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 (62वीं)/2023/ 801-848 दिनाँक:25.01.2023

सेवा में / To,

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

विषय: उत्तर क्षेत्रीय विद्युत समिति की 62वीं बैठक की कार्यसूची ।
Subject: Agenda for 62nd meeting of Northern Regional Power Committee-reg

महोदय / Sir,

उत्तर क्षेत्रीय विद्युत समिति की 62वीं बैठक दिनांक **31st जनवरी, 2023** को **1100** बजे विडियो कोंफ्रेंसिंग के माध्यम से आयोजित की जाएगी । बैठक की कार्यसूची संलग्न है। बैठक का लिंक एंव पासवर्ड नियत समय पर ईमेल द्वारा उपलब्ध करा दिया जायेगा ।

The 62nd meeting of Northern Regional Power Committee (NRPC) will be held at **1100 Hrs** on **31st January, 2022** via video conferencing. Agenda for the same is attached. The link and password for joining the meeting shall be sent in due course of time to the respective email-IDs.

भवदीय
Yours faithfully,

Naresh 25/1/23

(नरेश भंडारी)
(Naresh Bhandari)
सदस्य सचिव
Member Secretary

18-ए, शहीद जीत सिंह मार्ग, कटवारिया सराय, नई दिल्ली- 110016 फोन:011-26513265 ई-मेल: ms -nrpc@nic.in वेबसाईट: www.nrpc.gov.in
18-A, Shaheed Jeet Singh Marg, Katwaria Sarai, New Delhi-110016 Phone: 011-26513265 e- mail: ms-nrpc@nic.in Website: www.nrpc.gov.in

List of NRPC Members

1. Chairperson, Northern Regional Power Committee & CMD, Delhi Transco Limited (DTL), Shakti Sadan, Kotla Marg, New Delhi-110002
2. MD, PTCUL, Dehradun-248001, (Fax- 0135-2764496)
3. MD, UPPTCL, Lucknow-226001, (Fax-0522-2287792)
4. CMD, RRVPNL, Jaipur-302005, (Fax -01412740168)
5. Member (GO&D), CEA, New Delhi, (Fax-011-26108834)
6. CMD, PSTCL, Patiala-147001, (Fax-0175-2307779)
7. Commissioner/Secretary, PDD, J&K, Jammu, (Fax-0191- 2545447/ 01942452352)
8. Managing Director, HVPN Ltd, Panchkula -134109 (Fax-0172-2560640)
9. Chairman, BBMB, Chandigarh-160019, (Fax-0172-2549857/2652820)
10. Chief Engineer, UT of Chandigarh, Chandigarh-160066, (Fax-0172-2637880)
11. Managing Director, DTL, New Delhi-110002, (Fax-011-23234640)
12. General Manager, SLDC, DTL, New Delhi-110002, (Fax-011-23221069)
13. Managing Director, IPGCL, New Delhi-110002, (Fax-011-23275039)
14. Chief Engineer (SO&C), SLDC, HVPNL, Panipat, (Fax-0172-2560622/2585266)
15. Managing Director, HPGCL, Panchkula-134109, (Fax-0172-5022400)
16. Representative of DHBVNL (Haryana Discom)
17. Managing Director, HPSEB Ltd, Shimla -171004 (Fax-0177-2658984)
18. Managing Director, HPPTC Ltd, Himfed Bhawan, Shimla-171005, (Fax-0177-2832384)
19. Managing Director, HPSLDC, HP State Load Despatch Authority, Totu, Shimla, (Fax-0177-2837649)
20. Managing Director, J&K State Power Dev. Corp., Srinagar, J&K, (Fax-0194-2500145)
21. Chairman and Managing Director, PSPCL, Patiala-147001, (Fax-0175-2213199)
22. Chief Engineer (LD), SLDC, Heerapur, Jaipur-302024, (Fax-0141-2740920)
23. CMD, RRVUNL, Jaipur-302005, (Fax-0141-2740633)
24. Representative of JVVNL (Rajasthan Discom)
25. Managing Director, SLDC, UPPTCL, Lucknow-226001, (Fax-0522-2287792)
26. Managing Director, UPRVUNL, Lucknow-226001, (Fax-0522-2288410)
27. Representative of MVVNL (UP Discom)
28. Managing Director, SLDC, PTCUL, Rishikesh, (Fax-0135-2451160)
29. Managing Director, UJVNL, Dehradun-248001, (Fax-0135-2763507)
30. Managing Director, UPCL, Dehradun-248001, (Fax-0135-2768867/2768895)
31. Director (Technical), NHPC, Faridabad-121003, (Fax-0129-2258025)
32. Director (Finance), NPCIL, Mumbai-400094, (Fax-022-25563350)
33. Director (Commercial), NTPC, New Delhi-110003, (Fax-011-24368417)
34. Representative of CTUIL, Gurgaon-122001
35. CMD, SJVNL, New Delhi, (Fax-011-41659218/0177-2660011)
36. Director (Technical), THDC, Rishikesh-249201, (Fax-0135-2431519)
37. Director (Commercial), POSOCO, New Delhi-110016, (Fax-011-26560190)
38. ED, NRLDC, New Delhi-110016, (Fax-011-26853082)
39. CEO, Aravali Power Company Pvt. Ltd., NOIDA, (Fax-0120-2591936)
40. CEO, Jhajjar Power Ltd., Haryana, (Fax-01251-270105)
41. Representative of Lanco Anpara Power Ltd., (Fax-124-4741024)
42. Station Director, Rosa Power Supply Company Ltd., (Fax-05842-300003)
43. Director and head regulatory and POWER Sale, JSW Energy Ltd., New Delhi (Fax- 48178740)
44. COO, Adani Power Rajasthan Ltd., Ahmedabad-380006 (Fax No- 07925557176)
45. COO, Talwandi Sabo Power Ltd. Distt: Mansa, Punjab-151302(Fax: 01659248083)
46. MD, Lalitpur Power Generation Company Ltd., Noida-201301(Fax: 01204045100/555, 2543939/40)
47. Director (Commercial & Operations), PTC India Ltd., New Delhi (Fax- 01141659144,41659145)
48. CEO, Nabha Power Limited, (Fax: 01762277251 / 01724646802)
49. Representative of Prayagraj Power Generation Co. Ltd.
50. Representative of Greenko Budhil Hydro Power Private Limited (Member IPP<1000 MW)
51. Representative of TPDDL (Delhi Private Discom)

Special Invitee:

i. Member Secretary, WRPC, Mumbai-400 093.
ii. Member Secretary, SRPC, Bangalore-560 009
iii. Member Secretary, ERPC, Kolkata-700 033.
iv. Member Secretary, NERPC, Shillong-793 003.
v. RE generators/Holding companies as per mail list.

Contents

उत्तरी क्षेत्रीय विद्युत समिति की 62वीं बैठक

62nd MEETING OF NORTHERN REGIONAL POWER COMMITTEE

Time & Date of NRPC meeting: 11:00 HRS; 31st January 2023

Venue: Video Conferencing

AGENDA

A.1 Approval of MoM of 61st NRPC meeting

A.1.1 Minutes of 61st NRPC meeting (held on 26.12.2022) has been issued vide letter dtd. 19.01.2023.

A.1.2 NRLDC vide mail dtd. 24.01.2023 has requested for addition in above MoM regarding agenda no. 4 i.e. Transmission System for evacuation of power from Rajasthan REZ Ph-IV (Part 2: 7.5GW) (Jaisalmer/Barmer complex), as below:

Quote

Following issues were highlighted by CGM (I/C), NRLDC during the meeting:

- In the proposed scheme, 765kV D/C line from Jalore-Mandsaur has been proposed which would be nearly 320km long inter-regional line. In Feb scenario, the line is carrying 2200MW on each ckt. And under N-1 contingency, loading would be nearly 3000MW with angular difference around 25 deg.
- In case both lines trip, the angular difference would further increase to 37 deg. Therefore, in future, in case both lines trip and need to be revived during peak solar generation time, the system may not be stable.
- New intermediate substation in between may also be proposed and the line length may be reduced as switching of 320km long inter-regional line may lead to issues in future.

CTU representative informed the following:

- Outage of 765kV D/C line from Jalore-Mandsaur has not been studied as transmission system is being planned for N-1 contingency only and any additional transmission system would come with additional cost.

Unquote

Members may kindly deliberate and approve.

A.2 Requirement of 02 Nos. 500MVA, 400/220 kV and 02 Nos. 160 MVA 220/66 kV Power Transformer (agenda by PSETD Division, CEA)

A.2.1 PSETD Division, CEA in its letter dated 23.01.2023 (**Annexure –I**) has referred the issue of DTL to NRPC Sectt. for requirement of 02 Nos. 500MVA, 400/220 kV and 02 Nos. 160 MVA 220/66 kV Power Transformer

A.2.2 DTL in its letter No. F.DTL/Dir (O)/201/2022-23/F.03/216 dated 11.01.2023 had requested CEA to direct other State Transmission Utility (STUs) to provide 02 Nos. 500 MVA and 02 Nos. 160 MVA Transformers on returnable basis or cost-plus basis so that DTL may have spare Power Transformers in-hand to overcome any exigency during the period of G-20 events scheduled to be held in Delhi in the year 2023.

A.2.3 PSETD Division, CEA has mentioned that DTL was well aware in advance about the hosting of G-20 Summit in the year 2023 by India and many related events including Summit to be held in the Capital City of Delhi. Therefore keeping in view, the importance of the said event, DTL may have taken the advance action for ensuring the availability of the spare transformers for the reliable power supply in the said event.

A.2.4 Also, PSETD Division, CEA had mentioned that CEA would explore and assess the availability of the spare transformers with constituent of Northern Region for making available to DTL. However, DTL has also to take the necessary action in this regard for getting the spare transformers for ensuring the reliability of power supply during G-20 event.

Members may deliberate kindly.

A.3 Unchahar#6 (St-IV U#1) Flue Gas De-Sulphurisation (FGD) unit Performance Guarantee (PG) Test (agenda by NTPC)

A.3.1 Issue regarding the Performance Guarantee Test of Unchahar#6 (St-IV U#1) was deliberated in 57th NRPC meeting held on 31.08.2022. Minutes of Meeting is attached as **Annexure-II.**

A.3.2 In the meeting, NTPC representative apprised NRPC forum that PG Test of Unchahar#6 unit was initially scheduled from 00:00 hrs of 23.08.2022 to 24.00 Hrs of 25.08.2022 in compliance of Ministry of Environment, Forest and Climate Change (MoEFCC) directives & strict Supreme Court deadlines. Unit was to be operated at full Load for above 72 Hrs. to meet the test conditions.

A.3.3 Further, NTPC representative intimated NRPC forum that 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. However, UP has not responded/ not given consent for maintaining schedule.

A.3.4 NTPC representative in the meeting highlighted that 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.3.5 He emphasized that meeting SO_X emissions within limits as per MoEFCC 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.3.6 In view of decisions taken in 57th NRPC meeting, UPPCL was requested to cooperate with NTPC for the facilitation of the PG test (as FGD is a statutory requirement) by providing the adequate schedule.

Members may deliberate kindly.

A.4 Replacement of 420kV 80 MVAR 3-Ph Bus Reactor at Ballabgarh under Add-Cap 2019-2024 (Agenda by PGCIL)

A.4.1 PGCIL vide mail dtd. 24.01.2023 has informed that during 53rd NRPC meeting (held on 29.04.2022), it was agreed for replacement of 05 nos. transformers and reactors under Add-Cap except replacement of 420kV 80MVAR Bus reactor at Ballabgarh substation and it was decided that it may be discussed first in CMETS of NR.

A.4.2 Accordingly, the matter was discussed in 8th CMETS meeting of NR on 30.06.2022 (**Annexure-III**) and it was recommended for replacement of 420kV 80 MVAR Bus reactor at Ballabgarh with 125MVAR (420kV) bus reactor in view of prevailing high voltage situations in NR.

A.4.3 Further, the issue was again deliberated in 56th NRPC meeting (held on 29.07.2022) and POWERGRID was asked to submit the cost details in next NRPC meeting.

A.4.4 In view of the above, the details of cost for replacement of 80 MVAR 420kV Bus reactor at Ballabgarh with 125 MVAR 420kV Bus reactor under Add-Cap 2019-2024 is given below:

Cost of New 125MVAR 420kV Reactor	:	Rs. ~10.09 Cr
Gross Block of 80MVAR 420kV reactor at Ballabgarh	:	Rs. ~0.25 Cr

A.4.5 Accordingly, Replacement of 80 MVAR 420kV Bus reactor at Ballabgarh with 125 MVAR 420kV Bus reactor under ADD-CAP 2019-2024 is proposed by PGCIL.

Members may approve kindly.

A.5 Utilisation of spare 400/220kV 500MVA ICT (Without OLTC) available at Patna substation for replacement of 1x315MVA 400/220kV ICT (ICT-1) at Ludhiana substation with 1x500MVA 400/220kV ICT (Agenda by PGCIL)

A.5.1 PGCIL vide mail dtd. 24.01.2023 has informed that replacement of 1x315MVA 400/220kV ICT (ICT-1) at 400/220kV Ludhiana (PG) substation with 1x500MVA 400/220kV ICT was approved vide CTU Office Memorandum ref. no. C/CTU/AI/00/9th CCTP dated 28th November 2022 (**Annexure IV**) with Implementation timeframe of 18 months.

A.5.2 CMD PSTCL vide letter dated 25.11.2022 (**Annexure IV**) requested POWERGRID to complete the work by 31st May 2023 before onset of next summer/ paddy season.

A.5.3 The lead time for procurement of new transformer is 15 months, therefore, in view of urgency of replacement of ICT at Ludhiana 400/220kV, spare 400/220kV 500MVA ICT (without OLTC) available at 400/220kV Patna substation of POWERGRID may be utilised at Ludhiana. It is also to mention that 01 no. without OLTC 400/220kV 500MVA ICT has already commissioned at Ludhiana substation in May'2022 and same is working fine. It is further to mention that voltage at Ludhiana substation is controlled due to availability of SVC at Ludhiana.

A.5.4 In view of the above, it is proposed by PGCIL to divert the spare 400/220kV 500MVA ICT (without OLTC) available at the Patna substation to Ludhiana substation for replacement of 1x315MVA 400/220kV ICT (ICT-1) at 400/220kV Ludhiana (PG) substation with 1x500MVA 400/220kV ICT to meet the upcoming demand in Punjab.

Members may kindly deliberate.

A.6 Provision of Phasor measurement units (PMUs) at POI in RE feeders in Rajasthan (Agenda by PGCIL)

A.6.1 PGCIL vide mail dtd. 24.01.2023 has intimated that during 58th NRPC meeting (30.09.2022), POWERGRID had proposed to install PMUs in 63 nos. feeders connected to RE generators in Rajasthan at an estimated cost of Rs. ~ 14.0 Cr on request of POSOCO. During 58th NRPC meeting (**Annexure V**), it was deliberated that a sub-committee has been constituted under Member Secretary, WRPC and report from WRPC sub-committee may be asked for further discussion on the matter.

A.6.2 POWERGRID vide letter dated 04th Nov 2022 requested MS, WRPC to provide the report of WRPC sub-committee on installation of PMUs at POI (**Annexure V**). However, the said report is still awaited.

Members may kindly deliberate.

A.7 Issues related to Rajasthan state control area (Agenda by NRLDC)

A.7.1 NRLDC/GRID-INDIA vide mail dtd. 24.01.2023 has submitted that as discussed in 59th and 60th NRPC meeting held on 31.10.2022 and 30.11.2022 respectively, RVPN was asked to submit pointwise reply to following issues:

- Action plan to meet the 16000-17000MW peak demand during winter
- Establishing additional connectivity of 400 kV Alwar from Bhiwadi / Bassi / Phagi. Gas generation at Dholpur may also help till connectivity established
- Minimising planned/ forced outage of intrastate thermal generating units
- Operating intrastate RE generators in voltage control mode
- Load MVAR drawl management including identification of nodes at 220kV and 132kV level which are drawing huge MVAR from the grid
- Expediting upgradation of 400kV Jodhpur (Kankani) to 765kV along with associated 765kV lines
- Additional reactive power support devices for maintaining grid voltages within IEGC prescribed limits

A.7.2 In 202nd OCC meeting held on 16.12.2022, Rajasthan SLDC informed that they are awaiting response from STU for some points. NRLDC representative asked Rajasthan SLDC to submit reply for points that have been compiled at their end and for other points reply may be submitted after receipt of same from STU. Rajasthan SLDC agreed for the same. However, reply from Rajasthan side is still pending.

1. N-1 violation related:

NRLDC has been continuously raising the issue of N-1 non-compliance at 400/220kV Inter Connected Transformers (ICTs) across major RVPN substations. Although SPS has been implemented at number of 400/220kV substations in RVPN, it can be seen that loading is beyond the N-1 contingency limits at the time when demand is slightly on the higher side (>14500MW). N-1 non-compliance is observed at following 400/220kV ICTs:

Name of Substation	MVA Capacity	N-1 contingency limit (MW)	Total Loading (MW)
Hindaun	2*315 =630	400	300-550
Chittorgarh	2*315 =630	440	300-600
Ajmer	2*315 =630	430	300-600
Merta	2*315 =630	440	300-550
Bikaner	2*315 =630	410	300-550
Jodhpur	2*315 =630	430	300-550
Bhilwara	1*500+1*315 =815	460	300-550

There have been multiple tripping at 400/220kV Hindaun wherein 2*315 MVA ICTs have tripped on overloading (6 events of load loss from Nov'22-Jan'23) and no SPS is implemented at 400/220kV Hindaun. Apart from Hindaun, presently no SPS is implemented at 400/220kV Bhilwara.

From the above table, it can be seen that the loading of 400/220kV ICTs is very high and it is likely that SPS relief will not be able to bring ICT loading within safe limits under N-1 contingency of one ICT. This issue was also highlighted by NRLDC in 202nd and 203rd OCC meetings.

For the substations at which SPS has been implemented by RVPN, Rajasthan SLDC is requested to assess the safe loading limits and manage loadings within these limits such that SPS relief is able to make sure that one 400/220kV ICT survives and does not trip on overload, incase of N-1 contingency.

2. Huge Reactive power drawl at 400/220kV Substations:

It is being observed that apart from high MW loading, there is high MVAR drawl at number of RVPN 400/220kV substations

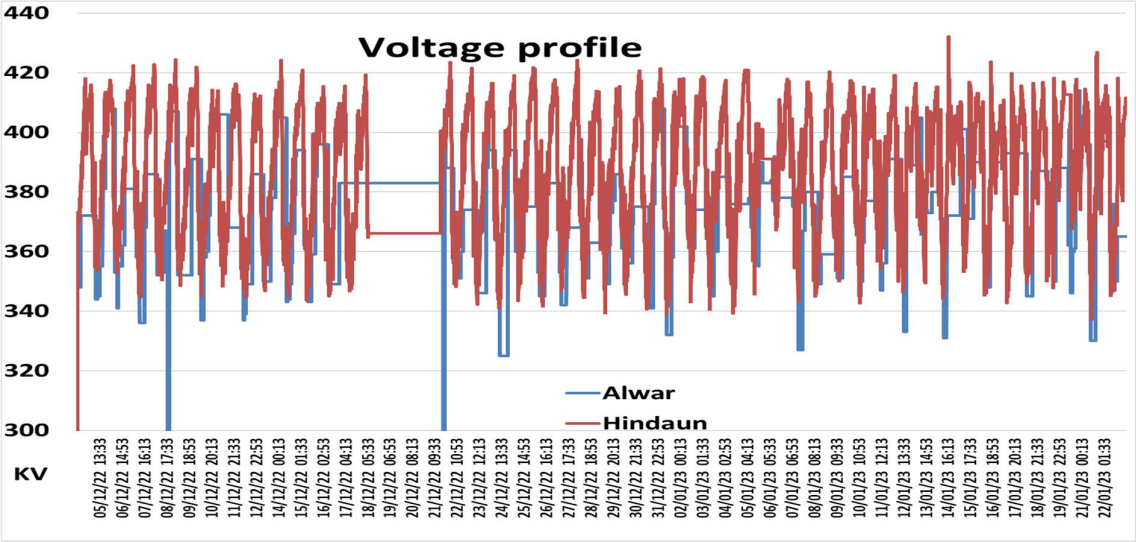
ICTs MW drawl, MVAr drawl, Power factor and S/s voltage for Solar hours (10:00-14:00hrs) for Rajasthan Control area (Dec'22-Jan'23)					
400/220 Sub-Station_ICTs	ICTs Capacity (MVA)	MW Drawl	MVAr Drawl	Power factor	Voltage(kV)
Jodhpur	2*315	400-550	200-350	0.73-0.75	375-385
Kankani	(315+500)	400-550	150-300	0.87-0.90	360-370
Merta	2*315	400-550	150-250	0.90-0.92	380-390
Bhinmal(Powergrid)	2*315	400-500	200-350	0.82-0.85	370-390
Bikaner(RVPN)	2*315	400-550	200-400	0.60-0.80	360-390
Ratangarh	3*315	600-800	300-450	0.80-0.90	380-390
Bhilwara	(315+500)	400-550	100-200	0.91-0.95	380-390
Hindaun	2*315	400-550	100-200	0.90-0.95	340-370
Alwar	2*315	250-350	100-200	0.86-0.95	330-360
Barmer	2*315	200-250	150-200	0.60-0.90	380-390
Akal #	315+ 3*500	100 -200	100-200	0.80-0.95	380-390
Ramgarh#	3*500	200 -300	100-150	0.80-0.95	360-390
Bhadla (RVPN)	3*500	1200-1300 (injection)	200-400	0.95-0.98	360-390

Plots depicting above issues are attached as (**Annexure VI**)

Poor power factor is resulting in low voltages in the system and therefore expeditious commissioning of network elements and shunt capacitor both at transmission and distribution level is required. It is also essential that load MVAR drawl management including identification of nodes at 220kV and 132kV level which are drawing huge MVAR from the grid and remedial actions is carried out on priority. It may be ensured that RE generators are complying with various regulations of CEA (Technical Standards for Connectivity to the Grid) and amendments thereof.

3. Perennial issue of low voltage at 400/220kV Hindaun & Alwar:

The issue of low voltage at 400/220kV Hindaun and Alwar substation was first discussed in detail in 44th Technical Coordination Sub-committee (TCC) & 47th Northern Regional Power Committee (NRPC) meetings held on 10th and 11th December, 2019 wherein it was highlighted that voltages at 400kV Hindaun and Alwar vary by 50-60kV (400kV level) in single day with voltages falling below 360kV at these substations. The issue has been subsequently highlighted on number of occasions in Operation Coordination Committee (OCC)/ NRPC meetings and through written communication. Voltage profile of Dec'22-Jan'23 is shown below:



In the last three years voltage profile at Hindaun and Alwar has worsened and now it is falling below 340kV on several occasions, it is essential that RVPN acts immediately to resolve these low voltage issues at Hindaun and Alwar.

4. Pending commissioning of 765kV at Jodhpur (Kankani):

Proposal for upgradation of 400kV Jodhpur to 765kV and interconnection with 765kV Phagi was discussed in Standing committee meetings held in 2019, wherein it was stressed by RVPN that this would help in existing RE evacuation and future planned Renewable Energy (RE) generation evacuation. In several meetings related to Inter State Transmission System (ISTS) connected RE generation evacuation, Central Transmission Utility of India Limited (CTUIL) has highlighted that they have been considering this substation while planning transmission system for upcoming ISTS connected RE generation whereas the works are getting delayed.

Upgradation of 400kV Jodhpur to 765kV and commissioning of proposed interconnections would help in improving voltage profile in the area and would increase system strength. Therefore, it is suggested to expedite works for upgradation of 400kV Jodhpur to 765kV.

5. Installation of PMU at RVPN substations:

As discussed in previous OCC and NRPC meetings, frequent voltage oscillation events have also been observed during solar generation period 10:00hrs-14:00hrs in Rajasthan control area as well as in ISTS RE pooling stations. Several issues related to LVRT/HVRT non-compliance are being observed at different ISTS connected RE generators. PMUs provide high resolution data and enables real-time monitoring and analysis of oscillations and Low voltage ride through (LVRT)/High voltage ride through (HVRT) compliance related issues of different RE generators.

Therefore, it is suggested that RVPN installs Phasor Measurement Units (PMUs) at all RE connected and nearby substations such as 400/220kV Kankani, Ramgarh, Akal,Bhadla (RVPN) and Bikaner (RVPN) at feeders connected to point of

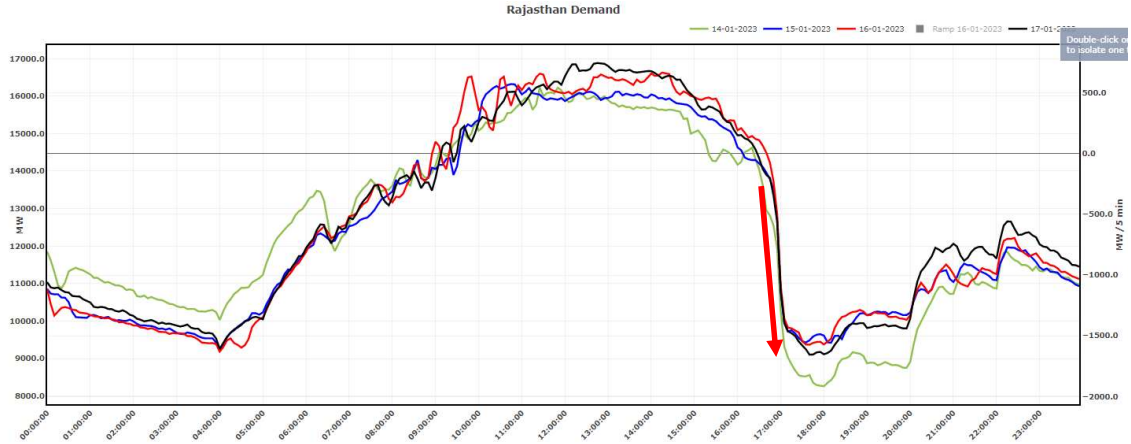
Interconnection to locate the exact source of oscillation and analyse Rajasthan Intra-state RE plants behavior during any event of fault.

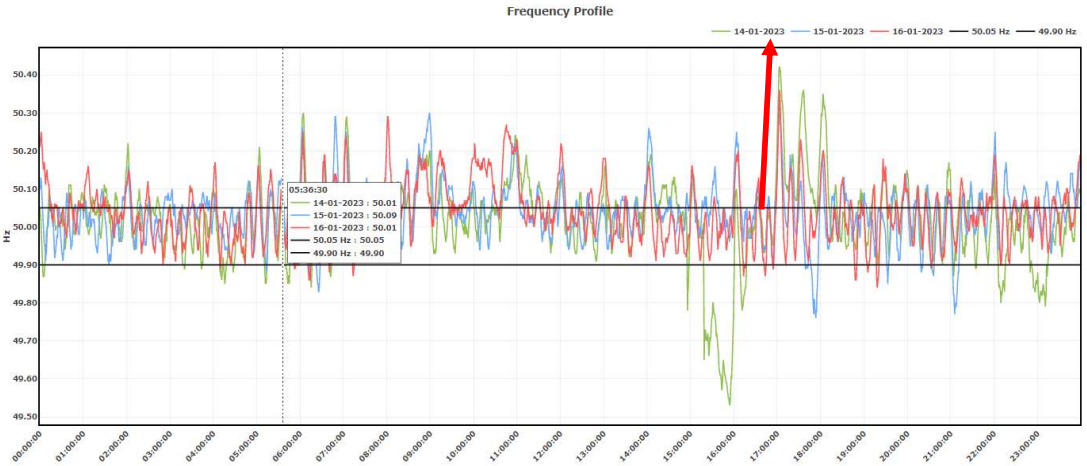
6. Sudden disconnection of load @17:00 hrs

NRLDC has been continuously taking up the issues of sudden connection/ disconnection of load at OCC level.

As per IEGC clause 5.2 (j),
"No user/ SEB shall cause a sudden variation in its load by more than one hundred (100MW) withour prior intimation to and consent of the RLDC."

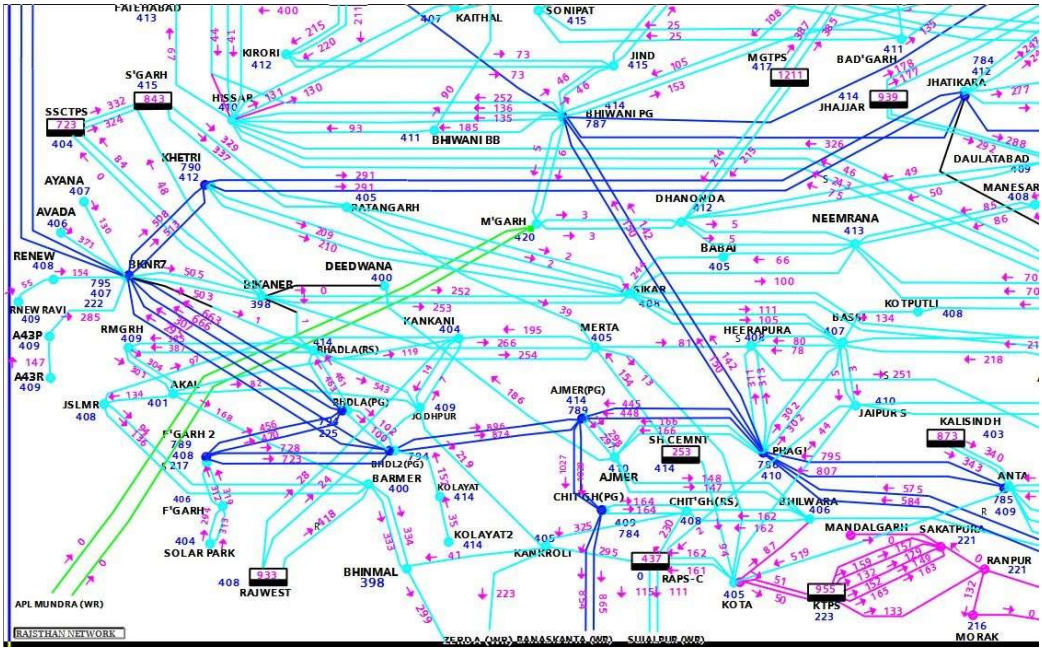
New issue of sudden disconnection of load (more than 4000MW on several days) at 17:00 hrs is being observed since 14.01.2023. This is leading to large deviations from schedule in the range of 1500MW which is violation of Indian Electricity Grid Code clause 5.2 (j) and also against grid security.





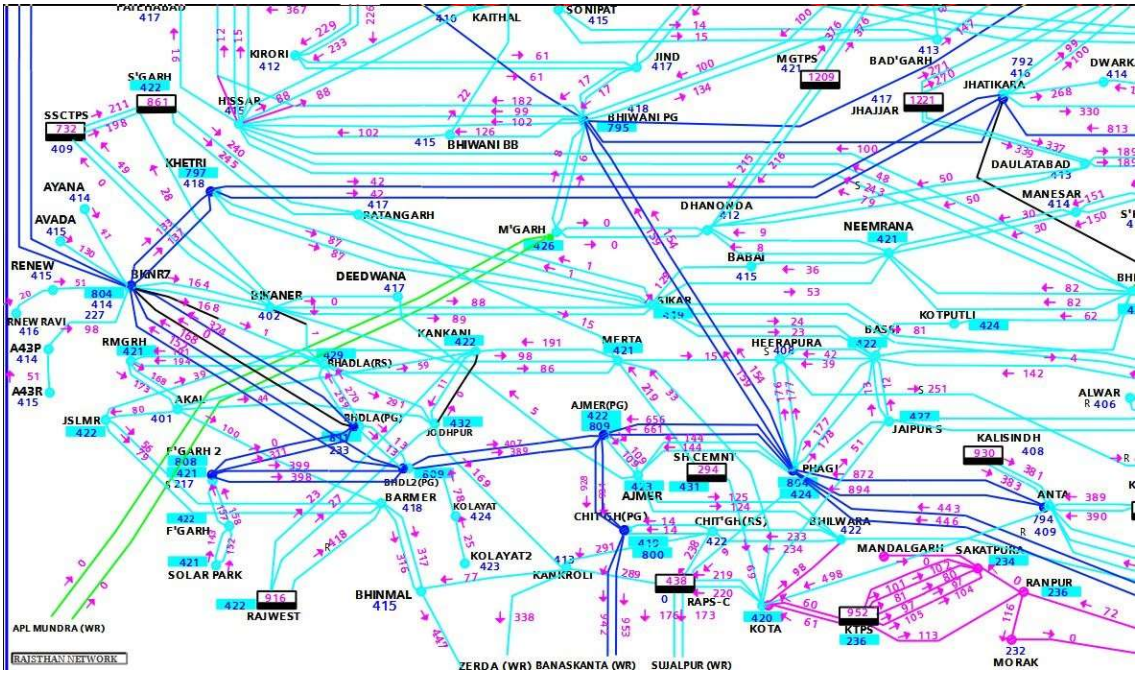
Such action by Rajasthan is leading to high voltage and high frequency at the time of sudden disconnection of load and has also lead to tripping of important lines on overvoltage. This needs to be immediately stopped by Rajasthan considering system security and staggering of load connection/ disconnection needs to be implemented at the earliest.
Snapshots shown below are of two instants

A.8.1 one before this sudden load disconnection @ 16:30hrs



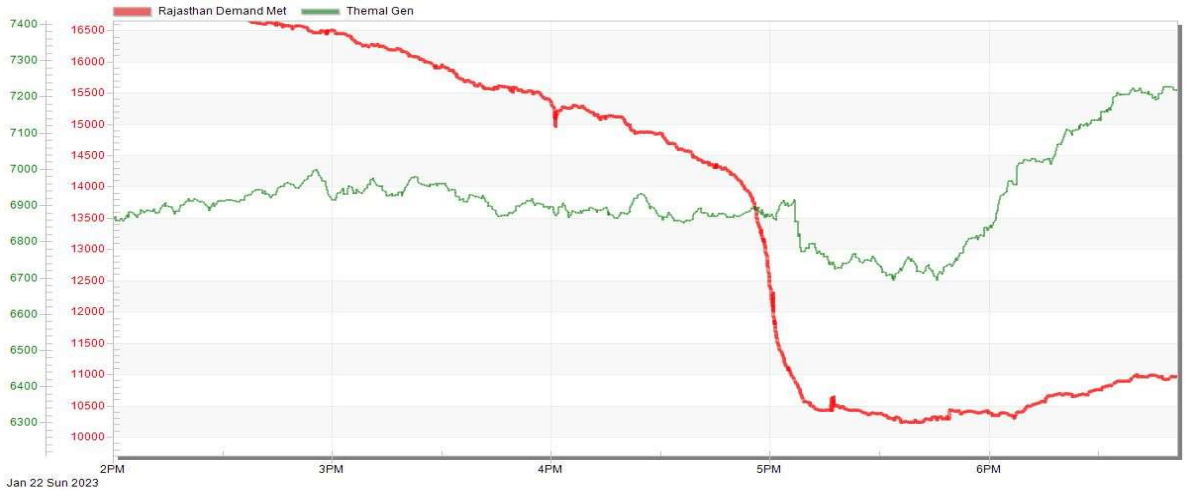
It can be seen that grid voltages are well within limits in Western Rajasthan at both intrastate as well as interstate substations.

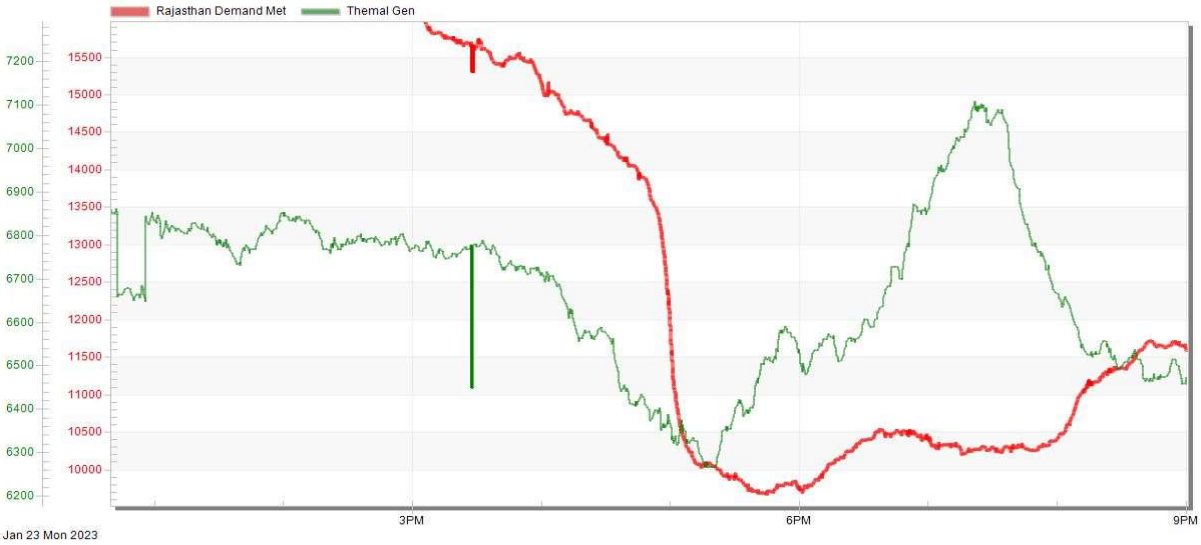
A.8.2 After sudden disconnection of load @17:15 hrs



It can be seen that voltages at number of substations are on the higher side. This has also lead to tripping of lines on overvoltage and also increases stress on the transmission elements.

Moreover, it is also being observed that Rajasthan is not reducing its thermal generation as per this disconnection of load and is mostly relying on change in drawl schedule for this load disconnection. Plots for two days i.e. 22 and 23 Jan 2023 are shown below. It is clear from the plots that thermal generation is not being reduced significantly at the time of load disconnection.





RVPN also needs to make sure that it is not solely relying on the grid for sudden disconnection of load.

It is once again suggested that RVPN acts swiftly to resolve the issues highlighted above to improve the security and resilience of the grid.

Rajasthan SLDC and STU to provide update.

A.8 N-1 violation related issues in Himalayan states of NR winter 2022-23 (Agenda by NRLDC)

A.8.1 NRLDC/GRID-INDIA vide mail dtd. 24.01.2023 has submitted that apart from Rajasthan, winter months are also associated with high demand season in Himalayan states such as HP, Uttarakhand and J&K and Ladakh U/Ts. During this period, the primary internal generation source which is hydro generation is available in limited amount, therefore these states are mostly dependent on grid for import of power and meeting their demand. During this high import, some constraints are observed in real-time grid operation which are regularly being discussed in OCC meetings and also submitted to CTUIL/CEA by Grid-India as quarterly operational feedback. Some of these constraints at interstate level along with remedial measures are shown below:

CONSTRAINTS	REMEDIAL ACTION TO MITIGATE THE CONSTRAINTS
N-1 Contingency of 3*315 MVA ICT at Nallagarh	New ICT/ Capacity augmentation to be proposed by HPPTCL/ PSTCL
N-1 Contingency of 220kV Nallagarh – Upernangal	New lines or additional supply may be provided. Switchgear ratings at Nallagarh end to be uprated for utilising full line capacity. POWERGRID informed bay equipments under ownership of HPSEB.
N-1 Contingency of 2*315 MVA ICT at Kashipur	New ICT/ Capacity augmentation to be planned by PTCUL. SPS implemented at Kashipur.
High loading of 220kV CB Ganj-Pantnagar	Additional connectivity/ conductor upgradation to be planned by PTCUL
High loading of 220kV lines from Roorkee (PG)	Additional connectivity/ conductor upgradation to be planned by PTCUL
N-1 Contingency of 2*315 MVA ICT at Amargarh	New ICT/ Capacity augmentation may be expedited by JKPDD (planned for Mar'2026). Additional planned 220kV and low voltage lines to be expedited to manage drawl from Amargarh.
High loading of 220kV lines from ISTS substations such as Wagoora(PG), Amargarh (NRSSXXIX), New Wanpoh(PG)	Additional connectivity to be planned and already approved schemes to be expedited by JKPTCL
Low voltage issues during winter season	Large dependency on SVC at New Wanpoh for MVAR support. Capacitor installation at low voltage level to be expedited.

A.8.2 Relevant plots depicting the above issues are attached as (**Annexure VII**)

A.8.3 There have been number of events reported wherein tripping of one 220kV line has led to tripping of other 220kV line on overloading or some load shedding had to be done to facilitate shutdown of one line. For instance, shutdown of 220 KV Wagoora(PG)-Ziankote(JK) (PDD JK) Ckt-2 was availed on 11.10.2022. To facilitate the shutdown, 100MW of load had to be shed as the power carrying capacity of ckt1 was limited. On 03.11.2022 at 13:02 hrs 220kV Amargarh – Ziankote ckt 2 tripped due to B-ph fault which caused tripping of ckt 1 on overloading. Load loss of approx. 300MW at Ziankote was reported.

A.8.4 Numerous tripping were reported in Apr-Sep 2022 at 400/220kV Kashipur ICTs on overloading. After number of load loss events and highlight of issues by NRLDC, SPS has been implemented at 400/220kV Kashipur to avoid complete load loss.

A.8.5 Therefore, it is important that these states accord priority to the issues observed and take necessary remedial measures.

A.8.6 All NR states except J&K, Ladakh and Chandigarh U/Ts are sharing basecase and ATC/TTC assessment with NRLDC. OCC has advised all states to timely declare TTC/ATC for prospective months and revise the figures as per requirement.

A.8.7 J&K representatives had intimated during 47th TCC and 49th NRPC meeting that they would be sharing ATC/TTC assessment with NRLDC from October 2021, however the same is still awaited. J&K and Ladakh U/Ts are once again requested to advise the concerned officers to evaluate their ATC/TTC limits in coordination with NRLDC and share latest assessment with NRLDC and NRPC. J&K officers may also take online/ offline assistance from NRLDC officers if required.

Members may deliberate kindly.

A.9 Actions for ensuring reliable grid operation during summer-monsoon 2023 (Agenda by NRLDC)

A.9.1 NRLDC/GRID-INDIA vide mail dtd. 24.01.2023 has submitted that NRLDC publishes the TTC/ATC of all the states on its website after discussion with respective SLDCs. For each state, the limiting constraint is declared in the TTC/ATC sheet by the RLDC and SLDCs.

A.9.2 Number of issues were observed in grid operation during Summer-Monsoon 2022 including loading beyond N-1 compliance limits at number of 400/220kV substations as shown below.

CONSTRAINTS	REMEDIAL ACTION LATEST STATUS AVAILABLE WITH NRLDC
N-1 Contingency of 2*315 MVA ICT at Deepalpur	New 500MVA ICT approved in 4 NRPCTP held on 05.10.2021. SPS commissioned as immediate measure. ICT commissioning delayed to PPP substation model issues as informed by HVPN.
N-1 Contingency of 3*150+500 MVA ICT at Panipat BBMB	Proposal for new ICT to be given by HVPN/DTL. Drawl to be planned from other nearby stations. Lack of space at Panipat as informed by BBMB in OCC meeting
N-1 Contingency of 2*500 MVA ICT at Kurukshetra (PG)	New 500MVA ICT approved in 4 NRPCTP held on 05.10.2021.

CONSTRAINTS	REMEDIAL ACTION LATEST STATUS AVAILABLE WITH NRLDC
High loading of 220kV Hissar (PG)-Hissar (IA)	Reconductoring of 220kV Hisar (PG)- Hisar (IA) to be taken up for approval.
N-1 Contingency of 2*500 MVA ICT at Patran	New 500MVA ICT approved in 11 CMETS held on 30.09.2022
N-1 Contingency of 2*315 MVA ICT at Nakodar	Capacity augmentation to 2*500MVA ICTs expected before paddy 2023
N-1 Contingency of 2*500+1*250+1*315 MVA ICT at Moga	One 250MVA ICT to be replaced by 500MVA ICT. Bay equipment of higher ratings to be used. Approved in 11 CMETS held on 30.09.2022
N-1 Contingency of 2*315+2*500 MVA ICT at Ludhiana	One 315MVA ICT to be replaced by 500MVA ICT. Approved in 11 CMETS held on 30.09.2022
N-1 contingency of 400kV Rajpura (Th)-Rajpura D/C	Additional evacuation path from Rajpura TPS may be planned. Line length is small.
N-1 Contingency of 2*500 MVA ICT at Azamgarh	New ICT/ Capacity augmentation to be planned by UPPTCL. SPS implemented
N-1 Contingency of 3*315+1*500 MVA ICT at Sarnath	New ICT/ Capacity augmentation to be planned by UPPTCL. SPS implemented. Commissioning of 400/220kV Sahupuri S/S likely to provide relief
N-1 Contingency of 2*315+1*240 MVA ICT at Obra	New ICT/ Capacity augmentation to be planned by UPPTCL. SPS under implementation by UPPTCL.
N-1 Contingency of 3*315 MVA ICT at Allahabad	New ICT/ Capacity augmentation may be proposed by UPPTCL. Commissioning of 400/220kV Jaunpur S/S likely to provide relief
N-1 Contingency of 2*315 MVA ICT at Sohawal(PG)	New 500MVA ICT approved in 3 NRPCTP held on 19.02.2021. SPS implemented
N-1 Contingency of 2*200 MVA ICT at Nehtaur	New ICT/ Capacity augmentation to be planned by UPPTCL. SPS implemented

CONSTRAINTS	REMEDIAL ACTION LATEST STATUS AVAILABLE WITH NRLDC
N-1 Contingency of 1*240+1*315+1*500 MVA ICT at Gorakhpur (UP)	Capacity augmentation at Gorakhpur (UP) from 1055MVA to 1315MVA (expected by Oct 2022). SPS implemented
N-1 contingency of 2*315 MVA ICT at Bawana	After bus -split due to high fault level at Bawana, ICTs N-1 non-compliant. Additional ICT/ load shifting to other station to be planned.
N-1 Contingency of 3*315 MVA ICT at Mundka	New ICT/ Capacity augmentation to be planned by DTL. One ICT under prolonged outage may be revived.

A.9.3 It is requested that states provide update on the remedial action being taken at their end to mitigate the limiting constraint of the states. It is also requested that actions for commissioning of transmission elements to remove these constraints may be prioritised. This would help in meeting the high demand forecasted in the month of Summer-Monsoon 2023 in Northern region in safe and reliable manner.

Tower strengthening activities:

A.9.4 There have been number of instances of tower collapse & damage in the past during thunder storms which resulted in constraints in supply power for extended duration of time. Number of tower collapse incidents occurred during last summer also in May/Jun 2021 & 2022 in which many EHV lines including 765kV lines were out on tower collapse.

A.9.5 All utilities are requested to ensure availability of Emergency Restoration System (ERS) for early restoration of supply. Each utility shall work on plan for tower repairing work before April.

A.9.6 Extra precautions need to be taken care for important lines which have history of tripping during thunderstorm/ windstorm.

Members may deliberate kindly.

A.10 Multiple events of tripping in generation complexes in UP state (Agenda by NRLDC)

A.10.1 NRLDC/GRID-INDIA vide mail dtd. 24.01.2023 has submitted that Northern region witnesses dense fog during winter every year. Due to pollution & fog (SMOG), EHV lines used to trip during such weather conditions. In order to avoid tripping of EHV lines during foggy weather, cleaning & washing of insulators, replacement of porcelain

insulators with polymer insulators and other maintenance activities are being carried out. This year also since Sep'22, NRLDC has started raising this issue for prompt actions by all utilities including UPPTCL.

A.10.2 However despite above, since start of fog from 19th Dec 2022 this year on frequent basis, lines in UP state are tripping from large generating complexes of Anpara, Bara, Meja, Harduaganj etc., e.g., 400kV Anpara-Mau has tripped 5 times, Bara-Meja D/C have tripped 4 times, 765kV Bara-Mainpuri ckt 4 times and 765kV AnparaC-Unnao 3 times since mid-December 2022.

A.10.3 **Bara evacuation related issues**

- On 12th Jan 2023, tripping of 400kV BaraTPS-MejaTPS both ckts and subsequent tripping of 765kV BaraTPS-Mainpuri resulted in outage of 1980 MW (3*660 = 1980 MW) Bara TPS plant. Apart from above, there have been other instances of tripping of 765kV Bara-Mainpuri when SPS at Bara had operated leading to tripping of one unit at Bara TPS.

- As per PMU, delayed clearance of fault is observed during most of the incidents and A/R operation is also not observed during these incidents.

- All concerned are once again advised to take immediate corrective actions and also for carrying out meticulous preparatory work in advance, every year.

- Apart from above, the commissioning of 765kV Bara-Mainpuri ckt1 and 2nd 765/400kV ICT at Bara is pending since long. Due to this Bara evacuation is not even N-1 non-compliant and SPS has implemented in complex after discussion in OCC forum. It is to be noted that the generation from Bara TPS is being evacuated without N-1 compliance since its commissioning in 2016-17.

A.10.4 Prolonged outage of 765kV AnparaD-Unnao S/C

- 765kV AnparaD-Unnao line was taken under shutdown on 8th Feb 2022 for Loop in Loop Out works of the said line at 765/400kV Obra C. and it was expected that the line works would be completed in 1-2 month and the same would be available before summer season of year 2022. However, it was brought out during discussion in 196th OCC meeting held on 22.06.2022 that

    - *"LILO of 765kV AnparaD-Unnao which were to be terminated at Obra have been reversed i.e. the bay in which AnparaD line was to be installed, Unnao line has been commissioned and vice-versa. The issue is there because reactor was to be commissioned in Obra-Unnao section whereas as per this scheme it is physically for AnparaD-Obra section."*

- The line could not be charged till date.

- It is important to understand that the said line is very critical for safe power evacuation from Singrauli-Anpara complex in case of any shutdown or line contingency. Due to absence of this lines, SPS is in service in the complex, which leads to generation shedding in case of outage of 765kV AnparaC-Unnao line beyond certain power order.

- Moreover, high loadings in other 400kV lines from Anpara is observed due to the absence of this line, which is leading to limitations on power flow of HVDC Vindhyachal Back To Back (BTB) HVDC (making power flow from Western Region (WR) to Northern Region(NR)). As Vindhyachal Back-to-back HVDC is not being taken towards NR, it further creates high loading on 765kV Vindhyachal-Varanasi D/C line which is an important line as it carries majority of the power imported by Northern region. Taking Vindhyachal BTB towards NR would relieve the loading of 765kV Vindhyachal-Varanasi D/C line especially during high demand season, therefore there is urgent requirement of revival of 765kV AnparaD-Unnao line especially before summer season in Northern region in view of ensuring grid reliability and security.

Members may deliberate kindly.

A.11 Multiple Generation loss event in ISTS RE complex in Western Rajasthan (Agenda by NRLDC)

A.11.1 NRLDC/GRID-INDIA vide mail dtd. 24.01.2023 has submitted that Multiple events of generation loss in Rajasthan RE generation complex of Northern Region were reported on dated 14th Jan 2023:

1. **Event 1: RE generation drop of approx. 1100MW in Rajasthan RE generation complex**

   At 12:06hrs, multiple elements tripping occurred at 220kV Heerapura S/s (Raj). As per PMU, R-N phase to earth fault in system is observed. At the same time, RE generation drop of approx. 1100MW(as per SCADA) observed in Rajasthan RE generation complex(connected at ISTS pooling stations)

2. **Event 2: RE Generation loss of around 2340 MW at 13:03hrs**

   At 13:03hrs, 765kV Ajmer-Bhadla2 ckt-2 tripped after unsuccessful A/R operation on permanent R-N fault. At the same time, reduction in RE generation of approx. 2340MW observed in Rajasthan RE generation complex (connected at ISTS pooling station).

3. **Event 3: RE Generation loss of around 3210 MW at 14:55hrs**

   At 14:55hrs, 400kV Bassi-Heerapura ckt-2 tripped on R-Y phase to phase fault. At the same time, significant reduction in RE generation also observed with delayed recovery due to non compliance of LVRT which led to the over voltage in system. On this over voltage multiple 765kV ISTS lines at 765kV pooling stations tripped. As per PMU, R-Y-N double phase to earth fault is observed.

As per SCADA, total reduction in RE generation of approx. 3210MW observed in Rajasthan RE generation complex (connected at ISTS pooling station).

4. **Event 4: RE Generation loss of around 4468 MW at 15:18hrs**

- At 15:18hrs, 400kV Phagi-Heerapura ckt-1 tripped on R-Y phase to phase fault. At the same time, significant reduction in RE generation also observed with delayed recovery due to non compliance of LVRT which led to the over voltage in system. On this over voltage multiple 765kV ISTS lines at 765kV pooling stations tripped. During same time, 400kV Fatehgarh1-Fatehgarh2-I also tripped on over voltage which was only emanating path left for RE generation at Adani Solar Park during. Prior to this, at 14:54 hrs on 14th Jan 2023, 400kV Fatehgarh1-Fatehgarh2-II tripped subsequent to multiple tripping at 765kV ISTS pooling station of RE on R-Y-N (L-L-G) fault at 400kV Bassi-Heerapura-II. Thus, evacuation path for 400kV Adani solar park loss at 15:18 hrs.

- At the same time, SPS to relive transmission congestions in Bikaner complex operated due to tripping of multiple 765kV lines at Bikaner(PG). On action of SPS, Thar Surya, SBSR, Tata Green Power and RENEW Power RE stations tripped. As per PMU, R-Y-N double phase to earth fault is observed. As per SCADA, total reduction in RE generation of approx. 4468MW observed in Rajasthan RE generation complex (connected at ISTS pooling station).

- NRLDC has separately taken up the matter with RE developers through emails/ letters as the faults were cleared timely and the RE generators failed to comply with present LVRT/ HVRT regulations.

- But, it can be seen that apart from LVRT/HVRT related issue, tripping were also there on account of loss of evacuation path, therefore, it is requested that the already delayed transmission system for RE evacuation Phase-II may be expedited, to avoid generation loss on account of loss of evacuation path.

To analyse the events in detail, following information are required from each Plant for all the event of 14th Jan 2023:

i. Active Power (MW) of Inverters terminal with resolution of atleast 50ms.
ii. Reactive Power (MVAR) of Inverters terminals with resolution of atleast 50ms.
iii. Instantaneous and RMS voltage at Inverter terminal with resolution of atleast 50ms.
iv. SOE of Plant showing tripping (if any) of 220kV lines, 220/33kV ICTs, 33kV feeders, 33/0.69 kV or 33/0.63 kV IDTs, Inverters.
v. Present implemented settings (Downloaded settings) from inverters for LVRT, HVRT, Active power Ramp up rate, Over & Under voltage and Over & Under frequency.
vi. Present implemented settings (Downloaded settings from PPC), firmware version of PPC.

vii. Reason for significant reduction in active power before any plant evacuating element tripping.
viii. Reason for slow active power ramp up rate.
ix. Reason for not injecting MVAR during the fault and not absorbing MVAR during high voltage.
x. Detailed report on the analysis done at Plant end for the events.
xi. Total generation reduction for the events may be segregated in following categories by the plant to identify the exact reason.

Reason for Generation loss	Quantum of Generation loss (MW) due mentioned reason
PLL Loss of Synchronism	
Momentary Cessation	
Slow Active Power Recovery	
Inverter AC Overvoltage	
Feeder AC Overvoltage	
Inverter AC Undervoltage	
Feeder AC Undervoltage	
Inverter DC Voltage Unbalance	
Inverter AC Overcurrent	
Inverter DC Overcurrent	
Inverter Overfrequency	
Inverter Underfrequency	
Inverter UPS Failure	
Tripping of Any elements (If any) and details thereof	

A.11.2 In all the events, RE generation reduced significantly at major of the RE plants. The generation at some plants picked up only after 2-3 minutes. This large outage of solar/wind generation could be interpreted either as failure of LVRT/HVRT capability of the PV inverters /WTG or tripping of lines/transformer connecting the plants to respective pooling stations leading to over voltage in system. Such behaviour during transients is neither expected nor desirable.

A.11.3 Latest status as available with NRLDC of details of present implemented settings at these plants is attached as (Annexure VIII)

A.11.4 Frequent voltage oscillation events have also been observed during solar generation period 10:00hrs-14:00hrs in Rajasthan control area as well as in ISTS RE pooling stations. In majority of the cases the oscillation frequency is observed to be around 2.5Hz with predominant oscillations in voltage.

In this situation, Rajasthan need to take following actions on immediate basis:

1. Improve the power factor and reduce the MVAr drawls at mentioned sub-stations in previous agenda.
2. Quantum of load and time block wise breakup being connected in Jodhpur-Kankani and Merta load center area may be reviewed.
3. Check whether oscillation is getting initiated on connecting load during Solar/Wind ramping period and when Rajasthan demand exceeds 14500MW.

4. Explore the possibilities of installing PMU at Kankani, Ramgarh, Akal,Bhadla (RS) and Bikaner (RS) substations to locate the exact source of oscillation and analyse Rajasthan Intra-state RE plants behavior during any event of fault.

A.11.5 Apart from above, it is requested that POWERGRID may expedite commissioning of STATCOMs in ISTS-RE Pooling substations. During commissioning of STATCOMs, it may be ensured that POD (power oscillation damping) functionality is enabled and study report of POD may be shared with NRLDC before first time charging for any comments/ observations.

A.11.6 CTU may also provide update regarding the utility of STATCOMs in damping out oscillations being observed in the grid and other remedial measures.

Members may deliberate kindly.

A.12 Connectivity of Central Control room of Sterlite with Hotline Exchanges (Agenda by NRLDC)

A.12.1 NRLDC/GRID-INDIA vide mail dtd. 24.01.2023 has submitted that Sterlite Power vide letter no: SPTL/O&M/2022-23/11/01 dated 25.11.2022 (**Annexure IX**)has informed that M/s Sterlite Power Transmission Limited is setting up Remote Control Centre at Gurugram intended as central coordination node of all assets/SPV's (including operational and under construction projects) of Sterlite Power.

A.12.2 So, for centralized coordination of the of SPTL central control room at Gurugram with NRLDC, STPL has requested NRLDC allow VOIP link connectivity access of their Control Room with NRLDC and onward towards all other RLDC's.

A.12.3 It may be noted that as per Communication Regulations, 2017 "The CTU shall provide access to its wideband network for grid management and asset management by all users."

A.12.4 In this regard, CTU is requested to update procedure to integrate with Hotline exchange. Matter was also discussed in 21st TeST Meeting held on 13.12.2022.

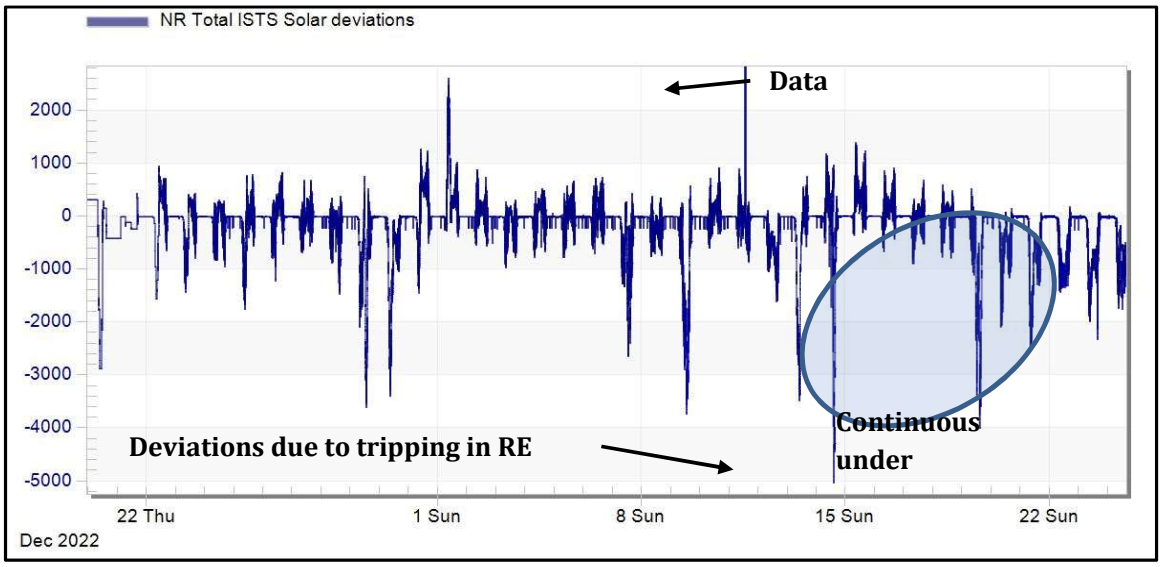
CTU to provide update.

A.13 Issues related to ISTS RE generators (Agenda by NRLDC)

Huge deviations by ISTS connected solar generation

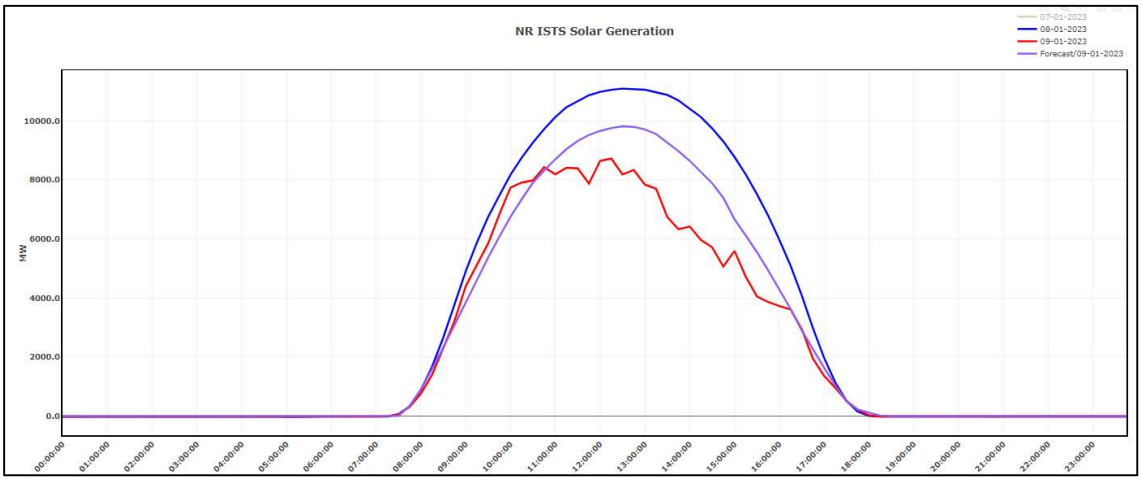
A.13.1 NRLDC/GRID-INDIA vide mail dtd. 25.01.2023 has submitted that they have emphasised many times that actual generation should not deviate from the schedule in order to maintain load generation balance and therefore grid frequency with in the IEGC band. However, it is being observed that there is a large difference between schedule and actual generation of RE plants connected to ISTS grid in Northern Region.

A.13.2 On number of days, during Dec-2022 to Jan-2023, there were huge deviations by ISTS Solar generators. Plot showing deviations of ISTS connected Solar generation in Northern region for 15Dec 2022 -22Jan 2023 is shown below:

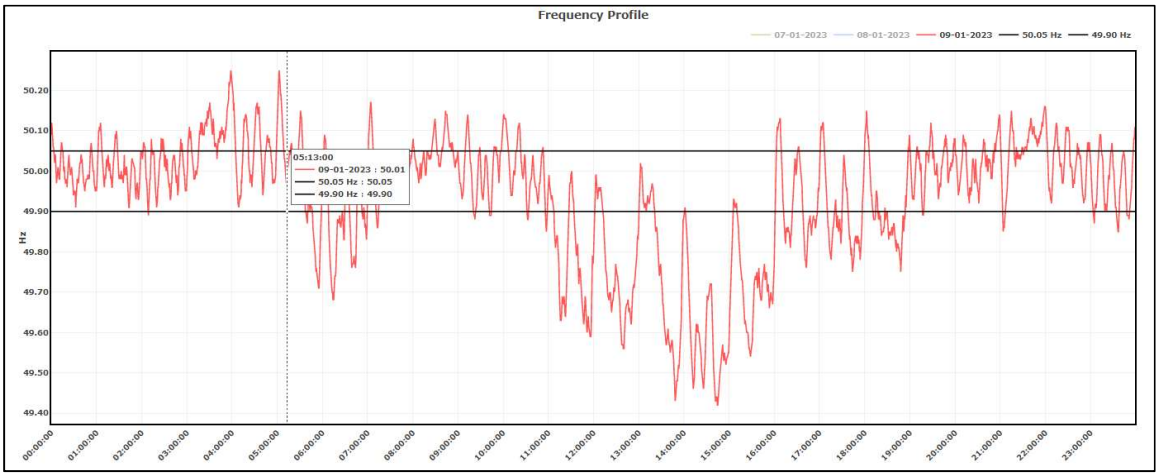


A.13.3 It can be seen that there are huge deviations by ISTS connected solar generators on some days. Managing the grid frequency due to such under injections becomes very challenging as schedule are also not timely revised by these generators.

A.13.4 For instance, on 9th Jan'23, approx. 2700MW difference was observed between 14:45 Hrs to 15:00 Hrs due to large variation in actual generation and schedule as shown below:



A.13.5 In the view of above the frequency even touched to 49.41Hz between 14:45 Hrs to 15:00 Hrs. Further continuously low grid frequency was observed from 11:00 Hrs to 16:00 Hrs during under injection of NR ISTS connected RE plants.



A.13.6 These events bring out followings;

1. Inaccurate forecast to take care of fog/cloud cover issues.
2. Poor utilization of schedule revision facilities by RE plants.

A.13.7 It is once again requested that RE developers improve the forecast as well as prompt schedule revision by observing ground conditions and fog/cloud forecasts.

Communication related Issues with RE plants

A.13.8 In the meeting held on 21st June 2022 with all RE developers, it was discussed and agreed to establish control room (24x7) with Landline/Mobile number, dedicated email id, address and shift operation timing.

A.13.9 Azure, Adani, Avaada and Renew have submitted details regarding common control room for communication with all plants under individual owners.

A.13.10 Moreover, on number of occasions it is being observed that the contact details provided at the time of registration/ first time charging details are changed and in real-time, NRLDC control room officers are not able to contact the responsible person.

A.13.11 It is requested that all other plants provide details of common control room and also regularly update contact details so that NRLDC is aware of the responsible person including control room operators of these RE plants for quick actions.

Members may deliberate kindly.

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File No.CEA-PS-14-95/1/2023-PSETD Division/66-71

Annexure I

भारत सरकार
Government of India
विद्युत मंत्रालय
Ministry of Power
केन्द्रीय विद्युत प्राधिकरण
Central Electricity Authority
विद्युत प्रणाली अभियांत्रिकी एवं प्रौद्योगिकी विकास प्रभाग
Power System Engineering & Technology Development Division
3rd Floor, Sewa Bhawan, R.K. Puram
New Delhi – 66, Telephone: 26732435
(Email: ce-psetd@gov.in)

To,

Shri Mukesh Kumar Sharma,
Director (Operations), Delhi Transco Limited,
Shakti Sadan, Kotla Road, New Delhi-110002

विषय: Requirement of 02 Nos. 500 MVA, 400/220 kV and 02 Nos. 160 MVA, 220/66 kV Power Transformers-reg.

महोदय,

Please refer to your letter No. F.DTL/Dir(O)/201/2022-23/F.03/216 dated 11.01.2023 on the subject matter vide which CEA was requested to direct other State Transmission Utility (STUs) to provide 02 Nos. 500 MVA and 02 Nos. 160 MVA Transformers on returnable basis or cost-plus basis so that DTL may have spare Power Transformers in-hand to overcome any exigency during the period of G-20 events scheduled to be held in Delhi in the year 2023.

2. It is understood that DTL was well aware in advance about the hosting of G-20 Summit in the year 2023 by India and many related events including Summit to be held in Capital city of Delhi. Therefore, keeping in view, the importance of the said event, DTL may have taken the advance action for ensuring the availability of the spare transformers for the reliable power supply in the said event.

3. In this regard, it is to mention that CEA would explore and assess the availability of the spare transformers with constituent of Northern Region for making available to DTL. However, DTL has also to take the necessary action in this regard for getting the spare transformers for ensuring the reliability of power supply during G-20 event.

भवदीय/ Regards

23/01/2023

(भंवर सिंह मीना /Bhanwar Singh Meena)
उपनिदेशक/ Deputy Director

Copy to:

1. Joint Secretary (Transmission), Ministry of Power
2. Member Secretary, NRPC-With a request to take up the issue with constituent members of NRPC to facilitate requested capacity Power Transformers to DTL on returnable or cost-plus basis.
3. SA to Chairperson, CEA
4. SA to Member (GO&D), CEA
5. SA to Member(PS), CEA

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.

from Dhaulasidh to Sujanpur with single zebra configuration along with two number of 220kV bays at Sujanpur. Accordingly, it was decided that SJVNL to approach HPPTCL for grant of connectivity and CTU to revoke the connectivity granted & revise LTA for Dhaulasidh HEP at Hamirpur.

HPPTCL vide intimation dated 15/12/2021 had granted Connectivity to Dhaulasidh HEP (66 MW) through HPPTCL transmission system subject to capex approval of Sujanpur switching station by HPERC. In the 3rd CMETS meeting, SJVN requested to keep the revocation of Connectivity under ISTS on hold till resolution of capex approval issue as per HPPTCL intimation.

Subsequently, SJVNL vide email dated 14/06/2022 reverted that matter regarding capex approval as well as the evacuation of power from Dhaulasidh HEP through the HPPTCL network has been discussed and resolved with HPPTCL. SJVNL has also submitted the application for grant of LTA for Dhaulasidh HEP to /HPPTCL, which is under process.

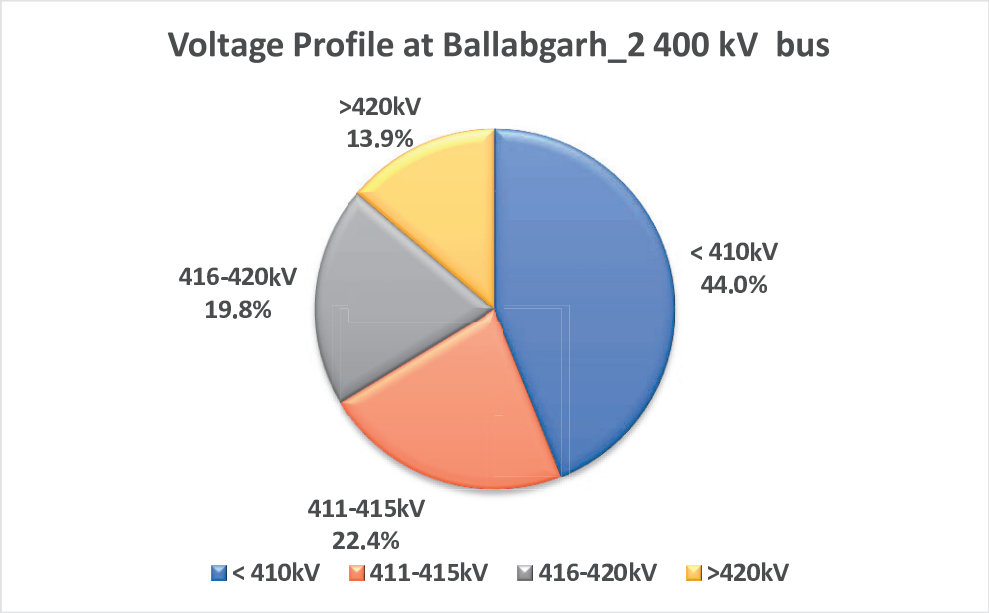
In view of above, it was decided that Connectivity granted to SJVN Ltd. for Dhaulasidh HEP in ISTS shall to be revoked and LTA in ISTS for the same shall also be revised for connectivity with the grid through HPPTCL's system.

B. ISTS Expansion in Northern Region

1. Replacement of 420kV 80 MVAR 3-Ph Bus Reactor at Ballabgarh

It was deliberated that in the 53rd NRPC meeting held on 29.04.22, POWERGRID agenda for replacement of 420kV 80 MVAR 3-Ph Bus Reactor at Ballabgarh was discussed. POWERGRID had approached CPRI to carry out Residual Life Assessment Studies for the 80 MVAR bus reactor at 400 kV Ballabgarh S/s. The bus reactor has completed 32 years of service and thus crossed its useful life of 25 years from commissioning. CPRI has recommended a replacement for the same. Considering above, NRPC decided that the matter may first be discussed in the Consultative Meeting of NR.

From the study results it was observed that taking the 80 MVAr bus reactor into service results in a voltage drop of around 1 kV at Ballabgarh Bus. If the 80 MVAr bus reactor is replaced with 125 MVAr the resultant voltage drop is around 2 kV. Voltage profile of 400 kV Ballabgarh S/s for the last one year (June'21-June'22) is as under:



From above, it may be seen that 400kV Ballabgarh S/s voltage remained >415 kV for about 34% time. Considering above and the high voltage prevailing in NR grid, it is recommended to replace 420 kV 80MVAr bus reactor at Ballabgarh with 420 kV 125 MVAr bus reactor.

CEA and POSOCO also recommended for Replacement of 80MVAR (420kV) Bus Reactor at Ballabgarh S/s with 125 MVAR (420kV) Bus Reactor in view of prevailing high voltage issues in NR. POWERGRID also confirmed feasibility of replacement. In view of above, proposal for 125 MVAR (420kV) Bus Reactor was agreed.

2. Implementation of "N -1" contingency at RE pooling substations in NR

It was deliberated that CEA transmission planning criteria, section 16.2 mentions that "The *'N-1' criteria may not be applied to the immediate connectivity of wind/solar farms with the ISTS/Intra-STS grid i.e. the line connecting the farm to the grid and the step-up transformers at the grid station."* The above criteria is also followed in planning of transmission system for integration of renewable energy zones in Rajasthan.

Annexure IV

सेंट्रल ट्रांसमिशन यूटिलिटी ऑफ इंडिया लिमिटेड
(पावर ग्रिड कॉर्पोरेशन ऑफ इंडिया लिमिटेड के स्वामित्व में)
(भारत सरकार का उद्यम)
CENTRAL TRANSMISSION UTILITY OF INDIA LTD.
(A wholly owned subsidiary of Power Grid Corporation of India Limited)
(A Government of India Enterprise)

Ref.: C/CTU/AI/00/9th CCTP

28th November 2022

OFFICE MEMORANDUM

Sub: Inter-State Transmission Schemes (costing up to Rs.100 Cr.) to be taken up for implementation under Regulated Tariff Mechanism (RTM).

The undersigned is directed to inform that CTU has approved the implementation of the following ISTS costing less than or equal to Rs.100 Cr. in line with the MoP office order dated 28.10.2021 under the Regulated Tariff Mechanism (RTM) mode by the implementing agencies as indicated in the table below:

Sl.	Name of scheme	Implementing Agency
Western Region		
1.	Implementation of 1 no. 220kV line bay at Bhuj PS for providing Connectivity to M/s NTPC Renewable Energy Ltd. (300MW)	Power Grid Corporation of India Ltd.
2.	Transmission System for providing connectivity to M/s VEH Jayin Renewables Pvt. Ltd. at Rajgarh (PG) S/s	Power Grid Corporation of India Ltd.
3.	Western Region Expansion Scheme XXXI (WRES-XXXI): Part C	Power Grid Corporation of India Ltd.
4.	Western Region Expansion Scheme XXXIII (WRES-XXXIII): Part D	Power Grid Corporation of India Ltd.
Northern Region		
5.	Implementation of 2 nos. of 220 kV line bays at 400/220 kV Panchkula (Barwala) (PG) S/s for interconnection with 220 kV Dera Bassi S/s.	Power Grid Corporation of India Ltd.
6.	Replacement of 1x315 MVA 400/220kV ICT (ICT-1) at 400/220 kV Ludhiana (PG) S/s with 1x500 MVA 400/220kV ICT	Power Grid Corporation of India Ltd.
7.	Replacement of 1x250 MVA, 400/220 kV ICT at 765/400/220 kV Moga (PG) S/s with 1x500 MVA 400/220kV ICT along with associated works at 220kV level.	Power Grid Corporation of India Ltd.
8.	Augmentation of Transformation Capacity by 1x500 MVA, 400/220kV ICT (3rd) at 400/220 kV Patran (GIS) S/s	Patran Transmission Company Ltd. (PTCL) (a subsidiary of India Grid Trust)
9.	Implementation of 1 no. of 220 kV line bay at 400/220kV Bikaner-II PS for interconnection of solar project (M/s NHPC Ltd.):	POWERGRID Bikaner Transmission System Ltd. {a subsidiary of Power Grid Corporation of India Ltd. [erstwhile known as Bikaner-II Bhiwadi Transco Ltd.]

Eastern Region		
10.	Eastern Region Expansion Scheme-XXX (ERES-XXX)	Power Grid Corporation of India Ltd.
11.	Eastern Region Expansion Scheme-XXXIII (ERES-XXXIII)	Power Grid Corporation of India Ltd.
North Eastern Region		
12.	North Eastern Region Expansion Scheme-XVIII (NERES-XVIII)	Power Grid Corporation of India Ltd.
13.	North Eastern Region Expansion Scheme-XX (NERES-XX)	Power Grid Corporation of India Ltd.
Southern Region		
14.	Implementation of 1 no. 400kV line bay at Kurnool New S/s for providing Connectivity to M/s Greenko AP01 IREP Pvt. Ltd. (2nd 400kV line bay for M/s Greenko)	Power Grid Corporation of India Ltd.

The detailed scope of works for the above transmission schemes, as approved by CTU is given at **Annexure-I**.

Implementing agencies shall enter into a concession agreement with CTU for the implementation of the above-mentioned schemes through the Regulated Tariff Mechanism (RTM).

This issues with the approval of Competent Authority.

Jasbir Singh
28/12/22

(Jasbir Singh)
Chief General Manager

Encl: as stated.

To:

1. **The Chairman & Managing Director** Power Grid Corporation of India Ltd., Saudamini, Plot No. 2, Sector-29, Gurgaon- 122 001	2. **Shri Lokendra Singh Ranawat** Head (Regulatory) Patran Transmission Company Ltd., (PTCL) (a subsidiary of India Grid Trust) Unit No. 101, First Floor, Windsor, Village KoleKalyan, off CST Road, Vidyanagari Marg, Kalina, Santacruz (East), Mumbai – 400 098

Copy to:

1. **Shri Ishan Sharan** Chief Engineer & Member Secretary (NCT) Central Electricity Authority Sewa Bhawan, R. K. Puram, New Delhi-110 066.	2. **Shri Goutam Ghosh** Director (Trans) Ministry of Power, Shram Shakti Bhawan, Rafi Marg, New Delhi 110 001

Annexure-I

Western Region

1. Implementation of 1 no. 220kV line bay at Bhuj PS for providing Connectivity to M/s NTPC Renewable Energy Ltd. (300MW)

Sl.	*Scope of the Transmission Scheme*	*Capacity /km*	*Implementation Timeframe.*
1	1 no. 220kV line bay at Bhuj PS associated with M/s NTPC Renewable Energy Ltd. (300MW)	220kV line bay: 1 no.	15 months from the date of issue of OM by CTUIL (*refer Note a*).
		Total Estimated Cost:	**INR 5.84 Crore**

Note:

a. Best efforts shall be carried out to implement the transmission scheme within 12 months from the issue of OM by CTUIL.

2. Transmission System for providing connectivity to M/s VEH Jayin Renewables Pvt. Ltd. at Rajgarh (PG) S/s

Sl.	*Scope of the Transmission Scheme*	*Capacity /km*	*Implementation Timeframe.*
1.	220kV bus extension (GIS) of Rajgarh 400/220 kV (PG) S/s along with 220kV Bus Coupler bay for extended bus.	• Bus Extension along with 220kV Bus coupler bay- 1 no. using GIS • Space provision in 220kV GIS Hall for accommodating 5 nos. 220kV future bays	21 months from the issue of OM by CTUIL.
2.	220kV bus sectionaliser bay (GIS) between existing & extended 220 kV bus of Rajgarh S/s.	• 220kV Bus Sectionaliser – 1 set (GIS)	
3.	220kV GIS line bay at Rajgarh 400/220 kV (PG) S/s (on extended bus) for RE interconnection.	• 220kV line bay: 1 no. (GIS) along with 220kV Bus Duct for Bus Extension (AIS to GIS building)	
		Total Estimated Cost:	**INR 29.33 Crore**

3. Western Region Expansion Scheme XXXI (WRES-XXXI): Part C

Sl.	*Scope of the Transmission Scheme*	*Capacity /km*	*Implementation Timeframe.*
1.	Augmentation of transformation capacity at Pune (GIS) 765/400	• 765/400 kV, 1500 MVA ICT – 1 no.	21 months from the issue of OM by CTUIL (refer note-a)

Sl.	Scope of the Transmission Scheme	Capacity /km	Implementation Timeframe.
	kV substation by 1x1500 MVA ICT (3rd)	• 400 kV ICT bay (GIS) – 1 no. • 765/400kV, 1500MVA ICT in existing bay with GIS bus duct along with associated GIS to AIS termination, Erection hardware are required.	
		Total Estimated Cost:	**INR 86.01 Crore**

Note:

a. Best efforts shall be carried out to implement the transmission scheme within 18 months from the issue of OM by CTUIL.

b. 1 no. 765kV ICT bay is available (up to wall of GIS building)

4. Western Region Expansion Scheme XXXIII (WRES-XXXIII): Part D

Sl.	Scope of the Transmission Scheme	Capacity /km	Implementation Timeframe.
1.	Installation of 1x500 MVA, 400/220 kV ICT (4th) along with associated ICT bays at Satna(PG)	• 400/220 kV, 500 MVA ICT – 1 no. • 400 kV ICT bay – 1 no. • 220 kV ICT bay – 1 no. (includes 220kV Cable interconnection for 220kV side of ICT)	18 months from the issue of OM by CTUIL
2.	2 No. of 220kV line bays at Satna for LILO of Satna 220kV - Maihar 220kV line at Satna (PG) S/s	220kV line bay – 2 nos.	
		Total Estimated Cost:	**INR 77.52 Crore**

Northern Region

5. Implementation of 2 nos. of 220 kV line bays at 400/220 kV Panchkula (Barwala) (PG) S/s for interconnection with 220 kV Dera Bassi S/s

Sl. No.	Scope of the Transmission Scheme	Capacity/km	Implementation timeframe
1	Implementation of 2 nos. of 220 kV line bays at 400/220 kV Panchkula (Barwala) (PG) S/s for interconnection with 220 kV Dera Bassi S/s	220 kV line bays – 2 nos.	31.05.24
		Total Estimated Cost:	**INR 11.68 Crore**

6. Replacement of 1x315 MVA 400/220kV ICT (ICT-1) at 400/220 kV Ludhiana (PG) S/s with 1x500 MVA 400/220kV ICT

Sl. No.	Scope of the Transmission Scheme	Capacity/km	Implementation timeframe
1	Replacement of 1x315 MVA 400/220kV ICT (ICT-1) at 400/220 kV Ludhiana (PG) S/s with 1x500 MVA 400/220kV ICT * *along with 66kV cable for shifting auxiliary supply to SVC from ICT-1 to ICT-2	500 MVA 400/220 kV ICT- 1no.	18 months from the issue of OM by CTUIL (refer note-a)
		Total Estimated Cost:	**INR 26.98 Crore**

Note:

a. *TSP may expedite the implementation of the above transmission scheme to the extent possible, as per the request of PSTCL vide letter dated 06.09.22 for implementation schedule of May'23 (reconfirmed to 31.05.23 vide mail dated 01.11.22)*

7. Replacement of 1x250 MVA, 400/220 kV ICT at 765/400/220 kV Moga (PG) S/s with 1x500 MVA 400/220kV ICT along with associated works at 220kV level

Sl. No.	Scope of the Transmission Scheme	Capacity/km	Implementation timeframe
1.	Replacement of 1x250 MVA, 400/220 kV ICT at 765/400/220 kV Moga (PG) S/s with 1x500 MVA 400/220kV ICT along with associated works at 220 kV level	500 MVA 400/220 kV ICT- 1no. (with associated works at 220 kV level)	18 months from the issue of OM by CTUIL (refer note a)
		Total Estimated Cost:	**INR 27.03Crore**

Note:

a. *TSP may expedite the implementation of the above transmission scheme to the extent possible, as per the request of PSTCL vide letter dated 06.09.22 for implementation schedule of May'23 (reconfirmed to 31.05.23 vide mail dated 01.11.22)*

8. Augmentation of Transformation Capacity by 1x500 MVA, 400/220kV ICT (3rd) at 400/220 kV Patran (GIS) S/s

Sl. No.	Scope of the Transmission Scheme	Capacity/km	Implementation timeframe
1.	Augmentation of Transformation Capacity by 1x500 MVA, 400/220kV ICT (3rd) at 400/220 kV Patran (GIS) S/s along with GIS duct (at 400kV and 220kV) in new diameter of ICT – Tie– Line.	• 500 MVA 400/220 kV ICT- 1no. • 400 kV ICT bay (GIS) – 1 no. • 400kV bay (GIS) for diameter completion for	21 months from the issue of OM by CTUIL.

		future line (duct up to outside GIS Hall) – 1 no. • 220 kV ICT bay (GIS) – 1 no.	
		Total Estimated Cost:	**INR 65.19 Crore**

Note:

a. *Best efforts shall be carried out to implement the transmission scheme by 31.05.2024 as per the request of PSTCL letter vide dated 06.09.22 and mail dated 01.11.2022*

9. Implementation of 1 no. of 220 kV line bay at 400/220kV Bikaner-II PS for interconnection of solar project (M/s NHPC Ltd.)

Sl. No.	Scope of the Transmission Scheme	Capacity/km	Implementation timeframe
1.	1 no. of 220 kV line bay at 400/220 kV Bikaner-II PS for interconnection of RE project (NHPC Ltd.)	• 220 kV line bay – 1 no. (refer note a)	15 months from the issue of OM by CTUIL
2.	Implementation of 220kV Bus sectionalizer along with bus coupler and transfer bus coupler at 400/220kV Bikaner–II PS	• 220kV Bus Sectionalizer Bay–1 Set • 220kV Bus Coupler Bay–1 No. • 220kV Transfer Bus Coupler Bay–1No. • Bus works for future Bays (4 Nos. of Line Bays & 3 Nos. of ICT Bays)	
		Total Estimated Cost:	**INR 29.21 Crore**

Note:

a. *At 220 kV Bikaner-II, future line bays in Section-C are proposed to be allocated to RE developers with bays in developer's scope (no. 230-231) and ISTS scope (no. 226-227). Accordingly, 220 kV bus works may also be suitably taken up under the above scope.*

Eastern Region

10. Eastern Region Expansion Scheme-XXX (ERES-XXX)

Sl. No.	Scope of the Transmission Scheme	Capacity/km	Implementation timeframe

1.	Installation of existing spare 132/66kV, 1x50MVA ICT (already stationed at Gangtok) as 3rd ICT at Gangtok (POWERGRID) S/s along with conversion of existing 132kV TBC bay as 132kV ICT bay for 3rd ICT and construction of new 66kV ICT bay in Hybrid/Outdoor GIS with suitable modification in the gantry structure of 66kV side.	• 132/66kV, 50MVA spare ICT as 3rd ICT – 1 no. • Conversion of 132kV TBC bay to ICT bay – 1 no. • New 66kV ICT bay (in Hybrid/Outdoor GIS) – 1 no.	21 months from the issue of OM by CTUIL (*best efforts may be made for early commissioning to the extent possible)*
2.	Construction of new 132kV TBC bay in Hybrid/Outdoor GIS.	• New 132kV TBC bay (in Hybrid/Outdoor GIS) – 1 no.	
		Total Estimated Cost:	**INR 11.64 Crore**

11. Eastern Region Expansion Scheme-XXXIII (ERES-XXXIII)

Sl. No.	Scope of the Transmission Scheme	Capacity/km	Implementation timeframe
1.	Reconductoring of Rangpo – Gangtok 132kV D/c line with single HTLS conductor of 800A (at nominal voltage level).	Ckt-1: 28km Ckt-2: 26km	24 months from the issue of OM by CTUIL.
2.	Upgradation of CTs at Gangtok end in both circuits of Rangpo – Gangtok 132kV D/c line from 600A to rating commensurate with rating of HTLS conductor (800A)	-	
		Total Estimated Cost:	**INR 23.08 Crore**

North Eastern Region

12. North Eastern Region Expansion Scheme-XVIII (NERES-XVIII)

Sl. No.	Scope of the Transmission Scheme	Capacity/km	Implementation timeframe
1.	Reconductoring of Melriat (GIS) (POWERGRID) – Zuangtui (Mizoram) 132kV ACSR Panther S/c line with Single HTLS conductor of 900A (at nominal voltage level) ***Note:*** *The existing line bay and dead tower at Melriat (POWERGRID) end of Melriat (POWERGRID) – Zuangtui (Mizoram) 132kV HTLS S/c line may be kept as spare bay after shifting of the line to newly constructed bay.*	10.13km	Apr 2025

2.	One (1) new 132kV line bay at Melriat (GIS) (POWERGRID) S/s (of rating commensurate with rating of HTLS viz. 900A) for shifting of Melriat (GIS) (POWERGRID) – Zuangtui (Mizoram) 132kV HTLS line from existing bay and termination of the HTLS line in the new bay (0.5km including approx. 5 nos. towers)	• 132kV GIS line bay – 1 no. • New 132kV S/c HTLS line section – 0.5km *(including approx. 5 nos. towers)*	
3.	Replacement of existing CT of 600/1A at Zuangtui (Mizoram) end in Melriat (GIS) (POWERGRID) – Zuangtui (Mizoram) 132kV S/c line with rating commensurate with ampacity (900A) of HTLS conductor.	-	
4.	Reconductoring of Aizawl (POWERGRID) – Luangmual (Mizoram) 132kV ACSR Panther S/c line with Single HTLS conductor of 800A (at nominal voltage level)	0.8km	
5.	Replacement of existing CT of 600/1A at Luangmual (Mizoram) end in Aizawl (POWERGRID) – Luangmual (Mizoram) 132kV S/c line with rating commensurate with ampacity (800A) of HTLS conductor.	-	
6.	Installation of OPGW in Aizawl (POWERGRID) – Luangmual (Mizoram) 132kV S/c line	0.8km	
		Total Estimated Cost:	**INR 11.49 Crore**

13. North Eastern Region Expansion Scheme-XX (NERES-XX)

Sl. No.	Scope of the Transmission Scheme	Capacity/km	Implementation timeframe
1.	Reconductoring of existing Single ACSR Panther Kopili (NEEPCO) – Khandong (NEEPCO) 132kV S/c line-1 (10.9km) of POWERGRID with Single HTLS conductor of ampacity of 800A (at nominal voltage level) along with replacement of existing wave trap at Kopili end and CT at Khandong end with rating commensurate with ampacity (800A) of HTLS conductor	10.9km	24 months from the issue of OM by CTUIL.
2.	Reconductoring of existing Single ACSR Panther Khandong (NEEPCO) – Khliehriat (POWERGRID) 132kV S/c line-1 (42.48km) of POWERGRID with Single HTLS conductor of ampacity of 800A (at nominal voltage level) along with replacement of existing CTs at both ends with rating commensurate with ampacity (800A) of HTLS conductor.	42.48km	

3.	Reconductoring of existing Single AAAC Panther Khandong (NEEPCO) – Khliehriat (POWERGRID) 132kV S/c line-2 (40.93km) of POWERGRID with Single HTLS conductor of ampacity of 800A (at nominal voltage level) along with replacement of existing CTs at both ends & wave trap at Khandong end with rating commensurate with ampacity (800A) of HTLS conductor, and strengthening of requisite tower members (approx. 0.348 MT).	40.93km	
4.	Reconductoring of existing Single ACSR Panther Khliehriat (POWERGRID) – Khliehriat (MePTCL) 132kV S/c POWERGRID line-1 (7.8km) of POWERGRID with Single HTLS conductor of ampacity of 800A (at nominal voltage level) along with replacement of existing CTs at both ends with rating commensurate with ampacity (800A) of HTLS conductor, and strengthening of requisite tower members (approx. 0.121 MT).	7.8km	
5.	Reconductoring of existing Single AAAC Panther Khliehriat (POWERGRID) – Badarpur (POWERGRID) 132kV S/c line (76.64km) with Single HTLS conductor of ampacity of 900A (at nominal voltage level) along with replacement of existing CTs at both ends with rating commensurate with ampacity (900A) of HTLS conductor.	76.64km	
6.	Replacement of existing bus coupler bay CT at Khandong HEP (NEEPCO) switchyard from 600A to 800A		
		Total Estimated Cost:	**INR 77.04 Crore**

Southern Region

14. Implementation of 1 no. 400kV line bay at Kurnool New S/s for providing Connectivity to M/s Greenko AP01 IREP Pvt. Ltd. (2nd 400kV line bay for M/s Greenko)

Sl. No.	Scope of the Transmission Scheme	Capacity/km	Implementation timeframe
1	Implementation of 1 no. 400kV line bay at Kurnool New S/s for providing Connectivity to M/s Greenko AP01 IREP Pvt. Ltd. (2nd 400kV line bay for M/s Greenko)	• 400kV line bay – 1 No (Bay No. 412, SLD enclosed).	15 months from the issue of OM by CTUIL (refer note a.)
		Total Estimated Cost:	**INR 8.55 Crore**

Note:

a. *Best efforts shall be carried out to implement the transmission scheme by 15.12.2023 as per the request of M/s Greenko AP01 IERP Pvt. Ltd. in its application / grant for enhancement of Connectivity.*

A Venu Prasad I.A.S.
Chairman-cum-Managing Director

PUNJAB STATE TRANSMISSION CORPORATION LIMITED

Phone : 0175-2212053
Fax : 0175-2307779
E-mail : cmd@pstcl.org

D.O. No. 673/SPS/D(T)

Punjab State Transmission Corporation Ltd.
Regd. Office : PSEB Head Office,
The Mall, Patiala - 147 001
CIN No. : U40109PB2010SGC033814

Date. 25-11-2022.

Subject: **Addition/ Augmentation at 400kV Substations of PGCIL in the Punjab Control Area.**

*****

Dear K. Sreekant ji,

Following additions/ augmentations have been approved in the 57th NRPC and 11th CMETS meeting which are to be carried out at PGCIL substations, before the onset of next summer/ paddy season i.e. by 31.05.2023.

Sr. No.	Description	Status
1.	Augmentation of one 315 MVA 400/220kV ICT with 1 No. 500MVA 400/220kV ICT at 400KV PGCIL Ludhiana.	Work is to be allotted.
2.	Augmentation of one 250 MVA 400/220kV ICT with one 500MVA 400/220kV ICT at 400KV PGCIL Moga.	Work is to be allotted, one 500MVA ICT available at Malerkotla
3.	Addition of one 500MVA 400/220kV ICT at Work in progress 400KV PGCIL Patiala (Faggan Majra).	Work in progress.

The above works are very critical for the power supply needs and ISTS ATC/ TTC limits of the State. You are requested to impart instructions to the concerned officers to complete all these three works within the stipulated time i.e. by 31st May 2023.

With Regards.

Yours sincerely,

(A Venu Prasad)

Sh. K Sreekant,
Chairman & Managing Director,
Power Grid Corporation of India Limited,
Gurgaon.

Annexure V

e. Upgradation of SCADA

i. POWERGRID apprised that upgradation of SCADA project is likely to be commissioned from January, 2025 to June, 2025 in phased manner. Accordingly, RLDCs/State utilities may extend their ongoing AMC contract for a period of two years as per provisions of AMC contracts.

ii. RVPN stated that AMC is done by POWERGRID only.

iii. POWERGRID stated that they may explore the contract document and accordingly AMC may be done by POWERGRID or State as mentioned in contract document.

A.2.5 Himachal Pradesh raised issue that insurance has been expired last year and is due for renewal. The same has been requested to POWERGRID.

A.2.6 POWERGRID stated payment of insurance cost is pending from states. However, the matter shall be taken up at appropriate level by POWERGRID.

A.2.7 Some states also raised issue that SIEMENS does not listen to them. POWERGRID assured to take up the matter.

A.3 Provision of Phasor measurement units (PMUs) at POI in RE feeders in Rajasthan (agenda by POWERGRID)

A.3.1 CGM, POWERGRID apprised that in the wake of recent grid disturbances in Northern region (RE complex in Rajasthan), a meeting of various stakeholders was convened by POSOCO on 21 September 2022 to discuss the relevant issues. The issue of lack of oscillography data at Inverter terminals and POI was discussed during the meeting. In this context, POSOCO requested POWERGRID to make provision for phasor measurement units (PMUs) at Point of interconnection (POI) i.e. POWERGRID bus and integrate the same in NRLDC system for capturing data during such events.

A.3.2 A list of RE feeders (including upcoming RE generators) terminating at various pooling stations of POWERGRID in Rajasthan is as below (List attached as Annexure-I of agenda):

S. N.	POWERGRID pooling substation	No. of RE feeders (nos.)
1	765/400/220kV Fatehgarh-2 substation	23
2	765/400/220kV Bhadla substation	14
3	765/400/220kV Bhadla-II substation	18

4	765/400/220kV Bikaner substation	8
		63

A.3.3 On the request of POSOCO, it is proposed to install PMUs in above mentioned 63 nos. feeders connected to RE generators for improved dynamic snapshot of the system during grid events/disturbances. The total estimated cost of installation of PMUs in 63 nos. feeders is Rs. ~14.0 Cr.

A.3.4 MS, NRPC enquired that as PMU is available at generator end located generally at 10-20 km distance of POI sub-station, whether data from same PMU can be used for analysis at sub-station end.

A.3.5 CGM, NRLDC stated that PMU at point of inter-connection is required for examining regulatory compliance of RE generators. There may be slight difference due to distance between generator ends and sub-station. However, possibility of accommodating 2 feeders in 1 PMU may be explored. Future projects may also be kept in mind while finalizing PMU numbers and locations.

A.3.6 POWERGRID stated that 1 PMU may accommodate 2 feeders only when both are in same kiosk. He also highlighted that PMU at both ends are required considering dynamics of power flow.

A.3.7 CGM, NRLDC stated that a sub-committee has been constituted under Member Secretary, WRPC. Its report may also be referred.

A.3.8 MS, NRPC stated that report from WRPC sub-committee may be asked and thereafter matter may be discussed in upcoming NRPC meeting.

A.4 UPPCL request for review of SRPC methodology in view of issue of calculation of transmission charges for UPPCL share in UCH Stage-II (132 MW), UCH Stage-III (66 MW) (Agenda by NRPC Sectt.)

A.4.1 Forum was apprised that the issue was discussed in 57th NRPC meeting wherein it was decided that the issue may be discussed separately at NRPC Secretariat.

A.4.2 A separate meeting was held on 23 September 2022 at NRPC Sectt., New Delhi, wherein, the issue was discussed (MoM attached as Annexure-II of agenda) and it was concluded that:

(i) As per SRPC methodology, UP's request for exemption in transmission charges in case of UCH-II, & UCH-III is not tenable as STU network is not sufficient to evacuate its share.

पावरग्रिड
POWERGRID

पावर ग्रिड कॉर्पोरेशन ऑफ इंडिया लिमिटेड
(भारत सरकार का उद्यम)
POWER GRID CORPORATION OF INDIA LIMITED
(A Government of India Enterprise)

C/AM/

Date: 04th Nov 2022

To
The Member Secretary,
Western Regional Power Committee,
F3 MIDC Area, Marol,
Andheri East, Mumbai 400093

Subject: WRPC sub-committee report on Phasor Measurement Units (PMUs) at POI in RE feeders

Dear Sir,

Bhadla-Fatehgarh RE Complex in Rajasthan is a major source of renewable generation in the Northern Grid. Recently, few incidents of generation loss in this complex have occurred which could be categorized as near-miss Grid events.

On 11th Sep'22 there was loss of approximate 1100 MW RE generation. This led to trippings of multiple 765kV lines connected at these stations, due to overvoltage. A similar incidence had also occurred on 11th Aug'22 in which there was loss of approx. 6100 MW RE generation.

Further, a meeting of various stakeholders was convened by POSOCO on 21st Dec'22 to discuss the relevant issues. The issue of lack of oscillography data at Inverter terminals and POI was discussed during the meeting. In this context, POSOCO requested POWERGRID to make provision for phasor measurement units (PMUs) at Point of interconnection (POI) i.e. POWERGRID bus and integrate the same in NRLDC system for capturing data during such events.

On request of POSOCO, POWERGRID proposed to install the PMUs in feeders connected to RE generators for improved dynamic snapshot of the system during grid events/ disturbances.

The matter was discussed in 58th NRPC meeting held on 30/09/2022. During the meeting, NRLDC stated that a committee has been constituted under MS, WRPC. In response MS, NRPC stated that report from WRPC sub-committee may be asked and thereafter matter may be discussed in upcoming NRPC meeting. The relevant excerpts of MOM of 58th NRPC is attached for ready reference.

In view of the above, it is requested to provide the report of WRPC sub-committee on installation of PMUs at POI.

Thanking you.

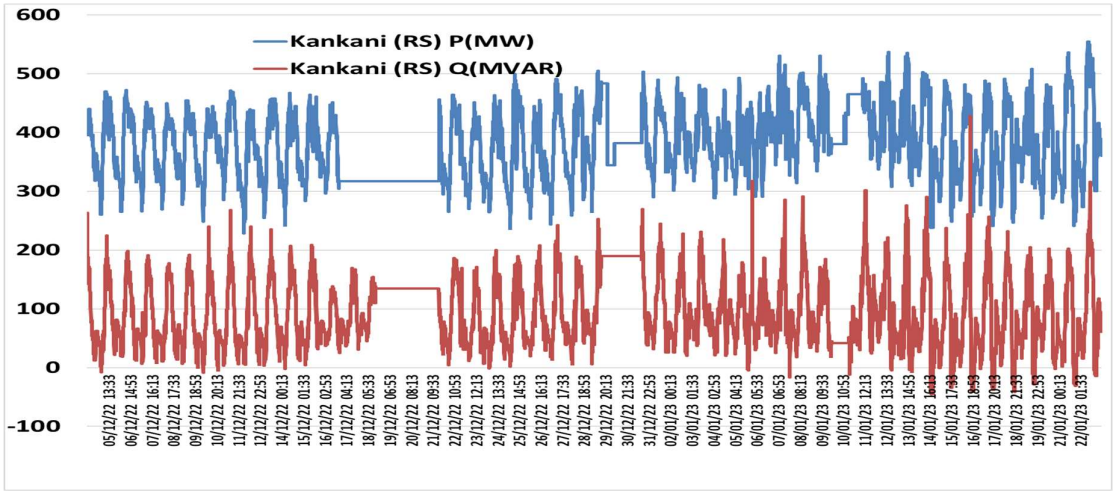
Yours faithfully

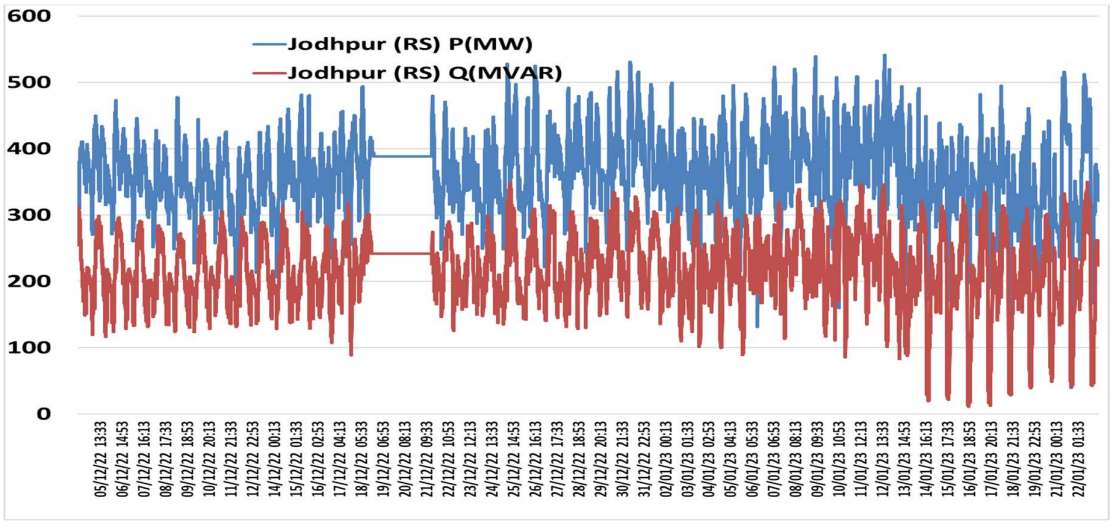
4/11

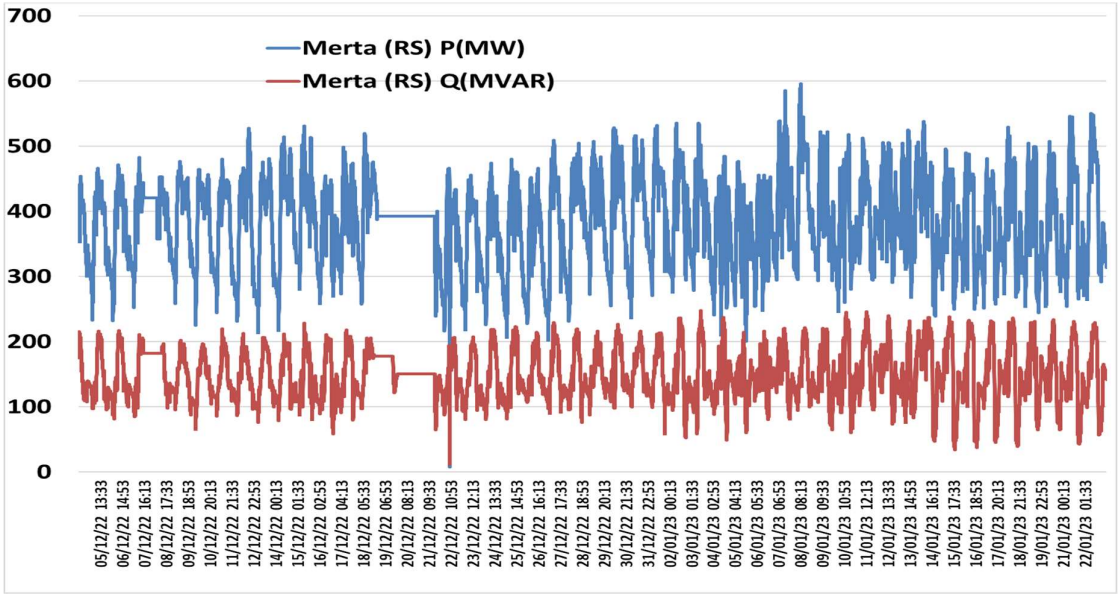
(Y.K. Dixit)
Executive Director

Copy: **MS, NRPC**

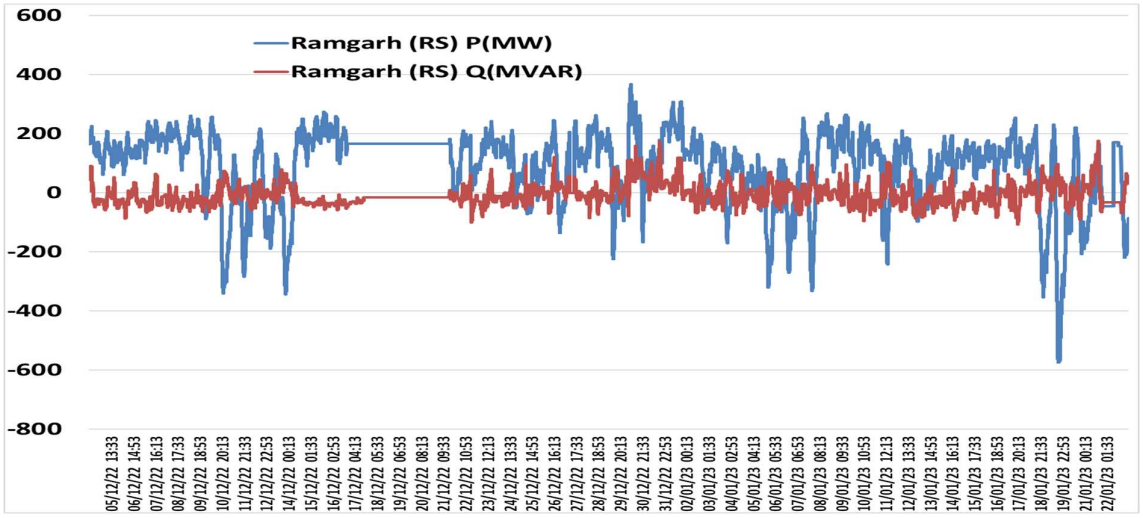
Annexure VI

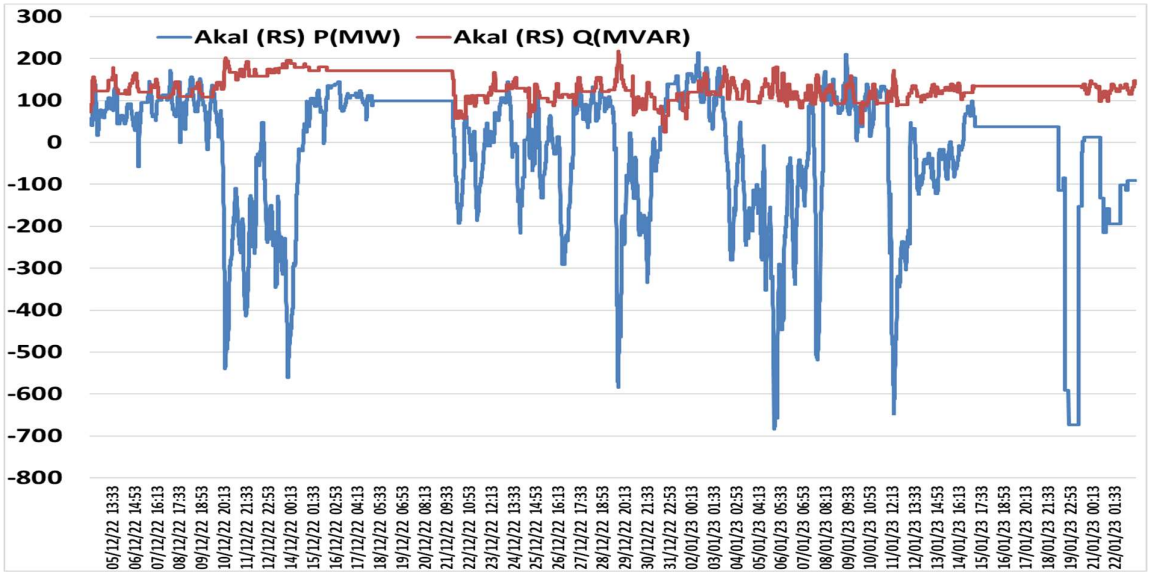

Kankani (RS) P(MW)
Kankani (RS) Q(MVAR)
600
500
400
300
200
100
0
-100

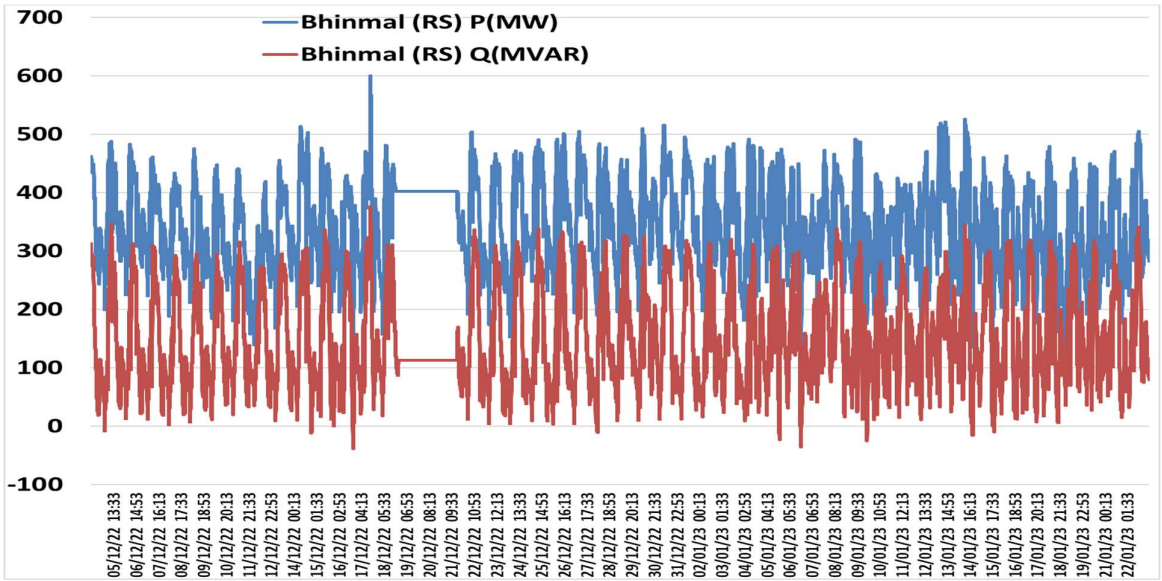

Jodhpur (RS) P(MW)
Jodhpur (RS) Q(MVAR)
600
500
400
300
200
100
0


Merta (RS) P(MW)
Merta (RS) Q(MVAR)
700
600
500
400
300
200
100
0

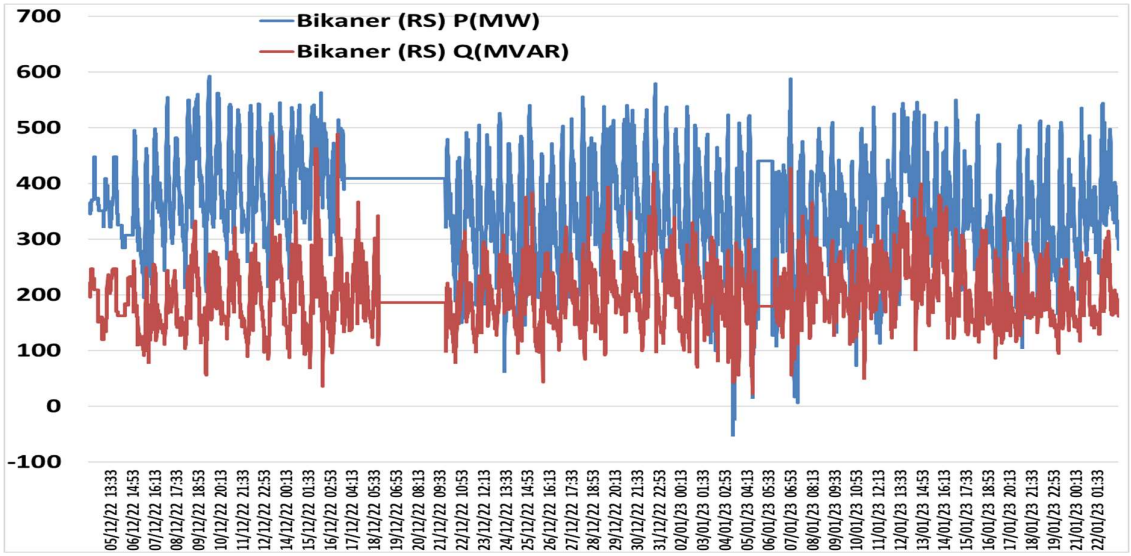
Annexure VI

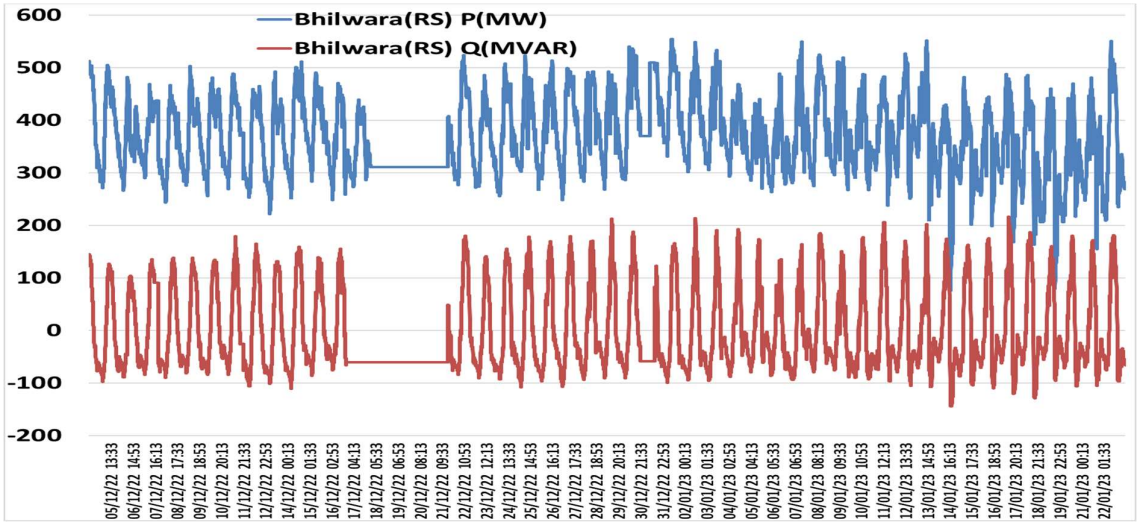

Ramgarh (RS) P(MW)
Ramgarh (RS) Q(MVAR)
600
400
200
0
-200
-400
-600
-800

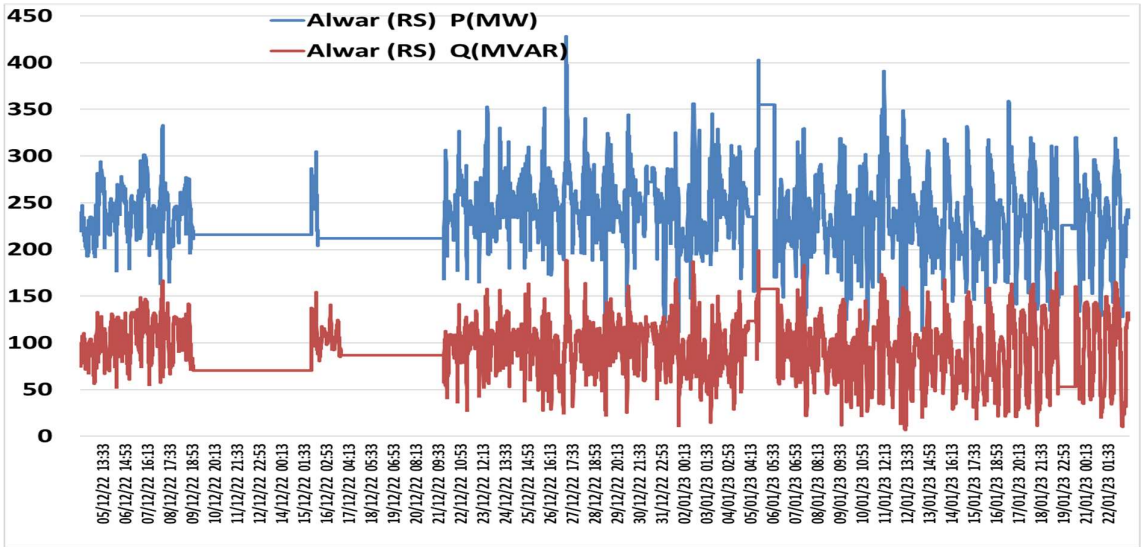

Akal (RS) P(MW)
Akal (RS) Q(MVAR)
300
200
100
0
-100
-200
-300
-400
-500
-600
-700
-800


Bhinmal (RS) P(MW)
Bhinmal (RS) Q(MVAR)
700
600
500
400
300
200
100
0
-100

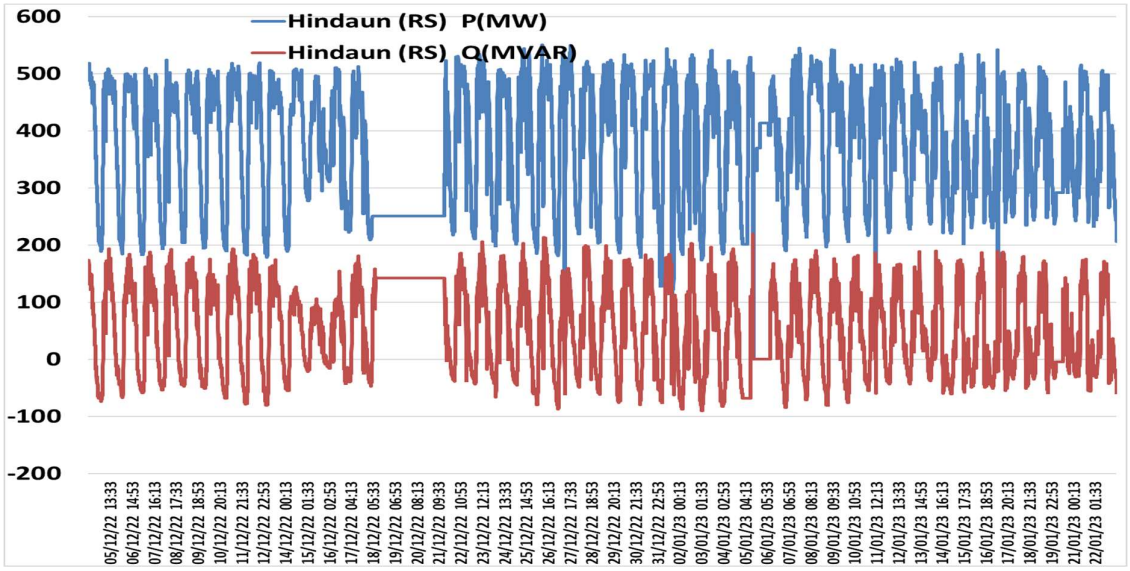
Annexure VI


Bikaner (RS) P(MW)
Bikaner (RS) Q(MVAR)
700
600
500
400
300
200
100
0
-100


Bhilwara(RS) P(MW)
Bhilwara(RS) Q(MVAR)
600
500
400
300
200
100
0
-100
-200


Alwar (RS) P(MW)
Alwar (RS) Q(MVAR)
450
400
350
300
250
200
150
100
50
0

Annexure VI


Hindaun (RS) P(MW)
Hindaun (RS) Q(MVAR)
600
500
400
300
200
100
0
-100
-200
05/12/22 13:33
06/12/22 14:53
07/12/22 16:13
08/12/22 17:33
09/12/22 18:53
10/12/22 20:13
11/12/22 21:33
12/12/22 22:53
14/12/22 00:13
15/12/22 01:33
16/12/22 02:53
17/12/22 04:13
18/12/22 05:33
19/12/22 06:53
20/12/22 08:13
21/12/22 09:33
22/12/22 10:53
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25/12/22 14:53
26/12/22 16:13
27/12/22 17:33
28/12/22 18:53
29/12/22 20:13
30/12/22 21:33
31/12/22 22:53
02/01/23 00:13
03/01/23 01:33
04/01/23 02:53
05/01/23 04:13
06/01/23 05:33
07/01/23 06:53
08/01/23 08:13
09/01/23 09:33
10/01/23 10:53
11/01/23 12:13
12/01/23 13:33
13/01/23 14:53
14/01/23 16:13
15/01/23 17:33
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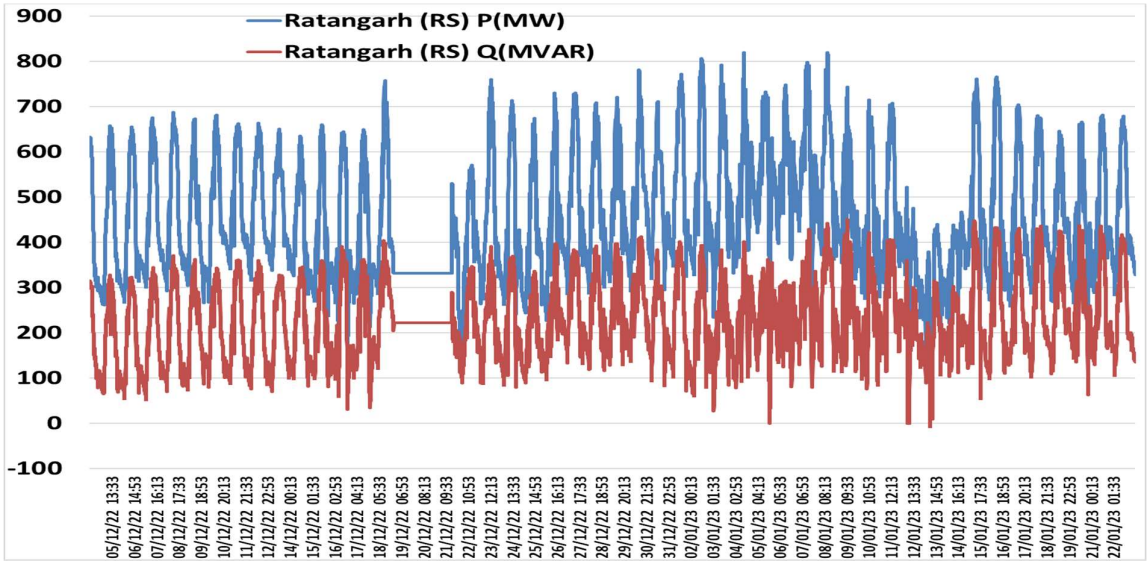
19/01/23 22:53
21/01/23 00:13
22/01/23 01:33


Ratangarh (RS) P(MW)
Ratangarh (RS) Q(MVAR)
900
800
700
600
500
400
300
200
100
0
-100
05/12/22 13:33
06/12/22 14:53
07/12/22 16:13
08/12/22 17:33
09/12/22 18:53
10/12/22 20:13
11/12/22 21:33
12/12/22 22:53
14/12/22 00:13
15/12/22 01:33
16/12/22 02:53
17/12/22 04:13
18/12/22 05:33
19/12/22 06:53
20/12/22 08:13
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27/12/22 17:33
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29/12/22 20:13
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31/12/22 22:53
02/01/23 00:13
03/01/23 01:33
04/01/23 02:53
05/01/23 04:13
06/01/23 05:33
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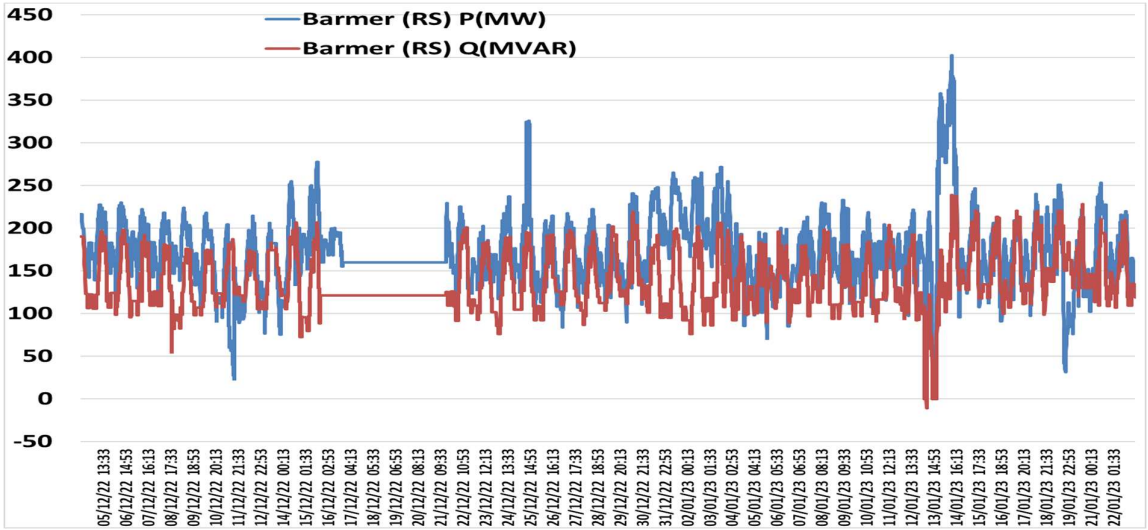
Barmer (RS) P(MW)
Barmer (RS) Q(MVAR)
450
400
350
300
250
200
150
100
50
0
-50
05/12/22 13:33
06/12/22 14:53
07/12/22 16:13
08/12/22 17:33
09/12/22 18:53
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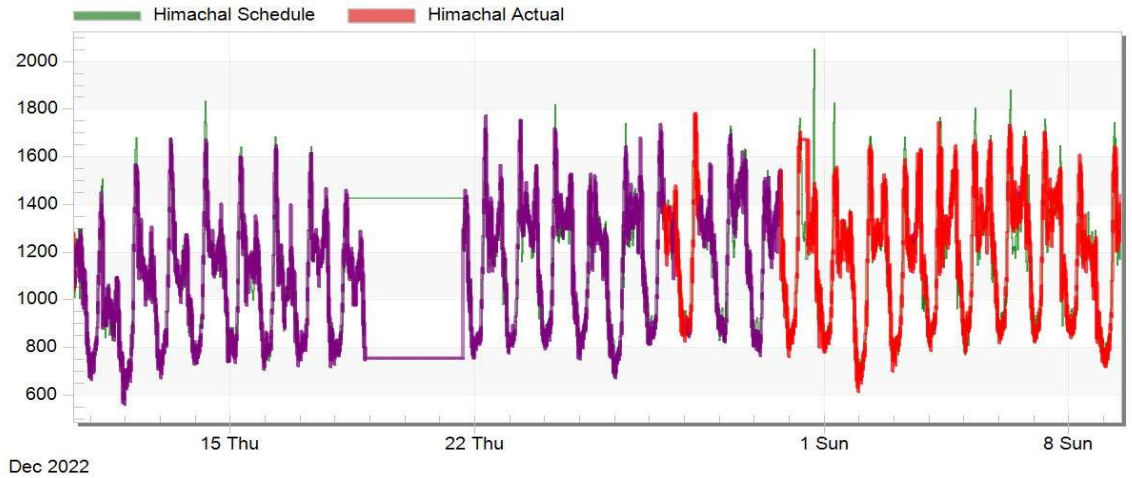
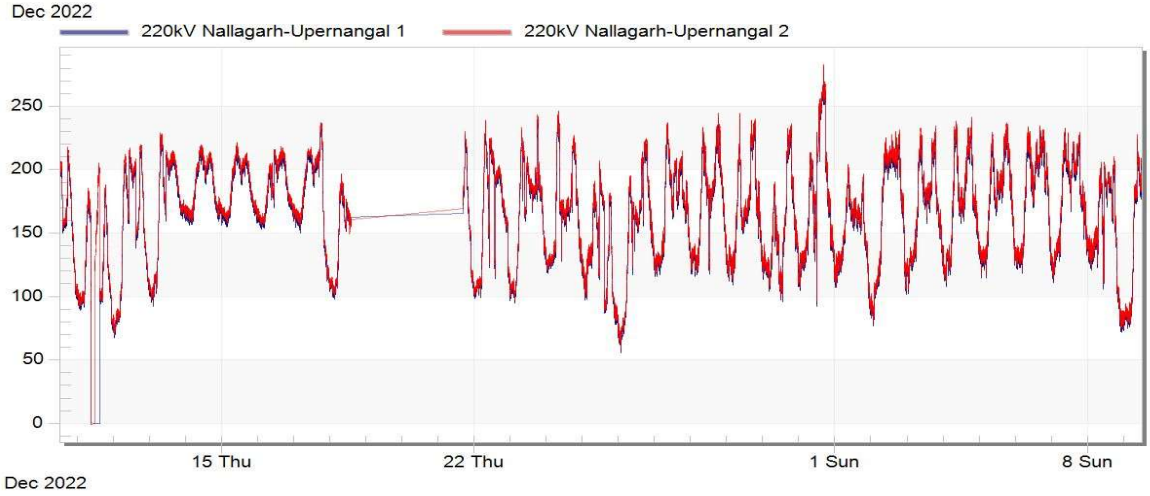
Annexure VII





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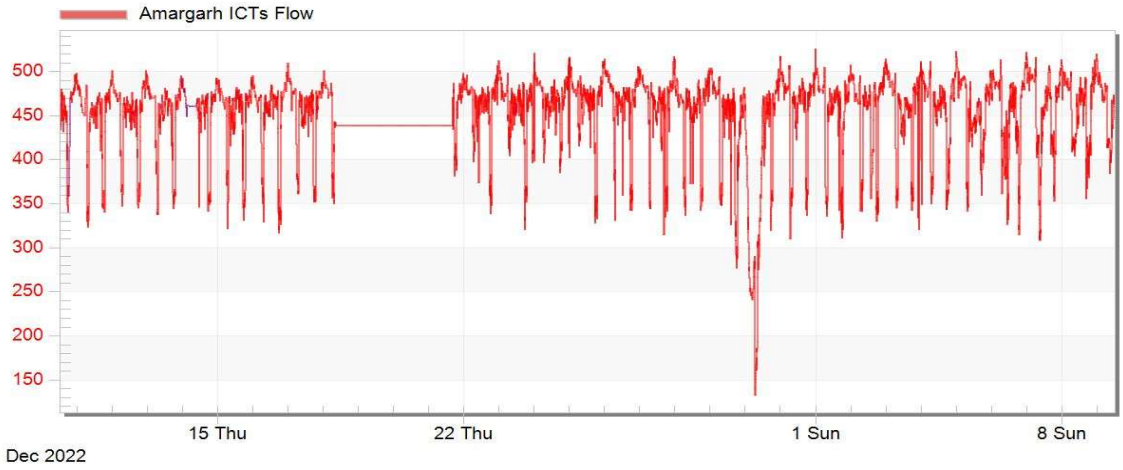
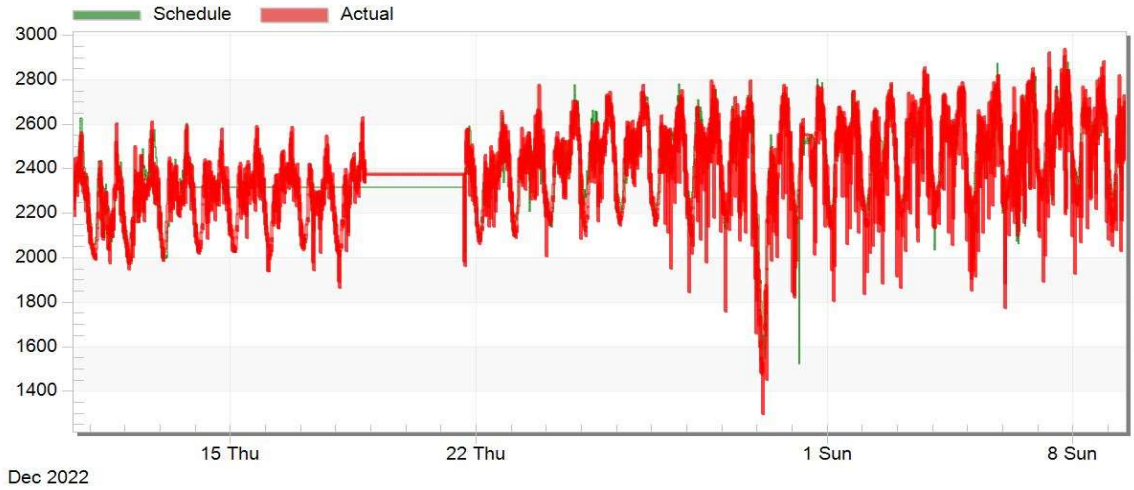
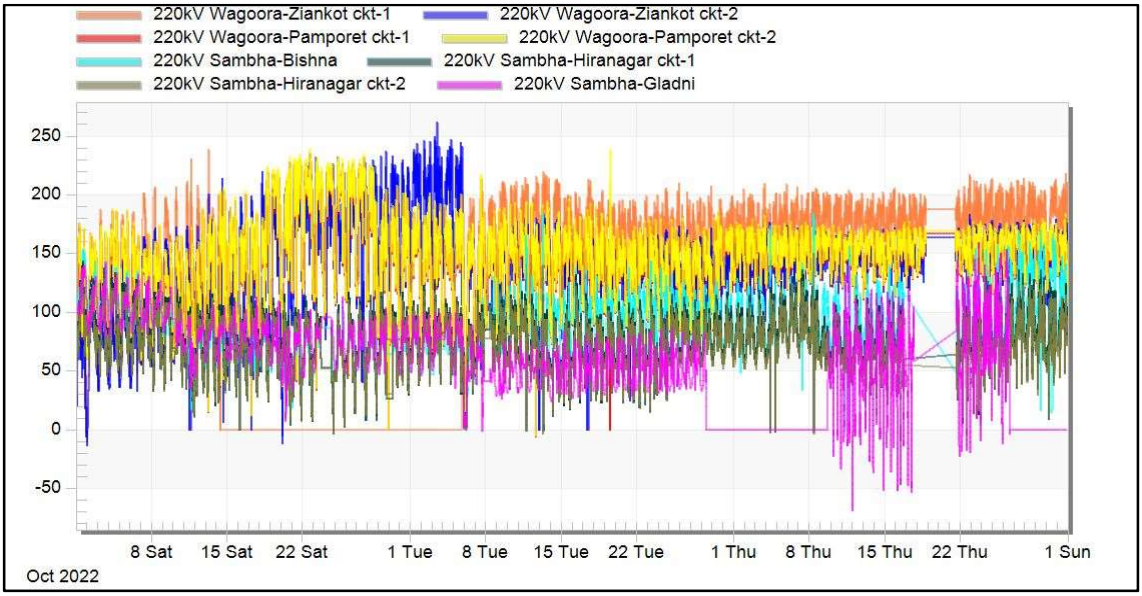
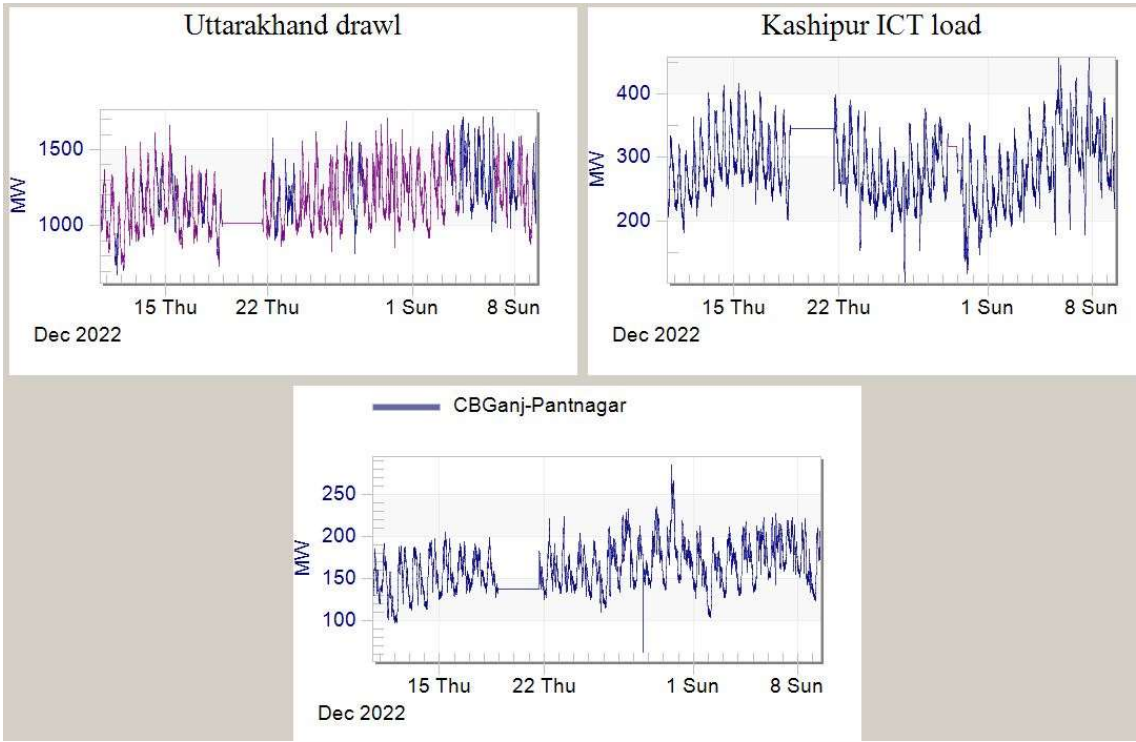






Annexure VII



Developers	Data received on the format circulated
Adani	Received (Plant wise data and WTGs data not received, received for Sungrow and Huawei Inverters)
Renew	Received
Ayana	Received
Eden	Received
Hero Solar	Received
Avaada	Not Received
Mahindra	Received
ACME	Not Received
Azure	Downloaded setting taken during plant visit
Tata Power	Not Received
NTPC	Received only for NTPC Kolayat
SBSR	Not Received
Thar Surya	Not Received

Settings Received from RE developers and comments on HVRT settings

Plant Name	Inverters Make	Status of protection setting	Settings in Format	Remarks	Setting shared in model during FTC
Eden Solar Plant	SUNGROW	Received	https://drive.google.com/file/d/1BcPVqiii-nyA4FG8wdeVD7rlyYG7Nzjp/view?usp=share_link	**Settings seems OK**	Setting at Inverter Terminal is kept same as defined for POI For 1.11 pu at Inverter terminal delay is 5sec For 1.2 pu at Inverter terminal delay is 2sec. For 1.3 pu at Inverter terminal delay is 0ms (Instantaneous tripping) **Final updated model is required as changes in settings have been made in field.**
ReNew Sun waves Pvt. Ltd.	SUNGROW	Received	https://docs.google.com/document/d/1SozRIkC-C0zF1YvTZsEu4IhufEENYrsL/edit?usp=share_link&ouid=116564959777146685176&rtpof=true&sd=true	Partial correct HVRT setting (Settings as shared) For 1.10125 pu at Inverter terminal delay is 2sec For 1.2 pu at Inverter terminal delay is 0.2sec. For 1.3 pu at Inverter terminal delay is 40ms	
Renew Sun Bright Pvt. Ltd. (RSEJ4L)	HUAWEI	Received	https://docs.google.com/document/d/1K6fDEEEZ6xOsqEboUZA5j4D1EJ_fK1Iw/edit?usp=share_link&ouid=116564959777146685176&rtpof=true&sd=true	Wrong HVRT setting (Settings as shared) For 1.1 pu at Inverter terminal delay is 2.5sec For 1.2 pu at Inverter terminal delay is 0.5sec. For 1.3 pu at Inverter terminal delay is 50ms	
ReNew Solar Energy (Jharkhand Three) Pvt. Ltd.	HUAWEI	Received	https://docs.google.com/document/d/1-fwAPvthot6DC6l15r44qMhDB-dUAlAk/edit?usp=share_link&ouid=116564959777146685176&rtpof=true&sd=true	Partial correct HVRT setting (Settings as shared) For 1.15 pu at Inverter terminal delay is 2.5sec For 1.2 pu at Inverter terminal delay is 0.5sec. For 1.3 pu at Inverter terminal delay is 50ms	
ReNew Solar Urja Pvt. Ltd.	SUNGROW & TBEA	Received	https://docs.google.com/document/d/1FIKJhWdZxQs3dkctCPXrGwT0uG1xc8wV/edit?usp=share_link&ouid=116564959777146685176&rtpof=true&sd=true	Partial correct HVRT setting (Settings as shared) For 1.10125 pu at Inverter terminal delay is 2sec For 1.2 pu at Inverter terminal delay is 0.2sec. For 1.3 pu at Inverter terminal delay is 40ms	
Mega Surya Urja Pvt. Ltd.	SINENG	Received	https://drive.google.com/file/d/1WduvjChsI1AGAaaWiMqfEOwyvxlAbIf1/view?usp=share_link	Partial correct HVRT setting (Settings as shared) For 1.11 pu at Inverter terminal delay is 2sec For 1.2 pu at Inverter terminal delay is 0.2sec. For 1.3 pu at Inverter terminal delay is 10ms	
Mahindra Renewable Pvt. Ltd.	SUNGROW	Received	https://drive.google.com/file/d/1Zx2wbd9t73rToihI1XUXSHptCztV8Ng-/view?usp=share_link	Wrong HVRT setting (Settings as shared) For 1.1 pu at Inverter terminal delay is 2sec For 1.2 pu at Inverter terminal delay is 0.2sec. For 1.3 pu at Inverter terminal delay is 100ms	
Clean Solar Power (Jodhpur) Pvt. Ltd.	SUNGROW	Received	https://docs.google.com/spreadsheets/d/1VskFcDHrE2u-Y8lFgIkYNkDufPFwKLH_/edit?usp=share_link&ouid=116564959777146685176&rtpof=true&sd=true	Wrong HVRT setting (Settings as shared) For 1.1 pu at Inverter terminal delay is 2sec For 1.2 pu at Inverter terminal delay is 0.2sec. For 1.3 pu at Inverter terminal delay is 0ms (Instantaneous trip)	
Adani Green Energy Ltd.	SUNGROW	Received	https://drive.google.com/file/d/1wYui-aqcrKTICcE_UySIRWKIj7HNEdtO/view?usp=share_link	Setting at Inverter Terminal is kept same as defined for POI For 1.1 pu at Inverter terminal delay is 10sec For 1.2 pu at Inverter terminal delay is 2sec. For 1.3 pu at Inverter terminal delay is 0ms (Instantaneous tripping)	
	HUAWIE	Received	https://drive.google.com/file/d/1kCTO-DMF9ZuoFofZlbpCX4Met0PDeVmw/view?usp=share_link	Setting at Inverter Terminal is kept same as defined for POI For 1.15 pu at Inverter terminal delay is 10sec (Changed recently) For 1.2 pu at Inverter terminal delay is 2sec. For 1.3 pu at Inverter terminal delay is 0ms (Instantenous tripping)	

Sterlite Power

DLF Cyber Park, Block B, 9TH Floor, Udyog Vihar Phase III, Sector -20, Gurugram-122001

Ref. No: SPTL/O&M/2022-23/11/01 Date: 25 Nov 2022

To,
Executive Director,
Northern Regional Load Dispatch Centre
Katwaria Sarai, New Delhi

Sub: Request for VOIP connectivity of Upcoming Sterlite Remote Control Room at Gurugram with NRLDC, WRLDC, SRLDC, ERLDC and NERLDC

Dear Sir,

We take this opportunity to thank you for the support provided from time to time. We are glad to inform you that M/s Sterlite Power Transmission Limited is setting up Remote Control Center at Gurugram intended as central coordination node of all assets/SPV's (including operational and under construction projects) of Sterlite Power namely:

1. Mumbai Urja Marg Limited – WR region and NER region
2. Lakadia Vadodara Transmission Projects Limited – WR region
3. Goa Tamnar Transmission Project Limited – WR region
4. Udupi Kasargode Transmission Limited – SR region
5. Nangalbibra Bongaigaon Transmission Ltd - ER
6. Kishtwar Transmission Limited – NR region

So, for centralized coordination of the assets and considering the proximity of SPTL central control room at Gurugram with NRLDC, requesting you to kindly review and further allow VOIP link connectivity access of our Control Room with NRLDC and onward towards all other RLDC's.

Kindly note that the optical fiber link required for end-to-end connectivity will be made available once your kind approval is received.

Thanking You,
Yours Truly,

Raghvendra Patil
Chief Manager – O&M