सत्यमेव जयते

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

संख्या: उ.क्षे.वि.स./ प्रचालन/106/01/2022/ 11858-11899 दिनांक: 07.12.2022

विषय: उत्तर क्षेत्रीय विद्युत समिति की प्रचालन समन्वय उप-समिति की 201वीं बैठक का कार्यवृत |

Subject: Minutes of 201th OCC meeting of NRPC.

उत्तर क्षेत्रीय विद्युत समिति की प्रचालन समन्वय उप-समिति की 201वीं बैठक दिनांक 15.11.2022 को आयोजित की गयी थी। उक्त बैठक का कार्यवृत्त उत्तर क्षेत्रीय विद्युत समिति की वेबसाइट http://164.100.60.165 पर उपलब्ध है। यदि कार्यवृत पर कोई टिप्पणी हो तो कार्यवृत जारी करने के एक सप्ताह के अन्दर इस कार्यालय को भेजें |

201th meeting of the Operation Co-ordination Sub-Committee of NRPC was held on 15.11.2022. The Minutes of this meeting has been uploaded on the NRPC website http://164.100.60.165. Any comments on the minutes may kindly be submitted within a week of issuance of the minutes.

संलग्नक: यथोपरि

Santosh 07/12/22

(संतोष कुमार)
अधीक्षण अभियंता (प्रचालन)

सेवा में,

उ.क्षे.वि.स. के प्रचालन समन्वय उप-समिति के सभी सदस्य

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उत्तर क्षेत्रीय विद्युत समिति की प्रचालन समन्वय उप-समिति की 201वीं बैठक का कार्यवृत्त

201th meeting of OCC of NRPC was held on 15.11.2022 through video conferencing.

खण्ड-क: उ.क्षे.वि.स. **PART-A:NRPC**

1. Confirmation of Minutes

Minutes of 200th OCC meeting was issued on 10.11.2022.

- In regard to agenda No. 7, Uttarakhand representative requested OCC forum that following statement may kindly be inserted after para 7.76:

"Uttarakhand SLDC representative iterated that scheme will not be feasible even Vyasi HEP does not run on continuous basis and also not available round the clock and data for study not available for one year as it has started generation in last week of April'22 and insisted to drop Dehradun as islanding scheme based on discussion with higherups and feasibility report submitted accordingly."

- With regard to Agenda No. 18 (Part B:NRLDC), BBMB requested OCC forum to modify para as mentioned below:

"BBMB representative stated that two machines are under overhauling and other machines are available for synchronous condenser mode of operation "

to be replaced with

"BBMB representative stated that only two machines are available for synchronous condenser operation at Pong Power House due to overhauling of compressors." BBMB informed that any change in regard to status shall be intimated in due course.

OCC confirmed the minutes with above modifications.

2. Review of Grid operations of October 2022

2.1. Anticipated vis-à-vis Actual Power Supply Position (Provisional) for October 2022

Reasons submitted by states for significant deviation of actual demand from anticipated figures during the month of October 2022 are as under:

- **Delhi**

The reason of lower peak demand and energy consumption is due to continuous rainy spells in Oct-2022 and consequently decreased in temperature.

- **Himachal Pradesh**

The Anticipation in Energy Requirement in respect of Himachal Pradesh for the month of October, 2022 came on the lower side due to the following reasons: -

1. Energy Requirements on Diwali, Vishwakarma Day and Bhai-Dooj came out to be very low as compared to anticipated.

2. Also, there was a load shedding of around 2.5 MU during the month of October, 2022 owing to trippings/planned/emergency shutdowns.

- **Haryana**

The variations between actual and anticipated demand and energy consumption for the month of October-2022 is due to low agriculture demand (approx 35% less) & drastic reduction in rural domestic demand observed.

- **Punjab**

It is intimated that actual maximum demand and actual energy requirement are less as compared to anticipated maximum demand and anticipated energy requirement respectively because of less demand of Agriculture in the state of Punjab during month of October 2022.

- **Rajasthan**

It is intimated that actual maximum demand and actual energy requirement are less as compared to anticipated maximum demand and anticipated energy requirement respectively because agricultural load did not pick up as expected.

- **Uttar Pradesh**

Unprecedented high intensity rainfall and certain drop in feel temperature in October 2022 in comparison to October 2021.

- **Uttarakhand**

Due to significant rain in the month of October 2022 as compared to last year and shutdowns for pre-Diwali maintenance caused load shedding, maximum demand in the month of October 2022 was recorded lower than last year and anticipated.

2.2. **Power Supply Position for NCR:**

The Sub-Committee was informed that the NCR Planning Board (NCRPB) is closely monitoring the power supply position of National Capital Region. Monthly power supply position for NCR till the month of October 2022 was enclosed in the agenda and same was discussed in the meeting.

Significant deviation in case of Uttar Pradesh was observed.

3. Maintenance Programme of Generating units and Transmission Lines

The maintenance programme of generating units and transmission lines for the month of December 2022 was deliberated in the meeting on 14.11.2022.

4. Planning of Grid Operation

4.1. **Anticipated Power Supply Position in Northern Region for December 2022**

The updated anticipated Power Supply Position for December 2022 is as below:

State / UT	Availability / Requirement	Revised Energy (MU)	Revised Peak (MW)	Date of revision
CHANDIGARH	Availability	120	270	No Revision submitted
	Requirement	120	270	
	Surplus / Shortfall	0	0	
	% Surplus / Shortfall	0.0%	0.0%	
DELHI	Availability	3108	5450	14-Nov-22
	Requirement	2300	5450	
	Surplus / Shortfall	808	0	
	% Surplus / Shortfall	35.2%	0.0%	
HARYANA	Availability	4390	10640	14-Nov-22
	Requirement	5404	8011	
	Surplus / Shortfall	-1014	2629	
	% Surplus / Shortfall	-18.8%	32.8%	
HIMACHAL PRADESH	Availability	1114	2000	09-Nov-22
	Requirement	1104	1995	
	Surplus / Shortfall	11	5	
	% Surplus / Shortfall	1.0%	0.3%	
J&K and LADAKH	Availability	910	3270	No Revision submitted
	Requirement	1980	2980	
	Surplus / Shortfall	-1070	290	
	% Surplus / Shortfall	-54.0%	9.7%	
PUNJAB	Availability	5160	11390	14-Nov-22
	Requirement	3970	7450	
	Surplus / Shortfall	1190	3940	
	% Surplus / Shortfall	30.0%	52.9%	
RAJASTHAN	Availability	7640	18970	10-Nov-22
	Requirement	9455	16500	
	Surplus / Shortfall	-1815	2470	
	% Surplus / Shortfall	-19.2%	15.0%	
UTTAR PRADESH	Availability	9920	19500	09-Nov-22
	Requirement	9765	19500	
	Surplus / Shortfall	155	0	

State / UT	Availability / Requirement	Revised Energy (MU)	Revised Peak (MW)	Date of revision
	% Surplus / Shortfall	1.6%	0.0%	
UTTARAKHAND	Availability	1215	2250	07-Nov-22
	Requirement	1237	2350	
	Surplus / Shortfall	-22	-100	
	% Surplus / Shortfall	-1.8%	-4.3%	
NORTHERN REGION	Availability	33577	67200	
	Requirement	35335	58800	
	Surplus / Shortfall	-1757	8400	
	% Surplus / Shortfall	-5.0%	14.3%	

5. Submission of breakup of Energy Consumption by the states

5.1. The updated status on the submission of energy consumption breakup is presented below:

State / UT	From	To
Delhi	Apr-2018	Jul-2022
Haryana	Apr-2018	Sep-2022
Himachal Pradesh	Apr-2018	Aug-2022
Punjab	Apr-2018	Aug-2022
Rajasthan	Apr-2018	Sep-2022
Uttar Pradesh	Apr-2018	Jul-2022
Uttarakhand	Apr-2018	Jul-2022

5.2. OCC forum again raised expressed concern on non-submission of energy breakup data by UTs of J&K & Ladakh, and Chandigarh despite repeated reminders.

6. Follow-up of issues from various OCC Meetings - Status update

6.1. The updated status of agenda items is enclosed at ***Annexure-A.I.***

6.2. In 195th OCC, SLDCs were requested to again to coordinate with respective Transmission utilities of states/UT's and submit details about the updated status of Down Stream network by State utilities from ISTS Station (enclosed as ***Annexure-A-I.I***) before every OCC meeting.

7. NR Islanding scheme

7.1. In the meeting (201st OCC), NRPC representative apprised members that a meeting was held on 04.11.2022 through VC to discuss regarding islanding

schemes of HP, Rajasthan and Punjab. The schemes submitted were discussed in detail and states were requested to submit revised scheme as per deliberations in the meeting. Rajasthan and HP has submitted the revised schemes.

7.2. Further, NRPC representative informed members that a meeting was held on 11.11.2022 at NRPC conference hall to discuss regarding proposed revised Delhi islanding scheme submitted by DTL, wherein it was decided that Delhi DISCOMS may submit additional load details, if any, latest by 18.11.2022 and Delhi will submit final scheme by 25.11.2022. He highlighted that average generation of 300 MW has been agreed upon for revised Delhi islanding scheme.

7.3. OCC members were apprised details of revised schemes submitted by HP and Rajasthan in line with discussion held in meeting dtd. 04.11.2022. Regarding UFR at identified reactor locations in islanding scheme, Rajasthan was requested to keep it as blocked until communication project is commissioned.

7.4. Further, members were also apprised regarding scheme submitted by Punjab and corrections highlighted in the meeting held on 04.11.2022. Punjab was requested to submit revised scheme with minor corrections at the earliest for deliberation in upcoming NRPC meeting.

7.5. Accordingly, OCC approved islanding schemes of Punjab, Rajasthan and HP. It was decided to put up these 3 schemes for approval of NRPC.

8. Coal Supply Position of Thermal Plants in Northern Region

8.1. In the meeting, NRPC representative apprised the forum about the coal stock position of generating stations in northern region during current month (till 10th November 2022).

8.2. Average coal stock position of generating stations in northern region, having critical stock, during first nine days of November 2022 is as follows:

Station	Capacity (MW)	PLF % (prev. months)	Normative Stock Reqd. (Days)	Actual Stock (Days)
ANPARA C TPS	1200	73.25	14	1.7
GOINDWAL SAHIB TPP	540	32.09	22	0.6
KOTA TPS	1240	71.17	22	2.6
OBRA TPS	1094	61.05	22	2.3
PARICHHA TPS	1140	52.09	22	2.4
PRAYAGRAJ TPP	1980	78.01	22	1.8
ROSA TPP Ph-I	1200	64.37	22	2.5
SURATGARH TPS	1500	32.74	22	3.3

Station	Capacity (MW)	PLF % (prev. months)	Normative Stock Reqd. (Days)	Actual Stock (Days)
TALWANDI SABO TPP	1980	51.98	22	4.0
CHHABRA-I PH-1 TPP	500	71.31	22	1.2
CHHABRA-I PH-2 TPP	500	39.67	22	0.8
CHHABRA-II TPP	1320	59.10	22	1.1

8.3. In the meeting, above mentioned generating stations were requested to take adequate measures.

9. Format for data submission of RE generation loss events to "Technical Committee under the chairmanship of Member (GO&D), CEA" (Agenda by NRLDC)

9.1. In the meeting, NRPC representative presented the matter to the forum and intimated forum that NRLDC vide mail dated 09.10.2022 has mentioned that in view of the recurrence of RE generation loss in Rajasthan RE complex of Northern Region and its further investigation, a Committee has been constituted by Chairperson, CEA, under the chairmanship of Member (GO&D), CEA.

9.2. NRLDC representative mentioned that in this regard format (Annexure-A.III.a attached in 201st OCC agenda) has been circulated to all RE generators in Rajasthan region on 09.11.2022 for submission of data/information/implemented settings for the following events of RE generation loss in NR.

a. ~3485MW on 09.07.2022 at 13:42 hrs.
b. ~6157MW on 11.08.2022 at 11:23 hrs.
c. ~3800MW on 11.09.2022 at 12:22 hrs.

9.3. NRLDC representative explained the above cited format to the OCC forum members.

9.4. OCC forum noted the same.

10. Proposed SPS for Grid stability through load shedding from various sub-stations in Kumaon region (Agenda by PTCUL)

10.1. PTCUL presented to the OCC forum the proposed SPS logic for grid stability through load shedding from various sub-stations in Kumaon region.

10.2. NRLDC representative discussed the cases put up by the PTCUL in the proposed SPS. PTCUL representative submitted that the scheme has also been discussed with the NRLDC.

10.3. PTCUL representative informed forum that the Kashipur area (Kumaon) has connectivity from different areas and some of the feeders are being kept open in real-time operation and accordingly SPS has been proposed.

10.4. CGM(I/C), NRLDC stated that PTCUL needs to make sure that SPS scheme is effective for both generation scenarios, when gas generation at Shravanti and Gamma Infra are available and also when the gas generation is not available.

10.5. Further, CGM (I/C) NRLDC has mentioned that it also needs to be ensured that there is no overloading in intrastate line when SPS operates. Moreover, it was requested that the lines/feeders that are normally kept open; may be separately intimated to NRLDC so that the necessary changes are also incorporated in NRLDC base case for performing simulation studies.

10.6. OCC forum approved the above cited SPS scheme subject to compliance of above stated NRLDC observations.

11. Issues faced by SJVN Hydro Power stations due to increased silt, cloud burst etc. (Agenda by SJVN)

11.1. In the meeting, SJVN representative presented the matter to the OCC forum. SJVN representative requested that existing Joint Protocol signed during the year 2012 for shut down of KWHPS, NJHPS and Rampur HPS may be reviewed, so that NJHPS can take its own decision for shutdown on the basis of silt level at its intake and other upstream locations as may be decided.

11.2. Further, SJVN representative stated that reviewing the existing Joint Protocol for improved co-ordination between hydro power stations of KWHEP, NJHPS and Rampur HPS during high silt conditions is required to discuss with OCC members to safeguard the generating plants in long run, to avoid spillage of water and penalty on account of DSM charges.

11.3. MS, NRPC opined that on the cited matter; a separate detailed deliberation may be done among the officials of NRPC, NRLDC, SLVN & KWHP and thereafter, outcome of that deliberation may be brought to the OCC forum.

12. Frequent trippings in 220kV Baghpat – Sambhli and 220kV Baghpat – Mandola transmission lines of UPPTCL. (Agenda by Powergrid, NR-1)

12.1. In the meeting, NRPC representative informed OCC forum that Powergrid, NR-1 vide letter dated 07.11.2022 (copy attached as Annexure-A.VI of agenda) has intimated that frequent trippings in 220kV Baghpat – Sambhli and 220kV Baghpat – Mandola transmission lines of UPPTCL has been observed since last ~~2 1/2~~ two and half years.

12.2. Further, Powergrid NR-1 apprised forum that their team carried out the patrolling of 220kV Baghpat-Shamli transmission line and its observations are as follows:

- Presence of Brick kiln near the tower. Since in this line porcelain insulators are being used, therefore there is high probability of insulators getting polluted causing tripping/ auto-reclose of line.
- Infringement of trees were observed below the line, thereby reducing the required clearance from ground.
- Electrical clearance at Powerline crossings were found to be insufficient, which might be one of major reason for tripping / auto-reclose of line.
- Also, Earthwire sag was found more than the required limit.
- Bird Nest were found at crossarm on many locations.

12.3. In view of the above, OCC forum asked UPPCL to carry out the joint patrolling with Powergrid of both 220kV Baghpat-Shamli line and 220kV Baghpat-Mandola line and rectify the observed defects to ensure the stability and healthiness of both Grid and Baghpat GIS.

13. Tanda Stage#2 Unit#6 (660MW) Revival from RSD dated 22.10.2022 (Agenda by NTPC)

13.1. In the meeting, NTPC representative presented the matter to the forum.

- Both Units of Tanda stage-2 (660MWX2) were under reserve shutdown from 07-Oct-2022, 23:00 Hrs.
- On 20-Oct-2022 at 21:46 hrs communication was received from NRLDC regarding revival of one St-2 Units by 16.00 Hrs of 21.10.2022. (As per AS1 form attached as Annexure-A.VII of agenda, revival time of Tanda St-2 Unit from cold start is 35 Hrs (when 2nd stage#2 Unit is running) and 48 Hrs when both Units are under s/d).
- Accordingly, Unit#6 was synchronized at 18:00 Hrs of 22.10.2022
- Another communication received from NRLDC regarding reserve shutdown of above Unit at 22.56 Hrs on 22.10.2022 with immediate effect.
- Unit was taken off bar at 01:57 Hrs on 23.10.2022.
- Approximately 300 KL of Secondary fuel is consumed during Cold start-up of super critical Machines.
- Better demand projection can reduce precious national reserve.

13.2. UPSLDC representative intimated OCC forum that unit was revived on the request of beneficiary and subsequently sent to RSD as per the request of beneficiary.

13.3. MS, NRPC opined that in future suitable care may be taken that upon revival of machine from RSD sufficient schedule may be given and it may not be sent to immediate RSD to avoid the wastage of precious national reserve.

14. Additional Agenda No.1: Proposed SPS for 400/220KV ICTs at RVPN's 400KV GSS Bhadla (Agenda by RRVPN)

14.1. NRPC representative intimated forum that as per the discussion in 197th OCC meeting, RRVPN vide letter dated 15.11.2022 (copy enclosed as Annexure-A.II) have submitted simulation study of the proposed SPS for 400/220 kV ICT's at RVPN's 400kV GSS Bhadla for analysis. Schematic diagram, load details and results of load flow study are attached in Annexure-A.II.

14.2. RRVPN representative presented the proposed SPS logic to the forum.

14.3. NRLDC representative mentioned that they will study the abovesaid SPS logic and thereby submit its observation within one week.

14.4. MS, NRPC intimated forum that after receiving the comments of NRLDC, a meeting would be conducted among the officials of NRPC, NRLDC and RRVPN and thereafter the proposed SPS schemes of Rajasthan would be presented in the upcoming NRPC meeting.

खण्ड-ख: उ.क्षे.भा.प्रे.के. **Part-B: NRLDC**

15. NR Grid Highlights for October 2022

NRLDC representative highlighted following points related to NR grid operation for Oct 2022:

- Maximum energy consumption of Northern Region was **1332 MUs** on 04th October'22 and it was 7.6 % higher than October' 2021 (1238 Mus 12th October'21)

- Average energy consumption per day of Northern Region was **1081 MUs** and it was 1 % higher than October'21 (1070 Mus per day)

- Maximum Demand met of Northern Region was **60710 MW** on 01st October'22 @20:00 hours (*based on data submitted by Constituents)* as compared to 57491 MW on 12th October'21 @13:00 hours.

Northern Region all time high value recorded in October'22:

	All Time High Record		Previous Record (upto September-22)	
Solar Generation	**Value**	**Achieved on**	**Value**	**Achieved on**
	124.79mu	03-10-2022	121.81mu	03-09-2022

Maximum daily mu penetration of RE	15.90%	25-10-2022	14.72%	25-09-2022
Maximum instantaneous penetration of RE in MW	42.96%	25-10-2022	37.53%	25-09-2022

Frequency Data

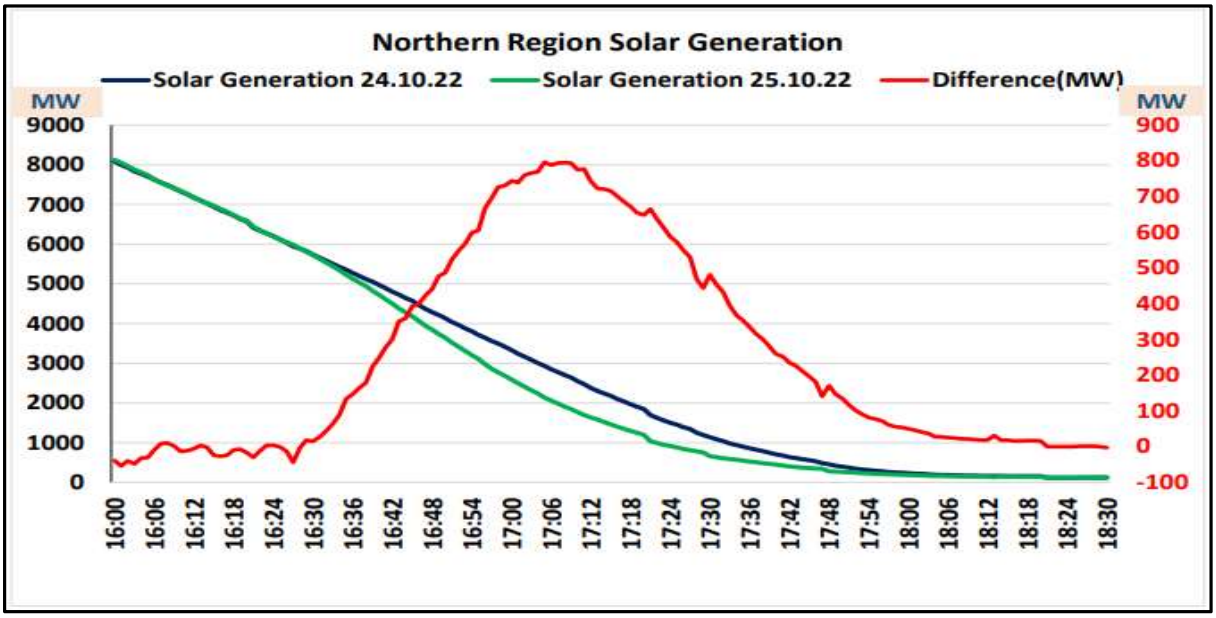
Month	Avg. Freq. (Hz)	Max. Freq. (Hz)	Min. Freq. (Hz)	<49.90 (% time)	49.90 – 50.05 (% time)	>50.05 (% time)
Oct'22	50.01	50.41	49.53	4.9	78.3	16.9
Oct'21	49.99	50.29	49.50	11.1	74.4	14.5

Detailed presentation as delivered by NRLDC representative is attached as Annexure-B.I.

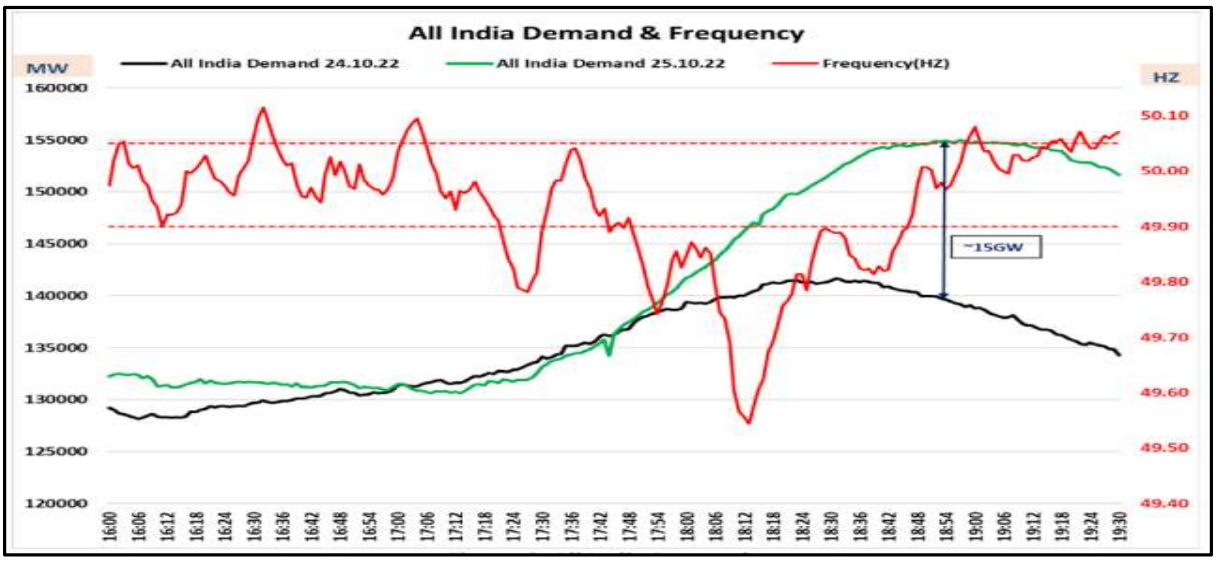
Grid operation on Solar eclipse on 25.10.2022:

NRLDC representative highlighted following points related to solar eclipse:

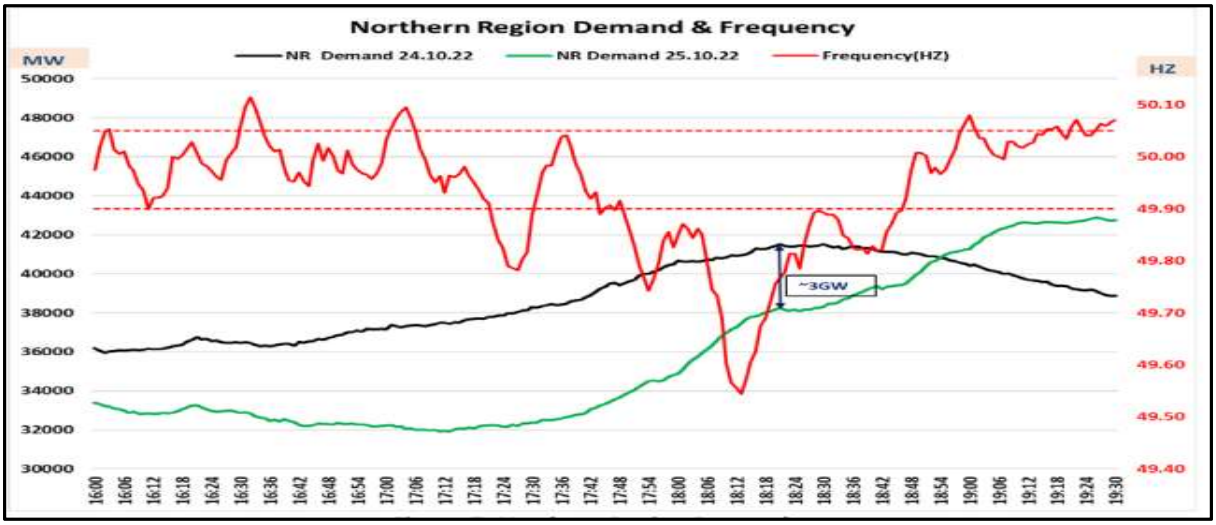
Solar generation started reducing from 16:40 Hrs and maximum reduction in solar generation was approximately 800 MW at 17:11 hrs w.r.t day before (24.10.2022) trend.



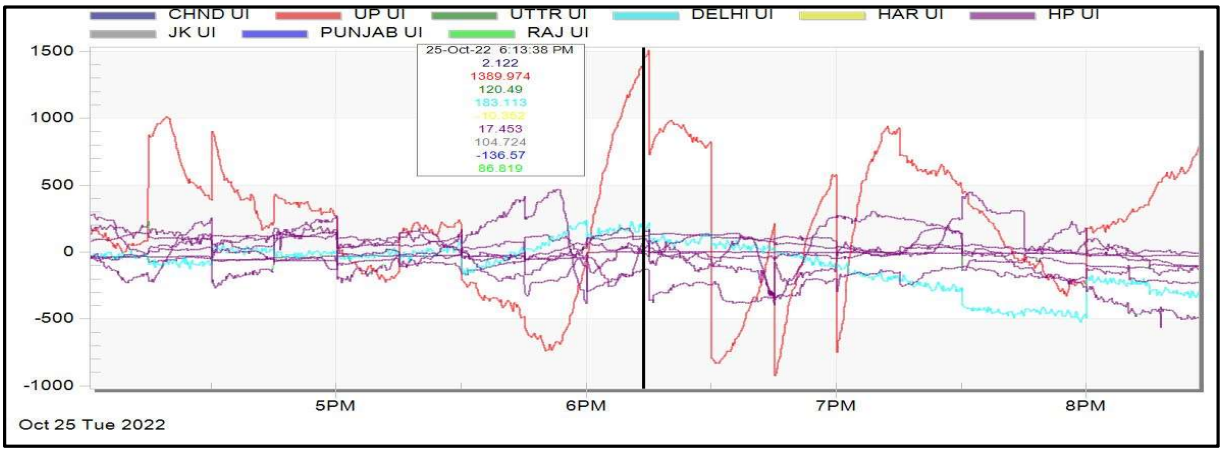
The All India demand was approximately 4 GW higher at 16:00 hrs than day before (24.10.2022) demand and at peak it was higher by 15 GW.



NR demand was approximately 5000 MW less than day before (24.10.2022) demand at 16:00 hrs and at peak also it was less by 3000 MW.



Some of the NR states had overdrawl just after the eclipse was over due to increased demand.



Overdrawl of NR states were:

UP: 1400MW, Uttarakhand: 120MW, Delhi: 180MW, J&K: 100MW, Rajasthan: 90MW at the instant when frequency dipped to 49.53 Hz.

NRLDC representative also shared that similar low frequency operation of grid occurred during Lunar eclipse on 08th November'22.

Major key learnings from above were shared :

- During the evening peak time, the actual demand was higher that day ahead forecast by 14,000 MW and higher than real time forecast by 9000MW.
- There was fast ramping during evening peak hours in All India demand than expected, this could not be complemented by sufficient ramp in generation.

It was stressed that the increase in demand after an eclipse event needs to be taken care in future and appropriate ramp in generation resources also need to be provided both at intrastate as well as interstate generating stations. Facilities of ADMS needs to be expedited by all states to prevent such low frequency operation of grid. Delhi state and Noida are having ADMS operational and were asked to submit information on load reduction for the above event.

Further utilities were requested to go through GRID-INDIA's report of previous solar eclipses (grid-india.in ->Publication) to gain more insight into operation planning during eclipses.

OCC members noted the above and agreed to take necessary actions in future.

16. Winter preparedness

NRLDC representative stated that in 199 & 200 OCC meetings, it was deliberated that winter in Northern region is likely to start from mid of October till February end, and the challenges faced during these months were also deliberated in the meeting. Following issues still persist related to winter preparedness measures:

a. <u>Plan for high voltage management at SLDC level:</u>

In 200 OCC meeting, all states were requested to prepare and share high voltage management plan for winter months with NRPC/ NRLDC. It was further communicated to all stakeholders with NRLDC letter dated 14th November'22. It was discussed that such plan would include instructions with their priority (graded response) to manage high voltage during winter months including pre-maintenance activities.

In 200 OCC meeting, MS NRPC stated that such plan developed by states should be readily available with NRLDC as well as SLDC control room officials so that effective voltage control is possible during winter months and real-time operator at SLDC as well as RLDC end are aware of the actions to be taken.

In 201 OCC meeting, utilities were further requested to include below points in the above action plan:

i. Reactive power resources available for voltage control.
ii. Synchronous condenser mode of operation of generating units.
iii. Monitoring of reactive power performance of state generators.

iv. Confirmation that O/V settings of lines and O/F settings of Transformers are as approved by NRPC.

All states were asked to submit low voltage management plan.

States agreed to provide the updated plan by 30th Nov 2022.

b. <u>Synchronous condenser operation</u>:

In 201 OCC meeting, following was discussed with respect to synchronous condenser mode of operation:

- Punjab representative stated that on 3rd and 4th November'22, Unit 3 of RSD was successfully tested on synchronous condenser mode of operation and was capable of absorbing 60 MVAR. Further Unit 1 and Unit 4 are also have the similar capability to run on synchronous condenser mode but their testing is to be done.
- NRLDC representative requested Punjab to expedite their testing and explore the possibility of running more than one machine simultaneously on synchronous condenser mode of operation.
- NRLDC representative asked SLDC HP about the progress of taking Larji HEP under synchronous condenser mode of operation during high voltage period.
- HP representative and Larji representative stated that the machines of Larji HEP are SCO (Synchronous condenser operation) compliant but since commissioning, testing to run on synchronous condenser mode of operation has not been done. Around three years back during testing the trial was not successful due to issue with hardware logics/protection. The same was taken up with BHEL and it has been informed that during capital maintenance of units it will be addressed as the SCMO system was lying idle since long.
- NRLDC representative asked HP/Larji for the reports for the failed trial run of Larji units conducted three years back. Further it was asked to submit action taken by Larji HEP to make available their units for Synchronous condenser mode of operation to NRPC/NRLDC so that same could be taken up in upcoming Board meeting of NRPC.
- NRLDC representative apprised that Forum that 2 machines of BBMB Pong will be available for Synchronous condenser mode of operation.
- NRLDC representative asked NHPC to apprise about the Units of Chamera-2 for SCMO.

NHPC could not provide update on synchronous condenser mode of operation.

c. <u>ICT Tap Optimization at 400kV:</u>

NRLDC has identified few 400/220kV nodes where it seems that there is need for tap change exercise. The analysis has been done based on the SCADA data of October month available at NRLDC. Following 400/220kV nodes have been identified for tap change exercise:

- **Increase by 2 steps:**
  - 400/220kV Sonepat
  - 400/220kV New Wanpoh
  - 400/220kV Daultabad
  - 400/220kV Nuhiyawali
  - 400/220kV Dhuri

Scatter Plots are attached as **Annexure-B.I** of agenda. Same exercise needs to be carried out by SLDCs at 220kV & below levels.

OCC forum agreed to carry out the proposed tap changes.

Utilization of line reactors as bus reactor:

NRLDC representative stated that to ensure that line reactors are available even after opening of lines are optimally utilized it is necessary that updated details of all the stations where the provision of using line reactors as bus reactors exist, is available at all control centers. The Reactive power document being compiled by NRLDC has the details of all such line reactors. Last updated document is available at NRLDC website under documents section:

https://nrldc.in/download/nr-reactive-power-management-2022/?wpdmdl=9908

All utilities were once again requested to go through the document and report if any incorrect or missing information is noticed. The document is being utilized in real-time operation by control room operators at NRLDC, and thus it is necessary that list of all reactors where such provision is available are updated in the document.

d. Insulator cleaning and replacement of damaged insulators/ porcelain insulator with polymer insulators

As discussed in the 199th and 200th OCC meeting, Northern Regional power transmission lines are exposed to the high pollution levels along their routes. Such pollution levels with the onset of the winter season, lead to the frequent tripping and finally to breakdown and long outages of the transmission lines. These outages make the grid weak, thereby endangering the grid reliability and security.

Therefore, in order to avoid/mitigate tripping of lines during foggy (smog) weather in winter season, preventive actions like cleaning/washing of insulators, replacement of conventional insulators with polymer insulators have been recommended and are being taken every year.

This being a regular activity, all the transmission licensees in the Northern Region are being requested in monthly OCCM to update line wise data for insulator replacement and cleaning in the format attached as Annexure-B.II of agenda.

Concerned transmission licensees are requested to provide the updated status of cleaning/washing of insulators, replacement of conventional insulators with polymer insulators works being done at their end.

It has also been once again requested vide NRLDC mail dated 09.11.2022 and letter dated 14.11.2022 to provide the latest status.

NRLDC representative stated that Punjab and HP have submitted the above details. PG NR-3 have submitted the data regarding the ongoing work of insulator replacement but the details of work already completed is still awaited.

Utilities were requested to share the latest status by 30th November'22.

NRLDC representative also presented list of lines which had frequently tripped from 21:00 hrs to 0900hrs during 12 Dec 2021- 12 Jan 2022 so that maintenance of the above lines may be taken on priority for insulator washing/insulator replacement work.

It was assured to all utilities that Shutdowns for the purposed of insulator cleaning/ insulator replacement with be prioritized as far as feasible and based on real time grid condition.

NRLDC representative presented the list of ICTs tripped on O/F protection operation for the period Oct'21-Mar'22 and requested concerned utilities to investigate the root cause of their tripping and take necessary actions to prevent further tripping on O/F protection by November'22 end. It was also requested to assure that the O/F and O/V tripping settings is as per NRPC philosophy.

17. TTC/ATC of state control areas for winter 2022

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

Based on feedbacks received till date, SLDCs were requested to go through the tentative ATC/TTC limits for December 2022 (Annexure-B.III of agenda) and provide comments. If no comments are received, these limits will be assumed confirmed and uploaded on NLDC website. SLDCs were also requested to upload these limits in their respective websites. States were also requested to regularly provide update regarding the upcoming transmission elements which would improve import capability of respective state control area.

Loading of 400/220kV ICTs and important 220kV lines observed above or close to N-1 contingency limits is also attached as Annexure-B.IV of agenda.

Punjab

Punjab SLDC was requested to share:

- ATC/TTC limits for low demand period i.e. winter months based on anticipated state generation scenario.
- Plan to control high voltages during winter months including list of 220kV lines that are being kept open continously during winter months

Punjab SLDC representative agreed to provide the details through mail.

UP

UP SLDC to provide update on:

- ATC/TTC limits for low demand period i.e. winter months based on anticipated state generation scenario.
- Status of Obra and Sohawal SPS

UP representative stated that testing of SPS of Sohawal is completed and will be operational in 2-3 days. Regarding SPS of Obra, order has been placed to Seimens and work will be completed within 30 days.

Rajasthan

Rajasthan SLDC agreed to submit SPS details for 400/220kV ICTs at Bhadla and Bikaner with 2-3 days.

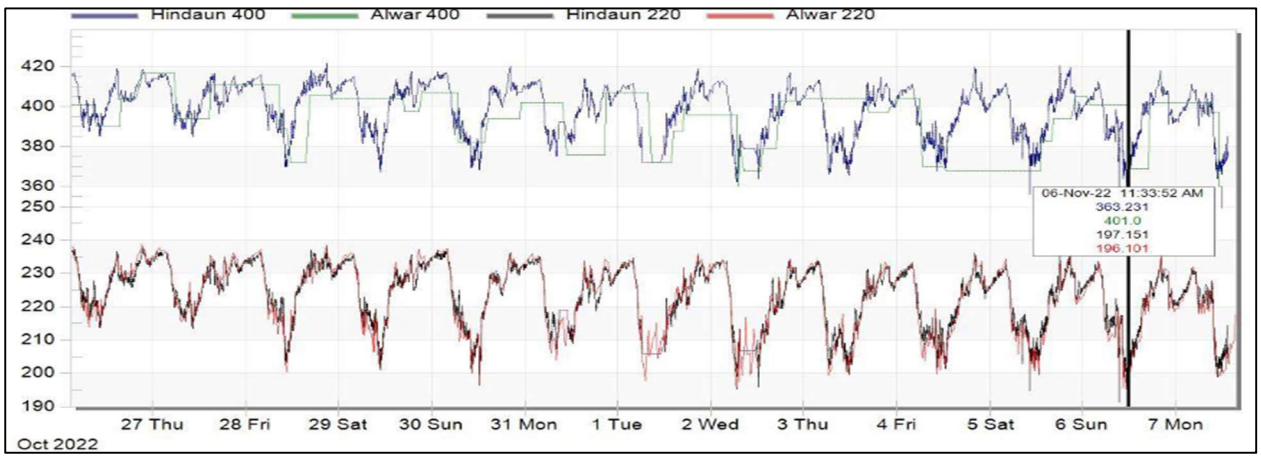
NRLDC representative asked Rajasthan to explore the need for SPS on ICTs at Bhinmal and Bhilwara.

Rajasthan SLDC submitted that to control the overloading of 220kV Lines in their control area, certaing lines feeding 132kV GSS in radial mode may be opened as per real time system conditions. NRLDC representative requested Rajasthan to share the details of the same so that the same can be simulated.

NRLDC representative further apprised that loading of 400/220kV ICTs is remaining very high since last two weeks (under import of 6500-7000MW), therefore, it was requested that loading of 400/220kV ICTs may be kept below their N-1 contingency limits and at places where SPS is installed, loading needs to be such that SPS relief is able to manage loading within safe limits in case of N-1 contingency.

Plots showing loading of highly loaded 400/220kV ICTs such as Jodhpur, Merta, Ajmer, Chittorgarh, Bikaner, Bhilwara, Bhinmal along with their N-1 contingency limits is attached as Annexure-B.IV of agenda and were presented in the meeting. It is to be noted that as per information available with NRLDC, there is no SPS at 400/220kV Bikaner, Bhinmal and Bhilwara ICTs and therefore loading of these ICTs needs to be below their N-1 contingency limits.

As per the data available at NRLDC, it can be seen that voltages at 400kV Alwar and Hindaun are getting low even below 360kV during the day-time since last few days.



NRLDC representative requested Rajasthan to provide present tap settings of 400/220kV Hindaun and Alwar ICTs & other 220/132kV ICTs and below voltage level ICTs for underlying network at Hindaun and Alwar (if they are not an nominal position) for study purposes.

It was apprised that Hindaun is connected with 400kV lines from Heerapura and Chhabra and as per simulation studies, if any one of these lines trip (N-1 contingency), the 400kV voltages would further fall by 15-20kV, thereby further degrading the voltage profile in that area.

It was requested to keep restricted drawl of Hindaun and Alwar loads so as to maintain voltages within the IEGC band and supply any agricultural load such that demand pattern of this area is predominantly stable and not very high during certain hours.

Rajasthan SLDC stated that DISCOM has been instructed to stagger load at Hindaun and Alwar to maintain stable demand profile and the above communication shall be shared with NRPC/NRLDC.

Delhi

Delhi SLDC was requested to share:

- Plan to control high voltages during winter months
- Status of commissioning of reactors.

In 200 OCC meeting, Delhi SLDC agreed to share the updated status and high voltage management plan through mail. However, it is still pending.

In 201 OCC meeting, Delhi representative stated that undergroud cables are opened as and when required during high voltage scenario. Further ICT tap positions are optimized to minimize high voltages.

NRLDC representative again requested Delhi to share the detail action plan of Delhi.

Delhi SLDC agreed for the same.

Haryana

Haryana SLDC was requested to provide update on:

- ATC/TTC limits for low demand period i.e. winter months based on anticipated state generation scenario.
- Plan to manage loading of 400/220kV Deepalpur and Panipat ICTs.
- Plan to control high voltages during winter months

In 200 OCC meeting, Haryana SLDC agreed to share the updated status and high voltage management plan through mail. However, it is still pending.

In 201 OCC meeting, Haryana representative agreed to submit the above data in 7-10 days to NRPC/NRLDC.

Uttarakhand

Uttarakhand SLDC representative visited NRLDC to finalise SPS for 400/220kV Kashipur and 220kV CBGanj-Pantnagar line as there were some issues regarding SPS scheme which needed to be discussed.

During last 30 days, loading was close to N-1 contingency limits of 400/220kV ICTs at Kashipur when import of Uttarakhand was close to their ATC limits.

Uttarakhand SLDC representative stated that revised SPS scheme has been mailed to NRLDC on 17.10.2022. NRLDC has provided their comments vide mail dated 02.11.2022 with request for slight modifications and submission of logic to NRPC and was discussed in NRPC Agenda no 10 in 201 OCC meeting.

HP

HP SLDC was requested to provide update on:

- Revised ATC/TTC limits of HP state control area for winter 2022-23.
- Switchgear capacity augmentation at Nallagarh (220kV) for 220kV Nallagarh-Upernangal line.

HP representative agreed to submit the above data in 7-10 days to NRPC/NRLDC.

J&K

NRLDC representative apprised the forum that loading of 400/220kV Amagarh ICTs was close to N-1 contingency limits for last 30 days due to increased drawl of state (~2400 MW) during lean hydro season.

It was further stated that J&K is not assessing its ATC. J&K representatives had intimated during 47th TCC and 49th NRPC meeting that they would be sharing ATC/TTC assessment with NRLDC from October 2021, however the same is still awaited.

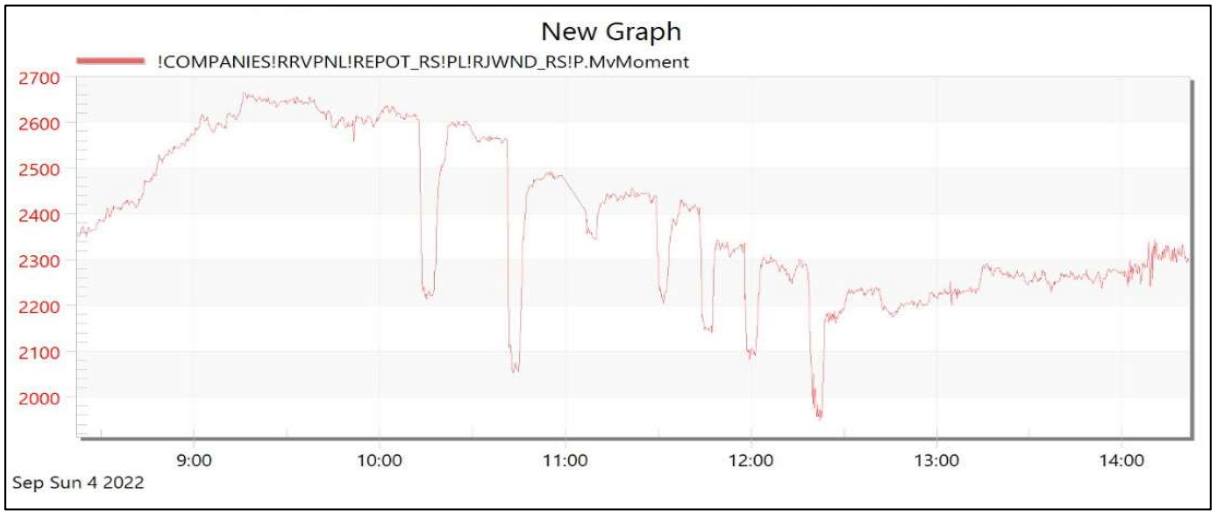
J&K and Ladakh U/Ts are once again requested to advise the concerned officers to evaluate their ATC/TTC limits in coordination with NRLDC and share latest assessment with NRLDC and NRPC. ***J&K officers may also take online/ offline assistance from NRLDC officers if required.***

It was again requested that SLDCs may ensure that loading of ICTs and lines are below their N-1 contingency limits. While requisitioning power from various sources, states should take care to limit their scheduled drawl as well as actual drawl in real time within the Available Transfer Capability (ATC) limits assessed by SLDC and NRLDC. NRLDC is continuously sending emails in real-time for ensuring N-1 compliances as well as restricting schedule till ATC limit and maximizing internal generation. SLDCs need to ensure this during real-time operation.

18. Grid operation related issues

(i) Wind generation fluctuation in Rajasthan control area

NRLDC representative apprised that various dips were observed in Rajasthan wind generation between 10:10 hrs to 12:30 hrs in the tune of 200 MW to 500MW on 4th September 2022. During this time huge variations in voltage were also observed in RE pooling substations of Rajasthan state control area such as Jaisalmer, Ramgarh, Bikaner and Bhadla.



In 200th OCC meeting, Rajasthan SLDC representative informed that some of the wind developer such as those having SUZLON machines are manually tripping their units when voltages are getting below 0.9 p.u.. MVAR drawl by solar generators, wind generators and load is coinciding which is leading to severe low voltages especially in Western Rajasthan pockets. NRLDC representative requested that SUZLON may be asked to furnish the reason for manually tripping their units and a separate meeting with Rajasthan SLDC, NRLDC, NRPC and wind developers may be convened.

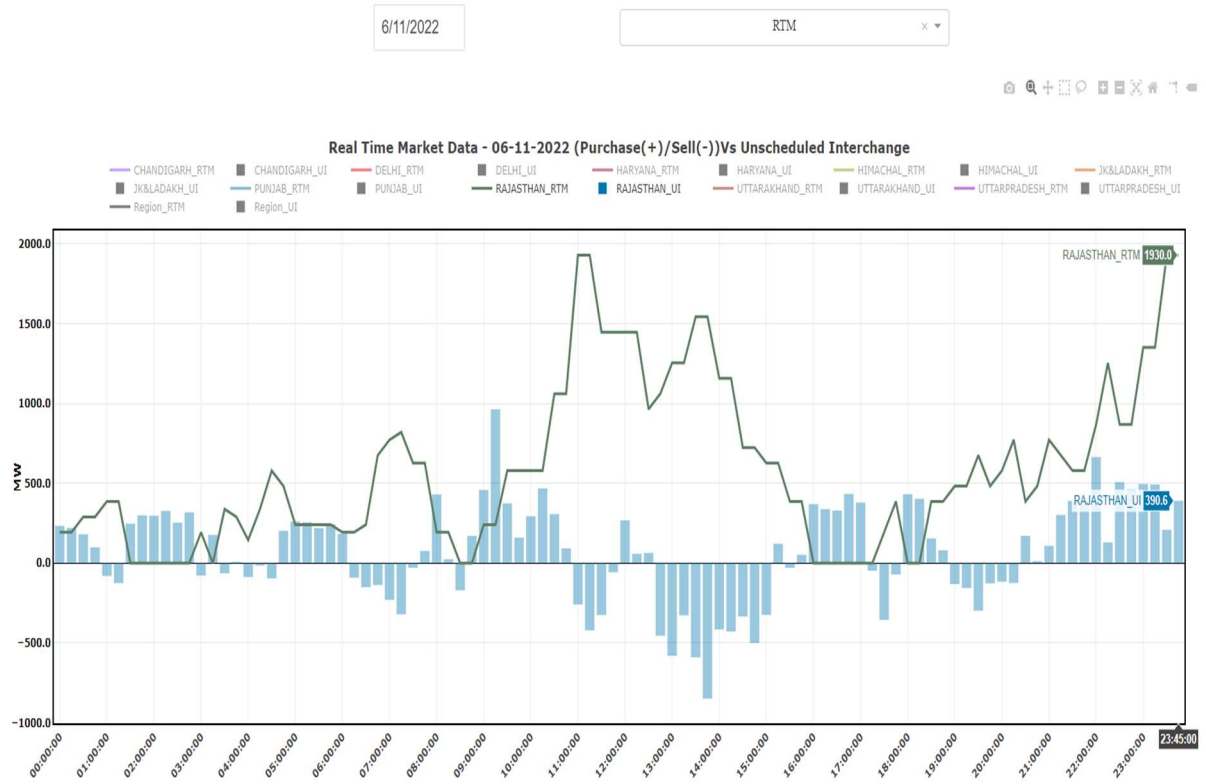
In 201st OCC meeting, Rajasthan SLDC representative stated that SUZLON have agreed for online meeting on 21.11.2022. Rajasthan SLDC agreed to send link for the meeting to NRPC/NRLDC.

(ii) Generation outage in Rajasthan control area and over-drawl from Grid

NRLDC representative stated that there have been outages of Rajasthan internal thermal generation in the range of 3000MW (about 27.5% of total internal generation (thermal+gas) of Rajasthan). Status of generating unit ouatge in Rajasthan state as on 10.11.2022 was presented in the meeting:

S. No.	Station	Unit No	Capacity (MW)	Reason(s)	Outage (Time & Date)	
1	Dholpur GPS	1	110	Reserve Shutdown (Non availability of domestic gas & NIL requisition by Rajasthan in RLNG and Spot Gas).	05:48	25-08-2020
2	Dholpur GPS	2	110	Reserve Shutdown (Non availability of domestic gas & NIL requisition by Rajasthan in RLNG and Spot Gas).	00:35	05-12-2020
3	Dholpur GPS	3	110	Reserve Shutdown (Non availability of domestic gas & NIL requisition by Rajasthan in RLNG and Spot Gas).	00:40	05-12-2020
4	Shree Cement (IPP) TPS	2	150	Shutdown due to Commercial reason	16:27	25-10-2022
5	Shree Cement (IPP) TPS	1	150	Shutdown due to Commercial reason	23:55	31-10-2022
6	Ramgarh GPS	2	38	Due to fire accident in GT - 2	01:17	04-06-2022
7	Suratgarh TPS	1	250	Stator earth fault	18:24	30-06-2022
8	Kota TPS	3	210	Due to problem in seal oil flow of generator.	23:44	08-08-2022
9	Kalisindh TPS	1	600	For ID fan 1B motor & Fan bearing replacement work & internal checking of ESP	22:19	01-11-2022
10	Barsingsar (NLC)	1	125	Due to suspected refractory failure.	20:20	02-11-2022
11	Kalisindh TPS	2	600	Due to chocking of Ash hoppers and overfilling of ESPs.	00:05	05-11-2022
12	Suratgarh TPS	6	250	Due to Furnance Pressure High.	06:33	05-11-2022
14	Rajwest (IPP) LTPS	1	135	Bed Material Leakage.	06:03	08-11-2022
15	Suratgarh TPS	4	250	Due to steam leakage in the superheater drain Line	07:14	08-11-2022
Total Outage (MW) :			3088			

Due to large no. of generating unit outages, Rajasthan has been resorting to over-drawl from the Grid to the tune of 400 to 1100MW, higher purchase from RTM in the range of 400 to 1900MW and Load shedding in the range of 1.5 to 9 MU daily. Moreover, N-1 loading violations of ICTs at number of 400/220kV sub-stations such as Bhinmal, Ajmer, Merta has been observed.



Details of Load Shedding by Rajasthan:

Sr. No.	Date	Daily Load Shedding (MU)
1	05-11-2022	0.53
2	06-11-2022	1.62
3	07-11-2022	5.86
4	08-11-2022	9.18
5	09-11-2022	4.13

The Grid frequency has been remaining below 49.90Hz (lower operational band) for considerable time for the last few days. Such low frequency operation is threat to the system security.

The details of Grid frequency remaining below 49.90Hz (lower operational band), minimum frequency of the day, and maximum MW over-drawl by Rajasthan (based on 5 minutes' average telemetered data for the last few days) is given below:

Date	Max. Over-drawl (MW)	Total Daily Deviation (in MU)	Minimum Frequency of the Day (Hz)	% of time frequency below 49.90Hz (lower operational band)
06-11-2022	1165 MW	2.08	49.71Hz at 12:58Hrs	7.2%
07-11-2022	901 MW	2.27	49.77Hz at 16:52Hrs	11.6%

08-11-2022	866 MW	2.11	49.44Hz at 18:30Hrs	8.3%
09-11-2022	618 MW	2.99	49.71Hz at 13:44Hrs	5%

Such large deviations from schedule are to be avoided to maintain system security.

During high demand, the prices in power exchange may increase and at times power is unavailable in real time market. Thus too much reliance on RTM could be avoided specially during high demand period.

As per Indian Electricity Grid Code (IEGC) clause 5.3 to balance their portfolio in operational planning as well as real-time operation as per clause no. 5.4.

Therefore, it was requested that portfolio of Rajasthan state control area shall be balanced in both operational planning as well as real-time operation by initiating required control by state authorities.

Rajasthan representative agreed to share the steps taken for the same to NRPC/NRLDC.

(iii) MVAR support from generators

During winter season, demand of Northern region is low and high voltages are a common phenomenon predominantly in Punjab, Haryana and Delhi area. Even after several actions being taken by control centers, it is seen that there is persistent high voltage in Northern region. The reactive power absorption by generators becomes an important resource that helps in managing high voltages in the grid. However, even after continuous follow up in OCC meetings, it is seen that MVAR data telemetry is poor/ inaccurate from most of the generating stations. For some of the generators it is seen that there is inadequate reactive power absorption based on their capability curve especially during night hours. The performance of generators in absorption of reactive power for last 30 days (12 Oct 2022 – 10 Nov 2022) is shown below:

S.No.	Station	Unit No.	Capacity	Geographical location	MVAR capacity as per capability curve (on LV side)	MVAR performance (-) Absorption (+) Generation (HV side data)	Voltage absorption above (in KV)
1	Dadri NTPC	1	490	Delhi-NCR	-147 to 294	-170 to 70	414
		2	490		-147 to 294	-	-
2	Singrauli NTPC	1	200	UP	-60 to 120	-15 to 10	405
		2	200		-60 to 120	-5 to 15	408
		3	200		-60 to 120	-15 to 15	404
		4	200		-60 to 120	-20 to 0	402

		5	200		-60 to 120	-25 to -5	400
		6	500		-150 to 300	-35 to 15	404
		7	500		-150 to 300	-40 to 15	404
3	Rihand NTPC	1	500	UP	-150 to 300	-80 to 20	396
		2	500		-150 to 300	-40 to 40	403
		3	500		-150 to 300	-100 to 0	396
		4	500		-150 to 300	-55 to 30	400
4	Kalisindh RS	1	600	Rajasthan	-180 to 360	-110 to 60	404
		2	600		-180 to 360	-110 to 50	404
5	Anpara C UP	1	600	UP	-180 to 360	-30 to 80	765
		2	600		-180 to 360	-40 to 80	765
6	Talwandi Saboo PB	1	660	Punjab	-198 to 396	-200 to 0	415
		2	660		-198 to 396	-200 to 80	420
		3	660		-198 to 396	-	-
7	Kawai RS	1	660	Rajasthan	-198 to 396	-150 to 20	400
		2	660		-198 to 396	-140 to 30	400
8	IGSTPP Jhajjar	1	500	Haryana	-150 to 300	-85 to 100	415
		2	500		-150 to 300	-	-
		3	500		-150 to 300	-	-
9	Rajpura (NPL)	1	700	Punjab	-210 to 420	-250 to 0	410
		2	700		-210 to 420	-250 to 80	410
10	MGTPS	1	660	Haryana	-198 to 396	-130 to 50	415
		2	660		-198 to 396	-150 to 50	412
11	Bawana	1	216	Delhi-NCR	-64.8 to 129.6	-	-
		2	216		-64.8 to 129.6	-	-
		3	216		-64.8 to 129.6	-60 to 40	410
		4	216		-64.8 to 129.6	-50 to 30	415
		5	253		-75.9 to 151.8	-	-
		6	253		-75.9 to 151.8	-40 to 60	415
12	Bara PPGCL	1	660	UP	-198 to 396	-40 to 50	770
		2	660		-198 to 396	-35 to 65	770

		3	660		-198 to 396	-80 to 40	765
13	Lalitpur TPS	1	660	UP	-198 to 396	-60 to 60	760
		2	660		-198 to 396	-	-
		3	660		-198 to 396	-85 to 65	760
14	Anpara D UP	1	500	UP	-150 to 300	-80 to 40	760
		2	500		-150 to 300	0 to 50	765
15	Chhabra TPS	1	250	Rajasthan	-75 to 150	-70 to 10	404
		2	250		-75 to 150	-80 to 0	405
		3	250		-75 to 150	-	-
		4	250		-75 to 150	-	-
		5	660		-198 to 396	-40 to 80	408
		6	660		-198 to 396	-45 to 90	408

All generating stations were requested to resolve any issues related to telemetry and make sure that MVAr absorption is as per grid requirement and capability curve of machine.

NRLDC representative stated that some of the generating units such as Dadri, Bawana need to explore possibility of further MVAR absorption. Generators may also set their Vsch (voltage set point) such that units are absorbing MVAR as per their capability and grid requirement.

(iv) Long outage of transmission elements/ generating units

Reasons and revival date for elements under long outage are being discussed regularly in OCC meetings. Any update on the status of these elements from last OCC meeting may be shared with the forum (Annexure-B.V of agenda).

Some of the important elements which are under long outage are shown below:

- 400/220 kV 315 MVA ICT-2 at Mundka (DTL)
- 400kV Bus-2 at Parbati-2 HEP (NHPC)
- 400kV Parbati-3(NHPC)-Sainj(HP) line
- 400kV Bus-2 at Parbati-3 HEP (NHPC)
- 765kV Anpara_D-Unnao(UP) Ckt-1 (UPPTCL)
- 50 MVAR Non-Switchable LR on 400kV Agra-Unnao (UP) Ckt-1 at Agra(UPPTCL)
- 50 MVAR Bus Reactor No 1 at 400KV Moradabad(UPPTCL)
- 50 MVAR BUS REACTOR NO 1 AT 400KV PANKI(UP)
- 125 MVAR Bus Reactor No 1 at 400KV Chamera_1(NH)
- 63 MVAR Bus Reactor No 1 at 400KV Muzaffarnagar(UP)
- 80 MVAR Bus Reactor No 1 at 400KV Nathpa Jhakri(SJ)

All utilities were requested to make it a practice to update status of elements under long outage in the NRLDC outage software portal. Utilities were requested to take necessary actions to revive elements which are under long outage. It was also stressed that Bus reactors out on long outage should be expedited to be brought in service to counter high voltage scenario in the grid in upcoming winter season.

NRLDC representative enquired about the status of 765kV Anpara_D-Unnao line. Reply from UP is still awaited.

All utilities were requested to share the information about transmission elements/ generating units which are expected to be first time charged in the next 45 days.

19. Frequent forced outages of transmission elements in the month of October'22:

The following transmission elements were frequently under forced outages during the month of **September 22**:

S. NO.	Element Name	No. of forced outages	Utility/SLDC
1	400kV Bareilly-Unnao (UP) Ckt-1	10	UP
2	400kV Muradnagar_2-Mathura (UP) Ckt-1	4	UP
3	220kV Saharanpur(UP)-Khodri(UK) (UP) Ckt-1	4	UP/UK
4	220kV RAPS_A(NP)-Sakatpura(RS) (RS) Ckt-2	5	NP/Raj

The complete details are attached at **Annexure-B.VI of agenda**.

Discussion during the meeting:

- **400kV Bareilly-Unnao(UP) ckt-1:** *UPPTCL representative informed that in spite of regular follow-up, they are not getting details with respect to tripping or any remedial action taken from 400/220kV Bareilly(UP) substation. NRLDC representative stated that such large number of tripping of 400kV line is not healthy with respect to reliability of the grid. He requested UP SLDC/STU to take the follow-up actions and also ensure the thorough patrolling of line to identify the issues and take corrective actions to rectify them so that such frequent tripping may be avoided.*

- **400kV Muradnagar_2-Mathura (UP) Ckt-1-**: *UPPTCL representative stated that there were issues related to polymer insulators, replacements of insulators has been done during shutdown on 09-10th Nov''22 and further patrolling of the line is also being done. NRLDC representative stated that as winter season is going on, inspection of other suspected lines may also be done with respect of healthiness of insulator so that precautionary actions such as replacement of defective insulators may be taken.*

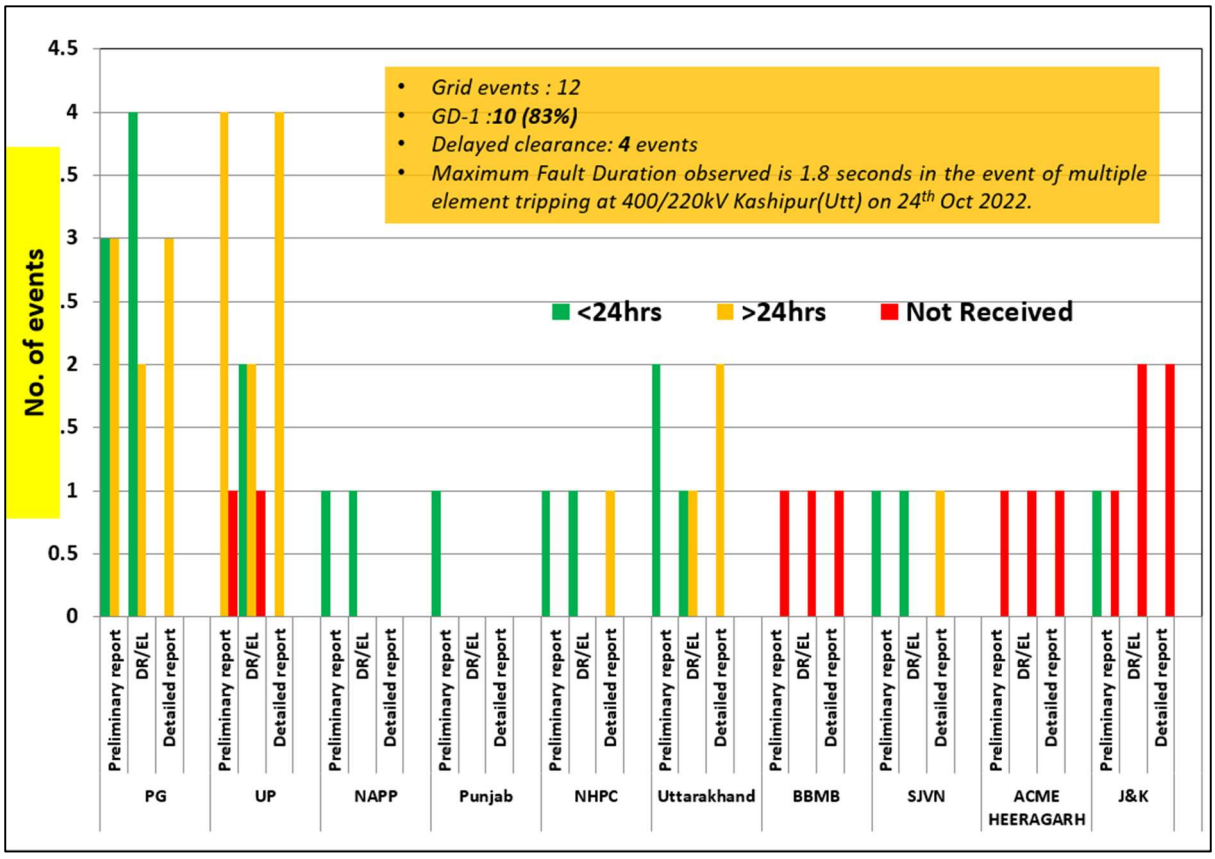
- **220kV Saharanpur(UP)-Khodri(UK) (UP) Ckt-1:** *NRLDC representative raised concerned over frequent tripping of this line, he stated that during Oct'22 also frequent tripping of this line was observed. He further asked about the status of carrier aided protection in line. UPPTCL representative stated that in first two (02) tripping, line successfully autoreclosed from their end and regarding carrier aided protection, they will check and inform.*

- **220kV RAPS_A(NP)-Sakatpura(RS) (RS) Ckt-2:** *RVPNL representative informed that they have conducted the patrolling of line, all the faults are of transient in nature and as autorecloser is not in operation at RAPS end, line gets trip on transient fault.*

NRLDC representative emphasized that A/R (auto re-closer) issue was found in many of these tripping. He further sensitized all the utilities to ensure healthiness/ in service of A/R in 220 kV and above transmission lines in compliance to CEA Grid Standards. He further informed that most of the tripping are transient in nature but due to non-operation of A/R, it resulted into tripping of the transmission element thus and reducing the reliability of the grid. All the utilities shall endeavor to keep auto re-closer in service and in healthy condition for 220 kV and above voltage level transmission line.

Frequent outages of such elements affect the reliability and security of the grid. Hence, utilities are once again requested to look into such frequent outages and share the remedial measures taken/being taken in this respect

20. Multiple element tripping events in Northern region in the month of October '22:



A total of 12 grid events occurred in the month of October '22 of which **10** are of GD-1 category **01** is of GI-2 Category and **01** is of GI-1 Category. The preliminary report of all the events have been issued from NRLDC. A list of all these events is attached at **Annexure-B.VII of agenda.**

Further, despite persistent discussions/follow-up in various OCC/PCC meetings, it is observed that provisions 5.2(r) and 5.9.4(d) of the IEGC, pertaining to reporting of events / tripping to RLDC, is not being complied with by many utilities.

Maximum Fault Duration observed is 1.8 seconds in the event of multiple element tripping at 400/220kV Kashipur(UK). As reported at 13:39hrs, Y-phase conductor of 220 KV Kashipur-Jafarpur(UK) Ckt (220 KV Kashipur-Pantnagar(UK) Ckt-2 LILO at Jafarpur) broke from gantry at Kashipur end and got in contact with top cover of CT hence created bus fault on 220kV Bus at Kashipur(UK). As per PMU at Roorkee(PG), Y-B fault which further converted into R-Y-B fault with delayed clearance of 1800ms is observed. Delayed clearance of fault (more than 100ms for 400kV and 160ms for 220kV system) observed in total 4 events out of **12** grid events occurred in the month.

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

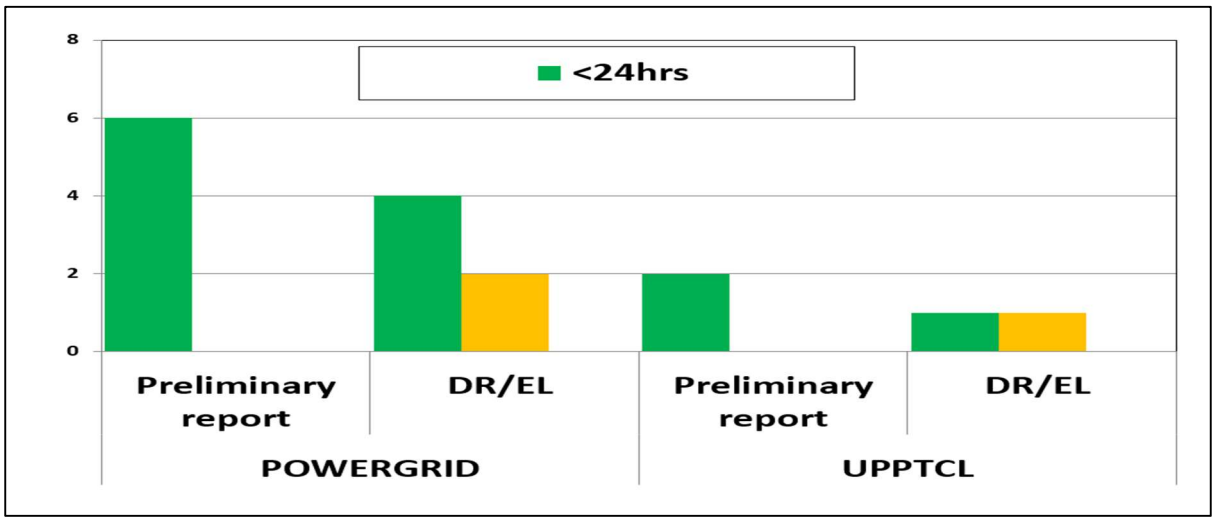
NRLDC representative asked about the tentative timeline of commissioning of bus bar protection at 220kV side of 400/220kV Kashipur(Utt). He also raised concern over protection coordination issue in Z-3 between Bareilly(UP) & Pantnagar(Utt) for fault at Kashipur(Utt). PTCUL representative informed that they will start the process of commissioning the bus bar protection at 220kV side of 400/220kV Kashipur(Uttarakhand) S/s. NRLDC representative asked to expedite the commissioning process. He further informed that Z-3 time delay has been revised to 800ms from 1200ms. UP representative said that they will revised the time delay setting at Bareilly(UP) end also to ensure proper protection coordination.

NRLDC representative raised concern about poor status of report updation by BBMB & J&K on the tripping portal. He further stated that timely report submission is an important activity and all constituents are advised to take this on priority and upload the reports.

OCC suggested all the NR constituents to update the information on tripping portal developed by NRLDC. All the constituents agreed to take proactive actions in this regard to minimize the tripping.

Members were asked to take expeditious actions to avoid such tripping in future, Moreover, utilities may impress upon all concerned for providing the Preliminary Report, DR/EL & Detailed Report of the events in line with the regulations. Members agreed to take action in this regard.

21. Details of tripping of Inter-Regional lines from Northern Region for October' 22:



A total of 8 inter-regional lines tripping occurred in the month of October'22. The list is attached at **Annexure-B.VIII of agenda.** The status of receipt of preliminary reports, DR/EL within 24hrs of the event and fault clearing time as per PMU data has also been mentioned in the table. The non-receipt of DR/EL & preliminary report within 24hrs of the event from SLDCs / ISTS licensees / ISGSs is in violation of regulation 5.2(r) of IEGC and regulation 15(3) of CEA Grid Standards. As per regulations, all the utilities shall furnish the DR/EL, flag details & preliminary report to RLDC/RPC within 24hrs of the event. They shall also furnish the detailed investigation report within 7 days of the event if fault clearance time is higher than that mandated by CEA (Grid Standard) Regulations.

NRLDC representative raised concerned over frequent tripping of 220 KV Auraiya(NT)-Malanpur(MP) (PG) Ckt-1 & 220 KV Auraiya(NT)-Mehgaon(MP) (MPSEB) Ckt-1 due to incomplete operation of autorecloser at Auraiya end (as per DR submitted by Auraiya end). NTPC representative informed that autorecloser is functioning properly at their end and there are issues at MPPTCL end. NRLDC representative requested NTPC to crosscheck the functioning of autorecloser at their end and take corrective actions if any issue found at their end, issues related to MPPTCL end will be taken up in coordination with NLDC.

NRLDC representative requested members to advise the concerned for taking corrective action to avoid such tripping as well as timely submission of the information.

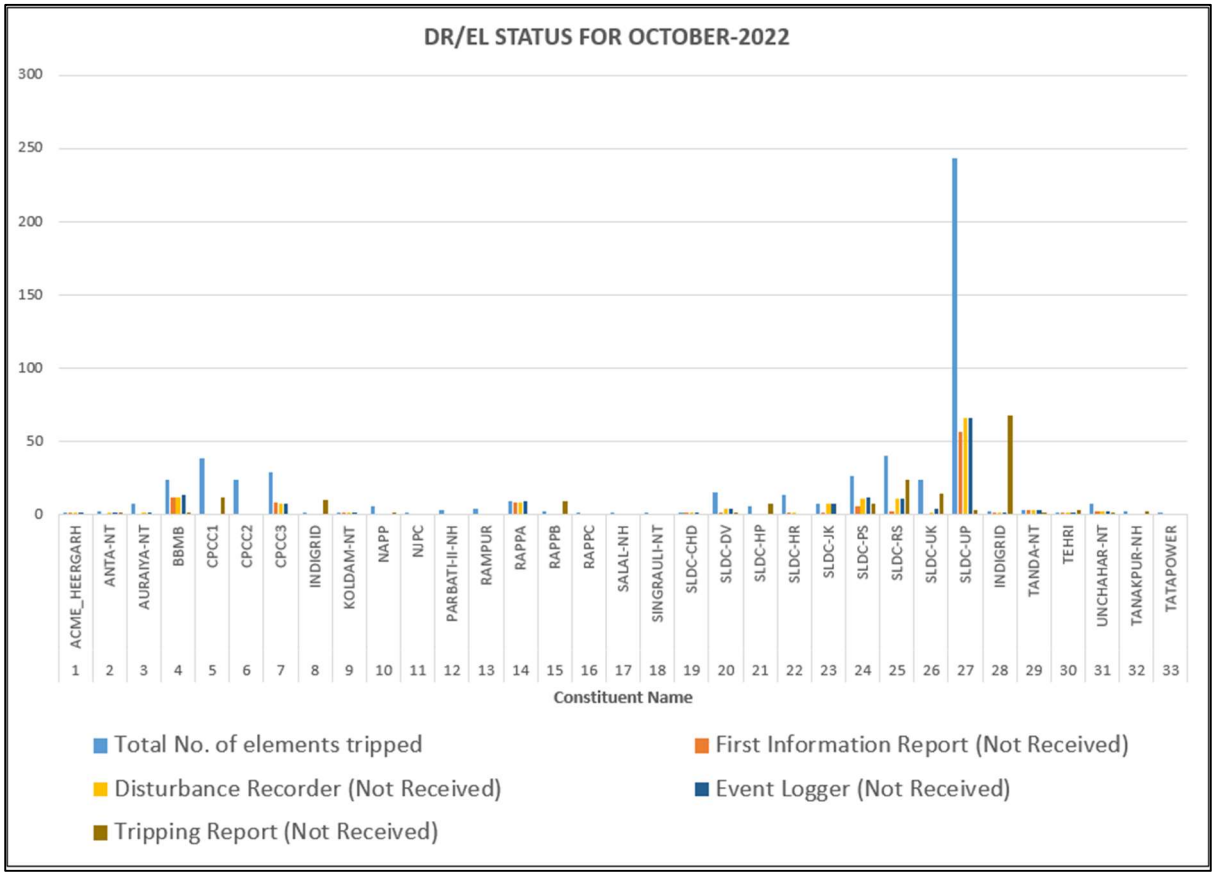
22. Status of submission of DR/EL and tripping report of utilities for the month of October'22.

The status of receipt of DR/EL and tripping report of utilities for the month of October'2022 is attached at **Annexure-B.IX of agenda**. It is to be noted that as per

the IEGC provision under clause 5.2 (r), detailed 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 and needs improvement.

NRLDC representative stated that status of Punjab, Rajasthan & POWERGRID(NR-1) has been improved. Status of J&K is poor.

Members may please note and advise the concerned for timely submission of the information. It is requested that DR/EL of all the trippings shall be uploaded on Web Based Tripping Monitoring System "http://103.7.128.184/Account/Login.aspx" within 24 hours of the events as per IEGC clause 5.2.r and clause 15.3 of CEA grid standard. Apart from prints of DR outputs, the corresponding COMTRADE files may please also be submitted in tripping portal / through email.



23. Status of PSS tuning/ re-tuning and Step Response Test of generator

Since 182nd OCC meeting, this point was discussed and Utilities were requested to submit the present status of PSS tuning/re-tuning and Step Response Test of their respective generators as per the below mentioned format.

S. No.	Name of the Generating Station	Date of last PSS tuning / re-tuning performed (in DD/MM/YYYY format)	Date of last Step Response Test performed (in DD/MM/YYYY format)	Report submitted to NRLDC (Yes/ No)	Remarks (if any)

The status of test performed till date is attached at **Annexure-B.X of agenda.**

It is to be noted that as per regulation 5.2(k) of IEGC, Power System Stabilizers (PSS) in AVRs of generating units (wherever provided), shall be got properly tuned by the respective generating unit owner as per a plan prepared for the purpose by the CTU/RPC from time to time.

Members were requested to update about their future plan for PSS tuning as there is no significant progress despite including this agenda in every OCC meeting and a separate meeting may be called for detail discussion on this matter.

NRLDC representative informed that all the units who have done Step response test before 2018 were requested to plan the exciter step-response test as soon as possible and submit the tentative schedule of step-response test on the units with NRPC/ NRLDC. He further informed that till date Schedule has been received from Rajasthan and UP Control area. He further requested that members may kindly accord due priority in this regard and update about their future plan for PSS tuning as there is little progress despite including this agenda in every OCC meeting.

24. Frequency response characteristic:

One FRC based event occurred in the month of **October-2022**. Description of the event is as given below:

Table:

S. No.	Event Date	Time (In hrs.)	Event Description	Starting Frequency (in Hz)	End Frequency (in Hz)	*Δf*
1	15-Oct-22	11:23hrs	On 15th Oct'22 at 11:23:44 hrs, R-N phase to earth bus fault occurred on 765kV Bhiwani(PG)	50.05	49.76	0.29

			Bus-1 due to blast of Main CB of 765kV Bhiwani-Phagi ckt-1. On this fault, bus bar protection of Bus-1 operated at Bhiwani(PG) end. At the same time, drop of approx. 3579MW of ISTS solar generation connected in Rajasthan RE complex and drop of approx. 150MW of Rajasthan State solar generation observed (as per SCADA data). Hence, net 3729MW generation loss figure has been considered for FRC calculation.			

Status of Data received till date:

Status of Field Data received of FRC of Grid event occurred at Rajasthan ISTS RE complex at 11:23 Hrs on 15.10.2022			
Data Received from		**Data Not Received from**	
NHPC	Rajasthan	Uttarakhand	APCPL Jhajjar
Singrauli NTPC	Dadri NTPC	Haryana	AD Hydro HEP
Rosa Reliance		UP	Rihand NTPC
		Punjab	Karcham HEP
		HP	
		BBMB	

PFR as per NRLDC SCADA data:

States	15-Oct-22 event	Remarks
PUNJAB	21.89%	
HARYANA	30.08%	
RAJASTHAN	-11.06%	Affected control area
DELHI	-119.95%	
UTTAR PRADESH	13.33%	
UTTARAKHAND	-33.37%	
CHANDIGARH	-48.65%	
HIMACHAL PRADESH	4.27%	
JAMMU & KASHMIR	-5.28%	
NR	29.77%	

ISGS Generators:

Generator	15-Oct-22 event	Generator	15-Oct-22 event
Singrauli TPS	6%	Salal HEP	4%
Rihand-1 TPS	11%	Tanakpur HEP	-2%
Rihand-2 TPS	14%	Uri-1 HEP	178%
Rihand-3 TPS	0%	Uri-2 HEP	0%
Dadri-1 TPS	33%	Dhauliganga HEP	34%
Dadri -2 TPS	61%	Dulhasti HEP	65%
Unchahar TPS	No generation	Sewa-II HEP	No generation
Unchahar stg-4 TPS	No generation	Parbati-3 HEP	No generation
Jhajjar TPS	29%	Jhakri HEP	235%
Dadri GPS	No generation	Rampur HEP	No generation
Anta GPS	No generation	Tehri HEP	No generation
Auraiya GPS	No generation	Koteswar HEP	No generation
Narora APS	5%	Karcham HEP	83%
RAPS-B	5%	Malana-2 HEP	No generation
RAPS-C	2%	Budhil HEP	-42%
Chamera-1 HEP	No generation	Bhakra HEP	-5%
Chamera-2 HEP	No generation	Dehar HEP	-6%
Chamera-3 HEP	No generation	Pong HEP	-5%
Bairasiul HEP	Suspected SCADA data	Koldam HEP	No generation
		AD Hydro HEP	0%

State control generators:

Generator	15-Oct-22 event	Generator	15-Oct-22 event
PUNJAB		UP	
Ropar TPS	No generation	Obra TPS	0%
L.Mohabbat TPS	No generation	Harduaganj TPS	No generation
Rajpura TPS	-18%	Paricha TPS	17%
T.Sabo TPS	23%	Rosa TPS	16%
Goindwal Sahib TPS	128%	Anpara TPS	2%
Ranjit Sagar HEP	No generation	Anpara C TPS	21%
Anandpur Sahib HEP	0%	Anpara D TPS	1%
HARYANA		Bara TPS	12%
Panipat TPS	-2%	Lalitpur TPS	40%
Khedar TPS	13%	Meja TPS	-1%
Yamuna Nagar TPS	No generation	Vishnuprayag HEP	0%
CLP Jhajjar TPS	4%	Alaknanda HEP	0%
Faridabad GPS	No generation	Rihand HEP	No generation
RAJASTHAN		Obra HEP	No generation
Kota TPS	3%	UTTARAKHAND	
Suratgarh TPS	2%	Gamma Infra GPS	No generation
Kalisindh TPS	No generation	Shravanti GPS	No generation
Chhabra TPS	No generation	Ramganga HEP	No generation
Chhabra stg-2 TPS	4%	Chibra HEP	0%
Kawai TPS	89%	Khodri HEP	0%
Dholpur GPS	No generation	Chilla HEP	0%
Mahi-1 HEP	0%	HP	
Mahi-2 HEP	0%	Baspa HEP	1%
RPS HEP	0%	Malana HEP	-2%
JS HEP	12%	Sainj HEP	0%
DELHI		Larji HEP	0%
Bawana GPS	No generation	Bhabha HEP	1%
Pragati GPS	No generation	Giri HEP	-2%
		J&K	
		Baglihar-1&2 HEP	-4%
		Lower Jhelum HEP	No generation

In line with the decisions taken during various OCC meetings, the time and date of the FRC events were e-mailed to respective utilities***. Constituents may submit the FRC of their control areas for the above event and reason of poor response, if observed.***

Rajasthan representative informed that process of PFR testing of power stations in their control area has been initiated and same is being taken up for approval. After completion of approval process they will share the schedule of PFR testing of their power stations.

Other utilities are also requested to kindly share the FRC calculations and further action taken at their end.

25. Mock black start exercises in NR:

As per Indian Electricity Grid Code (IEGC) clause 5.8(b)

"*Detailed plans and procedures for restoration after partial/total blackout of each user's/STU/CTU system within a Region, will be finalized by the concerned user's/STU/CTU in coordination with the RLDC. The procedure will be reviewed, confirmed and/or revised once every subsequent year. Mock trial runs of the procedure for different subsystems shall be carried out by the users/CTU/STU at least once every six months under intimation to the RLDC*".

Mock Black-start exercise of power stations therefore needs to be carried out in-order to ensure healthiness of black start facility.

The summary of last conducted mock black start exercise of ISGS hydro & gas stations during 2020-21 & 2021-22 is tabulated below:

Hydro Power Stations:

Name of stations	**Last conducted exercise date**	**Remark**
Uri-I, II HEP, Lower Jhelum HEP, Upper Sindh and Kishenganga	–	
Dhauliganga	28th Dec 2021	Exercise carried out successfully
Bairasiul	04th Dec 2020	
Sewa-2	29th May 2022	
N. Jhakri and Rampur	17th Dec 2019	
Karcham and Baspa	29th Dec 2021	Exercise was partially successful
Budhil	–	
Parbati-3 and Sainj	22nd Dec 2020	Black start of only Parbati-3 was carried out successfully. Sainj to explore blackstart capability.

Salal	-	
Chamera-3	-	
Kishenganga	-	
Koteshwar	19th Jan 2022	Exercise carried out successfully
Chamera-1 and Chamera-2	08th Dec 2020	
Malana-2, AD Hydro and Phozal	08th Jan 2021	
Tehri	12th Jan 2022	
Koldam	22nd Jan 2021	Partially successful.

Gas Power Stations:

Name of stations	Last conducted exercise date	Remark
Anta GPS	09th Feb 2021 (with load) 01st Feb 2022 (without load)	Exercise carried out successfully
Auraiya GPS	-	
Dadri GPS	28th Jan 2022 (without load)	Exercise carried out successfully

The winter months are off peak hydro period and therefore good time to carry out such exercises. Therefore, the schedule of mock exercise dates for different hydro & Gas power station need to be finalized. The power stations may propose the tentative date for mock black start exercise of their generating units. Power stations may confirm and inform to all the concerned persons of control centre/ substations to facilitate the exercise.

Hydro Power Stations:

Name of stations	Tentative Date for Mock Black start exercise (proposed by power plants)
*Uri-I, II HEP, Lower Jhelum HEP, Upper Sindh and Kishenganga	31st Jan 2023
Dhauliganga	28th Feb 2023
*Bairasiul	Conducted successfully on 30th Nov 2022
Sewa-2	12th Jan 2023
*N. Jhakri and Rampur	07th Dec 2022

Karcham and Baspa	
*Budhil	
*Parbati-3 and Sainj	09th Nov 2022(to be rescheduled)
*Salal	15th Dec 2022
*Chamera-3	27th Jan 2023
*Kishenganga	
Koteshwar	Mid December
*Chamera-1 and Chamera-2	10th Nov 2022(to be rescheduled)
*Malana-2, AD Hydro and Phozal	12th Dec 2022
Tehri	14th Dec 2022
*Koldam	Conducted successfully on 11th Nov 2022

*Mock Black start exercise not carried out during Year 2021-22

Gas Power Stations:

Name of stations	Tentative Date for Mock Black start exercise (proposed by power plants)
Anta GPS	23rd Jan 2023
*Auraiya GPS	Mar 2023
Dadri GPS	Jan 2023

*Mock Black start exercise not carried out during Year 2021-22

NRLDC representative requested other constituents also to share their schedule for mock black start exercise of Hydro/Gas units.

SLDC's may also carryout mock black-start of station in their respective control area & inform the tentative dates to the OCC as well as outcome of these exercises. The proposed Hydro Power Stations to undergo the exercise are as follows:

S. NO.	Utility	Hydro Power Station	Installed Capacity(MW)
1	J&K	Baglihar	3x150
2		Baglihar stage-2	3x150
3		Lower Jhelum	3x35
4		Upper Sindh	2x11+3x35
5		Larji	3x42
6		Bhabha	3x40
7		Malana -I	2x43
8		Baspa	3x100

9	Punjab	Anandpur Sahib	4x33.5
10		Ranjit Sagar	4x150
11	Rajasthan	Mahi-I&II	2x25+2x45
12		Rana Pratap Sagar	4x43
13		Jawahar Sagar	3x33
14		Gandhi Sagar	5x23
15		Dholpur GPS	3x110
16		Ramgarh GPS	1x35.5+2x37.5+1x110
17	UP	Rihand	6x50
18		Obra	3x33
19		Vishnuprayag	4x100
20 21		Srinagar (Alaknanda)	4x82.5
	Uttarakhand	Gamma Infra	2x76+1x73
22		Shravanti	6x75
23		Ramganga	3x66
24		Chibro	4x60
25		Khodri	4x30
26		Chilla	4x36
27		Maneri Bhali-I&II	3x30+4x76
28	Delhi	IP Extn GTs	6x30+3x30
29		Pragati GPS	2x104.6+1x121.2
30		Rithala	3x36
31	Haryana	Faridabad GPS	2x137.75+1x156.07

UP representative informed that they will conduct the mock black start exercise of Obra & Rihand HEP in Dec 2022.
Rajasthan representative stated that they will share the tentative schedule for mock black start exercise of Ramgarh GPS.

SLDCs shall submit the reports of black start exercise in their respective control area. SLDCs may also identify further generating stations/unit for black start exercise.

26. Revision of document for Reactive Power Management and System Restoration Procedure (SRP) for Northern Region:

NRLDC has been issuing 'Reactive Power document of Northern Region' on annual basis. Reactive Power Management document for Northern region was last revised on 31st Dec 2021 & updated document link is as below:
https://nrldc.in/download/nr-reactive-power-management-2022/.

Document is password protected and password was already informed to all the NR constituents through letter dated 31st Dec 2021.
In view of new addition/modification of transmission & generation element in NR grid since Dec'21, the document is being review for update.
Constituents are requested to provide the feedback, suggestion and updated information by 30th Nov 2022.

System restoration procedure document for Northern region has been revised on 31stJan 2022 & updated document link is as below:

https://nrldc.in/wp-content/uploads/2022/01/System-Restoration-Procedure_NR_2022.pdf

Document is password protected and for password request can be sent to nrldcso2@gmail.com Constituents are requested to go through the document and provide any modification/addition in respect of their system. SLDC/Generating utilities are requested to kindly update and share the restoration procedure in respect of their state/generating station.
Constituents were requested to provide the feedback, suggestion and updated information by 31st Dec 2022.

All the NR constituent were requested to go through these document and provide the feedback, suggestion if any. All the state SLDCs are also requested to kindly prepare these documents for their own control area.

Follow up issues from previous OCC meetings

Annexure-A.I

<table>
<tr><td>1</td><td>Down Stream network by State utilities from ISTS Station</td><td>Augmentation of transformation capacity in various existing substations, addition of new substations along with line bays as well as requirement of line bays by STUs for downstream network are under implementation at various locations in Northern Region. Further, 220kV bays have already been commissioned at various substations in NR. For its utilization, downstream 220kV system needs to be commissioned.</td><td>List of downstream networks is enclosed in Annexure-A.I.I.</td></tr>
<tr><td>2</td><td>Progress of installing new capacitors and repair of defective capacitors</td><td>Information regarding installation of new capacitors and repair of defective capacitors is to be submitted to NRPC Secretariat.</td><td>Data upto following months, received from various states / UTs:
◎ CHANDIGARH — Sep-2019
◎ DELHI — Aug-2022
◎ HARYANA — Aug-2022
◎ HP — Jan-2022
◎ J&K and LADAKH — Not Available
◎ PUNJAB — Jul-2022
◎ RAJASTHAN — Oct-2022
◎ UP — Oct-2022
◎ UTTARAKHAND — Oct-2022
All States/UTs are requested to update status on monthly basis.</td></tr>
<tr><td>3</td><td>Healthiness of defence mechanism: Self-certification</td><td>Report of mock exercise for healthiness of UFRs carried out by utilities themselves on quarterly basis is to be submitted to NRPC Secretariat and NRLDC. All utilities were advised to certify specifically, in the report that “All the UFRs are checked and found functional”.</td><td>Data upto following months, received from various states / UTs:
◎ CHANDIGARH — Not Available
◎ DELHI — Sep-2022
◎ HARYANA — Sep-2022
◎ HP — Oct-2022
◎ J&K and LADAKH — Not Available
◎ PUNJAB — Jun-2022
◎ RAJASTHAN — Sep-2022
◎ UP — Sep-2022
◎ UTTARAKHAND — Sep-2022
◎ BBMB — Sep-2022
All States/UTs are requested to update status for healthiness of UFRs on monthly basis for islanding schemes and on quartely basis for the rest .</td></tr>
<tr><td></td><td></td><td>In compliance of NPC decision, NR states/constituents agreed to raise the AUFR settings by 0.2 Hz in 47th TCC/49th NRPC meetings.</td><td>Status:
◎ CHANDIGARH — Not Available
◎ DELHI — Increased
◎ HARYANA — Increased
◎ HP — Increased
◎ J&K and LADAKH — Not increased</td></tr>
</table>

			◎	PUNJAB	Increased
			◎	RAJASTHAN	Increased
			◎	UP	Increased
			◎	UTTARAKHAND	Increased
			◎	BBMB	Increased
			BBMB was requested to submit the updated self certification report indicating increase of 0.2 Hz in AUFR settings, within one week. J&K and LADAKH were requested to update status for increasing settings of UFRs.		
4	Status of FGD installation vis-à-vis installation plan at identified TPS	List of FGDs to be installed in NR was finalized in the 36th TCC (special) meeting dt. 14.09.2017. All SLDCs were regularly requested since 144th OCC meeting to take up with the concerned generators where FGD was required to be installed. Further, progress of FGD installation work on monthly basis is monitored in OCC meetings.	Status of the information submission (month) from states / utilities is as under:		
			◎	HARYANA	Sep-2022
			◎	PUNJAB	Sep-2022
			◎	RAJASTHAN	Nov-2022
			◎	UP	Sep-2022
			◎	NTPC	Feb-2022
			FGD status details are enclosed as **Annexure-A.I.II**. All States/utilities are requested to update status of FGD installation progress on monthly basis.		
5	Information about variable charges of all generating units in the Region	The variable charges detail for different generating units are available on the MERIT Order Portal.	All states/UTs are requested to submit daily data on MERIT Order Portal timely.		
6	Status of Automatic Demand Management Sysytem in NR states/UT's	The status of ADMS implementation in NR, which is mandated in clause 5.4.2 (d) of IEGC by SLDC/SEB/DISCOMs is presented in the following table:	Status:		
			◎	DELHI	Fully implemented
			◎	HARYANA	Scheme not implemented
			◎	HP	Scheme not implemented
			◎	PUNJAB	Scheme not implemented
			◎	RAJASTHAN	Under implementation. Likely completion schedule is 31.12.2022.
			◎	UP	Scheme implemented by NPCIL only

7	Reactive compensation at 220 kV/ 400 kV level at 15 substations			
	State / Utility	Substation	Reactor	Status
i	POWERGRID	Kurukshetra	500 MVAr TCR	Testintg is under progress and Anticipated commissioning: Nov'22/Dec'22
ii	DTL	Peeragarhi	1x50 MVAr at 220 kV	PO awarded to M/s Kanohar Electricals Ltd. Drawings approved and under final stage inspection. GIS Bay is already available.
iii	DTL	Harsh Vihar	2x50 MVAr at 220 kV	PO awarded to M/s Kanohar Electricals Ltd. Drawings approved and under final stage inspection. GIS Bay is already available.
iv	DTL	Mundka	1x125 MVAr at 400 kV & 1x25 MVAr at 220 kV	Bay work awarded to M/s. Ethos. Bay work is expected to be completed by Dec.21. Reactor part tender is dropped and at present same is under revision.
v	DTL	Bamnauli	2x25 MVAr at 220 kV	Bay work awarded to M/s. Ethos. Bay work is expected to be completed by Dec.21. Reactor part tender is dropped and at present same is under revision.
vi	DTL	Indraprastha	2x25 MVAr at 220 kV	Bay work awarded to M/s. Ethos. Bay work is expected to be completed by Dec.21. Reactor part tender is dropped and at present same is under revision.
vii	DTL	Electric Lane	1x50 MVAr at 220 kV	Under Re-tendering due to Single Bid
viii	PUNJAB	Dhuri	1x125 MVAr at 400 kV & 1x25 MVAr at 220 kV	400kV Reactors - LOA issued on dated. 17.08.2021 and date of completion of project is 18 months from the date of LOA. 220kV Reactors - LOA issued on dated 19.07.2021 and date of completion of project is 18 months from the date of LOA.
ix	PUNJAB	Nakodar	1x25 MVAr at 220 kV	220kV Reactors - LOA issued on dated 19.07.2021 and date of completion of project is 18 months from the date of LOA.
x	PTCUL	Kashipur	1x125 MVAR at 400 kV	Price bid has been opened and is under evaluation

xi	RAJASTHAN	Akal	1x25 MVAr	1x25 MVAR Reactor at Akal has been commissioned on dated 25th July' 2022.
xii	RAJASTHAN	Bikaner	1x25 MVAr	Erection work of 1x25 MVAR Reactors at Bikaner and Suratgarh completed and testing work is pending. The same are likely to be commissioned in Aug / Sept 2022.
xiii	RAJASTHAN	Suratgarh	1x25 MVAr	Erection work of 1x25 MVAR Reactors at Bikaner and Suratgarh completed and testing work is pending. The same are likely to be commissioned in Aug / Sept 2022.
xiv	RAJASTHAN	Barmer & others	13x25 MVAr	Agreement signed on dt. 22.06.2020. Grant of Ist Instalment received on dt.19.02.21 &work order placed on dt. 7.04.2022 to M/s Kanohar Electricals Ltd.
xv	RAJASTHAN	Jodhpur	1x125 MVAr	Agreement signed on dt. 22.06.2020. Grant of Ist Instalment received on dt.19.02.21 &work order placed on dt. 7.04.2022 to M/s Kanohar Electricals Ltd.

Annexure-A-I.I

1. Down Stream network by State utilities from ISTS Station:

Sl. No.	Substation	Downstream network bays	Status of bays	Planned 220 kV system and Implementation status	Revised Target	Remarks
1	400/220kV, 3x315 MVA Samba	Commissioned: 8 Total: 8	Utilized: 6 Unutilized: 2	• Network to be planned for 2 bays.	-	PDD, J&K to update the status.
2	400/220kV, 2x315 MVA New Wanpoh	Commissioned: 6 Total: 6	Utilized: 2 Unutilized: 4	• 220 kV New Wanpoh - Alusteng D/c Line	-	PDD, J&K to update the status.
				• 220 kV New Wanpoh - Mattan D/c Line	-	PDD, J&K to update the status.
3	400/220kV, 2x315 MVA Amargarh	Commissioned: 6 Total: 6	Utilized: 6 Unutilized: 2	• 220kV D/C line from 400/220kV Kunzar - 220/33kV Sheeri	-	PDD, J&K to update the status.
4	400/220kV, 2x500 MVA Kurukshetra (GIS)	Commissioned: 8 Total: 8	Utilized: 6 Unutilized: 2	• 220kV Bhadson (Kurukshetra) – Ramana Ramani D/c line	-	HVPNL to update the status.
5	400/220 kV, 2x315 MVA Dehradun	Commissioned: 6 Total: 6	Utilized: 2 Unutilized: 4	• Network to be planned for 4 bays	-	PTCUL to update the status.
6	Shahjahanpur, 2x315 MVA 400/220 kV	Commissioned: 6 Approved/Under Implementation:1 Total: 7	Utilized: 5 Unutilized: 1 (1 bays to be utilized shortly) Approved/Under Implementation:1	• 220 kV D/C Shahajahanpur (PG) - Gola line	Feb'23	Updated in 201st OCC by UPPTCL
				• LILO of Sitapur – Shahjahanpur 220 kV SC line at Shahjahanpur (PG)	Commissioned	Energization date: 25.02.2022 updated by UPPTCL in 196th OCC
7	Hamirpur 400/220 kV Sub-station	Commissioned: 8 Total: 8	Utilized: 4 Unutilized: 4 (2 bays to be utilized shortly)	• 220 kV Hamirpur-Dehan D/c line	Commissioned	Commisioned date: 09.06.2022. Updated in 198th OCC by HPPTCL
				• Network to be planned for 4 bays	-	HPPTCL to update the status.
8	Sikar 400/220kV, 1x 315 MVA S/s	Commissioned: 8 Total: 8	Utilized: 6 Unutilized: 2	• LILO of 220 kV Sikar (220 kV GSS)-Dhod S/c line at Sikar (PG)	Commissioned	LILO of 220 kV S/C Sikar-Dhod line at 400 kV GSS PGCIL, Sikar has been charged on dt. 31.03.2022
				• Network to be planned for 2 bays.	-	Against the 3rd ICT at 400 kV GSS Sikar, only 2 bays were constructed and same has been utilized by RVPN by constructing LILO of 220 kV S/C Sikar – Dhod line as updated by RVPNL in 195th OCC
9	Bhiwani 400/220kV S/s	Commissioned: 6 Total: 6	Utilized: 0 Unutilized: 6	• 220 kV D/C line Bhiwani (PG) – Bhiwani (HVPNL) line	Dec'22	Updated in 197th OCC by HVPNL
				• 220 kV Bhiwani (PG) - Isherwal (HVPNL) D/c line.	Dec'22	Issue related to ROW as intimated in 192nd OCC.HVPNL to update the status.
				• 220 kV Bhiwani (PG) - Dadhibana (HVPNL) D/c line.	Apr'24	Issue related to ROW as intimated in 192nd OCC.HVPNL to update the status.
10	Jind 400/220kV S/s	Commissioned: 4 Approved:4 Total: 8	Utilized: 4 Unutilized: 0 Approved:4	• LILO of both circuits of 220 kV Jind HVPNL to PTPS D/C line at 400 kV substation PGCIL Khatkar (Jind) with 0.5 sq inch ACSR conductor	May'24	Updated in 197th OCC by HVPNL
11	400/220kV Tughlakabad GIS	Commissioned: 6 Under Implementation: 4 Total: 10	Utilized: 6 Unutilized: 0 Under Implementation:4	• RK Puram – Tughlakabad (UG Cable) 220kV D/c line – March 2023.	-	DTL to update the status.
				• Masjid Mor – Tughlakabad 220kV D/c line.	-	DTL to update the status.
12	400/220kV Kala Amb GIS (TBCB)	Commissioned: 6 Total: 6	Utilized: 0 Unutilized: 6	• HPPTCL has planned one no. of 220kV D/c line from Kala Amb 400/220kV S/s to 220/132kV Kala Amb S/s	Mar'23	Updated in 198th OCC by HPPTCL
				• Network to be planned for 4 bays	-	HPPTCL to update the status.

Sl. No.	Substation	Downstream network bays	Status of bays	Planned 220 kV system and Implementation status	Revised Target	Remarks
13	400/220kV Kadarpur Sub-station	Commissioned: 8 Total: 8	Utilized: 0 Unutilized: 8	• LILO of both circuits of 220 KV Pali - Sector 56 D/C line at Kadarpur along with augmentation of existing conductor from 220 KV Sector-56 to LILO point with 0.4 sq inch AL-59 conductor.	Mar'23	Updated in 197th OCC by HVPNL
				• LILO of both circuits of 220KV Sector 65 - Pali D/C line at Kadarpur along with augmentation of balance 0.4 sq. inch ACSR conductor of 220 kV Kadarpur - Sector 65 D/C line with 0.4sq inch AL-59 conductor	May'23	Updated in 197th OCC by HVPNL
14	400/220kV Sohna Road Sub-station	Commissioned: 8 Total: 8	Utilized: 2 Unutilized: 4	• LILO of both circuits of 220kV D/c Sector-69 - Roj Ka Meo line at 400kV Sohna Road	Jun'23	Updated in 197th OCC by HVPNL
				• LILO of both circuits of 220kV D/c Badshahpur-Sec77 line at 400kV Sohna Road	Jun'23	Updated in 197th OCC by HVPNL
15	400/220kV Prithla Sub-station	Commissioned: 8 Total: 8	Utilized: 2 Unutilized: 4 Under Implementation:2	• Prithla - Harfali 220kV D/c line with LILO of one ckt at Meerpur Kurali	Commissioned	Commisioned date: 31.12.2021. Updated in 198th OCC by HVPNL
				• LILO of both ckt of 220kV D/c Ranga Rajpur – Palwal line	-	HVPNL to update the status
				• 220kV D/C for Sector78, Faridabad	02.03.2023	Updated in 198th OCC by HVPNL
				• Prithla - Sector 89 Faridabad 220kV D/c line	31.03.2024	Under Implementation (Mar'24). Updated in 198th OCC by HVPNL
16	400/220kV Sonepat Sub-station	Commissioned: 6 Under Implementation:2 Total: 8	Utilized: 2 Unutilized: 2 Under Implementation:2	• LILO of both circuits of 220kV Samalkha - Mohana line at Sonepat	-	HVPNL to update the status.
				• Sonepat - HSIISC Rai 220kV D/c line	Mar'23	Line work is complete howere substation work is under progress. Updated in 201st OCC by HVPNL
17	400/220kV Neemrana Sub-station	Commissioned: 6 Total: 6	Utilized: 4 Unutilized: 2	• LILO of Bhiwadi - Neemrana 220kV S/c line at Neemrana (PG)	-	Work order is finalized as updated in 201st OCC by RVPNL.. 5 months from layout finalization.
18	400/220kV Kotputli Sub-station	Commissioned: 6 Total: 6	Utilized: 4 Unutilized: 2	• Kotputli - Pathreda 220kV D/c line	-	Bid documents under approval as updated in 195th OCC by RVPNL.
19	400/220kV Jallandhar Sub-station	Commissioned: 10 Total: 10	Utilized: 8 Unutilized: 2	• Network to be planned for 2 bays	May'24	LILO of 220 kV BBMB Jalandhar - Butari line at 400 kV PGCIL Jalandhar being planned. Work expected to be completed by May 2024. Updated in 198th OCC by PSTCL.
20	400/220kV Roorkee Sub-station	Commissioned: 6 Total: 6	Utilized: 4 Unutilized: 2	• Roorkee (PG)-Pirankaliyar 220kV D/c line	Commissioned	Roorkee (PG)-Pirankaliyar 220kV D/c line comiisioned in 2020 as intimated by PTCUL in 197th OCC
21	400/220kV Lucknow Sub-station	Commissioned: 8 Total: 8	Utilized: 4 Unutilized: 4	• Network to be planned for 2 bays	Jan'23	• Lucknow -Kanduni, 220 kV D/C line expected energization date Jan'23 updated by UPPTCL in 201st OCC _____ • No planning for 2 no. of bays upated by UPPTCL in 196th OCC. The same has been communicated to Powergrid.
22	400/220kV Gorakhpur Sub-station	Commissioned: 6 Total: 6	Utilized: 4 Unutilized: 2	• Network to be planned for 2 bays	Dec'22	• Gorakhpur(PG)- Maharajganj, 220 kV D/C line expected energization date Dec'22 updated by UPPCL in 196th OCC

Sl. No.	Substation	Downstream network bays	Status of bays	Planned 220 kV system and Implementation status	Revised Target	Remarks
23	400/220kV Fatehpur Sub-station	Commissioned: 8 Under Implementation:2 Total: 10	Utilized: 6 Unutilized: 2 Under Implementation:2	• Network to be planned for 2 bays	-	• UPPTCL intimated that 02 no. of bays under finalization stage. In 201st OCC, UPPTCL intimated that it is finalized that Khaga s/s will be connected (tentative time 1.5 years). _____ • No planning for 2 no. of bays updated by UPPTCL in 196th OCC. The same has been communicated to Powergrid.
24	400/220kV Abdullapur Sub-station	Commissioned: 10 Under Implementation:2 Total: 12	Utilized: 10 Unutilized: 0 Under Implementation:2	• Abdullapur – Rajokheri 220kV D/c line	Oct'22	Updated in 198th OCC by HVPNL
25	400/220kV Pachkula Sub-station	Commissioned: 8 Under tender:2 Total: 10 Out of these 10 nos. 220kV Line Bays, 2 bays would be used by the lines being constructed by POWERGRID (Chandigarh-2) and balance 8 nos. bays would be used by HVPNL	Utilized: 2 Unutilized: 4 Under Implementation:2	• Panchkula – Pinjore 220kV D/c line	31.12.2022	Updated in 194th OCC by HVPNL
				• Panchkula – Sector-32 220kV D/c line	31.12.2022	Updated in 194th OCC by HVPNL
				• Panchkula – Raiwali 220kV D/c line	Commissioned	Updated in 194th OCC by HVPNL
				• Panchkula – Sadhaura 220kV D/c line: Sep'23	Sept'23	Updated in 194th OCC by HVPNL
26	400/220kV Amritsar S/s	Commissioned:7 Approved in 50th NRPC- 1 no. Total: 8	Utilized: 6 Unutilized: 1 Approved in 50th NRPC- 1 no.	• Amritsar – Patti 220kV S/c line	May'23	Route survey/tender under process. Work expected to be completed by May 2023. Updated in 198th OCC by PSTCL.
				• Amritsar – Rashiana 220kV S/c line (2 bays shall be required for above lines. However, 1 unutilized bay shall be used for Patti and requirement of one additional bay approved for Rashiana by NRPC)	May'23	Route survey/tender under process. Work expected to be completed by May 2023. Updated in 198th OCC by PSTCL.
27	400/220kV Bagpat S/s	Commissioned: 8 Total: 8	Utilized:6 Unutilized: 2	• Bagpat - Modipuram 220kV D/c line	Commissioned	Updated in 201st OCC by UPPTCL
28	400/220kV Bahardurgarh S/s	Commissioned: 4 Total: 4	Utilized:2 Unutilized: 2	• Network to be planned for 2 bays.	Mar'24 and July'24	Updated in 198th OCC by HVPNL
29	400/220kV Jaipur (South) S/s	Commissioned: 4 Total: 4	Utilized:2 Unutilized: 2	• Network to be planned for 2 bays.	-	LILO case of 220 kV Dausa – Sawai Madhopur line at 400 kV GSS Jaipur South (PG) is under WTD approval as updated by RVPNL in 195th OCC
30	400/220kV Sohawal S/s	Commissioned: 8 Total: 8	Utilized: 8	• Sohawal - Barabanki 220kV D/c line	Commissioned	Energization date: 14.04.2018 updated by UPPTCL in 196th OCC
				• Sohawal - New Tanda 220kV D/c line	Commissioned	Energization date: 28.05.2019 updated by UPPTCL in 196th OCC
				• Network to be planned for 2 bays	Commissioned	• Sohawal - Gonda 220kV S/c line (Energization date: 27.04.2020) updated by UPPTCL in 196th OCC _____ • Sohawal - Bahraich 220kV S/c line (Energization date: 15.02.2021) updated by UPPTCL in 196th OCC

Sl. No.	Substation	Downstream network bays	Status of bays	Planned 220 kV system and Implementation status	Revised Target	Remarks
31	400/220kV, Kankroli	Commissioned: 6 Total: 6	Utilized: 4 Unutilized: 2	• Network to be planned for 2 bays	-	RVPNL to update the status
32	400/220kV, Manesar	Commissioned: 8 Total: 8	Utilized: 4 Unutilized: 4	• Network to be planned for 4 bays	-	One bay 220 kV Manesar (PG)-Panchgaon ckt commissioned on 05.09.2022
33	400/220kV, Saharanpur	Commissioned: 6 Under Implementation:2 Total: 8	Utilized: 6 Unutilized: 0 Under Implementation:2	• Network to be planned for 2 bays	31.12.2022	Saharanpur(PG)-Devband D/c line expected energization date Dec'22 updated by UPPTCL in 201st OCC
34	400/220kV, Wagoora	Commissioned: 10 Total: 10	Utilized: 6 Unutilized: 4	• Network to be planned for 4 bays	-	PDD, J&K to update the status.
35	400/220kV, Ludhiana	Commissioned: 9 Total: 9	Utilized: 8 Unutilized: 1	• Network to be planned for 1 bay	Mar'23	Direct circuit from 220 kV Lalton Kalan to Dhandari Kalan to be diverted to 400 kV PGCIL Ludhiana. Work expected to be completed by March 2023.Updated in 198th OCC by PSTCL.
36	400/220kV, Chamba (Chamera Pool)	Commissioned: 3 Under tender:1 Total: 4	Utilized:3 Unutilized: 0 Under tender:1	• Stringing of 2nd ckt of Chamera Pool – Karian 220kV D/c line	-	Stringing of 2nd Circuit of Chamera Pool-Karian Tansmission line has been completed & terminal bay at 400/220 kV chamera pooling substation (PGCIL) is not ready.Updated in 198th OCC by HPPTCL
37	400/220kV, Mainpuri	Commissioned: 6 Under Implementation:2 Total: 8	Utilized: 6 Unutilized: 0 Under Implementation:2	• Network to be planned for 2 bays	-	• 02 no. of bays under finalization stage updated by UPPTCL in 196th OCC. Mainpuri S/s planned. Land is not finalized, therefore timeline not available as intimated by UPPTCL in 201st OCC.
38	400/220kV, Patiala	Commissioned: 8 Total: 8	Utilized: 6 Unutilized: 2	• Network to be planned for 2 bays	May'24	2 Nos. bays for 400 kV PGCIL Patiala - 220 kV Bhadson (D/C) line being planned. Work expected to be completed by May 2024. Updated in 198th OCC by PSTCL.

2. Establishment of new 400/220kV substations in Northern Region:

Sl. No.	Name of Substation	MVA Capacity	Expected Schedule		Downstream connectivity by States
1	400/220kV Dwarka-I GIS (8 nos. of 220kV bays)	4x 500	Mar'22		DTL to update the status
2	220/66kV Chandigarh GIS (8 nos. of 66kV bays)	2x 160	Apr'22		Chandigarh to update the status.
3	400/220kV Jauljivi GIS Out of these 8 nos. 220kV Line Bays, 4 nos. (Pithoragath-2, & Dhauliganga-2) would be used by the lines being constructed by POWERGRID and balance 4 nos. bays would be used by the lines being constructed by PTCUL.	2x315	Feb'22		• 220kV Almora-Jauljibi line • 220kV Brammah-Jauljibi line PTCUL to update the status of lines.

FGD Status

Updated status of FGD related data submission

NTPC (25.02.2022)
MEJA Stage-I (Updated by UP on 18.06.2022)
RIHAND STPS
SINGRAULI STPS
TANDA Stage-I
TANDA Stage-II
UNCHAHAR TPS
UPRVUNL (14.11.2022)
ANPARA TPS
HARDUAGANJ TPS
OBRA TPS
PARICHHA TPS

PSPCL (14.11.2022)
GGSSTP, Ropar
GH TPS (LEH.MOH.)
RRVUNL (14.11.2022)
CHHABRA SCPP
CHHABRA TPP
KALISINDH TPS
KOTA TPS
SURATGARH SCTPS
SURATGARH TPS

Updated status of FGD related data submission

Lalitpur Power Gen. Co. Ltd. (17.10.2022)
Lalitpur TPS
Lanco Anpara Power Ltd. (18.06.2022)
ANPARA-C TPS

HGPCL (14.09.2022)
PANIPAT TPS
RAJIV GANDHI TPS
YAMUNA NAGAR TPS

Adani Power Ltd. (18.02.2022)
KAWAI TPS

Rosa Power Supply Company (18.06.2022)
Rosa TPP Phase-I
Prayagraj Power Generation Company Ltd. (17.10.2022)
Prayagraj TPP
APCPL (25.02.2022)
INDIRA GANDHI STPP

Pending submissions

GVK Power Ltd.
GOINDWAL SAHIB

NTPC
DADRI (NCTPP)
Talwandi Sabo Power Ltd.
TALWANDI SABO TPP
L&T Power Development Ltd.
Nabha TPP (Rajpura TPP)

Target Dates for FGD Commissioning (Utility-wise)

Adani Power Ltd.	KAWAI TPS U#1 (Target: 31-12-2024), KAWAI TPS U#2 (Target: 31-12-2024)
APCPL	INDIRA GANDHI STPP U#1 (Target: 30-09-2022), INDIRA GANDHI STPP U#2 (Target: 30-09-2022), INDIRA GANDHI STPP U#3 (Target: 30-09-2022)
GVK Power Ltd.	GOINDWAL SAHIB U#1 (Target: 30-04-2020), GOINDWAL SAHIB U#2 (Target: 29-02-2020)
HGPCL	PANIPAT TPS U#6 (Target: 30-04-2021), PANIPAT TPS U#7 (Target: 28-02-2021), PANIPAT TPS U#8 (Target: 31-12-2020), RAJIV GANDHI TPS U#1 (Target: 30-04-2022), RAJIV GANDHI TPS U#2 (Target: 28-02-2022), YAMUNA NAGAR TPS U#1 (Target: 31-12-2021), YAMUNA NAGAR TPS U#2 (Target: 31-10-2021)

NTPC	DADRI (NCTPP) U#1 (Target: 31-12-2020), DADRI (NCTPP) U#2 (Target: 31-10-2020), DADRI (NCTPP) U#3 (Target: 31-08-2020), DADRI (NCTPP) U#4 (Target: 30-06-2020), DADRI (NCTPP) U#5 (Target: 30-06-2022), DADRI (NCTPP) U#6 (Target: 30-06-2022), RIHAND STPS U#1 (Target: 30-06-2024), RIHAND STPS U#2 (Target: 30-06-2024), RIHAND STPS U#3 (Target: 31-12-2023), RIHAND STPS U#4 (Target: 31-12-2023), RIHAND STPS U#5 (Target: 30-06-2023), RIHAND STPS U#6 (Target: 30-06-2023), SINGRAULI STPS U#1 (Target: 30-06-2024), SINGRAULI STPS U#2 (Target: 30-06-2024), SINGRAULI STPS U#3 (Target: 30-06-2024), SINGRAULI STPS U#4 (Target: 30-06-2024), SINGRAULI STPS U#5 (Target: 30-06-2024), SINGRAULI STPS U#6 (Target: 31-03-2023), SINGRAULI STPS U#7 (Target: 31-03-2023), UNCHAHAR TPS U#1 (Target: 31-12-2023), UNCHAHAR TPS U#2 (Target: 31-12-2023), UNCHAHAR TPS U#3 (Target: 30-06-2024), UNCHAHAR TPS U#4 (Target: 30-06-2024), UNCHAHAR TPS U#5 (Target: 30-06-2024), UNCHAHAR TPS U#6 (Target: 30-06-2022), MEJA Stage-I U#1 (Target: 31-12-2022), MEJA Stage-I U#2 (Target: 31-03-2023), TANDA Stage-I U#3 (Target:), TANDA Stage-I U#4 (Target:), TANDA Stage-II U#3 (Target: 31-12-2022), TANDA Stage-II U#4 (Target: 31-12-2022)

L&T Power Development Ltd (Nabha)	Nabha TPP (Rajpura TPP) U#1 (Target: 30-04-2021), Nabha TPP (Rajpura TPP) U#2 (Target: 28-02-2021)
Lalitpur Power Gen. Company Ltd.	LALITPUR TPS U#1 (Target: 31-12-2026), LALITPUR TPS U#2 (Target: 30-09-2026), LALITPUR TPS U#3 (Target: 30-06-2026)
Lanco Anpara Power Ltd.	ANPARA C TPS U#1 (Target: 31-12-2023), ANPARA C TPS U#2 (Target: 31-12-2023)
Prayagraj Power Generation Company Ltd.	PRAYAGRAJ TPP U#1 (Target: 31-12-2024), PRAYAGRAJ TPP U#2 (Target: 31-12-2024), PRAYAGRAJ TPP U#3 (Target: 31-12-2024)
PSPCL	GH TPS (LEH.MOH.) U#1 (Target: 31-12-2024), GH TPS (LEH.MOH.) U#2 (Target: 31-12-2024), GH TPS (LEH.MOH.) U#3 (Target: 31-12-2024), GH TPS (LEH.MOH.) U#4 (Target: 31-12-2024), GGSSTP, Ropar U#3 (Target: 31-03-2022), GGSSTP, Ropar U#4 (Target: 31-05-2022), GGSSTP, Ropar U#5 (Target: 31-07-2022), GGSSTP, Ropar U#6 (Target: 30-09-2022)

Rosa Power Supply Company	ROSA TPP Ph-I U#1 (Target: 31-12-2026), ROSA TPP Ph-I U#2 (Target: 31-12-2026), ROSA TPP Ph-I U#3 (Target: 31-12-2026), ROSA TPP Ph-I U#4 (Target: 31-12-2026)
RRVUNL	KOTA TPS U#5 (Target: 31-08-2022), KOTA TPS U#6 (Target: 31-08-2022), KOTA TPS U#7 (Target: 31-08-2022), SURATGARH TPS U#1 (Target: 31-12-2026), SURATGARH TPS U#2 (Target: 31-12-2026), SURATGARH TPS U#3 (Target: 31-12-2026), SURATGARH TPS U#4 (Target: 31-12-2026), SURATGARH TPS U#5 (Target: 31-12-2026), SURATGARH TPS U#6 (Target: 31-12-2026), SURATGARH SCTPS U#7 (Target: 28-02-2025), SURATGARH SCTPS U#8 (Target: 28-02-2025), CHHABRA TPP U#1 (Target: 31-12-2026), CHHABRA TPP U#2 (Target: 31-12-2026), CHHABRA TPP U#3 (Target: 31-12-2026), CHHABRA TPP U#4 (Target: 31-12-2026), CHHABRA SCPP U#5 (Target: 28-02-2025), CHHABRA SCPP U#6 (Target: 28-02-2025), KALISINDH TPS U#1 (Target: 28-02-2025), KALISINDH TPS U#2 (Target: 28-02-2025)
Talwandi Sabo Power Ltd.	TALWANDI SABO TPP U#1 (Target: 28-02-2021), TALWANDI SABO TPP U#2 (Target: 31-12-2020), TALWANDI SABO TPP U#3 (Target: 31-10-2020)
UPRVUNL	ANPARA TPS U#1 (Target: 31-12-2023), ANPARA TPS U#2 (Target: 31-12-2023), ANPARA TPS U#3 (Target: 31-12-2023), ANPARA TPS U#4 (Target: 31-12-2023), ANPARA TPS U#5 (Target: 31-12-2023), ANPARA TPS U#6 (Target: 31-12-2023), ANPARA TPS U#7 (Target: 31-12-2023), HARDUAGANJ TPS U#8 (Target: 31-12-2024), HARDUAGANJ TPS U#9 (Target: 31-12-2024), OBRA TPS U#9 (Target: 31-12-2024), OBRA TPS U#10 (Target: 31-12-2024), OBRA TPS U#11 (Target: 31-12-2024), OBRA TPS U#12 (Target: 31-12-2024), OBRA TPS U#13 (Target: 31-12-2024), PARICHHA TPS U#3 (Target: 30-04-2022), PARICHHA TPS U#4 (Target: 31-12-2024), PARICHHA TPS U#5 (Target: 31-12-2024), PARICHHA TPS U#6 (Target: 31-12-2024)

RAJASTHAN RAJYA VIDYUT PRASARAN NIGAM LIMITED.
[Corporate Identity Number (CIN):U40109RJ2000SGC016485]
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RVPN
An ISO 9001:2000 Certified Company

No. RVPN/SE(P&P)/XEN-2(P&P)/AE-2/ F. /D 1211 Jaipur, Dt. 15/09/2022

To
The General Manager (NRLDC)
Power System Operation Corporation Ltd. (POSOCO)
18-A, Shaheed Jeet Singh Sansanwal Marg, Katwaria Sarai
New Delhi-110016.

Sub:- Proposed SPS for 400/220 kV ICTs at RVPN's 400 KV GSS Bhadla.
Ref: MOM 197th OCC Meeting held on dated 22.07.2022

On the above captioned subject, it was decided in the 197th OCC Meeting held on dated 22.07.2022 that RVPN to share the studies/simulation study of the proposed SPS for 400/220 kV ICTs at RVPN's 400 kV GSS Bhadla for further analysis. RVPN has carried out the load flow study for proposed SPS. Kindly find attached modified justification note for proposed SPS for 400/220 KV ICTs at RVPN's 400 KV GSS Bhadla alongwith schematic diagram, load details and results of load flow study for consideration and approval.

Encl: As above

(K.K. Meena)
Chief Engineer (PP&D)
RVPNL, Jaipur.

Copy to the following for information and necessary action please-

1. The Member Sceratry (NRPC), 18-A, Shaheed Jeet Singh Marg, Katwaria Sarai, New Delhi-110016
2. The Chief Engineer (LD/T&C/MPT&S), RVPN, Jaipur/Jodhpur/Jodhpur.
3. The Chief Engineer, Power System Planning & Appraisal-I Division, CEA, Sewa Bhawan, RK Puram-I, New Delhi-110066
4. The Superintending Engineer (Operation), NRPC, 18-A, Shaheed Jeet Singh Marg, Katwaria Sarai, New Delhi-110016.

Encl: As above

Chief Engineer (PP&D)
RVPNL, Jaipur

Proposed SPS for 2x315 MVA, 400/220 kV ICTs at 400 kV GSS Bhadla

1. Details of Installed ICTs and Transmission Lines

- There are 3x500MVA, 400/220 kV ICTs at 400 kV GSS Bhadla. Mainly these ICTs are used to stepped up the RE power to evacuate through 400 kV lines to Jodhpur, Merta and Bikaner. Load sharing on all the ICTs is almost equal and each ICT is loaded near to rated capacity of 500 MVA.
- Power map of transmission system at 400 kV GSS Bhadla is shown in Figure 1.

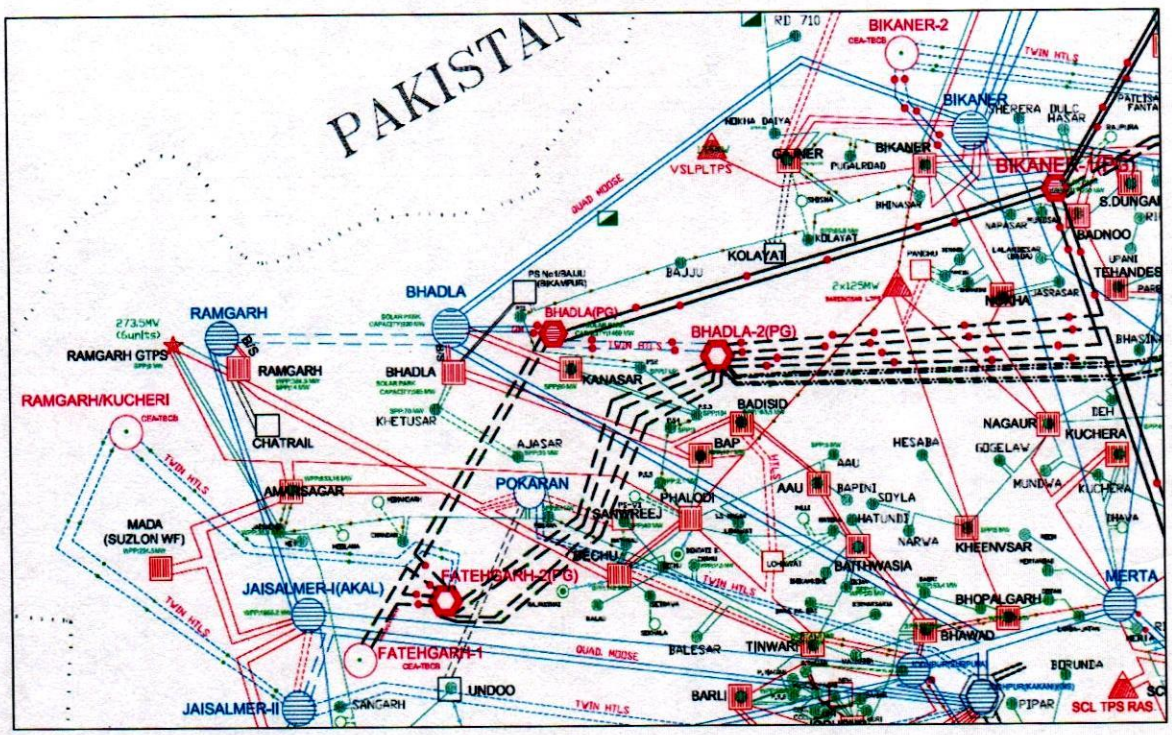


Fig. 1 Power map of Bhadla region

2. Load Details on ICTs and Transmission Lines Associated with 400 kV GSS Bhadla

- Peak Loads recorded on the 400/220 kV ICTs and 220 kV lines associated with 400 kV GSS Bhadla are detailed below in Table 1. RE power injected by the lines to 220 kV Bus of 400 kV GSS Bhadla is also mentioned in the Table 1.

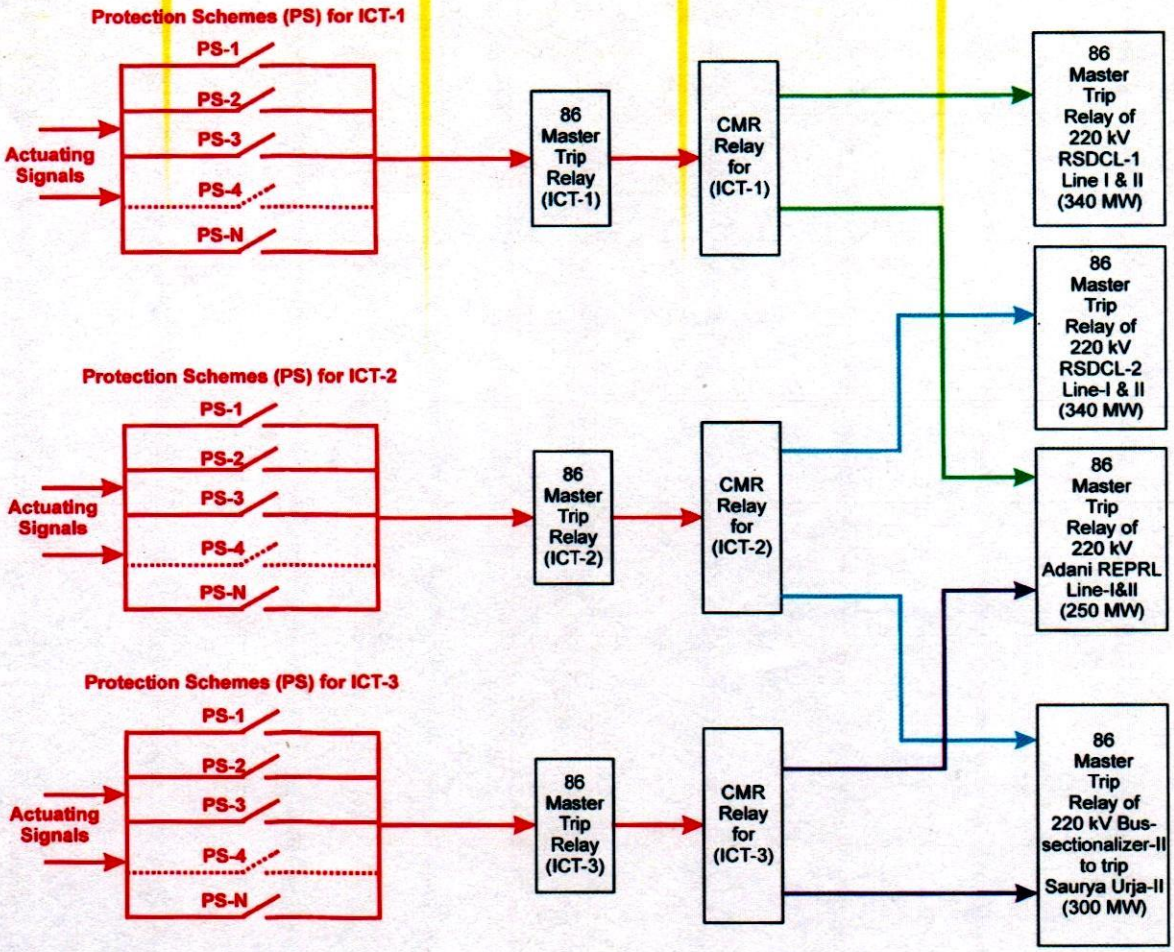
Table 1: Load Details on ICTs and Transmission Lines Associated with 400 kV GSS Bhadla

S. No.	Name of 220 kV line/ILTs	Peak Load (MW)	RE Generation
1	500 MVA, 400/220 kV ICT-I	494	
2	500 MVA, 400/220 kV ICT-II	490	
3	500 MVA, 400/220 kV ICT-III	491	
4	400 kV Bhadla-Bikaner Ckt-I Line	598	
5	400 kV Bhadla-Bikaner Ckt-II Line	710	

6	400 kV Bhadla-Ramgarh Ckt-I Line	520	
7	400 kV Bhadla-Ramgarh Ckt-II Line	520	
8	400 kV Bhadla-Merta Line	406	
9	400 kV Bhadla-Jodhpur (Surpura) Line	600	
10	400 kV Bhadla (RVPN)-Bhadla(PGCIL) Ckt-I Line	562	
11	400 kV Bhadla (RVPN)-Bhadla(PGCIL) Ckt-II Line	548	
12	220 kV Bhadla-Kanasar Ckt-I Line	134	190 MW
13	220 kV Bhadla-Kanasar Ckt-II Line	134	
14	220 kV Bus Sectionalizer-II to evacuate power of Saurya Urja-II (300 MW)	-	300 MW
15	220 kV Bhadla-RSDCL-1 Ckt-I Line	153	340 MW
16	220 kV Bhadla-RSDCL-1 Ckt-II Line	152	
17	220 kV Bhadla-RSDCL-2 Ckt-I Line	154	340 MW
18	220 kV Bhadla-RSDCL-2 Ckt-II Line	156	
19	220 kV Bhadla-Adani REPRL Ckt-I Line	132	250 MW
20	220 kV Bhadla- Adani REPRL Ckt-II Line	131	

3. Proposed SPS for ICTs at 400 kV GSS Bhadla

- After detailed analysis of above loading conditions, RE power injection & grid interconnection issues, following lines are considered for tripping as soon as any one of the 3x500 MVA, 400/220 kV ICTs is tripped on fault/protection:-
  - 220 kV Bhadla-RSDCL-1 Ckt-I Line
  - 220 kV Bhadla-RSDCL-1 Ckt-II Line
  - 220 kV Bhadla-RSDCL-2 Ckt-I Line
  - 220 kV Bhadla-RSDCL-2 Ckt-II Line
  - 220 kV Bhadla- Adani REPRL Ckt-I Line
  - 220 kV Bhadla- Adani REPRL Ckt-II Line
  - 220 kV Bus Sectionalizer-II used to evacuate 300 MW RE power of Saurya Urja-II
- Tripping command for the 220 kV lines and 220 kV Bus Sectionalizer-II used to inject RE power on the 220 kV bus of 400 kV GSS Bhadla is to be taken from the 86 relay installed on 220 kV side of all the 3x500 MVA, 400/220 kV ICTs which will be utilized to trip the above 220 kV lines and/or 220 kV Bus Sectionalizer-II when any one ICT trips on fault/protection.
- Schematic diagram for tripping of 220 kV lines included in SPS for 3x500 MVA, 400/220 kV ICTs at 400 kV GSS Bhadla is shown below in Figure 2.



SCHEMATIC DIAGRAM OF PROPOSED SPS FOR 3X500 MVA 400/220 KV ICTs AT 400 KV GSS BHADLA

Fig. 2 Schematic diagram of proposed logics for SPS of 3x500 MVA, 400/220 kV ICTs at 400 kV GSS Bhadla

- To facilitate the RE generators for evacuation of RE powers of all generators in proportionate quantum, the tripped lines may be re-connected after curtailing the RE generation from all generators in such a quantum to maintain loadings on the healthy 400/220 kV ICTs within permissible limits.

4. Validation of Proposed SPS for ICTs at 400 kV GSS Bhadla Using Load Flow Studies

- Load flow study is carried out for the condition corresponding to FY 2022-2023 for total system load of 16012 MW (recorded on 28.06.2022) considering the RE generation mentioned in the Table 2 at injection point with the RVPN network. The voltage level and injection point for RE generators are also mentioned in the Table 2.

Table 2 Details of RE Generators and Injection Point

S. No.	Name of RE Generator	Quantum of RE Power	Voltage Level of Grid Injection Point/Location	RE evacuation arrangement

1	RSDCL-1	340 MW	220 kV (400 kV GSS Bhadla)	220 kV D/C RSDCL-Bhadla line integrated to 220 kV bus of 400 kV GSS of Bhadla
2	RSDCL-2	340 MW	220 kV (400 kV GSS Bhadla)	220 kV D/C RSDCL-Bhadla line integrated to 220 kV bus of 400 kV GSS of Bhadla
3	Adani REPRL	250 MW	220 kV (400 kV GSS Bhadla)	220 kV D/C RSDCL-Bhadla line integrated to 220 kV bus of 400 kV GSS of Bhadla
4	Saurya Urja-II	300 MW	220 kV (400 kV GSS Bhadla)	220 kV D/C Saurya Urja-II-Bhadla line integrated to 220 kV bus of 400 kV GSS of Bhadla using bus coupler between the 220 kV GSS and 400 kV GSS
5	220 kV GSS Kanasar	190 MW	220 kV (400 kV GSS Bhadla)	220 kV D/C Kanasar-Bhadla line integrated to 220 kV bus of 400 kV GSS of Bhadla
6	Saurya Urja-I	200 MW	220 kV (220 kV GSS Bhadla)	220 kV D/C Saurya Urja-I-Bhadla line integrated to 220 kV bus of 220 kV GSS of Bhadla
7	Injection on 33 kV voltage level by 6 nos. generators	65 MW	33 kV (220 kV GSS Bhadla)	Power is injected on 33 kV voltage level in the yard of 220 kV GSS Bhadla
8	132 kV GSS Khetusar	70 MW	132 kV (220 kV GSS Bhadla)	Power is injected on 132 kV voltage level in the yard of 220 kV GSS Bhadla

- Load flow study is carried out for the following case studies:-

Case-1: Base Case (Power flow plot is placed at Exhibit-1). Power flow plot with outage of one ICT is placed at Exhibit-1A.

Case-2: Outage of 500 MVA, 400/220 kV ICT-1 and tripping of following lines (Power flow plot is placed at Exhibit-2)

- 220 kV D/C Bhadla-RSDCL-1 line
- 220 kV D/C Bhadla-Adani REPRL line

Case-3: Outage of 500 MVA, 400/220 kV ICT-2 and tripping of following lines (Power flow plot is placed at Exhibit-3)

- 220 kV D/C Bhadla-RSDCL-2 line
- 220 kV Bus Coupler between 400 kV GSS Bhadla and 220 kV GSS Bhadla for outage of 300 MW generation of Saurya Urja-II

Case-4: Outage of 500 MVA, 400/220 kV ICT-3 and tripping of following lines (Power flow plot is placed at Exhibit-4)

- 220 kV D/C Bhadla-Adani REPRL line

- 220 kV Bus Coupler between 400 kV GSS Bhadla and 220 kV GSS Bhadla for outage of 300 MW generation of Saurya Urja-II

- Power flow on the ICTs and transmission lines associated with the 220 kV and 400 kV transmission lines associated with 400 kV GSS Bhadla are Tabulated in Table 3:-

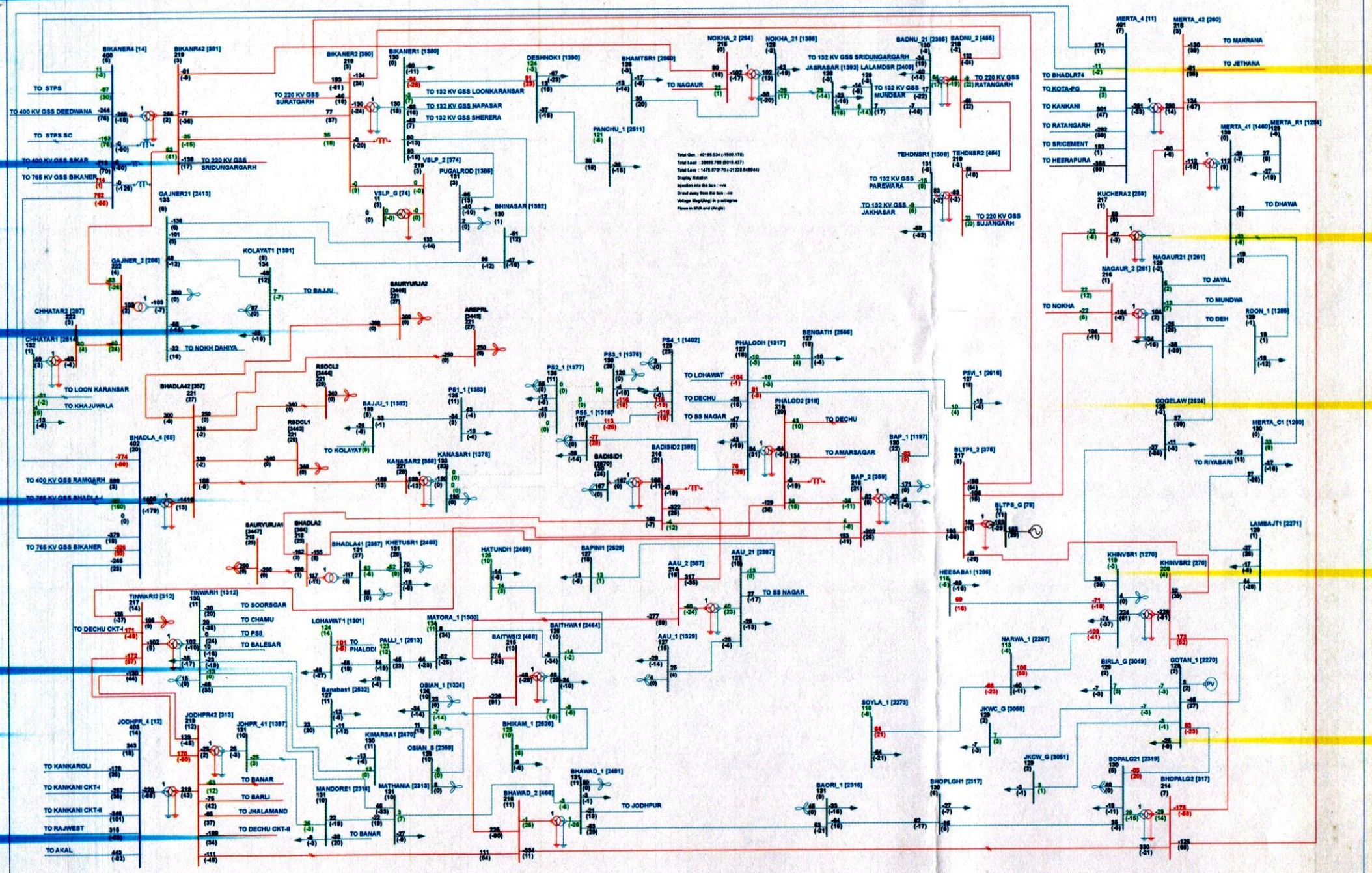
Table 3 Power Flow on the ICTs and Transformers

S. No.	Name of ICT/Line	Power Flow (MW)				
		Base Case (Case-1)		Case-2	Case-3	Case-4
		(Exhibit-1)	(Exhibit-1A)	(Exhibit-2)	(Exhibit-3)	(Exhibit-4)
1	3x500 MVA, 400/220 kV ICTs	-1408	NA	NA	NA	NA
1	2x500 MVA, 400/220 kV ICTs	NA	**-1403**	-823	-774	-862
2	400 kV S/C Bhadla-Bikaner (RVPN) line	774	772	710	704	714
3	400 kV S/C Bhadla-Bikaner (PGCIL) line	526	525	476	471	479
4	400 kV S/C Bhadla-Jodhpur line	245	244	208	205	211
5	400 kV S/C Bhadla-Merta line	379	378	348	345	350
6	400 kV S/C Bhadla-Ramgarh line	-599	-598	-656	-661	-652
7	400 kV S/C Bhadla (RVPN)-Bhadla (PGCIL) line	83	82	-262	-291	-239
8	220 kV D/C Bhadla-RSDCL1 line	-339	-339	NIL	-339	-339
9	220 kV D/C Bhadla-RSDCL2 line	-339	-339	**-339**	NIL	-339
10	220 kV D/C Bhadla-Adani line	-250	-250	NIL	-250	NIL
11	220 kV D/C Bhadla-Saurya Urja-II line (Bus coupler)	-300	-300	-300	NIL	NIL
12	220 kV D/C Bhadla (220 kV GSS)-Saurya Urja-I line	-200	-200	-200	-200	-200
13	220 kV D/C Bhadla (220 kV GSS)-Bap line	155	155	155	155	155
14	220 kV D/C Bhadla (220 kV GSS)-Badisid line	162	162	162	162	162

- Detailed analysis of the power flow on the transmission elements associated with the 400 kV GSS Bhadla and 220 kV GSS Bhadla mentioned in Table 3 indicates that loading on all the healthy ICTs is within permissible limits. However, with reduced RE generation loading on the healthy ICTs vary from 77.4% to 82.3%. These ICTs can be utilized up to full capacity by allowing the generation from the tripped RE generators on reduced capacity.

5. Conclusion

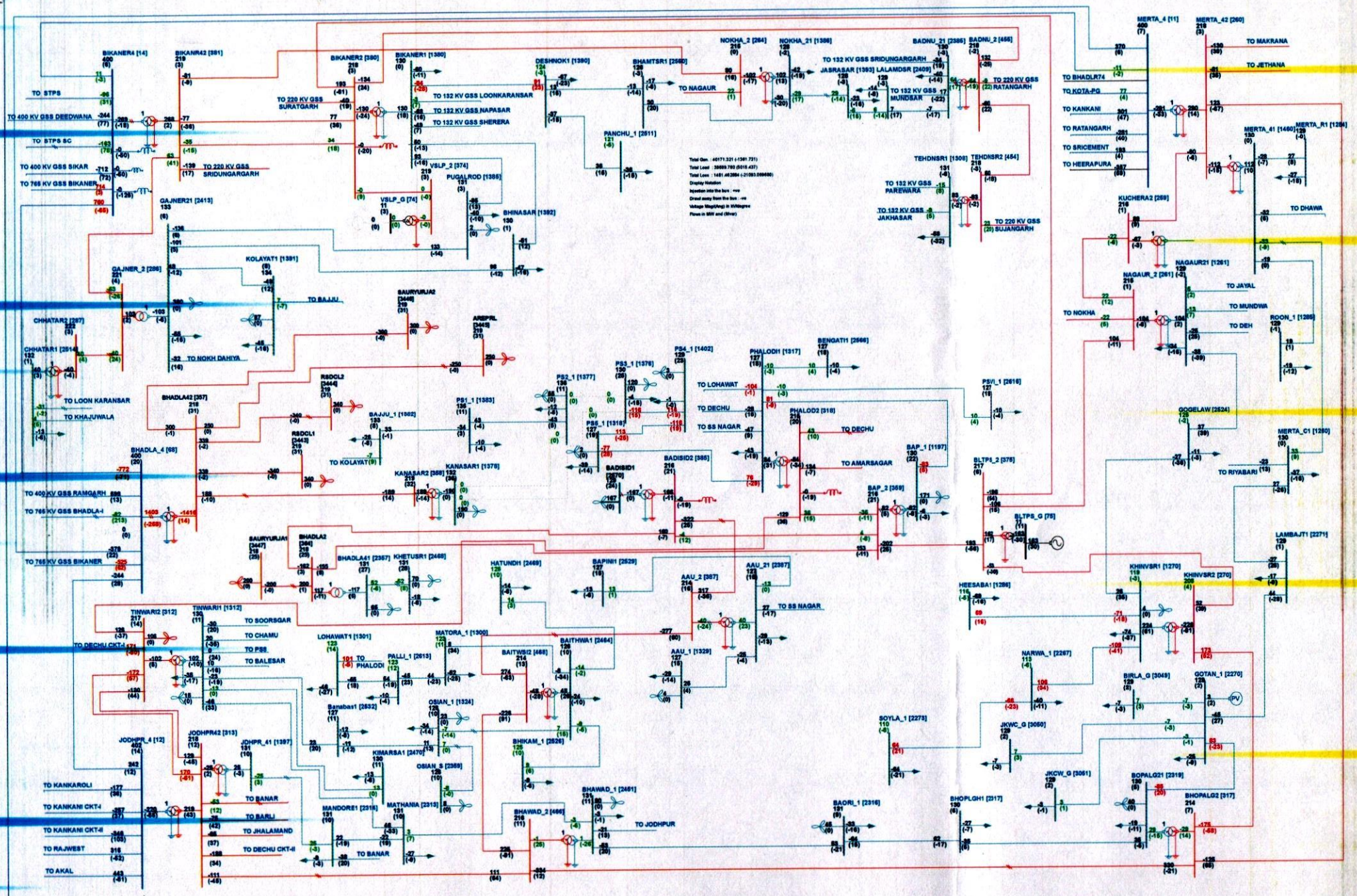
Based on the results of load flow study, SPS logics included in the section 3 and explained in Fig. 2 are found feasible.



BASE CASE: LOAD FLOW STUDY FOR CONDITION CORRESPONDING TO THE FY 2022-2023 FOR TOTAL SYSTEM LOAD OF 16012 MW

SPS STUDY-400 KV GSS BHADLA

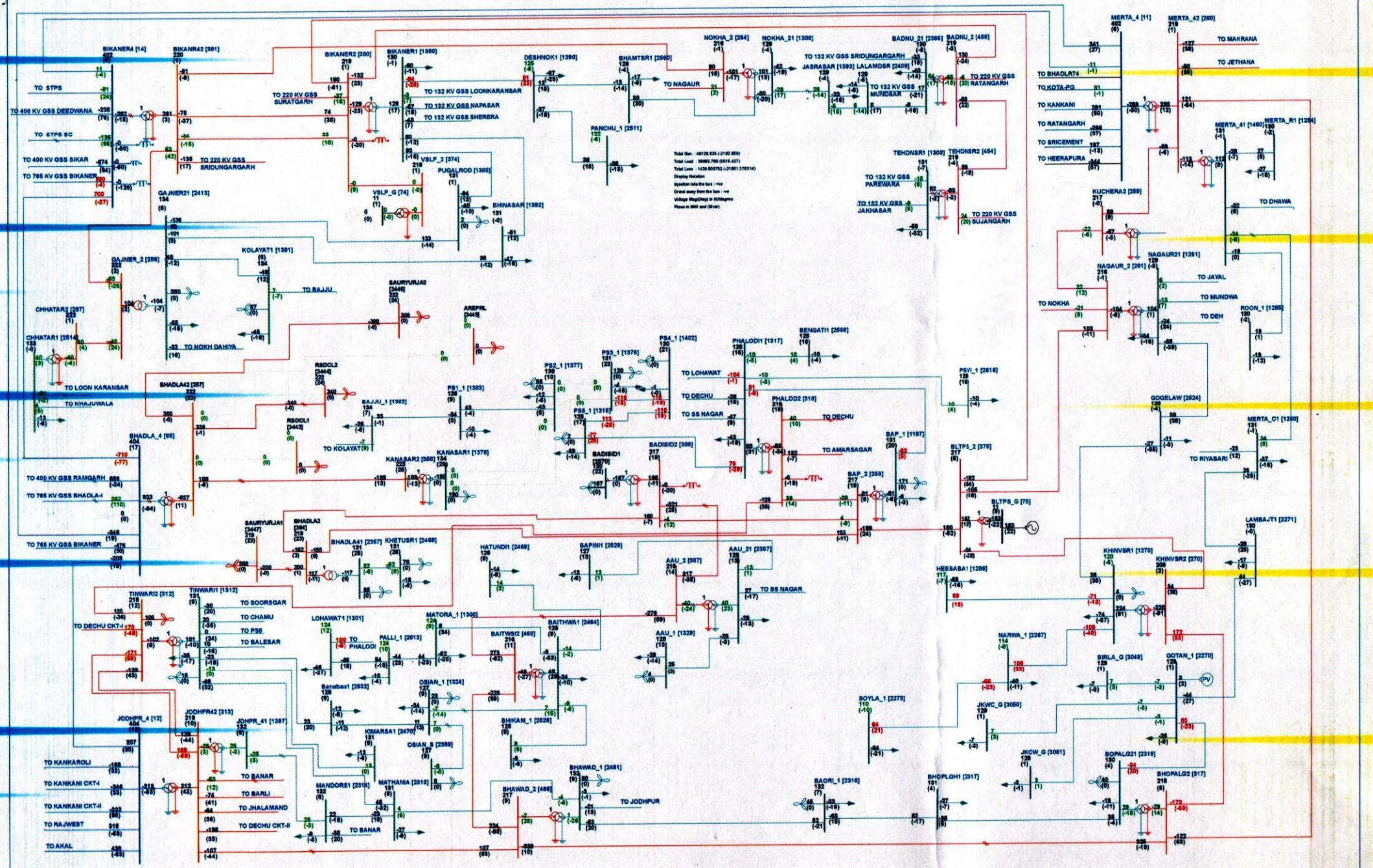
EXHIBIT-1



BASE CASE: LOAD FLOW STUDY FOR CONDITION CORRESPONDING TO THE FY 2022-2023 FOR TOTAL SYSTEM LOAD OF 16012 MW (OUTAGE OF ONE ICT)

SPS STUDY-400 KV GSS BHADLA

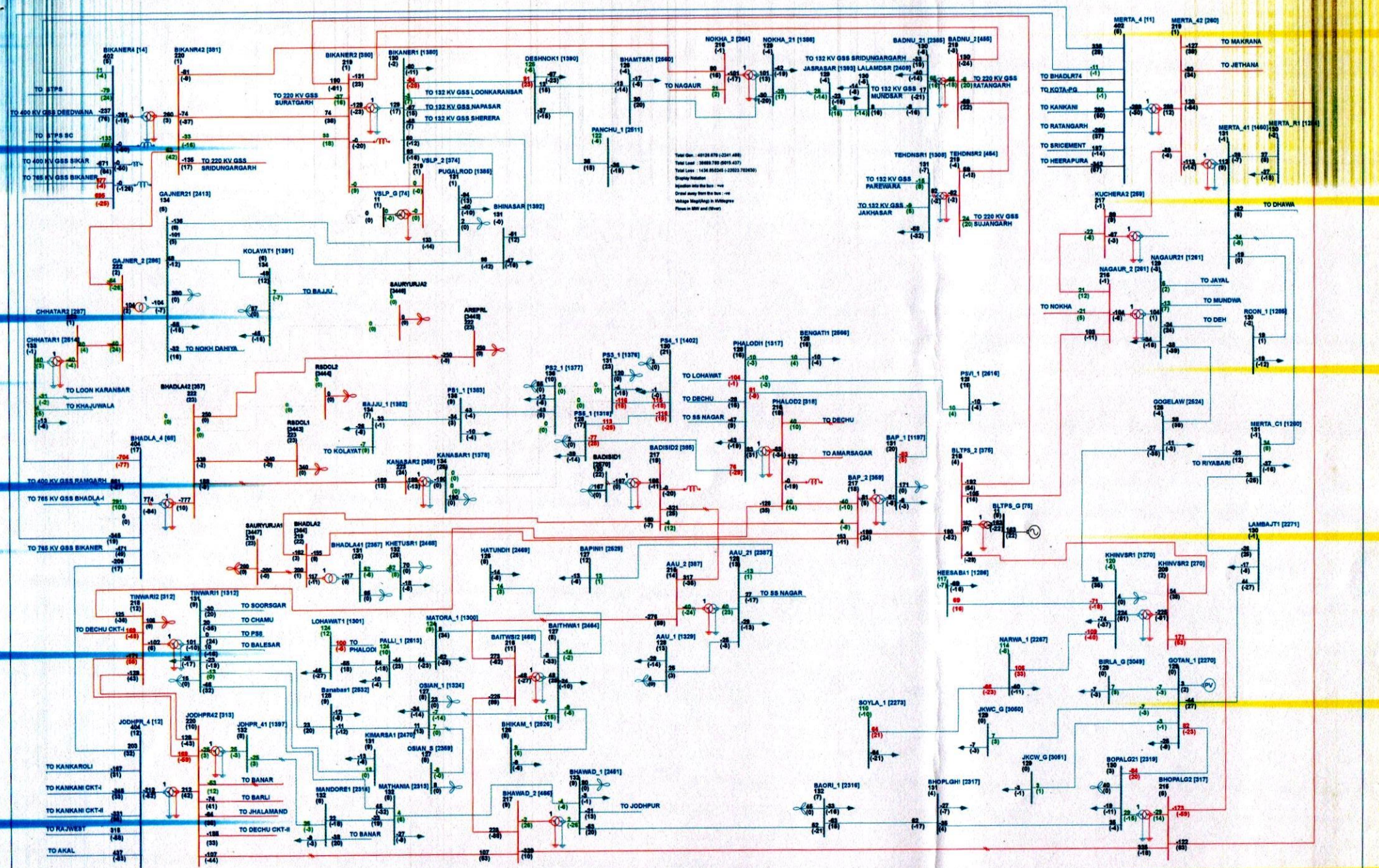
EXHIBIT-1 A



CASE-2: OUTAGE OF ONE ICT AND TRIPPING OF POWER PLANTS OF RSDCL1 AND ADANI REPRL

SPS STUDY-400 KV GSS BHADLA

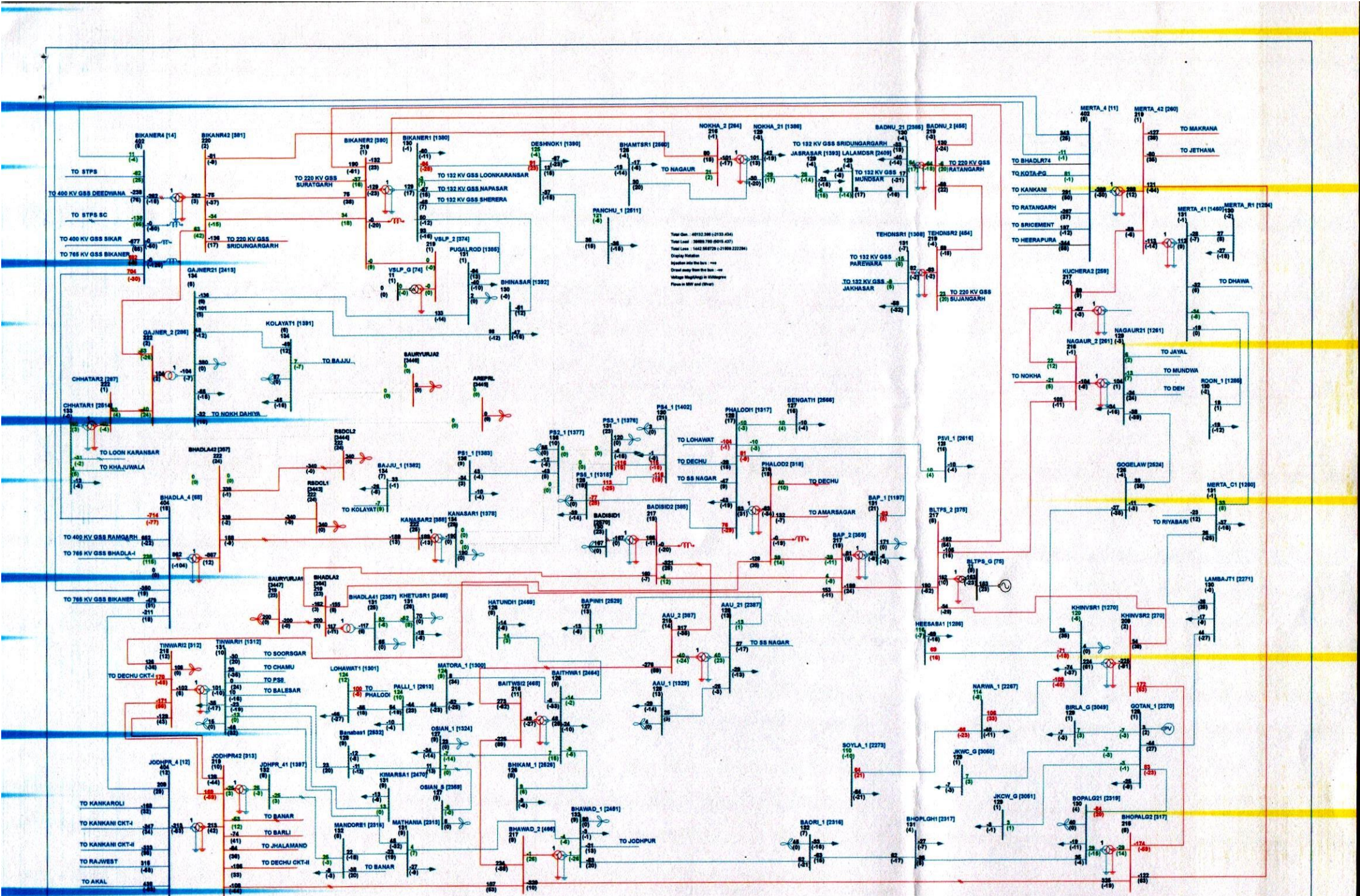
EXHIBIT-2



CASE-3: OUTAGE OF ONE ICT AND TRIPPING OF POWER PLANTS OF RSDCL2 AND SAURYA URJA-II(BUS COUPLER)

SPS STUDY-400 KV GSS BHADLA

EXHIBIT-3



CASE-4: OUTAGE OF ONE ICT AND TRIPPING OF POWER PLANTS OF RSDCL2 AND SAURYA URJA-II(BUS COUPLER)

SPS STUDY-400 KV GSS BHADLA

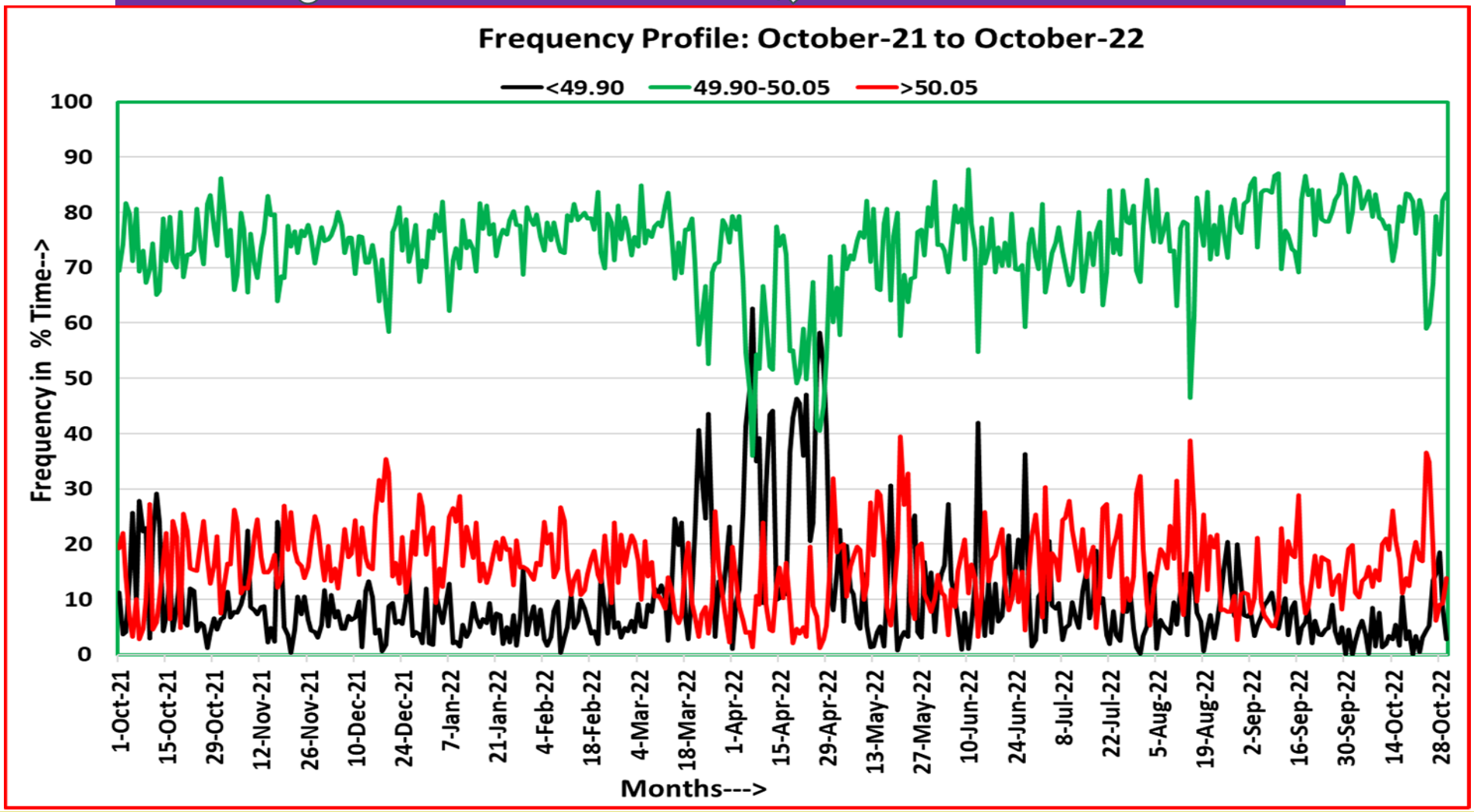
EXHIBIT-4

प्रचालन समन्वय उपसमिति की बैठक
अक्टूबर - 2022

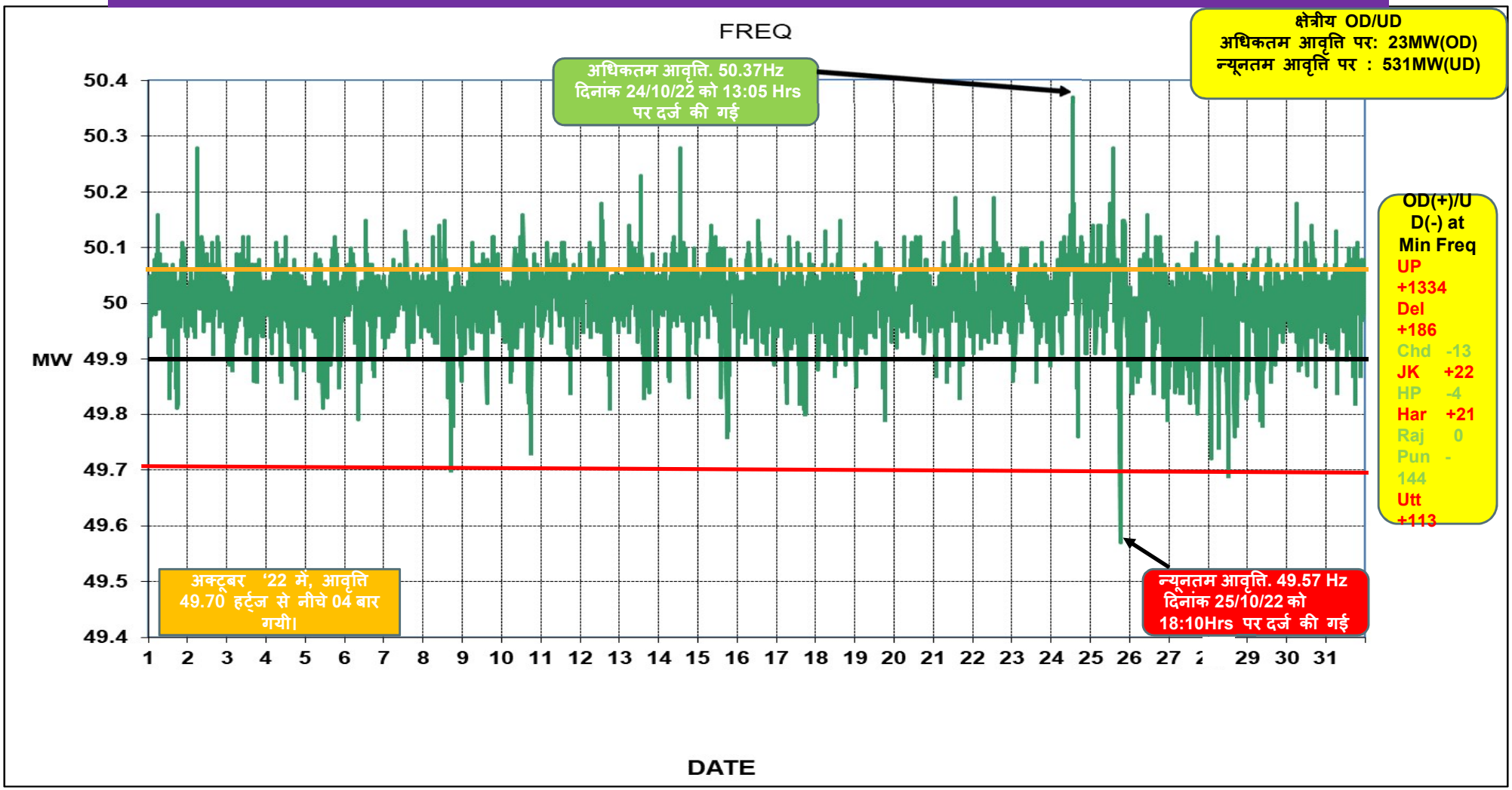
पिछले एक साल मे आवृत्ति की स्थिति

आवृत्ति बैंड	अक्टूबर 2021	नवम्बर 2021	दिसम्बर 2021	जनवरी 2022	फ़रवरी 2022	मार्च 2022	अप्रैल 2022	मई 2022	जून 2022	जुलाई 2022	अगस्त 2022	सितम्बर 2022	अक्टूबर 2022
< 49.7 Hz(%)	0.31	0.09	0.03	0.02	0.08	0.46	4.94	0.27	0.42	0.42	0.49	0.17	0.04
<49.8 Hz(%)	2.43	1.17	0.71	0.53	0.55	2.92	13.60	1.94	2.41	1.78	2.02	0.91	0.46
<49.9 Hz(%)	11.10	8.02	6.92	5.84	5.99	14.50	31.98	9.83	12.45	7.82	8.77	5.94	4.88
49.90-50.05 Hz(%)	**74.38**	**74.10**	**73.14**	**75.66**	**77.06**	**73.42**	**59.30**	**72.23**	**73.38**	**73.45**	**75.77**	**80.77**	**78.27**
50.05-50.10 Hz(%)	12.70	14.77	15.09	15.17	14.36	10.28	7.35	12.95	11.46	14.84	11.99	11.55	14.04
>50.10 Hz(%)	1.81	3.05	3.89	3.21	2.51	1.72	1.35	4.11	2.43	3.58	3.00	1.65	2.63
>50.20 Hz(%)	0.06	0.07	0.25	0.11	0.08	0.08	0.08	0.88	0.28	0.31	0.47	0.08	0.18
औसत आवृत्ति	49.99	50.00	50.00	50.00	50.00	49.98	49.93	50.00	49.99	50.00	50.00	50.00	50.00

आवृत्ति की स्थिति: अक्टूबर -2021 से 2022



अक्टूबर -2022 के दौरान आवृत्ति की स्थिति
(As per 5 Minute SCADA data)

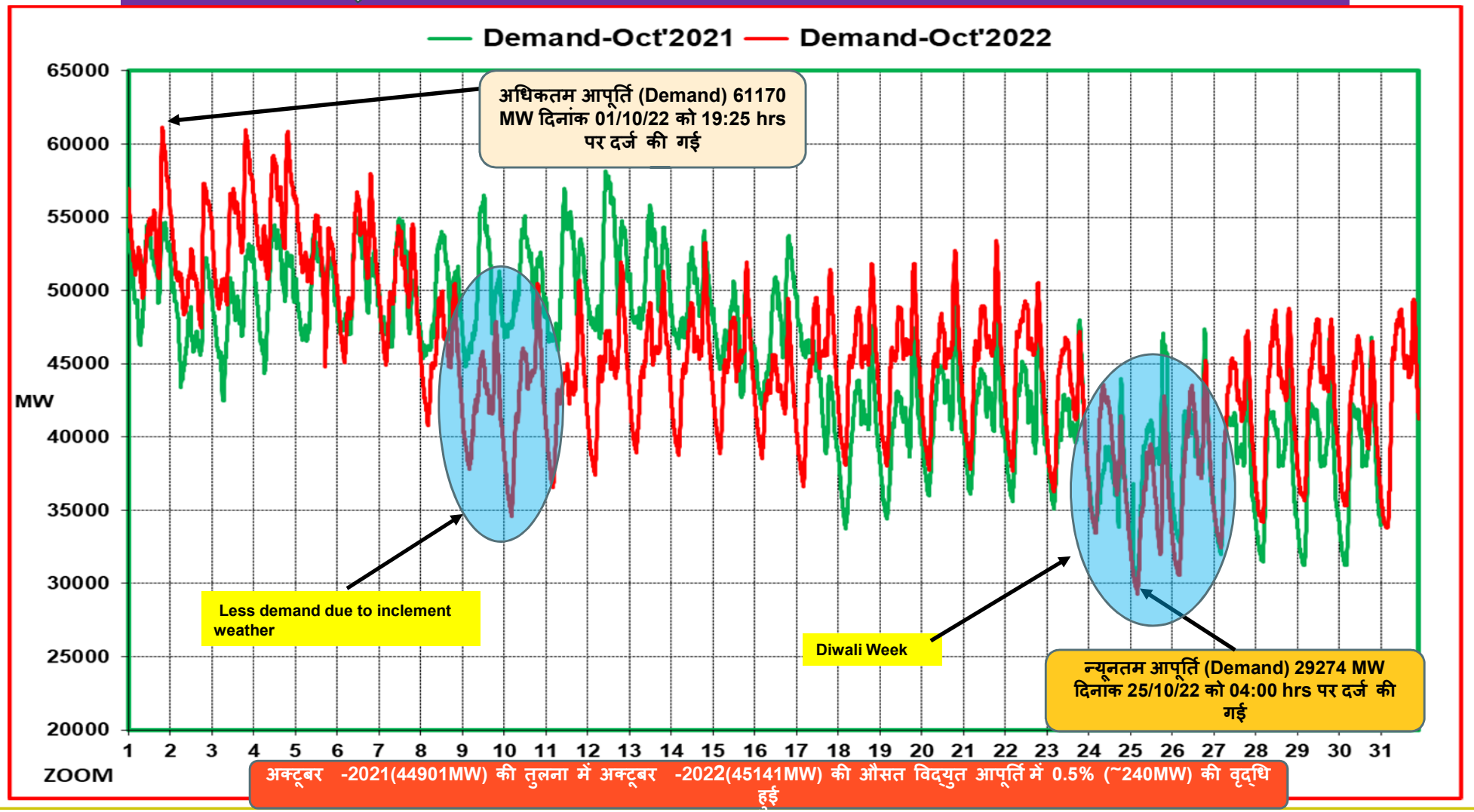


अक्टूबर -2022 के दौरान अधिकतम मांग (Demand Met), अधिकतम ऊर्जा खपत (Energy consumption) और अब तक का कीर्तिमान (राज्यों द्वारा जमा आंकड़ों के अनुसार)

राज्य	अधिकतम मांग (MW) (in Oct'22)	दिनांक / समय	रिकॉर्ड अधिकतम मांग (in MW) (upto Sep'22)	दिनांक / समय	अधिकतम ऊर्जा खपत (MU) (in Oct'22)	दिनांक	रिकॉर्ड अधिकतम ऊर्जा खपत (MU) (Upto Sep'22)	दिनांक
पंजाब	11498	06.10.22 at 11:45	14295	22.08.22 को 14:45 बजे	241.89	06.10.22	334.45	29.06.22
हरियाणा	8479	04.10.22 at 09:00	12768	28.06.22 को 11:56 बजे	179.79	04.10.22	266.15	07.07.21
राजस्थान	13918	29.10.22 at 11:00	16012	28.06.22 को 14:00 बजे	283.64	04.10.22	328.86	09.09.22
दिल्ली	4990	04.10.22 at 16:17	7695	29.06.22 को 15:10 बजे	104.81	04.10.22	153.52	28.06.22
उत्तर प्रदेश	22631	01.10.22 at 19:31	26589	09.09.22 को 21:39 बजे	429.00	03.10.22	547.360	19.08.22
उत्तराखंड	2054	04.10.22 at 18:00	2594	14.06.22 को 21:00 बजे	43.31	04.10.22	54.27	15.06.22
हिमाचल प्रदेश	1771	12.10.22 at 07:45	2030	07.01.22 को 10:00 बजे	34.52	07.10.22	36.91	28.06.22
जम्मू और कश्मीर (UT) तथा लद्दाख़ (UT)	2823	02.10.22 at 19:00	2967	30.09.22 को 07:00 बजे	54.03	30.10.22	59.95	17.01.22
चंडीगढ़	260	01.10.22 at 18:00	426	08.07.21 को 15:00 बजे	5.12	05.10.22	8.41	08.07.21
उत्तरी क्षेत्र #	61170	01.10.22 at 19:25	77006	28.06.22 को 11:50 बजे	1331.79	04.10.22	1737.09	28.06.22

उत्तरी क्षेत्र अधिकतम मांग (Demand Met) as per SCADA Data

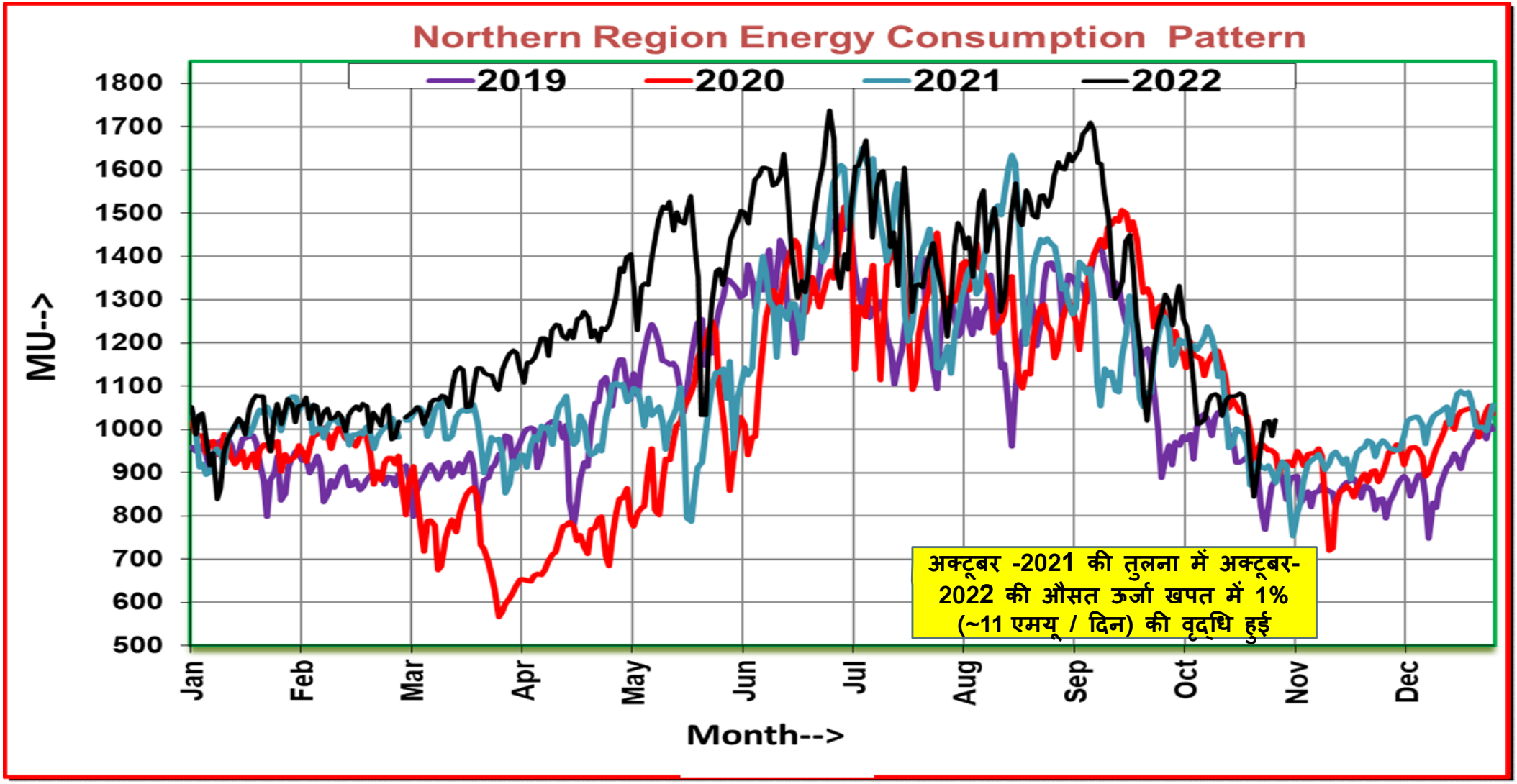
क्षेत्रीय विद्युत आपूर्ति (Demand) अक्टूबर 2021 बनाम अक्टूबर 2022 (As per 5 Minute SCADA data)



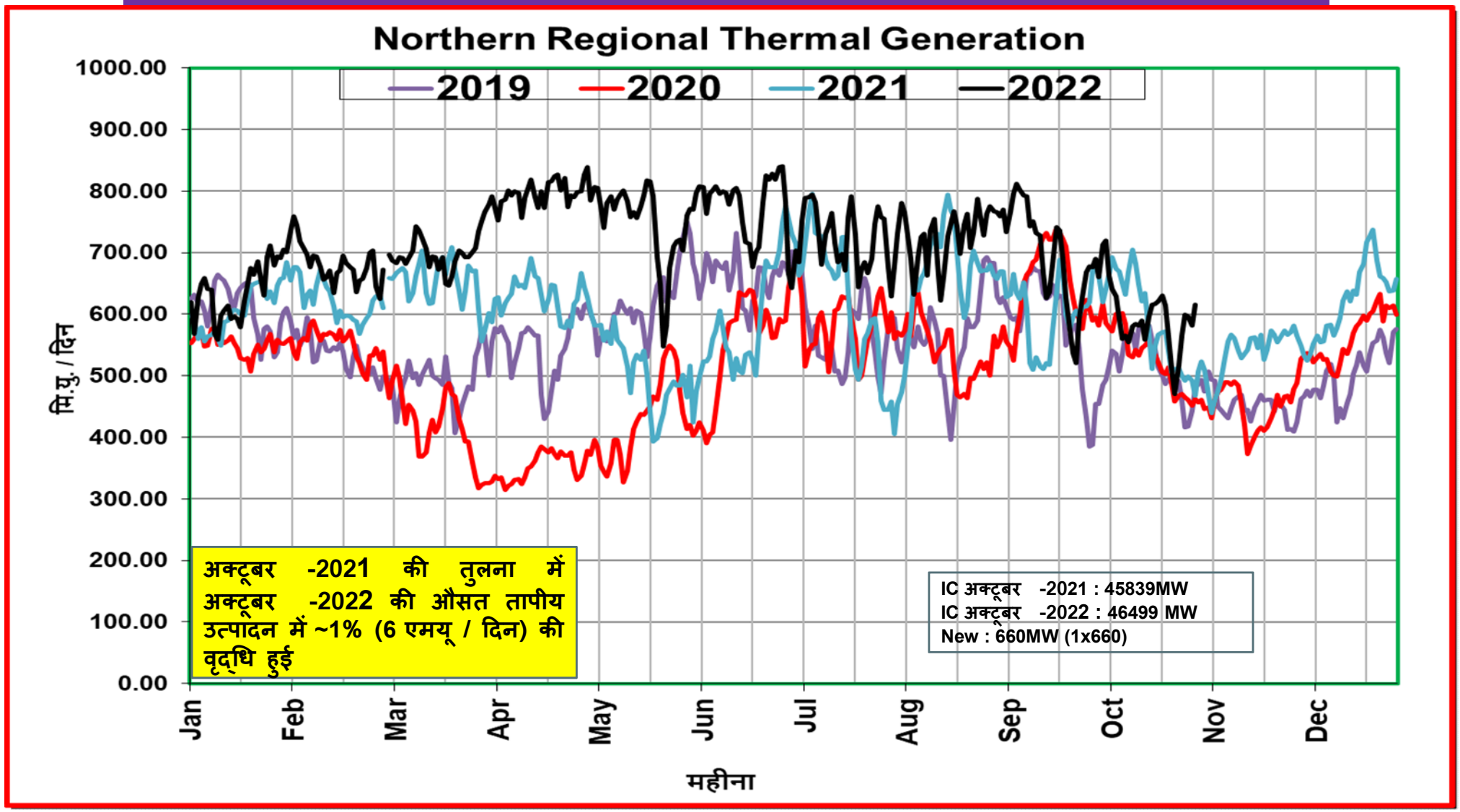
उत्तरी क्षेत्र की औसत ऊर्जा खपत में वृद्धि(% में) अक्टूबर -2022/ अक्टूबर -2021 / अक्टूबर -2020

राज्य	अक्टूबर -2020	अक्टूबर -2021	अक्टूबर -2022	% वृद्धि (अक्टूबर -2021 vs अक्टूबर -2020)	% वृद्धि (अक्टूबर -2022 vs अक्टूबर -2021)
पंजाब	152.42	157.30	163.01	3.20%	3.63%
हरियाणा	155.20	149.51	140.12	-3.67%	-6.28%
राजस्थान	242.28	226.56	254.37	-6.49%	12.28%
दिल्ली	80.12	85.38	78.52	6.57%	-8.04%
उत्तर प्रदेश	347.62	334.79	324.25	-3.69%	-3.15%
उत्तराखंड	36.53	36.88	36.02	0.96%	-2.34%
चंडीगढ़	3.65	4.07	3.89	11.46%	-4.41%
हिमाचल प्रदेश	29.18	31.31	30.24	7.29%	-3.42%
जम्मू और कश्मीर (UT) तथा लद्दाख़ (UT)	46.34	44.05	50.21	-4.94%	13.97%
उत्तरी क्षेत्र	1093.35	1069.85	1080.63	-2.15%	1.01%

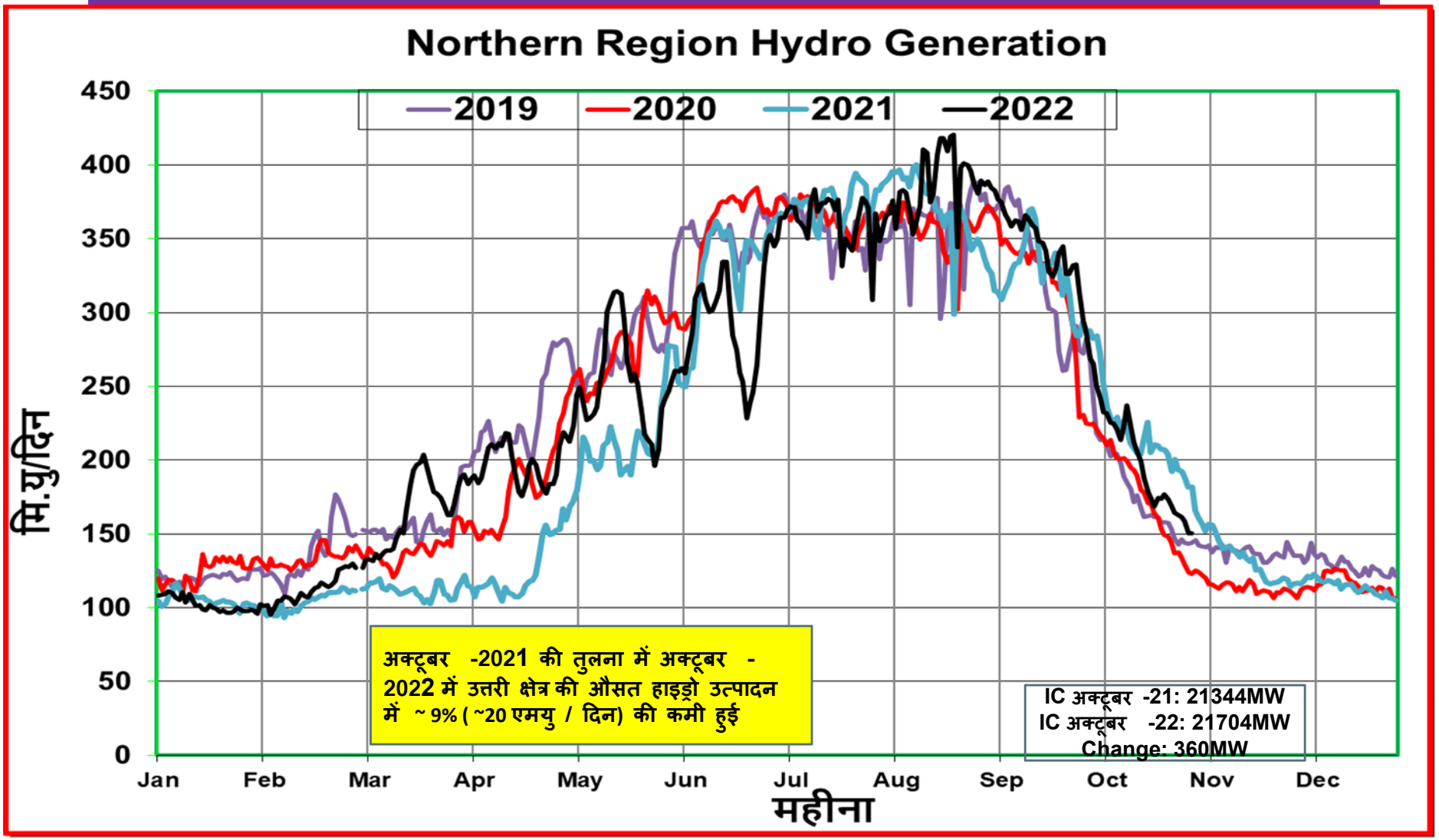
उत्तरी क्षेत्र की ऊर्जा खपत(MUs)



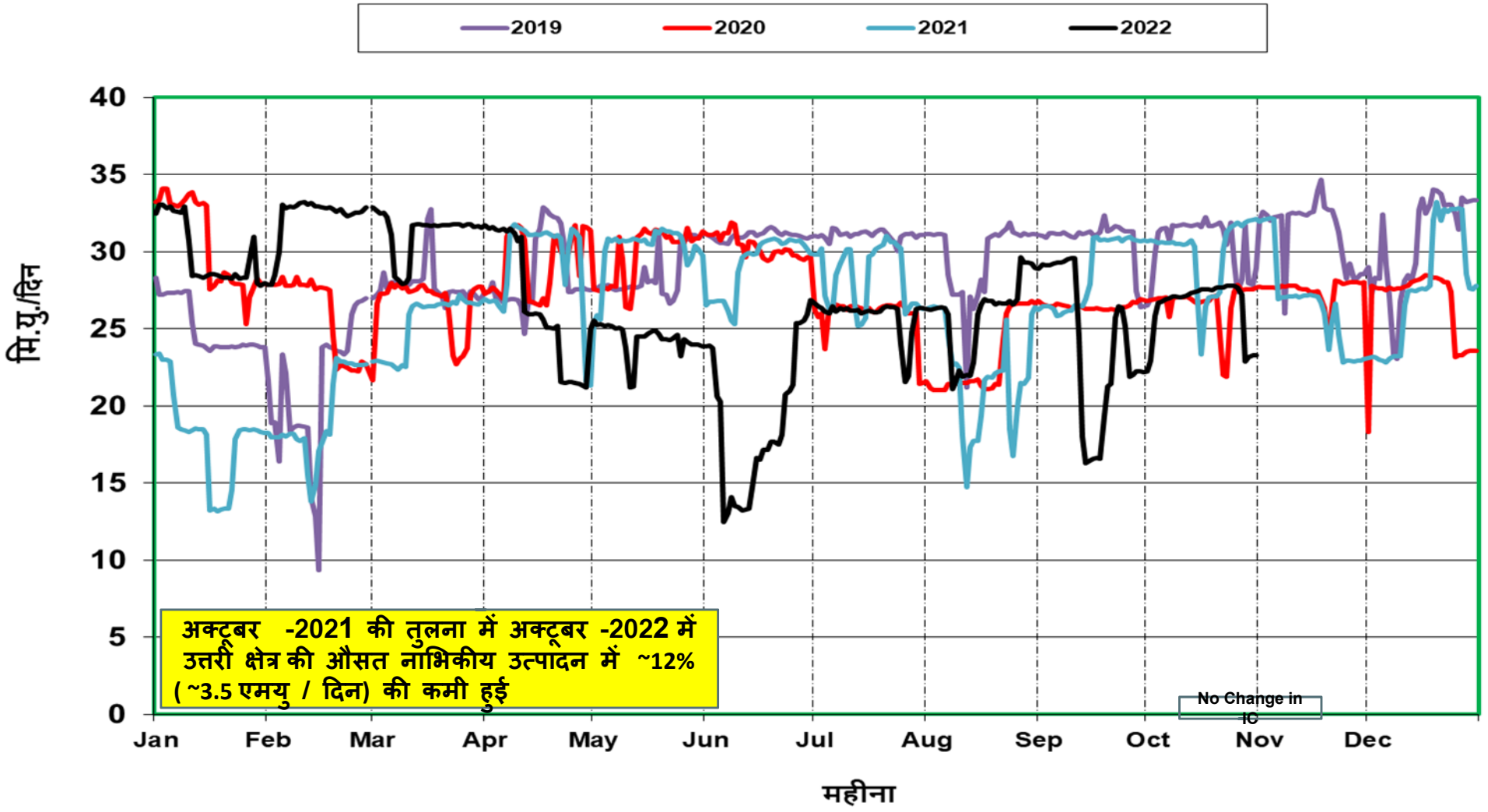
उत्तरी क्षेत्र की तापीय (Thermal) उत्पादन की स्थिति(Mus/Day)



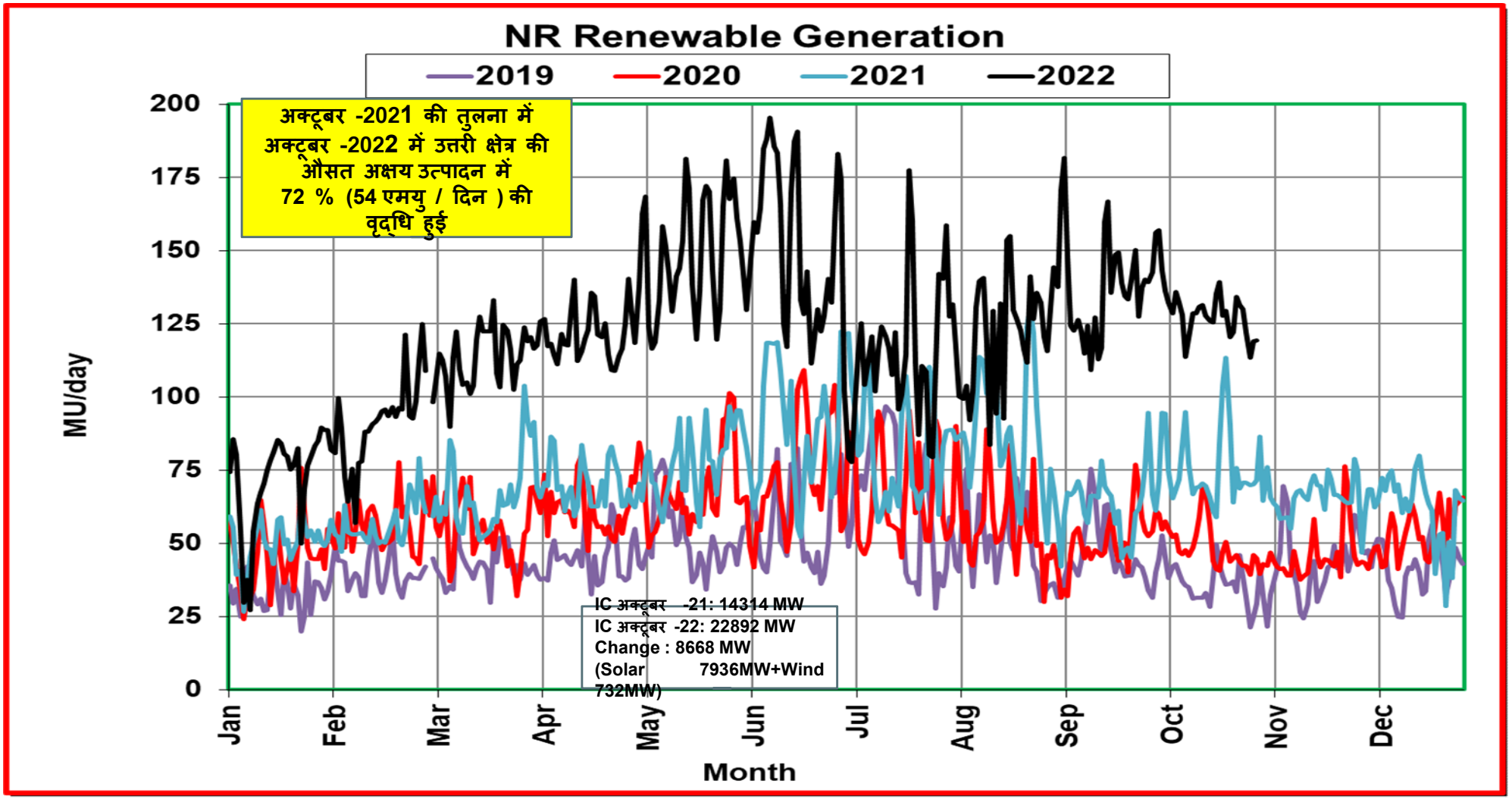
उत्तरी क्षेत्र की जलीय (हाइड्रो) उत्पादन की स्थिति(Mus/Day)



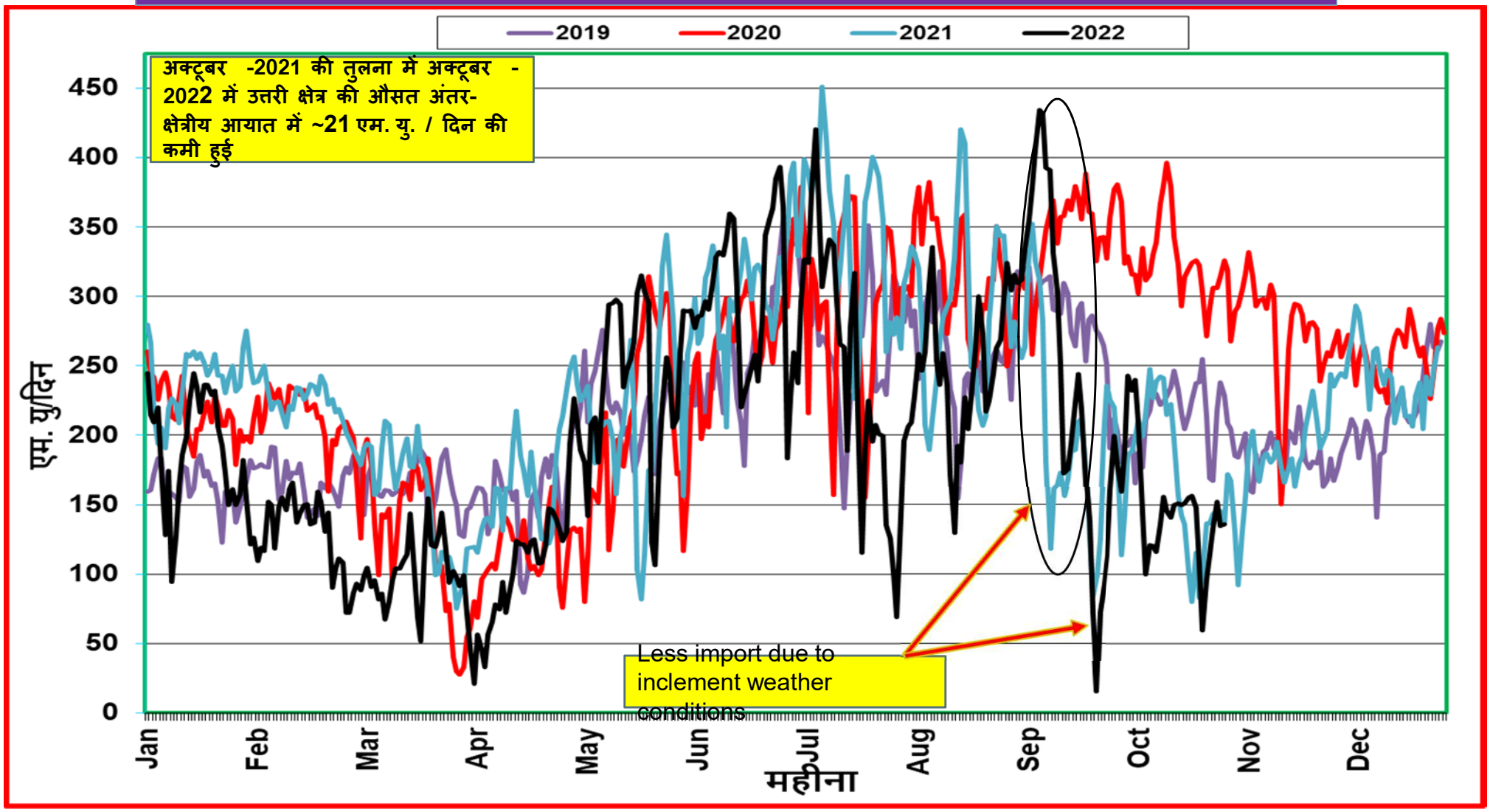
उत्तरी क्षेत्र की नाभिकीय उत्पादन की स्थिति (Mus/Day)



(Mus/Day)


NR Renewable Generation
2019
2020
2021
2022
अक्टूबर -2021 की तुलना में
अक्टूबर -2022 में उत्तरी क्षेत्र की
औसत अक्षय उत्पादन में
72 % (54 एमयु / दिन) की
वृद्धि हुई
IC अक्टूबर -21: 14314 MW
IC अक्टूबर -22: 22892 MW
Change : 8668 MW
(Solar 7936MW+Wind 732MW)
MU/day
200
175
150
125
100
75
50
25
0
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Month

अंतर-क्षेत्रीय आयात(Mus/Day) की स्थिति



RE Penetration

	Maximum Daily MU Penetration			
	October '2022		Record upto September '2022	
	Max % Penetration	Date	Max % Penetration	Date
Punjab	5.66	25-10-2022	12.28	01-04-2020
Rajasthan	18.54	08-10-2022	36.47	22-10-2021
UP	3.79	25-10-2022	4.07	30-10-2021
NR	15.90	25-10-2022	14.72	25-09-2022

	Maximum Instantaneous Penetration in MW			
	October '2022		Record upto September '2022	
	Max % Penetration	Date	Max % Penetration	Date
Punjab	8.28	25-10-2022	26.87	22-04-2020
Rajasthan	38.46	02-10-2022	68.38	31-03-2020
UP	12.26	25-10-2022	15.13	01-04-2021
NR	42.96	25-10-2022	37.53	25-09-2022

वास्तविक सारांश - अक्टूबर -2021 बनाम अक्टूबर -2022

	अक्टूबर - 2021 (मि.यु./दिन)	**अक्टूबर - 2022 (मि.यु./दिन)**	**अक्टूबर माह में वृद्धि (मि.यु./दिन)**
तापीय (Thermal) उत्पादन	593.73	599.87	6.14
जलीय (Hydro) उत्पादन	219.61	199.94	-19.67
नाभिकीय (Nuclear) उत्पादन	29.99	26.46	-3.53
अंतर-क्षेत्रीय (Inter-Regional) कुल आयात	169.82	149.19	-20.63
अक्षय (Renewable) उत्पादन	75.52	129.85	54.33
कुल उपलब्धता	**1088.67**	**1105.31**	**16.64**

B.20

Outage Summary For October 2022									
CONSTITUENTS	PLANNED (A)	FORCED OUTAGES (B=C+D)	EMERGENCY SHUTDOWNS (C)	TRIPPING (D)	% PLANNED SHUTDOWNS (A/(A+C))	% EMERGENCY SHUTDOWNS(C/(A+C))	% ESD SHUTDOWNS(C/B)	% TRIPPING (D/B)	TOTAL OUTAGES (A+B)
POWERGRID	313	215	157	58	66.6%	33.4%	73.0%	27.0%	528
UPPTCL	114	153	41	112	73.5%	26.5%	26.8%	73.2%	267
PSTCL	96	34	11	23	89.7%	10.3%	32.4%	67.6%	130
RRVPNL	46	74	30	44	60.5%	39.5%	40.5%	59.5%	120
BBMB	51	27	10	17	83.6%	16.4%	37.0%	63.0%	78
HVPNL	46	24	10	14	82.1%	17.9%	41.7%	58.3%	70
AEPL	28	1	0	1	100.0%	0.0%	0.0%	100.0%	29
DTL	8	20	11	9	42.1%	57.9%	55.0%	45.0%	28
PTCUL	16	12	2	10	88.9%	11.1%	16.7%	83.3%	28
HPPTCL	4	19	8	11	33.3%	66.7%	42.1%	57.9%	23
Adani Solar	6	14	3	11	66.7%	33.3%	21.4%	78.6%	20
NTPC	8	11	8	3	50.0%	50.0%	72.7%	27.3%	19
PDD JK	6	8	1	7	85.7%	14.3%	12.5%	87.5%	14
FBTL	7	3	3	0	70.0%	30.0%	100.0%	0.0%	10
Tata Power_SL	10	0	0	0	100.0%	0.0%	0.0%	0.0%	10
ACME	7	1	0	1	100.0%	0.0%	0.0%	100.0%	8
Cleansolar_Jodhpur	7	0	0	0	100.0%	0.0%	0.0%	0.0%	7
NTPC_SL	2	4	2	2	50.0%	50.0%	50.0%	50.0%	6
MAHINDRA	5	0	0	0	100.0%	0.0%	0.0%	0.0%	5
PKTSL	3	2	1	1	75.0%	25.0%	50.0%	50.0%	5
PKTCL	1	4	1	3	50.0%	50.0%	25.0%	75.0%	5
Saurya Urja	4	1	0	1	100.0%	0.0%	0.0%	100.0%	5
BKTL	3	1	1	0	75.0%	25.0%	100.0%	0.0%	4
EDEN (ERCPL)	4	0	0	0	100.0%	0.0%	0.0%	0.0%	4
NHPC	1	3	1	2	50.0%	50.0%	33.3%	66.7%	4
NRSS XXIX	4	0	0	0	100.0%	0.0%	0.0%	0.0%	4
POWERLINK	3	1	0	1	100.0%	0.0%	0.0%	100.0%	4
Renew Power_SL	2	2	2	0	50.0%	50.0%	100.0%	0.0%	4
NPCIL	1	2	0	2	100.0%	0.0%	0.0%	100.0%	3
SBSRPC-11	3	0	0	0	100.0%	0.0%	0.0%	0.0%	3
THAR SURYA1	3	0	0	0	100.0%	0.0%	0.0%	0.0%	3
SJVNL	0	3	0	3	0.0%	0.0%	0.0%	100.0%	3
Chandigarh SEB	0	2	1	1	0.0%	100.0%	50.0%	50.0%	2
APCPL	1	1	1	0	50.0%	50.0%	100.0%	0.0%	2
JPL	1	1	1	0	50.0%	50.0%	100.0%	0.0%	2
JSW	1	1	1	0	50.0%	50.0%	100.0%	0.0%	2
PUTL	1	1	0	1	100.0%	0.0%	0.0%	100.0%	2
ADHPL	0	1	0	1	0.0%	0.0%	0.0%	100.0%	1
Mega_SuryaUrja	0	1	1	0	0.0%	100.0%	100.0%	0.0%	1
Azure	0	1	1	0	0.0%	100.0%	100.0%	0.0%	1
PAPTL	1	0	0	0	100.0%	0.0%	0.0%	0.0%	1
Sekura	1	0	0	0	100.0%	0.0%	0.0%	0.0%	1
TOTAL	**818**	**648**	**309**	**339**	**72.6%**	**27.4%**	**47.7%**	**52.3%**	**1466**

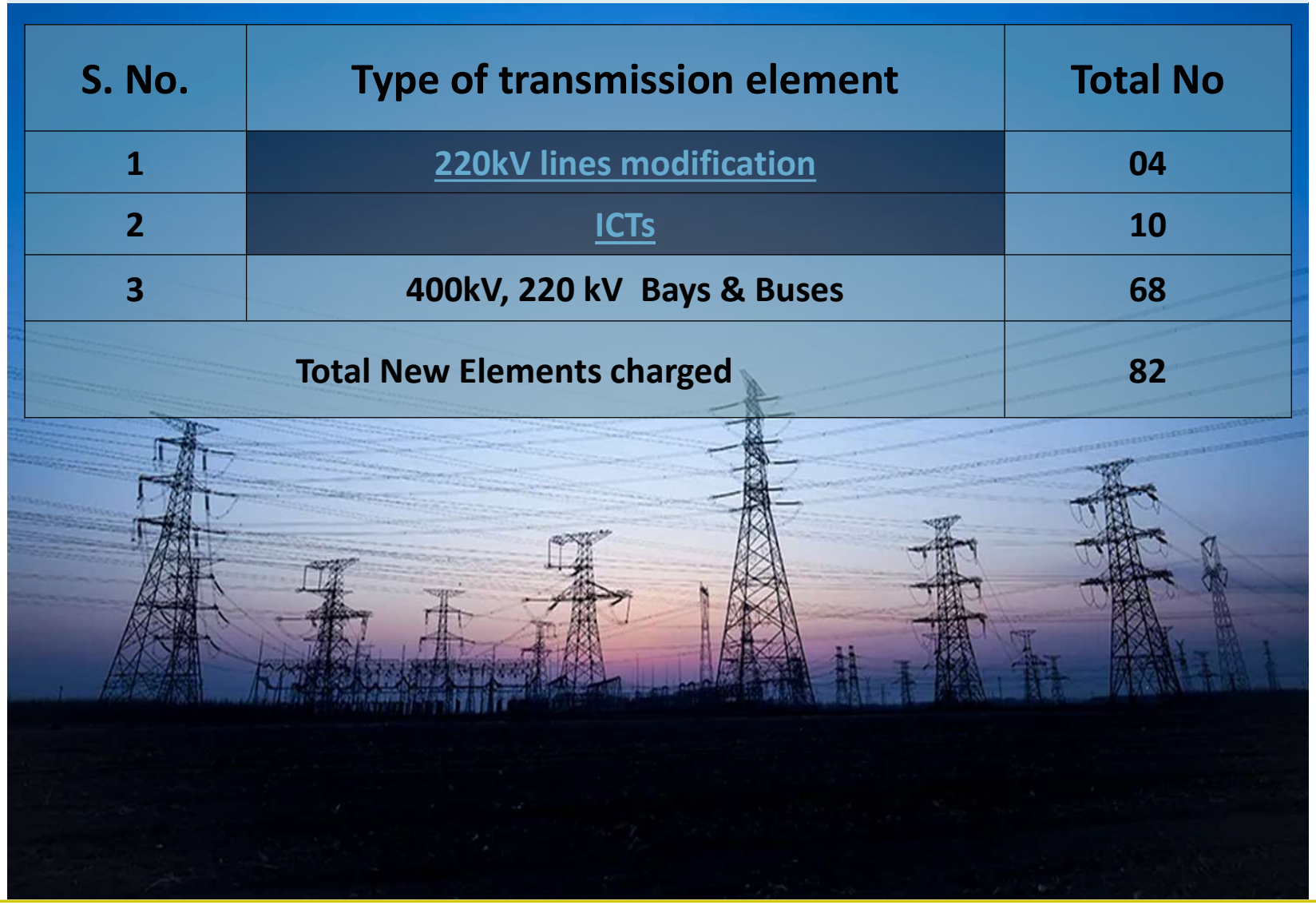
B.20

OUTAGE SUMMARY OF LAST THREE MONTHS							
MONTH	PLANNED	FORCED OUTAGES	EMERGENCY SHUTDOWNS	TRIPPING	% PLANNED as of TOTAL S/D	% EMERGENCY SHUTDOWNS	TOTAL OUTAGES (A+B)
	(A)	(B=C+D)	(C)	(D)	(A/(A+C))	(C/(A+C))	
July-22	453	720	303	417	59.9%	40.1%	1173
August-22	458	626	278	348	62.2%	37.8%	1084
September-22	676	724	375	349	64.3%	35.7%	1400
October-22	**818**	**648**	**309**	**339**	**72.6%**	**27.4%**	**1466**

B.20

New Elements First Time Charged During October 2022

S. No.	Type of transmission element	Total No
1	220kV lines modification	04
2	ICTs	10
3	400kV, 220 kV Bays & Buses	68
Total New Elements charged		82



B.20

TRANSMISSION LINES MODIFICATION						
S.NO.	**Agency/Owner**	**LINE NAME**	**Length (KM)**	**Conductor Type**	**DATE**	**Remarks**
1	ASEJOL	220kV Fatehgarh_II(PG)-ASEJOL_HB FTGH2 (ASEJOL)-1	(Length 34.171 kms) 24.743 kms on Double Ckts & 9.43 kms on Multi Ckts Tower	AL59 Zebra	16-Oct-2022	
2	ASEJOL	220kV Fatehgarh_II(PG)-ASEJOL_HB FTGH2 (ASEJOL)-2		AL59 Zebra	16-Oct-2022	
3	ASEJOL	220kV ASEJOL_HB FTGH2 (ASEJOL)-ASEJOL_WIND FTGH2 (ASEJOL)-1	(Length 22.923 kms) 22.507 kms in Single Circuit & 0.416 kms in Multi Circuit Tower	AL59 Zebra	16-Oct-2022	
4	HVPNL	220kV Manesar(PG)-Panchgaon (HV)-2	0.217	MOOSE	19-Oct-2022	
5	NTPC_DEVIKOT	220kV Fatehgarh_II(PG)-Devikot SL_FTGH2 (NTPC_DEVIKOT)-1	3.83 KM	AL59 Zebra	29-Oct-2022	
6	UPPTCL	Antitheft charging of 400kV Varanasi(PG)-Jaunpur (UP) -2	72.695 KM	Twin Moose	04-Oct-2022	Charged from Varanasi(PG) Upto dead end tower of Jaunpur end

B.20

ICTs/ GTs / STs							
S.NO.	**Agency/Owner**	**SUB-STATION**	**ICT NO**	**Voltage Level (kV)**	**CAPACITY (MVA)**	**DATE**	**Remarks**
1	POWERGRID	Bhadla_2 (PG)	3	765/400/33	1500	02-Oct-2022	
2	ASEJOL	ASEJOL_WIND FTGH2 (ASEJOL)	1	220/33	150	17-Oct-2022	
3	ASEJOL	ASEJOL_HB FTGH2 (ASEJOL)	1	220/33	150	17-Oct-2022	
4	ASEJOL	ASEJOL_HB FTGH2 (ASEJOL)	2	220/33	150	17-Oct-2022	
5	ASEJOL	ASEJOL_HB FTGH2 (ASEJOL)	3	220/33	150	17-Oct-2022	
6	UPPTCL	Gr.Noida_2(UP)	2	765/400/33	500	28-Oct-2022	REPLACEMENT IN PLACE OF DAMAGED 500 MVA ICT B-PHASE OF 1500 MVA ICT-II
7	UPPTCL	Hapur(UP)	2	765/400/33	500	29-Oct-2022	REPLACEMENT IN PLACE OF DAMAGED 500 MVA ICT B-PHASE OF 1500 MVA ICT-II
8	NTPC_DEVIKOT	Devikot SL_FTGH2 (NTPC_DEVIKOT)	1	220/33	100	30-Oct-2022	
9	NTPC_DEVIKOT	Devikot SL_FTGH2 (NTPC_DEVIKOT)	3	220/33	100	30-Oct-2022	
10	NTPC_DEVIKOT	Devikot SL_FTGH2 (NTPC_DEVIKOT)	2	220/33	100	30-Oct-2022	

B.20

GENERATING UNITS							
SL. NO.	**Location**	**OWNER/UNIT NAME**	**Unit No/Source**	**Capacity added (MW)**	**Total/Installed Capacity (MW)**	**DATE**	**Remarks**
1	Rajasthan	Thar Surya1_Bikaner (PG)	Solar	55	300	09.10.2022	
2	Rajasthan	NTPC Devikot_Fatehgarh_2 (PG)	Solar	120	240	31.10.2022	
3	Rajasthan	NTPC Kolayat 2_Bhadla_2 (PG)	Solar	50	300	16.10.2022	
4	Rajasthan	Adani Solar Energy Jaisalmer One_Fatehgarh_2 (PG)	Solar	421.88	450 MW Hybrid (421.875 MW Solar + 105 MW Wind)	21.10.2022	
5	Rajasthan	Adani Solar Energy Jaisalmer One_Fatehgarh_2 (PG)	Wind	105		21.10.2022	
6	Rajasthan	AHEJ4L PSS4_Fatehgarh (FBTL)	Wind	42	260	02.10.2022	
		Total Solar Generation addition		**646.88**			
		Total Wind Generation addition		**147**			


धन्यवाद