaner ckt-1 and few 220kV lines to RE stations tripped on over voltage protection.
- As per SCADA, loss of approx. 5807MW solar generation connected at Bhadla(PG), Bhadla2(PG), Bikaner(PG), Fatehgarh2(PG) & Fatehgarh1

(ADANI Solar Park) & approx. 350MW wind generation connected at Fatehgarh2 & Fatehgarh1 (ADANI Solar Park) & wind occurred.

- As reported, load shedding of approx. ~200MW in Punjab, ~150MW in Haryana & ~400MW in UP control area was seen due to df/dt protection operation during the event.

UP SLDC representative stated that the issues in the complex needs to be resolved at the earliest as in this case even in case of timely clearance of fault in 220kV line, nearly 6000MW generation loss is taking place.

NRLDC representative stated that it has been observed that in most of the events, after the clearance of faults, the voltage rise is very high which is driving inverters of solar plants to HVRT mode of operation. Apart from increased support from RE plants during LVRT/ HVRT mode of operation, the situation can be improved by providing planned reactive power support devices such as STATCOMs at the earliest and increasing the short circuit level at these nodes through synchronous condenser etc. The issues of non-compliance of LVRT/HVRT regulations was also discussed in detail in 56th NRPC meeting held on 29th July 2022.

NRLDC representative that since no significant response is being received from solar developers, detailed discussion with solar developers and respective inverter & PPC OEMs is planned in first week of September. The PMU data available at NRLDC has already been shared with solar developers and response from solar developers including performance of inverters during this event is yet to be received.

POWERGRID representative stated that STATCOMs under implementation at Bhadla-II and Fatehgarh-II are expected by Dec-2022 whereas Bikaner-II S/s is expected to be charged by Jan-2023.

NRPC forum agreed that non-compliance of LVRT/HVRT regulations is a serious issue and needs to be attended by respective solar developers at the earliest. It was also agreed that the commissioning of planned transmission network and reactive power support devices such as STATCOMs at RE pooling stations as part of Rajasthan SEZ Phase-II scheme needs to be expedited to improve the present situation.

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