सत्यमेव जयते

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

विषय: उ.क्षे.वि.स. की नवीकरणीय ऊर्जा उप-समिति की 3वीं बैठक का कार्यवृत।

Subject: Minutes of the 3rd meeting of Renewable Energy Sub-committee of NRPC.

उत्तर क्षेत्रीय विद्युत समिति की नवीकरणीय ऊर्जा उप-समन्वय उप-समिति की 3 वीं बैठक दिनांक 10.07.2025 को आयोजित की गयी थी। उक्त बैठक का कार्यवृत संलग्न है और यह उत्तर क्षेत्रीय विद्युत् समिति की वेबसाइट http://164.100.60.165 पर भी उपलब्ध है।

The **3rd** Renewable Energy sub-committee meeting of NRPC was held on 10.07.2025. The Minutes of this meeting is attached herewith and the same has been uploaded on the NRPC website http://164.100.60.165.

(डी. के. मीना) 25/8/25
अधीक्षण अभियंता (प्रचालन)

सेवा में : उ.क्षे.वि.स. की नवीकरणीय ऊर्जा उप समिति के सभी सदस्य।
To : All Members of Renewable Energy Sub-committee of NRPC
(As per attached list)

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List of addressee (via mail)

List of Members of Rnenewable Energy Sub-committee

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19	Adani Hybrid Energy Jaisalmer Four Ltd.	
20	Adani Renewable Energy (RJ) limited Rawara	
21	Adani Solar Energy Jaisalmer One Pvt. Ltd._450MW (Solar)	
22	Adani Solar Enegry Four Private Limited	
23	Adani Solar Energy Jaisalmer Two Private Limited	
24	Adani Solar Energy Jaisalmer Two Private Limited Project Two	
25	SB ENERGY FOUR PRIVATE LIMTED, Bhadla	

26	SB Energy Six Private Limited, Bhadla	
27	Adani Solar Enegry Jodhpur Two Limited, Rawara	
28	Adept Renewable Technologies Pvt. Ltd.	
29	Adani Solar Energy RJ Two Pvt. Ltd. (Devikot)	
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39	Avaada Sustainable RJ Pvt. Ltd.	
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55	SINGRAULI SOLAR	
56	Anta Solar	
57	Unchahar Solar	
58	NTPC Devikot Solar plant_240MW	
59	NTPC Kolayat_400kV	
60	Nedan Solar NTPC	

61	NTPC Nokhra_300MW	
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65	ReNew Solar Urja Private Limited	
66	Renew Sun Bright Pvt. Ltd. (RSBPL)	
67	Renew Sun Waves Private Limited (RSEJ4L)	
68	Renew Surya Partap Pvt. Ltd.	
69	Renew Surya Ravi Pvt. Ltd.	
70	Renew Surya Roshni Pvt. Ltd.	
71	Renew Surya Vihan Pvt. Ltd.	
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83	Transition Sustainable Energy Services Private Limited	

Contents

उत्तर क्षेत्रीय विद्युत समिति की नवीकरणीय ऊर्जा उप-समिति की 3वीं बैठक का कार्यवृत्त

The 3rd Renewable Energy sub-committee meeting of NRPC was held on 10.07.2025 (10:30 hrs. onwards) at NRPC Secretariat, Conference Hall, New Delhi. MS, NRPC welcomed all the participants. List of participants is attached as **Annexure-A**.

1) Confirmation of Minutes

Minutes of the 2nd Renewable Energy sub-committee meeting of NRPC was issued on 01.04.2025. Renewable Energy sub-committee confirmed the minutes of the meeting.

2) Submission of protection performance indices along with reason and corrective action taken for indices less than unity to NRPC Secretariat on monthly basis (agenda by NRPC Secretariat)

2.1 EE(P), NRPC apprised that as per clause 15 (6) of IEGC 2023;

- *Users shall submit the following protection performance indices of previous month to their respective RPC and RLDC on monthly basis for 220 kV and above (132 kV and above in NER) system, which shall be reviewed by the RPC:*

  a) *The **Dependability Index** defined as* $D = Nc / Nc+Nf$

  b) *The **Security Index** defined as* $S = Nc/Nc+Nu$

  c) *The **Reliability Index** defined as* $R = Nc/ Nc+Ni$

  where,
  Nc is the number of correct operations at internal power system faults,
  Nf is the number of failures to operate at internal power system faults,
  Nu is the number of unwanted operations,

  Ni is the number of incorrect operations and is the sum of Nf and Nu

- *Each user shall also submit the reasons for performance indices less than unity of individual element wise protection system to the respective RPC and action plan for corrective measures. The action plan will be followed up regularly in the respective RPC.*

2.2 In PSC meeting, it has been decided that each utility shall submit the Performance **indices of previous month by 7th day of next month.**

2.3 It has been observed that RE utilities are not submitting indices to NRPC Secretariat. However, some of RE utilities have submitted the performance indices delayed.

2.4 During the discussion in PSC meetings, it was decided that agenda may be

discussed in RE Sub-Committee meeting as most of RE members do not join the Protection Sub-Committee meeting regularly.

2.5 The status of submitted protection performance indices for the month of June & July 2025 by RE utilities is attached as **Annexure-I.** Further, format for submission of indices is attached as **Annexure-II** for reference.

2.6 **MS, NRPC asked RE utilities to submit the performance indices of previous month by 7th day of next month element wise along with the reason for indices less than unity and corrective action taken.**

3) Annual protection audit plan for FY 2025-26 (agenda by NRPC Secretariat)

3.1 EE(P), NRPC apprised that as per clause 15 of IEGC 2023;

- *Annual audit plan for the next financial year shall be submitted by the users to their respective RPC by 31st October. The users shall adhere to the annual audit plan and report compliance of the same to their respective RPC.*

3.2 In view of above, all utilities were requested to submit the annual protection audit plan for FY-2025-26 latest by 31st October 2024 in the 53rd PSC meeting. Thereafter, agenda is regularly follow-up in monthly PSC meeting.

3.3 However, most of the RE utilities have not submitted annual audit plan for FY 2025-26. The status of submitted protection audit plan for the same is attached as **Annexure-III.** Further, format for submission of audit plan is attached as **Annexure-IV** for reference.

3.4 MS, NRPC asked RE utilities to expedite and submit the Annual protection audit plan for FY 2025-26 to NRPC Sectt. (at seo-nrpc@nic.in).

4) Third-party protection audit plan (agenda by NRPC Secretariat)

4.1 EE(P), NRPC apprised that as per clause 15 of IEGC 2023:

All users shall also conduct third party protection audit of each sub-station at 220 kV and above (132 kV and above in NER) once in five years or earlier as advised by the respective RPC.

4.2 Further, EE(P) NRPC mentioned that as per clause 15 (4) of IEGC 2023;

*The third-party protection audit report shall contain information sought in the format enclosed as Annexure–1 in IEGC. The protection audit reports, along with **action plan for rectification of deficiencies detected, if any, shall be submitted to the respective RPC and RLDC or SLDC, as the case may be, within a month of submission of third-party audit report**. The necessary compliance to such protection audit report shall be followed up regularly in the respective RPC.*

4.3 However, most of the RE utilities have neither submitted the third-party audit plan nor report of audit conducted. The status of submitted the third party protection audit plan is attached as **Annexure-V.**

4.4 MS, NRPC asked RE utilities to expedite and submit third party protection audit plan

to NRPC Sectt. (at seo-nrpc@nic.in) along with the audited report and its compliance as per IEGC 2023.

5) Final approval of protection settings by PSC Forum for FTCs which have been provisionally allowed by NRLDC/SLDCs (agenda by NRPC Secretariat)

5.1 EE (P), NRPC apprised that procedure for approval of protection setting has been approved in 75th NRPC meeting as attached as **Annexure-VI**. Accordingly, FTC allowed by RLDC/SLDCs based on protection philosophy (**Annexure-VII**). The final approval of protection settings to be done in monthly PSC meetings.

5.2 It is observed that RE generators are not taking final approval of protection settings in PSC meeting. The issue was discussed in 54th PSC meeting, wherein, it was decided as:

Quote

NRLDC shall give provisional protection clearance during FTC on conditional basis subject to submission of agenda in next Protection Sub-Committee meetings (not later than next 2nd PSC meeting). If utility does not put up the agenda within time, further FTC clearance would not be granted to the concerned utilities for upcoming project.

Unquote

5.3 MS, NRPC asked utilities to take note of the above procedure and submit agenda for final approval of protection settings in PSC meeting.

6) RE generation loss events in case of fault in the vicinity of RE complex and Low Voltage Ride Through (LVRT) & High Voltage Ride Through (HVRT) non-compliance by RE Generators at interconnection point:

6.1 The representative from NRLDC provided an overview of the regulations related to LVRT and HVRT as outlined in the CEA (Technical Standards for Connectivity to the Grid) (Amendment) Regulations. It was further clarified that these regulations specifically refer to the Point of Interconnection (POI) and settings at the inverter end must be kept in coordination with POI.

6.2 Regulations pertaining to LVRT & HVRT as per CEA (Technical Standards for Connectivity to the Grid) (Amendment) Regulations, 2019 are as follows.

(i). Clause B2 (3) under Part II of the Schedule for LVRT:
Quote

"The generating station connected to the grid, shall remain connected to the grid when voltage at the interconnection point on any or all phases dips up to the level depicted by the thick lines in the following curve, namely:

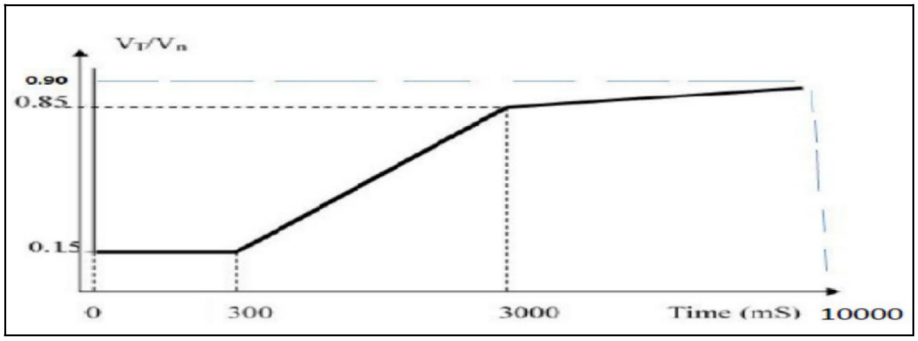


Figure 1 LVRT operating range

Provided that during the voltage dip, the supply of ***reactive power has first priority****, while the supply of active power has second priority and* ***the active power preferably be maintained during voltage drops****, provided, a reduction in active power within the plant's design specifications is acceptable and* ***active power be restored to at least 90% of the pre-fault level within 1 sec*** *of restoration of voltage."*

Unquote

(ii). Clause B2(7) under Part II of Schedule for HVRT:

Quote

"The generating station connected to the grid, shall remain connected to the grid when the voltage at the interconnection point, on any or all phases (symmetrical or asymmetrical overvoltage conditions) rises above the specified values given below for specified time".

Over voltage (pu)	Minimum time to remain connected (Seconds)
1.30 < V	0 Sec (Instantaneous trip)
1.30 ≥ V > 1.20	0.2 Sec
1.20 ≥ V >1.10	2 Sec
V ≤ 1.10	Continuous

Unquote

Further, CEA has issued the clarification on HVRT clause vide file no. 12/X/STD/CONN/GM/2023/438 dated 06.01.2023.

Quote

"In HVRT mode, the generating station shall provide reactive power support (absorption) proportional to the voltage rise at point of interconnection. During this phase, the quantum of reactive current absorption shall be dependent on reactive current gain in the system i.e. HVRT "K" factor. The active current and overall current shall be limited as per the transient rated current limit of the plant".

Unquote

6.3 Representative from NRLDC presented the detailed analysis of four RE generation loss and LVRT/HVRT non-compliance events from 01.01.2025 to 20.06.2025 where generation loss was more than 1000MW. It was highlighted that same agenda was discussed in earlier RE Sub-Committee meetings, the necessary action items for RE developers were also outlined in the last meetings, while some improvement can be seen however several RE generators are still LVRT/HVRT non-compliant.

Details of RE generation loss events from 01.01.2025 to 20.06.2025 and LVRT/HVRT non-compliance of RE generators:

6.4 Since 1st Jan'2025 to 20th June'2025, total 4 numbers of RE generation loss events (>1000MW) occurred in RE complex of Northern Region. Summary of these four (4) events is shown below;

Summary of RE Generation loss in NR (1st Jan'25-20th June'25):

S. No	Date & Time	Fault event	Quantum of RE generation drop	Voltage dip observed	Frequency Dip (Hz)
1	08.01.2025, 13:38 hrs	R-Y fault on 400 kV Fatehgarh-II(PG)-Fatehgarh-I (FBTL) Ckt-1	1450 MW	0.514 pu	0.14
2	18.03.2025, 10:00 hrs	R-N fault on 400 kV AGE25L-Bhadla-II (PG) line	1035 MW	0.75 pu	0.183
3	11.05.2025, 12:31 hrs	3-ph Fault on 220 kV RSDCL (PSS4)-Bhadla-II (PG) line, at the same time 220 kV NTPC Nokhra-Bhadla-II (PG) line, STATCOM-2 (-425/+550MVAR) at 400kV Bhadla-II (PG) and 400kV Bikaner (RS)-Deedwana line tripped.	2215 MW (Including ~400 MW in Rajasthan)	0.86 pu	0.22
4	12.06.2025, 13:34 hrs	Y-B phase to phase fault on 400 kV AKAL-JAISALMER (RS) CKT-1	1636 MW (Including ~600 MW in Rajasthan)	0.78 pu	0.18

6.5 NRLDC representative informed that Tripping details from RE generators for aforementioned four (4) events is yet to be received. STATCOM TFR details for 11th May'25 is also not yet received.

6.6 The CGM, NRLDC, highlighted the critical importance of timely maintenance and accurate protection settings, noting that the tripping of a single feeder could potentially cause the tripping of nearby renewable energy plants due to HVRT/LVRT issues leading to large generation loss.

6.7 NRLDC representative further presented the detailed analysis of all the above four (4) events based on SCADA/PMU data available at NRLDC. Based on analysis, list of

LVRT/HVRT Non-compliant RE Plants, their Generation Loss quantum and details of common inverters were displayed as given below.

Table-1: List of LVRT/HVRT Non-compliant RE Plants and their Generation Loss quantum for 8th Jan'25 event: (12 nos. of RE plants found LVRT/HVRT Non-compliant on 8th Jan'25 event)

Event analysis of 08.01.2025 RE generation loss event @13:38hrs								
RE Plant Name	**Pooling Station**	**Plant Capacity (MW)**	**Generation before the event (MW) (A)**	**Generation after the event (MW) (B)**	**Generation loss (MW) C = (A-B)**	**% Generation loss (MW) D = (C/A) *100**	**Inverters Make**	**Inverter/ WTG Model No**
ACME PHALODI SOLAR POWER PVT. LTD.	Fatehgarh-I PS	300	299	7	292	98	SUNGROW	SG3300UD-20 (50 deg. Model)
ACME DEOGHAR SOLAR POWER PVT. LTD.	Fatehgarh-I PS	300	291	40	251	86	SUNGROW	SG3300UD-20 (50 deg. Model)
ACME RAISAR SOLAR POWER PVT. LTD.	Fatehgarh-I PS	300	305	162	143	47	SUNGROW	SG3300UD-20 (51 deg. Model)
ReNew Solar Urja Private Limited	Fatehgarh-II(PG)	300	293	183	110	38	SUNGROW	SG250HX-IN
							TBEA	TS208KTL-HV
Renew Surya Ravi Pvt. Ltd.	Bikaner(PG)	300	276	205	71	26	SUNGROW	SG250HX-IN
Adani Green Energy Twenty Four Limited	Fatehgarh-II(PG)	500	220	165	55	25	TBEA	TS300KTL-HV-C1
Avaada Sunrays Pvt. Ltd.	Bhadla-II(PG)	320	339	266	73	22	SINENG	SP-250K-INH
Clean Solar Power (Jodhpur) Pvt. Ltd.	Bhadla (PG)	250	250	200	50	20	SUNGROW	SG250HX-IN
NTPC Devikot Solar plant_240MW	Fatehgarh-II(PG)	240	226	182	44	19	TBEA	TC2500KF
ACME Chittorgarh Solar Energy Pvt Ltd	Bhadla (PG)	250	213	179	34	16	TBEA	TC3750KF
							TBEA	TC5000KF
							TBEA	TS208KTL
Adani Solar Energy Jaisalmer One	Fatehgarh-II(PG)	450	434	366	68	16	SUNGROW	SG3125HV
							KEHU	SPI3125

Pvt. Ltd._450MW (Solar)							A	K-B-HUD
							KEHUA	SPI3125K-B-H2
Azure Power Forty Three Pvt. Ltd.	Bikaner(PG)	600	403	360	43	11	SUNGROW	SG3125HV
							SUNGROW	SG250HX-IN
Total		**3810**	**3549**	**2315**	**1234**	**35**		

Table-2: List of LVRT/HVRT Non-compliant RE Plants and their Generation Loss quantum for 18th March'25 event: (12 nos. of RE plants found LVRT/HVRT Non-compliant on 18th March'25 event)

Event analysis of 18.03.2025 RE generation loss event @10:00hrs								
RE Plant Name	**Pooling Station**	**Plant Capacity (MW))**	**Generation before the event (MW) (A)**	**Generation after the event (MW) (B)**	**Generation loss (MW) C = (A-B)**	**% Generation loss (MW) D = (C/A) *100**	**Inverters/ WTG Make**	**Inverter/ WTG Model No**
NTPC Nokhra_300MW	Bhadla-II(PG)	300	261	0	261	100	TBEA	TC3125KF
							SINENG	EP-3125-HA-UD
NTPC Devikot Solar plant_240MW	Fatehgarh-II (PG)	240	189	104	85	45	TBEA	TC2500KF
Thar Surya Pvt. Ltd.	Bikaner (PG)	300	268	192	76	28	GAMESA	GAMESAE - 2.25MVA-SB-I
Avaada Sunrays Pvt. Ltd.	Bhadla-II(PG)	320	293	214	79	27	SINENG	SP-250K-INH
AMP Energy Green Five Pvt. Ltd.	Bhadla-II(PG)	100	103	78	25	24	FIMER	PVS98O
SB ENERGY FOUR PRIVATE LIMTED, Bhadla	Bhadla (PG)	200	171	133	38	22	KEHUA	SPI3125K-B-H
SBSR Power Cleantech Eleven Private Ltd.	Bikaner (PG)	300	264	208	56	21	KEHUA	SPI3125K-B-H
ReNew Solar Urja Private Limited	Fatehgarh-II (PG)	300	251	199	52	21	SUNGROW	SG250HX-IN
							TBEA	TS208KTL-HV
Avaada Sustainable RJ Pvt. Ltd.	Bikaner (PG)	300	260	207	53	20	SINENG	EP-3125-HA-UD
Adani Hybrid	Fatehgarh-	300	303	260	43	14	HUAW	SUN2000

Energy Jaisalmer Three Ltd.	II (PG)						EI	-185KTL-INH0
							TBEA	TS208KTL-HV
ABC Renewable Pvt. Ltd	Bhadla-II(PG)	300	272	235	37	14	TBEA	TC3125KF
AMP Energy Green Six Pvt. Ltd.	Bhadla-II(PG)	100	105	93	12	11	SUNGROW	SG320HX
Total		**3060**	**2740**	**1923**	**817**	**30**		

Table-3: List of LVRT/HVRT Non-compliant RE Plants and their Generation Loss quantum for 11th May'2025 event: (21 nos. of RE plants found LVRT/HVRT Non-compliant on 11th May'2025)

Event analysis of 11.05.2025 RE generation loss event @12:31hrs								
RE Plant Name	**Pooling Station**	**Plant Capacity (MW)**	**Generation before the event (MW)**	**Generation after the event (MW)**	**Generation loss (MW)**	**% Generation loss (MW)**	**Inverters/ WTG Make**	**Inverter/WTG Model No**
			(A)	**(B)**	**C = (A-B)**	**D = (C/A) *100**		
*NTPC Nokhra_300MW	Bhadla-II(PG)	300	242	0	242	100	TBEA	TC3125KF
							SINENG	EP-3125-HA-UD
NTPC Nokh Solar	Bhadla-II(PG)	245	211	0	211	100	FIMER	Fimer-PVS980-58-5000-L
Avaada Sunrays Pvt. Ltd.	Bhadla-II(PG)	320	325	54	271	83	SINENG	SP-250K-INH
Azure Maple Pvt. Ltd.	Bhadla (PG)	300	275	83	192	70	HUAWEI	SUN2000-185KTL-INH0
NTPC Devikot Solar plant_240MW	Fatehgarh-II(PG)	240	210	124	86	41	TBEA	TC2500KF
RENEW SOLAR POWER Pvt. Ltd. Bikaner	Bikaner (PG)	250	227	146	81	36	HUAWEI	SUN2000-185KTL-INH0
TP Surya Pvt. Ltd.	Bikaner (PG)	110	89	59	30	34	SUNGROW	SG3125HV-32
Avaada	Bikaner	30	295	212	83	28	SINE	EP-

Sustainable RJ Pvt. Ltd.	(PG)	0					NG	3125-HA-UD
ACME Sikar Solar Power Pvt. Ltd.	Bikaner-II	53	88	64	24	27	SUN GROW	SG4400UD-20
Clean Solar Power (Jodhpur) Pvt. Ltd.	Bhadla (PG)	250	240	175	65	27	SUN GROW	SG250 HX-IN
Mega Surya Urja Pvt. Ltd. (MSUPL)	Bhadla-II(PG)	250	247	181	66	27	SINE NG	EP3125-HA-UD
ACME RAISAR SOLAR POWER PVT. LTD.	Fatehgarh-I	300	313	233	80	26	SUN GROW	SG3300UD-20 (51 deg. Model)
AMP Energy Green Six Pvt. Ltd.	Bhadla-II(PG)	100	85	65	20	24	SUN GROW	SG320 HX
Avaada RJHN_240MW	Bikaner (PG)	240	231	177	54	23	SINE NG	EP-3125-HA-UD
							SINE NG	SP-250K-INH
Adani Hybrid Energy Jaisalmer Three Ltd.	Fatehgarh-II(PG)	300	290	237	53	18	HUA WEI	SUN2000-185KTL-INH0
							TBEA	TS208KTL-HV
ReNew Solar Urja Private Limited	Fatehgarh-II(PG)	300	289	237	52	18	SUN GROW	SG250 HX-IN
							TBEA	TS208KTL-HV
Renew Sun Waves Private Limited (RSEJ4L)	Fatehgarh-II(PG)	300	257	217	40	16	SUN GROW	SG250 HX-IN
ACME DHAULPUR SOLAR POWER PVT. LTD.	Fatehgarh-I	300	304	259	45	15	SUN GROW	SG3300UD-20 (51 deg. Model)
Adani Solar Energy RJ Two Pvt. Ltd. (Devikot)	Fatehgarh-II(PG)	180	180	155	25	14		
ReNew Solar Energy (Jharkhand	Fatehgarh-II(PG)	300	260	226	34	13	HUA WEI	SUN2000-185KTL

Three) Pvt. Ltd.								-INH0
ACME PHALODI SOLAR POWER PRIVPVT. LTD.	Fatehgarh-I	300	314	279	35	11	SUN GROW	SG3300UD-20 (50 deg. Model)
Total		**5238**	**4972**	**3183**	**1789**	**36**		

**Tripping of 220kV NTPC Nokhra-Bhadla-II (PG) despite no fault in the line caused loss of evacuation path and hence generation loss of 100%, undesirable tripping of line may be reviewed.*

Table-4: List of LVRT/HVRT Non-compliant RE Plants and their Generation Loss quantum for 12th June'2025 event: (11 nos. of RE plants found LVRT/HVRT Non-compliant on 12th June'2025)

Event analysis of 12.06.2025 RE generation loss event @13:34hrs								
RE Plant Name	**Pooling Station**	**Plant Capacity (MW)**	**Generation before the event (MW)**	**Generation after the event (MW)**	**Generation loss (MW)**	**% Generation loss (MW)**	**Inverters/ WTG Make**	**Inverter/WTG Model No**
			(A)	**(B)**	**C = (A-B)**	**D = (C/A) *100**		
Azure Maple Pvt. Ltd.	Bhadla (PG)	300	275	158	117	43	HUAWEI	SUN2000-185KTL-INH0
Avaada Sustainable RJ Pvt. Ltd.	Bikaner (PG)	300	293	207	86	29	SINENG	EP-3125-HA-UD
ACME RAISAR SOLAR POWER PVT. LTD.	Fatehgarh-I	300	303	222	81	27	SUN GROW	SG3300UD-20 (51 deg. Model)
Adani Hybrid Energy Jaisalmer Four Ltd.	Fatehgarh-I	700	654	481	173	26	HUAWEI	SUN2000-185KTL-H1
SBSR Power Cleantech Eleven Private Ltd.	Bikaner (PG)	300	265	202	63	24	KEHUA	SPI3125K-B-H
NTPC Devikot Solar plant_240MW	Fatehgarh-II(PG)	240	194	148	46	24	TBEA	TC2500KF
Avaada Sunrays Pvt. Ltd.	Bhadla-II(PG)	320	301	244	57	19	SINENG	SP-250K-INH

Mega Surya Urja Pvt. Ltd. (MSUPL)	Bhadla-II(PG)	250	246	202	44	18	SINENG	EP3125-HA-UD
ACME DHAULPUR SOLAR POWER PVT. LTD.	Fatehgarh-I	300	303	256	47	16	SUNGROW	SG3300UD-20 (51 deg. Model)
ACME Chittorgarh Solar Energy Pvt Ltd	Bhadla(PG)	250	210	178	32	15	TBEA	TC3750KF
							TBEA	TC5000KF
							TBEA	TS208KTL
RENEW SOLAR POWER Pvt. Ltd. Bikaner	Bikaner(PG)	250	212	186	26	12	HUAWEI	SUN2000-185KTL-INH0
Total		**3510**	**3256**	**2484**	**772**	**24**		

Comprehensively analysis of RE generation loss events occurred after 30th June'2024 i.e. events occurred from 01.07.2024 to 30.04.2025 and repetitive LVRT/HVRT non-compliant RE generators based on these events analysis:

6.8 Since 1st July'2024 to 30th April'2025, total 4 numbers of RE generation loss events (>1000MW) occurred in RE complex of Northern Region, details given below;

Summary of RE Generation loss in NR (1st July'24-30th April'25):

S. No	Date & Time	Fault event	Quantum of RE generation drop	Voltage dip observed	Frequency Dip (Hz)
1	12.12.2024, 12:25 hrs	B-N fault on 220 KV AzurePSS41-Bhadla (PG) line	1860 MW	0.716 PU	0.245
2	15.12.2024, 11:35 hrs	B-N fault on 220 KV AzurePSS41-Bhadla (PG) line	1066 MW	0.63 PU	0.192
3	08.01.2025, 13:38 hrs	R-Y fault on 400 KV Fatehgarh-II(PG)-Fatehgarh-I (FBTL) Ckt-1	1450 MW	0.514 PU	0.14
4	18.03.2025, 10:00 hrs	R-N fault on 400 KV AGE25L-Bhadla-II (PG) line	1035 MW	0.75	0.183

6.9 Representative from NRLDC stated that events as mentioned in Sl.no. 1 & 2 were discussed in detailed in the 2nd RE sub-committee meeting and actions points with timeline was issued vide MoM of 2nd RE sub-committee meeting.

6.10 He further added that all the four (4) events have been comprehensively analysed to identify the repetitive non-compliant RE plants. Below table shows the repetitive

LVRT/HVRT Non-compliant RE plants based on the analysis of all the aforementioned four (4) events.

Table-5: List of LVRT/HVRT non-compliant RE plants in any of the 4 nos. of RE generation loss (>1000MW) events from 01.07.2024 to 30.04.2025

Sr. No.	Name of REGS	Capacity of REGS (MW)	Name of ISTS Pooling Station where REGS is connected	Generation loss (MW)	% Generation loss (MW)	LVRT Compliant/Non-compliant w.r.t recovery of active power	Generation loss (MW))	% Generation loss (MW)	LVRT Compliant/Non-compliant w.r.t recovery of active power	Generation loss (MW)	% Generation loss (MW)	LVRT Compliant/Non-compliant w.r.t recovery of active power	Generation loss (MW)	% Generation loss (MW)	LVRT Compliant/Non-compliant w.r.t recovery of active power	Total Numbers of Events	No. of times RE GS found Non-compliant	% of Non compliance of REGS (Nos. of times non-compliant w.r.t total nos. of event occurred)
				18.03.2025, 10:00 hrs event			08.01.2025, 13:38 hrs event			15.12.2024, 11:35 hrs event			12.12.2024, 12:25 hrs event					
1	**ReNew Solar Urja Private Limited**	300	Fatehgarh-II(PG)	52	21	Non-compliant	110	38	Non-compliant	37	13	Non-compliant	32	11	Non-compliant	4	4	**100 %**
2	**NTPC Devikot Solar plant_240MW**	240	Fatehgarh-II(PG)	85	45	Non-compliant	44	19	Non-compliant	90	40	Non-compliant	98	43	Non-compliant	4	4	**100 %**
3	**Avaada Sunrays Pvt. Ltd.**	320	Bhadla-II(PG)	79	27	Non-compliant	73	22	Non-compliant	175	51	Non-compliant	167	50	Non-compliant	4	4	**100 %**
4	**Avaada Sustainable RJ Pvt. Ltd.**	300	Bikaner(PG)	53	20	Non-compliant	11	4	Compliant	43	14	Non-compliant	62	23	Non-compliant	4	3	**75%**
5	**SB ENERGY FOUR PRIVATE LIMTED, Bhadla**	200	Bhadla (PG)	38	22	Non-compliant	0	0	Compliant	28	14	Non-compliant	77	41	Non-compliant	4	3	**75%**
6	**AMP**	10	Bha	25	24	Non-	0	0	Comp	30	43	Non-	29	45	Non-	4	3	**75%**

	Energy Green Five Pvt. Ltd.	0	dla-II(PG)			compliant			liant			compliant			compliant			
7	**Renew Surya Ravi Pvt. Ltd.**	300	Bikaner(PG)	12	5	Compliant	71	26	Non-compliant	25	10	Compliant	36	15	Non-compliant	4	2	**50%**
8	**Thar Surya Pvt. Ltd.**	300	Bikaner(PG)	76	28	Non-compliant	1	0	Compliant	0	0	Compliant	283	100	Non-compliant	4	2	**50%**
9	**SBSR Power Cleantech Eleven Private Ltd.**	300	Bikaner(PG)	56	21	Non-compliant	23	8	Compliant	2	1	Compliant	46	17	Non-compliant	4	2	**50%**
10	**SB Energy Six Private Limited, Bhadla**	300	Bhadla(PG)	-1	0	Compliant	4	1	Compliant	161	53	Non-compliant	73	26	Non-compliant	4	2	**50%**
11	**ACME Chittorgarh Solar Energy Pvt Ltd**	250	Bhadla(PG)	0	0	Compliant	34	16	Non-compliant	24	13	Non-compliant	0	0	Compliant	4	2	**50%**
12	**Clean Solar Power (Jodhpur) Pvt. Ltd.**	250	Bhadla(PG)	14	6	Compliant	50	20	Non-compliant	56	22	Non-compliant	8	3	Compliant	4	2	**50%**
13	**Adani Hybrid Energy Jaisalmer Three Ltd.**	300	Fatehgarh-II(PG)	43	14	Non-compliant	18	7	Compliant	0	0	Compliant	38	16	Non-compliant	4	2	**50%**
14	**ABC Renewable Pvt. Ltd**	300	Bhadla-II(PG)	37	14	Non-compliant	0	0	Compliant	16	5	Compliant	64	21	Non-Compliant	4	2	**50%**
15	**NTPC Nokhra_300MW**	300	Bhadla-II(PG)	261	100	Non-compliant	5	2	Compliant	22	8	Compliant	109	40	Non-compliant	4	2	**50%**
16	**Azure Power Forty**	600	Bikaner(P	1	5	Compliant	43	11	Non-compliant	31	5	Compliant	0	0	Compliant	4	1	**25%**

	Three Pvt. Ltd.		G)															
17	**Avaada Sunce energy Pvt limited**	350	Bikaner(PG)	6	2	Compliant	5	1	Compliant	31	9	Compliant	72	23	Non-compliant	4	1	**25%**
18	**Ayana Renewable Power Three Pvt Ltd (ARPTPL)**	300	Bikaner(PG)	0	0	Compliant	0	0	Compliant	1	0	Compliant	32	14	Non-compliant	4	1	**25%**
19	**RENEW SOLAR POWER Pvt. Ltd. Bhadla**	50	Bhadla (PG)	0	0	Compliant	5	10	Compliant	-1	-2	Compliant	10	20	Non-compliant	4	1	**25%**
20	**Renew Sun Waves Private Limited (RSEJ4L)**	300	Fatehgarh-II(PG)	4	2	Compliant	9	3	Compliant	3	1	Compliant	223	76	Non-compliant	4	1	**25%**
21	**Adani Solar Energy Jaisalmer One Pvt. Ltd.**	450	Fatehgarh-II(PG)	2	1	Compliant	68	16	Non-compliant	39	9	Compliant	33	7	Compliant	4	1	**25%**
22	**Adani Green Energy Twenty Four Limited**	500	Fatehgarh-II(PG)	-1	0	Compliant	55	25	Non-compliant	0	0	Compliant	-1	-2	Compliant	4	1	**25%**
23	**ACME DEOGHAR SOLAR POWER PRIVATE LIMITED**	300	Fatehgarh-I PS	-1	0	Compliant	251	86	Non-compliant	7	3	Compliant	6	2	Compliant	4	1	**25%**
24	**ACME PHALODI SOLAR POWER PRIVATE LIMITED**	300	Fatehgarh-I PS	-4	-2	Compliant	292	98	Non-compliant	3	1	Compliant	1	0	Compliant	4	1	**25%**
2	**ACME**	30	Fat	-1	0	Comp	14	47	Non-	4	2	Comp	18	7	Comp	4	1	**25%**

5	**RAISAR SOLAR POWER PRIVATE LIMITED**	0	ehg arh-I PS			liant	3		compl iant			liant			liant			
26	**Mega Surya Urja Pvt. Ltd. (MSUPL)**	250	Bha dla-II(PG)	21	10	Comp liant	0	0	Comp liant	57	24	Non-compl iant	13	6	Comp liant	4	1	**25%**
27	**AMP Energy Green Six Pvt. Ltd.**	100	Bha dla-II(PG)	12	11	Non-compl iant	1	1	Comp liant	2	3	Comp liant	3	4	Comp liant	4	1	**25%**

6.11 MS, NRPC suggested to discuss the plant wise issues regarding generation loss one by one, corrective actions taken, required corrective actions along with timeline for implementing the same. Same have been deliberated as follows;

ACME

6.12 No one was present from ACME in the meeting

Renew Surya Ravi Pvt. Ltd.

6.13 The representative from NRLDC highlighted that during the event on 8th January 2025, approximately 71 MW (around 21%) of generation was lost. It was inquired whether any root cause analysis had been conducted at the plant level to address the non-compliance observed.

6.14 In response, the representative from Renew shared the following points:

- The inverter firmware was updated in December 2024, revising transient protection logic. Since then, only two instances of non-compliance have observed, which are currently being discussed with the OEM.
- For similar inverters, firmware updates are being tested on a trial basis in 2–3 blocks, one at Adani RE plants by the OEM. Based on the results, updates will be rolled out across all inverters if found effective.
- The timeline for resolution will be communicated via email.

6.15 Additionally, MS NRPC and ED NRLDC emphasized the need for conducting preliminary analysis at the plant level rather than relying solely on the OEM, as this leads to delays. The findings/corrective actions should be submitted to NRLDC and may be shared with forum for benefit of others as well as it might give a direction to others. It was also reiterated that the timeline specified in the IEGC—submission of data within 7 days—must be strictly followed for timely reporting.

RSUPL (Indigrid)

6.16 The NRLDC representative mentioned that RSUPL, owned by Indigrid, is equipped with the same inverter model—SUNGROW SG250HX-IN—as installed in RSRPL and some other plants. While the performance in other plants has shown some improvement, the issues in RSUPL continue to persist as it was non-compliant in the three events out of the four mentioned events

6.17 The representative from RSUPL mentioned the following:

- The inverter firmware was updated in December 2024 but still non-compliance is being observed, further discussions with OEM is being carried out.
- The timeline for RCA report shall be communicated via mail.

6.18 Representative from NRLDC requested to analyse the events at their end and share event details including plant level settings to identify the root cause.

Avaada

6.19 The NRLDC representative mentioned that Avaada Sunrays Pvt. Ltd was non-compliant in all the four events and Avaada Sustainable RJ Pvt. Ltd.was non-compliant in three events out of the four.

6.20 The representative from Avaada mentioned the following:

- Data of the all the events were shared with the OEM after which it was suggest from OEM that Anti-islanding scheme may be disabled
- Firmware was updated previously three time as well, but no improvement observed.
- Further firmware shall be updated with one month.

AMP Energy

6.21 The NRLDC representative mentioned that AMP Energy Green Five Pvt. Ltd. was non-compliant in one event out of the three events

6.22 Representative from AMP energy stated that firmware was updated post which improvement have been observed and further findings shall be shared

NTPC

6.23 The representative from NRLDC highlighted that NTPC Devikot was non-compliant in all the events. It was inquired whether any root cause analysis had been conducted at the plant level to address the non-compliance observed.

6.24 The representative from NTPC mentioned the following:

- Firmware and settings at the NTPC Devikot plant were updated in December 2024, and further discussions are ongoing with the OEM as non-compliance is still being observed.
- They are unable to perform analysis at the inverter level, as only 5-minute interval data is available to them, millisecond data is not available. As a result, they rely on the OEM for post-fault analysis.

6.25 In response, the NRLDC representative stated that the Minutes of the 2nd RE Sub-Committee meeting included a detailed list of Northern Region plants along with their respective inverter make and model. If the same inverter make and model is performing better at other plants, coordination with those plants could help in updating settings or firmware accordingly.

Adani Hybrid Energy Jaisalmer Three Ltd.

6.26 The representative from NRLDC highlighted that NTPC Devikot was non-compliant in 50% of the events.

6.27 The representative from Adani Hybrid Energy Jaisalmer Three Ltd mentioned the following:

- They are currently experiencing issues with HUAWEI inverters.
- A meeting is scheduled with the inverter OEM to address the problem, and if a solution is provided, it will be implemented within one month.

Clean Solar Power (Jodhpur) Pvt. Ltd.

6.28 The representative from NRLDC highlighted that Clean Solar Power (Jodhpur) Pvt. Ltd. was non-compliant in 50% of the events.

6.29 The representative from **Clean Solar Power (Jodhpur) Pvt. Ltd.** mentioned that:

- Following the previous firmware update, the inverters are no longer tripping as frequently as before; however, the issue still remains during the recovery phase, as they cannot restore output to 90% of the pre-fault level.
- They are awaiting the outcome of firmware updates currently being tested on a pilot basis in 2–3 blocks at Adani plants by the OEM. If the results are found to be effective, the updates will be implemented across all inverters within two months.

SB ENERGY FOUR PRIVATE LIMTED, Bhadla

6.30 The representative from NRLDC highlighted that SB ENERGY FOUR PRIVATE LIMTED, Bhadla was non-compliant one time out of the last four events.

6.31 The representative from SB ENERGY FOUR PRIVATE LIMTED mentioned that the firmware update was carried in March'2025. Post which no non-compliance has been observed.

6.32 NRLDC representatives stated that details of the update may be shared with them.

Renew

6.33 The representative from Renew stated that Post firmware update improvement has been oberserved and only one event of non-compliance has been observed for which OEM has been consulted and is working towards it. Reports containing the details of corrective action will be shared with NRLDC once it is made available by the OEM.

Azure Maple Pvt. Ltd.

No one was present from ACME in the meeting

6.34 CGM NRLDC further requested all the developers to refer to the list of non-compliant plants and take necessary corrective actions.

6.35 MS NRPC further requested the Solar Federation to take up the ongoing concerns with OEMs, regarding the LVRT/HVRTnon-compliance

In response, the representative from the Solar Federation suggested that a list of non-participating entities be shared with them. They assured that the issues regarding non-compliance would be circulated internally to the relevant departments of RE developers, as the Federation does not have direct communication with OEMs. They also committed to encouraging better participation in future meetings.

6.36 MS NRPC further stated that the Minutes of Meeting (MoM) could serve as a reference document for the Solar Federation to escalate these issues with both RE developers and OEMs.

6.37 MS NRPC also suggested that concerns related to OEMs be raised during the monthly meetings chaired by the Secretary, MNRE, as OEM representatives are typically present in those meetings and most of the issues being encountered are at the inverter level.

Analysis of performance of 15 repetitive LVRT/HVRT Non-compliant RE generators in events occurred between 1st July'24 – 30th April'25 *(identified as repetitive non-compliant based on event analysis of 1st Jan'24 to 30th June'24):*

6.38 Representative from NRLDC presented that out of 15 repetitive non-compliant LVRT/HVRT RE plants (as identified from Jan 1 to June 30, 2024), some have shown improvement after taking corrective actions, while others remain non-compliant despite multiple follow-ups.

Table-6: Summary of performance of 15 repetitive RE plants w.r.t LVRT/HVRT compliance (Events of RE gen. loss > 1000MW) since 01.07.2024 to 30.04.2025

Sr. No.	Name of REGS	Capacity of REGS (MW)	Name of ISTS Pooling Station where REGS is connected	Total Numbers of Events	No. of times REGS found non-compliant	% of Non-compliance of REGS (Nos. of times non-compliant w.r.t total nos. of event occurred)	Found Compliant in 12.12.2024 event (YES/NO)	Found Compliant in 15.12.2024 event (YES/NO)	Found Compliant in 08.01.2025 event (YES/NO)	Found Compliant in 18.03.2025 event (YES/NO)	Found Compliant in 11.05.2025 event (YES/NO	Found Compliant in 12.06.2025 event (Yes/No)	Remarks
1	Renew Sun Waves Pvt.	300	Fatehgarh-II (PG)	4	1	33%	NO	YES	YES	YES	NO	YES	Action taken, Disable of

	Ltd.												df/dt setting in all Sungrow SG250 HX-IN inverters. Upgradation of firmware with optimization of Transient Protection Logic & Wave by wave fast protection logic
2	Adani Hybrid Energy Jaisalmer Two Ltd.	300	Fatehgarh-II (PG)	4	0	0%	YES	YES	YES	YES	YES	YES	Action taken, Disable of df/dt setting in all Sungrow SG250 HX-IN inverters. Upgradation of firmware with optimi

													zation of Transient Protection Logic & Wave by wave fast protection logic
3	ReNew Solar Urja Pvt. Ltd.	300	Fatehgarh-II (PG)	4	4	83%	NO	NO	NO	NO	NO	YES	No action taken Yet, still non-compliant in all the events
4	Clean Solar Power (Jodhpur) Pvt. Ltd.	250	Bhadla (PG)	4	2	50%	YES	NO	NO	YES	NO	YES	No action taken report submitted yet, found non-compliant 50% of the time
5	Azure Power Forty-Three Pvt. Ltd.	600	Bikaner (PG)	4	1	17%	YES	YES	NO	YES	YES	YES	No action taken report submitted yet, found non-

													compliant 17% of the time
6	**Renew Surya Ravi Pvt. Ltd.**	300	Bikaner (PG)	4	2	**33%**	**NO**	**YES**	**NO**	**YES**	**YES**	**YES**	**No action taken report submitted yet, found non-compliant 50% of the time, same need to be implemented as implemented in Renew Sun Waves Pvt. Ltd.**
7	**ACME Chittorgarh Solar Energy Pvt. Ltd.**	250	Bhadla (PG)	4	2	**50%**	**YES**	**NO**	**NO**	**YES**	**YES**	**NO**	**No action taken report submitted yet, found non-compliant 50% of the time**
8	**Adani**	450	Fateh	4	1	**17%**	**YES**	**YES**	**NO**	**YES**	**YES**	**YES**	**No**

	Solar Energy Jaisalmer One Pvt. Ltd.		garh-II (PG)										**action taken report submitted yet, found non-compliant 17% of the time. The issue in KEHUA inverters is yet to be resolved.**
9	**AMP Energy Green Five Pvt. Ltd.**	100	Bhadla-II (PG)	4	3	**50%**	**NO**	**NO**	**YES**	**NO**	**YES**	**YES**	**No action taken Yet, still non-compliant 50% of the time**
10	**AMP Energy Green Six Pvt. Ltd.**	100		4	1	**33%**	**YES**	**YES**	**YES**	**NO**	**NO**	**YES**	**No action taken report submitted yet, found non-compliant 25% of the**

													time
11	Adani Hybrid Energy Jaisalmer Three Ltd.	300	Fatehgarh-II (PG)	4	2	50%	NO	YES	YES	NO	NO	YES	No action taken report submitted yet, found non-compliant 50% of the time.
12	ABC Renewable RJ-01 Pvt. Ltd	300	Bhadla-II (PG)	4	2	33%	NO	YES	YES	NO	YES	YES	No action taken report submitted yet, found non-compliant 50% of the time
13	Altra Xergi Power Pvt. Ltd.	380	Fatehgarh-III	4	0	0%	YES	YES	YES	YES	YES	YES	Action taken, Active islanding protection (including df/dt protection) have been disabled in all the Sungrow

													SG4400UD-20 Inverters
14	**Avaada Sunrays Pvt. Ltd.**	320	Bhadla-II (PG)	4	4	**100%**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**No action taken Yet, still non-compliant in all the events**
15	**Devikot Solar plant NTPC Ltd.**	240	Fatehgarh-II (PG)	4	4	**100%**	**NO**	**NO**	**NO**	**NO**	**NO**	**NO**	**No action taken Yet, still non-compliant in all the events**

6.39 MS NRPC requested all the plants to submit their respective action taken reports, emphasizing that the learnings from one plant could serve as valuable suggestions or guidance for others.

6.40 Additionally, NRLDC representatives highlighted those certain plants have already provided their actions which are present in the remarks section of the table, which may be referred to by other plants for further reference.

Update on present status and submission of action taken/progress report of LVRT/HVRT Non-compliant RE generators as per the timelines committed in 2nd sub-committee meeting.

6.41 NRLDC representative further discussed that

- Based on the detailed deliberations in the 2nd RE sub-committee meeting, status of Action taken, further course of action and Tentative Timeline for submission of report for LVRT/HVRT non-compliant RE plants was issued vide MoM of 2nd RE sub-committee meeting.
- After the issuance of MoM of 2nd RE sub-committee meeting, Only ReNew Power and Adani Green Energy Ltd. (AGEL) submitted the Root cause analyses (RCA) report pertaining to the long pending issue of Sungrow SG250HX-IN inverter, no RCA report and progress status report received from other RE plants.

- Timeline for submission of action taken/progress report as issued in Table-3 of MoM of 2nd RE sub-committee meeting have been updated based on present status (Report received/not received), and same is summarized below;

Table-7: Details of LVRT/HVRT Non-compliant RE Plants on 12th Dec'24 and 15th Dec'24 fault event, Action taken, Corrective action required / further course of action, Tentative timelines as committed in the meeting along with present status (Report received/not received)

Sl. No.	Plant Name	Action Taken	Corrective action required / further course of action	Tentative Timeline & present status
1	Renew Sun Waves Pvt. Ltd. (RSWPL)	Sungrow (OEM) brought the updation of firmware, in this update, Sungrow has disabled df/dt (ROCOF) and Anti-islanding protections of the SG250HX-IN Inverter	Again, in Dec'24 events generation loss occurred in the Plant even after the Firmware update in Nov'24, same need to be analysed in detailed and Root cause analyses report (RCA) along with changes implemented (i.e. earlier Firmware Vs New Firmware) will be shared with NRLDC/NRPC.	15.02.2025 **Report Received**
2	Renew Surya Ravi Pvt. Ltd. (RSRPL)	Sungrow (OEM) brought the updation of firmware, in this update, Sungrow has disabled df/dt (ROCOF) and Anti-islanding protections of the SG250HX-IN Inverter	Again, in Dec'24 events generation loss occurred in the Plant even after the Firmware update in Nov'24, same need to be analysed in detailed and Root cause analyses report (RCA) along with changes implemented (i.e. earlier Firmware Vs New Firmware) will be shared with NRLDC/NRPC.	15.02.2025 **Report Received**
3	AMP Energy Green Five Pvt. Ltd (AEG5L)	Inverter Firmware was updated and some improvements have been observed.	AMP Energy Green Five Pvt. Ltd (AEG5L) is in the list of 15 repetitive non-complaint RE plants, issue was deliberated in 1st RE Sub-committee meeting, but no improvement observed yet. Plant needs to take the corrective measures and appraise the same to the forum accordingly.	**No Report /updated status Received yet**
4	NTPC Nokhra	Firmware and settings at the	Plant needs to take the corrective measures and appraise the same to	**No Report**

		NTPC Devikot plant were updated in December 2024 but non-compliance is still being observed.	the forum accordingly.	**/updated status Received yet**
5	NTPC Devikot	NTPC representative informed that issue has been taken up with OEM however corrective action is yet to be taken	NTPC Devikot is in the list of 15 repetitive non-complaint RE plants, issue was deliberated in 1st RE Sub-committee meeting, but no improvement observed yet. Plant needs to take the corrective measures and appraise the same to the forum accordingly.	**No Report /updated status Received yet**
6	NTPC Kolayat	NTPC representative informed that issue has been taken up with OEM however corrective action is yet to be taken	Plant needs to take the corrective measures and appraise the same to the forum accordingly.	**No Report /updated status Received yet**
7	Avaada Sunrays Energy Pvt. Ltd. (ASEPL)	Software of String Inverters (SINENG SP-250K-INH) in Avaada Sunce energy Pvt Ltd. have been updated by SINENG (OEM) on 15th Dec'2024. As both the events occurred before updation of software, hence improvement can be seen in any next event. OEM is requested to submit report as early as possible.	Same is under observation after software update, in case of any fault event after 15th Dec'2024 performance will be analysed, and report will be submitted to NRLDC/NRPC. Detailed report along with reason of tripping in Avaada Plants in both the events of 12.12.2024 and 15.12.2024 will be submitted to NRLDC/NRPC.	10.02.2025 **No Report Received yet**
8	Avaada Sustainable RJ	Reason of No absorption of Reactive power in	Detailed report along with reason of tripping in Avaada Plants in both the events of 12.12.2024 and 15.12.2024	10.02.2025 **No**

	Pvt. Ltd.	HVRT is under discussion with OEM (SINENG).	to be submitted to NRLDC/NRPC.	**Report Received yet**
9	Avaada Sunce energy Pvt Ltd.	Reason of No absorption of Reactive power in HVRT is under discussion with OEM (SINENG).	Detailed report along with reason of tripping in Avaada Plants in both the events of 12.12.2024 and 15.12.2024 to be submitted to NRLDC/NRPC.	10.02.2025 **No Report Received yet**
10	ABC Renewable (RJ-01) Pvt. Ltd.	After continuous follow up with TBEA (OEM), they have updated the Firmware & software of TBEA TC3125KF inverters two (2) times in Set'24 and Oct'24. After the Non-compliance and generation loss on 12th Dec'24 event, issue was again taken-up with TBEA and meeting was held with R&D team. Based on 12th Dec'24 event, Firmware & software again updated for all the TBEA TC3125KF inverters on 10th Jan'2025. OEM is requested to submit report within a week.	Details of actions taken, Firmware & software updated and the reason of tripping on 12th Dec'24 event will be shared with NRLDC/NRPC. Further observations after Firmware & software on 10th Jan'25 will be share in case of any future fault event.	15.02.2025 **No Report Received yet**
11	SB ENERGY FOUR PVT LTD (SBE4L)	Regarding tripping in SB ENERGY FOUR PVT LTD (SBE4L), details have been shared with OEMs.	OEM is analysing the root cause, once report will come, same will be shared with NRLDC/NRPC	20.02.2025 **No Report Received yet**

12	SB Energy Six Pvt. Ltd. (SBE6PL)	Regarding tripping in SB Energy Six Pvt. Ltd. (SBE6PL), details have been shared with OEMs.	OEM is analysing the root cause, once report will come, same will be shared with NRLDC/NRPC	20.02.2025 **No Report Received yet**
13	Adani Hybrid Energy Jaisalmer Three Ltd. (AHEJ3L)	Issue is being faced in TBEA TS208KTL-HV inverters installed in the plant, same is under continuous follow up with TBEA (OEM)	Progress status report will be shared with NRLDC/NRPC	15.02.2025 **No Report Received yet**
14	Adani Solar Energy Jaisalmer Two Pvt. Ltd.	Issue is being faced in KEHUA SPI3125K-B-H inverters installed in the plant, same is under continuous follow up with KEHUA (OEM)	Progress status report will be shared with NRLDC/NRPC	15.02.2025 **No Report Received yet**
15	ReNew Solar Urja Pvt. Ltd. (RSUPL)	Inverter firmware was updated in December but no improvement is observed	ReNew Solar Urja Pvt. Ltd. (RSUPL) is in the list of 15 repetitive non-complaint RE plants, issue was deliberated in 1st RE Sub-committee meeting but no improvement observed yet. Plant needs to take the corrective measures and appraise the same to the forum accordingly.	**No Report /updated status Received yet**
16	Ayana Renewable Power Three Pvt Ltd	Details are being analysed	Report on Reason of generation loss and tripping of Inverter along with suggestive corrective action will be submitted to NRLDC/NRPC.	15.02.2025 **No Report Received yet**
17	ACME Chittorgarh Solar Energy Pvt Ltd.	No action taken yet, concerned person from Ayana attended the meeting was not aware of the generation loss event in ACME	ACME Chittorgarh Solar Energy Pvt Ltd. is in the list of 15 repetitive non-complaint RE plants, issue was deliberated in 1st RE Sub-committee meeting but no improvement observed yet. Plant needs to take the corrective measures and appraise the same to the forum accordingly.	20.02.2025 **No Report Received yet**

		Chittorgarh.		
18	Clean Solar Power (Jodhpur) Pvt. Ltd.	No action taken yet.	Clean Solar Power (Jodhpur) Pvt. Ltd. is in the list of 15 repetitive non-complaint RE plants, issue was deliberated in 1st RE Sub-committee meeting but no improvement observed yet. Plant needs to take the corrective measures and appraise the same to the forum accordingly.	**No Report /updated status Received yet**
19	Mega Surya Urja Pvt. Ltd. (MSUPL)	No action taken yet.	Plant needs to take the corrective measures and appraise the same to the forum accordingly.	**No Report /updated status Received yet**
20	Azure Power 41 Pvt. Ltd. (AP41PL)	No one was present from Azure Power 41 Pvt. Ltd. (AP41PL) in the meeting to update any action taken at Plant end.	Plant needs to take the corrective measures and appraise the same to the forum accordingly.	**No Report /updated status Received yet**

6.42 **MS NRPC requested all the RE developers mentioned above for timely submission of report.**

6.43 NRLDC representative stated the following points:

- Drop in RE generation is mainly due to LVRT non-compliance of RE plants during fault events (i.e. several RE plants failed to recover 90% of pre-fault active power within 1 sec). Other reasons are undesirable tripping of Inverter on various protection during fault event such as Over voltage, df/dt, Under frequency, Transient Over current or Transient Over Voltage etc despite no tripping condition as per POI voltage & frequency.
- Despite taking up in several earlier meetings, adequate action from some RE developers to resolve the generation loss issue is yet to be implemented.
- Ony few RE developers submitted the required details for analysing the event and to find the reason of generation loss and LVRT/HVRT non-compliance at POI *(Non- submission of tripping details is Non-compliance of IEGC clause 37.2(c) and clause 15.3 of CEA grid standard).* It is causing issues remained unresolved and persistence non-compliance.
- Issue pertaining to validation of Plant level simulation model with actual fault event is yet to be addressed. As per FTC procedure RE plants needs to validate the Plant level simulation model within 3 months of commissioning. Simulation model submitted at the time of connectivity/FTC are not depicting the actual plant behaviour in real-time due to various shortcomings like no modelling of various protection of Inverter or other elements which is implemented in field and causing abnormal tripping during fault event.

6.44 MS NRPC stressed the importance of timely model validation and urged RE developers to treat this as a key takeaway and provide their feedback. It was informed that timelines for completing the validation will be finalized in the next meeting.

6.45 NRLDC representative suggested the following points for improvement:

a. RE plants need to keep the settings of Plant's internal elements *(from 220kV or 400kV evacuating line to Inverters terminal)* in coordination with Point of Interconnection (POI) as per CEA standards, to prevent tripping of any internal elements of plants (causing generation loss) when voltage and frequency at Interconnection point remains within the No-trip zone. HVRT, over voltage, over current, Transient O/V and frequency protection settings of Inverters need to be reviewed & rectified for Non-complaints RE plants.

b. RE developers should include the requirement of IEEE 2800-2200 (i.e. No ROCOF protection in Inverter) or if frequency protection or df/dt protection is there in inverters then operation of protection should be on frequency measured by averaging the frequency of 4-5 cycles window. *(Same was suggested in 1st RE sub-committee meeting)*

c. RE generators need to analyse the reactive power support from Inverter during HVRT in case of any tripping of Inverter in Over voltage, as several cases have been observed where plant didn't absorb reactive power despite Inverters went in HVRT and tripped on O/V.

d. Firmware of Inverters may be updated to resolve the issue of sharp reduction in active power during fault (even despite insignificant voltage dip) and to resolve the issue of any reduction in active power during HVRT (until the transient current limit of the Inverter/WTG is not hit).

e. Firmware of Inverters may be updated for adequate and prompt reactive power support (i.e. injection during LVRT, ceasing reactive power immediately after fault clearance and absorption during HVRT).

f. RE generators should also analyse the events of generation loss and non-compliance of LVRT/HVRT requirements at their end, high resolution data archiving and data logging facility at least in case of fault event should be ensured at plant end for better analysis of the events, remedial actions should be taken accordingly to resolve the issue.

NRLDC representative stated that Drop of significant quantum of RE generation affect the grid security due to large excursion in grid frequency, hence all RE plants are requested to take serious cognizance of the issue of LVRT/HVRT non-compliance of RE plants at POI and to implement necessary corrective measures to ensure LVRT/HVRT compliance at POI, further timely submission of required details for analysing the event and to find the reason of generation loss and LVRT/HVRT non-compliance at POI must be ensured by RE plants to comply with IEGC clause 37.2(c) and CEA grid standard clause 15.3.

7) Voltage Oscillation and Voltage spikes issue in RE complex:

7.1 Representative from NRLDC started discussion on the issues of Voltage Oscillation and voltage spikes issues in RE complex and stated the following points:

i. Few instances of high frequency, high amplitude voltage oscillations (30-50kV) occurred in the Rajasthan RE complex of the Northern Regional grid in the month of May'25.

ii. All the events of oscillations occurred in the month of May'2025 have been analysed, antecedent conditions and Amplitude & Frequency of oscillation have also been studied, summary is given below **Table-8.**

Table-8: Antecedent conditions and Amplitude & Frequency of oscillation in NR RE complex:

Sl. No.	Oscillation event in NR RE complex		Antecedent conditions			Oscillation Details		Major Tr. Line outage
	Event date (dd/mm/yyyy)	Event Time (hh:mm:ss)	ISGS Solar Generation (MW)	Total Wind generation (MW)	Bus Voltage at 400kV Bhadla-II (PG)	Amplitude of Oscillation (kV) (Peak-to-Peak) at 400kV bus	Frequency of Oscillation (Hz)	
1	07.05.2025	10:11:22	16704	26	397	52	3.5-4 Hz	400 kV Jaisalmer (RS) -Barmer (RS) D/C line. 400 kV Barmer - Bhinmal (RS) D/C line. 400 KV BHADLA-JODHPUR (RS) line. 400 KV BHADLA-MERTA (RS) line. 400 KV Akal-Kankani (RS) line.
2	10.05.2025	10:04:20	16701	10	401	32	3.5-4 Hz	400 kV Jaisalmer (RS) -Barmer (RS) D/C line. 400 kV Barmer - Bhinmal (RS) D/C line. 400 KV Akal-Kankani (RS) line.
3	10.05.2025	10:22:20	16737	10	401	20	3.5-4 Hz	400 kV Jaisalmer (RS) -Barmer (RS) D/C line. 400 kV Barmer - Bhinmal (RS) D/C line.

								400 KV Akal-Kankani (RS) line.
4	11.05.2025	10:20:22	16580	154	402	27	3.5-4 Hz	400 kV Jaisalmer (RS) -Barmer (RS) D/C line. 400 kV Barmer - Bhinmal (RS) D/C line. 400 KV Akal-Kankani (RS) line.
5	13.05.2025	14:34:48	17412	1670	402	30	3.5-4 Hz	400 kV Jaisalmer (RS) -Barmer (RS) D/C line. 400 kV Barmer - Bhinmal (RS) D/C line.
6	14.05.2025	10:21:00	17728	1456	398	35	3.5-4 Hz	400 kV Jaisalmer (RS) -Barmer (RS) D/C line. 400 kV Barmer - Bhinmal (RS) D/C line.
7	17.05.2025	10:21:08	17843	1667	399	26	3.5-4 Hz	400 kV Jaisalmer (RS) -Barmer (RS) D/C line. 400 kV Barmer - Bhinmal (RS) D/C line.

iii. High-frequency, low-amplitude voltage oscillations (mainly from RE plants side) escalated into high-frequency, high-amplitude voltage oscillations when the STATCOM at Fatehgarh-II & Bhadla-II remained in Auto mode (VCM or QCM) under low SCR scenario and voltage at 400kV bus of RE pooling S/s fell below 400kV. To mitigate this, STATCOM at Fatehgarh-II (PG)/Bhadla-II(PG) were put in manual mode (Fixed-Q) for short duration only when oscillation occurred.

iv. Issue of voltage oscillations and translation of high frequency, low-amplitude voltage oscillations into high frequency, high-amplitude voltage oscillations when STATCOM remains in Voltage control mode (Auto mode-VCM) were discussed in detailed in previous RE sub-committee meetings.

v. It was observed that high frequency, high-amplitude voltage oscillations and voltage dip/fluctuation considerably reduced after charging of 765kV Bhadla-II-Sikar-II D/C line on 17.12.2024. After 17.12.2024, STATCOMs in RE pocket were mostly being operated in Auto mode only, also SCR of Fatehgarh-II & Bhadla-II system were improved slightly.

vi. However, with further addition of new RE capacity in the complex, SCR again depleted. ~ 3500-4000 MW capacity have been integrated in last 6 months without commissioning of any evacuating Transmission system. This shows serious lag in the commissioning of evacuating Transmission system w.r.t the commissioning of RE capacity in the complex.

vii. With the rise in solar generation without commissioning of its associated transmission system, the SCR has declined and causing oscillation when ISTS connected RE generation exceeds 18.5 GW in the complex. Therefore, it is crucial to take proactive measures to identify the **root-cause of High-frequency, low-amplitude oscillations originating from RE plants** and translation of high-frequency, low-amplitude voltage oscillations into high-frequency, high-amplitude voltage oscillations in case of Low SCR (Weak grid connectivity/low system strength) when STATCOMs remains in Auto mode (VCM or QCM).

viii. Commissioning of RE evacuating lines planned for evacuation of Phase-II & Phase-III generation needs to be expeditated as nearly entire generation of Phase-II has already been commissioned and ~2000 MW of Phase-III generation has been commissioned but few Transmission elements of Ph-II is yet to get commissioned and not a single transmission element of Phase-III is commissioned yet. Delay is commissioning of associated transmission system causing Weak grid connectivity/low system strength because of penetration of additional RE generation of Phase-III in existing system**.**

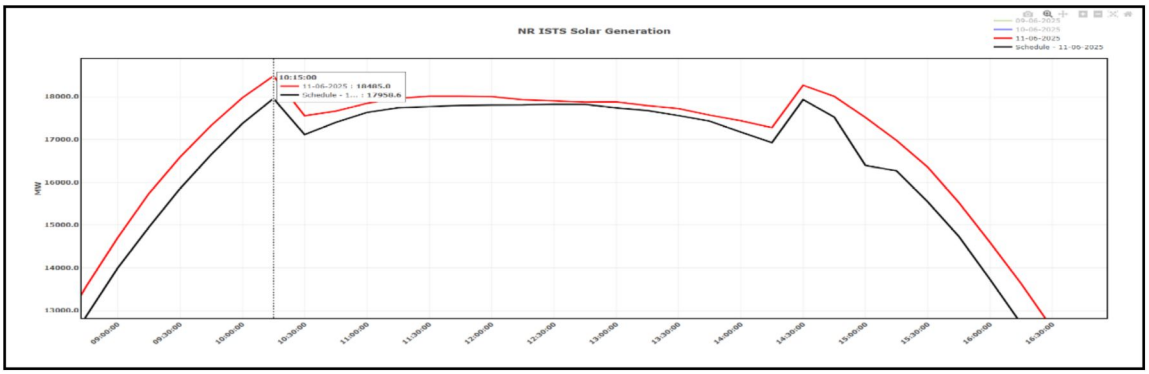
ix. A detailed deliberation was made in 2nd RE sub-committee meeting regarding issue of STATCOM, SIEMENS (OEM) was also present in the meeting. As per the MoM of 2nd RE sub-committee issued dated 01.04.2025 "*After detailed deliberation it was decided to constitute a Committee under SE(O) comprising members from NRLDC/NLDC, PGCIL, CTUIL, Rajasthan SLDC and SIEMENS (OEM) to look into the issue of STATCOM operation in view of the oscillations observed in Northern Region. The Committee shall go through the detailed technical analysis of the events, shall carry meetings among members for better technical deliberations & arriving some conclusion and Committee may submit report within one month suggesting some corrective actions and specifications for future STATCOM".*

Responding to which the committee member informed the forum that a meeting had already been conducted, during which the OEM was requested to provide responses to the committee's queries. A one-week timeframe was given for this, for which the inputs are awaited; Powergrid along with OEM shall also conduct a study based on the past events of oscillation.

x. As per point no. **7.15** of the MoM of 2nd RE sub-committee issued dated 01.04.2025 *"MS NRPC requested all 15 RE plants (as identified having reactive power in phase with the oscillating voltage in system) to submit the report/reason of in-phase oscillation occurred on 28th Dec'24 by 15.02.2025".* **No RE plant submitted the report/reason of in-phase oscillation with system voltage.**

xi. Oscillatory behaviour has been observed at boundary points around 10:30 Hrs and 14:30 Hrs, coinciding with instances of over-injection by RE generators beyond their scheduled limits. This over-generation undermines the intent of generation restriction measures already taken and increases system vulnerability, especially when the pocket is already weak due to multiple line outages and low SCR. All RE plants are strictly advised to adhere to scheduled generation and avoid over-injection during these critical hours. Detailed analysis is enclosed as **Annexure-VIII**. Below plot of NR ISTS connected solar generation shows the over-injection by RE generators around 10:30 Hrs and

14:30 Hrs boundary points.



xii. **NRLDC Instruction should be strictly adhere in case of any oscillations or contingency in the grid.**

xiii. **RE generators should promptly provide the reactive power support in case of NRLDC instruction and should maintain their bus voltage ~225 kV in general to avoid any low voltage issue in the complex.**

xiv. High resolution data archiving and data logging facility should be ensured by RE developers. In case of any oscillation, data should be analysed by RE generators and same should be shared with NRLDC for further detailed analysis.

7.2 MS NRPC advised all RE developers to follow their schedules strictly and enhance the accuracy of their forecasting. They were also requested to avoid maintaining a 10% margin between schedule and actual generation, as cumulatively it leads to a large deviation.

8) Power Quality measurement and Harmonic distortion analysis for all RE generating stations in line with Central Electricity Authority (Technical Standards for Connectivity to the Grid) (Amendment) Regulations, 2013, Part-II, clause B1, Sub-clause (1), (2), (3) & (4):

8.1 Representative from NRLDC started the discussion with harmonic related clauses of Central Electricity Authority (Technical Standards for Connectivity to the Grid) Regulations, 2007 and amendments thereof

8.2 It was emphasised that measurement of harmonic content, DC injection and flicker shall be done at least once in a year in presence of the parties concerned and the indicative date for the same shall be mentioned in the connection agreement.

8.3 It was informed to the forum that there are **50 RE plants** whose **full capacity commissioned before 31st March'24**, **out of 50 RE plant only 22 RE plants has submitted the Power quality filed test report**. Therefore, it was requested to perform Power Quality measurement, Harmonic analysis test and Flicker test at Field in the presence of concerned parties as per CEA regulation and submit the Test report for Power Quality measurement, Harmonic analysis, DC injection and Flicker test showing the %THD and distortion Individual Harmonic distortion at Point of Interconnection for Voltage and Current, DC injection and Flicker at POI.

8.4 The NRLDC representative suggested that all RE developers may proceed with the installation of Power Quality meters and mentioned that this was also discussed during the 1st RE Sub-Committee meeting. The installation would help plants

effectively monitor harmonic injection and take necessary corrective measures on continuous basis rather than monitoring once in a year.

8.5 NRLDC representative also emphasised that the power quality test reports must be validated by the “parties concerned” as decided in the previous subcommittee meetings.

8.6 Representative from Adani stated that the testing has been carried out in all their plants and they will submit the reports within a week.

8.7 Representative from Renew stated that they had submitted the report for 5 plants 1 day prior to this meeting only.

8.8 MS NRPC and CGM NRLDC requested all RE developers to perform Power Quality (Harmonic, DC injection & flicker) testing at field and to submit the Power Quality test report by September’2025. Status of progress regarding Power Quality testing of RE plant shall be taken as agenda in next RE Sub-Committee meeting.

9) Huge MVAr drawl by RVPN network:

9.1 Representative from NRLDC stated that issue of significant reactive power drawl by Rajasthan Intra state system has been discussed several times in earlier meetings, same is being again informed that Rajasthan state control area has been drawing significant amount of Reactive power (MVAr) from the grid. This has led to very poor power factors at many 400/220kV stations in Rajasthan, causing severe low voltage issues. The issue has been repeatedly highlighted through NRLDC letters and discussions in various OCC and NRPC forums, in Quarterly operational feedback of Grid-India and in the 1st RE Sub-Committee meeting of NRPC as well.

9.2 It was stated that high drawal by the Rajasthan control area leads to increased dependency on STATCOM and other ISGS RE plants, as they attempt to compensate by increasing MVAr to maintain voltage stability and this pushes them towards saturation, **limiting their ability to provide adequate support during sudden voltage drops due to faults**. Moreover, low voltage conditions causes voltage oscillations in the RE pocket.

9.3 It was further requested that Rajasthan SLDC take immediate and focused action to address this critical issue and provide update on followings;

i. Status of installation of already approved Capacitor bank in Rajasthan Intra-state system.

Representatives from Rajasthan SLDC informed that an order has been placed for 150 capacitors, each of 5 MVAR, totalling 750 MVAR. Out of the first lot of 50 capacitors, 5 have already been installed, and the remaining 45 are expected to be installed by the end of July 2025.

For the second lot of 50 capacitors, partial material has been received, and installation is planned to be completed by the end of August 2025.

The third and final lot of 50 capacitors is scheduled for installation by December 2025.

ii. Status of approval of planned STATCOM. SLDC Rajasthan informed in last meeting that Rajasthan Electricity Regulatory Commission (RERC) is yet to approve the investment plan for ±300MVAr STATCOM at 400kV Bhadla(RS) and at 765kV Jaiselmer S/s. *Rajasthan SLDC may give update on this.*

Representatives from Rajasthan SLDC stated that for STATCOM investment approval from RERC has been granted for 300MVAR at 400kV Bhadla, 100MVAR STATCOM at 220kV Tinwari and 220kV Phalodi. It is being examined if Rajasthan moves forward with it through their own resources or PSDF.

iii. Status on Installation of Power Plant controller (PPC) in Old Solar/Wind plant of Intra-state. As these plants don't have PPC, in case of any Wind generation ramping it causes direct reactive power (MVAr) drawl from the grid, plants are reliant on the grid causing uncontrolled reactive power at POI level and sever low voltage issue at Grid S/S.

Representatives from Rajasthan SLDC stated that they have identified the developers and taking up issues with them

9.4 Representatives from Rajasthan SLDC stated that new solar plants are coming near agricultural load area only, MVAR support are being taken through these solar plants as and when required. They are facing issues with the older plants as the official present are not able to operate plants in MVAR injection mode despite having the capability.

9.5 CGM NRDLC suggested that Rajasthan may conduct monthly meeting with all the RE developers connected in Rajasthan control are to discuss issues and resolve promptly.

10) Status of RE evacuation Phase-II transmission system:

10.1 Representatives from NRLDC informed the forum that

- Commissioning of Planned Phase-II transmission system for RE generation evacuation from Rajasthan RE complex is essential not only for RE generation evacuation but also for improving the RE pocket's system strength making system more stable and less vulnerable to fluctuations and also for reliving the constraint of N-1 non-compliance of 765kV Jhatikara, 765kV Bhiwani and 765kV Moga S/s ICTs loading. Phase-II transmission system needs to be expedited as commissioning of planned Phase-II generation is almost completed, also ~2000MW of phase-III generation is commissioned.
- Creation of 765kV Narela S/s, commissioning of 765kV Khetri-Narela D/C line, LILO of 765kV Meerut-Bhiwani at 765kV Narela S/s and commissioning of 2 nos. of 400kV Narela-Maharanibagh D/C lines needs to be expedited. It would relive the constraint of 765/400kV Jhatikara ICTs loading, as it would divert some quantum of RE power flow from Khetri---Jhatikara path to Khetri---Narela path.

10.2 However, due to 765kV Khetri-Narela D/C line, loading on 765kV Bikaner-Khetri D/C line would increase further which is already highly loaded. Therefore, to relive the constraint of 765kV Bikaner-Khetri D/C line loading, with commissioning of Phase-III planned generation, commissioning of 765kV Bhadla-II-Sikar-II D/C line (2nd), 765kV Sikar-II-Khetri D/C line and 765kV Sikar-II-Narela D/C line is most important.

10.3 Further, forum asked the status of commissioning of important evacuating line of RE complex from PGCIL to avoid future RE curtailment. PGCIL informed the expected timeline of commissioning for important Transmission line are as follows;

i. 765kV Bhadla-II(PG)-Sikar-II D/C (2nd) (i.e. Ckt-3 & Ckt-4). (Phase-II) by September'2025

ii. Creation of 765kV Narela S/s and 765/400kV, 2*1500MVA ICTs are 765kV Narela S/s. (Phase-II)- by July'2025 end

iii. 765kV Khetri-Narela D/C line. (Phase-II) by September'2025
iv. LILO of 765kV Meerut-Bhiwani at 765kV Narela S/s. (Phase-II) – By July'2025 end
v. 2 nos. of 400kV Narela-Maharanibagh D/C lines. (Phase-II)- by September'2025
vi. 765kV Sikar-II-Khetri D/C line. (Phase-III)- by September'2025
vii. 765kV Sikar-II-Narela D/C line. (Phase-III)-By Decemeber'2025
viii. 765kV Beawar-Dausa system. (Phase-III)-By October 2025

10.4 MS-NRPC requested for timely commissioning of RE evacuating lines for harnessing the RE power, further ROW issues may be resolved expeditiously in coordination with concerned authority.

11) Refurbishment of 400kV Bhadla(Rs)-Bikaner(Rs) D/C

11.1. NRLDC representative informed the forum that for assessment of inter control-area transfer capability and related simulation studies, thermal ratings of transmission lines as per CEA's Manual on Transmission Planning Criteria 2023 are being adopted, considering anticipated ambient temperatures as the basis for safe operating limits.

11.2. However, in the case of the 400kV Bhadla(RS)–Bikaner(RS) D/C line, the rating of terminal equipment is significantly lower than the thermal capacity of the line itself. This mismatch is resulting in under-utilization of the transmission corridor and is emerging as a **critical bottleneck in renewable energy evacuation from the Western Rajasthan RE complex**—leading to **curtailment of renewable power**. Immediate resolution is essential to ensure optimal RE integration and evacuation.

11.3. Representative from Rajasthan stated that on 11th June 2025 order has been placed to a firm for strengthening of 400kV Bhadla(Rs)-Bikaner(Rs) D/C, six months' timeline has been given and by Jan'2026 the work is expected to be completed increasing the capacity of of double ckt to 3000MW.

11.4. MS NRLC and CGM NRLDC appreciated the initiative and suggested to continuously monitor and ensure timely completion of refurbishment of the lines.

12) Night mode operation of RE-Plants

12.1 Representative from NRLDC apprised the forum regarding **clause 39 (11) of IEGC 2023** *"All the Inverter Based Resources (IBRs) covering wind, solar and energy storage shall ensure that they have the necessary capability, as per CEA Connectivity Standards, all the time including non-operating hours and night hours for solar. The active power consumed by these devices for purpose of providing reactive power support, when operating under synchronous condenser/night-mode, shall not be charged under deviations and shall be treated as transmission losses in the ISTS."*

12.2 He further added that in accordance with this regulation, all Renewable Energy (RE) developers are advised to ensure that their inverters are capable to both injecting and absorbing reactive power during night mode operation. Utilizing inverters in night mode to manage voltage levels is crucial to prevent line opening under high

voltage conditions during night hours and to reduce delays in charging transmission lines during morning hours when solar is ramping. Such operations are expected to be carried out soon, and the preparedness of the plant in this regard is essential.

13) Protection related issues in multiple elements tripping, detailed analysis of the event and status of remedial measures:

13.1 The list of major RE tripping events occurred during **January-May 2025** is attached as Annexure-XI of agenda.

13.2 **RE plants were requested to review the above-mentioned grid events, prepare detailed analysis report and present the event details during 03rd RE sub-committee meeting.** Necessary actions also need to be taken to ensure the compliance of LVRT/JVRT during any grid events.

Discussion during the meeting:

Tripping Events

A. Tripping event at Nokhra SL_BHD2 (NTPC) and RSDCL PSS4 at 13:13 hrs on 15.01.2025

13.3 NRLDC representative shared the following observations w.r.t. tripping event:

i) Exact reason of tripping and nature of protection operated in 220 KV Nokhra SL_BHD2 (NTPC)-Bhadla_2 (PG) (NTPC_NOKHRA) Ckt, 220/33 kV 100 MVA ICT 1, 2 and 3 at Nokhra SL_BHD2 (NTPC) need to be shared.
ii) SCADA and PMU data were not available at 220KV RSDCL PSS4(IP) after the event. Healthiness and availability of the same need to be ensured.
iii) DR/EL along with tripping report need to be shared from Nokhra(NT) and RSDCL PSS4(IP) ends.
iv) Status of overvoltage protection in 220kV Nokhra line? Whether it has been disabled or not.
v) Remedial action taken report to be shared.

13.4 RSDCL representative was not available during the discussion.

13.5 NTPC representative informed that DT signal was going to remote end through PLCC during initiation of Overvoltage alarm. The issue has been corrected now. Further, it was informed that Overvoltage stage-1 protection has been kept as 120% with 5 sec delay.

13.6 NRLDC representative stated that as per NRPC protection philosophy for transmission lines, NO overvoltage protection needs to be kept in 220kV lines. If required, then OV stage-2 with pick up at 140% & above with 50-100msec may be kept. During 59th PSC meeting also, PSC forum requested NTPC to disable the overvoltage protection in 220kV line of Nokhra RE station. However, actions haven't been taken yet and further tripping of 220kV Nokhra line on overvoltage occurred on 9th June also.

13.7 Therefore, NTPC Green is requested to ensure that overvoltage protection is kept disabled in 220kV lines at all the RE stations.

13.8 Feedback from other RE stations were also taken in this regard. ADANI & RENEW representatives confirmed that overvoltage is disabled in their 220kV lines also and NO operational issue has been faced due to this.

13.9 *Further, NRLDC representative also stated that disabling of stage-1 overvoltage protection is also needed in 220kV lines of RE stations to ensure the proper coordination of overvoltage protection in line and inverter level.*

13.10 *NRLDC representative further raised concern over non-submission of DR/EL & tripping details of the grid event by NTPC Green plants and requested to share the details on NR Tripping Monitoring System.*

13.11 *Further, NRLDC also presented the NR Tripping Monitoring System dashboard during the meeting and requested all the members to make a practice of uploading tripping details on this portal. This will be helpful in event analysis and maintaining the tripping database. IEGC clause 37.2 (c) also mandates the sharing of Disturbance Recorder (DR), station Event Logger (EL), Data Acquisition System (DAS) to RLDC within 24 hrs of the event.*

PSC Recommendations:

- *NTPC Green shall ensure the disabling of overvoltage stage-1 protection in 220kV lines. OV stage-2 with pick up at 140% & above with 50-100msec may be kept if required. Other RR plants shall also ensure the same in their respective stations.*
- *RE plants shall ensure the timely submission of DR/EL & tripping report of grid events on NR Tripping Monitoring System.*

B. Tripping event at Azure Maple SL_BHD2 & Azure 34 at 13:43 hrs on 31.03.2025

13.12 NRLDC representative shared the following observations w.r.t. tripping event:

i) Exact reason of tripping of 220/33KV 130 MVA ICT at Azure34(IP) need to be shared.
ii) As per DR at Bhadla(PG) end, 3-phase A/R is observed. POWERGRID/Azure may confirm whether 3-ph A/R is enabled instead of 1-ph A/R in the line.
iii) SCADA and PMU data was unavailable after tripping in 220 kV Azure34(IP) & Azure Maple(IP). Healthiness and availability of the same need to be ensured.
iv) Details of RE generation loss (i.e., TPREL, AHEJ4L) and reason of the same need to be shared from RE plants and Rajasthan.
v) DR/EL with tripping report need to be shared from Azure34 end.
vi) Remedial action taken report to be shared.

13.13 AZURE representatives were not available during the discussion.

13.14 NRLDC representative highlighted that 3-ph A/R was observed from POWERGRID end in 220kV Bhadla2-Azure Mapple line during R-N fault. POWERGRID was requested to share the reason of the same and whether any action has been taken in this regard.

13.15 POWERGRID representative stated that during review it was found that 3-ph A/R was incorporated inadvertently in A/R logic of Azure maple line at Bhadla2 end. The issue has been corrected and 1-ph A/R has been kept in A/R scheme.

13.16 NRLDC representative further highlighted the drop in RE generation at TPREL & AHEJ4L RE stations. TPREL & AGEL representative were requested to share the reason of the same and whether any remedial actions have been taken in this regard.

13.17 TPREL representative informed that inverters of TMEIC tripped during the event. OEM has only shared a preliminary report mentioning that inverters tripped on undervoltage. However, root cause analysis details have not received yet. Continuous follow-ups is being done with the OEM in this regard.

13.18 AHEJ4L representative stated that they will share the details within a week by mail.

PSC Recommendations:

- *TPREL & AGEL shall take necessary corrective actions in coordination with OEM to avoid unwanted loss of regeneration during LVRT/HVRT.*
- *RE plants shall ensure the timely submission of DR/EL & tripping report of grid events on NR Tripping Monitoring System.*

C. Multiple elements tripping at 400/220KV Jaisalmer(RS) at 01:53 hrs on 05th May, 2025

13.19 NRLDC representative shared the following observations w.r.t. tripping event:

i) Exact location and nature of fault need to be shared.
ii) Reason of delayed clearance of fault even after operation of bus bar protection also need to be shared.
iii) Reason of tripping of ICT-1 and 400kV Akal-Jaisalmer line from Akal end only need to be shared.
iv) DR/EL along with tripping report need to be shared for each element from both the ends.
v) Power flow in all the remaining ICTs (ICT-2 & 5) and other 220kV feeders also became zero after the event. Reason of the same also need to be shared.

13.20 **Representatives from RVPNL informed the following:**

i) 220kV Jaisalmer-NTPC Solar line and 400/220kV ICT-1,3&4 were connected to 220kV Bus-2 and rest of the elements were connected at 220kV Bus-1.
ii) At 01:53 hrs, R-N fault occurred on 220kV Jaisalmer-NTPC Solar line at distance ~3.5km from Jaisalmer end. At the same time, the bus side jumper of the NTPS Solar line snapped and created R-N bus fault on 220kV Bus-2.

iii) On this fault, bus bar relay sensed differential current of ~15kA in R-ph however tripping was not initiated. After ~800msec, Y-ph also involved in bus fault and on this R-Y fault, bus bar relay, initiated bus bar tripping.

iv) A fault was persisting till ~800msec, during that time 400kV Akal-Jaislamer line, 220kV Jaisalmer-Akal D/C tripped in Z-2 and 400/220kV ICT-2 tripped on backup O/C E/F protection (with delay of ~600msec).

v) Delayed fault clearance was due to non operation of bus bar protection on R-N fault.

vi) Z-2 reach of 400kV Akal-Jaislamer line distance protection had to be changed after commissioning of new ICTs at Jaisalmer. Now, Z-2 reach setting has been revised.

vii) Pick up setting of ICT-2 was sensitive i.e., 10% of full load current. The setting has been revised to 20%.

viii) Further review of protection system is being done and necessary corrective actions are being taken to ensure the healthiness of protection system at Jaisalmer(RS) .

PSC Recommendations:

- *Reason of non-operation of bus bar protection on R-N fault need to be identified and necessary corrective actions need to be taken to ensure its proper operation.*
- *Healthiness of protection system need to be ensured.*
- *Timely submission of DR/EL and tripping analysis report need to be ensured.*

14) Status of submission of DR/EL and tripping report for the month of January 2025-May 2025:

14.1. The status of receipt of DR/EL and tripping report of utilities for the month of **January 2025-May 2025** are attached as Annexure-XII of agenda.

14.2. It is to be noted that as per the IEGC provision under clause 37.2 (c), tripping report along with DR/EL has to be furnished within 24 hrs of the occurrence of the event. However, it is evident from the submitted data that reporting status is not satisfactory from almost all the RE plants and needs improvement. Non submission of DR/EL & tripping details further affect the grid event analysis.

14.3. NRLDC representative stated that on the basis of status of submission of DR/EL & tripping reports of tripping incidents during Jan25-May25, it is evident that reporting status of almost all the RE plants is unsatisfactory. Unavailability of tripping details from sites, affects the analysis of tripping incidents and further follow-up for remedial actions. Unsatisfactory submission of tripping details from RE stations is persistent issues.

14.4. ***As per IEGC clause 37.2 (c), Disturbance Recorder (DR), station Event Logger (EL), Data Acquisition System (DAS) shall be submitted within 24 hrs of the event and as per IEGC clause 37.2 (e), the user shall submit a detailed report in***

the case of grid disturbance or grid incidence within one (1) week of the occurrence of event to RLDC and RPC.

14.5. *NRLDC representative requested all the RE stations to improve the status of submission of DR/EL & tripping reports. Further, it was also suggested to organize training programs for site engineers regarding DR/EL extraction and their uploading on TMS. RE stations were also requested to start preparing the detailed report of the tripping events as per timeline mentioned in IEGC 2023 and share the report with NRLDC & NRPC. Remedial actions taken by constituents to avoid such multiple elements tripping may also be included in the detail report.*

14.6. *NRLDC representative also presented the NR Tripping Monitoring System dashboard during the meeting and requested all the members to make a practice of uploading tripping details on this portal. This will be helpful in event analysis and maintaining the tripping database. In case of any issue in uploading the details on the portal, concerned may contact the NRLDC Protection Team.*

Forum requested members to take necessary preventive measures to avoid such grid incidents / disturbances in future and report actions taken by respective utilities in OCC & PSC forum.

Forum also emphasized the importance of DR/EL & tripping report data for analysis of the tripping. Moreover, utilities may impress upon all concerned for providing the Preliminary Report, DR/EL & detailed report of the events to RLDC in line with the regulations. Members were requested to comply with IEGC 37.2(c) and submit the details in time. Members agreed to take necessary follow-up actions to improve the reporting status.

Members may please note and advise the concerned for timely submission of the information. It is requested that DR/EL of all the tripping shall be uploaded on Web Based Tripping Monitoring System "https://postda.nrldc.in/Default.aspx" within 24 hours of the events as per IEGC clause 37.2.(c) and clause 15.3 of CEA grid standard.

15) Intimation and approval of NRPC during any revision of protection setting at site:

15.1. NRLDC representative highlighted that during analysis of some of the grid events, protection settings different from what was approved during FTC was found at some of the RE stations. Major observations was that RE stations revise the protection settings mainly voltage & current protection settings in discussion with OEM without intimation & approval from NRPC & NRLDC.

15.2. As per IEGC clause 14.2,

"All users connected to the grid shall:

a) furnish the protection settings implemented for each element to respective RPC in a format as prescribed by the concerned RPC;

b) obtain approval of the concerned RPC for (i) any revision in settings, and (ii) implementation of new protection system;

c) *intimate to the concerned RPC about the changes implemented in protection system or protection settings within a fortnight of such changes;*
d) *ensure correct and appropriate settings of protection as specified by the concerned RPC.*
e) *ensure proper coordinated protection settings."*

15.3. **NRLDC requested all the RE stations to keep the protection settings which is being approved during FTC of elements. In case any changes in protection settings are required then case may be brought in notice to NRPC & NRLDC.**

Forum requested RE stations to keep the protection settings which is approved during FTC. Any changes / revision in protection settings may only be done after approval of NRPC.

16) Compliance regarding Rated Capacity demonstration and Performing Frequency response test. (Agenda by NRLDC):-

16.1. **Rated capacity Demonstration:-** Representative from NRLDC presented the Solar plants who have yet not demonstrated their rated capacity as per IEGC clause 22, (b), (ii).

(i). Renew Surya Roshni Private yet not performed rated capacity demonstration and 1yr from COD (COD date 21.06.24) is passed.

He further stated and read out the relevant IEGC2023 clauses as follows; IEGC 2023 Clause 22 (3);

"If it is not possible to demonstrate the rated capacity of the plant due to insufficient solar irradiation, COD may be declared subject to the condition that the same shall be demonstrated immediately when sufficient solar irradiation is available after COD, within one year from the date of COD"

"Provided that if such a generating station is not able to demonstrate the rated capacity when sufficient solar irradiation is available after COD, the generating company shall de-rate the capacity in terms of sub-clause (h) of clause (3) of this Regulation"

Also, Some of plant near to completion of one year i.e. Serentica Renewables India 4 Private Limited (First part COD date:02.05.24, Final COD Date: 16.09.24), Ayana Renewable Power Three Private Limited (First part COD date:03.05.24, Final COD Date: 16.01.25). These plants are yet not performed rated capacity demonstration , there one year is passed since first part COD.

NRLDC requested to RE plants to demonstrate the Rated capacity at the earliest whenever sufficient irradiation is available.

16.2. **Frequency Response:-** The following tests shall be performed at the point of interconnection as per IEGC-2023:

(i). Frequency response of machines as per the CEA Technical Standards for Connectivity.

(ii). Reactive power capability as per OEM rating at the available irradiance or the wind energy, as the case may be.

Provided that the generating company may submit offline simulation studies for the specified tests, in case testing is not feasible before COD, subject to the condition that tests shall be performed within a period of one year from the date of achieving

COD. Plants list mentioned below not demonstrated the frequency response test as per IEGC

1. Renew Surya Pratap Private Limited, Renew Surya Vihaan Private Limited, Renew Surya Aayan Private Limited, Renew Surya Roshni Private Limited has yet not perform frequency response test and 1yr from COD is passed. Kindly perform the test at the earliest
2. RE plants Serentica Renewables India 4 Private Limited and Ayana Renewable Power Three Private Limited yet not performed frequency response test, and there one year is passed since first part COD.
3. RE plants Serentica Renewables India 5 Private Limited, Adani(Phalodi) Solar Energy RJ Two Private Limited yet not performed frequency response test are nearby to complete its 1 yr since COD. Kindly plan the test and perform within 1 yr from COD

16.3. NRLDC requested to perform frequency response test at the earliest whenever feasible condition.

17) Protection against electromagnetic interference:-

17.1 Representative from NRLDC shows the guidelines from CEA regarding Protection against electromagnetic interference. – The owner of every electric supply line of voltage level 11 kV or above shall obtain the clearance of Power Telecommunication Co-ordination Committee to ensure the safety of the personnel and telecommunication line as per the requirement of section 160 of the Act.

17.2 CEA has issued the Guidelines for processing PTCC proposals for 33 kV feeders of ISTS connected RE projects vide letter dated: 03.07.25.

17.3 NRLDC requested all RE Plants Kindly follow the guidelines to process PTCC clearance for 33kV feeders and take PTCC clearance from CEA prior to physical connection from Grid.

18) Injection of infirm power in the grid

18.1. NRLDC representative apprised the forum that in accordance with Regulations 19(7) of IEGC Regulations, 2023 interchange of Infirm power is for the specific purposes of pre-commissioning activities, testing and commissioning. The generating station shall provide RLDC prior information relevant to specific testing, commissioning or any other activities planned to be performed during the interchange of infirm power. NRLDC representative requested all RE plants to provide the specific details of each such occasion of infirm power injection on day ahead basis and submit the data on OMS portal in consultation with NRLDC FTC team.

18.2. It was further emphasized that the scheduling of infirm power should be limited to the period planned for any commissioning activities, as this data is also utilized for segregation between firm and infirm power.

18.3. MS NRPC instructed all plants to ensure compliance with these requirements.

19) Constraints in evacuation of RE power in Western Rajasthan: Procedure for issuance of Deemed T-GNA/ Standing Clearance to RE plants

19.1. NRLDC representative informed that as per clause 22.4(a) of CERC (Connectivity and General Network Access to the inter-State Transmission System) Regulations, 2022, deemed T-GNA are being given to RE plants whose connectivity is yet to become effective. Deemed T-GNA is issued based on available margin after consideration of margin allocated to RE plants whose connectivity is effective.

19.2. It was noted that in Rajasthan, where RE generation is being commissioned before completion of the corresponding transmission systems, evacuation constraints are being observed. To manage this, it has been decided that deemed T-GNA/NOCs will be issued on a bimonthly basis: applications received by the 25th of each month will be processed collectively for the first half of the following month, and those received by the 10th will be processed for the second half, with margin allocated on a pro-rata basis and NOCs issued accordingly.

19.3. NRLDC requested all RE plants to follow the bimonthly application process as per these timelines.

Additional Points:

19.4. Entry of payment details in respect of RLDC Fees & Charge Bills

NRLDC representative requested all RE Generating Stations to enter details of offline payments pertaining to RLDC Fees & Charge Bills including date of payment, amount, UTR number, rebate, and TDS under the **Payments** section of the portal: https://fc.grid-india.in/FnCWeb/#/landing on timely basis.

RE developers were urged to switch to the online mode of payment through the payment gateway at portal.

19.5. Payment of Amounts in Wrong Bank Accounts

NRLDC informed that some RE Generating Stations responsible for handling payments related to NRLDC Fees & Charges and Pool Accounts are frequently depositing funds into incorrect bank accounts. Notably, payments intended for Weekly DSM Accounts have often been mistakenly credited to the Grid-India RLDC Fees & Charges accounts, and vice versa. These misdirected transactions require a lengthy internal process for fund transfers, causing unnecessary delays. In several instances, such errors go unnoticed for extended periods and are only identified after follow-up by RLDC coordinators, indicating a concerning lack of diligence among some RE developers.

19.6. Therefore, all RE developers are strongly advised to exercise accuracy and care when making payments and ensure funds are transferred to the correct designated accounts. In case of any doubt, representatives should consult the concerned RLDC coordinators before initiating payments.

20) Reliable Telemetry from RE Plants:

20.1. During 3rd RE sub-committee meeting, NRLDC representative highlighted that real-time telemetry data from many Plants remains unavailable for longer time through one or both RTU/gateways at NRLDC. It was noted that in many cases, telemetry remains unavailable for extended durations, despite continuous follow-ups by NRLDC. Further, it is also informed that reliable and accurate telemetry is critical for real-time grid monitoring, system reporting, forecasting, and post-event analysis.

20.2. All RE generators were requested to ensure prompt response to calls from NRLDC regarding telemetry issues for faster resolution. Lists of plants with long-pending telemetry issues (both RTUs and PMUs) have been shared.

Sl. No	Plant Name	RTUs/ SAS Gateway Issue	Remarks/Updates
1	Altra Xergi	Both Gateway are Out	Restored
2	Devikot	Both Gateway are Out	Down for more than 6 months
3	ABC SOLAR	Both Gateway are Out	Restored
4	RSDCL PPS4	Both Gateway are Out	Standby Gateway is creating Communication loop in the system
5	MSUPL	Both Gateway are Out	
6	NTPC Nokhra	Gateway UP but data having issues (Either bad quality data or wrong data)	
7	Renew Sunwave	Gateway UP but data having issues (Either bad quality data or wrong data)	
8	Ayana 3	Gateway UP but data having issues (Either bad quality data or wrong data)	
9	Azure 43 RSS	Gateway UP but data having issues (Either bad quality data or wrong data)	
10	Azure 43 PSS	Gateway UP but data having issues (Either bad quality data or wrong data)	

20.3. CGM, NRLDC, expressed serious concern over persistent data unavailability and asked all RE Plants to refer to the list of telemetry non-compliant plants and take immediate corrective actions to restore real-time data availability.

20.4. Member Secretary, NRPC, underlined the criticality of SCADA telemetry and communication systems for secure and reliable grid operations, and emphasized the need for strict adherence to telemetry data availability norms by all RE generators.

21) Requirement of Firewall at Sub-station end:

21.1. During 3rd RE sub-committee meeting, NRLDC representative informed that as per the *“Guidelines on Interfacing Requirements”* issued by CERC in January 2024, it is

essential to install firewalls at the substation end for secure integration of RE plants into the grid. However, many RE plants are still operating without firewalls, posing a serious cyber security risk. List of RE plants without firewall installation as:

S. No.	Pooling Substation	Plant	Remarks/Updates
1	Fatehgarh-1	Adani Solar PSS 1	As informed by Adani Power representative, Firewall installation is in process. Installed at few sites. They will share the details with NRLDC
2		Adani Solar PSS 2	
3		Adani Wind PSS 1	
4		Adani Wind PSS 2	
5		Nidan	
6	Fatehgarh-2	EDEN Solar	
7		Adani Hybrid 1	As informed by Adani Power representative, Firewall installation is in process. Installed at few sites. They will share the details with NRLDC
8		Adani Hybrid 2	
9		Adani Hybrid 3	
10		ASERJ1 Solar	
11		ASERJ1 wind	
12	Bikaner	ReNew Bikaner 250	
13		SBSR 300	
14	Bhadla	Adani Bhadla	
15		Azure Mapple	
16		CSP Jodhpur	
17		Saurya Urja	
18		ESSEL	
19	Bhadla 2	AVAADA 320	

21.2. In this regard all RE Generators are requested to please take up for installation for necessary firewalls.

21.3. CGM, NRLDC, expressed serious concern about the lack of cyber security measures and asked all the Non-compliant RE Plant for immediate action to mitigate potential risks. to strictly adhere to the guidelines and speed up the installation of the necessary firewalls.

21.4. Member Secretary, NRPC, also stressed upon the importance of cyber security now a days and asked all stakeholders to treat this issue with high priority and expedite the installation of firewalls, in line with the CERC guidelines and asked all RE Plants to share the status of implementation with NRLDC.

22) Over-injection than NOC/IC:

22.1. Based on the available system margin for RE evacuation from Rajasthan RE complex, RE plants are being allowed to schedule generation even when the associated systems are not yet commissioned. However, it has been observed that some Renewable energy (RE) plants are injecting power beyond the approved NOC/IC limits during peak solar generation periods.

22.2. Despite repeated follow-ups, these plants are not complying with the instructions. On several occasions, this over-injection has led to emergency situations in the system. While some compliance is observed temporarily after follow-ups, it is often not sustained, and in some cases, there is no compliance at all.

List of NR ISTS connected RE plants found over injecting based on 09-Mar-2025 to 09-Apr-2025 data:

Sl. No.	Name of the RE Developers	Name of the RE plants	Maximum Injection (MW)	Installed Capacity (MW)
1	ABC Renewable (RJ-01)	ABCREPL*	319	300
2	ACME	ACME Raisar,	**326**	300
		ACME Dhaulpur,	**325**	300
		ACME Deogarh,	**327**	300
		ACME Phalodi,	**329**	300
		ACME Heergarh	322	300
3	Adani	ARERJL,	210	200
		ASE4PL,	52.5	50
		ASEJ2L,	52.5	50
		ASERJ2PL,	170	150
		SBE6PL,	**335**	300
		AHEJOL,	**425**	390
		AHEJ2L,	330	300
		AHEJ3L,	**325**	300

		ASEJOPL,	470	450
		AGE24L*,	**558**	500
		ASERJ2PL_FTG2,	196	180
		ASERJ2PL_P1,	159	150
		ASERJ2PL_P2,	159	150
		AHEJ4L,	**887**	700
		AGE25L*	**548**	500
4	Amp Energy	AEG4PL*,	111	100
		AEGFPL*,	112	100
		AEGSPL*	**116.5**	100
5	Avaada	Avaada RJHN,	258	240
		Avaada Sunce,	**383**	350
		Avaada Sustainable	**330**	300
		Avaada Sunrays	330	320
6	Ayana	Ayana,	305	300
		Ayana3*	**331**	300
7	Azure	APTFL,	137	130
		Azure Mapple*,	308	276
		Azure43	623	600
8	CSP	CSP(Saurya Urja)	305	300
9	Eden	Eden	309	300
10	Enel	Thar Surya1	314	300
11	Mahindra	MSUPL	264	250
12	NTPC	Nidan	307	296
13	O2 Power	AXPPL	**409**	380
14	Prerak	ARTPL*,	138	110
		TGEPL*,	120	100
		TSESPL*	60	50

15	Renew	Renew(Adani), RSWPL, RSPPL, RSAPL	53 307 206 313	50 300 300 300
16	Rising Sun	RSEKPL	211	190
17	Sterlite	RSUPL	307	300
18	Tata power	TPGEL Bikaner	243	225

(*) Restriction during peak solar hours for the RE plants for which ATS is yet to get commissioned.

22.3. RE developers were specifically deliberated on this issue. Further, plants admitted they would take necessary action and comply in future.

23) Delayed Response for TRAS-Down and TRAS requirement from RE generators:

23.1 Due to low demand resulting from inclement weather conditions and the likelihood of high system frequency, TRAS down in renewable energy (RE) has been implemented on the WBES portal after backing down thermal generation to their technical minimum. The concerned RE plants were informed well in advance, and revised schedules were issued significantly prior to the delivery period.

23.2 However, it has been observed that the some RE plants are not adhering to the revised schedules following the TRAS down. In real-time operations, inconsistent and delayed responses from the plants have been noted. Furthermore, when sudden TRAS down instructions are issued, the plants often fail to respond promptly. This results in the need for repeated telephonic communication to align actual generation with the scheduled values.

23.3 List shown below for the RE plants which do not promptly complied the implemented schedule on 25.05.2025 as follows:

Sl. No.	Plant Name	Pooling Station
1	CSP Jodhpur	Bhadla (PG)
2	SBE6PL	Bhadla (PG)
3	MSRPL	Bhadla (PG)
4	Azure41	Bhadla (PG)
5	Avaada Sunce	Bikaner (PG)
6	Avaada Sustainable	Bikaner (PG)
7	Ayana	Bikaner (PG)

8	RSRPL	Bikaner (PG)
9	RSPPL	Bikaner (PG)
10	TS1PL	Bikaner (PG)
11	Ayana3	Bikaner (PG)
12	Azure43	Bikaner (PG)
13	ACME Heergarh	Bhadla-II (PG)
14	Avaada Sunrays	Bhadla-II (PG)
15	Nokhra	Bhadla-II (PG)
16	MSUPL	Bhadla-II (PG)
17	Kolayat	Bhadla-II (PG)
18	SGEL	Bikaner-II
19	NTPC Nidan	Fatehgarh-I
20	RSUPL	Fatehgarh-II (PG)
21	AHEJ2L	Fatehgarh-II (PG)
22	AHEJ3L	Fatehgarh-II (PG)

23.4 Despatch under TRAS DOWN, as per the emergency provisions of the Ancillary Services Regulations, has been initiated for regional entity solar RE generating stations with an installed capacity of 250 MW or more. This measure is part of real-time actions taken to maintain system frequency within the IEGC band during periods of low demand. NLDC/RLDCs have informed the concerned RE generators about the TRASDOWN in advance.

23.5 In the event of receiving a TRAS Down instruction, generators are requested to continuously monitor their injection schedules in real-time through the Web-Based Energy Scheduling (WBES) software [**https://newwbes.gridindia.in/login**], until the required updates/modifications are incorporated into the REMC portal.

RE developers were specifically deliberated on this issue. Further, plants admitted they would take necessary action and comply in future.

24) PPC not installed in 250 MW Adani Bhadla Solar Park:

24.1 200MW solar Azure plant is connected at 250MW Adani pooling station along with 50MW Renew solar plant. Adani pooling station is further connected to Bhadla (PG) through 220kV Adani Bhadla-Bhadla (PG) D/C line. Therefore, PPC should be installed in the park to individually control the active and reactive power of 200MW

Azure and 50MW Renew Solar plants being evacuated through 220kV Adani Bhadla-Bhadla (PG) D/C line.

24.2 **PPC is yet to be installed in 200MW Azure Power and at Central Park level, 50 MW Renew is having PPC at its 33kV level.** Due to unavailability of PPC, Adani Bhadla Solar Park is unable to provide the desired reactive power support whenever required. Most of the time these two plants are absorbing MVARs and **not complying NRLDC instruction in real-time** for reactive power support. ***It is a non-compliance of clause B2(1) of CEA technical standards for grid connectivity.***

24.3 Representative from Adani Green Energy Ltd. (AGEL) confirmed in last meeting that PPC shall be installed **by 31st March'2025** in 200MW Azure Plant.

24.4 ***The AGEL representative stated they would report this issue to their administration to expedite necessary action. Further, necessary action will be taken jointly with Azure and Renew developers.***

25) In-adequate/Delayed MVAR response by the plants: -

It is observed that the many of the times RE plants are not complying with the Fix-Q injection code given during peak solar generation hours. It is causing low voltages in the system, few of the examples observed in real-time are as follows:

Sl. No.	Name of the RE Plant/Park	Code for Fix MVAR injection 10:30-14:30hrs	Maximum support received (MVAr)	Date of observation followed by mail-communication
1	TPREL(Bhadla)	80	40	05.06.2025
2	SBE6PL(Bhadla)	80	22	05.06.2025
3	Mahoba(Bhadla)	80	42	05.06.2025
4	Avaada Pooling(Bikaner)	200	120	22.05.2025
5	Azure43(Bikaner)	180	160	22.05.2025

26) Frequently changing of manpower/ mail ids/ communication over mobile no. (other than VOIP):

26.1.A Number of point of mobile contacts are observed while received communication from RE plants regarding scheduling, forecasting and real-time operation, SCADA or protection. It is more difficult where the QCA is not there.

26.2.The concern person is also changing frequently and sometimes it is observed that the concern person is not at the plant and he ask for some time to communicate at the plants' control room.

26.3. There is observed delay in action for the communication from NRLDC control room to RE plants.

26.4. Plants are also preferring over mobile communication the VOIP during real-time operation.

RE developers were specifically deliberated on this issue. Further, plants admitted they would provide the above details and take necessary action for ease of communication

27) Frequency Response from the RE plants:

27.1. Frequency response from wind generating stations, generating stations using inverters, wind - solar photo voltaic hybrid systems as per CEA (Technical Standards for Connectivity to the Grid) (Amendment) Regulations, 2019 Clause B2(4) is quoted below

Quote

The generating stations with installed capacity of more than 10 MW connected at voltage level of 33 kV and above –

……..

(i) shall have governors or frequency controllers of the units at a droop of 3 to 6% and a dead band not exceeding ±0.03 Hz:
Provided that for frequency deviations in excess of 0.3 Hz, the Generating Station shall have the facility to provide an immediate (within 1 second) real power primary frequency response of at least 10% of the maximum Alternating Current active power capacity*;*

(ii) shall have the operating range of the frequency response and regulation system from 10% to 100% of the maximum Alternating Current active power capacity, corresponding to solar insolation or wind speed, as the case may be;

(iii) shall be equipped with the facility for controlling the rate of change of power output at a rate not more than ± 10% per minute.

All RE developers are requested to ensure compliance with CEA standards for frequency response. Further, plants admitted they would discuss with their administration and take necessary action to comply in future.

28) Access to WBES:

28.1. NRLDC representative informed the forum that to ensure WBES access is restricted to authorized users, access has been permitted only through the static IP addresses provided by them. All RE generators are hereby informed that WBES will be accessible solely through the whitelisted static IPs submitted by the users.

28.2. He further requested all the stakeholders to kindly provide the static/physical IP in the format mentioned below at the earliest, if not already shared.

SL	Beneficiary	Physical	Physical	Mobile number	Email id (one id

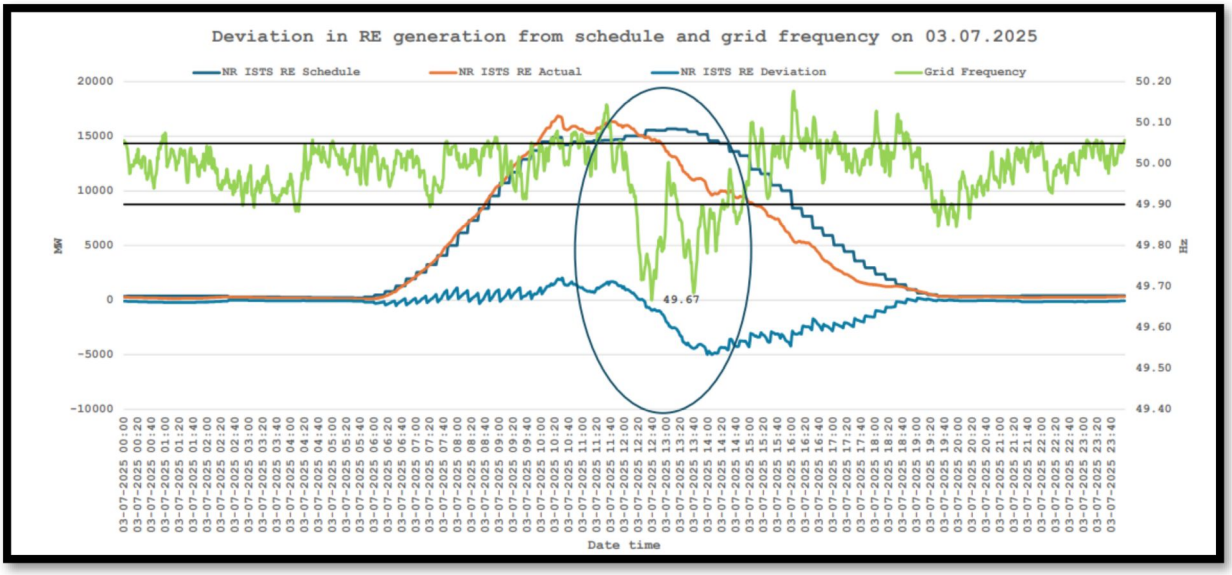
no	Name	IPs for WBES access	IPs for data fetching from API	(One number only) for OTP Authentication for WBES access	only) for OTP Authentication for WBES access
1					

28.3. It also stated that implementing OTP based login to WBES in currently being developed. Hence, all the users are requested to provide the details such as mobile number and email address if not already shared.

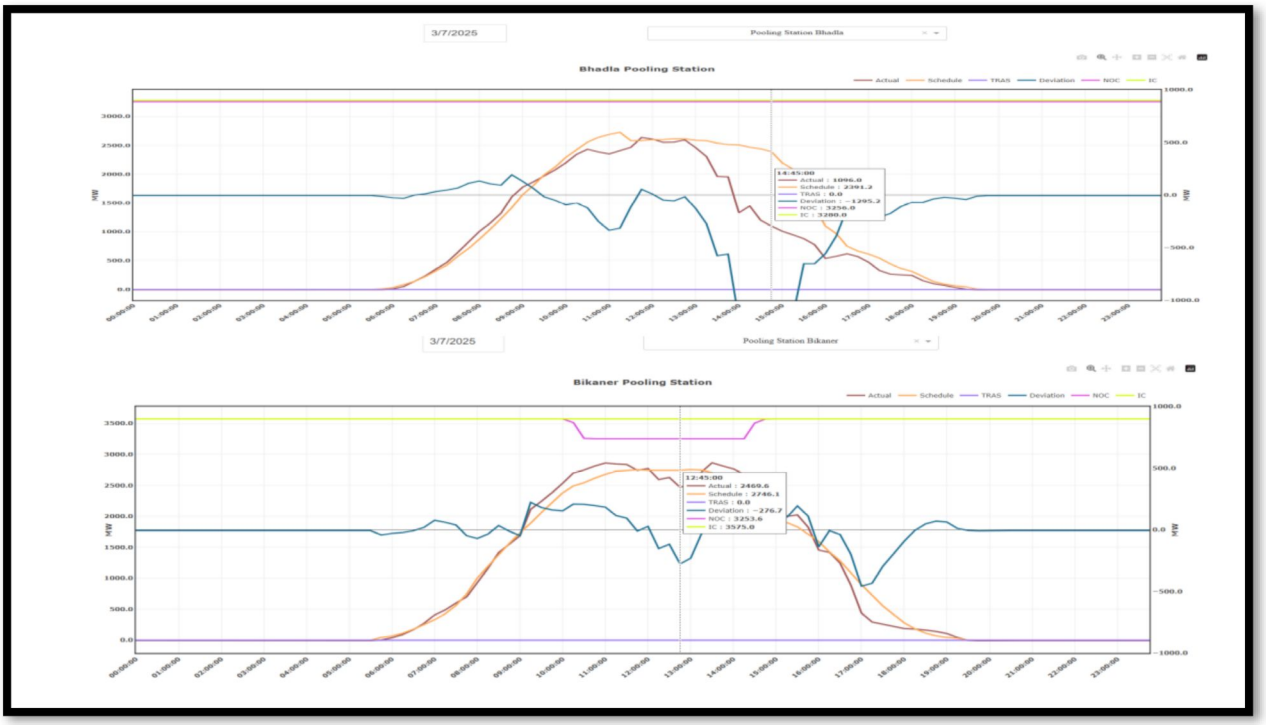
The Meeting ended with a vote of thanks to the Chair.

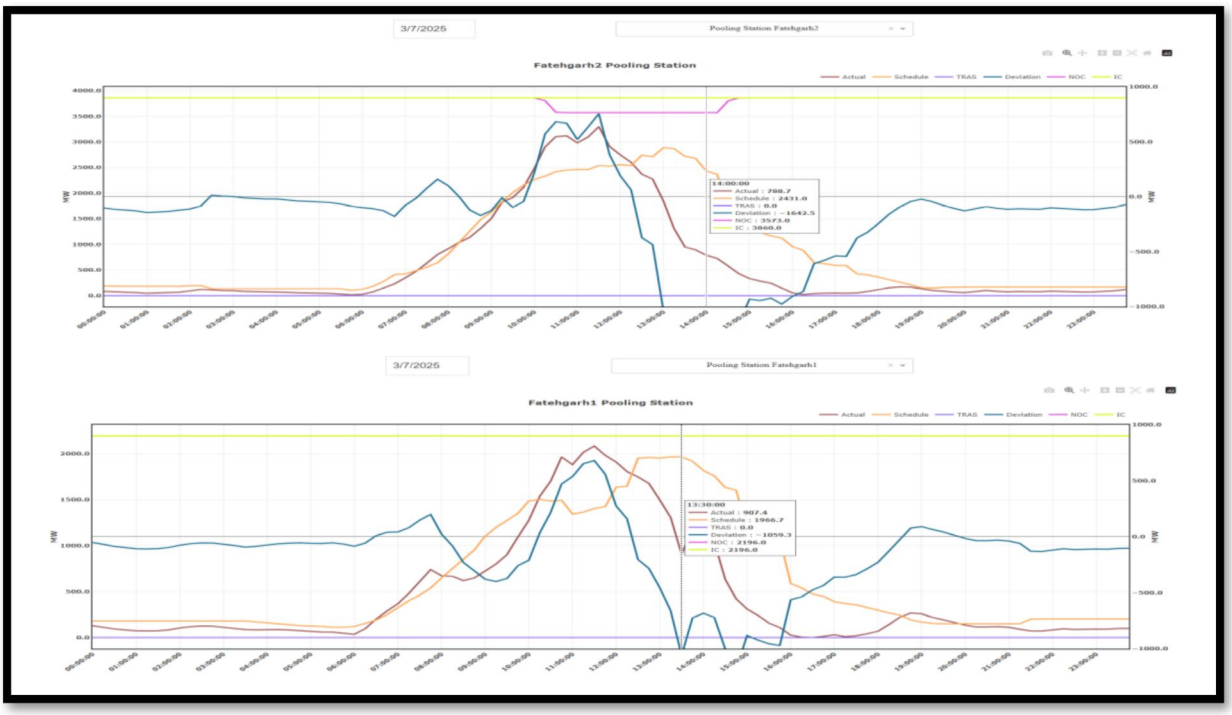
29) Table Agenda: Prompt and effective schedule revision requirement on inclement weather conditions

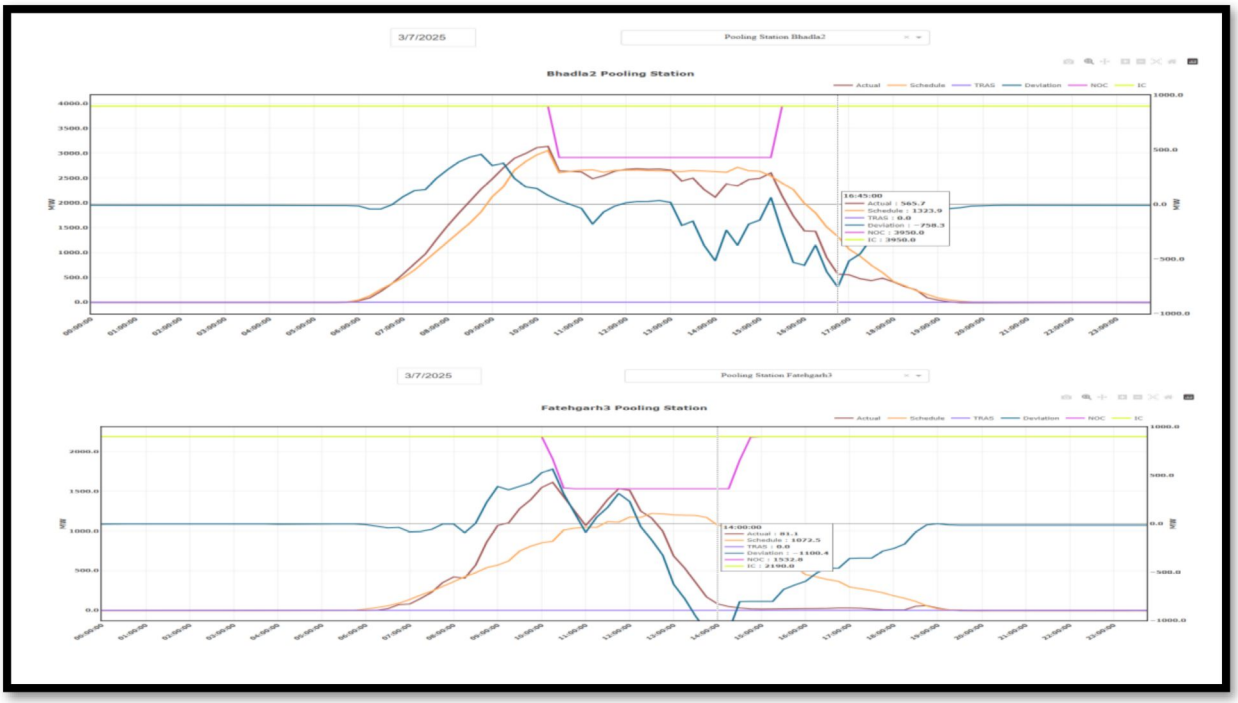
29.1. This matter is accelerated in the view of following deviation followed by impact on grid frequency were being observed during past couple of days for e.g. on 03.07.2025 as follows:



29.2. This impact was majorly contributed by NR ISTS connected RE plants by not revising the generation schedule promptly and even after the persistent deviations.
Significant deviation at aggregate pooling level were also shown:


3/7/2025
Pooling Station Bhadla
Bhadla Pooling Station
Actual
Schedule
TRAS
Deviation
NOC
IC
MW
14:45:00
Actual : 1096.0
Schedule : 2391.2
TRAS : 0.0
Deviation : -1295.2
NOC : 3256.0
IC : 3280.0
3/7/2025
Pooling Station Bikaner
Bikaner Pooling Station
12:45:00
Actual : 2469.6
Schedule : 2746.1
TRAS : 0.0
Deviation : -276.7
NOC : 3253.6
IC : 3575.0


3/7/2025
Pooling Station Fatehgarh2
Fatehgarh2 Pooling Station
Actual
Schedule
TRAS
Deviation
NOC
IC
MW
14:00:00
Actual : 788.7
Schedule : 2431.0
TRAS : 0.0
Deviation : -1642.5
NOC : 3573.0
IC : 3860.0
3/7/2025
Pooling Station Fatehgarh1
Fatehgarh1 Pooling Station
13:30:00
Actual : 907.4
Schedule : 1966.7
TRAS : 0.0
Deviation : -1059.3
NOC : 2196.0
IC : 2196.0



RE plants were specifically deliberated on this issue and its impact. Further, RE plants admitted they would take necessary action to promptly control these deviations by means of schedule revision and ensure proper coordination with RLDC during these emergency grid conditions.

Meeting concluded with vote of thanks to chair.

Annexure-A

List of Participants of 3rd Renewable Energy Sub-Committee Meeting dated 10.07.2025 (10:30 AM)			
S. No.	**Name**	**Designation**	**Organization**
1	Rishika Sharan	Member Secretary	NRPC
2	D.K. Meena	SE, NRPC	NRPC
3	Reeturaj Pandey	EE	NRPC
4	Omkishor	EE	NRPC
5	Akash Jain	AE	NRPC
6	Brajesh Kumar	VP	Renew
7	Subhajit Roy	Sr. Manager	Renew
8	Nilesh Apte	DGM	Renew
9	Arsh Khanna	Sr. Manager	Renew
10	kailash Chandra Pandey	VP	Renew
11	K.Simhadri	GM	Hero
12	Atul Tomar	GM	Hero Future Energies
13	Sushant Sinha	AGM	Hero Future Energies
14	Sumit Kumar	GM	Renew
15	Ankur Kumar Jha	Associate Director	NSEFT
16	Neeraj Kumar Verma	A.V.P.	Sekura Energy Pvt.Ltd.
17	Vivek Tripathi	Vice President	Sekura Energy Pvt.Ltd.
18	Arvind Kr. Agrawal	DGM	AVAADA Energy
19	Gaurab Dash	Dy. Mgr	NLDC, GRID-INDIA
20	Nitin Yadav	Dy. GM	NLDC, GRID-INDIA
21	Paresh Khandelwal	Dy. GM	NLDC, GRID-INDIA
22	Vikas Kumar Jha	Dy. GM	NLDC, GRID-INDIA
23	Sunil Aharwal	Dy. GM	NLDC, GRID-INDIA
24	Somara Lakra	CGM	NRLDC
25	Manoj Kumar Agarwal	Executive Director	NRLDC
26	Rahul Negi	Dy. Mgr	NRLDC
27	Iltesam Asif	Dy. Mgr	NRLDC
28	Sugata Battacharya	Dy. Manager	NRLDC
29	R.K. Agarwal	Consultant	SECI
30	Vineet Kumar	DGM	SECI
31	Shiv Verma	AGM	Adani
32	Sunil Desai	AGM	Adani
33	Kapil Gupta	AEN	RRVPNL
34	Lavkesh Jaga	AEN	RRVPNL
35	M.P. Sharma	EE	SLDC, Rajasthan
36	V.K. Gupta	AEN (Sold)	SLDC, Rajasthan
37	Yashpal Choudhary	DGM	PGCIL, Bikaner
38	Imran Khan	Station Head RO (Chhayan)	Tata Power
39	Rajesh Pawar	Head Teshing Solar O & M	Tata Power
40	Suruchi Jain	DGM	NRLDC
41	Akash Tomar	DM	NRLDC
42	Ravi Balana	DGM	NTPC Green Energy NGEL
43	A.S. Parira	Scientist-E	MNRE
44	Chanonan Banerjee	DGM	AVAADA Energy
45	Alpesh Prajapati	GM	AVAADA Energy
46	Neel Kamal	Manager	AMP Energy Green
47	Victor Acharya	GM Head (OPS)	AMP Energy Green (6+5+4)
48	Aman Chaturvedi	Asset. Manager	ABC Renewable Energy RJ-01
49	Samriddhi.gogoi	Asset. Manager	INDIGRID

Annexure-I

Status of perfomance indices reporting of June 2025 (Last date of submission 07.07.2025)							
S. No.	**Utility**		**Received Status (Yes/No)**	**Vide mail dated**	**Remarks**	**Indices less than 1 (Yes/No)**	**Reason submitted and corrective action taken**
1	PGCIL	Central Government owned Transmission Company	Yes	06.07.2025	NR-1	NO	NA
			Yes	07.07.2025	NR-2	YES	YES
			Yes	08.07.2025	NR-3	NO	NA
2	NTPC	Central Generating Company	Yes	09.07.2025	Anta	YES	YES
					Auriya		
			Yes	03.07.2025	Dadri	NO	NA
			Yes	10.07.2025	Koldam	NO	NA
					Rihand		
			Yes	11.07.2025	Singrauli	NO	NA
			Yes	13.07.2025	Unchahar	NO	NA
			Yes	04.07.2025	Tanda	NO	NA
3	BBMB		Yes	21.07.2025	-	NO	NA
4	THDC		Yes	07.07.2025	Tehri	Yes	YES
					Koteshwar		
5	SJVN		Yes	05.07.2025	RHPS	NO	NA
			Yes	05.07.2025	NJHPS	NO	NA
6	NHPC		Yes	01.07.2025	-	NO	NA
7	NPCIL				RAPS-A		
			Yes	07.07.2025	RAPS-B	NO	NA
			Yes	04.07.2025	RAPS-C(5&6)	NO	NA
					RAP -D (7 & 8)		
					NAPS-1&2		
8	DTL	State Transmission Utility					
9	HVPNL		Yes	07.07.2025	-	YES	YES
10	RRVPNL		Yes	04.07.2025	-	YES	YES
11	UPPTCL		Yes	02.07.2025	Meerut Circle	NO	NA
			Yes	03.07.2025	Agra Circle		
			Yes	02.07.2025	Jhansi Circle	NO	NA
			Yes	03.07.2025	Prayagraj Circle	YES	YES
			Yes	03.07.2025	Gorakhpur Circle		
			Yes	03.07.2025	Lucknow Circle		
12	PTCUL		Yes	05.07.2025	Kumaon	NO	NA
					Garhwal		
13	PSTCL		Yes	18.08.2025		yes	no
14	HPPTCL		Yes	05.07.2025	-	NO	NA
15	JKPTCL		Yes	01.07.2025	Jammu	NO	NA
			Yes	01.07.2025	Kashmir	NO	NA
16	IPGCL		Yes	04.07.2025	PPS-I	NO	NA
			Yes	04.07.2025	PPS-III, Bawana	NO	NA
17	HPGCL		Yes	12.07.2025	PTPS, Panipat	NO	NA
			Yes	12.07.2025	DCRTPP, Yamunanagar	NO	NA
			Yes	12.07.2025	RGTPP (Khedar)	NO	NA
18	RRVUNL		YES	07.07.2025	KTPS	NO	NA
			YES	07.07.2025	kATPP, Jhalawar	NO	NA

Status of perfomance indices reporting of June 2025 (Last date of submission 07.07.2025)							
S. No.	**Utility**		**Received Status (Yes/No)**	**Vide mail dated**	**Remarks**	**Indices less than 1 (Yes/No)**	**Reason submitted and corrective action taken**
		State Generating Company	YES	07.07.2025	CSCTPP Chhabra	NO	NA
			YES	07.07.2025	RGTPP, Ramgarh	NO	NA
			YES	07.07.2025	Ctpp,Chhabra	NO	NA
			Yes	01.07.2025	DCCPP, Dholpur	NO	NA
			YES	07.07.2025	STPS Suratgarh	NO	NA
			YES	07.07.2025	SSCTPS Suratgarh	NO	NA
18	UPRVUNL				Parichha B (220 kV)		
			Yes	01.07.2025	Parichha C (400 kV)	NO	NA
			Yes	02.07.2025	DTPS Anpara	NO	NA
					Obra A & B		
					Obra C		
					Harduaganj 400 kV		
					Ghatampur 765 kV		
					Anpara-A&B		
					Panki TPS		
					Jawaharpur		
19	UJVNL		Yes	02.07.2025	Dharasu	NO	NA
			Yes	02.07.2025	Tiloth	NO	NA
					Khodri		
					Chibro		
					Vyasi		
20	HPPCL		YES	05.07.2025	Kashang HEP	NO	NA
			YES	05.07.2025	Sawara Kuddu	NO	NA
			YES	05.07.2025	Sainj	NO	NA
21	PSPCL	State Generating Company & State owned Distribution Company	Yes	03.07.2025	RSD	NO	NA
			Yes	11.07.2025	GGSTPS, Rupnagar	NO	NA
			YES	01.07.2025	GVK Power Goindwal Shahib Ltd.	NO	NA
					GHSTPS, Lehra Mohabbat		
22	HPSEBL	Distribution company having Transmission connectivity ownership	YES	05.07.2025	Hamirpur Circle	NO	NA
			YES	05.07.2025	Shimla Circle	NO	NA
23	Prayagraj Power Generation Co. Ltd.		YES	01.07.2025		YES	YES
24	Aravali Power Company Pvt. Ltd						
25	Apraava Energy Private Limited		YES	21.07.2025		NO	NA
26	Talwandi Sabo Power Ltd.		YES	02.07.2025		NO	NA
27	Nabha Power Limited		YES	01.07.2025		NO	NA
28	MEIL Anpara Energy Ltd (Anpara-C)						
29	Rosa Power Supply Company Ltd		YES	04.07.2025		NO	NA
30	Lalitpur Power Generation Company Ltd		YES	02.07.2025		NO	NA
31	MEJA Urja Nigam Ltd.						
32	Adani Power Rajasthan Limited		YES	05.07.2025	Kawai	NO	NA
33	JSW Energy Ltd. (KWHEP)		YES	03.07.2025		NO	NA
	ISTS Transmission Utilities						
#REF!	INDIGRID						
#REF!	ADHPL		Yes	07.07.2025	220 kV Prini	No	Na

Status of perfomance indices reporting of June 2025 (Last date of submission 07.07.2025)							
S. No.	**Utility**		**Received Status (Yes/No)**	**Vide mail dated**	**Remarks**	**Indices less than 1 (Yes/No)**	**Reason submitted and corrective action taken**
#REF!	Adani Transmission Limited	AESL	Yes	11.07.2025		No	Na
#REF!	Bikaner Khetri Transmission Limited		Yes	11.07.2025		No	Na
#REF!	Fatehgarh Bhadla Transmission Limited		Yes	11.07.2025		No	Na
#REF!	Powergrid Sikar Transmission Limited	POWERGRID, NR-1					
#REF!	Powergrid Aligarh Sikar Transmission Limited						
#REF!	Powergrid Ajmer Phagi Transmission Limited						
#REF!	Powergrid Bikaner Transmission System Limited						
#REF!	Powergrid Khetri Transmission System Limited						
#REF!	Powergrid Ramgarh Transmission Limited						
#REF!	Powergrid Fatehgarh Transmission Limited						
#REF!	Powergrid Bhadla Transmission Limited						
#REF!	Powergrid Meerut Simbhavli Transmission Limited						
#REF!	Powergrid Kala Amb Transmission Limited	POWERGRID, NR-2					
	State Utilities						
	Uttar Pradesh						
#REF!	Vishnuprayag Hydro Electric Plant (J.P.)						
#REF!	Alaknanda Hydro Electric Plant (GVK)		YES	08.07.2025		NO	NA
#REF!	Khara Power House (Khara)		YES	04.07.2025		NO	NA
#REF!	WUPPTCL		Yes	02.07.2025		No	NA
#REF!	SEUPPTCL						
#REF!	ATSCL	**AESL**					
#REF!	GTL	**AESL**					
#REF!	HPTSL	**AESL**					
#REF!	MTSCL	**AESL**					
#REF!	OCBTL	**AESL**					
69	STSL	**AESL**					
	Rajasthan						
70	Barsingsar Plant	**NLC**					
71	Rajwest Plant	**JSW**					
	RE Utilities						
72	ABC Renewable Pvt. Ltd		YES	07.07.2025		NO	NA
73	ACME Heeragarh powertech Pvt. Ltd						
74	ACME Chittorgarh Solar Energy Pvt Ltd						
75	AHEJOL-Hybrid-1 Madhopura	ADANI GREEN	YES	07.07.2025		NO	NA
76	AHEJ3L - Hybrid-2B 300MW	ADANI GREEN	YES	07.07.2025		NO	NA
77	AHEJFL(AEML_250)	ADANI GREEN	YES	07.07.2025		NO	NA
78	AHEJ4L(AEML-350)	ADANI GREEN	YES	07.07.2025		NO	NA
79	ASEJ2PL(Hapasar 300MW) SPC11PL	ADANI GREEN	YES	07.07.2025		NO	NA

Status of perfomance indices reporting of June 2025 (Last date of submission 07.07.2025)							
S. No.	Utility		Received Status (Yes/No)	Vide mail dated	Remarks	Indices less than 1 (Yes/No)	Reason submitted and corrective action taken
80	Adani Renewable Energy (RJ) Limited Rawra 200	ADANI GREEN	YES	07.07.2025		NO	NA
81	Adani Solar Energy Four Limited SECI 50	ADANI GREEN	YES	07.07.2025		NO	NA
82	Adani Solar Energy Jodhpur Two Limited Merchant 50	ADANI GREEN	YES	07.07.2025		NO	NA
83	ASEJ05PL (RJ200)	ADANI GREEN	YES	07.07.2025		NO	NA
84	ASERJ2PL - Phalodi 150 MW	ADANI GREEN	YES	07.07.2025		NO	NA
85	ASERJ01PL-Pokhran 300 MW (SB energy six)	ADANI GREEN	YES	07.07.2025		NO	NA
86	AGE25L(Badi Sid)	ADANI GREEN	YES	07.07.2025		NO	NA
87	Bhadla park - South block	ADANI GREEN	YES	07.07.2025		NO	NA
	AGE24L (Bhimsar)	ADANI GREEN					
	AHEJ2L - Hybrid-2A 300MW	ADANI GREEN					
	ASERJ2PL - Devikot 180 MW	ADANI GREEN					
88	ASEJOPL-Hybrid 450 MW	ADANI GREEN	YES	07.07.2025		NO	NA
89	Altra Xergi Pvt. Ltd.		YES	07.07.2025		NO	NA
90	AMP Energy Green Four Pvt. Ltd.		YES	05.07.2025		NO	NA
91	AMP Energy Green Five Pvt. Ltd.		YES	05.07.2025		NO	NA
	AMP Energy Green Six Pvt. Ltd.		YES	05.07.2025		NO	NA
92	Amplus Ages Private Limited	AmPlus Solar	YES	07.07.2025		NO	NA
93	Avaada RJHN_240MW	Avaada	YES	04.07.2025		NO	NA
94	Avaada sunce energy Pvt limited		YES	04.07.2025		NO	NA
95	Avaada Sunrays Pvt. Ltd.		YES	04.07.2025		NO	NA
96	Avaada Sustainable RJ Pvt. Ltd.		YES	04.07.2025		NO	NA
97	Ayana Renewable Power Three Private Limited						
98	Ayaana Renewable Power One Pvt. Ltd.						
99	Azure Power Forty One Pvt limited						
100	Azure Power Forty Three Pvt. Ltd._RSS						
101	Azure Maple Pvt. Ltd.						
102	AZURE POWER INDIA Pvt. Ltd., Bhadla						
103	Azure Power Thirty Four Pvt. Ltd.						
104	SB Energy Six Private Limited, Bhadla						
105	Clean Solar Power (Jodhpur) Pvt. Ltd.						
106	Clean Solar Power (Bhadla) Pvt. Ltd						
107	Eden Renewable Cite Private Limited						
108	Grian Energy private limited		YES	07.07.2025		NO	NA
109	Mahindra Renewable Private Limited						
110	Mega Surya Urja Pvt. Ltd. (MSUPL)						
111	AURAIYA Solar						
112	DADRI SOLAR						
113	SINGRAULI SOLAR						
114	Anta Solar						
115	Unchahar Solar						

Status of perfomance indices reporting of June 2025 (Last date of submission 07.07.2025)							
S. No.	Utility		Received Status (Yes/No)	Vide mail dated	Remarks	Indices less than 1 (Yes/No)	Reason submitted and corrective action taken
116	NTPC Devikot Solar plant-1	NGEL	y	08.08.2025		n	na
117	NTPC Devikot Solar plant-2		y	08.08.2025		n	na
#REF!	SKB NTPC -1 (250MW)	NGEL	y	08.08.2025		n	na
#REF!	SKB NTPC-2 (300MW)		y	08.08.2025		n	na
#REF!	NTPC Nokhra_300MW		y	08.08.2025		Y	NO
#REF!	NTPC Fatehgarh 296MW		y	08.08.2025		n	na
#REF!	One Volt energy Pvt. Ltd.		YES	07.07.2025		NO	NA
#REF!	ReNew Solar Urja Private Limited	IndiGrid					
#REF!	ReNew Solar Energy (Jharkhand Three) Private Limited	ReNew	YES	04.07.2025		NO	NA
#REF!	RENEW SOLAR POWER Pvt. Ltd. Bhadla		YES	04.07.2025		NO	NA
#REF!	Renew Sun Bright Pvt. Ltd. (RSBPL)		YES	04.07.2025		NO	NA
#REF!	Renew Surya Partap Pvt. Ltd.		YES	04.07.2025		NO	NA
#REF!	Renew Surya Ravi Pvt. Ltd.		YES	04.07.2025		NO	NA
#REF!	Renew Surya Roshni Pvt. Ltd.		YES	04.07.2025		NO	NA
#REF!	Renew Surya Vihan Pvt. Ltd.		YES	04.07.2025		NO	NA
#REF!	Renew Surya Ayaan Pvt. Ltd.		YES	04.07.2025		YES	YES
#REF!	Renew Solar Photovoltaic Pvt Ltd		YES	04.07.2025		NO	NA
#REF!	RENEW SOLAR POWER Pvt. Ltd. Bikaner						
#REF!	Rising Sun Energy-K Pvt. Ltd.						
#REF!	Serentica Renewables India 4 Private Limited						
#REF!	Solzen Urja Private Limited	Sekura	YES	07.07.2025		NO	NA
#REF!	Tata Power Green Energy Ltd. (TPGEL)	TATA POWER					
#REF!	Tata Power Renewable Energy Ltd. (TPREL)						
#REF!	Banderwala Solar Plant TP Surya Ltd.						
#REF!	Thar Surya Pvt. Ltd.						
#REF!	TP Surya Pvt. Ltd.						
#REF!	TRANSITION ENERGY SERVICES PRIVATE LIMITED						
#REF!	Transition Green Energy Private Limited						
#REF!	Transition Sustainable Energy Services Private Limited						

Status of perfomance indices reporting of July 2025 (Last date of submission 07.08.2025)							
S. No.	**Utility**		**Received Status (Yes/No)**	**Vide mail dated**	**Remarks**	**Indices less than 1 (Yes/No)**	**Reason submitted and corrective action taken**
1	PGCIL	Central Government owned Transmission Company	Y	07.08.2025	NR-1	No	NA
			y	12.08.2025	NR-2	yes	no
			Y	08.08.2025	NR-3	No	NA
2	NTPC				Anta		
					Auriya		
			y	12.08.2025	Dadri	No	NA
					Koldam		
					Rihand		
					Singrauli		
			Yes	01.08.2025	Unchahar	No	NA
			Y	05.08.2025	Tanda	No	NA
3	BBMB	Central Generating Company					
4	THDC		Yes	02.08.2025	Tehri	No	NA
			Y	06.08.2025	Tehri PSP	No	NA
			y	13.08.2025	Koteshwar	No	NA
5	SJVN		Y	06.08.2025	RHPS	YES	YES
			Y	06.08.2025	NJHPS	YES	YES
6	NHPC		Yes	01.08.2025	-	Yes	Yes
7	NPCIL		y	07.08.2025	RAPS-A	No	na
			Y	05.08.2025	RAPS-B	No	na
			Y	05.08.2025	RAPS-C(5&6)	No	na
					RAP -D (7 & 8)		
					NAPS-1&2		
8	DTL	State Transmission Utility					
9	HVPNL		Yes	05.08.2025	-	No	NA
10	RRVPNL		Y	07.08.2025	-	YES	YES
11	UPPTCL		Yes	02.08.2025	Meerut Circle	No	NA
			Yes	04.08.2025	Agra Circle	No	NA
			Yes	01.08.2025	Jhansi Circle	No	NA
			Yes	04.08.2025	Prayagraj Circle	Yes	No
			Yes	04.08.2025	Gorakhpur Circle	No	NA
			Yes	04.08.2025	Lucknow Circle	No	NA
12	PTCUL		Yes	05.08.2025	Kumaon	No	NA
			Yes	05.08.2025	Garhwal	No	NA
13	PSTCL						
14	HPPTCL				-		
15	JKPTCL	UT	Yes	05.08.2025	Jammu	No	NA
		UT	Yes	05.08.2025	Kashmir	No	NA
	Chandigarh Power Distribution Ltd	UT	Y	07.08.2025	220 Kv Kishangarh	No	NA
16	IPGCL		y	06.08.2025	PPS-I	No	NA
			y	06.08.2025	PPS-III, Bawana	No	NA
17	HPGCL		y	06.08.2025	PTPS, Panipat	No	NA
			y	06.08.2025	DCRTPP, Yamunanagar	No	NA
			y	06.08.2025	RGTPP (Khedar)	No	NA
18	RRVUNL		Yes	01.08.2025	KTPS	No	NA

Status of perfomance indices reporting of July 2025 (Last date of submission 07.08.2025)							
S. No.	**Utility**		**Received Status (Yes/No)**	**Vide mail dated**	**Remarks**	**Indices less than 1 (Yes/No)**	**Reason submitted and corrective action taken**
		State Generating Company	Y	07.08.2025	kATPP, Jhalawar	No	NA
			Y	07.08.2025	CSCTPP Chhabra	No	NA
			Y	05.08.2025	RGTPP, Ramgarh	No	NA
			Y	07.08.2025	Ctpp,Chhabra	No	NA
			Yes	01.08.2025	DCCPP, Dholpur	No	NA
			Y	07.08.2025	STPS Suratgarh	No	NA
			Y	07.08.2025	SSCTPS Suratgarh	No	NA
18	UPRVUNL				Parichha B (220 kV)		
			Yes	01.08.2025	Parichha C (400 kV)	No	NA
			Yes	01.08.2025	DTPS Anpara	No	NA
					Obra A & B		
					Obra C		
					Harduaganj 400 kV		
					Ghatampur 765 kV		
					Anpara-A&B		
					Panki TPS		
					Jawaharpur		
19	UJVNL				Dharasu		
					Tiloth		
					Khodri		
					Chibro		
					Vyasi		
20	HPPCL				Kashang HEP		
					Sawara Kuddu		
					Sainj		
21	PSPCL	State Generating Company & State owned Distribution Company	Y	05.08.2025	RSD	No	NA
					GGSTPS, Rupnagar		
			Yes	01.08.2025	GVK Power Goindwal Shahib Ltd.	No	NA
			Y	06.08.2025	GHSTPS, Lehra Mohabbat	No	NA
22	HPSEBL	Distribution company having Transmission connectivity ownership	Yes	04.08.2025	Hamirpur Circle	No	NA
					Shimla Circle		
23	Prayagraj Power Generation Co. Ltd.		Yes	01.08.2025	-	No	NA
24	Aravali Power Company Pvt. Ltd						
25	Apraava Energy Private Limited		Y	06.08.2025		No	NA
26	Talwandi Sabo Power Ltd.		Y	06.08.2025		No	NA
27	Nabha Power Limited		Y	01.08.2025		No	NA
28	MEIL Anpara Energy Ltd (Anpara-C)						
29	Rosa Power Supply Company Ltd		Yes	04.08.2025		No	NA
30	Lalitpur Power Generation Company Ltd						
31	MEJA Urja Nigam Ltd.						
32	Adani Power Rajasthan Limited		Y	05.08.2025	Kawai	No	NA
33	JSW Energy Ltd. (KWHEP)		Yes	04.08.2025		No	NA
	ISTS Transmission Utilities						
#REF!	INDIGRID						
#REF!	ADHPL		Y	06.08.2025	220 kV Prini	No	NA
#REF!	Adani Transmission Limited	AESL	Y	06.08.2025		No	NA
#REF!	Bikaner Khetri Transmission Limited		Y	06.08.2025		No	NA
#REF!	Fatehgarh Bhadla Transmission Limited		Y	06.08.2025		No	NA
#REF!	Powergrid Sikar Transmission Limited	POWERGRID, NR-1					
#REF!	Powergrid Aligarh Sikar Transmission Limited	POWERGRID, NR-1					

Status of perfomance indices reporting of July 2025 (Last date of submission 07.08.2025)							
S. No.	**Utility**		**Received Status (Yes/No)**	**Vide mail dated**	**Remarks**	**Indices less than 1 (Yes/No)**	**Reason submitted and corrective action taken**
#REF!	Powergrid Ajmer Phagi Transmission Limited	POWERGRID, NR-1					
#REF!	Powergrid Bikaner Transmission System Limited	POWERGRID, NR-1					
#REF!	Powergrid Khetri Transmission System Limited	POWERGRID, NR-1					
#REF!	Powergrid Ramgarh Transmission Limited	POWERGRID, NR-1					
#REF!	Powergrid Fatehgarh Transmission Limited	POWERGRID, NR-1					
#REF!	Powergrid Bhadla Transmission Limited	POWERGRID, NR-1					
#REF!	Powergrid Meerut Simbhavli Transmission Limited	POWERGRID, NR-1					
#REF!	Powergrid Kala Amb Transmission Limited	POWERGRID, NR-2					
	State Utilities						
	Uttar Pradesh						
5	Vishnuprayag Hydro Electric Plant (J.P.)		Yes	01.08.2025		No	NA
6	Alaknanda Hydro Electric Plant (GVK)		Y	05.08.2025		N	NA
7	Khara Power House (Khara)		Y	04.08.2025		N	NA
8	WUPPTCL		Y	02.08.2025		N	NA
9	SEUPPTCL						
10	ATSCL	**AESL**	Y	06.08.2025		No	NA
11	GTL	**AESL**	Y	06.08.2025		No	NA
12	HPTSL	**AESL**	Y	06.08.2025		No	NA
13	MTSCL	**AESL**	Y	06.08.2025		No	NA
14	OCBTL	**AESL**	Y	06.08.2025		No	NA
69	STSL	**AESL**	Y	06.08.2025		No	NA
	Rajasthan						
70	Barsingsar Plant	**NLC**					
71	Rajwest Plant	**JSW**					
	RE Utilities						
72	ABC Renewable Pvt. Ltd		Y	07.08.2025		NO	NA
73	ACME Heeragarh powertech Pvt. Ltd						
74	ACME Chittorgarh Solar Energy Pvt Ltd						
75	AHEJOL-Hybrid-1 Madhopura	ADANI GREEN	Y	06.08.2025		No	NA
76	AHEJ3L - Hybrid-2B 300MW	ADANI GREEN	Y	06.08.2025		No	NA
77	AHEJFL(AEML_250)	ADANI GREEN	Y	06.08.2025		No	NA
78	AHEJ4L(AEML-350)	ADANI GREEN	Y	06.08.2025		No	NA
79	ASEJ2PL(Hapasar 300MW) SPC11PL	ADANI GREEN	Y	06.08.2025		No	NA
80	Adani Renewable Energy (RJ) Limited Rawra 200	ADANI GREEN	Y	06.08.2025		No	NA
81	Adani Solar Energy Four Limited SECI 50	ADANI GREEN	Y	06.08.2025		No	NA
82	Adani Solar Energy Jodhpur Two Limited Merchant 50	ADANI GREEN	Y	06.08.2025		No	NA
83	ASEJ05PL (RJ200)	ADANI GREEN	Y	06.08.2025		No	NA
84	ASERJ2PL - Phalodi 150 MW	ADANI GREEN	Y	06.08.2025		No	NA
85	ASERJ01PL-Pokhran 300 MW (SB energy six)	ADANI GREEN	Y	06.08.2025		No	NA
86	AGE25L(Badi Sid)	ADANI GREEN	Y	06.08.2025		No	NA

Status of perfomance indices reporting of July 2025 (Last date of submission 07.08.2025)							
S. No.	Utility		Received Status (Yes/No)	Vide mail dated	Remarks	Indices less than 1 (Yes/No)	Reason submitted and corrective action taken
87	Bhadla park - South block	ADANI GREEN	Y	06.08.2025		No	NA
	AGE24L (Bhimsar)	ADANI GREEN	Y	06.08.2025		No	NA
	AHEJ2L - Hybrid-2A 300MW	ADANI GREEN	Y	06.08.2025		No	NA
	ASERJ2PL - Devikot 180 MW	ADANI GREEN	Y	06.08.2025		No	NA
88	ASEJOPL-Hybrid 450 MW	ADANI GREEN	Y	06.08.2025		No	NA
89	Altra Xergi Pvt. Ltd.		Yes	04.08.2025		N	NA
90	AMP Energy Green Four Pvt. Ltd.	AMPIN ENERGY	Y	07.08.2025		N	NA
91	AMP Energy Green Five Pvt. Ltd.	AMPIN ENERGY	Y	07.08.2025		N	NA
	AMP Energy Green Six Pvt. Ltd.	AMPIN ENERGY	Y	07.08.2025		N	NA
92	Amplus Ages Private Limited	GENTARI	Y	07.08.2025		N	NA
93	Avaada RJHN_240MW	Avaada	Yes	04.08.2025		N	NA
94	Avaada sunce energy Pvt limited		Yes	04.08.2025		N	NA
95	Avaada Sunrays Pvt. Ltd.		Yes	04.08.2025		N	NA
96	Avaada Sustainable RJ Pvt. Ltd.		Yes	04.08.2025		N	NA
97	Ayana Renewable Power Three Private Limited						
98	Ayaana Renewable Power One Pvt. Ltd.						
99	Azure Power Forty One Pvt limited						
100	Azure Power Forty Three Pvt. Ltd._RSS						
101	Azure Maple Pvt. Ltd.						
102	AZURE POWER INDIA Pvt. Ltd., Bhadla						
103	Azure Power Thirty Four Pvt. Ltd.						
104	SB Energy Six Private Limited, Bhadla						
105	Clean Solar Power (Jodhpur) Pvt. Ltd.						
106	Clean Solar Power (Bhadla) Pvt. Ltd						
107	Eden Renewable Cite Private Limited						
108	Grian Energy private limited	GENTARI	Y	07.08.2025		N	NA
109	Mahindra Renewable Private Limited						
110	Mega Surya Urja Pvt. Ltd. (MSUPL)						
111	AURAIYA Solar						
112	DADRI SOLAR						
113	SINGRAULI SOLAR						
114	Anta Solar						
115	Unchahar Solar						
116	NTPC Devikot Solar plant-1	NGEL	y	08.08.2025		n	na
117	NTPC Devikot Solar plant-2		y	08.08.2025		n	na
#REF!	SKB NTPC -1 (250MW)	NGEL	y	08.08.2025		n	na
#REF!	SKB NTPC-2 (300MW)		y	08.08.2025		n	na
#REF!	NTPC Nokhra_300MW		y	08.08.2025		n	na
#REF!	NTPC Fatehgarh 296MW		y	08.08.2025		n	na
#REF!	One Volt energy Pvt. Ltd.	GENTARI	Y	07.08.2025		N	NA
#REF!	ReNew Solar Urja Private Limited	IndiGrid					
#REF!	ReNew Solar Energy (Jharkhand Three) Private Limited		Y	08.08.2025			
#REF!	RENEW SOLAR POWER Pvt. Ltd. Bhadla		N				
#REF!	Renew Sun Bright Pvt. Ltd. (RSBPL)		Y	08.08.2025			
#REF!	Renew Surya Partap Pvt. Ltd.	ReNew	Y	08.08.2025			
#REF!	Renew Surya Ravi Pvt. Ltd.		Y	08.08.2025			
#REF!	Renew Surya Roshni Pvt. Ltd.		Y	08.08.2025			
#REF!	Renew Surya Vihan Pvt. Ltd.		Y	08.08.2025			
#REF!	Renew Surya Ayaan Pvt. Ltd.		Y	20.08.2025			

Status of perfomance indices reporting of July 2025 (Last date of submission 07.08.2025)							
S. No.	**Utility**		**Received Status (Yes/No)**	**Vide mail dated**	**Remarks**	**Indices less than 1 (Yes/No)**	**Reason submitted and corrective action taken**
#REF!	Renew Solar Photovoltaic Pvt Ltd		Y	20.08.2025			
#REF!	RENEW SOLAR POWER Pvt. Ltd. Bikaner		Y	08.08.2025			
#REF!	Rising Sun Energy-K Pvt. Ltd.						
#REF!	Serentica Renewables India 4 Private Limited						
#REF!	Solzen Urja Private Limited	Sekura	Y	05.08.2025		No	NA
#REF!	Tata Power Green Energy Ltd. (TPGEL)	TATA POWER	Y	06.08.2025		No	NA
#REF!	Tata Power Renewable Energy Ltd. (TPREL)		Y	06.08.2025		No	NA
#REF!	Banderwala Solar Plant TP Surya Ltd.		Y	06.08.2025		No	NA
#REF!	Thar Surya Pvt. Ltd.						
#REF!	TP Surya Pvt. Ltd.						
#REF!	TRANSITION ENERGY SERVICES PRIVATE LIMITED						
#REF!	Transition Green Energy Private Limited						
#REF!	Transition Sustainable Energy Services Private Limited						

Annexure-II

Format No.-PI-01

Reporting of performance indices for protection system

(for elements connected at 220 kV and above)

Name of Utility:

Month:

S.N.	Sub-station	Unit (SPS/Line/ICT/GT/ etc)	Nc	Nf	Nu	Ni	Dependability Index (D)	Security Index (S)	Reliability Index (R)

Justification for less than one index may be attached separately.

Nc is the number of correct operations at internal power system faults

Nf is the number of failures to operate at internal power system faults

Nu is the number of unwanted operations

Ni is the number of incorrect operations and is the sum of Nf and Nu

Status of Internal Protection Audit Plan for FY 2025 -26								
S. No.	**NRPC Member**	**Category**	**Status**	**Schedule submitted as per utililty**	**Present Status Comlpleted (yes/no)**	**Report Submission Date by audit party**	**Discussion held in PSC meeting number**	**Compliance status**
1	PGCIL	Central Government owned Transmission Company	Received (NR-1,2,3)					
2	NTPC	Central Generating Company	Received					
3	BBMB		Received					
4	THDC		Received	Tehri- March, 2026 Koteshwar- December, 2025				
5	SJVN		Received (NJHPS, RHPS)					
6	NHPC		Received					
7	NPCIL		Received (RAP C)	July, 2025				
			Conducted (RAPS-1,2)	Jun-25			61	
8	Delhi SLDC	SLDC						
9	Haryana SLDC							
10	Rajasthan SLDC							
11	Uttar Pradesh SLDC		Received (Jaypee Vishnuprayag, WUPPTCL, SEUPPTCL, Alaknanda, GTL)	GTL- Jan'2026 & Feb'2026				
12	Uttarakhand SLDC							
13	Punjab SLDC							
14	Himachal Pradesh SLDC							
15	DTL	State Transmission Utility	Received					
16	HVPNL		Received					
17	RRVPNL		Received					
18	UPPTCL		Received (All zones)	Jan-March 2026				
19	PTCUL		Received	July-December 2025				
20	PSTCL							
21	HPPTCL		Received					
22	IPGCL	State Generating Company	Received (PPS-III, I)					
23	HPGCL		Received	Aug'25				
24	RRVUNL		Received					
25	UPRVUNL		Received (Anpara B)	Jun-25				
			Received (Obra A & B)	Jan - March 2026				
			Received (Anpara D)	May-25				
			Received (Harduaganj)	April -May 2025				
			Received (Harduaganj D)	April -May 2025				
			Received (Harduaganj E)	April -May 2025				
			Received (Parichha)	May-25				
			Received (Parichha Ext)	Feb-26				
			Received (Obra C)	Mar-26				
			Received (Jawaharpur)	Jul-25				
26	UJVNL		Received (Chibro)	Oct-25				
			Received (Khodri)	Nov-25				
			Received (Vyasi)	Dec-25				
			Received (Dharashu, Tiloth)					
27	HPPCL		Received (Kasheng HEP, Sawara Kuddu, Sainj)	Nov'25-Mar'26				
28	PSPCL	State Generating Company & State owned Distribution Company	Received (GHTP, GGSSTP, GATP, RSD)					
29	HPSEBL	Distribution company having Transmission connectivity ownership	Received					
30	Prayagraj Power Generation Co. Ltd.	IPP having more than 1000 MW installed capacity	Received	Aug'25				
31	Aravali Power Company Pvt. Ltd							
32	Apraava Energy Private Limited		Received	May'25				
33	Talwandi Sabo Power Ltd.		Received	May'25				
34	Nabha Power Limited		Received	May'25				
35	MEIL Anpara Energy Ltd		Received	May'25				
36	Rosa Power Supply Company Ltd		Received	Jan'26				
37	Lalitpur Power Generation Company Ltd		Received	Oct - Nov 2025				
38	MEJA Urja Nigam Ltd.							
39	Adani Power Rajasthan Limited							
40	JSW Energy Ltd. (KWHEP)		Received	Nov-25 to Feb 26				
41	UT of J&K	UT of Northern Region						
42	UT of Ladakh							
43	UT of Chandigarh							
	ISTS Transmission Utilities							

44	INDIGRID		Received	Aug-25 to March-26				
45	ADHPL							
46	Adani Transmission Limited		Received(400kV Mohindergarh SS)	October, 2025				
47	Bikaner Khetri Transmission Limited		Received (765 kV Bikaner and Khetri extension bays)	September, 2025				
48	Fatehgarh Bhadla Transmission Limited		Received (400 kV Fatehgarh SS)	September, 2025				
49	Powergrid Sikar Transmission Limited		Received	Sikar- August,25				
50	Powergrid Aligarh Sikar Transmission Limited		Received	Aligarh- April, 25 Sikar- August,25				
51	Powergrid Ajmer Phagi Transmission Limited		Received	March,2025				
52	Powergrid Bikaner Transmission System Limited		Received	Bikaner-II Feb,2025				
53	Powergrid Khetri Transmission System Limited		Received	Khetri-Feb,2025				
54	Powergrid Ramgarh Transmission Limited		Received	Fatehgarh-II Dec, 2025 Fatehgarh-III May, 2025				
55	Powergrid Fatehgarh Transmission Limited		Received	Fatehgarh-II Dec, 2025 Bhadla-II Jan, 2025				
56	Powergrid Bhadla Transmission Limited		Received	Fatehgarh-II Dec, 2025 Bhadla-II Jan, 2025				
57	Powergrid Meerut Simbhavli Transmission Limited		Received	Nov, 2025				
58	Powergrid Kala Amb Transmission Limited		Received	September, 2025				
	State Utilities							
	Uttar Pradesh							
59	Vishnuprayag Hydro Electric Plant (J.P.)		Received	Jun-25				
60	Alaknanda Hydro Electric Plant (GVK)		Received	Dec'25 -Mar'26				
61	Ghatampur TPS		Received	February, 26				
62	Khara Power House (Khara)		Received	Dec'25				
63	WUPPTCL		Received	Oct-25				
64	SEUPPTCL		Received	Jan-26				
65	ATSCL	**AESL**	Received (400/220KV Alwar SS)	September, 2025				
66	GTL	**AESL**	Received (765 kV Hapur extension bays**)**	September, 2025				
67	GTL	**AESL**	Received (765 kV Agra and Gr. Noida extension bays)	September, 2025				
68	HPTSL	**AESL**	Received (220kV Ranpur SS)	August, 2025				
69	MTSCL	**AESL**	Received (400/220/132KV Deedwana SS)	August, 2025				
70	OBTL	**AESL**	Received (400/220/132KV Badaun SS)	Jan'2026				
71	STSL	**AESL**						
	Rajasthan							
72	Barsingsar Plant	**NLC**						
73	Rajwest Plant	**JSW**						

	RE Utilities							
74	ABC Renewable Pvt. Ltd							
75	ACME Heeragarh powertech Pvt. Ltd		Received	Jun-25				
76	ACME Pholidi		Received	Jun-25				
77	ACME Deagarh		Received	Jun-25				
78	ACME Raisar		Received	Jun-25				
79	ACME Dhoulpar		Received	Jun-25				
80	ACME Chittorgarh Solar Energy Pvt Ltd							
81	Adani Hybrid Energy Jaisalmer One Ltd.		Received	Jul-25				
82	Adani Hybrid Energy Jaisalmer Two Ltd.		Received	Jul-25				
83	Adani Hybrid Energy Jaisalmer Three Ltd.		Received	Aug-25				
84	Adani Hybrid Energy Jaisalmer Four Ltd.		Received	Aug-25				
85	Adani Renewable Energy (RJ) limited Rawara		Received	Sep-25				
86	Adani Solar Energy Jaisalmer One Pvt. Ltd. 450MW (Solar)		Received	Oct-25				
87	Adani Solar Enegry Four Private Limited		Received	Sep-25				
88	Adani Hybrid Energy Jaisalmer Four Ltd. (AEML 2-350)		Received	Sep-25				
89	Adani Solar Energy Jaisalmer Two Private Limited Project Two		Received	Oct-25				
90	SB Energy Six Private Limited, Bhadla		Received	Oct-25				
91	Adani Solar Enegry Jodhpur Two Limited, Rawara		Received	Sep-25				
92	Adani Solar Energy RJ Two Pvt. Ltd. (Devikot)		Received	Nov-25				
93	Adani Solar Energy RJ Two Pvt. Ltd. (Phalodi)		Received	Nov-25				
94	Adani Green Energy 24 Limited (Bhimsar)		Received	Nov-25				
95	Adani Green Twenty-Five Limited (Badisid)		Received	Dec-25				
96	Altra Xergi Pvt. Ltd.							
97	AMP Energy Green Five Pvt. Ltd.		Received	Completed			62	
98	AMP Energy Green Six Pvt. Ltd.		Received	Completed			62	
99	Amplus Ages Private Limited							
100	Avaada RJHN_240MW		Received	Oct-25				
101	Avaada sunce energy Pvt limited		Received	Oct-25				
102	Avaada Sunrays Pvt. Ltd.		Received	Oct-25				
103	Avaada Sustainable RJ Pvt. Ltd.		Received	Oct-25				
104	Ayana Renewable Power Three Private Limited							
105	Ayaana Renewable Power One Pvt. Ltd.							
106	Azure Power Forty One Pvt limited							
107	Azure Power Forty Three Pvt. Ltd._RSS							
108	Azure Maple Pvt. Ltd.							
109	AZURE POWER INDIA Pvt. Ltd., Bhadla							
110	Azure Power Thirty Four Pvt. Ltd.							
111	Clean Solar Power (Jodhpur) Pvt. Ltd.							
112	Clean Solar Power (Bhadla) Pvt. Ltd							
113	Eden Renewable Cite Private Limited							
114	Grian Energy private limited							
115	Mahindra Renewable Private Limited							
116	Mega Surya Urja Pvt. Ltd. (MSUPL)							
117	AURAIYA Solar							
118	DADRI SOLAR							
119	SINGRAULI SOLAR							
120	Anta Solar							
121	Unchahar Solar							
122	NTPC Devikot Solar plant 240MW							
123	NTPC Kolayat_400kV							
124	Nedan Solar NTPC							
125	NTPC Nokhra 300MW							
126	One Volt energy Pvt. Ltd.							
127	ReNew Solar Energy (Jharkhand Three) Private Limited		Received	19-11-2025				
128	RENEW SOLAR POWER Pvt. Ltd. Bikaner		Received	17-11-2025				
129	ReNew Solar Urja Private Limited							
130	Renew Sun Bright Pvt. Ltd. (RSBPL)		Received	20-11-2025				
131	Renew Surya Partap Pvt. Ltd.		Received	21-11-2025				
132	Renew Surya Ravi Pvt. Ltd.		Received	18-11-2025				
133	Renew Surya Roshni Pvt. Ltd.		Received	24-11-2025				
134	Renew Surya Vihan Pvt. Ltd.		Received	28.11.2025				
135	Renew Surya Ayaan Pvt. Ltd.							
136	Renew Solar Photovoltaic Pvt Ltd		Received	25-11-2025				
137	Renew Hans Urja Pvt Ltd		Received	26-11-2025				
138	Renew Surya Jyoti Pvt Ltd		Received	27-11-2025				
139	RENEW SOLAR POWER Pvt. Ltd. Bhadla							
140	Rising Sun Energy-K Pvt. Ltd.							
141	Serentica Renewables India 4 Private Limited							
142	Solzen Urja Private Limited		Received	Oct-25				
143	Tata Power Green Energy Ltd. (TPGEL) (225MW)		Received	30-1-2026				

144	Tata Power Renewable Energy Ltd. (TPREL) (300MW)		Received	28-1-2026				
145	Thar Surya Pvt. Ltd.							
146	TP Surya Ltd., Noorsar (110MW)		Received	30-1-2026				
147	Banderwala Solar Plant TP Surya Ltd. (300MW)		Received	28-02-2026				
148	TRANSITION ENERGY SERVICES PRIVATE LIMITED							
149	Transition Green Energy Private Limited							
150	Transition Sustainable Energy Services Private Limited							

Annexure-IV

Format

Internal Protection Audit Calendar

(for elements connected at 220 kV and above)

FY 2023-24

Name of Utility:……..

S.N.	Name of Sub-station	Voltage level	Next Internal Audit schedule	Last Audit conducted (Month/Year)
1				
2				

Status of 3rd Party Protection Audit Plan								
S. No.	**NRPC Member**	**Category**	**Status**	**Schedule submitted as per utililty**	**Present Status Comlpleted (yes/no)**	**Report Submission Date by audit party**	**Discussion held in PSC meeting number**	**Compliance status**
1	PGCIL	Central Government owned Transmission Company	Received (7 S/s of NR-1, 1 S/s of NR-2, 4 S/s of Nr-3)	By Jan 2025				
2	NTPC	Central Generating Company	Received (Singrauli, Rihand, Unchahar, Dadri, Dadri Gas, Auraiya Gas, Faridabad Gas, Anta Gas Power Station)	By Oct 2028				
			Received (Tanda)	By 17.07.2025				
3	BBMB		Received	Feb-27				
4	THDC		Received	March 2026-Tehri, F.Y. 2025-26- Koteshwar				
5	SJVN		Received	Nov-Dec 2025 for RHPS, Nov 24- March 25 for NJHPS				
6	NHPC		Received	FY-2025-26				
7	NPCIL		Completed (220kV) (NAPS)	Jan'25	Completed	18.01.2025	57	
			RAPS-C (6&&)	-	Completed	23.06.2025	Planned for 62	
8	Delhi SLDC	SLDC						
9	Haryana SLDC							
10	Rajasthan SLDC							
11	Uttar Pradesh SLDC		Received (Tanda extension)	17.07.2025				
			Received (Tanda)	17.07.2025				
12	Uttarakhand SLDC							
13	Punjab SLDC							
14	Himachal Pradesh SLDC							
15	DTL	State Transmission Utility	Received	September, 2025 to November, 2026				
16	HVPNL		Received	June-Oct 2025				
17	RRVPNL							
18	UPPTCL		Received	2025;	Under tendering; GKP-cpmpleed but report awaited			
19	PTCUL		Received	By Jan 2025				
20	PSTCL							
21	HPPTCL		Received	FY 25-26				
22	IPGCL	State Generating Company	Received (PPS-III)	FY 25-26				
23	HPGCL		Received	Oct'25				
24	RRVUNL		Received					
25	UPRVUNL		Obra-B	2026-27				
			Obra-C	Feb-26				
			Anpara D	2025	Under tendering			
			Anpara B	2025	Under tendering			
			Harduaganj	2025	Under tendering			
			Harduaganj D	2025	Under tendering			
			Parichha	2025	Under tendering			
			Parichha Ext	2025	Under tendering			
			Jawaharpur	2025	Under tendering			
			Paricha BTPS	2026				
			Panki	2025				
26	UJVNL		Dharasu		Completed in Nov, 2024		56	submitted
			Others					
27	HPPCL		Swara Kuddu	2026				
			Kashang HEP	FY 2025-26				
28	PSPCL	State Generating Company & State owned Distribution Company	Reeceived (GHTP)	Dec. 2025				
			Received (GATP)	May 2025				
			GGSSTP	2026				
			RSD/ Sahapur Kandi	Mar'26				
29	HPSEBL	Distribution company having Transmission connectivity ownership	Kunihar	Conducted			55	
			Upper Nangal	Conducted			61	
			Baddi	Conducted			61	
30	Prayagraj Power Generation Co. Ltd.	IPP having more than 1000 MW installed capacity	Received	Dec-24	Januray 2025	08.01.2025	59	
31	Aravali Power Company Pvt. Ltd							
32	Apraava Energy Private Limited		Received	By May, 2025				
33	Talwandi Sabo Power Ltd.		Conducted	Dec'22	completed	20.12.2024	60	
34	Nabha Power Limited		Received	By December, 2025				
35	MEIL Anpara Energy Ltd		Received	* May 2025				
36	Rosa Power Supply Company Ltd		Conducted	By 30.09.2024	08.08.2024	13.01.2025	57	
37	Lalitpur Power Generation Company Ltd		Conducted	26.03.2024				
38	MEJA Urja Nigam Ltd.		Conducted		Completed in Oct, 2024	22.03.2025	59	
39	Adani Power Rajasthan Limited		Conducted	November, 2024	Kawai		56	Pending
40	JSW Energy Ltd. (KWHEP)		Received	December 2024 to March 2025	Completed		57	Pending

41	UT of J&K	UT of Northern Region						
42	UT of Ladakh							
43	UT of Chandigarh							
	ISTS Transmission Utilities							
44	INDIGRID		Received (PTCL)	FY 25-26				
			Received (NRSS 29)	FY 24-25				
45	ADHPL		Received	* September 2026				
46	Adani Transmission Limited		Received (400kV Mohindergarh SS)	October, 2025				
47	Bikaner Khetri Transmission Limited		Received (765 kV Bikaner and Khetri extension bays)	September, 2025				
48	Fatehgarh Bhadla Transmission Limited		Received (400 kV Fatehgarh SS)	September, 2025				
49	Powergrid Sikar Transmission Limited							
50	Powergrid Aligarh Sikar Transmission Limited							
51	Powergrid Ajmer Phagi Transmission Limited							
52	Powergrid Bikaner Transmission System Limited							
53	Powergrid Khetri Transmission System Limited							
54	Powergrid Ramgarh Transmission Limited							
55	Powergrid Fatehgarh Transmission Limited							
56	Powergrid Bhadla Transmission Limited							
57	Powergrid Meerut Simbhavli Transmission Limited							
58	Powergrid Kala Amb Transmission Limited							
	State Utilities							
	Uttar Pradesh							
59	Vishnuprayag Hydro Electric Plant (J.P.)		Received	December, 2028				
60	Alaknanda Hydro Electric Plant (GVK)		Received	Mar-25				
61	Ghatampur TPS		Received	FY 27-28				
62	Khara Power House (Khara)		Received	Dec-25				
63	WUPPTCL		Conducted		Completed		59	
64	SEUPPTCL		Completed on Oct 2024		Completed		59	
65	ATSCL	**AESL**	Received (400/220KV Alwar SS)	September, 2025				
66	GTL	**AESL**	Received (765 kV Hapur extension bays)	September, 2025				
67	GTL	**AESL**	Received (765 kV Agra and Gr. Noida extension bays)	September, 2025				
68	HPTSL	**AESL**	Received (220kV Ranpur SS)	August, 2025				
69	MTSCL	**AESL**	Received (400/220/132KV Deedwana SS)	August, 2025				
70	OCBTL	**AESL**	Received (400/220/132KV Badaun SS)	FY 24-25	Completed			
71	STSL	**AESL**						
	Rajasthan							
72	Barsingsar Plant	**NLC**						
73	Rajwest Plant	**JSW**						
	RE Utilities							
74	ABC Renewable Pvt. Ltd							
75	ACME Heeragarh powertech Pvt. Ltd							
76	ACME Pholidi							
77	ACME Deagarh							
78	ACME Raisar							
79	ACME Dhoulpar							
80	ACME Chittorgarh Solar Energy Pvt Ltd							
81	Adani Hybrid Energy Jaisalmer One Ltd.							
82	Adani Hybrid Energy Jaisalmer Two Ltd.							
83	Adani Hybrid Energy Jaisalmer Three Ltd.							
84	Adani Hybrid Energy Jaisalmer Four Ltd.							
85	Adani Renewable Energy (RJ) limited Rawara							
86	Adani Solar Energy Jaisalmer One Pvt. Ltd. 450MW (Solar)							
87	Adani Solar Enegry Four Private Limited							
88	Adani Hybrid Energy Jaisalmer Four Ltd. (AEML 2-350)							
89	Adani Solar Energy Jaisalmer Two Private Limited Project Two							
90	SB Energy Six Private Limited, Bhadla							
91	Adani Solar Enegry Jodhpur Two Limited, Rawara							
92	Adani Solar Energy RJ Two Pvt. Ltd. (Devikot)							

93	Adani Solar Energy RJ Two Pvt. Ltd. (Phalodi)							
94	Adani Green Energy 24 Limited (Bhimsar)							
95	Adani Green Twenty-Five Limited (Badisid)							
96	Altra Xergi Pvt. Ltd.		Conducted		Completed	03.02.2025-04.02.2025	60	
97	AMP Energy Green Five Pvt. Ltd.		Received	Nov-27				
98	AMP Energy Green Six Pvt. Ltd.		Received	Nov-27				
99	Amplus Ages Private Limited							
100	Avaada RJHN 240MW		Received	Aug-26				
101	Avaada sunce energy Pvt limited		Received	Aug-26				
102	Avaada Sunrays Pvt. Ltd.		Received	Aug-27				
103	Avaada Sustainable RJ Pvt. Ltd.		Received	Aug-26				
104	Ayana Renewable Power Three Private Limited		Conducted		18.05.2025		61	
105	Ayaana Renewable Power One Pvt. Ltd.		Conducted		09.03.2025		59	
106	Azure Power Forty One Pvt limited							
107	Azure Power Forty Three Pvt. Ltd. RSS							
108	Azure Maple Pvt. Ltd.							
109	AZURE POWER INDIA Pvt. Ltd., Bhadla							
110	Azure Power Thirty Four Pvt. Ltd.							
111	Clean Solar Power (Jodhpur) Pvt. Ltd.							
112	Clean Solar Power (Bhadla) Pvt. Ltd							
113	Eden Renewable Cite Private Limited							
114	Grian Energy private limited							
115	Mahindra Renewable Private Limited							
116	Mega Surya Urja Pvt. Ltd. (MSUPL)							
117	AURAIYA Solar							
118	DADRI SOLAR							
119	SINGRAULI SOLAR							
120	Anta Solar							
121	Unchahar Solar							
122	NTPC Devikot Solar plant 240MW							
123	NTPC Kolayat 400kV							
124	Nedan Solar NTPC							
125	NTPC Nokhra 300MW							
126	One Volt energy Pvt. Ltd.							
127	ReNew Solar Energy (Jharkhand Three) Private Limited							
128	RENEW SOLAR POWER Pvt. Ltd. Bhadla							
129	ReNew Solar Urja Private Limited							
130	Renew Sun Bright Pvt. Ltd. (RSBPL)							
131	Renew Surya Partap Pvt. Ltd.							
132	Renew Surya Ravi Pvt. Ltd.							
133	Renew Surya Roshni Pvt. Ltd.							
134	Renew Surya Vihan Pvt. Ltd.							
135	Renew Surya Ayaan Pvt. Ltd.							
136	Renew Solar Photovoltaic Pvt Ltd							
137	RENEW SOLAR POWER Pvt. Ltd. Bikaner							
138	Rising Sun Energy-K Pvt. Ltd.							
139	Serentica Renewables India 4 Private Limited							
140	Solzen Urja Private Limited		Received	Oct-26				
141	Tata Power Green Energy Ltd. (TPGEL) (225MW)		Received	31-03-2027				
142	Tata Power Renewable Energy Ltd. (TPREL) (300MW)		Received	31-03-2027				
143	Thar Surya Pvt. Ltd.							
144	TP Surya Ltd., Noorsar (110MW)		Received	31-03-2027				
145	Banderwala Solar Plant TP Surya Ltd. (300MW)		Received	31-03-2027				
146	TRANSITION ENERGY SERVICES PRIVATE LIMITED							
147	Transition Green Energy Private Limited							
148	Transition Sustainable Energy Services Private Limited							

सत्यमेव जयते

उत्तर क्षेत्रीय विद्युत समिति

NORTHERN REGIONAL POWER COMMITTEE

Procedure for Approval of Protection Settings in Northern Region

(In reference to regulation 14 of IEGC 2023)

Version: 1.0

(Approved in 75th NRPC meeting held on 28.08.2024)

August, 2024

A. Procedure in case of new element charging

1. ISTS users shall submit the protection settings to NRPC and NRLDC for every new element to be commissioned one month in advance through mail.
   In case of intrastate elements, users shall submit the protection settings to NRPC and concerned SLDC for every new element to be commissioned one month in advance through mail.
2. NRLDC based on the above information and the First Time Charging (FTC) request by user through Outage Management System (OMS) portal of NRLDC, shall allow integration of new element in the system as per NRLDC FTC procedure with the prevailing practice to avoid any delay in charging of the new element. The settings shall be treated as provisional arrangement till approval in PSC (Protection Sub-Committee).
   In case of intrastate elements, SLDC shall allow integration of new element in the system. This shall be treated as provisional arrangement till approval in PSC.
3. NRLDC/SLDCs may ask any other relevant data/information from concerned utilities during scrutiny of settings.
4. Users will be responsible for any revision in settings of the existing element required due to charging of new element. The settings shall be treated as provisional arrangement.
5. The concerned utility shall put up the agenda for getting final approval in next PSC.
6. NR PSC will review and approve the final settings based on the inputs submitted by the utility. In case of any change required in final protection settings of the new element than the provisional one, as decided by the committee, the same shall be implemented within 7 days by the concerned utility.
7. Utility shall intimate to NRPC Secretariat and NRLDC/SLDC (as applicable) within fortnight after implementation of settings for record in regional protection settings database.

B. Procedure in case of revision of settings of any existing element (without any changes in network configuration):

1. Any change in the existing protection settings shall be carried out only after prior approval from PSC Forum of NRPC.
2. The concerned utility (both ISTS and intrastate) shall put up an agenda regarding any changes required in existing protection settings due to integration of new element in the existing system or otherwise, in PSC.
3. Utility shall intimate to NRLDC/SLDC (as applicable) and NRPC about the changes implemented in protection system or protection settings within 15 days of such changes.

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Annexure-VII

सत्यमेव जयते

उत्तर क्षेत्रीय विद्युत समिति

NORTHERN REGIONAL POWER COMMITTEE

Protection Philosophy of Northern Region

(Developed in compliance of IEGC 2023)

Version: 3.0

(Approved in 53rd PSC meeting held on 22.10.2024)

October 2024

Contents

1. Transmission line & Cable

S.N.	Protection Setting/ Protocol	Mandated Setting for transmission lines
1	**Protection Scheme**	**220kV and above:** Independent Main-I and Main-II protection (of different make OR different type/different algorithm) of non-switched numerical type is to be provided with carrier aided scheme. **132kV and below:** One non-switched distance protection scheme and, directional over current and earth fault relays, should be provided as back up.
2	**Distance Protection Zone-1**	Reach: 80% of the protected line; 110% of the protected line (In case of radial lines) TimeSetting: Instantaneous.
3	**Distance Protection Zone-2**	Reach: Single Circuit Line: 120% of length of principle line section. Double circuit line: 150% coverage of line to take care of underreaching due to mutual coupling effect. Time setting: i. 0.35 second *(considering LBB time of 200mSec, CB open time of 60ms, resetting time of 30ms and safety margin of 60ms)* ii. 0.5-0.6 second *(For a long line followed by a short line)*

4	**Distance Protection Zone-3**	Reach: Zone-3 should overreach the remote terminal of the longest adjacent line by an acceptable margin (typically 20% of highest impedance seen) for all fault conditions. Time Setting: 800-1000 msec If zone-3 reach transcends to other voltage level, time may be taken upto 1.5 sec.
5	**Distance Protection Zone- 4**	The Zone-4 reverse reach must adequately cover expected levels of apparent bus bar fault resistance. Time may be coordinated accordingly. Where Bus Bar protection is not available, time setting: 160 msec.
6	**Power Swing Blocking**	Block tripping in all zones, all lines. Out of Step tripping to be applied on all inter-regional tie lines. Deblock time delay = 2s
7	**Protection for broken conductor**	Negative Sequence current to Positive Sequence current ratio more than 0.2 (i.e. I2/I1 ≥ 0.2) Alarm Time delay: 3-20 sec. Tripping may be considered for radial lines to protect single phasing of transformers.
8	**Switch on to fault (SOTF)**	Switch on to fault (SOTF) function to be provided in distance relay to take care of line energization on fault.
9	**VT fuse fail detection function**	VT fuse fail detection function shall be correctly set to block the distance function operation on VT fuse failure.
10	**Carrier Protection**	To be applied on all 220kV and above lines with the only exception of radial feeders.

11	**Back up Protection**	1. On 220kV and above lines with 2 Main Protections: • Back up Earth Fault protections alone to be provided. • No Over current protection to be applied. 2. At 132kV and below lines with only one Main protection: • Back up protection by IDMT O/C and E/F to be applied.
12	**Auto Reclosing with dead time.**	AR shall be enabled for 220 kV and above lines for single pole trip and re-closing. Dead time = 1.0s. Reclaim time = 25.0s Auto-recloser shall be blocked for following: i. faults in cables/composite ii. Breaker Fail Relay iii. Line Reactor Protections iv. O/V Protection v. Received Direct Transfer trip signals vi. Busbar Protection vii. Zone 2/3 of Distance Protection viii. Circuit Breaker Problems. CB Pole discrepancy relay time:1.5 sec; for tiebreaker: 2.5 sec

13	Line Differential	For cables and composite lines, line differential protection with built in distance back up shall be applied as Main-I protection and distance relay as Main-II protection. For very short line (less than 10 km), line differential protection with distance protection as backup (built- in Main relay or standalone) shall be provided mandatorily as Main-I and Main-II. Differential protection may be done using dark fiber (preferably), or using bandwidth.

14	**Over Voltage Protection**	FOR 765kV LINES/CABLE: Low set stage (Stage-I): 106% - 109% (typically 108%) with a time delay of 5 seconds. High set stage (Stage-II): 140% - 150% with a time delay of 100 milliseconds. 400kV LINES/CABLE: Low set stage (Stage-I): 110% - 112% (typically 110%) with a time delay of 5 seconds. High set stage (Stage-II): 140% - 150% with a time delay of 100 milliseconds. FOR 220 KV LINES: High set stage: 140% - 150% with a timedelay of 100 milliseconds. (OPTIONAL) FOR 220 KV CABLE/COMPOSITE: Low set stage (Stage-I): 110% - 112% (typically 110%) with a time delay of 5 seconds. High set stage (Stage-II): 140% - 150% with a time delay of 100 milliseconds. Drop-off to pick-up ratio of overvoltage relay: better than 97% Grading: Voltage as well as time grading may be done for multi circuit lines/cable.
15	**Resistive reach setting to prevent load point encroachment**	Following criteria may be considered for deciding load point encroachment: • Maximum load current (Imax) may be considered as 1.5 times the thermal rating of the line or 1.5 times the associated bay equipment current

		rating (the minimum of the bay equipment individual rating) whichever is lower. (Caution: The rating considered is approximately 15minutes rating of the transmission facility). • Minimum voltage (Vmin) to be considered as 0.85pu (85%).
16	**Direct Inter-trip**	To be sent on operation of following: i. Overvoltage Protection ii. LBB Protection iii. Busbar Protection iv. Reactor Protection v. Manual Trip (400 kV and above) vi. Cable Fault (in composite lines)
17	**Permissive Inter-trip**	To be sent on operation of Distance Protection

2. Series Compensated lines

1	**Lines with Series and other compensations inthe vicinity of Substation**	• Zone-1:FSC end: 60% of the protected line. Time: Instantaneous; Remoted end: 60% of the protected line with 100ms-time delay. POR Communication scheme logic is modified suchthat relay trips instantaneously in Zone-1 on carrierreceive. • Zone-2: 120 % of uncompensated line impedance for single circuit line. For Double circuit line, settings may be decided on basis of dynamic study in view of zero sequence mutual coupling. • Phase locked voltage memory is used to copewith the voltage inversion. Alternatively, an intentional time delay may be applied to overcome directionality problems related to voltage inversion. • over-voltage stage-I setting for series compensated double circuit lines may be kept higher at 113%.

3. Busbar protection

1	**Busbar protection**	To be applied on all 220kV and above sub stations with the only exception of 220kV radial fed bus bars.

4. Local Breaker Back-up

1	**Local Breaker Backup (LBB)**	For 220 kV and above level substations as well as generating stations switchyards, LBB shall be provided for each circuit breaker. LBB Current sensor I > 20% In LBB time delay = 200ms In case of variation in CT ratio, setting may be done accordingly.

5. Power Transformer

5.1 Differential Protection

1	Id min (sensitivity) i.e. multiple of trans. HV side rated current	Default: 0.2 pu Or If tap range is -X% to +Y%, then (X+Y)% may be kept as setting.
2	First Slope	0 - 10%. In case of differential relay with only two slopes, this slope is considered as zero.
3	Second Slope	20% to 40%
4	Third Slope	60% to 80%
5	Unrestrained operation level	Unrestrained differential current ≤ 1/(% impedance at nominal tap)
6	Max. ratio of 2nd harm. to fundamental harm dif. curr. in %	I2/I1Ratio = 10 - 15%
7	Max. ratio of 5th harm. to fundamental harm dif. curr. in %	I5/I1Ratio = 25%
8	Second and fifth harmonics restrain feature	Enabled
9	Cross block feature	Enabled

5.2 Restricted earth fault (REF) protection

1	Pick up current (IREF)	10 – 15 % of Full load current (IFL).
2	Stabilizing resistor (RSTAB)	stabilizing resistor (RSTAB) is obtained by dividing stabilizing voltage (VSTAB) by pick-up current. Stabilizing voltage VSTAB = IF x (RCT + 2RL) RSTAB = (VSTAB / IREF)*k Where: IF = Maximum through fault current, RCT = CT resistance, RL = CT circuit lead resistance, k = Multiplying factor (1-1.5)

5.3 Over Current Protection

1	Scheme	To be implemented on both sides of ICT
2	Low set Directional	Pick up: 110-150% of full load currentCharacteristics: IDMT Co-ordination: to be coordinated with distance relay zone 3 settings of outgoing feeders.
3	High Set Non-Directional	Pick Up: 100-110% of the through fault level of the transformer Characteristics: DT; 0 to 50 msec For IV side of 220 kV transformer only Pick Up: 70-100% of the through fault level of the transformer Characteristics: DT; 100 to 150 msec

5.4 Earth Fault Protection

1	Scheme	To be implemented on both sides of ICT
2	Low set Directional	Pickup: 20-80% of rated full load current Characteristics: IDMT Co-ordination: to be coordinated with earth fault relay setting of outgoing feeders.
3	High Set Non-Directional	Pick Up: 100-110% of the through fault level of the transformer Characteristics: DT; 0 to 50 msec For IV side of 220 kV transformer only Pick Up: 70-100% of the through fault level of the transformer Characteristics: DT; 100 to 150 msec

5.5 Overexcitation protection:

In case of non-availability capability curve by OEM, Shall be provided on both HV and LV sides as below:

U/F %	Time set (s)
110	9000
118	90
126	49.5
134	18
142	4
150	1

***Over excitation setting curve should be as per capability curve provided by OEM. The setting should be well below capability curve and continuous operating limit. However, it must be ensured that Over excitation setting provided by OEM are not be over-sensitive.

6. Shunt Reactor protection

6.1 Differential Protection

1	Id min (sensitivity)	Default: 0.2 pu
2	First Slope	0 - 10%. In case of differential relay with only two slopes, this slope is considered as zero.
3	Second Slope	20% to 40%
4	Third Slope	60% to 80%
5	Unrestrained operation level	2 pu
6	Max. ratio of 2nd harm. to fundamental harm dif. curr. in %	I2/I1Ratio = 15%
7	Max. ratio of 5th harm. to fundamental harm dif. curr. in %	I5/I1Ratio = 25%
8	Second and fifth harmonics restrain feature	Enabled
9	Cross block feature	Enabled

6.2 Impedance/ Zone protection

1	Setting	60% of reactor impedance
2	Time setting	1.2 sec

6.3 Phase overcurrent

1	DT	setting of 6-10 times rated current with a time delay of 0.1s

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Voltage Oscillation in Northern Region RE complex in May'2025

All the events of oscillations occurred in the month of May'2025 have been analysed, antecedent conditions and Amplitude & Frequency of oscillation have also been studied, summary is given below **Table-1.**

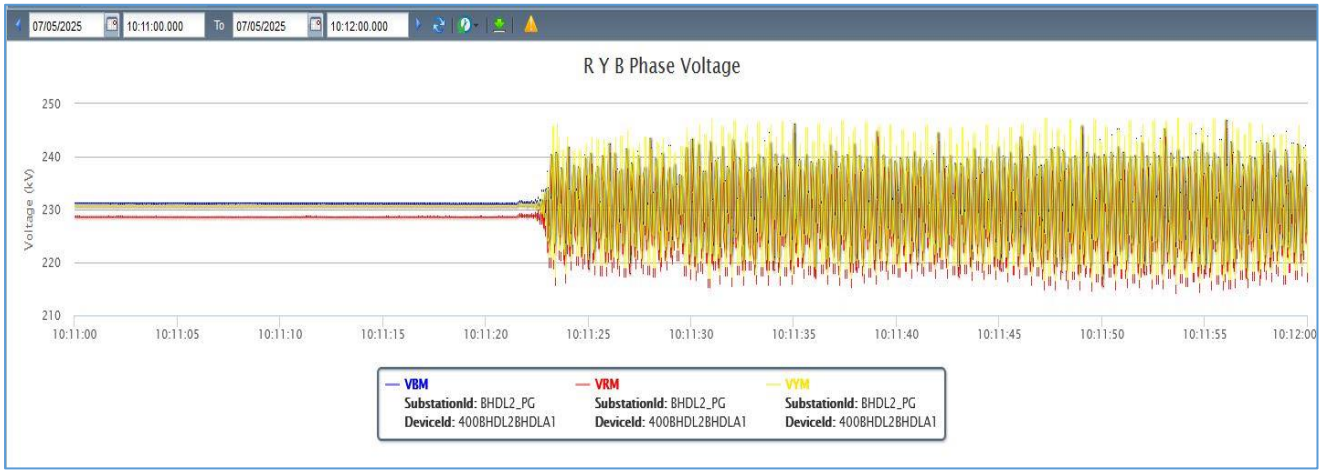
Sl. No.	Oscillation event in NR RE complex		Antecedent conditions			Oscillation Details		Major Tr. Line outage
	Event date (dd/mm/yyyy)	Event Time (hh:mm:ss)	ISGS Solar Generation (MW)	Total Wind generation (MW)	Bus Voltage at 400kV Bhadla-II (PG)	Amplitude of Oscillation (kV) (Peak-to-Peak) at 400kV bus	Frequency of Oscillation (Hz)	
1	07.05.2025	10:11:22	16704	26	397	52	3.5-4 Hz	400 kV Jaisalmer (RS) -Barmer (RS) D/C line. 400 kV Barmer - Bhinmal (RS) D/C line. 400 KV BHADLA-JODHPUR (RS) line. 400 KV BHADLA-MERTA (RS) line. 400 KV Akal-Kankani (RS) line.
2	10.05.2025	10:04:20	16701	10	401	32	3.5-4 Hz	400 kV Jaisalmer (RS) -Barmer (RS) D/C line. 400 kV Barmer - Bhinmal (RS) D/C line. 400 KV Akal-Kankani (RS) line.
3	10.05.2025	10:22:20	16737	10	401	20	3.5-4 Hz	400 kV Jaisalmer (RS) -Barmer (RS) D/C line. 400 kV Barmer - Bhinmal (RS) D/C line. 400 KV Akal-Kankani (RS) line.
4	11.05.2025	10:20:22	16580	154	402	27	3.5-4 Hz	400 kV Jaisalmer (RS) -Barmer (RS) D/C line. 400 kV Barmer - Bhinmal (RS) D/C line. 400 KV Akal-Kankani (RS) line.
5	13.05.2025	14:34:48	17412	1670	402	30	3.5-4 Hz	400 kV Jaisalmer (RS) -Barmer (RS) D/C line. 400 kV Barmer - Bhinmal (RS) D/C line.
6	14.05.2025	10:21:00	17728	1456	398	35	3.5-4 Hz	400 kV Jaisalmer (RS) -Barmer (RS) D/C line. 400 kV Barmer - Bhinmal (RS) D/C line.
7	17.05.2025	10:21:08	17843	1667	399	26	3.5-4 Hz	400 kV Jaisalmer (RS) -Barmer (RS) D/C line. 400 kV Barmer - Bhinmal (RS) D/C line.

Details of all the above-mentioned events, Voltage plot at 400kV Bhadla-II (PG) bus along with ISTS connected Solar generation and Total Wind generation is given below;

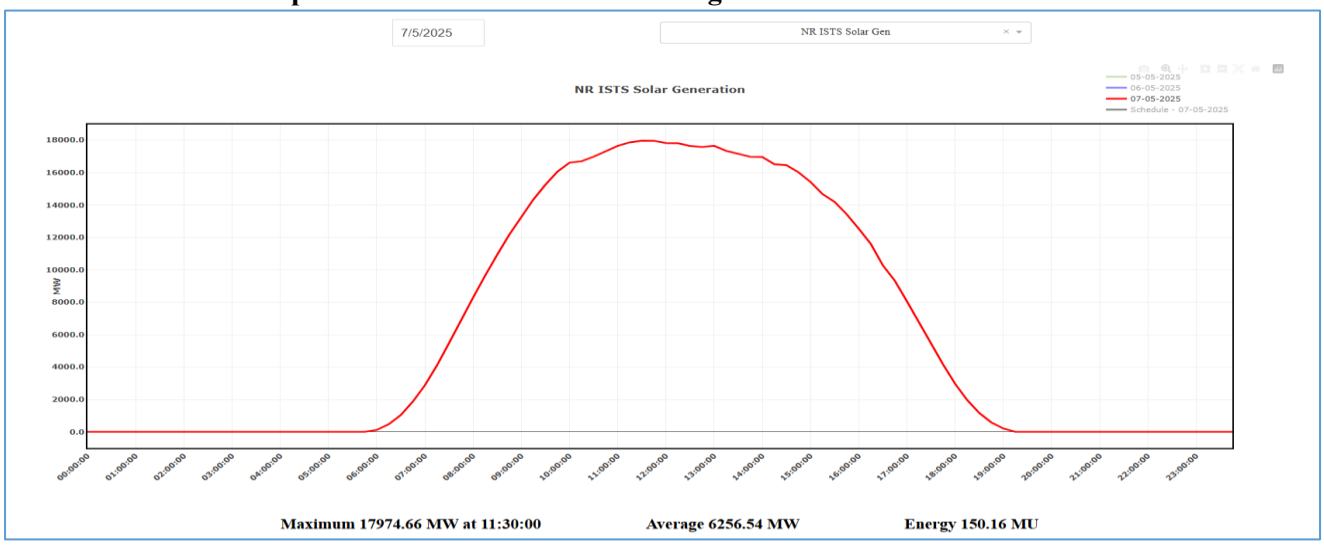
On 07.05.2025

On 07.05.2025, Oscillation occurred at 10:11:22hrs, Peak-Peak Amplitude of Oscillation was 52kV and frequency was 3.5 Hz. 7 nos. of Rajasthan Intra-state line were out as mentioned in Table-1, Rajasthan Total Intra-state RE was restricted to 5000 MW, Over-injection was observed in Rajasthan Intra-state RE generation.

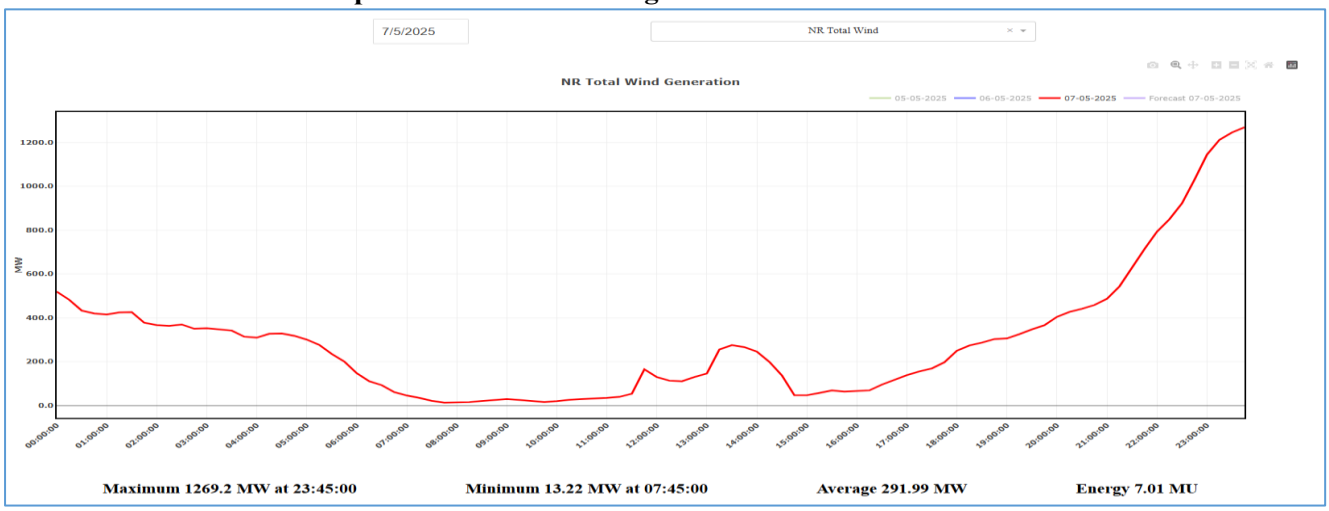
PMU plot of Bus Voltage at 400kV Bhadla-II (PG)_07.05.2025 @10:11:00-10:12:00



SCADA plot of NR ISTS connected Solar generation for 07.05.2025



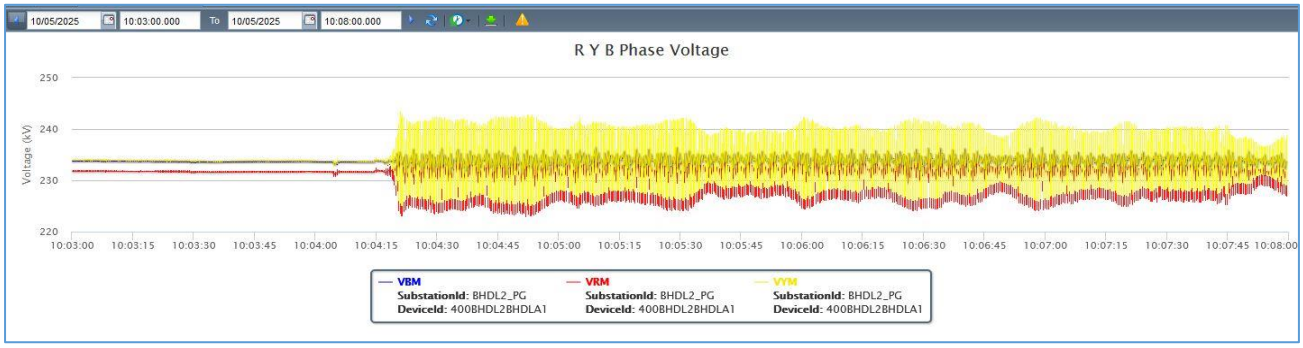
SCADA plot of NR Total Wind generation for 07.05.2025



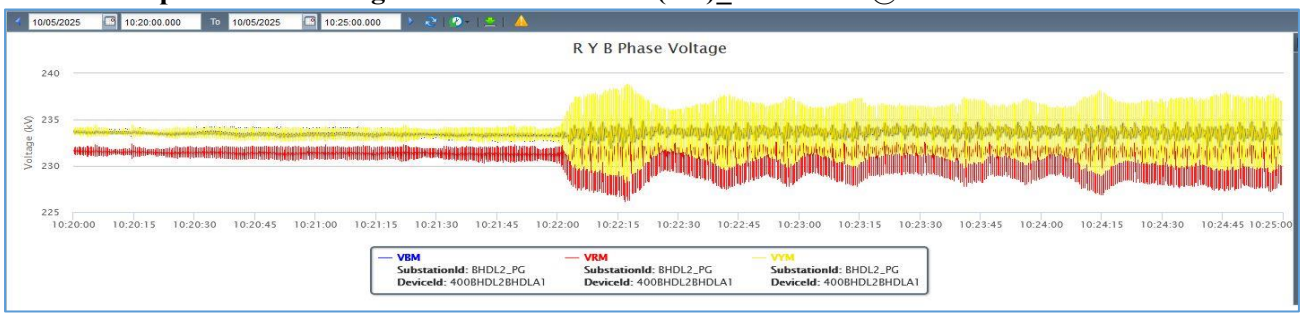
On 10.05.2025

On 10.05.2025, O Oscillation occurred at 10:04:20hrs and 10:22:20hrs, Peak-Peak Amplitude of Oscillation was 32kV and 20kV respectively and frequency was 3.5 Hz. 5 nos. of Rajasthan Intra-state line were out as mentioned in Table-1, Rajasthan Total Intra-state RE was restricted to 5600 MW, Over-injection was observed in Rajasthan Intra-state RE generation.

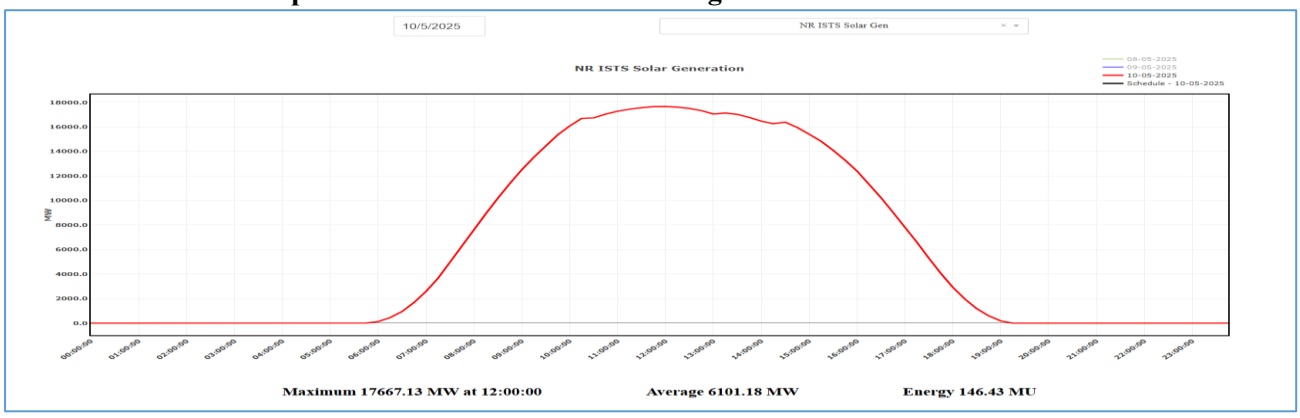
PMU plot of Bus Voltage at 400kV Bhadla-II (PG)_10.05.2025 @10:03:00-10:08:00



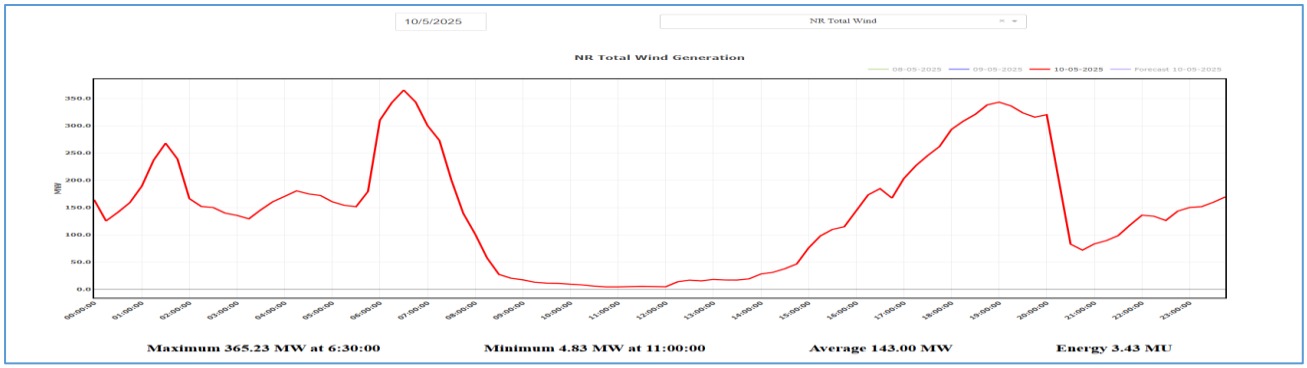
PMU plot of Bus Voltage at 400kV Bhadla-II (PG)_10.05.2025 @10:20:00-10:25:00



SCADA plot of NR ISTS connected Solar generation for 10.05.2025



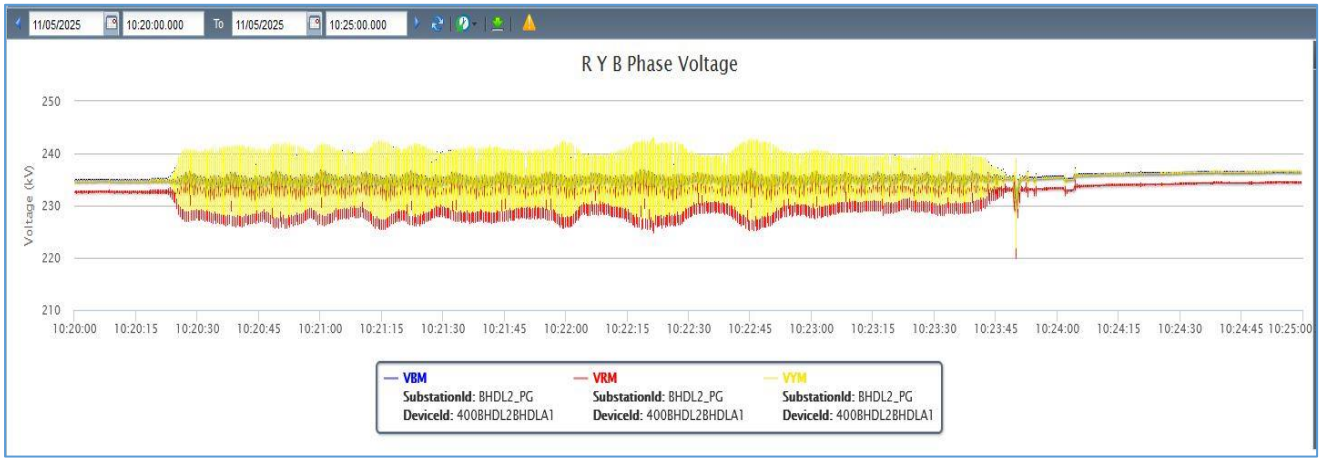
SCADA plot of NR Total Wind generation for 10.05.2025



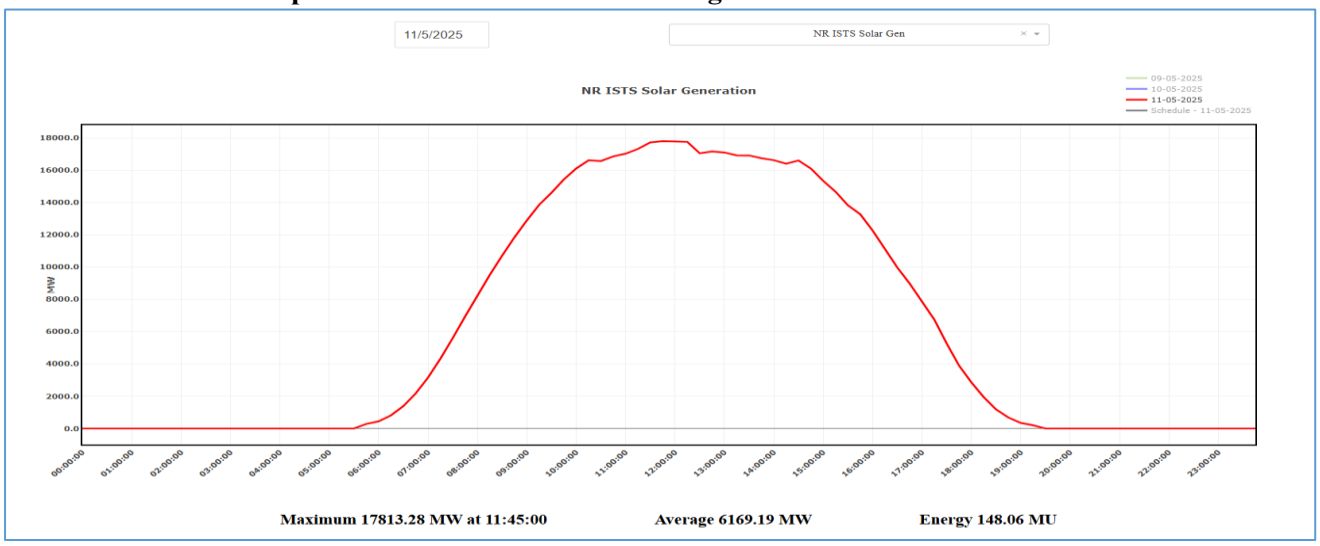
On 11.05.2025

On 11.05.2025, Oscillation occurred at 10:20:22hrs, Peak-Peak Amplitude of Oscillation was 27kV and frequency was 3.5 Hz. 5 nos. of Rajasthan Intra-state line were out as mentioned in Table-1, Rajasthan Total Intra-state RE was restricted to 5600 MW, Over-injection was observed in Rajasthan Intra-state RE generation.

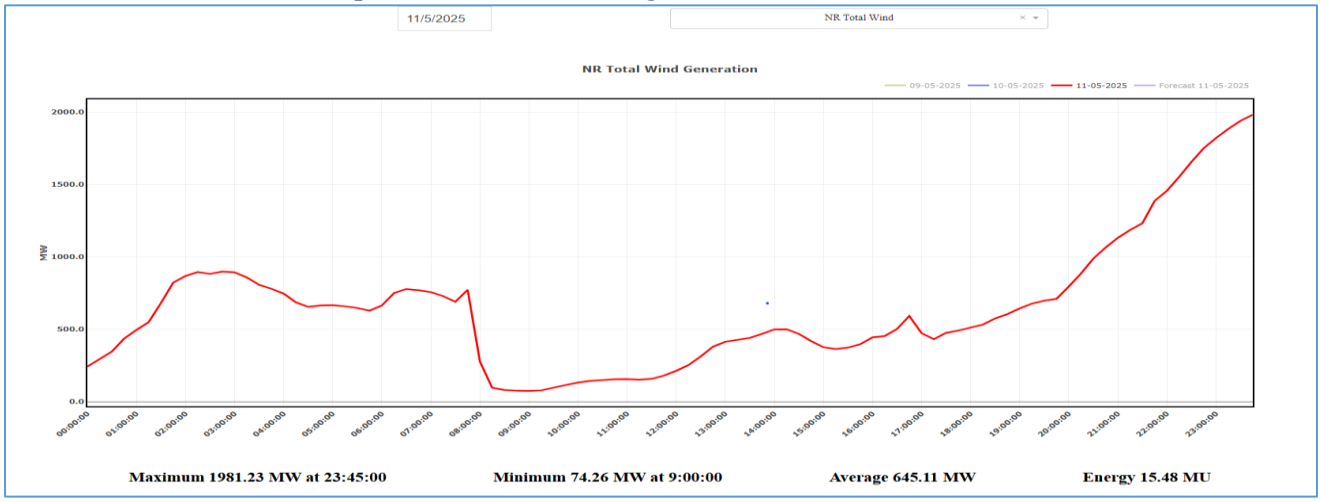
PMU plot of Bus Voltage at 400kV Bhadla-II (PG)_11.05.2025 @10:20:00-10:25:00



SCADA plot of NR ISTS connected Solar generation for 11.05.2025



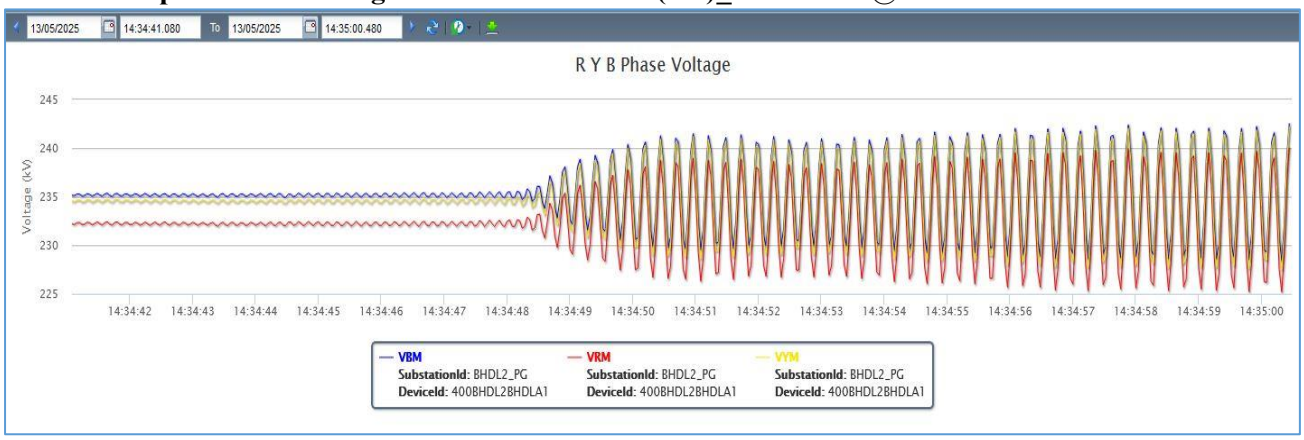
SCADA plot of NR Total Wind generation for 10.05.2025



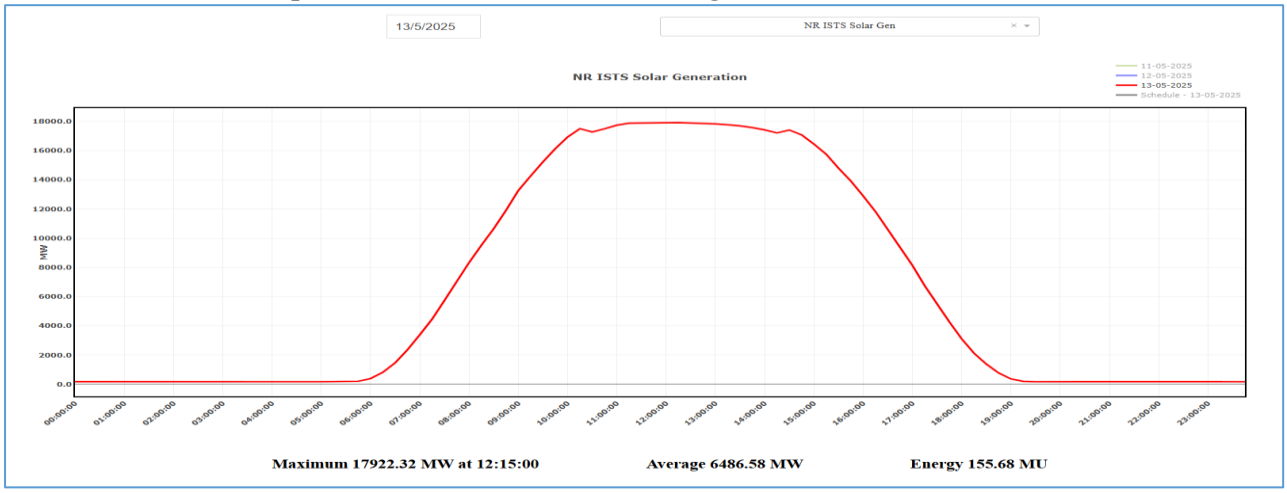
On 13.05.2025

On 13.05.2025, Oscillation occurred at 14:34:48hrs, Peak-Peak Amplitude of Oscillation was 30kV, and frequency was 3.5 Hz. 4 nos. of Rajasthan Intra-state line were out as mentioned in Table-1, Rajasthan Total Intra-state RE was restricted to 6000 MW, Rajasthan Wind generation was on higher side, ~1700MW, significant MVAr drawl was there by Rajasthan Intra-state Wind plants. Voltage at 400kV Bhadla-II (PG) bus was >400kV (~402kV) but oscillation occurred.

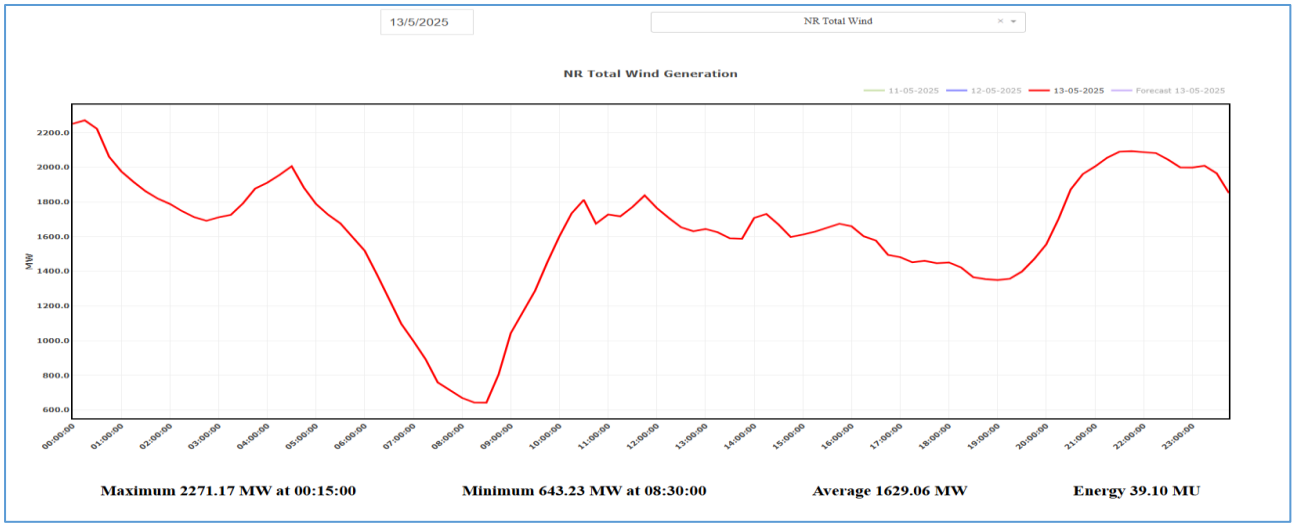
PMU plot of Bus Voltage at 400kV Bhadla-II (PG)_13.05.2025 @14:34:40-14:35:00



SCADA plot of NR ISTS connected Solar generation for 11.05.2025



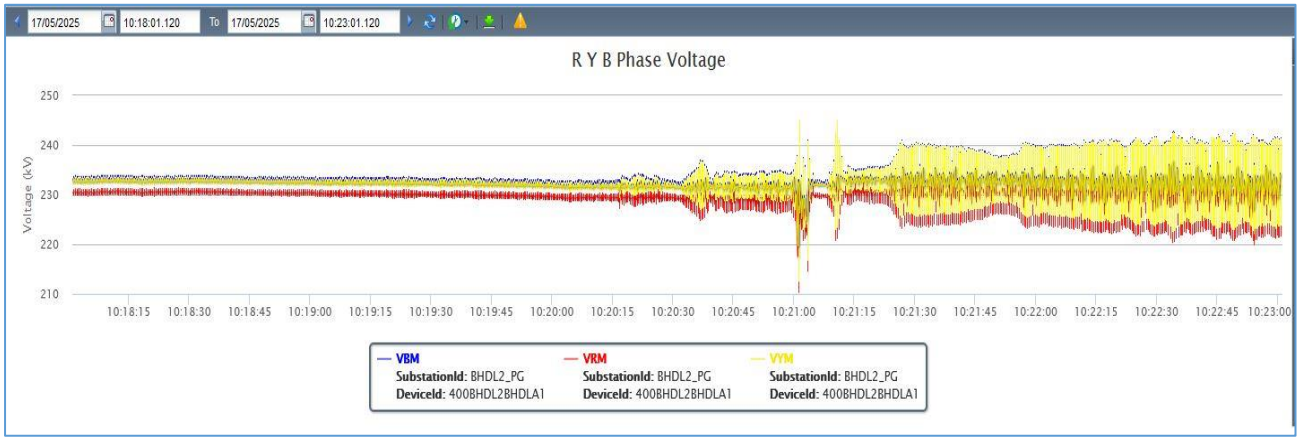
SCADA plot of NR Total Wind generation for 10.05.2025



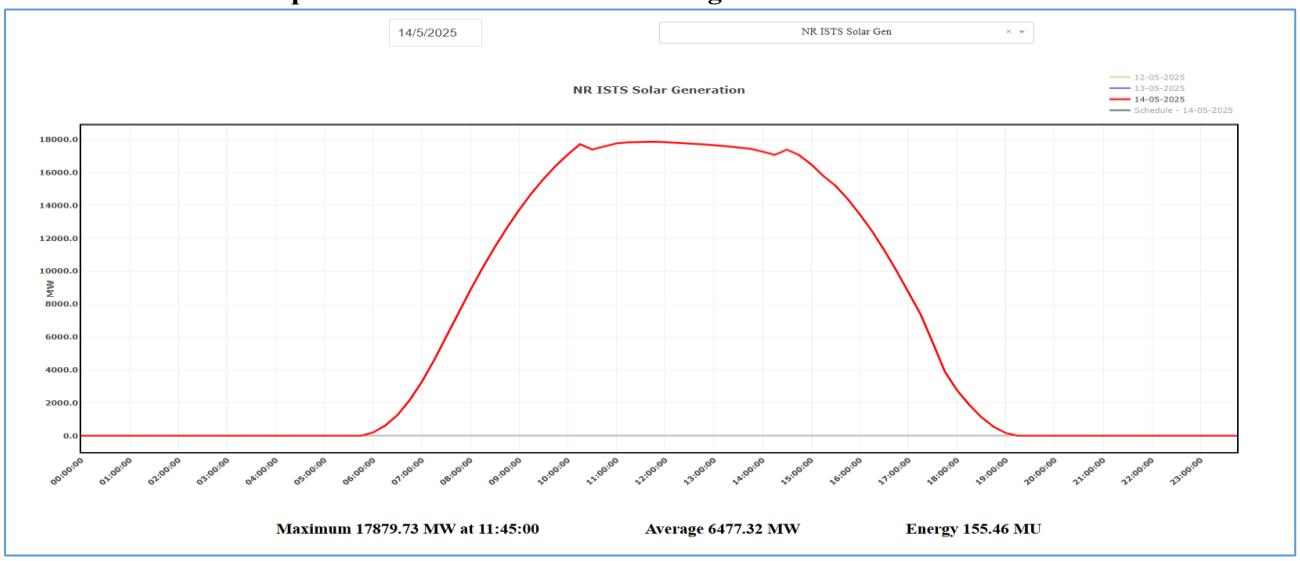
On 14.05.2025

On 14.05.2025, Oscillation occurred at 10:21:00hrs, Peak-Peak Amplitude of Oscillation was 35kV and frequency was 3.5 Hz. 4 nos. of Rajasthan Intra-state line were out as mentioned in Table-1, Rajasthan Total Intra-state RE was restricted to 6000 MW, Over-injection was observed in Rajasthan Intra-state RE generation.

PMU plot of Bus Voltage at 400kV Bhadla-II (PG)_14.05.2025 @10:18:00-10:23:00

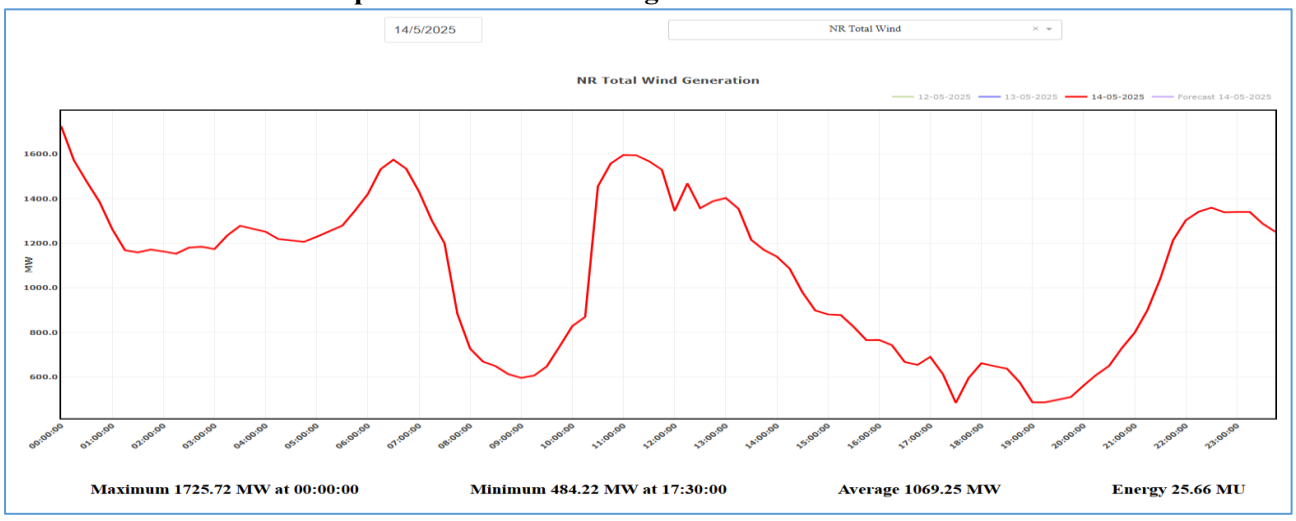


SCADA plot of NR ISTS connected Solar generation for 14.05.2025



Maximum 17879.73 MW at 11:45:00 **Average 6477.32 MW** **Energy 155.46 MU**

SCADA plot of NR Total Wind generation for 14.05.2025

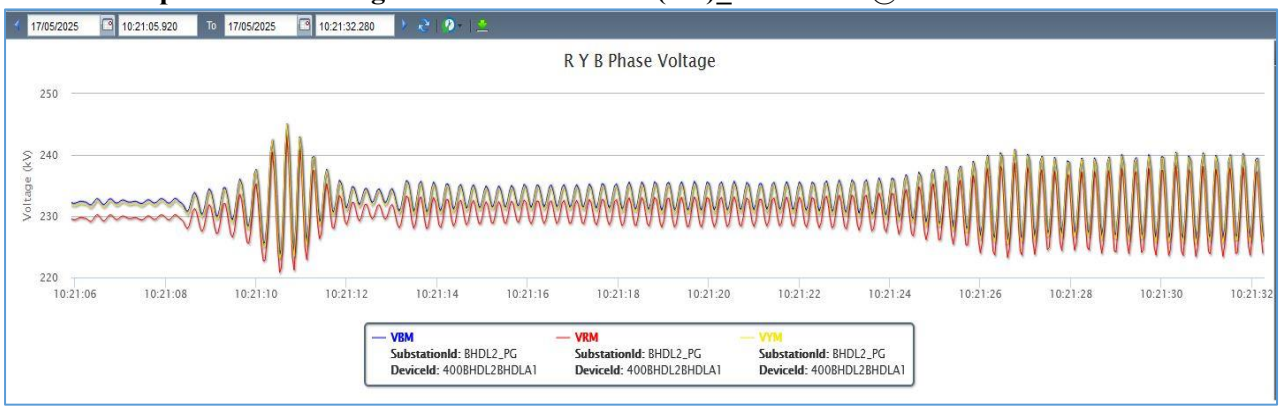


Maximum 1725.72 MW at 00:00:00 **Minimum 484.22 MW at 17:30:00** **Average 1069.25 MW** **Energy 25.66 MU**

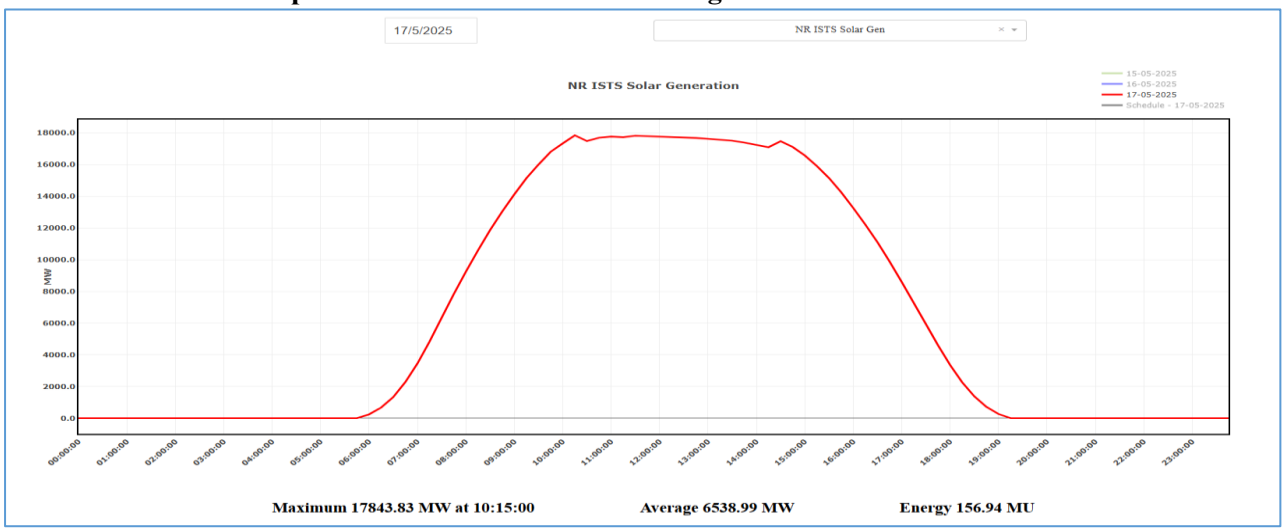
On 17.05.2025

On 17.05.2025, Oscillation occurred at 10:21:08hrs, Peak-Peak Amplitude of Oscillation was 26kV, and frequency was 3.5 Hz. 4 nos. of Rajasthan Intra-state line were out as mentioned in Table-1, Rajasthan Total Intra-state RE was restricted to 6000 MW, Over-injection was observed in Rajasthan Intra-state RE generation. Rajasthan Wind generation was on higher side, ~1700MW, significant MVAr drawl was there by Rajasthan Intra-state Wind plants.

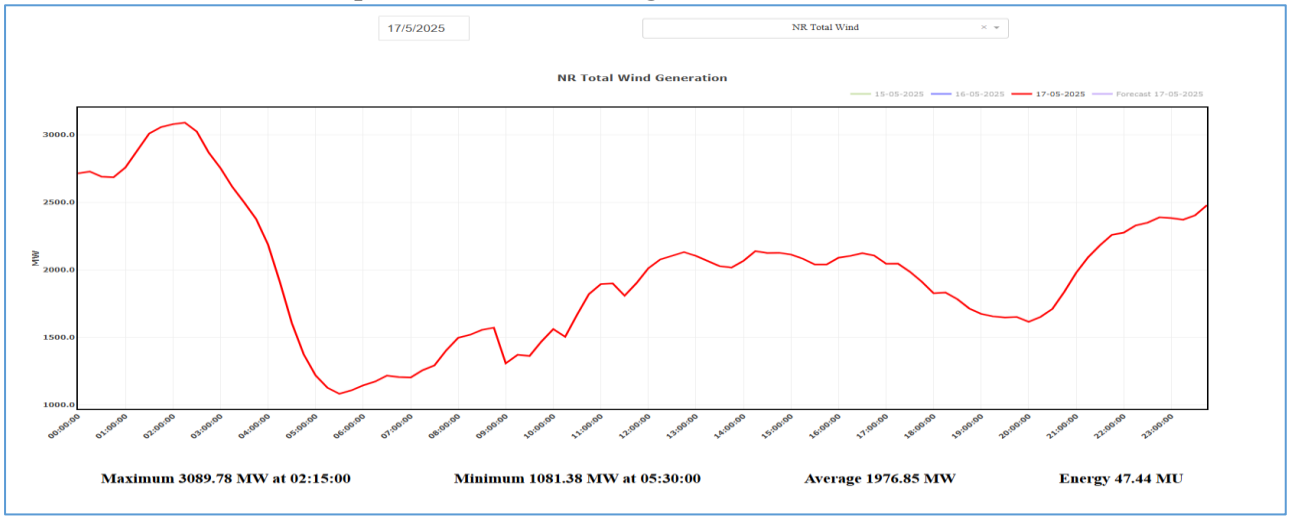
PMU plot of Bus Voltage at 400kV Bhadla-II (PG)_17.05.2025 @10:21:06-10:21:32



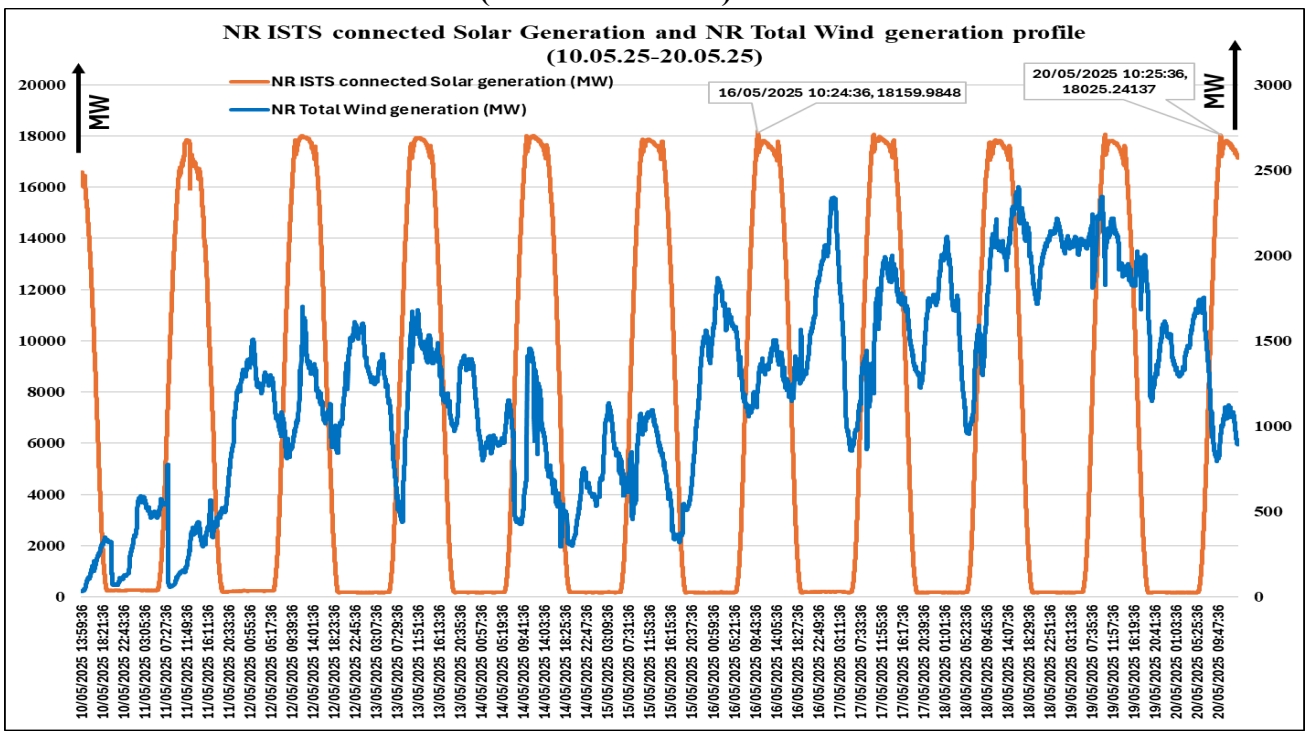
SCADA plot of NR ISTS connected Solar generation for 14.05.2025



SCADA plot of NR Total Wind generation for 17.05.2025



NR ISTS connected Solar Generation and NR Total Wind generation profile (10.05.25 20.05.25)



Observations and Inference:

1) In May'2025, 7 nos. of Oscillation events occurred. Out of 7, 6 nos. of Oscillation events occurred b/w 10:00-10:30hrs and 1 no. of Oscillation event occurred b/w 14:30-15:00hrs.

2) It has been observed that despite negligible total Wind generation (<200MW) on 07.05.25, 10.05.25 and 11.05.25, Oscillations were observed. In 4 Instances of oscillation from 07.05.25-11.05.25, Voltage at 400kV bus was >400kV in 3 instances. Major factor of oscillation was observed as the Low SCR of the RE complex due to Outage of Multiple lines.

3) Maximum amplitude of oscillation in May'25 was observed on 07.05.25 having amplitude of oscillation (Peak-to-Peak) at 400kV Bhadla-II (PG) bus was 52kV (~90kV in 765kV bus). Oscillation died out only after taking STATCOMs in Manual Fixed-Q mode.

4) 7 nos. of Rajasthan Intra-state line were out on 07.05.2025 as mentioned in Table-1. Out of 7 nos., 2 nos. of line (400 KV BHADLA-JODHPUR (RS) line & 400 KV BHADLA-MERTA (RS) line) revived on 09.05.2025.

5) Oscillation of comparatively lesser amplitude having amplitude of oscillation (Peak-to-Peak) at 400kV Bhadla-II (PG) bus was 30kV (~60kV in 765kV bus) were observed in 3 instances from 10.05.25 to 11.05.25. On 11.05.25, 5 nos. of Rajasthan Intra-state line were out as mentioned in Table-1, 1 line i.e. 400 KV Akal-Kankani (RS) line revived on 12.05.2025.

6) On 13.05.25, 14.05.25 and 17.05.25 events of oscillation, Wind generation was on higher side (~1500-1700MW) coinciding with Solar ramping at the time of oscillation.