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

सं. उक्षेविस/ वाणिज्यिक/ 209/ आर पी सी (57वीं)/2022/ 7837-7884 दिनाँक : 29.08.2022

सेवा में / To,

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

विषय: उत्तर क्षेत्रीय विद्युत समिति की 57वीं बैठक की अतिरिक्त कार्यसूची ।
Subject: 57th meeting of Northern Regional Power Committee – Additional Agenda.

Madam/Sir,

उत्तर क्षेत्रीय विद्युत समिति की 57वीं बैठक दिनांक **31 अगस्त, 2022** को **1100** बजे विडियो कोंफ्रेंसिंग के माध्यम से आयोजित की जाएगी । बैठक की अतिरिक्त कार्यसूची संलग्न है।

The 57th meeting of Northern Regional Power Committee (NRPC) will be held at **1100 Hrs** on **31st August, 2022** via video conferencing. Additional agenda for the same is attached.

भवदीय
Yours faithfully,

(नरेश भंडारी) 29/8/22
(Naresh Bhandari)
सदस्य सचिव
Member Secretary

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List of NRPC Members

1. Chairperson, NRPC & CMD, Delhi Transco Limited (DTL), Shakti Sadan, Kotla Marg, New Delhi-110002
2. MD, PTCUL, Dehradun-248001, (Fax- 0135-2764496)
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31. Director (Technical), NHPC, Faridabad-121003, (Fax-0129-2258025)
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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.

Contents

उत्तरी क्षेत्रीय विद्युत समिति की 57वीं बैठक

57th MEETING OF NORTHERN REGIONAL POWER COMMITTEE

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

Venue: Video Conferencing

ADDITIONAL AGENDA

AA.1 Implementation of Late Payment Surcharge rule w.e.f. 06th August 2022 (Agenda by NRLDC)

AA.1.1 Ministry of Power has notified Electricity (Late Payment Surcharge and related matters) Rules 2022 on dt: 03.06.22. The rules were implemented from the 06.08.22. As per the Electricity (Late Payment Surcharge and related matters) Rules 2022, Distribution Company shall be liable to be debarred for sale and purchase through Power Exchange(s) or grant of Short Term Open Access (STOA) in case outstanding dues is more than two and half months overdue from the date of presentation of monthly bill. The same shall also be applicable on already approved short-term open access bilateral transaction.

AA.1.2 The list of entities having outstanding dues and to be regulated shall be available at the link https://posoco.in/market/action-under-lpsc-rules-2022/ and PRAPTI Portal.

AA.1.3 Since access to the STOA market is denied to the regulated Discoms, it is requested to Distribution licensees to strictly adhere to the schedules and avoid any deviations from the schedules during the period of such debarment from the STOA market.

Members may like to discuss.

AA.2 NR-ISTS RE evacuation issues (Agenda by NRLDC)

AA.2.1 Presently, more than 10GW of Interstate Renewable energy has been commissioned in Northern region, most of which is in Western Rajasthan. Following capacities have been commissioned and Approved under LTA/MTOA/STOA at different ISTS RE pooling stations in NR:

User Name	Capacity Approved under LTA/MTOA/STOA (MW)			Total Approved capacity (MW)	Total Contracted Capacity (MW)	Total Installed Capacity (MW)
	LTA	MTOA	STOA			
Bhadla(PG)	2637	0	450	3087	3087	3130
Bikaner(PG)	1950	240	483	2673	2673	2673

Fatehgarh-II(PG)	1890	0	600	2490	2490	2670
Fatehgarh-I(Adani)	296	0	657	953	953	1181
Bhadla-II(PG)	250	0	850	1100	1100	1100
Total RE at NR ISTS	**7023**	**240**	**3040**	**10303**	**10303**	**10754**

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

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

AA.2.2 Out of this 10,303 MW around 3040 MW (30%) is being evacuated through short term open access as the planned transmission system for evacuation of RE from these stations is yet to be commissioned. Due to absence of complete planned transmission system, high loading of 400kV Bikaner(PG)-Bikaner(RS) line and voltage issues are being observed in real-time.

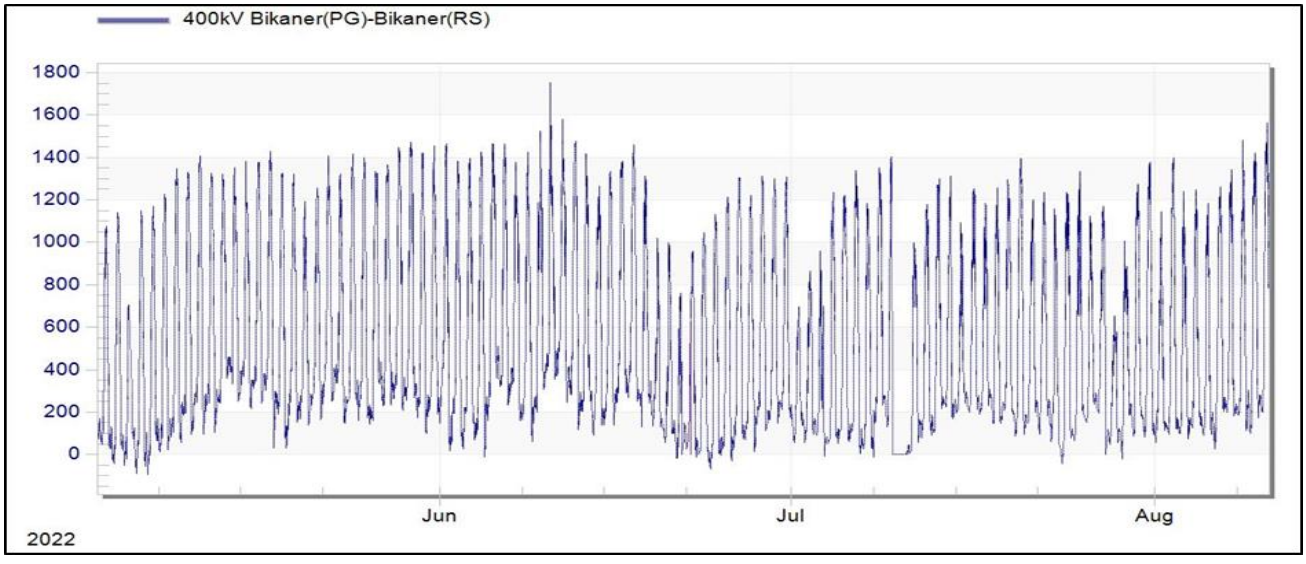
AA.2.3 Additional 342MW at Bikaner(PG), 300MW at Bhadla-II(PG), 43MW at Bhadla(PG) and 43MW at Fatehgarh-I (Adani) would come soon as plants are already registered and commissioned their part capacity.

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

AA.2.4 Although 400kV Bikaner(PG)-Bikaner(RS) line is Quad moose having thermal loading limit of ~1750MW. Due to significant RE at Bikaner(PG), and low impedance path of 400kV Bikaner(PG)-Bikaner(RS) line, line loading of 400kV Bikaner(PG)-Bikaner(RS) remains high and reaching 1400-1500MW during peak solar generation period. As of now, 400kV Bikaner(RS)-Sikar D/C lines are being opened to manage loading of 400kV Bikaner(PG)-Bikaner(RS).

AA.2.5 However, opening of 400kV Bikaner(RS)-Sikar(PG) ckt-1 & ckt-2 has its own drawback,

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



AA.2.6 At the time of peak RE generation of ISTS and Rajasthan, 400kV Bikaner(PG)-Bikaner(RS) line would be N-1 non-compliant (when line loading>1400MW) and in case of tripping of either 765kV Bikaner(PG)-Khetri or 400kV Bhadla(PG)-Bhadla(RS) line, loading of 400kV Bikaner(PG)-Bikaner(RS) may cross the thermal loading limit.

Voltage related issues during peak solar generation period:

AA.2.7 With existing quantum of generation and existing network system, safe generation evacuation is nearing its limit and any N-1 contingency of 765kV Bikaner(PG)-Khetri ckt-1&2, 400kV Bikaner(PG)-Bikaner(RS), 765kV Fatehgarh-II(PG)-Bhadla(PG) ckt 1&2 and 765kV Fatehgarh-II(PG)-Bhadla-II(PG) ckt-1&2 may lead to generation loss or critical voltage issues in the complex.

AA.2.8 From the analysis of past events it was seen that at the time of higher demand and high wind (7:30hrs-12:00hrs) in Rajasthan voltage was on lower side at Kankani & Jodhpur leading to low voltage at 400kV Akal, 400kV, Kankani, 400kV Barmer, and 400kV Ramgarh. At the same time solar generation ramped up and resulted in further MVAR drawl from Jodhpur and Kankani. Hence, significant low voltage at 400kV Akal, 400kV, Kankani, 400kV Barmer, 400kV Ramgarh and 400kV Bhinmal has also been observed in past. High reactive power demand in Rajasthan is also playing important role in low voltage and voltage oscillation of RE pocket of NR.

AA.2.9 The above issues were also discussed in 198 OCC meeting. Deliberation held in 198 OCC meeting is summarised below:

AA.2.10 RE evacuation zone is on the verge of voltage instability at the time of Peak RE generation of ISTS and Rajasthan and any N-1 contingency of 765kV Bikaner(PG)-Khetri ckt-1&2, 400kV Bikaner(PG)-Bikaner(RS), 765kV Fatehgarh-II(PG)-Bhadla(PG) ckt-1&2 and 765kV Fatehgarh-II(PG)-Bhadla-II(PG) ckt-1&2 may lead to huge generation loss or serious voltage issues in the complex.

AA.2.11 NRLDC representative stated that apart from the LVRT/HVRT related issues, delayed commissioning of transmission elements in the complex needs to be prioritised and commissioned at the earliest as it is leading to RE evacuation related issues. Commissioning of Bikaner-II should be expedited and the commissioning of solar generators and transmission lines may be done in close timeframe so as to make sure RE can be safely evacuated without any issues.

AA.2.12 POWERGRID representative stated that STATCOMs under implementation at Bhadla-II and Fatehgarh-II are expected by Dec-2022 and no additional RE evacuation transmission system is envisaged in near months.

AA.2.13 CTU representative stated that STATCOMs under implementation at Bhadla-II and Fatehgarh-II were earlier to be commissioned by August 2022 which is being postponed and are not expected by end of 2022 as per latest intimation by POWERGRID. POWERGRID was asked to commission these STATCOMs at the earliest.

AA.2.14 Removal of LILO of 400kV Bhadla(RS)-Bikaner(RS) needs to be completed by its scheduled time i.e. Dec'2022 to ease loading of 400kV Bikaner(PG)-Bikaner(RS) and also facilitate generation evacuation from Bikaner-II.

AA.2.15 CTU representative also stated that the solar generators planned have been coming up as their commissioning period is less however only part of transmission system is commissioned due to delay in clearance due to GIB related issues.

AA.2.16 MS NRPC expressed concern that commissioning of solar plants and transmission system should be aligned as the situation wherein evacuation is not possible due to transmission evacuation constraint should not happen. CTU representative stated that this issue has arisen due to GIB issue in transmission system commissioning and the generators were regularly updated about the transmission system commissioning status. The situation is likely to improve with commissioning of Bikaner-II and associated transmission elements expected in Dec' 2022.

AA.2.17 RVPN & PGCIL were advised by OCC to explore feasibility of the following options to minimize the post contingency impact of this line on the system:

- Expediting planned transmission system for RE evacuation so that loadings in the complex are eased.
- Expediting removal of LILO of one circuit of Bhadla-Bikaner(RVPN) 400kV D/c(Quad) line at Bikaner(PG). Extension of above LILO section from Bikaner(PG) upto Bikaner-II PS to form Bikaner-II PS – Bikaner (PG) 400kV D/c(Quad) line)
- Switchgear rating at Bikaner(PG) and Bikaner(RJ) end to be checked and upgraded.
- Shifting the supply of part of Rajasthan load to some S/S other than Bikaner.
- Managing N-1 non-compliance at 400/220kV Bikaner ICTs

AA.2.18 Rajasthan SLDC in coordination with DISCOMs needs to improve the voltage profile at 400kV Akal, 400kV, Kankani, 400kV Barmer, 400kV Ramgarh and 400kV Bhadla by providing required reactive power compensation so as to avoid poor p.f. in the area and improve voltage profile.

AA.2.19 In the meeting, it was discussed that near-miss incident of 6000 MW loss of solar generation on 11th Aug 2022 was observed in which frequency had fallen to 49.46 Hz from a level of 50.16 Hz narrowly missing the first stage of UFR shedding. If the frequency had been slightly on the lower side i.e. below 50 Hz there would have been a major event including UFR load shedding.

PMU Plot of frequency at 765kV Agra(PG)

11:23hrs/11-Aug-22

AA.2.20 Some key points of event are highlighted below:

- At 11:22:59hrs, R-B phase to phase fault occurred on 220kV Bhadla- Clean Solar Jodhpur ckt due to snapping of B-ph jumper which fell on R-ph. As per PMU, R-B phase to phase fault which cleared within 80ms is observed.
- As per PMU plots of phase voltage, MW & MVAr of RE stations, it is observed that during the voltage dip of fault, phase voltage at Bhadla, Fatehgarh2, Bhadla2 & Bikaner dropped to 0.59pu, 0.79pu, 0.8pu & 0.82pu respectively.
- As per PMU plots of MVAR of RE station, MVAR support is also not observed from most of the RE inverters during voltage dip on fault.
- It is observed that even voltage recovered to its normal value after clearing of fault within 100ms, MW of RE stations didn't recover in defined time as per LVRT operation.
- Due to significant drop in MW and inadequate MVAR support from RE stations, rise in voltage is observed at ISTS RE pooling stations.
- Further after approx. 5-6secs, all four (04) 765kV lines connected at Fatehgarh2 (PG) along with 765kV Ajmer- Bhadla2 D/C & 765kV Bhadla2-Bikaner ckt-1 and few 220kV lines to RE stations tripped on over voltage protection.
- As per SCADA, loss of approx. 5807MW solar generation connected at Bhadla(PG), Bhadla2(PG), Bikaner(PG), Fatehgarh2(PG) & Fatehgarh1 (ADANI Solar Park) & approx. 350MW wind generation connected at Fatehgarh2 & Fatehgarh1 (ADANI Solar Park) & wind occurred.
- As reported, load shedding of approx. ~200MW in Punjab, ~150MW in Haryana & ~400MW in UP control area was seen due to df/dt protection operation during the event.

AA.2.21 CTU representative enquired whether HVRT related trippings were also observed in this event or only LVRT. NRLDC representative stated that in event observed on 9th July 2022, both LVRT and HVRT non-compliances were observed which were also communicated to CTU/CEA by NRLDC letter. However, for event of 11 Aug 2022, it seems to be LVRT compliance issue majorly, however same is being investigated in detail and data from solar generators is awaited.

AA.2.22 In the meeting, it was discussed that along with developers the matter also needs to be taken up with plant manufacturers and OEM as even after pursuing the matter with solar generators no/ improper response is received. LVRT/HVRT compliance test at Point of Interconnection is not being done during pre-commissioning field tests and same is only being checked based on real-time events where most of the plants are observed to be LVRT/ HVRT non-compliant.

AA.2.23 Following points need further analysis and discussion:

- Why Behaviour of MW & MVAR was not as per LVRT operation (as per CEA standard for connectivity) in this as well as previous many events.
- Operation of PPC during LVRT/ HVRT operation needs to be analysed.
- DR, EL & tripping report needs to be shared by all RE stations.

Members may please discuss.

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