



सत्यमेव जयते

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

स.उक्षेविस/ प्रचालन/108/04/2020/ 2517-51
No. NRPC/OPR/108/04/2020/

दिनांक : 06.03.2020
Date: 06.03.2020

सेवा में / To,

संलग्नसूची के अनुसार/As per list attached

विषय: दूरसंचार, स्काडा और टेलीमेट्री उपसमिति की सत्रहवीं बैठक के स्थगन के सन्दर्भ में।

Subject: 17th meeting of Telecommunication, SCADA & Telemetry Sub Committee-regarding postponement

यह पत्र इस कार्यालय के पत्र दिनांक 06.03.2020 के क्रम में है जिसमें यह सूचित किया गया था कि दूरसंचार, स्काडा और टेलीमेट्री उपसमिति की सत्रहवीं बैठक को 12 मार्च 2020 को आयोजित किया जाएगा।

बैठक की तिथि को अपरिहार्य कारणों कि वजह से स्थगित कर दिया गया है। वास्तविक तिथि व स्थान सुनिश्चित होने के पश्चात आपको सूचना प्रदान कर दी जायेगी।

This is further in continuation to our letter of even no. dated 06.03.2020 vide which it was intimated that the 17th meeting of Telecommunication, SCADA & Telemetry Sub Committee is scheduled on 12th March 2020.

Due to certain unavoidable reasons, the meeting now has been postponed. The exact date and venue will be intimated in due course as and when the same is finalised.

(आर.पी. प्रधान/ R.P. Pradhan)

(अधी. अभि.& सदस्य संयोजक टेस्ट उप समिति /
SE & Member Convener TeST sub-committee)



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Northern Regional Power Committee

सं. उक्षेविस/ प्रचालन/108/04/2020/2473-2507

दिनांक :06.03.2020

No. NRPC/OPR/108/04/2020/

Date: 06.03.2020

सेवा में / To,

संलग्न सूची के अनुसार/As per list attached

विषय: दूरसंचार, स्काडा और टेलीमेटरी उप समिति की सत्रहवीं बैठक की कार्यसूची।

Subject: Agenda for 17th meeting of Telecommunication, SCADA & Telemetry Sub Committee

महोदय ,

Sir,

इस कार्यालय के पत्र दिनांक 13.02.2020 के क्रम करते हुए यह सूचित किया जाता है कि उत्तर क्षेत्रीय विद्युत समिति की दूरसंचार, स्काडा और टेलीमेटरी (टेस्ट) उप-समिति की 17 वीं बैठक दिनांक 12.03.2020 को 10:00 बजे से उ.क्षे.वि.स. सचिवालय सम्मलेन कक्ष, नई दिल्ली में होनी सुनिश्चित है। बैठक की कार्यसूची आपकी सूचना एवं आवश्यक कार्यवाही हेतु संलग्न है। कृपया बैठक में भाग लेने की कृपा करें।

In continuation to NRPC letter of even no. dated 13.02.2020, it is intimated that the 17th meeting of Telecommunication, SCADA & Telemetry (TeST) Sub-committee of NRPC will be held on 12.03.2020 at 10:00 AM at NRPC secretariat conference hall, New Delhi. The agenda for the meeting is enclosed herewith for your information and necessary action. Kindly make it convenient to attend the meeting.

भवदीय

Yours faithfully, ,

(आर.पी. प्रधान)

(R.P. Pradhan)

अधीक्षण अभियंता

Superintending Engineer

List

1. Chief Engineer(SLDC), PTCUL, Dehradun-248001, (Fax-0135-2530336)
2. Dy Chief Engineer BBMB, Chandigarh-160019, (Fax-0172-2549548)
3. Chief Engineer (GM), CEA, R. K. Puram, New Delhi-110066, (Fax-011-26109750)
4. Chief Engineer, UT of Chandigarh, Chandigarh-160009, (Fax-0172-2740276)
5. General Manager (SLDC), DTL, New Delhi-110002, (Fax-011-23221012)
6. Chief Engineer ,HPGCL, Panchkula-134109, (Fax-0172-2560622 & 2565042)
7. Chief Engineer, HPPTC Ltd., Shimla-171004, (Fax-0177-2626284)
8. Chief Engineer, SLDC, HP Load Dispatch, Totu, Shimla, (Fax-0177-2837543)
9. Chief Engineer HPSEB Ltd, Shimla-171004, (Fax-0177-26163554)
10. Chief Engineer (SLDC) PSTCL, Patiala, (Fax-0175-2304017)
11. Chief Engineer (Distribution), PSPCL, The Mall, Patiala, (Fax- 0175-2212069)
12. SE(communication), RVPNL, Heerapura, Jaipur-302005, (Fax-0141-2250967)
13. Chief Engineer (TO), UPRVUNL, Lucknow-226001, (Fax-0522-2287861)
14. General Manager (RMU), UJVNL, Dehradun-248006, (Fax-0135-2530708)
15. Development Commissioner (P), PDD, Srinagar, J&K, (Fax-0194-2452173)
16. Managing Director, J&K State Power Dev. Corp., Srinagar, J&K, (Fax-0194-2500145)
17. Managing Director, UPCL, Dehradun-248006, (Fax-0135-2768867)
18. Chief Engineer (O&M), NHPC, Faridabad-121003, (Fax-0129-2255706)
19. General Manager (OS)(NCR), NCR-HQ, NTPC, Noida-201301, (Fax-0120-2410052)
20. General Manager(ULDC) & General Manager (LD&C) POWERGRID, New Delhi-110016, (Fax-011-26564849)
21. General Manager (C&SO), SJVNL, Sharma Niwas, Below BCS, New Shimla-171009, (Fax-0177-2673283)
22. General Manager (Electrical Design), THDC, Rishikesh-249201, (Fax-0135-2438682)
23. General Manager (Technical), IPGCL, New Delhi-110002, (Fax-011-23270590)
24. GM(O&M) DTL, New Delhi-110002, (Fax-011-23232721)
25. General Manager, NRLDC, New Delhi-110016, (Fax-011-26853082)
26. Chief Engineer (SO&C), SLDC, HVPNL, Sewah, Panipat , (Fax-0172-2560622)
27. Dy. General manager, Rosa PSCL , (Fax-05842-300003)
28. Chief Engineer(SLDC), UPPTCL, Lucknow.(Fax 0522-2287880)
29. Chief Engineer(Transmission), NPCIL, Mumbai-400094,(Fax-022-25993570/25991258)
30. DGM, Electrical, Jhajar Power Ltd., Haryana, (Fax-01251-270155)
31. EPPL Malana-II, Gurgaon Fax:011-45823862
32. Shree Cement Limited. Beawar - 305 901 (Fax: 01462-228117/228119)
33. Director, LancoAnpara Power Ltd., (Fax-124-2341627)
34. GM (Comml.), Aravali Power Company Pvt. Ltd., NOIDA, (Fax-0120-2425944)
35. AsVP, BSES Rajdhani Power Limited, New Delhi (Fax:011-26419833)
36. Addl. VP, BSES Yamuna Power Limited, New Delhi (Fax:011-39992076)
37. HOD power system control, TATA Power Delhi Distribution Limited, New Delhi, (Fax-011-66050601), CENNET building, Opp to PP Jewellers Netaji SubhshPlace,, New Delhi.
38. Sr. Vice President, JSW Energy Ltd., New Delhi-110066 (Fax: 46032343 / 26183546)
39. Station Head, Adani Power Rajasthan Ltd., Ahmedabad-380006 (Fax No- 079-25557176)

40. Sh. Anil Kumar Garg, General Manager(BD) , AD Hydro Power Ltd , Noida-201301 ,
(Fax: 0120- 4323271/4278772)
41. Sh . Amit Mittal , GM(Corporate Affairs),Talwandi Sabo Power Ltd. Distt Mansa,
Punjab-151302(Fax01659-248083)
42. Sh. S.N.M Tripathi, Director, Lalitpur Power generation Company Ltd., Lucknow-
226010(Fax: 0120-4045100/555, 2543939/40)
43. Sh . Harish Saran, ED (Marketing), PTC India Ltd., New Delhi (Fax- 011-
41659144,41659145)
44. Nabha Power Limited , (Fax: 01762277251 /01724646802)
45. Prayagraj Power Generation Co. Ltd. Bara, Allahabad, Uttar Pradesh-212107

Special Invitee:

1. Sh. G.Rama Krishna Reddy, Project Manager, SIEMENS, e-mail:
g.reddy@siemens.com

Agenda for
17th Meeting of Telecommunication, SCADA & Telemetry (TeST)
Sub- Committee

Date: 12.03.2020

Venue: Conference Hall, First Floor, NRPC, Katwaria Sarai, New Delhi

1. Confirmation of Minutes

1. Confirmation of Minutes

The minutes of 16th meeting of TeST sub-committee held on 14.11.2019 were issued on 17.12.2019. Minutes are available at NRPC website (www.nrpc.gov.in). No comment on the MoM has been received.

Members may discuss and confirm the Minutes.

1A. FOLLOW UP

1A Follow-up of Decisions in last TeST meeting held on 14.11.2019

Action plan and Time line for various issues were mentioned in Minutes of last TeST meeting.

Members may submit the status of action taken. If the action could not be taken, then, the reasons, constraints and action plan for completion of the task may be submitted, so that the same could be discussed in the meeting.

2. Telecommunication Related Issues

2.1 Requirement of Fibre optic Communication for 765kV Meerut-Bhiwani T/L of POWERGRID for connectivity of LILO portion at 765kV Narela S/s (upcoming TBCB) (Agenda by POWERGRID):

2.1.1 Ministry of Power vide Gazette of India dated 27th January 2020 has notified Transmission system strengthening scheme for evacuation of power from solar energy zones in Rajasthan (8.1 GW) under Phase II: Part A, B, C, D, E, F & G among others. RfP documents for all such schemes are under finalization by CTU & BPC (copy of Gazette notification enclosed at **Annexure-2.1.1**).

2.1.2 Under Transmission system strengthening scheme for evacuation of power from solar energy zones in Rajasthan (8.1 GW) under Phase-II: Part G, the scope of work is as follows:

S.No.	Scope of the Transmission Scheme	Capacity /km
1	<p>Establishment of 765/400 kV, 3X1500 MVA GIS substation at Narela with 765 kV (2x330 MVA) bus reactor and 400 kV (1x125MVAR) bus reactor</p> <p>Future provisions: Space for 765/400kV ICTs along with bays: 1</p> <p>765 kV line bays along with switchable line reactor: 6</p> <p>400 kV line bays: 6+4</p> <p>765kV reactor along with bays:2</p> <p>400/220 kV ICTs along with bays:8</p> <p>220 kV line bays: 12</p> <p>400 kV bus reactor along with bays:2</p>	<p>765/400 kV, 1500 MVA ICT – 3</p> <p>765/400 kV, 500 MVA spare ICT (1-phase) – 1</p> <p>765 kV ICT bays –3</p> <p>400 kV ICT bays –3</p> <p>765 kV line bays- 4 (GIS)</p> <p>330MVA, 765 kV bus reactor- 2</p> <p>765 kV bus reactor bay – 2</p> <p>110 MVA, 765 kV, 1-Ph Bus Reactor (spare unit) -1</p> <p>125 MVA, 420 kV bus reactor - 1</p> <p>420 kV bus reactor bay – 1</p> <p>330 MVA, 765 kV line reactor- 2</p> <p>Switching equipment for 765 kV reactor - 2</p> <p>(1x110MVA spare reactor at Khetri to be used as spare for Khetri – Narela 765 kV D/c line)</p>
2	<p>Khetri – Narela 765 kV D/c line</p> <p>1x330MVA Switchable line reactor for each circuit at Narela end of Khetri</p> <p>– Narela 765kV D/c line</p>	Length-180 km
3	<p>2 nos. of 765 kV line bays at Khetri for</p> <p>Khetri – Narela 765 kV D/c line</p>	765 kV line bays –2 (AIS)
4	<p>LILO of 765 kV Meerut- Bhiwani S/c line at Narela</p>	Length – 25 km

2.1.3 In order to provide data & voice connectivity for Narela 765kV S/s (to be implemented in TBCB; BPC-PFC Consulting Ltd.) as ISTS, 24F OPGW each in Line IN & Line out (LILO) of 765 kV Meerut- Bhiwani S/c Line at Narela S/s (point no. 4 scope of TSP) with communication equipment is proposed at the RfP stage.

- 2.1.4 Accordingly, for connectivity of Narela 765kV S/s (TBCB), fibre optic connectivity shall be required for 765 kV Meerut- Bhiwani S/c (173km) line of POWERGRID. The estimated cost for fibre optic connectivity on Meerut-Bhiwani link is Rs 5.7Cr(approx.) for implementation on cost plus basis. However, the actual quantity/cost shall be discovered only after implementation. The Tariff for the investment made is to be shared by all constituents as per CERC notification. The scheme shall become part of existing Commercial Agreement signed for ULDC Project.
- 2.1.5 Further, the completion schedule of Transmission system strengthening scheme for evacuation of power from solar energy zones in Rajasthan (8.1 GW) under Phase-II: Part G is December'2021 (as per Gazette of India). To match this completion schedule, fibre optic connectivity on 765 kV Meerut- Bhiwani S/c (173km) may be considered in ongoing Reliable Communication Project being implemented by POWERGRID for Central Sector in Northern region (7398km) approved in 39th, 40th & 47th NRPC. The revised network size of Reliable Communication Scheme for Central Sector in Northern region will become 7571km.

Members may please deliberate and approve the scheme for further put up for NRPC approval.

2.2 Status of OPGW connectivity at NHPC Power Stations under Central Sector scheme (Agenda by NHPC)

Parbati-III: During 16th TeST meeting held on 14.11.2019, it was informed by POWERGRID that the work would be completed by 31st December, 2019.

POWERGRID may update the status.

2.3 VSAT Connectivity at URI-II Power Station (Agenda by NHPC)

During 16th TeST meeting held on 14.11.2019, it was informed by POWERGRID that procurement process has been completed in the last week and work would be completed by 30th November, 2019. VSAT Vendor M/s NELCO made site survey at Uri-II Power Station during the month of December 2019, but found difficulty in getting proper line of sight.

A meeting was held between representatives of POWERGRID and NHPC Limited at PGCIL Faridabad office on 20.01.2020 wherein it was agreed that M/S NELCO will explore line of sight after 26th January 2020 by erecting the VSAT equipment at site. VSAT material has been delivered at Uri-II Power Station on 04.02.2020.

POWERGRID may update the status.

2.4 Replacement of S-900 RTUs (Agenda by NHPC)

As per the MOU dated 03.05.2019 signed between POWERGRID and NHPC Limited, S900 RTU was to be replaced at three locations namely, Tanakpur, Chamera-II and Uri Power Station.

- (a) At Tanakpur and Chamera-II Power Station, material has been delivered on 28.12.2019 and 24.12.2019 respectively. However, the installation and commissioning is pending as on date.
- (b) At Uri Power Station, delivery of material is pending.

POWERGRID may be requested to expedite the Supply/Installation and Commissioning of RTU at the earliest so that expenditure made may be capitalized in FY2019-2020, as already filed in tariff petition of respective Power Stations.

2.5 E-waste management for replaced S-900 RTUs (Agenda by HVPNL)

23 no RTUs has been dismantled. What action/procedure is being followed by PGCIL regarding e-waste management as per Govt. policy. HVPNL intends to follow the same.

POWERGRID may comment.

2.6 Replacement of S-900 RTUs (Agenda by BBMB)

The contract agreement for replacement of S-900 RTUs installed under ULDC-1 scheme at 11 sites of BBMB and integration of 61850 compliant Numerical Relays with HMI servers for providing the functionality of Event Logger at all the sites of BBMB through POWERGRID was signed on 30.3.2019 and accordingly an advance payment was made to POWERGRID. Subsequently, site survey for 5 sites of BBMB was carried out during April – May 2019. However, till date neither the work of installation / commissioning of RTUs nor the integration of 61850 compliant Numerical Relays with HMI servers has been started at any of the sites of BBMB.

POWERGRID may update the status.

2.7 Replacement of S-900 Remote Terminal Units (RTUs) at 9 nos. sites of PSTCL by M/s. PGCIL in lieu of MOU signed between M/s. PGCIL and PSTCL (Agenda by PSTCL)

The locations of 9 nos. RTUs where old RTUs of PSTCL are to be replaced is as under: -

Sr.	Name of the Substation	Voltage Level
1	Batala	132KV
2	Bhogpur	132KV
3	Civil Lines Amritsar	220KV
4	Ferozepur	220KV

5	Gobindgarh-II(NEW)	220KV
6	Goraya	220KV
7	Nawanshahar	132KV
8	Patti	220KV
9	Verka	132KV

The Memorandum of Understanding (MOU) in respect of replacement of above mentioned 9 nos. S-900 RTUs at estimated cost of Rs. 1,36,31,976/- was signed between M/s. PGCIL and PSTCL after the approval of worthy CMD/PSTCL, Director/ Technical & Director/F&C on 12.02.2018. As per the **Clause No. 8** of MOU signed between M/s. PGCIL and PSTCL: -

- **TIME SCHEDULE:**

"The entire work under this project is to be completed within 24 (Twenty-Four) months from the date of release of full payment by PSTCL. "

In view of aforesaid MOU, PSTCL has already made the 100% advance payment to M/s. PGCIL on dt. 04.09.2018. However, only 3 nos. RTUs have been delivered till date, for which installation & testing is still pending. The Delivery, Installation & Commissioning of remaining 6 nos. RTUs is pending.

PGCIL may update the status and is requested to expedite the same.

2.8 **AMC of existing S900 RTUs: (Agenda by POWERGRID)**

POWERGRID is executing S900 RTU replacement project for Central sector as well as Constituents and works are expecting to be completed by Sept'2020. As discussed in earlier TeST meetings, till the time of replacement of all RTUs, AMC contract shall be extended by POWERGRID (up to Sept'2020), however after that all other constituents for which POWERGRID is not replacing S900 RTUs, may arrange their RTU maintenance at their own as POWERGRID will not extend the AMC contract after that.

2.9 **Arrangement of FRTU for monitoring of real time status of UPS and DG Set (Agenda by UPSLDC)**

M/s Siemens is required to coordinate with M/s Delta & M/s Synergy in order to integrate FRTU for monitoring of real time status of UPS & DG set through SCADA System. However, Siemens expressed that it cannot commit on anything until it is confirmed that there is no compatibility issue.

PGCIL may hold a meeting with M/S Siemens, M/S Delta and M/S Synergy to ensure that there is no compatibility issue, so that M/S Siemens may coordinate with M/S Delta and M/S Synergy for integration of FRTU.

The issue has already been discussed with M/S Siemens on 07-02-2020 (Minutes of the meeting enclosed at **Annexure-2.9.1**)

2.10 **Issues being faced in OPGW laying in HPSEBL (Agenda by POWERGRID)**

As discussed during 16th TeST sub-committee meeting, it was informed by POWERGRID that, some of the links (approx. 155 Kms) were on Rail Pole and Lattice structure and OPGW cable laying on these old transmission lines is not safe and same has been agreed by HPSEBL transmission officials. During the last meeting HPSEBL informed that they will strengthen the 66kV rail pole structures. They further added that reconductoring is also being carried out at some of the aforesaid locations. Simultaneously, POWERGRID may install OPGW on these locations. However, as of now, there is no information from HPSEBL in regard to the strengthening and reconductoring works.

In view of delay in project execution, it is again requested to delete above mentioned links (approx. 155Kms) from the scope of the scheme.

2.11 **HPSEB Communication Related Issues (Agenda by HPSEB)**

2.11.1 Implementation of OPGW under Package-I (a).

Under Package I (a), OPGW stringing work on HPSEBL transmission network was commenced w.e.f. 09.02.2017 and as on date, about 206 Km OPGW has been laid by the firm i.e. M/s. Ten Dot Cable Pvt. Ltd. out of about 543 Km. Further, during 16th TeST meeting, Member Secretary, NRPC opined that installation of ADSS cable instead of OPGW, would be considered as departure from existing scope of work under the contract and may not be a feasible solution because of additional financial implication. Thus, representative of POWERGRID stated that HPSEBL should certify the strengthening of the link and survey report should be submitted confirming line as safe for installation/operation and thereafter, POWERGRID may proceed for installation.

Finally, representative of HPSEBL stated that they will strengthen the 66kV rail pole. He further added that reconductoring is also being carried out at some of the aforesaid locations. Simultaneously, POWERGRID, may install OPGW on these locations. POWERGRID agreed for the same. POWERGRID informed that OPGW may be installed below the conductors and additional clamping may be required for this purpose. HPSEBL agreed for the same. Presently, the following activities carried out by HPSEBL for strengthening of :-

- A. Re-conductoring work on 25KM of 66KV Line between Nogli-Kotla -Ganvi is in progress and weak rail pole structures are being replaced by lattice structure tower to on ten locations. Further, reconductoring on 19KM line has been completed and balance work will be completed by June, 2020.

- B. Estimation for strengthening of 66KV rail pole structure on Nogli-Kumarsain, 66KV Kumarsan-Gumma, 66KV Gumma-Jutogh, 66KV Ghanvi-Nathpa is in progress. Due to bad weather condition, the survey could not be completed in the winter season as most of the lines fall in snow bound area. Further, it is informed that strengthening work of above mentioned rail pole structures is likely to be completed by September, 2020.
- C. Therefore, Member-Secretary, NRPC is requested to allow seven months' time to complete the strengthening of 66KV rail pole structures on following lines:-

S/No.	Name of Link	Length	Remarks
1.	66 kV Nathpa-Ghanvi	20 KM	Rail pole structure
2.	66 kV Ghanvi-Jeori	4 KM	Rail pole structure
3.	66 kV Jeori-Nogli	25 KM	Rail pole structure
4.	66 kV Nogli-Kumarsain	25 KM	Rail pole structure
5.	66 kV Kumarsain-Gumma	42 KM	Rail pole structure
6.	66 kV Gumma-Jutogh	15 KM	Rail pole structure
7.	66 kV Nathpa-Bhaba	2 KM	Rail pole structure
8.	66 kV Sainj-Hulli	21 KM	Lattice structure

POWERGRID may update the status.

2.11.2 Replacement of 12 fibre OPGW with 24 fibre on the HPSEBL links i.e. 132kV Jutogh (Shimla)-Kunihar-Kangoo (Gagal)-Hamirpur-II under Reliable Communication Scheme (Package-B)

It has been given to understand that PGCIL has placed LAO for replacement of 12 fibre OPGW installed under ULDC Phase-I with 24 fibre OPGW under Reliable Communication Scheme (Package-B) and included following HPSEBL links:-

S. No.	Description	Length of link	Remarks
1	132kV Jutogh-Kunihar-II	16.21 KM	Replacement of 12 fibre OPGW installed under ULDC Phase-I with 24 fibre OPGW under Reliable Communication Scheme.
2	132kV Kunihar-Kangoo (Gagal)	50.24 KM	
3	132kV Kangoo (Gagal)-Hamirpur-II	43.78 KM	

Total	110.23 KM	
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In this context, it is intimated that updated status of replacement of 12 Fibre OPGW with 24 Fibre under package-B of Reliable Communication Scheme may please be deliberated during discussion.

Submitted for kind information please.

POWERGRID may update the status.

2.12 Annual Maintenance Contract for OPGW laid under package-V on the HPSEBL Transmission line under “Establishment of Fibre Optic Communication in Northern Region”. (Agenda by HPSEBL)

It is informed that the following OPGW Links with associated communication equipments in Northern Region under “Establishment of Fibre Optic Communication in Northern Region” has been put under the commercial operation w.e.f 00.00 Hrs. of 31st March 2019 in term of clause 4 of CERC (Terms and conditions of tariff) regulation 2014.

S. No.	Description	Length of link
1	132kV Jassore-Dehra	60.556 KM
2	132kV Dehra-Hamirpur-II	42.544 KM
3	132kV Amb-Dehra	26.832 KM
4.	132kV Dehra-Kangra	30.062 KM
5.	132kV Hamirpur-Chullah	36.172 KM
6.	132kV Chullah-Bassi	15.416 KM
7.	132kV Pandoh-Mandi	19.901 KM
8.	132kV Larji-Bajura	20.085 Km
9.	132kV Jassore-Bathri	39.200 KM
10.	132kV Rakkar-Golthai	16.103 KM
11.	132kV Larji-Kangoo	53.700 KM

Further, it is mentioned that the warranty period of one year from the DOCO is going to expire on 30th March, 2020 and AMC shall commence after the expiry of warranty period. Therefore, Committee members may deliberate on the issue w.r.t. following points:-

- A. Methodology adopted for Annual Maintenance Contract (AMC) for OPGW laid under package-V under “Establishment of Fibre Optic Communication in Northern Region” i.e. jointly through PGCIL or by the constituents directly with JV of ZTT & SPL.
- B. Total cost of Scheme as approved by the Hon’ble CERC term of clause 4 of CERC (Terms and conditions of tariff) regulation 2014 and cost and

other terms & conditions of AMC agreed with M/s. JC and SPL by other constituents, if any.

2.13 Regarding commissioning of OPGW under Package 1(a) on various transmission lines of PSTCL. (Agenda by PSTCL)

In the above context, it is brought to your kind notice that PSTCL is under process of laying OPGW on its various 220 KV/132 kV transmission lines under Package 1(a) through PGCIL. Package 1(a) which consists of 1378kms, 132kV/220kV transmission lines.

Package 1(a) had to be completed by Dec 19 which was committed by PGCIL. But PGCIL fails to meet deadline.

It is requested that this contentious issue may be resolved by putting up this case in TeST meeting so that commissioning may get impetus as due to inordinate delay. Also PSTCL is procuring RTUs and for commissioning purpose OPGW route should be ready. So that Package 1(a) may be completed in time bound manner and tentative commissioning schedule may be apprised to PSTCL and PGCIL may be made accountable if there is delay in execution of this project.

2.14 Implementation of Multisite Configuration between BBMB SLDC and PSTCL SLDC (Agenda by BBMB)

2.14.1 The issue was discussed in 15th & 16th TeST meeting wherein BBMB conveyed that the following Multisite Configuration is yet to be implemented by M/s SIEMENS:

a) Flow of BBMB ICCP data between Backup Control Centre and NRLDC.

2.14.2 After deliberation, it was stated that SIEMENS would discuss the feasibility with NRLDC and explore to implement the same. NRLDC and M/s SIEMENS may update the status.

2.15 Implementation of PSTCL SLDC Grid Operations from BBMB BackUp Control Centre (Agenda by PSTCL)

As PSTCL intends to operate and control Grid Operations from BBMB BackUp Control Centre for one day, availability of all the SCADA data/displays/UFR/df-dt displays/Remote tripping displays etc. etc.(as available in Punjab SLDC Control room Ablowal) in the Backup SCADA Control centre, BBMB, Chandigarh is required .

Presently, the SCADA data of SLDC, Patiala is either not reporting or reporting incorrectly at BBMB Backup SLDC Control Center.

Hence, M/s Siemens is requested to confirm date of readiness and do the needful required so that all the operations of Main SCADA control centre can be performed from Backup Control Centre, Chandigarh

2.16 **Strengthening of Communication System (Agenda by UPPTCL)**

Fibre Communication links were established in Microwave Replacement Project through POWERGRID in 2011. At that time, SDH equipments (FIBREHOME) of STM-1 capacity were commissioned. Later on for Strengthening of Communication System, ECI make STM-4 SDH equipments were arranged by POWERGRID at some locations. For enhancement of transmission capacity and Strengthening of communication network, SDH equipments of STM-16 capacity and at least 04 optical directions are required at the following locations.

- i. 400 KV Lucknow (PG)
- ii. Obra-B TPS
- iii. 220 KV Mirzapur
- iv. 220 KV Sirathu
- v. 220 KV Fatehpur
- vi. 400 KV Panki
- vii. 220 KV Chhibramau
- viii. 220 KV Etah

POWERGRID may consider the procurement and commissioning of equipments under their ongoing Reliable Communication Scheme.

Members may like to deliberate and approve the proposal.

2.17 **Replacement of Synchronous Digital Hierarchy(SDH) installed under Unified Load Despatch Centre(ULDC) Phase-I. (Agenda by PSTCL)**

In the above context it is intimated that ULDC-I project was executed by PGCIL pertaining to supply, laying/erection and commissioning of Optical ground wire(OPGW) and Fibre Optic Terminal Equipment (FOTE) covering nearly 554 Km line length at various S/Stns under PSTCL. In the said project Fiberhome make SDHs having Synchronous Transport Module(STM)-1 features were installed, which at present, are Achilles heels & are not able to match/synchronise with up-graded/new versions of STMs. Now-a-days more versatile STM-4 or STM-16 are being used in system. The un-deniable fact is that due to installation of STM-1 [which sans small form-factor pluggable(SFP) provision], there remained an integration issue of patching of STM-4 SDHs (under pkg-V) with STM-I SDHs (under ULDC) due to non-compatibility of both the above said versions of SDHs. Consequently commissioning of Package V could be accomplished in May 2019, after some 1.5 years delay from its schedule.

Similar problem is likely to crop up in future project envisaged by PSTCL on its own where nearly 2200 Km OPGW covering 84 No. S/Stns will be erected and STM-4 SDH are proposed there. It is apprehended that if STM-1 installed under ULDC-1 are not replaced or upgraded with new version of STM-4, it may hamper smooth execution of said project to be executed by PSTCL.

Hence, it is proposed that 28 No. Fiberhome make STM-1 installed on 26 Nos. S/Stns. by PGCIL may be replaced by STM-4.

Hence PGCIL is requested for the up-gradation of SDH-1 (installed under ULDC Phase-I) to SDH-4.

2.18 OPGW cut due to diversion of Transmission Lines (Agenda by POWERGRID)

It has been observed that on several occasions that some of transmission line wing has diverted the transmission lines without informing to concern offices of that constituents or POWERGRID. Due to this, OPGW installed on these transmission lines are cut and services (RTU/speech/ICCP channels) to SLDC/NRLDC or other customers are affecting. These types of incident have happened on several occasions. Recently Gorakhpur-Azamgarh line has been diverted by UPPTCL transmission line group and no information was shared with ULDC-POWERGRID (owner of OPGW) or UPPTCL. After rectification by transmission line vendors, it was learnt that 4 nos of fibres were broken in mid span. In this case additional OPGW and Joint Boxes are needed for splicing due to unplanned fibre cut and in some cases, shutdown is also required for OPGW installation, this affected the system operation and availability of communication network.

2.19 Fiber cut between Kishenpur-New Wanpoh (Agenda by NRLDC)

There is a fiber cut between Kishenpur-Wanpoh since January 2019 due to which PMU data from Wagoora, Wanpoh and Uri was not available at NRLDC. It is to mention that data from these stations is critical for monitoring of Kashmir Valley.

The matter was also discussed during 15th & 16th TeST Meeting, during which POWERGRID stated that unprecedented ice deposition on OPGW in Kashmir valley has led to the breakage of the same. He further added that data from alternate route has been restored. However, they will arrange some alternate arrangements for PMU data. However alternate arrangements are yet to be made.

POWERGRID to update the status of alternate arrangements and timeline for replacement of damaged OPGW.

2.20 Reliable Voice communication between Central Sector Substations / Generating Stations and NRLDC (Agenda by NRLDC)

This is to inform that out of total 129 sub-stations/generating stations at inter-State level in Northern Region VOIP connectivity is presently available only in 98 locations and out of these available locations only 85 (i.e. just 65% of total locations) are in working condition. Further, it is understood that VOIP was not established at some locations during project implementation due to non-availability of fiber connectivity/interfaces equipment. Since now the fiber connectivity to most of these locations has been established, concerned utilities are requested to please arrange availability of Voice communication through VOIP network for these locations also at the earliest.

The size of the Northern Grid has increased subsequently and with increasing penetration of renewable, fast and reliable voice communication is now much more critical for ensuring reliable grid operation and speedy restoration in case of any contingency.

The matter was also discussed in 16th TeST Meeting in which POWERGRID has confirmed that they ensure healthiness of VOIP at their substations and will procure new VOIP equipment for POWERGRID Substations by 31st December 2019.

Also POWERGRID informed that owners/generating sub-stations shall procure centralized PABX compatible VOIP phone on their own and POWERGRID shall configure communication link from sub-station to NRLDC wherever communication links are available.

NRLDC has also taken with various entities for restoration of VOIP communication. The present status of VOIP connectivity is given below:

S.No	Constituent/utility	No of Sub-Station	Available	% percentage availability	Working	% Working
1	POWERGRID	77	64	75.32%	54	70.13%
2	NHPC	14	8	35.71%	8	57.14%
3	NTPC	11	7	60.00%	5	45.45%
4	THDC	2	2	100.00%	2	100.00%
5	SJVNL	1	0	0.00%	0	0.00%
6	NJPC	1	0	0.00%	0	0.00%
7	NPCIL	4	4	100.00%	4	100.00%
8	IPP	19	13	22.22%	12	63.16%
	TOTAL	129	98	62.20%	85	65.89%

It is therefore requested that all other Utilities to procure the VOIP equipment for those locations where it was not considered earlier during project execution phase. All concerned are requested that kindly ensure healthiness and near 100% availability of VOIP connectivity at all inter-State.

PGCIL/NTPC/NHPC/IPP to revert with time lines.

2.21 Communication availability from NLDC/ RLDCs to the nearest wide band node/switchyard for the generating stations under AGC as per CERC order 319/RC/2018 dated 28th August 2019 (Agenda by NRLDC/POWERGRID)

During 44th TCC-47th NRPC meeting, members agreed that detailed plan of OPGW requirement along with cost estimate is to be put in NR-TeST committee for their concurrence before TCC/NRPC approval. Accordingly, POWERGRID has worked out the Fibre Optic network requirement of 435kms along with 13 nos of communication equipment. The link wise details is mentioned at **Annexure-2.21.1.**

Establishment of fibre optic connectivity on account of AGC shall be implemented on cost plus basis. The Tariff for the investment made is to be shared by all constituents as per CERC notification. The scheme shall become part of existing Commercial Agreement signed for ULDC Project.

Members may please deliberate and approve the scheme for further put up for NRPC approval.

2.22 Maintenance of 48V DCPS (Agenda by POWERGRID)

As discussed in earlier meetings, all constituents are requested to procure and maintenance their 48V DCPS at their own as communication equipment vendors are facing severe problem in maintaining 48V DCPS system. Sub-station officials are well maintained their DCPS system which are being used for PLCC and services of engineers are also available 24x7, However in case of faults reported in DCPS used for communication equipment, officials are reluctant even to touch being a third party equipment which affects the communication availability of the network. POWERGRID has also started same philosophy by adopting common 48V DCPS for PLCC, DTPC as well as Communication equipment. All constituents are also requested to take up with respective sub-station protection team to arrange shifting of load for communication equipment at sub-station's 48V DCPS.

<p>3. Issues in Unified Load Dispatch & Communication scheme of NR (Phase-II):</p>

3.1 SCADA issues of HP-SLDC (Agenda by HP-SLDC)

3.1.1 Services (API) for Data exchange from Historian system to HPSLDC Web server :-

H.P. State Load Despatch Centre has placed an order to M/s SIEMENS Ltd. for providing “Services (API) for Data Exchange from Historian to HPSLDC Web Server. The scope of work is detailed as under: -

- Publish real time data from Historian system to HPSLDC website for approx.200 points
- The Data will be published to web server every 30 seconds.
- Website is available and supports REST interface. Values will be published in the website using available REST interface for the website.
- The points whose values are to be read from Historian are assumed to be already configured in real services. The values for these points are assumed to be already configured in real time service. The values for these points are assumed to be updated from an already configured data source.

3.1.2 Deployment of Expert Site engineer: - It has been observed that there is frequent change /replacement of Staff deployed by M/s SIEMENS Ltd. at HPSLDC control Shimla without any prior intimation. In future this office may be taken in loop before replacement / substitution of SIEMENS site engineer at HPSLDC control Centre Shimla and also ensured the training of the new Site Engineers before their deployment at control centre.

3.1.3 Up-gradation of Windows 7 Operating System to higher version in respect of SCADA/EMS system installed at HPSLDC Shimla. :- Presently Operator and remote consoles of SCADA systems is running on Window 7 Operating System. NCIIPC also observed that rarely any up gradation is being done and the support of Windows 7 is also likely to be stopped very soon. Thus it is proposed that this Operating System should be migrated to higher version and provision needs to be included for regular offline/ online updates.

3.1.4 Warranty of Hardware installed at HPSLDC by M/s SIEMENS is expired:-

It has been found that feature of external firewall is expired due to which it is not possible to change or save the configuration and as well as it is not possible to fully utilize the firewalls feature which may lead to external threat also. It's also has been observed that the warranty of some servers are showing expired on Dell web portal. The above issue may please be taken with M/s SIEMENS on top priority for uninterrupted and smooth functioning.

3.2 SCADA issues of HVPNL (Agenda by HVPNL)

- 3.2.1 **Rollover to IPv6:-** In the 12th TeST Meeting, the sub-committee advised that the necessary action regarding migration to IPv6 in compliance to Govt. directions shall be taken by the concerned utilities in co-ordination with their internet service provider. However, work is still pending, thus Power Grid is requested to get this activity carried out.
- 3.2.2 **Interruption in publishing of SCADA data on SCADA Web Server: -** The publishing of SCADA data on SCADA Web Server gets interrupted many times, resulting into inconvenience to the system user. In the previous TeST Meeting Representative of Siemens stated that there was multiple reason for occurrence of the problem. During the debugging, they found that lock was created in the temp directory and it stop update of static data, for clearance of this problem, they have deployed a script in one of the AD server (not in the second AD server) which runs periodically on hourly basis. M/s Siemens may be asked to deploy script in other AD server also.
- 3.2.3 **Issue regarding functionality of IMM: - Transfer failed in Graphic Job: (Error: SVG POP Error):** During the activation of a display job in IMM, most of the time it shows SVG POP error and 'transfer job failed error' occurs. In the last 2 months, frequency of such type of incident has increased too much. We are having IMM installed only in one operator console & due to non-functional PDS, Database modification/addition is not possible for most of the time. In the previous TeST meeting Representative of Siemens stated that for solution of this issue, Siemens created a dummy job in IMM which prevents occurring of this error but the issue is still existing. Thus M/s SIEMENS may be asked to permanently resolve the issue to avoid occurrence of such instances in future.
- 3.2.4 **Issue regarding functionality of PDS:-**The PDS system of SLDC, Panipat has not been working for last one and half years and same has been communicated to several time to M/s SIEMENS. In the 16th TeST meeting, M/s Siemens requested to allow them till 15.12.2019 to resolve the issue. Subsequently, M/s Siemens had deputed engineer Mr. Arpan in the month of Jan-2020 to resolve the issue but he too couldn't resolve the issue even the progress made on this also not being shared. Thus M/s Siemens may be asked to update the status & resolve the issue at the earliest.
- 3.2.5 **Regarding renewal of SSL certificates of Haryana SLDC website:** It is intimated that SLDC website SSL certificate has been expired dated 21.02.2020. A new SSL Certificate has been timely handed over to Siemens site engineer(10 days before the actual date of expire) .But due to non-seriousness of Site engineer the website couldn't be renewed on time even after giving downtime of website 5-6 times already (4-5 hours each time). SLDC website is in public domain and is being continuously visualized by Govt. offices, HVPNL higher management and System operation of Discom/ HVPNL. Due to non-working of website System operation activity is being highly impacted.

Other than this, it is also stated that in the last TeST meeting M/s Siemens stated that failure of website occurred due to deletion of database during maintenance. However, no such report has been furnished by M/s Siemens for any of the instances.

M/s Siemens may be asked to resolve the issue of SSL certificate renewal at the earliest & share the database deletion report.

3.2.6 Hardware failure issue & Services stopped thereof: In the last 3 months there are 9 nos. of hardware equipment failure incident happened and because of this, different services of the system stopped abruptly for example EDNA service, Web site service etc. For example in last 2-3 months there are 5-6 times Edna service stopped & data was found missing. It was ensured by M/s Siemens that data will be restored from buffer after some time automatically but nothing like this happened even after timely intimation to M/s Siemens about this situation. Such type of Hardware failure issues affect operational activity badly. It was requested to M/s Siemens to thoroughly check the whole HVPNL SCADA system in the physical presence of representative of M/s Siemens & SCADA team of HVPNL, ensure the healthiness of the system & make necessary changes in the system if required like Hardware replacement, Firmware up gradation etc. so that such type of issues could be avoided in future.

3.2.7 Intermittency of BBMB data:

For the last 2-3 months it has been observed that BBMB Data ICCP link remains intermittent specially Narela t/fs data. BBMB data is not only having operational importance but also has commercial impact from Haryana State point of view as some of BBMB points comes in the Haryana state drawl and intermittency of such drawl point makes imbalance between drawl and schedule. So BBMB may be asked to resolve this issue and make the availability of data round-the-clock.

3.2.8 Replacement of Faulty Router: One no. of defective WAN router for RTU communication of Siemens SCADA system was replaced with spare router available at SLDC, Panipat in the month of Dec., 2019. Now there is no spare router available at SLDC, Panipat. It was repeatedly requested to M/s Siemens to make availability of spare Router to handle any emergency situation. But no such arrangement has been made so far. M/s Siemens may be asked to make availability of spare Router at the earliest.

3.2.9 Regarding Contractual obligation (qualification) of Site engineer: As per conditions of contract "The support engineer so deployed shall be qualified personnel having at least 5 years of experience in the delivered SCADA/EMS System. "But neither such conditions are obliged nor the regular training is being provided to the site engineers. So M/s Siemens may be asked to oblige conditions of contract.

3.2.10 Window 7 Operating System Updation & Up-gradation: In the 16th TeST meeting it was proposed that the Operating System of Operator consoles/servers should be migrated to higher version of Windows considering the recommendation of NCIIPC. In response of this Representative of Siemens stated that “they have tested SP7 1.0 s/w using windows10, preliminary observations that operator work stations could be made functional without IMM up gradation however for IMM work stations windows 7 OS to be used.” So M/s Siemens may be asked to update the latest status on this & timeline to upgrade the Operating System of Operator consoles/servers.

3.2.11 Cyber Security Auditor:

The SCADA system was commissioned in the NRLDC/SLDCs under ULDC Phase-II during Jan, 2015. It was executed by Powergrid on the behalf of NR constituent states through M/s SIEMENS. As per contract, there was a provision of cyber security audit from a third party CERT-IN empanelled vendor. Accordingly, M/s SIEMENS is getting the cyber security audit done on annual basis from M/s AKS Information Technology Services Pvt. Ltd. since 2016. The cyber security audit is being done by same third party CERT-IN empanelled vendor continuously for the last three years. NCIIPC suggested that in future, the cyber audit should be got carried out from different CERT-IN empanelled Auditors annually.

In the 16th TeST meeting, Member Secretary, NRPC stated that since it is additional requirement by utility therefore utility may get it done through a separate tender. However there is nowhere in the contract, it is mentioned that M/s Siemens will conduct cyber security audit from single vendor. So M/s Siemens may be asked to implement the NCIIPC suggestion by engaging different Cyber Security Auditors annually.

3.2.12 Cyber Security Audit Compliance: Every year the cyber security audit is being carried out by the third party vendor M/s AKS through M/s SIEMENS. The Audit report and their recommendations are being submitted annually but most of the patches are not being taken care of. After going through the cyber audit report of this year, it has been found that during previous year (2018) Cyber audit report most of the Vulnerability Assessment Findings are still existing in the system. Therefore, M/s Siemens may be asked to conduct re-scanning/patch updation (that have been find during cyber audit) within a stipulated time period to avoid any endanger to SCADA system.

3.2.13 Updation of SLDC Website: - Currently, SLDC website is running on Siemens system which is accessing data through SIEMENS servers. The SLDC Website is a web portal which is neither user friendly nor interactive. SLDC Panipat, Haryana is under process to update the website. Accordingly it was requested to M/s Siemens to provide interface for accessing real time data. M/s Siemens stated that

“Integration of new website with existing system is not advisable due to security concern and requested to discuss the same in the next TeST review meeting and take final decision in this regard.” M/s Siemens may be asked to put their concern in this regard so that final decision may be taken in this regard.

3.3 Cyber Security of SCADA/EMS System (Agenda by BBMB)

- 3.3.1 In the 15th & 16th TeST meeting BBMB informed that as per Govt. of India, Ministry of Power Office Memorandum dated 2nd August 2017 (copy enclosed) regarding steps to be taken to prevent cyber incidents due to malware, under the heading “Important and immediate steps need to be taken by the Power Sector Companies” (point (iv)), it has been mentioned that:
- 3.3.2 “No use of Word processing software Power Point, Excel sheets on ICT systems deployed in the operational network”.
- 3.3.3 Further, it was intimated that preparation of Control Room Reports and extraction of history data from SCADA/EMS System installed under ULDC Phase-2 is being done by using MS Excel.
- 3.3.4 Sub-committee suggested BBMB to carry out works in compliance to OM issued by MoP and other relevant guidelines issued by Ministry regarding the same.
- 3.3.5 In pursuance to this the matter was taken up by BBMB with M/s SIEMENS (OEM & AMC vendor of SCADA/EMS System) wherein it was requested that an alternate arrangement may be made for the same and MS Excel be deactivated from the SCADA/EMS System in compliance to Volume-II, Part-B Section-4 clause 4.9 of the contract agreement between POWERGRID and M/s SIEMENS that latest cyber security guidelines of CERT-In shall be followed. However, M/s SIEMENS replied that they are implementing cyber security audit as per contract awarded in 2012 and not possible for us to implement for any additional requirement.
- 3.3.6 POWERGRID may take up the matter with M/s SIEMENS for implementation of the same.

3.4 SCADA data loss (Agenda by BBMB)

- 3.4.1 Complete SCADA data loss was observed at BBMB SLDC on 02.01.2020, 11.02.2020 14.02.2020 & 17.02.2020. The complete logs for disturbances observed on the above mentioned dates have been shared with POWERGRID / NRLDC for analysing the same. POWERGRID / NRLDC are requested to update the same.

3.5 SCADA issues of PSTCL (Agenda by PSTCL)

3.5.1 Window 7 Operating System Updation & Up-gradation to Windows 10:

As discussed in the previous TeST meetings, Operating System of Operating Consoles/Remote Consoles/Laptop is Windows 7 and the support of Windows 7 has been discontinued. As such, Operating System needs to be upgraded to Windows 10. M/s SIEMENS is once again requested to do the needful, so as not to compromise the cyber security threat..

3.5.2 Cyber Security Audit and Compliance of Discrepancies:

In Regards to Cyber Security Audit held in Dec 19/Jan-20, Cyber Security report including External Penetration report has been received by PSTCL. However, Compliance of the Critical and High Vulnerabilities found during audit have still not been attended and compliance report has not been submitted.

Hence M/s Siemens is requested to submit the root cause analysis report and compliance report by attending the vulnerabilities.

3.6 SCADA issues of RVPNL (Agenda by RVPNL)

3.6.1 Buffers are created in EDNA & SCADA servers, due to these buffers data could not be fetched from EDNA/SCADA & clearing of buffers may sometimes take several hours.

3.6.2 Multisite Database synchronization with DTL is still pending.

3.6.3 As Microsoft Windows 7 security updates are stopped from 14-01-2020 , no step is taken to install new version of Windows (Windows 10 or higher version) in workstations & operator consoles.

3.7 SCADA issues of UPSLDC (Agenda by UPSLDC)

3.7.1 Networking Issues:-

(a) M/s Siemens have not taken any suitable measures so far in respect of major data interruption during which most of the Scada data becomes intermittent. Such problem has recently occurred on 05.02.2020 when the entire data of Modipuram SubLDC got "SUSPECT". M/s Siemens has informed that they recently got this issue examined by a third party which concluded that the problem does not pertain with Siemens.

(b) M/S Siemens to share the conclusion of 3rd party report along with comments of M/S to networking and above comments with M/S Siemens. The issue has already been discussed with M/S Siemens on 07-02-2020 (MOM enclosed)

(c) As discussed in 16th Test meeting regarding resolution of networking issue, NRLDC like schematic is to be implemented by Siemens. Networking hardware has already been provided to Siemens by UPPTCL. Siemens to provide the status

3.7.2 **Implementation of Recommendations of Cyber Security Audit Report**

Cyber Security Audit has been taken up by M/s AKS Information Technology Services Pvt Ltd (authorized & deputed by M/s Siemens) from 06.12.19 to 07.12.19. No preventive measures have been taken by M/s Siemens so far, even if the Audit Report has some very serious concerns.

M/S Siemens to take all necessary measures and accordingly issue necessary Cyber Security Audit Certificate by 29.02.2020.

NRPC may suitably instruct M/S Siemens

The issue has already been discussed with M/S Siemens on 07-02-2020 (MOM enclosed)

3.7.3 **Invalid Quality Flag with Historical Data**

It has been observed that the quality flag is showing **OK** even before integration of substation.

M/s Siemens to intimate apprise about the precautionary measures to be taken while developing databases.

The issue has already been discussed with M/S Siemens on 07-02-2020 (MOM enclosed)

3.7.4 **Appointment of competent Site Engineer at Backup SLDC Modipuram.**

M/s Siemens has shifted its Site Engineer from Backup SLDC Modipuram to some other location. Without given any intimation to UPSLDC.

UPSLDC is of the view that if the shifting was unavoidable, even then M/s Siemens should have deputed some experience person over there and rotated the new site engineer for at least one month with the previous person as the newly deputed engineer.

3.7.5 **E-DNA Issues**

CHAD application becomes inactive very frequently (3-4 times in a week), causing interruption of EDNA services.

Also the process E-DNA graph refresh has become very slow.

The issue has already been discussed with M/S Siemens on 07-02-2020 (MOM enclosed)

3.7.6 **Corruption of Historical Data**

It has been observed that many historical data got freeze and the original data got lost in SAN which is a serious concern. M/s Siemens to analyze the same and provide

3.7.7 **IMM Issues:-**

Issue of frequent shut down of IMM workstation has been reported to Siemens through site engineer and complaint portal several times but problem is still unresolved even after lapse of 4-5 months.

3.7.8 PDS Console not Operational

This issue has been discussed several times but M/S Siemens could not resolve the same so far. It was discussed in meeting on 07-02-2020 also and M/S Siemens assured to provide new alternate solution by 31-03-2020.

NRPC may suitably instruct M/S Siemens.

4. Telemetry Related Issues

4.1 Non-Availability / Reliability of Telemetry (Agenda by NRLDC)

4.1.1 In order to have proper visualization and Situational awareness to control room operator for ensuring reliable grid operation, uninterrupted availability of telemetry is essential. It is essential to ensure 100% availability of the data from all the Sub-stations. However, it is seen that data is highly intermittent even for some of the 400kV/ 765kV Sub-stations.

4.1.2 The non-availability of various 400 KV / 765 stations was calculated for the month of January 2020. The list of stations where data availability is less than 80% is given below.

4.1.3 Out of 200 number of 400/765 sub-stations data of nearly 15 (8%) is highly intermittent.

Central Sector	PTCUL	UPPTCL
Kishenpur	Rishikesh	Gonda
Amargarh	Srinagar	Muradnagar
Kishanganga	HVPNL	Agra South
Mohindargarh	Nunhiyawali	Noida SEC 148
Kurushetra		Vishnu Prayag
Parbati 2	RRVNL	
	Bhainsara	

*Intermittency based on January'2020-month data availability

4.1.4 Since, the Reliability of telemetry is essential for smooth monitoring and operation of the grid, the matter has been discussed in various TeST Meetings. Though there is some improvement from last TeST meeting but still 10% station data at 400 KV and above is intermittent.

4.1.5 The matter was also discussed in 16th TeST Meeting wherein MS NRPC has emphasized the importance of telemetry and requested all to ensure 100% availability of telemetry.

4.1.6 Member may like to discuss the issues and resolution target for restoration of reliability.

4.2 Telemetry of digital status (Agenda by NRLDC)

4.2.1 The importance of correct Digital telemetry was discussed in all the TeST sub-committee meeting and it is observed that there is no improvement in this regard. It is was decided in previous TeST Sub-committee meeting that the constituent will furnish the availability status of 220 kV and above stations and improvement there off.

4.2.2 The matter regarding availability of correct digital status is being regularly taken in various TeST Meeting since 2016 but still there is negligible improvement in availability of digital status.

4.2.3 The matter was also discussed during 16th TeST Meeting where it was decided that all constituents would submit the digital status availability report to NRPC/NRLDC on quarterly basis but till date no report has been submitted by constituents.

4.2.4 Availability of digital status based on snapshot of 2nd March 2020 (1600 hrs) is given below:

S.No	Constituent	Total CB	Available	Not Available	% Availability
1	Central Sector	3344	2708	636	85.31%
2	RRVNL	1851	1264	587	68.29%
3	UPPTCL	2076	1437	639	69.22%
4	BBMB	261	248	14	94.64%
5	DTL	549	444	105	80.87%
6	HVNL	806	557	249	69.11%
7	HPSEB	121	89	32	73.55%
8	PSTCL	838	587	251	70.05%
9	Uttarakhand	152	100	52	65.79%

4.2.5 All

members are requested to honour the decision taken in the TeST committee meeting and furnish the status regularly and take actions for making correct digital status available to Control Centers.

Members may like to deliberate.

4.3 Communication plan for channel redundancy to NRLDC (Agenda by NRLDC)

- 4.3.1 The provision of redundant & reliable communication was discussed in various TeST Meetings. Redundant communication is to ensure that two ports at RTU end are configured for RLDC. Also, data is configured with two different communication channel for bringing redundancy into the system and increase reliability of data to NRLDC/RLDC.
- 4.3.2 The reliability of communication channel to NRLDC was discussed in various TeST Meeting since November 2016(8th TeST Meeting). It is informing that still 14 RTUs are reporting to NRLDC on single channel.
- 4.3.3 Presently 120 RTU out of 134 are reporting on redundant channel. It is requested to expedite the process of providing redundant channel for the remaining locations at the earliest. It is to note that stations where second is down since long is considered as single channel only.
- 4.3.4 However redundant channels provided are not reliable and it is found that standby channel are also down due to lack of path diversity/common source of Power Supply etc. Thus it is requested that reliability of redundant channel may also be ensured.
- 4.3.5 List of RTUs with single channel is given below:

S.NO.	Name of RTU	Comments	Timeline
1	KISHANGANGA	NHPC	NHPC to revert
2	PARBATI-2	NHPC	NHPC to revert
3	SALAL	NHPC	NHPC to revert
4	SEWA-2	NHPC	NHPC to revert
5	RIHAND-3	NTPC	NTPC to revert
6	SINGRAULI HYDRO	NTPC	NTPC to revert
9	BUDHIL	IPP	
10	KARCHAM WANGTOO	IPP	
11	SHREE CEMENT	IPP	
12	CHEMERA-3*	NHPC	NHPC to revert
13	NATHPA JHAKRI*	RTU to be replaced	October 2019
14	URI-2*	NHPC	NHPC to revert

*Standby channel down since long.

- 4.3.6 The matter was also discussed in 16th TeST Meeting and comments received during the meeting is given table above. However, no response has been received from NHPC.

POWERGRID/Utilities are requested to please update the status.

4.4 Unreliable Telemetry from States/Utilities (Agenda by NRLDC)

- 4.4.1 Telemetry status as on 31.01.2020 is given below:

Northern Region summary sheet and details of current status of implementation of telemetry system													
												Updated Till:	31.01.2020
Sl. No.	User Name	Total Nos of Stations		Telemetry not Provided				Telemetry Intermittent				Total non-availability of data in %	
				Total nos of		Non-		Total nos of		Non-			
		GS	SS	GS	SS	GS	SS	GS	SS	GS	SS	GS	SS
1	Punjab	17	171	-	65	-	38%	-	12	-	7%	-	45%
2	Haryana	5	71	-	12	-	17%	-	-	-	-	-	17%
3	Rajasthan	20	227	-	-	-	-	2	8	10%	4%	10%	4%
4	Delhi	6	43	-	-	-	-	2	7	33%	16%	33%	16%
5	UP	21	198	-	-	-	-	-	45	-	23%	-	23%
6	Uttarakhand	11	18	-	1	-	6%	7	15	64%	83%	64%	89%
7	HP	15	27	-	-	-	-	3	-	20%	-	20%	-
8	JK	4	17	3	12	75%	71%	1	5	25%	29%	100%	100%
9	POWERGRID	-	81	-	-	-	-	-	4	-	5%	-	5%
10	NTPC	15	-	-	-	-	-	-	-	-	-	-	-
11	NHPC	14	-	-	-	-	-	2	-	14%	-	14%	-
12	NPCIL	5	-	-	-	-	-	-	-	-	-	-	-
13	NJPC	2	-	-	-	-	-	-	-	-	-	-	-
14	THDC	2	-	-	-	-	-	-	-	-	-	-	-
15	BBMB	6	16	-	-	-	-	-	-	-	-	-	-
16	IPP/JV/Patran	8	5	-	-	-	-	2	1	25%	20%	25%	20%
	TOTAL	151	874	3	90	2%	10%	19	97	13%	11%	15%	21%
	Total (over all)	1025		93		9%		116		11%		20%	

It is to mention that non availability as on 31.01.2019 was 22% whereas non -availability as on 31.01.2020 is 20%. It is to again emphasis that very little or no improvement in this regards.

Average Data Non-availability	
Jun-18	26%
Jul-18	24%
Aug-18	24%
Sep-18	22%
Oct-18	25%
Nov-18	24%
Dec-18	22%
Jan-19	22%
Feb-19	28%
Mar-19	25%
Apr-19	26%
May-19	23%
Jun-19	25%
Jul-19	24%
Aug-19	21%
Sep-19	21%
Jan-20	20%

Members are requested to please expedite the availability of data at SLDC/NRLDC.

5. Unified Real Time Dynamic State Measurement (URTDSM) Scheme

5.1 URTDSM issue of HVPNL (Agenda by HVPNL)

5.1.1 Installation of PMU

SAT of PMU installed at 220KV DCRTTPP is still pending. However PGCIL informed that SAT was carried out at PTPS.

5.2 PMUs installed under URTDSM Scheme at 400 kV Substations / Power Houses of BBMB (Agenda by BBMB)

5.2.1 BBMB stated that due to phase mismatch of 400 kV viz-a-viz 220 kV system at 400 kV Substations / Power Houses of BBMB, phasor mismatch is being observed in the PMUs installed under URTDSM Scheme. In the 15th TeST meeting, POWERGRID intimated that necessary instructions shall be imparted to M/s GE to alter the phase sequence wiring in PMUs installed at Dehar Power House, Bhiwani & Panipat. However, this work has yet to be executed, as such, POWERGRID is requested to get this work completed at the earliest.

5.2.2 For 2*80 kVA UPS system installed under PMU project at BBMB SLDC, POWERGRID is requested to update regarding warranty period and procedure to escalate any defect in the UPS system after warranty period.

5.3 Unified Real-time Dynamic State Measurements (URTDSM) scheme (Agenda by PSTCL)

5.3.1 As already intimated in the past, Real time data from Guru Gobind Singh Super Thermal Power Plant (GGSSTP), Ropar plant is not reporting at SLDC Ablowal since long already PGCIL is once again requested to resolve the telemetry data issue of GGSSTP, Ropar in a time bound manner and also intimate the tentative time line.

5.3.2 In addition, PGCIL is also requested to clarify that :-

a) Status of 2nd Phase of URTDSM scheme (along with its tentative time schedule).

b) Guidelines/Regulations to install/commission Phasor Measurement Units (PMU's) at Independent Power Producer (IPPs) for providing PMU data at SLDC may please be shared.

5.4 URTDSM PHASE -II: finalization for PMU Locations (Agenda by POWERGRID)

- 5.4.1 CERC vide its Order dated 16-09-2016 in Petition No: 206/MP/2014 directed POWERGRID for submission of Petition for Phase – II of URTDSM Project after Completion of Phase-I Project (Copy of Relevant Pages enclosed-**Annexure-5.4.1**).
- 5.4.2 As the Phase – I Project of URTDSM is completed and Commissioned, POWERGRID is in process of filing Petition in CERC for Regulatory Approval of Phase – II of URTDSM.
- 5.4.3 List of Feeders for STUs/PPs/ISGS/CTU which will be considered for Phase – II is attached at **Annexure-5.4.2**. The attached List was prepared in 2014 at the time of filing earlier Petition.
- 5.4.4 Substantive Changes have taken place in last 4 year time due to addition of Feeders/LILO/Addition of STATCOMs/New Substations. Therefore, all the Constituents are requested to update the List with Additions/Deletions/Renaming of Feeders so that Final Count of PMUs can be arrived for filing Petition in CERC.

5.5 Data reporting of PMU interrupted (Agenda by POWERGRID):

- 5.5.1 Due to fire in OBRA plant last year, PMU data reporting was affected after burning of cable and fibre cable. It was finalized in last TeST meeting that, in this type of cases concerned plant/station should take action to rectify the PMU along with all accessories and data reporting should be ensured. However, till date no action has been taken up by UPPTCL/UPUUNL to restore the data. Further, data of one more station namely Sahupuri is affecting due to panel dismantling by sub-station staff for Obra-A1, ObraA2 and Bhelupur-I and all cables were dismantled from panels.
- 5.5.2 All constituents are advised to issue necessary instructions to all sub-station not do any activity without prior notice to concerned offices of UPPTCL/POWERGRID/ GE T&D India Ltd as these PMUs are under Warranty/Guarantee and maintenance contract, any issues observed with their termination / CT/PT cabling of equipment / Panel may lead to expiry of warranty / guarantee for that particular item/ site.

<p>6. OTHER AGENDA</p>

6.1 RVPNL other issues (Agenda by RVPNL)

- 6.1.1 The services of M/s Insync(Vendor of AMC for TATA Libert make UPS) are not satisfactory. They are not attending faults within time inspite of repeated intimation.
- 6.1.2 The replacement /repairing of 01 no. of faulty battery charger along with battery for DG Set pending at SLDC Jaipur.

6.2 Provisioning of Phasor Measurement Units (PMU) on HVDC and FACTS device locations (Agenda by NRLDC)

- 6.2.1 HVDC and FACT devices are important transmission components in Indian power system. As these power electronics devices are known to enhance the stability of the grid, therefore understanding behaviour of these devices during perturbations or faults in the power system, is very important besides controller-controller interactions. Apart from local high resolution recording already available at these installation, the high resolution data provided by the PMU can be very helpful in carrying out the necessary analysis/studies. The availability of PMU data will also enhance the visualization of the system parameters and help in taking appropriate timely actions by RLDCs/NLDC and also validation of study models by both RLDCs/NLDC as well as CTU/CEA.
- 6.2.2 It is important to mention that even with presence of such large numbers of PMU, the visibility of HVDC and FACT devices is still low at Control centres.
- 6.2.3 The details regarding installing of PMU on HVDC and FACTs Devices location already informed to POWERGRID vide letter no-: POSOCO/NLDC/SO/PMU/296 DATED-03/02/2020. (**Annexure-6.2.1**)
- 6.2.4 Therefore, POWERGRID is requested to confirm whether data from coupling transformer can be integrated with existing PMU installed at Sub-station or new PMU installation is required. POWERGRID to provide timeline for installation PMU/integrating coupling transformer data at following Locations.

PMU Data Availability on HVDC installed			
S.No.	HVDC station	PMU installed in Substation (Y/N)	PMU data of DC-AC Inter Connector Reporting to RLDC (Y/N)
1	Mahendergarh	No	No
2	Rihand	yes	yes
3	Dadri	yes	yes
4	Balia	yes	No
5	Bhiwadi	yes	no
6	Kurukshetra	Yes	Yes
7	Agra	Yes	No

PMU Data Availability on STATCOM installed			
S.No.	Statcom station	PMU installed in Substation (Y/N)	Coupling Transformer PMU data Reporting to RLDC (Y/N)
1	LUCKNOW	Yes	No
2	NALLAGARH	Yes	No

S.No.	Statcom station	ID	Rating	PMU installed in Substation (Y/N)	Coupling Transformer PMU data Reporting to RLDC (Y/N)
1	400kV KANPUR	SVC-1	+140 / - 140	Yes	No
2	400kV KANPUR	SVC-2	+140 / - 140	Yes	No
3	400 kV Ludhiana	SVC-1	600	Yes	No
4	400 kV Ludhiana	SVC-2	-400	Yes	No
5	400 kV Kankroli	SVC-1	400	Yes	No
6	400 kV Kankroli	SVC-2	-300	Yes	No
7	400 kV New Wangpoh	SVC-1	300	Yes	No
8	400 kV New Wangpoh	SVC-2	-200	Yes	No

*It may be noted that PMU is installed at many sub-stations but there is a requirement of additional PMU installation of Coupling Transformers of SVCs/STATCOM and HVDC Coupling transformer.

6.3 Installation of PMU for all new feeders of State Network (Agenda by NRLDC)

- 6.3.1 It may be noted that installation of PMUs has benefited system operator by taking preventive actions based on synchro phasor measurements in advance, avoiding large scale disturbances and operating the system in a more reliable manner. PMU data has helped a lot in system operation in real time, protection co-ordination, disturbance analysis and network model validation. Based on PMU data PSS tuning was done to avoid such oscillations. During foggy winter nights, large number of auto-reclosure operation took place and its detection in real time by system operator helped a lot in effective real time monitoring and control of the grid.
- 6.3.2 Based on the above advantages PMU was installed under URTDSM project with following strategies:
- Approach on PMU Placement:
- i. All 400 kV stations in State and ISTS grids
 - ii. All generating stations at 220 kV and above
 - iii. HVDC terminals and inter-regional and inter-national tie lines
 - iv. Both ends of all the transmission lines at 400kV and above: State and ISTS sector
- 6.3.3 Further based on the above CTU has included installation of PMUs in connectivity agreement and now all new bays which are coming up have the provision of PMU data at ISTS level. However, the same is lacking at state level.
- 6.3.4 All states are opined to kindly take up with respective STUs for installation/provision of PMUs in upcoming project/connectivity agreement at intrastate level.

Members may discuss.

6.4 Requirement of details of existing Communication network for Establishment of State of the Art U-NMS System for Centralized Supervision for ISTS and State Utility Communication Network in a unified manner (Agenda by POWERGRID)

- 6.4.1 Scheme for centralized supervision for quick fault detection and restoration of communication network of ISTS and all other Utility by integrating its NMS with other users NMS has been approved in 46th NRPC meeting in line with CERC notified Communication Regulation, May'17.
- 6.4.2 Accordingly, CTU is to implement State of the Art Unified Network Management System (U-NMS) in a Control Centre environment at National/Regional/State level.
- 6.4.3 The establishment of U-NMS is proposed to be taken up in a unified manner for implementing centralized supervision of communication Network for transmission system of Cross Border, Inter Regional, Inter-State and Intra-State System.

- 6.4.4 The proposed U-NMS shall acquire data directly from existing NMS of ISTS and State Utility and also from nodes not integrated with existing NMS for all ISTS and all other Utility communication links.
- 6.4.5 In view to implement U-NMS, details of existing/planned NMS/NE in Communication network of State utilities shall also be required to correctly size the software & hardware requirements of U-NMS. The format for details is enclosed at Annexure-II.
- 6.4.6 Members are requested to give details of their existing/planned Communication system as per format at the earliest.

6.5 Signing of side letters of MoU for AMC: (Agenda by POWERGRID)

- 6.5.1 Side letter of MoU for maintenance of OPGW and Wideband has been send to respective constituents. However, side letters for MoUs are yet to be signed by following Constituents and payment got stuck
 - a) **OPGW** – BBMB, PSTCL, PTCUL, UPPTCL, DTL & RRVPNL
 - b) **Wideband** – DTL (Package-V) and UPPTCL
 - c) **APS** - UPPTCL
- 6.5.2 It is once again requested to expedite the signing of side letter to MoUs immediately otherwise it is difficult to carry out the AMC works without MOU in place.

6.6 Maintaining of temperature at control centres: (Agenda by POWERGRID)

- 6.6.1 To maintain the temperature in Communication, Server room, Battery room, adequate numbers of Air conditioners must be required to maintain temperature at 27 Degree Celsius. Further, SCADA/URTDMS servers are inbuilt feature for having Auto shutdown to prevent loss of data in case of over temperature (set at 33 Degree), all constituents are requested to main standard AC temperature.

6.7 Delay in Payment (Agenda by POWERGRID)

- 6.7.1 POWERGRID is providing consultancy services on RTU/APS/Wideband/OPGW maintenance to constituents on overhead charges basis as per MOU signed with respective Constituents. Constituents are paying on quarterly or yearly basis with advance payment, however even advance payments are being released on delay of 5-6 months and in some cases the delay is of up to one and more years which is not acceptable and POWERGRID have no other option to deduct the overhead charges from advance 1% deposited with us and cancellation of AMC with immediate effects. All constituents are requested to deposit advance payment yearly basis.
- 6.7.2 Outstanding payment:

UPPTCL – approx. Rs 750 Lac (APS, RTU, OPGW, wideband)

DATE AND TIME OF THE NEXT MEETING

The date and venue of next (18th) meeting of the Telecommunication, SCADA & Telemetry (TeST) will be intimated later.

रविजी सं. डी.एल.- 33024/99

NEG. NO. D. L-33004/99



भारत का राजपत्र

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विद्युत मंत्रालय

अभिसूचना

नई दिल्ली, 24 जनवरी, 2020

क्र.सा. 388(अ).—विद्युत अधिनियम, 2003 (2003 की सं. 36) की धारा 63 के अधीन परिचालित विश्वा-निर्देशों के पैरा 3 के उप-पैरा 3.2 द्वारा प्रदत्त शक्तियों का प्रयोग करते हुए, केंद्र सरकार एतद्वारा पारेषण योजना के नाम के सामने दर्शाए गई पारेषण योजना के लिए निम्न लिखित बोली प्रक्रिया समन्वयकर्ताओं (बीपीसी) को नियुक्त करती है:

क्र.सं.	पारेषण योजना का नाम एवं क्षेत्र	बोली प्रक्रिया समन्वयकर्ता
1.	महाराष्ट्र में उस्मानाबाद क्षेत्र में (1 गीगावाट) नवीकरणीय ऊर्जा परियोजनाओं से विद्युत की निकासी के लिए पारेषण प्रणाली कार्य क्षेत्र:	आईसी इंसोलिशन प्रोपेकट्स कंपनी लिमिटेड
1	कलाम पीएस के पास 2x500 एमवीए, 400/220 केवी की स्थापना प्राची प्रस्ताव: निम्न के लिए स्थान अे सहित 400/220 केवी आईसीटी : 4 400 केवी लाइन अे : 8 220 केवी लाइन अे : 7 अे के साथ 400 केवी बस रिपेक्टर : 1	
		2x500 एमवीए, 400/220 केवी 400केवी आईसीटी अे-2 220 केवी आईसीटी अे-2 400 केवी लाइन अे-4 220 केवी लाइन अे-2

507 (अ)/2020

(1)

	2	कलाम पीएस पर 1x125 एमवीएआर बस रिएक्टर	1x125 एमवीएआर, 400 केवी रिएक्टर बे-1																
	3	कलाम पीएस पर पारली (पीजी)-पुणे (जीआईएस) 400 केवी डी/सी लाइन के दोनों सर्किटों का एलआईएलओ	10 किमी																
	4	कलाम-पुणे (जीआईएस) 400 केवी डी/सी लाइन के कलाम पीएस छोर पर नई 50 एमवीएआर स्विचेबल लाइन रिएक्टर का प्रावधान	2x50 एमवीएआर, 400 केवी रिएक्टर बे-2																
	<p>नोट :</p> <ul style="list-style-type: none"> ऊपर उल्लिखित लाइन की लंबाई अनुमानित है क्योंकि वास्तविक लंबाई का पता विस्तृत सर्वेक्षण के बाद चलेगा। स्विचेबल लाइन रिएक्टर के लिए स्थान सहित 400 केवी लाइन बे के भावी प्रावधान के लिए स्थान। <p>स्कीम के पूरे होने की समय सीमा दिसम्बर, 2021 है।</p>																		
2.	<p>मध्य प्रदेश राजगढ़ (2500 मेगावाट) एसईजेड में नवीकरणीय ऊर्जा परियोजनाओं से विद्युत की निकासी के लिए पारेषण प्रणाली:</p> <p>कार्य क्षेत्र:</p> <table border="1"> <tr> <td>1</td> <td>राजगढ़ एसईजेड पीपी पर 420 केवी (125 एमवीएआर) बस रिएक्टर सहित 400/220 केवी, 5x500 एमवीए की स्थापना भावी प्रावधान: निम्न के लिए स्थान बे सहित 400/220 केवी आईसीटी : 3 400 केवी लाइन बे : 6 220 केवी लाइन बे : 6 बे के साथ 400 केवी बस रिएक्टर : 1</td> <td>400/220 केवी, 500 एमवीए आईसीटी-5 400 केवी आईसीटी बे-5 220 केवी आईसीटी बे-5 400 केवी लाइन बे-4 220 केवी लाइन बे-9 125 एमवीएआर, 420 केवी रिएक्टर 420 केवी रिएक्टर बे-1</td> </tr> <tr> <td>2</td> <td>राजगढ़ एसईजेड पीपी-भोपाल (स्टेरलाइट) 400 केवी डी/सी लाइन (एचटीएलएस) (नाम मात्र के बोल्टेज पर 2100 एमवीए/सीकेटी की न्यूनतम क्षमता के साथ)</td> <td>लंबाई – 130</td> </tr> <tr> <td>3</td> <td>राजगढ़ एसईजेड पीपी-भोपाल (स्टेरलाइट) 400 केवी डी/सी लाइन (एचटीएलएस) (नाम मात्र के बोल्टेज पर 2100 एमवीए/सीकेटी की न्यूनतम क्षमता के साथ) के लिए भोपाल (स्टेरलाइट) पर 400 केवी लाइन के 2 बे</td> <td>400 केवी लाइन बे-2</td> </tr> <tr> <td>4</td> <td>राजगढ़ एसईजेड पीपी – शूजलपुर 400 केवी डी/सी लाइन (एचटीएलएस) (नाम मात्र के बोल्टेज पर 2100 एमवीए/सीकेटी की न्यूनतम क्षमता के साथ)</td> <td>लंबाई – 80</td> </tr> <tr> <td>5</td> <td>राजगढ़ एसईजेड पीपी – शूजलपुर 400 केवी डी/सी लाइन (एचटीएलएस) (नाम मात्र के बोल्टेज पर 2100 एमवीए/सीकेटी की न्यूनतम क्षमता के साथ) के लिए शूजलपुर पर 400 केवी लाइन के 2 बे</td> <td>400 केवी लाइन बे-2</td> </tr> </table>			1	राजगढ़ एसईजेड पीपी पर 420 केवी (125 एमवीएआर) बस रिएक्टर सहित 400/220 केवी, 5x500 एमवीए की स्थापना भावी प्रावधान: निम्न के लिए स्थान बे सहित 400/220 केवी आईसीटी : 3 400 केवी लाइन बे : 6 220 केवी लाइन बे : 6 बे के साथ 400 केवी बस रिएक्टर : 1	400/220 केवी, 500 एमवीए आईसीटी-5 400 केवी आईसीटी बे-5 220 केवी आईसीटी बे-5 400 केवी लाइन बे-4 220 केवी लाइन बे-9 125 एमवीएआर, 420 केवी रिएक्टर 420 केवी रिएक्टर बे-1	2	राजगढ़ एसईजेड पीपी-भोपाल (स्टेरलाइट) 400 केवी डी/सी लाइन (एचटीएलएस) (नाम मात्र के बोल्टेज पर 2100 एमवीए/सीकेटी की न्यूनतम क्षमता के साथ)	लंबाई – 130	3	राजगढ़ एसईजेड पीपी-भोपाल (स्टेरलाइट) 400 केवी डी/सी लाइन (एचटीएलएस) (नाम मात्र के बोल्टेज पर 2100 एमवीए/सीकेटी की न्यूनतम क्षमता के साथ) के लिए भोपाल (स्टेरलाइट) पर 400 केवी लाइन के 2 बे	400 केवी लाइन बे-2	4	राजगढ़ एसईजेड पीपी – शूजलपुर 400 केवी डी/सी लाइन (एचटीएलएस) (नाम मात्र के बोल्टेज पर 2100 एमवीए/सीकेटी की न्यूनतम क्षमता के साथ)	लंबाई – 80	5	राजगढ़ एसईजेड पीपी – शूजलपुर 400 केवी डी/सी लाइन (एचटीएलएस) (नाम मात्र के बोल्टेज पर 2100 एमवीए/सीकेटी की न्यूनतम क्षमता के साथ) के लिए शूजलपुर पर 400 केवी लाइन के 2 बे	400 केवी लाइन बे-2	आरईसी ट्रांसमिशन प्रोजेक्ट्स कंपनी लिमिटेड
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	<p>नोट :</p> <ul style="list-style-type: none"> • मैसर्स बीडीटीएल (भोपाल धुले ट्रांसमिशन कंपनी लिमिटेड) राजगढ़ एसईजेड पीपी- भोपाल (स्टरलाइट) 400 केवी डी/सी लाइन के समापन के लिए भोपाल (स्टरलाइट) पर 400 केवी लाइन के 2 बे के लिए स्थान उपलब्ध कराएगा। • पावरग्रिड राजगढ़ एसईजेड पीपी-शुजलपुर 400 केवी डी/सी लाइन के समापन के लिए शुजलपुर पर 400 केवी लाइन के 2 बे के लिए स्थान उपलब्ध कराएगा। • स्विचेबल लाइन रिएक्टर के लिए स्थान सहित 400 केवी लाइन बे के भावी प्रावधान के लिए स्थान । <p>स्कीम के पूरे होने की समय सीमा दिसम्बर, 2021 है।</p>																						
3.	<p>अनंतपुरम (अनंतपुर) (2500 मेगावाट) और कुरनूल (1000 मेगावाट), आंध्र प्रदेश में सौर ऊर्जा क्षेत्र के लिए पारेषण प्रणाली:</p> <p>कार्य क्षेत्र:</p> <table border="1" data-bbox="406 694 1125 1444"> <thead> <tr> <th>क्र.सं.</th> <th>पारेषण योजना का कार्य क्षेत्र</th> <th>क्षमता/किमी</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>अनंतपुरम और कुरनूल जिले के बीच उपयुक्त सीमा स्थल पर 400 केवी (2 x125 एमवीएआर) बस रिएक्टर के साथ 400/220 केवी, 7x500 एमवीए की स्थापना भावी प्रावधान: निम्न के लिए स्थान बे के साथ 400/220 केवी आईसीटी : 1 400 केवी लाइन बे : 6 220 केवी लाइन बे : 4</td> <td>400/220 केवी, 500 एमवीए आईसीटी-7 400केवी आईसीटी बे-7 220 केवी आईसीटी बे-7 400 केवी लाइन बे-4 220 केवी लाइन बे-12 125 एमवीएआर, 420 केवी रिएक्टर -2 420 केवी रिएक्टर बे-2</td> </tr> <tr> <td>2</td> <td>अनंतपुरम पीएस- कुरनूल III पीएस 400 केवी (क्वैड मूज के बराबर उच्च क्षमता) डी/सी लाइन</td> <td>लंबाई - 100</td> </tr> <tr> <td>3</td> <td>अनंतपुरम पीएस- कुरनूल III पीएस 400 केवी डी/सी लाइन के लिए कुरनूल III पीएस पर 400 केवी लाइन बे</td> <td>400 केवी लाइन बे-2</td> </tr> <tr> <td>4</td> <td>अनंतपुरम पीएस- कड्डुपा 400 केवी (क्वैड मूज के बराबर उच्च क्षमता) डी/सी लाइन</td> <td>लंबाई - 150</td> </tr> <tr> <td>5</td> <td>अनंतपुरम पीएस- कड्डुपा पीएस 400 केवी के लिए कड्डुपा पीएस पर 400 केवी लाइन बे</td> <td>400 केवी लाइन बे-2</td> </tr> <tr> <td>6</td> <td>अनंतपुरम पीएस- कड्डुपा 400 केवी डी/सी लाइन के लिए 80 एमवीएआर, 420 केवी स्विचेबल लाइन रिएक्टर</td> <td>420 केवी, 80 एमवीएआर रिएक्टर - 2 लाइन रिएक्टर के लिए स्विचिंग उपस्कर -2</td> </tr> </tbody> </table> <p>नोट :</p> <ol style="list-style-type: none"> कुरनूल पीएस का विकासकर्ता अनंतपुरम पीएस- कुरनूल III पीएस 400 केवी (क्वैड मूज के बराबर उच्च क्षमता) डी/सी लाइन के समापन के लिए कुरनूल पीएस पर 400 केवी लाइन के 2 बे के लिए स्थान उपलब्ध कराएगा। पावरग्रिड अनंतपुरम पीएस- कड्डुपा 400 केवी (क्वैड मूज के बराबर उच्च क्षमता) डी/सी लाइन के समापन के लिए कड्डुपा पीएस पर 400 केवी लाइन के 2 बे के लिए स्थान उपलब्ध कराएगा। स्विचेबल लाइन रिएक्टर के लिए स्थान सहित 400 केवी और 765 केवी लाइन बे के भावी प्रावधान के लिए स्थान । <p>स्कीम के पूरे होने की समय सीमा दिसम्बर, 2021 है।</p>	क्र.सं.	पारेषण योजना का कार्य क्षेत्र	क्षमता/किमी	1	अनंतपुरम और कुरनूल जिले के बीच उपयुक्त सीमा स्थल पर 400 केवी (2 x125 एमवीएआर) बस रिएक्टर के साथ 400/220 केवी, 7x500 एमवीए की स्थापना भावी प्रावधान: निम्न के लिए स्थान बे के साथ 400/220 केवी आईसीटी : 1 400 केवी लाइन बे : 6 220 केवी लाइन बे : 4	400/220 केवी, 500 एमवीए आईसीटी-7 400केवी आईसीटी बे-7 220 केवी आईसीटी बे-7 400 केवी लाइन बे-4 220 केवी लाइन बे-12 125 एमवीएआर, 420 केवी रिएक्टर -2 420 केवी रिएक्टर बे-2	2	अनंतपुरम पीएस- कुरनूल III पीएस 400 केवी (क्वैड मूज के बराबर उच्च क्षमता) डी/सी लाइन	लंबाई - 100	3	अनंतपुरम पीएस- कुरनूल III पीएस 400 केवी डी/सी लाइन के लिए कुरनूल III पीएस पर 400 केवी लाइन बे	400 केवी लाइन बे-2	4	अनंतपुरम पीएस- कड्डुपा 400 केवी (क्वैड मूज के बराबर उच्च क्षमता) डी/सी लाइन	लंबाई - 150	5	अनंतपुरम पीएस- कड्डुपा पीएस 400 केवी के लिए कड्डुपा पीएस पर 400 केवी लाइन बे	400 केवी लाइन बे-2	6	अनंतपुरम पीएस- कड्डुपा 400 केवी डी/सी लाइन के लिए 80 एमवीएआर, 420 केवी स्विचेबल लाइन रिएक्टर	420 केवी, 80 एमवीएआर रिएक्टर - 2 लाइन रिएक्टर के लिए स्विचिंग उपस्कर -2	पीएफसी कन्सल्टिंग लिमिटेड
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5	अनंतपुरम पीएस- कड्डुपा पीएस 400 केवी के लिए कड्डुपा पीएस पर 400 केवी लाइन बे	400 केवी लाइन बे-2																					
6	अनंतपुरम पीएस- कड्डुपा 400 केवी डी/सी लाइन के लिए 80 एमवीएआर, 420 केवी स्विचेबल लाइन रिएक्टर	420 केवी, 80 एमवीएआर रिएक्टर - 2 लाइन रिएक्टर के लिए स्विचिंग उपस्कर -2																					

4.	गडग (2500 मेगावाट) कर्नाटक में सौर ऊर्जा क्षेत्र के लिए पारेषण प्रणाली -भाग ए :		आरईसी ट्रांसमिशन प्रोजेक्ट्स कंपनी लिमिटेड	
	कार्य क्षेत्र:			
	1	400/220 केवी, 400 केवी (1x125 एमवीएआर) बस रिएक्टर के साथ 5x500 एमवीए गडग पूर्लिंग स्टेशन की स्थापना भावी प्रावधान: निम्न के लिए स्थान बे के साथ 400/220 केवी आईसीटी : 1 400 केवी लाइन बे : 6 220 केवी लाइन बे : 4		400/220 केवी, 500 एमवीए आईसीटी -5 400 केवी आईसीटी बे-5 220 केवी आईसीटी बे-5 400 केवी लाइन बे-4 220 केवी लाइन बे-8 125 एमवीएआर, 420 केवी रिएक्टर -1 420 केवी रिएक्टर बे-1
	2	गडग पीएस- कोप्ल पीएस 400 केवी (क्वैड मूज के बराबर उच्च क्षमता) डी/सी लाइन		लंबाई 60 -
	3	गडग पीएस- कोप्ल पीएस 400 केवी डी/सी लाइन के लिए कोप्ल पीएस पर 400 केवी लाइन बे		2 - केवी लाइन बे 400
	4	गडग पीएस- नरेन्द्र (नया) पीएस 400 केवी (क्वैड मूज के बराबर उच्च क्षमता) डी/सी लाइन		लंबाई 100 -
5	गडग पीएस- नरेन्द्र (नया) पीएस 400 केवी डी/सी लाइन के लिए नरेन्द्र 400 (नया) पर केवी लाइन बे	2 - केवी लाइन बे 400		
नोट :				
(i) कोप्ल पीएस का विकासकर्ता गडग पीएस- कोप्ल पीएस 400 केवी (क्वैड मूज के बराबर उच्च क्षमता) डी/सी लाइन के समापन के लिए कोप्ल पीएस पर 400 केवी लाइन के 2बे के लिए स्थान उपलब्ध कराएगा।				
(ii) पावरग्रिड गडग पीएस- नरेन्द्र (नया) 400 केवी (क्वैड मूज के बराबर उच्च क्षमता) डी/सी लाइन के समापन के लिए नरेन्द्र 400 (नया) केवी सब स्टेशन पर 400 केवी लाइन के 2बे के लिए स्थान उपलब्ध कराएगा।				
स्कीम के पूरे होने की समय सीमा दिसम्बर, 2021 है।				
5.	बीदर (2500 मेगावाट), कर्नाटक में सौर ऊर्जा क्षेत्र के लिए पारेषण प्रणाली :		आरईसी ट्रांसमिशन प्रोजेक्ट्स कंपनी लिमिटेड	
	कार्य क्षेत्र:			
	क्र.सं.	पारेषण योजना का कार्य क्षेत्र		क्षमता/किमी
1	765 केवी (1x240 एमवीएआर) और 400 केवी (1x125 एमवीएआर) बस रिएक्टर के साथ बीदर के पास उपयुक्त सीमा स्थल पर 3x1500 एमवीए (765/400 केवी), 5x500 एमवीए (400/220) केवी स्टेशन की स्थापना भावी प्रावधान: निम्न के लिए स्थान बे के साथ 765/400 केवी आईसीटी :1 बे के साथ 400/220 केवी आईसीटी :1 765 केवी लाइन बे : 6 400 केवी लाइन बे : 8	1500 एमवीए, 765/400 केवी- 3 500 एमवीए, 400/220 केवी- 5 765 केवी आईसीटी बे - 3 400 केवी आईसीटी बे- 8 220 केवी आईसीटी बे- 5 765 केवी लाइन बे- 2 220 केवी लाइन बे-8 1x240 एमवीएआर, 765 केवी-1 1x125 एमवीएआर, 400 केवी-1		

	220 केवी लाइन बे : 4 बे के साथ 765 केवी बस रिएक्टर : 1	765 केवी रिएक्टर बे -1 400 केवी रिएक्टर बे-1 1x500 एमवीए, 765/400 केवी- 1 पीएच आईसीटी (अतिरिक्त इकाई)-1 1x180 एमवीएआर, 765 केवी, 1 पीएच रिएक्टर (अतिरिक्त इकाई)-1 (दोनों बस रिएक्टरों के लिए और वीदर पीएस के लिए 240 एमवीएआर रिएक्टर- महेश्वरम (पीजी) 765 केवी डी सी लाइन																		
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4	वीदर पीएस - महेश्वरम (पीजी) 765 केवी डी/सी लाइन के वीदर पीएस छोर पर प्रत्येक सर्किट के लिए 765 केवी, 1x240 एमवीएआर स्विचबल लाइन रिएक्टर	240 एमवीएआर, 765 केवी लाइन - रिएक्टर 2 लाइन रिएक्टर के लिए स्विचिंग उपस्कर- 2																		
<p>नोट :</p> <p>(i) पावरग्रिड वीदर पीएस- महेश्वरम (पीजी) 765 केवी डी/सी लाइन के समापन के लिए महेश्वरम 765 केवी सब स्टेशन पर 765 केवी लाइन के 2 बे के लिए स्थान उपलब्ध कराएगा।</p> <p>स्कीम के पूरे होने की समय सीमा दिसम्बर, 2021 है।</p>																				
6	<p>चरण-II भाग ए के अंतर्गत राजस्थान में (8.1 जीडब्ल्यू) सौर ऊर्जा क्षेत्रों से बिजली की निकासी हेतु पारेषण प्रणाली की सुदृढीकरण स्कीम।</p> <p>कार्यक्षेत्र:</p> <table border="1"> <thead> <tr> <th>क्र.सं.</th> <th>पारेषण योजना का कार्यक्षेत्र</th> <th>क्षमता/किमी</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>रामगढ़-II में 400/220 केवी, 4x500 एमवीए, 420 केवी (2x125 एमवीएआर) बस रिएक्टर के साथ पीएस की स्थापना भविष्य प्रावधान; बे सहित 400/200 केवी आईसीटी : 2 400 केवी बे लाइन सहित स्विचबल लाइन रिएक्टर-2 220 केवी लाइन बे-4 बे सहित 420 केवी रिएक्टर : 1</td> <td>400/220 केवी, 500 एमवीए आईसीटी - 4 400 केवी आईसीटी बे- 4 220 केवी आईसीटी बे - 4 400 केवी लाइन बे - 4 220 केवी लाइन बे - 7 125 एमवीएआर, 420 केवी बस रिएक्टर-2 420 केवी रिएक्टर बे- 2</td> </tr> <tr> <td>2</td> <td>रामगढ़-II पीएस - फतेहगढ़- II पीएस 400 केवी डी/सी लाइन (दो एचटीएलएस*)</td> <td>लंबाई - 150</td> </tr> <tr> <td>3</td> <td>रामगढ़- II पीएस फतेहगढ़- II पीएस 400 केवी डी/सी लाइन के लिए फतेहगढ़- II में दो 400 केवी बे लाइन</td> <td>400 केवी लाइन बे - 2</td> </tr> <tr> <td>4</td> <td>रामगढ़ - II पीएस- जैसलमेर- II (आरवीपीएन) 400 केवी डी/सी लाइन (दो एचटीएलएस*)</td> <td>लंबाई- 60</td> </tr> <tr> <td>5</td> <td>रामगढ़- II जैसलमेर-II 400 केवी डी/सी</td> <td>400 केवी लाइन बे - 2</td> </tr> </tbody> </table>	क्र.सं.	पारेषण योजना का कार्यक्षेत्र	क्षमता/किमी	1	रामगढ़-II में 400/220 केवी, 4x500 एमवीए, 420 केवी (2x125 एमवीएआर) बस रिएक्टर के साथ पीएस की स्थापना भविष्य प्रावधान; बे सहित 400/200 केवी आईसीटी : 2 400 केवी बे लाइन सहित स्विचबल लाइन रिएक्टर-2 220 केवी लाइन बे-4 बे सहित 420 केवी रिएक्टर : 1	400/220 केवी, 500 एमवीए आईसीटी - 4 400 केवी आईसीटी बे- 4 220 केवी आईसीटी बे - 4 400 केवी लाइन बे - 4 220 केवी लाइन बे - 7 125 एमवीएआर, 420 केवी बस रिएक्टर-2 420 केवी रिएक्टर बे- 2	2	रामगढ़-II पीएस - फतेहगढ़- II पीएस 400 केवी डी/सी लाइन (दो एचटीएलएस*)	लंबाई - 150	3	रामगढ़- II पीएस फतेहगढ़- II पीएस 400 केवी डी/सी लाइन के लिए फतेहगढ़- II में दो 400 केवी बे लाइन	400 केवी लाइन बे - 2	4	रामगढ़ - II पीएस- जैसलमेर- II (आरवीपीएन) 400 केवी डी/सी लाइन (दो एचटीएलएस*)	लंबाई- 60	5	रामगढ़- II जैसलमेर-II 400 केवी डी/सी	400 केवी लाइन बे - 2	आरईसी ट्रांसमिशन प्रोजेक्ट्स कंपनी लिमिटेड
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3	रामगढ़- II पीएस फतेहगढ़- II पीएस 400 केवी डी/सी लाइन के लिए फतेहगढ़- II में दो 400 केवी बे लाइन	400 केवी लाइन बे - 2																		
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	लाइन के लिए जैसलमेर में दो 400 केवी बे लाइन														
	<p>* प्रत्येक सर्किट में नाममात्र वोल्टेज के साथ 2200 एमवीए न्यूनतम क्षमता के साथ</p> <p>नोट :</p> <p>(i) पावरग्रिड फतेहगढ़-II में दो 400 केवी बे लाइन के लिए स्थान करेगा।</p> <p>(ii) मैसर्स आरबीपीएनएल जैसलमेर-II में दो 400 केवी बे लाइन के लिए स्थान प्रदान करेगा।</p> <p>(iii) ऊपर उल्लिखित लाइनों की लंबाई अनुमानित है क्योंकि वास्तविक लंबाई विस्तृत सर्वेक्षण के बाद ही पता चलेगा।</p> <p>स्कीम के पूरे होने की समय सीमा दिसम्बर, 2021 है।</p>														
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1	फतेहगढ़- II पीएस – भाडला- II पीएस 765 केवी डी/सी लाइन (द्वितीय)	लंबाई-200													
2	फतेहगढ़-II में दो 765 केवी लाइन बे फतेहगढ़-II के लिए भाडला-II पीएस-भाडला-II पीएस 765 केवी डी/सी लाइन (द्वितीय)	765 केवी लाइन बे – 4													
3	फतेहगढ़- II भाडला- II 765 केवी डी/सी लाइन (द्वितीय) में प्रत्येक छोर पर प्रत्येक सर्किट के लिए 1x240 एमवीएआर स्विचेबिल लाइन रिपेक्टर	फतेहगढ़- II तथा भाडला- II में दो रिपेक्टर (240 एमवीएआर, 765 केवी रिपेक्टर- 4 केवी रिपेक्टर के लिए 765 स्विचिंग उपकरण- 4 (फतेहगढ़-II तथा भाडला-II में दो स्विचिंग उपकरण) (फतेहगढ़- II तथा भाडला- II के लिए 1x80 एमवीएआर अतिरिक्त रिपेक्टर और यह फतेहगढ़- II – भाडला- II 765 केवी डी/सी लाइन (द्वितीय) में अतिरिक्त रिपेक्टर के रूप में उपयोग किया जाएगा।													
	<p>नोट :</p> <p>(i) पावरग्रिड फतेहगढ़-II तथा भाडला-II सब-स्टेशन में प्रत्येक 765 केवी बे के दो तथा फतेहगढ़-II तथा भाडला-II सब-स्टेशन में दो स्विचेबिल लाइन रिपेक्टरों के लिए स्थान प्रदान करेगा।</p> <p>(ii) ऊपर उल्लिखित लाइनों की लंबाई अनुमानित है क्योंकि वास्तविक लंबाई का विस्तृत सर्वेक्षण के बाद ही पता चलेगा।</p> <p>स्कीम के पूरे होने की समय सीमा दिसम्बर, 2021 है।</p>														
8	<p>चरण II – भाग सी के अंतर्गत राजस्थान में (8.1 जीडब्ल्यू) सौर ऊर्जा क्षेत्रों से विजली की निकासी हेतु पारेषण प्रणाली की सुदृढीकरण स्कीम।</p> <p>कार्यक्षेत्र:</p> <table border="1"> <thead> <tr> <th>क्र.सं.</th> <th>पारेषण योजना का कार्यक्षेत्र</th> <th>क्षमता/किमी</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>1 केवी 400x125 एमवीएआर और 765 केवी 2x330 एमवीएआर) बस रिपेक्टर के साथ</td> <td>765/400 केवी, 1500 एमवीए आईसीटी – 2</td> </tr> </tbody> </table>		क्र.सं.	पारेषण योजना का कार्यक्षेत्र	क्षमता/किमी	1	1 केवी 400x125 एमवीएआर और 765 केवी 2x330 एमवीएआर) बस रिपेक्टर के साथ	765/400 केवी, 1500 एमवीए आईसीटी – 2	आरईसी ट्रांसमिशन प्रोजेक्ट्स कंपनी लिमिटेड						
क्र.सं.	पारेषण योजना का कार्यक्षेत्र	क्षमता/किमी													
1	1 केवी 400x125 एमवीएआर और 765 केवी 2x330 एमवीएआर) बस रिपेक्टर के साथ	765/400 केवी, 1500 एमवीए आईसीटी – 2													

	<p>सीकर-II में 2x1500 एमवीए, 765/400 केवी की स्थापना</p> <p>भावी प्रावधान :</p> <p>बे के साथ 765/400 केवी आईसीटी के लिए स्थान - 2</p> <p>स्विचेबिल लाइन रिएक्टर के साथ 765 केवी लाइन बे - 10</p> <p>स्विचेबिल लाइन रिएक्टर के साथ 400 केवी लाइन बे -6</p> <p>बे के साथ 400/220 केवी आईसीटी -4</p> <p>220 केवी बे -8</p> <p>400 केवी बस रिएक्टर -2</p>	<p>765/400 केवी, 500 एमवीए अतिरिक्त सिंगल फेस आईसीटी-1</p> <p>765 केवी आईसीटी बे - 2</p> <p>400 केवी आईसीटी बे- 2</p> <p>765 केवी लाइन बे-2</p> <p>400 केवी लाइन बे- 2</p> <p>125 एमवीएआर, 420 केवी बस रिएक्टर-1</p> <p>420 केवी रिएक्टर बे- 1</p> <p>330 एमवीएआर, 765 केवी बस रिएक्टर- 2</p> <p>765 केवी रिएक्टर बे- 2</p> <p>110 एमवीएआर, 765 केवी, 1 पीएच रिएक्टर (अतिरिक्त यूनिट) -1</p>	
2	भाइला-II पीएस- सीकर-II 765 केवी डी/सी लाइन	लंबाई- 310 किमी	
3	भाइला-II पीएस-सीकर-II 765 केवी डी/सी लाइन के लिए भाइला-II पर 765 केवी लाइन के दो बे	765 केवी लाइन बे-2	
4	भाइला-II पीएस-सीकर-II 765 केवी डी/सी लाइन के अंत में सीकर-II पर प्रत्येक सर्किट के लिए 1x330 एमवीएआर स्विचेबिल लाइन रिएक्टर	330 एमवीएआर, 765 केवी रिएक्टर- 2 <p>765 केवी रिएक्टर के लिए स्विचिंग उपकरण - 2</p>	
5	भाइला-II पीएस-सीकर-II 765 केवी डी/सी लाइन के अंत में भाइला-II पर प्रत्येक सर्किट के लिए 1x240 एमवीएआर स्विचेबिल लाइन रिएक्टर	240 एमवीएआर, 765 केवी रिएक्टर- 2 <p>765 केवी रिएक्टर के लिए स्विचिंग उपकरण - 2</p>	
6	सीकर-II - नीमराना 400 केवी डी/सी लाइन (दो एचटीएलएस*)	लंबाई-140	
7	सीकर-II-नीमराना 400 केवी डी/सी लाइन (दो एचटीएलएस) के लिए नीमराना पर 400 केवी लाइन के दो बे।	400 केवी लाइन बे- 2	
<p>* प्रत्येक सर्किट में नाममात्र वोल्टेज के साथ 2200 एमवीए न्यूनतम क्षमता के साथ</p> <p>नोट :</p> <p>(i) पावरग्रिड भाइला-II सब-स्टेशन में प्रत्येक 765 केवी बे के दो तथा भाइला-II सब-स्टेशन में दो स्विचेबिल लाइन रिएक्टरों के लिए स्थान प्रदान कराएगा।</p> <p>(ii) पावरग्रिड नीमराना में दो 400 केवी बे के लिए स्थान प्रदान कराएगा।</p> <p>(iii) ऊपर उल्लिखित लाइन की लंबाई अनुमानित है क्योंकि वास्तविक लंबाई विस्तृत सर्वेक्षण के बाद पता चलेगा।</p> <p>स्कीम के पूरे होने की समय सीमा दिसम्बर, 2021 है।</p>			
9	चरण II - भाग डी के अंतर्गत राजस्थान में (8.1 जी वा) सौर ऊर्जा क्षेत्रों में बिजली की निकासी हेतु पारेषण प्रणाली का सुदृढीकरण स्कीम: कार्यक्षेत्र:		पीएफसी कन्सल्टिंग लिमिटेड

क्र.सं.	पारेषण योजना का कार्यक्षेत्र	क्षमता/किमी
1	सीकर-II -अलीगढ़ 765 केवी डी/सी लाइन	लंबाई - 330 किमी
2	सीकर-II - अलीगढ़ 765 केवी डी/सी लाइन हेतु सीकर-II और अलीगढ़ में 765 केवी दो बे लाइन	765 केवी लाइन बे- 4
3	सीकर-II - अलीगढ़ 765 केवी डी/सी लाइन में प्रति सर्किट हेतु 1x330 एमवीएआर स्विटचेबल रिएक्टर	स्विचिंग उपकरण,765 के वी रिएक्टर-4 (सीकर-II और अलीगढ़ में दो रिएक्टर) 765 के वी रिएक्टर हेतु स्विचिंग उपकरण -4(सीकर-II और अलीगढ़ में दो स्विचिंग उपकरण) 110 एमवीएआर , 765 के वी, 1 पी एच रिएक्टर (अतिरिक्त इकाई)-1

नोट :

(i) पावरग्रिड अलीगढ़ सब स्टेशन में दो लाइन रिएक्टरों तथा दो 765 केवी बे के लिए स्थान उपलब्ध कराएगा।

(ii) सीकर-II सब स्टेशन के विनिर्माता सीकर-II सब स्टेशन में दो लाइन रिएक्टरों तथा दो 765 केवी बे के लिए स्थान उपलब्ध कराएगा।

(iii) ऊपर उल्लिखित लाइन की लंबाई अनुमानित है क्योंकि वास्तविक लंबाई विस्तृत सर्वेक्षण के बाद पता चलेगा।

स्कीम के पूरे होने की समय सीमा दिसम्बर, 2021 है।

10 चरण II - भाग ई के अंतर्गत राजस्थान में (8.1 जीवा) सौर ऊर्जा क्षेत्रों में बिजली की निकासी हेतु पारेषण प्रणाली का सुदृढीकरण स्कीम:

कार्य क्षेत्र:

क्र.सं.	पारेषण योजना का कार्यक्षेत्र	क्षमता/किमी
1	भाइला-II-पी एस सीकर II- 765 केवी डी/सी लाइन(द्वितीय)	लंबाई- 310 किमी
2	भाइला-पी एस सीकर II-II 765 केवी डी/सी लाइन के लिए भाइला-II और सीकर-II में दो 765 केवी बे	765 केवी लाइन बे-4
3	भाइला-II पी एस सीकर-II 765 केवी डी/सी लाइन के लिए प्रति सर्किट हेतु 1x330 एमवीएआर स्विचेबल लाइन रिएक्टर	330 एमवीएआर 765 केवी रिएक्टर-2 765 केवी रिएक्टर हेतु स्विचेबल उपकरण -2
4	भाइला-II पी एस सीकर-II 765 केवी डी/सी लाइन के लिए भाइला में प्रति सर्किट हेतु 1x240 एमवीएआर स्विचेबल लाइन रिएक्टर	240 एमवीएआर 765 केवी रिएक्टर-2 765 केवी रिएक्टर हेतु स्विचेबल उपकरण -2

नोट :

(i) पावरग्रिड भाइला-II सब स्टेशन में दो लाइन रिएक्टरों तथा दो 765 केवी बे के लिए स्थान उपलब्ध कराएगा।

(ii) ऊपर उल्लिखित लाइन की लंबाई अनुमानित है क्योंकि वास्तविक लंबाई विस्तृत सर्वेक्षण के बाद पता चलेगा।

स्कीम के पूरे होने की समय सीमा दिसम्बर, 2021 है।

पीएफसी कन्सल्टिंग लिमिटेड

11	चरण II - भाग एफ के अंतर्गत राजस्थान में (8.1 जीवा) सौर ऊर्जा क्षेत्रों में बिजली की निकासी हेतु पारेषण प्रणाली का सुदृढीकरण स्कीम:		पीएफसी कन्सल्टिंग लिमिटेड	
	कार्य क्षेत्र:			
	क्र.सं.	पारेषण योजना का कार्य क्षेत्र		क्षमता/किमी
	1	400/220 केवी की स्थापना, 400 केवी पर उपयुक्त बस विभाजन के साथ ब्रीकानेर-II पर 6x500 एमवीए पूलिंग स्टेशन तथा 220 केवी लेवल तथा 420 केवी (2x125 एमवीएआर) बस रिएक्टर <i>भावी प्रावधान : बे के साथ 400/220 केवी आईसीटी के लिए स्थान : 4 400 केवी लाइन बे :6 220 केवी लाइन बे :6 बे के साथ 420 केवी रिएक्टर : 2</i>		400/220 केवी 500, एमवीए, आईसीटी-6 400 केवी आईसीटी बे-6 220 केवी आईसीटी बे-6 400 केवी लाइन बे-4 220 केवी लाइन बे-6 125 एमवीएआर, 420 केवी बस रिएक्टर-2 400 केवी बस रिएक्टर बे- 2 400 केवी 80 एमवीएआर लाइन रिएक्टर- 4 400 केवी स्विचेबिल लाइन रिएक्टर के लिए स्विचिंग उपकरण-4
	2	ब्रीकानेर-II पीएस - खेतड़ी 400 केवी 2xडी/सी लाइन (एम/सी टावर पर दो एचटीएलएस*)		लंबाई -2x270
	3	ब्रीकानेर-II के अंत में खेतड़ी में प्रत्येक सर्किट पर 1x80 एमवीएआर स्विचेबिल लाइन रिएक्टर - खेतड़ी 400 केवी 2xडी/सी लाइन		400 केवी 80 एमवीएआर रिएक्टर - 4 400 केवी स्विचेबिल लाइन रिएक्टर के लिए स्विचिंग उपकरण -4
	4	ब्रीकानेर-II पीएस के लिए खेतड़ी पर 400 केवी लाइन बे की सं. 4		400 केवी लाइन बे - 4
	5	खेतड़ी- भिवाड़ी 400 केवी डी/सी लाइन (दो एचटीएलएस*)		लंबाई- 120
	6	खेतड़ी के लिए 400 केवी लाइन बेयसट की सं. 2		400 केवी लाइन बे- 2
	7	खेतड़ी के लिए भिवाड़ी पर 400 केवी (जीआईएस) की सं. 2-भिवाड़ी 400 केवी डी/सी लाइन		400 केवी लाइन बे - 2
8	ब्रीकानेर-II एस/एस पर स्टेटकॉम	± 300 एमवीएआर, 2x125 एमवीएआर एमएससी, 1x125 एमवीएआर एमएसआर		
*नाममात्र के वोल्टेज पर प्रत्येक सर्किट पर 2200 एमवीए की न्यूनतम क्षमता के साथ				
नोट :				
(I) पावरग्रिड भिवाड़ी सब स्टेशन में दो लाइन रिएक्टरों तथा 400 केवी बे के लिए दो स्थान उपलब्ध कराएगा।				

	<p>(ii) बीकानेर-II के लिए खेतड़ी पर 400 केवी बे की सं 6 के लिए स्थान प्रदान करने के लिए खेतड़ी सब-स्टेशन के विकासकर्ता- स्विचेबिल लाइन रिएक्टर तथा खेतड़ी - भिवाड़ी 400 केवी डी/सी लाइन (दो एचटीएलएस) के लिए खेतड़ी 400 केवी 2xडीसी लाइन के साथ स्थान प्रदान करने के लिए।</p> <p>(iii) ऊपर उल्लिखित लाइन की लंबाई अनुमानित है क्योंकि वास्तविक लंबाई विस्तृत सर्वेक्षण के बाद पता चलेगा।</p> <p>स्कीम के पूरे होने की समय सीमा दिसम्बर, 2021 है।</p>													
12	<p>चरण II - भाग जी के अंतर्गत राजस्थान में (8.1 जीडब्ल्यू) सौर ऊर्जा क्षेत्रों से बिजली की निकासी हेतु पारेषण प्रणाली की सुदृढीकरण स्कीम।</p> <p>कार्यक्षेत्र:</p> <table border="1" data-bbox="403 672 1126 1751"> <thead> <tr> <th>क्र.सं.</th> <th>पारेषण योजना का कार्यक्षेत्र</th> <th>क्षमता/किमी</th> </tr> </thead> <tbody> <tr> <td>1</td> <td> <p>765 केवी (2x330 एमवीएआर) बस रिएक्टर तथा 400 केवी (1x125 एमवीएआर) बस रिएक्टर के साथ नरेला पर 765/400 केवी, 3x1500 एमवीए जीआईएस सब स्टेशन की स्थापना।</p> <p><i>भावी प्रावधान: बे के साथ 765/400 केवी आईसीटी के लिए स्थान: 1</i></p> <p><i>स्विचेबिल लाइन रिएक्टर के साथ 765 केवी लाइन बे: 6</i></p> <p><i>400 केवी लाइन बे: 6+4</i></p> <p><i>बे के साथ 765 केवी रिएक्टर: 2</i></p> <p><i>बे के साथ 400/220 केवी आईसीटी: 8</i></p> <p><i>220 केवी लाइन बे: 12</i></p> <p><i>बे के साथ 400 केवी बस रिएक्टर: 2</i></p> </td> <td> <p>765/400 केवी, 1500 एमवीए आईसीटी-3</p> <p>765/400 केवी, 500 एमवीए अतिरिक्त आईसीटी (1-फेस) - 1</p> <p>765 केवी आईसीटी बे-3</p> <p>400 केवी आईसीटी बे-3</p> <p>765 केवी लाइन बे-4 (जीआईएस)</p> <p>330 एमवीएआर, 765 केवी बस रिएक्टर- 2</p> <p>765 केवी बस रिएक्टर बे- 2</p> <p>110 एमवीएआर, 765 केवी, 1-पीएच बस रिएक्टर (अतिरिक्त यूनिट) -1</p> <p>125 एमवीएआर, 420 केवी बस रिएक्टर- 1</p> <p>420 केवी बस रिएक्टर बे- 1</p> <p>330 एमवीएआर, 765 केवी लाइन रिएक्टर- 2</p> <p>765 केवी रिएक्टर के लिए स्विचिंग उपकरण- 2</p> <p>(खेतड़ी-नरेला 765 केवी डी/सी लाइन के लिए अतिरिक्त उपयोग के लिए 1x110 एमवीएआर अतिरिक्त रिएक्टर)</p> </td> </tr> <tr> <td>2</td> <td> <p>खेतड़ी के अंत में नरेला पर प्रत्येक सर्किट के लिए नरेला 765 केवी डी/सी लाइन 1x330 एमवीएआर स्विचेबिल लाइन रिएक्टर-नरेला 765 डी/सी लाइन</p> </td> <td> <p>लंबाई-180</p> </td> </tr> <tr> <td>3</td> <td> <p>खेतड़ी-नरेला 765 केवी डी/सी लाइन के लिए खेतड़ी पर दो 765 केवी लाइन बे दो</p> </td> <td> <p>765 केवी लाइन बे-2 (एआईएस)</p> </td> </tr> </tbody> </table>	क्र.सं.	पारेषण योजना का कार्यक्षेत्र	क्षमता/किमी	1	<p>765 केवी (2x330 एमवीएआर) बस रिएक्टर तथा 400 केवी (1x125 एमवीएआर) बस रिएक्टर के साथ नरेला पर 765/400 केवी, 3x1500 एमवीए जीआईएस सब स्टेशन की स्थापना।</p> <p><i>भावी प्रावधान: बे के साथ 765/400 केवी आईसीटी के लिए स्थान: 1</i></p> <p><i>स्विचेबिल लाइन रिएक्टर के साथ 765 केवी लाइन बे: 6</i></p> <p><i>400 केवी लाइन बे: 6+4</i></p> <p><i>बे के साथ 765 केवी रिएक्टर: 2</i></p> <p><i>बे के साथ 400/220 केवी आईसीटी: 8</i></p> <p><i>220 केवी लाइन बे: 12</i></p> <p><i>बे के साथ 400 केवी बस रिएक्टर: 2</i></p>	<p>765/400 केवी, 1500 एमवीए आईसीटी-3</p> <p>765/400 केवी, 500 एमवीए अतिरिक्त आईसीटी (1-फेस) - 1</p> <p>765 केवी आईसीटी बे-3</p> <p>400 केवी आईसीटी बे-3</p> <p>765 केवी लाइन बे-4 (जीआईएस)</p> <p>330 एमवीएआर, 765 केवी बस रिएक्टर- 2</p> <p>765 केवी बस रिएक्टर बे- 2</p> <p>110 एमवीएआर, 765 केवी, 1-पीएच बस रिएक्टर (अतिरिक्त यूनिट) -1</p> <p>125 एमवीएआर, 420 केवी बस रिएक्टर- 1</p> <p>420 केवी बस रिएक्टर बे- 1</p> <p>330 एमवीएआर, 765 केवी लाइन रिएक्टर- 2</p> <p>765 केवी रिएक्टर के लिए स्विचिंग उपकरण- 2</p> <p>(खेतड़ी-नरेला 765 केवी डी/सी लाइन के लिए अतिरिक्त उपयोग के लिए 1x110 एमवीएआर अतिरिक्त रिएक्टर)</p>	2	<p>खेतड़ी के अंत में नरेला पर प्रत्येक सर्किट के लिए नरेला 765 केवी डी/सी लाइन 1x330 एमवीएआर स्विचेबिल लाइन रिएक्टर-नरेला 765 डी/सी लाइन</p>	<p>लंबाई-180</p>	3	<p>खेतड़ी-नरेला 765 केवी डी/सी लाइन के लिए खेतड़ी पर दो 765 केवी लाइन बे दो</p>	<p>765 केवी लाइन बे-2 (एआईएस)</p>	पीएफसी कन्सल्टिंग लिमिटेड
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4	नरेला में 765 केवी मेरठ-भिवानी एस/सी लाइन का लीलो	लंबाई- 25
<p>नोट :</p> <p>(i) खेतड़ी सब-स्टेशन के निर्माणकर्ता दो लाइन रिएक्टरों के लिए स्थान के साथ खेतड़ी सब-स्टेशन पर 765 केवी के दो ब्रे के लिए स्थान प्रदान कराएगा।</p> <p>(ii) उपरोक्त उल्लिखित लाइन की लंबाई विस्तृत सर्वे के पश्चात् प्राप्त की गई वास्तविक लंबाई के लगभग बराबर होती है।</p> <p>स्कीम के पूरे होने की समय सीमा दिसम्बर, 2021 है।</p>		

2. बोली प्रक्रिया समन्वयकर्ता की नियुक्ति दिशानिर्देशों में निर्धारित शर्तों के अधीन है।

[फा. सं. 15/3/2018-ट्रान्स-पार्ट(1)]

एस .के .जी. रहाटे, अपर सचिव (ट्रान्स)

MINISTRY OF POWER

NOTIFICATION

New Delhi, the 24th January, 2020

S.O. 386(E).—In exercise of the powers conferred by sub- para 3.2 of Para 3 of the Guidelines circulated under Section 63 of the Electricity Act, 2003 (no. 36 of 2003), the Central Government hereby appoints the following Bid-Process Coordinators (BPCs) for the Transmission Schemes, as shown against the name of the Transmission Schemes: -

Sl. No.	Name & Scope of the Transmission Scheme	Bid Process Coordinator															
1	<p>Transmission system for evacuation of power from RE projects in Osmanabad area (1 GW) in Maharashtra.</p> <p>Scope:</p> <table border="1"> <thead> <tr> <th>Sl. No</th> <th>Scope of the Transmission Scheme</th> <th>Capacity /km</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Establishment of 2x500MVA, 400/220kV near Kallam PS Future Provisions: Space for 400/220 kV ICTs along with bays: 4 nos. 400 kV line bays: 6 nos. 220kV line bays: 7 nos. 400 kV bus reactor along with bays: 1 no.</td> <td>2x500MVA, 400/220kV 400kV ICT bay-2 220kV ICT bay-2 400kV line bay-4 220kV line bay- 4</td> </tr> <tr> <td>2</td> <td>1x125MVA bus reactor at Kallam PS</td> <td>1x125 MVA 400kV reactor bay -1</td> </tr> <tr> <td>3</td> <td>LILO of both circuits of Parli(PG) – Pune(GIS) 400kV D/c line at Kallam PS</td> <td>10km</td> </tr> <tr> <td>4</td> <td>Provision of new 50MVA switchable line reactor at Kallam PS end of Kallam – Pune(GIS) 400kV D/c line</td> <td>2x50 MVA 400kV Reactor bays -2</td> </tr> </tbody> </table> <p>Note: (i) The line lengths mentioned above are approximate as the exact length shall be obtained after the detailed survey.</p>	Sl. No	Scope of the Transmission Scheme	Capacity /km	1	Establishment of 2x500MVA, 400/220kV near Kallam PS Future Provisions: Space for 400/220 kV ICTs along with bays: 4 nos. 400 kV line bays: 6 nos. 220kV line bays: 7 nos. 400 kV bus reactor along with bays: 1 no.	2x500MVA, 400/220kV 400kV ICT bay-2 220kV ICT bay-2 400kV line bay-4 220kV line bay- 4	2	1x125MVA bus reactor at Kallam PS	1x125 MVA 400kV reactor bay -1	3	LILO of both circuits of Parli(PG) – Pune(GIS) 400kV D/c line at Kallam PS	10km	4	Provision of new 50MVA switchable line reactor at Kallam PS end of Kallam – Pune(GIS) 400kV D/c line	2x50 MVA 400kV Reactor bays -2	REC Transmission Projects Company Limited
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4	Provision of new 50MVA switchable line reactor at Kallam PS end of Kallam – Pune(GIS) 400kV D/c line	2x50 MVA 400kV Reactor bays -2															

	(ii) Space for future provisions for 400 kV line bays to kept including the space for switchable line reactors. <i>The completion schedule for the scheme is December' 2021.</i>																			
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3	Transmission scheme for Solar Energy Zone in Ananthpuram (Ananthapur) (2500 MW) and Kurnool (1000 MW), Andhra Pradesh	PFC Consulting Ltd.																		

Scope:											
Sl. No	Scope of the Transmission Scheme	Capacity /km									
1	Establishment of 400/220 kV, 7x500 MVA pooling station at suitable border location between Ananthpuram & Kurnool Distt with 400kV (2x125 MVAR) bus reactor <u>Future provisions:</u> Space for 400/220kV ICTs along with bays: 1 nos. 400kV line bays: 6 nos. 220kV line bays: 4 nos.	400/220 kV, 500 MVA ICT – 7 400 kV ICT bays – 7 220 kV ICT bays – 7 400 kV line bays – 4 220 kV line bays – 12 125 MVAR, 420 kV reactor - 2 420 kV reactor bay – 2									
2	Ananthpuram PS-Kurnool-III PS 400 kV (High capacity equivalent to quad moose) D/c Line	Length – 100									
3	400 kV line bays at Kurnool-III PS for Ananthpuram PS-Kurnool-III PS 400 kV D/c line	400 kV line bays – 2									
4	Ananthpuram PS-Cuddapah 400 kV (High capacity equivalent to quad moose) D/c Line	Length - 150									
5	400 kV line bays Cuddapah PS for Ananthpuram PS-Cuddapah 400 kV	400 kV line bays – 2									
6	80 MVAR, 420 KV switchable line reactor for Ananthpuram PS-Cuddapah 400 kV D/c line	420 kV, 80 MVAR reactor – 2 nos. Switching equipments for line reactor- 2									
<p>Note:</p> <p>(i) Developer of Kurnool PS to provide space for 2 no. of 400 kV line bays at Kurnool PS for termination of Ananthpuram PS-Kurnool-III PS 400 kV (High capacity equivalent to quad moose) D/c Line.</p> <p>(ii) Powergrid to provide space for 2 no. of 400 kV line bays at Cuddapah PS for termination of Ananthpuram PS-Cuddapah 400 kV (High capacity equivalent to quad moose) D/c Line.</p> <p>(iii) Space for future provisions for 400 kV and 765 kV line bays to kept including the space for switchable line reactors.</p> <p>The completion schedule for the scheme is December' 2021.</p>											
4	Transmission Scheme for Solar Energy Zone in Gadag (2500 MW), Karnataka – Part A Scope:										
<table border="1"> <thead> <tr> <th>Sl. No</th> <th>Scope of the Transmission Scheme</th> <th>Capacity /km</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Establishment of 400/220 kV, 5x500 MVA Gadag Pooling Station with 400kV (1x125 MVAR) bus reactor <u>Future provisions:</u> Space for 400/220kV ICTs along with bays: 1 nos. 400kV line bays: 6 nos. 220kV line bays: 4 nos</td> <td>400/220 kV, 500 MVA ICT – 5 400 kV ICT bays – 5 220 kV ICT bays – 5 400 kV line bays – 4 220 kV line bays – 8 125 MVAR, 420 kV reactor - 1 420 kV reactor bay – 1</td> </tr> <tr> <td>2</td> <td>Gadag PS-Koppal PS 400 kV (high capacity equivalent to quad moose) D/C Line</td> <td>Length – 60</td> </tr> </tbody> </table>			Sl. No	Scope of the Transmission Scheme	Capacity /km	1	Establishment of 400/220 kV, 5x500 MVA Gadag Pooling Station with 400kV (1x125 MVAR) bus reactor <u>Future provisions:</u> Space for 400/220kV ICTs along with bays: 1 nos. 400kV line bays: 6 nos. 220kV line bays: 4 nos	400/220 kV, 500 MVA ICT – 5 400 kV ICT bays – 5 220 kV ICT bays – 5 400 kV line bays – 4 220 kV line bays – 8 125 MVAR, 420 kV reactor - 1 420 kV reactor bay – 1	2	Gadag PS-Koppal PS 400 kV (high capacity equivalent to quad moose) D/C Line	Length – 60
Sl. No	Scope of the Transmission Scheme	Capacity /km									
1	Establishment of 400/220 kV, 5x500 MVA Gadag Pooling Station with 400kV (1x125 MVAR) bus reactor <u>Future provisions:</u> Space for 400/220kV ICTs along with bays: 1 nos. 400kV line bays: 6 nos. 220kV line bays: 4 nos	400/220 kV, 500 MVA ICT – 5 400 kV ICT bays – 5 220 kV ICT bays – 5 400 kV line bays – 4 220 kV line bays – 8 125 MVAR, 420 kV reactor - 1 420 kV reactor bay – 1									
2	Gadag PS-Koppal PS 400 kV (high capacity equivalent to quad moose) D/C Line	Length – 60									
		REC Transmission Projects Company Limited									

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3	400 kV line bays at Koppal PS for Gadag PS-Koppal PS 400 kV D/c line	400 kV line bays – 2															
4	Gadag PS-Narendra (New) PS 400 kV (high capacity equivalent to quad moose) D/C Line	Length - 100															
5	400 kV line bays at Narendra (new) for Gadag PS-Narendra (New) PS 400 kV D/c line.	400 kV line bays – 2															
5	<p>Transmission Scheme for Solar Energy Zone in Bidar (2500 MW), Karnataka</p> <p>Scope:</p> <table border="1"> <thead> <tr> <th>Sl. No</th> <th>Scope of the Transmission Scheme</th> <th>Capacity /km</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Establishment of 3x1500MVA (765/400kV), 5x500MVA (400/220kV) station at suitable border location near Bidar with 765kV (1x240 MVAR) and 400kV (1x125 MVAR) bus reactor Future provisions: Space for 765/400kV ICTs along with bays: 1 no. 400/220kV ICTs along with bays: 2 nos. 765kV line bays: 6 nos. 400kV line bays: 8 nos. 220kV line bays: 4 nos. 765kV bus reactor along with bays: 1 no</td> <td>1500MVA, 765/400kV- 3 500 MVA, 400/220kV- 5 765kV ICT bay-3 400kV ICT bay-8 220kV ICT bay- 5 765kV line bay-2 220kV line bays -8 1x240MVA, 765kV - 1 1x125MVA, 420kV - 1 765kV reactor Bay -1 400kV reactor Bay -1 1x500 MVA, 765/400 kV, 1-ph ICT (spare unit) - 1 1x80 MVAR, 765 kV, 1 ph Reactor (spare unit) – 1 (for both bus reactor and 240 MVA line reactor of Bidar PS – Maheshwaram (PG) 765 kV D/C line)</td> </tr> <tr> <td>2</td> <td>Bidar PS – Maheshwaram (PG) 765 kV D/C line</td> <td>Length - 160</td> </tr> <tr> <td>3</td> <td>765 kV line bays at Maheshwaram (PG) for termination of Bidar PS – Maheshwaram (PG) 765 kV D/C line</td> <td>765 kV line bays - 2</td> </tr> <tr> <td>4</td> <td>765kV, 1X240MVA switchable Line reactor for each circuit at Bidar PS end of Bidar PS – Maheshwaram (PG) 765 kV D/C line</td> <td>240 MVAR, 765 kV line reactor – 2 Switching equipments for line reactor- 2</td> </tr> </tbody> </table> <p>Note:</p> <p>(i) Powergrid to provide space for 2 no. of 765 kV line bays at Maheshwaram 765 kV substation for termination of Bidar PS – Maheshwaram (PG) 765 kV</p>	Sl. No	Scope of the Transmission Scheme	Capacity /km	1	Establishment of 3x1500MVA (765/400kV), 5x500MVA (400/220kV) station at suitable border location near Bidar with 765kV (1x240 MVAR) and 400kV (1x125 MVAR) bus reactor Future provisions: Space for 765/400kV ICTs along with bays: 1 no. 400/220kV ICTs along with bays: 2 nos. 765kV line bays: 6 nos. 400kV line bays: 8 nos. 220kV line bays: 4 nos. 765kV bus reactor along with bays: 1 no	1500MVA, 765/400kV- 3 500 MVA, 400/220kV- 5 765kV ICT bay-3 400kV ICT bay-8 220kV ICT bay- 5 765kV line bay-2 220kV line bays -8 1x240MVA, 765kV - 1 1x125MVA, 420kV - 1 765kV reactor Bay -1 400kV reactor Bay -1 1x500 MVA, 765/400 kV, 1-ph ICT (spare unit) - 1 1x80 MVAR, 765 kV, 1 ph Reactor (spare unit) – 1 (for both bus reactor and 240 MVA line reactor of Bidar PS – Maheshwaram (PG) 765 kV D/C line)	2	Bidar PS – Maheshwaram (PG) 765 kV D/C line	Length - 160	3	765 kV line bays at Maheshwaram (PG) for termination of Bidar PS – Maheshwaram (PG) 765 kV D/C line	765 kV line bays - 2	4	765kV, 1X240MVA switchable Line reactor for each circuit at Bidar PS end of Bidar PS – Maheshwaram (PG) 765 kV D/C line	240 MVAR, 765 kV line reactor – 2 Switching equipments for line reactor- 2	REC Transmission Projects Company Limited
Sl. No	Scope of the Transmission Scheme	Capacity /km															
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Sl. No	Scope of the Transmission Scheme	Capacity /km																		
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5	2 no. of 400 kV line bays each at Jaisalmer- II for Ramgarh – II - Jaisalmer-II 400kV D/c line	400 kV line bays – 2																		
7	<p>Transmission system strengthening for evacuation of power from solar energy zones in Rajasthan (8.1 GW) under Phase II –Part B</p> <p>Scope:</p> <table border="1"> <thead> <tr> <th>Sl. No</th> <th>Scope of the Transmission Scheme</th> <th>Capacity /km</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Fatehgarh-II PS – Bhadla-II PS 765kV D/c line (2nd)</td> <td>Length-200</td> </tr> <tr> <td>2</td> <td>2 no. of 765 kV line bays each at Fatehgarh-II and Bhadla-II for Fatehgarh-II PS – Bhadla- II PS 765kV D/c line (2nd)</td> <td>765 kV line bays – 4</td> </tr> <tr> <td>3</td> <td>1x240 MVAR Switchable line reactor for each circuit at each end of Fatehgarh-II – Bhadla- II 765kV D/c line (2nd)</td> <td>240 MVAR, 765 kV reactor- 4 (2 reactors each at Fatehgarh-II and Bhadla-II) Switching equipment for 765 kV reactor - 4 (2</td> </tr> </tbody> </table>	Sl. No	Scope of the Transmission Scheme	Capacity /km	1	Fatehgarh-II PS – Bhadla-II PS 765kV D/c line (2 nd)	Length-200	2	2 no. of 765 kV line bays each at Fatehgarh-II and Bhadla-II for Fatehgarh-II PS – Bhadla- II PS 765kV D/c line (2 nd)	765 kV line bays – 4	3	1x240 MVAR Switchable line reactor for each circuit at each end of Fatehgarh-II – Bhadla- II 765kV D/c line (2 nd)	240 MVAR, 765 kV reactor- 4 (2 reactors each at Fatehgarh-II and Bhadla-II) Switching equipment for 765 kV reactor - 4 (2	REC Transmission Projects Company Limited						
Sl. No	Scope of the Transmission Scheme	Capacity /km																		
1	Fatehgarh-II PS – Bhadla-II PS 765kV D/c line (2 nd)	Length-200																		
2	2 no. of 765 kV line bays each at Fatehgarh-II and Bhadla-II for Fatehgarh-II PS – Bhadla- II PS 765kV D/c line (2 nd)	765 kV line bays – 4																		
3	1x240 MVAR Switchable line reactor for each circuit at each end of Fatehgarh-II – Bhadla- II 765kV D/c line (2 nd)	240 MVAR, 765 kV reactor- 4 (2 reactors each at Fatehgarh-II and Bhadla-II) Switching equipment for 765 kV reactor - 4 (2																		

		Switching equipments each at Fatehgarh-II and Bhadla-II) (1x80 MVAR spare reactor each at Fatehgarh-II and Bhadla-II to be used as spare for Fatehgarh-II – Bhadla-II 765kV D/c line (2 nd))																									
	<p>Note:</p> <p>(i) Powergrid to provide space for 2 no of 765 kV bays each at Fatehgarh II and Bhadla II substation and space for 2 no of switchable line reactors each at Fatehgarh II and Bhadla II substation</p> <p>(ii) The line lengths mentioned above are approximate as the exact length shall be obtained after the detailed survey</p> <p>The completion schedule for the scheme is December' 2021.</p>																										
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Sl. No	Scope of the Transmission Scheme	Capacity /km																									
1	Establishment of 765/400 kV, 2x1500 MVA at Sikar – II with 400kV (1x125 MVAR) and 765 kV (2x330 MVAR) bus reactor <i>Future provisions:</i> <i>Space for-</i> 765/400kV ICT along with bays- 2 765 kV line bays along with switchable line reactors – 10 400 kV line bays along with switchable line reactor –6 400/220kV ICT along with bays -4 220kV bays -8 400kV bus reactor -2	765/400 kV, 1500 MVA ICT – 2 765/400 kV, 500 MVA spare single phase ICT-1 765 kV ICT bays – 2 400 kV ICT bays – 2 765 kV line bays –2 400 kV line bays-2 125 MVAR, 420 kV bus reactor-1 420 kV reactor bay – 1 330 MVAR, 765 kV bus reactor- 2 765 kV reactor bay- 2 110MVAR, 765 kV, 1 ph Reactor (spare unit) -1																									
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	<p>Neemrana for Sikar-II – Neemrana 400kV D/c line (Twin HTLS*)</p> <p><i>*with minimum capacity of 2200 MVA on each circuit at nominal voltage</i></p> <p>Note:</p> <p>(i) Powergrid to provide space for 2 no of 765 kV bays at Bhadla II and space for 2 no of switchable line reactors at Bhadla II substation</p> <p>(ii) Powergrid to provide space for 2 no of 400 kV bays each at Neemrana</p> <p>(iii) The line lengths mentioned above are approximate as the exact length shall be obtained after the detailed survey.</p> <p>The completion schedule for the scheme is December' 2021.</p>													
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	<p>4</p> <p>1x240MVA switchable line reactor for each circuit at Bhadla-II end of Bhadla-II PS – Sikar-II 765kV D/c line</p>	<p>240 MVA, 765 kV reactor- 2</p> <p>Switching equipment for 765 kV reactor - 2</p>																						
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		for Khetri - Bhiwadi 400kV D/c line	
7		2 no of 400 kV(GIS) line bays at Bhiwadi for Khetri- Bhiwadi 400 kV D/c line	400 kV line bays – 2
8		STATCOM at Bikaner-II S/s	± 300 MVar, 2x125 MVar MSC, 1x125 MVar MSR
*with minimum capacity of 2200 MVA on each circuit at nominal voltage			
Note:			
(i) Powergrid to provide space for 2 no of 400 kV bays at Bhiwadi substation.			
(ii) Developer of Khetri substation to provide space for 6 no of 400 kV bays at Khetri for Bikaner-II –Khetri 400 kV 2x D/c line along with space for switchable line reactors & Khetri- Bhiwadi 400 kV D/c line (Twin HTLS)			
(iii) The line lengths mentioned above are approximate as the exact length shall be obtained after the detailed survey.			
The completion schedule for the scheme is December' 2021.			
12	Transmission system strengthening scheme for evacuation of power from solar energy zones in Rajasthan (8.1 GW) under Phase-II- Part G		PFC Consulting Ltd.
Scope:			
	Sl. No	Scope of the Transmission Scheme	Capacity /km
	1	Establishment of 765/400 kV, 3X1500 MVA GIS substation at Narela with 765 kV (2x330 MVar) bus reactor and 400 kV (1x125 MVAR) bus reactor <i>Future provisions: Space for 765/400kV ICTs along with bays: 1 765 kV line bays along with switchable line reactor: 6 400 kV line bays: 6+4 765kV reactor along with bays:2 400/220 kV ICTs along with bays:8 220 kV line bays: 12 400 kV bus reactor along with bays:2</i>	765/400 kV, 1500 MVA ICT – 3 765/400 kV, 500 MVA spare ICT (1-phase) – 1 765 kV ICT bays –3 400 kV ICT bays –3 765 kV line bays- 4 (GIS) 330MVar, 765 kV bus reactor- 2 765 kV bus reactor bay – 2 110 MVar, 765 kV, 1-Ph Bus Reactor (spare unit) -1 125 MVar, 420 kV bus reactor - 1 420 kV bus reactor bay – 1 330 MVar, 765 kV line reactor- 2 Switching equipment for 765 kV reactor - 2 <i>(1x110MVar spare reactor at Khetri to be used as spare for Khetri – Narela 765 kV D/c line)</i>
	2	Khetri – Narela 765 kV D/c line 1x330MVar Switchable line reactor for each circuit at Narela end of Khetri – Narela 765kV D/c line	Length -180
	3	2 nos. of 765 kV line baysat Khetri for Khetri – Narela 765 kV D/c line	765 kV line bays –2 (AIS)

4	LILO of 765 kV Meerut- Bhiwani S/c line at Narela	Length – 25	
<p>Note:</p> <p>(i) Developer of Khetri substation to provide space for 2 no of 765 kV bays at Khetri substation along with the space for 2 no of line reactors.</p> <p>(ii) The line lengths mentioned above are approximate as the exact length shall be obtained after the detailed survey.</p> <p>The completion schedule for the scheme is December' 2021.</p>			

2. The appointment of the Bid-Process Coordinators is subject to the conditions laid down in the Guidelines.

[F. No. 15/3/2018-Trans-Pt(1)]

S.K.G. RAHATE, Addl. Secy. (Trans)

Annexure-2.9.1

Minutes of Meeting held between UPSLDC & M/s Siemens on 07.02.2020 in the chamber of Chief Engineer (C&S), UPSLDC, Lucknow.

List of participants

UPSLDC

1. Er A K Singh, Chief Engineer (C&S)
2. Er Rajeev Mohan, Superintending Engineer, (Scada & IT)
3. Er. Amit Narain, Executive Engineer (Scada &IT)
4. Er Modh. Tahir Athar, Executive Engineer (Scada & IT)
5. Er Ashok Kumar, Assistant Engineer (Scada &IT)
6. Er . Sanjeev Kumar Gangwar, Assistant Engineer (Scada & IT)
7. Er Vikrant Kumar, Assistant Engineer (Scada &IT)

M/s SIEMENS

1. Sri G.K Reddy, Project Manager
2. Sri Satish Kumar, Commissioning Engineer
3. Sri Rasool Karam Siddiqui, Engineer deputed by M/s Siemens at UPSLDC, Lucknow.
4. Sri Jaffar Abbas, Engineer deputed by M/s Siemens at UPSLDC, Lucknow.

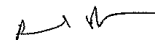
This meeting has been called by UPSLDC to discuss various pending SCADA issues, concerned with M/s Siemens. During the meeting, following issues are discussed:-

1) Shifting of Site Engineer from Backup SLDC Modipuram without prior intimation

UPSLDC has expressed its deep concern over the manner in which M/s Siemens has shifted its Site Engineer from Backup SLDC Modipuram to some other location. M/s Siemens have not given any intimation to UPSLDC in this regard and even the local officer at Modipuram was not taken into confidence. UPSLDC is of the view that if the shifting was unavoidable, even then M/s Siemens should have deputed some experience person over there and rotated the new site engineer for at least one month with the previous person as the newly deputed engineer is untrained and unable to handle day-to-day affairs. UPSLDC expressed its displeasure as M/s Siemens did not take any measures in this respect even if UPSLDC rejected any such change in the beginning itself. Siemens *regrets for the same and assured that the newly deputed engineer shall be given sufficient training to handle the issues and if UPSLDC continues to give similar feedback about him then suitably competent site engineer will again be deputed at Modipuram backup SLDC by 31.03.2020.*

2) Implementation of Recommendations of Cyber Security Audit Report

Cyber Security Audit has been taken up by M/s AKS Information Technology Services Pvt Ltd (authorized & deputed by M/s Siemens) from 06.12.19 to 07.12.19. No preventive measures have been taken by M/s Siemens so far, even if the Audit Report has some very serious concerns. Siemens *intimated that compliance report & compatible patches are underway and assured to*



take all necessary measures shortly and accordingly issue necessary Cyber Security Audit Certificate by 29.02.2020.

3) Frequent unavailability of CHAD application, affecting EDNA services

CHAD application becomes inactive very frequently (3-4 times in a week), causing interruption of EDNA services. The issue has been discussed at length among UPSLDC & Siemens engineers and finally Siemens appreciated the problem and assured to resolve the same within a weeks' time.

4) Frequent problem of Oracle Report

It has been observed very frequently that daily Oracle Report is not generated automatically at its schedule time. Further even if it is generated, sometimes it comes with freeze schedule data. Subsequently, it is seen that many historical data got freeze and the original data got lost which is a serious concern. M/s Siemens also expressed its concern over this issue and assured to analyze the same shortly. However, Siemens also instructed Sri Rasool to share such data as and when such problem occurs in future.

5) Invalid Quality Flag with Historical Data

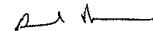
It has been observed that the quality flag is OK even before integration of substation. M/s Siemens intimated that it is some configuration related issue and the same shall be examined and resolved by Sri Satish & Sri Rasool jointly by tomorrow and accordingly apprise UPSLDC officers about the precautionary measures to be taken while developing databases.

6) Problem in Corporate Display

The newly constructed data does not get reflected in corporate display even after 24 hrs. It was instructed to Site engineer to run some script every time a new RTU is integrated and thereafter assured UPSLDC that such problem will not repeat in future.

7) Major Data Interruption.

M/s Siemens have not taken any suitable measures so far in respect of major data interruption during which most of the scada data becomes Intermittent. Such problem has recently occurred on 05.02.2020 when the entire data of Modipuram SubLDC got "SUSPECT". Sri Reddy intimated that it is an issue which has been discussed several times at various platform and is not restricted to UP only. Sri Reddy reiterated that it may be networking issue and not at all concerned with Siemens. He also confirmed that M/s Siemens has recently got this issue examined by a third party which concluded that the problem does not pertain with Siemens. Sri Reddy assured to share the conclusion of third party in this regard with UPSLDC along with the comments of M/s Siemens within a weeks' time.



8) **Restarting of IMM console**

M/s Siemens requested to take remote access of that system for 3-4 days. During meeting, it has been decided that UPSLDC will allow remote access to M/s Siemens on 08.02.2020 & 09.02.2020 and even 10.02.2020 if need arises.

9) **PDS Console not operational**

Sri Reddy assured to take up the issue on priority and if the problem persists, M/s Siemens shall provide new alternate solution shall be provided by 31.03.2020.

10) **Defective 55" defective monitor (defective VGA port) (pending since long)**

Sri Reddy instructed Sri Rasool & Sri Jaffar to immediately take up the issue at their end & resolve within a weeks' time and assured UPSLDC that such issue will be taken up by M/s Siemens on priority.

11) M/s Siemens earlier agreed for Quarterly visit to SubLDCs but the same has not been ensured so far. Sri Reddy again agreed for the same and reiterated that such visits shall start soon.

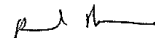
12) **SCADA AMC Meeting Pending Issues**

- a) Siemens to intimate the names of Reserve Engineers within one month from last MRM meeting (17.05.19) but the same has not yet been intimated.
- b) Siemens to inform about the new escalation matrix to SLDCs, NRLDC and Powergrid by 23rd May 2019 but the same has not yet been informed even after lapse of eight months.
- c) It was agreed by Siemens that it would impart training to resident engineers through VC for knowledge sharing and other purposes. Such sessions would be held on fortnightly basis and first meeting was to be held in the first week of June'19. No progress has been made by Siemens so far.

Sri Reddy intimated that some AMC Group shall be formed soon by M/s Siemens and all such problem shall be taken up accordingly on highest priority in a time bound manner.

13) **Coordination among Siemens, Delta & Synergy for integration of FRTU to incorporate UPS system under Scada**

M/s Siemens is required to coordinate with M/s Delta & M/s Synergy in order to integrate FRTU so that UPS System also comes under Scada System. However Siemens express that it cannot commit anything unless until it is confirmed that there is no compatibility issue. Siemens requested UPSLDC to intervene with PGCIL to hold a meeting among all parties to assure that there is no compatibility issue and accordingly assured UPSLDC to full cooperation once it is established that there is no compatibility issue.



14) Changes to be made in Corporate Display

Certain changes are required to be made under various Tab in Corporate Display. M/s Siemens is required to depute some competent person for coordination. *Siemens requested UPSLDC to finalise the background at their end and thereafter intimate Siemens for necessary action.*

15) Commissioning of Additional Video display wall at Backup SLDC Modipuram.

UPSLDC intimated M/s Siemens about commissioning of new video wall at Modipuram Backup SLDC, which will be in addition to already existing VPS system of M/s BARCO, *M/s Siemens agreed to provide technical support for the same.*



(Er. Vikrant Kumar)



(Jaffar Abbas)



(Sanjeev Kumar Gangwar)



(Rasool Karam Siddiqui)



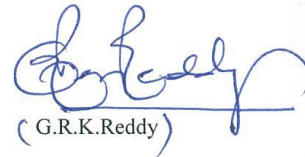
(Ashok Kumar)



(Satish Kumar)



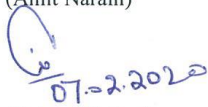
(Mohd. Tahir Athar)



(G.R.K.Reddy)



(Amit Narain)



(Rajeev Mohan)



(A.K. Singh)

Annexure-2.21.1

Sl. No .	Region	Generating Station	Nearest WB node	Main Communication path	Alternate Communication path	Main Path	Alternate path	Route diversity	route diversity under implementation	route diversity to be planned	Remarks	OPGW/UG FO required (kms.)	Ethernet Port Availability	Comments by NR-I
1	NR	Singrauli STPS	Singrauli STPS	Singrauli STPS- Rihand TPS- Rihand HVDC-Allahabad - Kanpur-Agra- Ballabhgarg- Badarpur-NRLDC	Singrauli STPS- Anpara B- Varanasi- Varanasi-Varanasi 765-Balia- Sohawal-Lucknow- Shahjahanpur- Baereily-Kashipur- Roorkee- Muzaffarnagar- Meerut-Mandola- Dadri- Maharanibagh- NRLDC	Yes	No	No	Yes		Rihand HVDC-Allahabad is under implementation		No ethernet port (FiberHome eqpt.)	Telecom link will be provided to NLDC till new equipment/link commissioned New equipment proposed for Singrauli NTPC and Anpara UPPTCL
2	NR	Naptha Jhakri	Naptha Jhakri	N'Jhakri-Nallagarh- Manimajra- Chandigarh- Panipat- Maradnagar-Dadri- Maharanibagh- NRLDC	N'Jhakri-Pachkula- Abdullahpur- dehradun- Roorkee-Kashipur- Bareilly765- BareillyPG- Lucknow- Sarojnagar- Panki-Kanpur- Agra-Ballabhgarg- Badarpur- Mehrauli-NRLDC	Yes	yes	yes	No	No			Available	link will be provided on ULDC Network

3	NR	Indra Gandhi STPS	IG STPP, Jhajjar	Jhajjar-Mundka -Bawana-Mandola-Dadri-Maharanibagh-NRLDC	Jhajjar-Daulatabad 400 (on HVPN network)-Ballabgarh-NRLDC	Yes	No	No	yes		Jhajjar-Mundka is under implementation		link will be provided on ULDC network by Mar' 2020 as new equipment is being supplied. For path redundancy, HVPNL may provide 2 pair of fibres on Jhajjar - Daulatabad - Gurgaon link New Equipment proposed for Daulatabad 400	
4	NR	Tehri	Tehri	Tehri-TehriPS-Meerut -Mandola-Dadri-Ballabgarh-Badarpur-Mehrauli-NRLDC	Tehri-TehriPS-Meerut -Kaithal-PatialaPG-Chandigarh SLDC-Panipat SLDC-Maradnagar-Dadri-Maharanibagh-NRLDC	Yes	no	No	No	Yes	Tehri – Tehri PS – 6 kms	6	Available	Since the proposed Transmission line is common, POWERGRID will lay OPGW on new line in future if lines available, same was discussed in TEST meeting. Laying of OPGW on other peak may not solve purpose. It is proposed OPGW may be laid on THDC to Koteswar PG (6 Kms) under

														construction line.
5	NR	Koldam	Koldam	Koldam-Parbati PS -Hamirpur-Gagal-Kunihar-Manimajra-Chandigarh-Panipat-Maradnagar-Dadri-Maharanibagh-NRLDC	Koldam-Nalagarh-N'Jhakri-Pachkula-Abdullahpur-dehradun-Roorkee-Kashipur-Bareilly765-BareillyPG-Lucknow-Sarojinagar-Panki-Kanpur-Agra-Ballabgarh-Badarpur-Mehrauli-NRLDC	Yes	no	No	Yes	no	Koldam - Pasbati PS in under implementation	Available	link will be provided on ULDC Network	
6	NR	Rihand TPS Stage-I	Rihand TPS	Rihand HVDC-Allahabad -Kanpur-Agra-Ballabgarg-Badarpur-NRLDC	Rihand TPS-Singrauli-Anpara B-Varanasi-Varanasi 765-Balia-Sohawal-Lucknow-Shahjahanpur-Baereily-Kashipur-Roorkee-Muzaffarnagar-Meerut-Mandola-Dadri-Maharanibagh-NRLDC	Yes	No	No	Yes	No	Rihand HVDC-Allahabad is under implementation	No ethernet port (FiberHome eqpt.)	Telecom link will be provided to NLDC till new equipment/link commissioned	
7	NR	Rihand TPS Stage-II												
8	NR	Rihand TPS Stage-III												

9	NR	Dehar	Dehar	Deher-Ganguwal- Chandigarh- Patiala-Kaithal- Bagpat-Meerut- Mandola-Dadri- Maharanibagh- NRLDC	Dehar-Gagal- Kunihar- Manimajra- Nalagarh-N'Jhakri- Pachkula- Abdullahpur- dehradun- Roorkee-Kashipur- Bareilly765- BareillyPG- Lucknow- Sarojinagar- Panki-Kanpur- Agra-Ballabgarh- Badarpur- Mehrauli-NRLDC	Yes	Yes	Yes	No	No		Available	link will be provided on ULDC Network	
10	NR	Dadri TPS Stage-I	Dadri NTPC	Dadri NTPC-Dadri HVDC- Ballabgarg- Badarpur-NRLDC	Dadri NTPC-Dadri HVDC- Maharanibagh- NRLDC	yes	no	No	No	Yes	(a) Dadri TPS St-I - Dadri NTPC - 1 kms. (b) Dadri NTPC -Dadri HVDC - 1 kms.	2	Eqpt. Planned under reliable	link will be provided on ULDC Network, new equipment has been planeed in NTPC Dadri - April' 2020
11	NR	Dadri TPS Stage-II												
12	NR	Dadri Gas												
13	NR	Bhakra Right	Bhakra Right	Bhakra Rt.- Ganguwal- Chandigarh- Panipat- Muradnagar-Dadri- Maharanibagh- NRLDC	Bhakra Rt- Jamalpur- Dhandari Kalan- Lalton Kalan220- LudhianaPG- Malerkotla-Patiala SLDC-Patiala PG- Kaithal-Bagpat- Meerut- Muzaffarnagar- Roorkee-Kashipur- Bareilly765- BareillyPG- Lucknow- Sarojinagar- Panki-Kanpur- Agra-Ballabgarh- Badarpur--NRLDC	Yes	yes	No	No	no	Available	link will be provided on ULDC Network		
14	NR	Auraiya Gas	Auraiya	Auraiya-Kanpur- Panki-Lucknow- Bareilly-Kashipur- Roorkee- Muzaffarnagar- Meerut-Mandola- Dadri- Maharanibagh- NRLDC	Auraiya-Agra- Ballabgarh- Badarpur-NRLDC	Yes	no	No	Yes	no	Auraiya-Agra is under implementati on	Available	link will be provided on ULDC Network	

15	NR	Bhakra Left	Bhakra Left	Bhakra left-Bhakra Rt-Ganguwal-Chandigarh-Panipat-Muradnagar-Dadri-Maharanibagh-NRLDC	Bhakra-Left-Bhakra-Rt.-Jamalpur-Dhandari Kalan-Lalton Kalan220-LudhianaPG-Malerkotla-Patiala SLDC-Patiala PG-Kaithal-Bagpat-Meerut-Muzzafarnagar-Roorkee-Kashipur-Bareilly765-BareillyPG-Lucknow-Sarojinagar-Panki-Kanpur-Agra-Ballabgarh-Badarpur--NRLDC	Yes	no	No	No	Yes	(a) Bhakra-Left-Bhakra-Rt.- 1 kms.	No ethernet port (FiberHome eqpt.)	During last TEST (16th) meeting, it was finalised that BBMB will lay this 1 KM UGOFCC cable to establish protection path. New Equipment has to be planned for Bhakra Left	
16	NR	Chamera-I	Chamera-I	Chameral-Chamerall-Kishenpur-Moga-Hissar-Bhiwani-Mandola-Dadri-Maharanibagh-NRLDC	Chameral-Jalandhar-Ludhiana-Malerkotla-Patiala-Kaithal-Bagpat-Meerut-Muzzafarnagar-Roorkee-Kashipur-Bareilly765-BareillyPG-Lucknow-Sarojinagar-Panki-Kanpur-Agra-Ballabgarh-Badarpur--NRLDC	Yes	no	No	Yes	no	Chameral-Jalandhar is under implementation	Available	link will be provided on ULDC Network	
17	NR	Parbati-III	Parbati-III	ParbatiIII-ParbatiPS-HamirpurCS-HamirpurII-Gagal-Deher-Ganguwal-Chandigarh-Patiala-Kaithal-Bagpat-Meerut-Mandola-Dadri-Maharanibagh-NRLDC	Parbati -III- Sainj-Parbati-2-Parbati PS- Koldam-Nalagarh-N'Jhakri-Pachkula-Abdullahpur-dehradun-Roorkee-Kashipur-Bareilly765-BareillyPG-Lucknow-Sarojinagar-Panki-Kanpur-Agra-Ballabgarh-Badarpur-Mehrauli-NRLDC	No	No	No	No	Yes	(a) Parbati -III- Sainj - 15 kms. (b) Sainj-Parbati-2 – 15 kms. (c) Parbati-2-Parbati PS – 15 kms. (d) Parbati PS – Koldam – under implementation	45	Available	No Fibre Connectivity till date, 5 Kms of OPGW still pending on Parbati PS to Parbati-III Consent for new OPGW links on other utility lines may be required, New equipment at Sainj

18	NR	Unchahar TPS Stage-IV	Unchahar	Unchahar-Kanpur-Agra-Ballabhgarg-Badarpur-NRLDC	Unchahar-Raebareilly-Lucknow220-Lucknow765-Baereilly765-Kashipur-Roorkee-Muzaffarnagar-Meerut-Mandola-Dadri-Maharanibagh-NRLDC	Yes	No	No	Yes	No	Available	link will be provided on ULDC Network		
19	NR	Unchahar TPS Stage-I								No				
20	NR	Unchahar TPS Stage-II								No				
21	NR	Anta Gas	Bassi PG	Bassi PG-Alwar-Bhiwadi-Ballabgarh-Badarpur-NRLDC	Bassi PG-Jaipur South-Agra-Meerut-Mandola-Dadri-Maharanibagh-NRLDC	NO	NO	NO	NO	No	Anta to Kota PG 91.5 Kms	91.5	No ULDC Equipment/Fibre	New OPGW and Equipment at Anta required, temporarily telecom link will be provided to NLDC
22	NR	Koteshwar	Koteshwar	Koteshwar-TehriPS-Meerut-Mandola-Dadri-Maharanibagh-NRLDC	Koteshwar-TehriPS-Meerut-Agra-Ballabgarh-Badarpur-NRLDC	Yes	No	No	No	Yes	(a) Koteshwar-TehriPS- 2.5 kms. (b) Tehri PS - Meerut considered in Sr. 4 above	Available	POWERGRID will not lay any UGOFCCable for any of the link/area. Ethernet Port will be provided on existing ULDC Equipment	
23	NR	Pong	Pong	Pong-Dasuya-Sarna-Tibber-Moga-Hissar-Bhiwadi-Ballabgarh-Badarpur-NRLDC	Pong-Jalandhar BBMB-Jamsher-Kottajunga-Kartarpur220-JalandharPG-LudhianaPG-Malerkotla-Patiala SLDC-PatialaPG-Kaithal-Bagpat-Meerut-Mandola-Dadri-Maharanibagh-NRLDC	Yes	No	No	No	Yes	(a) Pong-Jalandhar BBMB- 100 kms.	100	Available	link will be provided on ULDC Network. New OPGW along with equipment at Jalandhar BBMB is required

24	NR	Dulhasti	Dulhasti	Dulhasti-Kishenpur-Moga-Hissar-Bhiwadi-Ballabgarh-Badarpur-NRLDC	Dulhasti-Kishenpur-ChameraPS-JalandharPG-LudhianaPG--Malerkotla-PatialaSLDC-PatialaPG-Kaithal-Bagpat-Meerut-Mandola-Dadri-Maharanibagh-NRLDC	Yes	No	No	No	Yes			Available	Since the proposed Transmission line is common, POWERGRID will lay OPGW on new line in future if lines available, same was discussed in TEST meeting. Laying of OPGW on other peak may not solve purpose.
25	NR	Chamera-II	Chamera-II	Chamera II-Kishenpur-Moga-Hissar-Bhiwadi-Ballabgarh-Badarpur-NRLDC	Chamera II-Chamera PS-JalandharPG-LudhianaPG--Malerkotla-PatialaSLDC-PatialaPG-Kaithal-Bagpat-Meerut-Mandola-Dadri-Maharanibagh-NRLDC	Yes	No	No	Yes	No	Chamera PS-Jalandhar is under implementation		Available	link will be provided on ULDC Network

26	NR	Dhauligan ga	Dhauligan ga	Dhauliganga- Jauljivi-Bareily- Lucknow-Panki- Kanpur-Agra- Ballabgarh- Badarpur-NRLDC	Dhauliganga- Pithoragarh (70 kms. UGFO)- PTCUL network(Almora- Haldwani- Pantnagar- Kashipur, OPGW)- Roorkee- Muzaffarnagar- Meerut-Mandola- Dadri- Maharanibagh- NRLDC	Yes	No	No	No	Yes	(a) Pithoragarh (PG) – Pirhoragarh (PTCUL) -10 kms. (PTCUL line) (b) Pithoragarh - Almora - 110kms. (PTCUL line) (c) Almora- Haldwani – 100 kms. (PTCUL line) (d) Haldwani- Pantnagar – 35 kms. (PTCUL line) (e) Pant nagar – Kashipur – 60 kms. (PTCUL line)	Available	POWERGRI D will not lay any UGOFD Cable for any of the link/area, same was informed in TEST meeting as well. PTCUL is being implementin g their OPGW network at their own and we can not consider any of their transmission line without their consent for OPGW laying for ULDC purpose
27	NR	Chamera- III	Chamera- III	Chamera III- Chamera PS- Chamera II- Kishenpur-Moga- Hissar-Bhiwadi- Ballabgarh- Badarpur-NRLDC	Chamera III- Chamera PS- JalandharPG- LudhianaPG-- Malerkotla-Patiala SLDC-PatialaPG- Kaithal-Bagpat- Meerut-Mandola- Dadri- Maharanibagh- NRLDC	Yes	No	No	No	Yes	Chamera III- Chamera PS	Available	POWERGRI D will not lay any UGOFD Cable for any of the link/area. Ethernet Port will be provided on existing ULDC Equipment

28	NR	Bairasiul	Bairasiul	Bairasul-Pong-Dasuya-Sarna-Tibber-Moga-Hissar-Bhiwadi-Ballabgarh-Badarpur-NRLDC	Bairasul-Jasore-Pong-Jalandhar BBMB-Jamsher-Kottajunga-Kartarpur220-JalandharPG-LudhianaPG-Malerkotla-PatialaSLDC-PatialaPG-Kaithal-Bagpat-Meerut-Mandola-Dadri-Maharanibagh-NRLDC	Yes	No	No	No	Yes		Available	Pong-Bairashul line/Jassore line is common till LILO point and no Earthwire peak is available for laying of OPGW. This link has been considered in Reliable Scheme, however site have confirmed for deletion. Port will be provided on existing Equipment	
29	NR	Sewa-II	Sewa-II	Sewa II-Hiranagar-Gladini SLDC-Kishenpur-Chamera II-Chamera PS-JalandharPG-LudhianaPG--Malerkotla-PatialaSLDC-PatialaPG-Kaithal-Bagpat-Meerut-Mandola-Dadri-Maharanibagh-NRLDC	Sewa-II - Kathua-Hiranagar-Sarna-Tiber- Moga-Hissar-Bhiwadi-Ballabgarh-Badarpur-NRLDC	Yes	No	No	No	Yes	(a) Sewa-II – Kathua – 110 kms. (b) Kathua-Hiranagar – 30 kms. (c) Hiranagar-Sarna – 50 kms.	190	Available	J&K PDD lines could not be used for ULDC purpose as nobody is maintaining. Will provide Ethernet port on existing Equipment
30	NR	Rampur	Ranpur	Rampur- Nalagarh-Manimajra-Chandigarh-Dulkote-Panipat SLDC- Dadri HVDC-Ballabgarh-Bmnauli-Mehrauli-NRLDC	Rampur- Nathpa Jhakri- Panchkula-Abdulapur-deealpur-Bawana-mandola-wazirabad-patparganj-IP Power stn-Lodhi road-NRLDC	Yes	Yes	Yes	No	No			Available	link will be provided on ULDC Network

434.5

13
Equipment

Annexure-5.4.1

**CENTRAL ELECTRICITY REGULATORY COMMISSION
NEW DELHI**

Petition No. 206/MP/2014

Coram:
Shri Gireesh B.Pradhan, Chairperson
Shri A.K.Singhal, Member
Shri A.K.Bakshi, Member
Dr. M.K.Iyer, Member

Date of Order : 16th of September, 2016

In the matter of:

Approval under Central Electricity Regulatory Commission (Grant of Regulatory approval for execution of Inter-state Transmission Scheme to Central Transmission utility) Regulations, 2010 read with Central Electricity Regulatory Commission (Grant of Connectivity, Long Term and Medium Term Open Access to Inter-State Transmission system and related matters) Regulations, 2009 for grant of regulatory approval for execution of Unified Real Time Dynamic State Measurement (URTDSM) Phase-II.

**And
In the matter of:**

Power Grid Corporation of India Ltd.
B-9, Qutab Institutional Area
New Delhi-110016

.....Petitioner

V/s

- 1) Rajasthan Rajya Vidyut Prasaran Nigam Limited
Vidyut Bhawan, Vidyut Marg
Jaipur-302 005
- 2) Ajmer Vidyut Vitran Nigam Limited
400 kV GSS Building (Ground Floor)
Ajmer Road, Heerapura, Jaipur
- 3) Jaipur Vidyut Vitran Nigam Limited

expedite the work of Phase-I of the scheme so that it may be completed by November 2016 as submitted by the petitioner. Since substantial progress has not been achieved by the petitioner in phase-I, it may not be appropriate to grant regulatory approval for implementation of Phase-II of the scheme at this stage.

Accordingly, the petitioner is granted liberty to submit the fresh proposal for grant of regulatory approval for Phase-II of the scheme in consultation with CEA after implementation of Phase-I scheme, which would be considered in accordance with law.

23. The petitioner has sought reimbursement of fee paid by it for filing the petition. In terms of our order dated 11.1.2009 in Petition No. 109/2009, reimbursement of filing fee and expenses on publication in the present petition cannot be allowed.

24. The petition is disposed of with the above direction.

Sd/-
(Dr. M.K.Iyer)
Member

sd/-
(A.S. Bakshi)
Member

sd/-
(A. K. Singhal)
Member

sd/-
(Gireesh B. Pradhan)
Chairperson

Annexure-5.4.2

URTDSM Project Phase-II



URTDSM Project Phase-II List of Substations under Northern Region for PMU placement															
S.No	Project Phase	KV S/s	Name of Station	Owner Utility	No. of feeders	Name of Feeder	Phasor Quantities to be Measured by the PMUs							Substations having SAS with bay kiosk	Tentative no of PMUs
							3-Phase Voltage Phasors (Vr, Vy, Vb)	3-Phase Current Phasors (Ir, Iy, Ib)	Positive Sequence Voltage & Current	Digital Inputs (Dis)	Freq uency	ROCOF	Analog Values (MW & MVAR)		
						No of signals ----->	3	3	2	4	1	1	2		
1	Uttar Pradesh-II	400	Agra	U.P.	4	Agra-1&2(PG),Muradnagar,Uннаo	12	12	8	16	1	1	8	2	
2	Uttar Pradesh-II	400	Greater noida	UTTAR PRADESH	2	Ballabgarh,Dadri	6	6	4	8	1	1	4	1	
3	Uttar Pradesh-II	400	Gorakhpur	UTTAR PRADESH	4	Gorakhpur(pg)-1&2,Azamgarh,Mau	12	12	8	16	1	1	8	2	
4	Uttar Pradesh-II	400	Mau	UTTAR PRADESH	5	Azamgarh,Anpara,Balia-1&2,Gorakhpur	15	15	10	20	1	1	10	3	
5	Uttar Pradesh-II	220	N.A.P.P.	NPCIL	5	Khurja-1&2,Moradabad,Simbholi,Atrauli	15	15	10	20	1	1	10	3	
6	Uttar Pradesh-II	220	Parichha	UTTAR PRADESH	4	Orai-1,2&3,Safai	12	12	8	16	1	1	8	2	
7	Uttar Pradesh-II	220	Tanda	NTPC	2	Sultanpur-1&2	6	6	4	8	1	1	4	1	
8	Rajasthan-II	400	Suratgarh TPS	RAJASTHAN	3	Ratangarh-1&2,Bikaner	9	9	6	12	1	1	6	2	
9	Rajasthan-II	400	Bikaner	RAJASTHAN	1	Suratgarh	3	3	2	4	1	1	2	1	
10	Rajasthan-II	400	Hindaun	RAJASTHAN	3	Heerapur,G.T.Power station,Chhabra	9	9	6	12	1	1	6	2	
11	Rajasthan-II	400	Station	RAJASTHAN	1	Hindaun	3	3	2	4	1	1	2	1	
12	Rajasthan-II	400	Jaisalmer	RAJASTHAN	2	Jodhpur,Barmer	6	6	4	8	1	1	4	1	
13	Rajasthan-II	400	Chhabra	RAJASTHAN	3	Hindaui,Dahra-1&2	9	9	6	12	1	1	6	2	
14	Rajasthan-II	400	Dahra	RAJASTHAN	4	Chhabra-1&2,Heerapur-1&2	12	12	8	16	1	1	8	2	
15	Rajasthan-II	400	Anta-765/400kV	RAJASTHAN	8	Jaipur-2, Chbara-2, Kawai-2, Kalisindh-2	24	24	16	32	1	1	16	4	
16	Rajasthan-II	400	Kawai	Private	2	Anta-2	6	6	4	8	1	1	4	1	
17	Rajasthan-II	400	Kalisindh	RAJASTHAN	2	anta-2	6	6	4	8	1	1	4	1	
18	Rajasthan-II	400	Ajmer	RAJASTHAN	2	Jaipur 765	6	6	4	8	1	1	4	1	
19	Rajasthan-II	400	Jaipur-765/400kV	RAJASTHAN	12	Anta-1&2, Gwalior-1 &2, Bhiwani-1 Jaipur's -4, Ajmer-2	36	36	24	48	1	1	24	6	
20	Rajasthan-II	220	Suratgarh	RAJASTHAN	5	Suratgarh(old)-1 &2,Ratangarh-1&2,Bikaner-1	15	15	10	20	1	1	10	3	
21	Rajasthan-II	220	Giral	RAJASTHAN	1	Barmer	3	3	2	4	1	1	2	1	

URTDSM Project Phase-II



URTDSM Project Phase-II List of Substations under Northern Region for PMU placement														
S.No	Project Phase	KV S/s	Name of Station	Owner Utility	No. of feeders	Name of Feeder	Phasor Quantities to be Measured by the PMUs						Substations having SAS with bay kiosk	Tentative no of PMUs
							3-Phase Voltage Phasors (Vr, Vy, Vb)	3-Phase Current Phasors (Ir, Iy, Ib)	Positive Sequence Voltage & Current	Digital Inputs (Dis)	Freq uency	ROCOF		
						No of signals ----->	3	3	2	4	1	1	2	
22	Rajasthan-II	220	RAPP-A	RAJASTHAN	4	Kota-1 &2,RAPP-B,Debari	12	12	8	16	1	1	8	2
23	Rajasthan-II	220	RAPP-B	RAJASTHAN	5	Chittorgarh-1&2,Rapp-A,Kota,Debari	15	15	10	20	1	1	10	3
24	Rajasthan-II	220	Morak(IR)	RAJASTHAN	3	Ujjain-1,	9	9	6	12	1	1	6	2
25	H. P.-II	400	Baspa	Pvt	2	Karcham Wangtoo-1&2	6	6	4	8	1	1	4	1
26	H. P.-II	220	Bhabha	H.P	2	Kunihar-1,Juri-1	6	6	4	8	1	1	4	1
27	H. P.-II	220	Giri	H.P	2	Khodri-1,2	6	6	4	8	1	1	4	1
28	Uttarakhand-II	400	Vishnuprayag	Pvt	2	Muzaffarnagar-1&2	6	6	4	8	1	1	4	1
29	Uttarakhand-II	400	Kashipur-400	UTTARAKHAND	4	Bareilly-2, roorkee-1, sravanthi-1	12	12	8	16	1	1	8	2
30	Uttarakhand-II	220	Chibro	UTTRANCHAL	2	khodri-1&2	6	6	4	8	1	1	4	1
31	Uttarakhand-II	220	Khodri	UTTRANCHAL	6	chibro-1&2,Rishikesh,majri,Shaharanpur-1&2	18	18	12	24	1	1	12	3
32	Uttarakhand-II	220	Tanakpur	NHPC	2	C.B.ganj,PG	6	6	4	8	1	1	4	1
33	Haryana-II	400	Daultabad	Haryana	4	Gurgaon-1&2,Jhajjar-1&2	12	12	8	16	1	1	8	2
34	Haryana-II	400	Jhajjar	IPP of NTPC JV	4	Mundka-1&2,Daultabad-1&2	12	12	8	16	1	1	8	2
35	Haryana-II	400	Kheddar	Haryana	4	Fatehabad-1,2,Kirori,1&2	12	12	8	16	1	1	8	2
36	Haryana-II	400	Sirsa (nuhiyawali)	Haryana	2	Hissar (T), Fatehabad	6	6	4	8	1	1	4	1
37	Haryana-II	400	Hissar(H)	Haryana	4	Hissar(T)-2 Jind-2	12	12	8	16	1	1	8	2
38	Haryana-II	400	Jhajjar-CLP	Pvt	4	Dhanoda-2, Rohtak-2	12	12	8	16	1	1	8	2
39	Haryana-II	400	Rohtak	Haryana	4	Jhajjar CLP-2 Sonapat H-2	12	12	8	16	1	1	8	2
40	Haryana-II	400	Sonapat (deepalpur)	Haryana	4	Abdullapur, Bawana, Sonapat H-2	12	12	8	16	1	1	8	2
41	Haryana-II	400	Mahndeargarh	ISTS Licensee	4	Bhiwani(PG)-2, Dhanoda-2	12	12	8	16	1	1	8	2
42	Haryana-II	400	Dhanoda	Haryana	6	2	18	18	12	24	1	1	12	3
43	Haryana-II	220	Yamuna nagar	Haryana	6	Yamunangr-1&2,Nissing-1&2,Abdullapur-1,2	18	18	12	24	1	1	12	3

URTDSM Project Phase-II



URTDSM Project Phase-II List of Substations under Northern Region for PMU placement														
S.No	Project Phase	KV S/s	Name of Station	Owner Utility	No. of feeders	Name of Feeder	Phasor Quantities to be Measured by the PMUs						Substations having SAS with bay kiosk	Tentative no of PMUs
							3-Phase Voltage Phasors (Vr, Vy, Vb)	3-Phase Current Phasors (Ir, Iy, Ib)	Positive Sequence Voltage & Current	Digital Inputs (Dis)	Freq uency	ROCOF		
						No of signals ----->	3	3	2	4	1	1	2	
44	Delhi-II	400	Loni Road	Delhi	2	Dadri-2	6	6	4	8	1	1	4	1
45	Delhi-II	400	Mundka	Delhi	4	Jhajjar-1&2,Jattikaian,Bawna	12	12	8	16	1	1	8	2
46	Delhi-II	220	Rajghat	Delhi	2	I.P. Gas turbines-1&2	6	6	4	8	1	1	4	1
47	Delhi-II	220	Pragati gas Turbine	Delhi	6	I.P.Gas turbine-1&2,Park street 1,2,MaharaniBagh-1,2	18	18	12	24	1	1	12	3
48	J&K-II	400	Baglihar	J&K	2	Kishenpur-1&2	6	6	4	8	1	1	4	1
49	Punjab-I	220	Ropar GGS TPS	Punjab	10	Govindnagar-1,2,3&4,Jamsher-1&2,Sanehwal-1&2,Mohali-1&2	30	30	20	40	1	1	20	5
50	Punjab-I	220	Lehara	Punjab	8	Mansa-1&2,Batinda-1&2,bazakhana-1&2,barnala-bbmb,PSEB	24	24	16	32	1	1	16	4
51	Punjab-II	220	Rajpur generation	Pvt	4	Rajpura-1&2, Nakodar-1&2	12	12	8	16	1	1	8	2
52	Punjab-II	220	Rajpura	Pvt	4	Rajpura gen-1&2, Dhuri-1&2	12	12	8	16	1	1	8	2
53	Punjab-II	220	Talwandi	Pvt	6	Dhuri-2, Muktsar-2, Nakodra, Moga	18	18	12	24	1	1	12	3
54	Punjab-II	220	Muktsar	Punjab	4	Talwandi-2, Makhu-2	12	12	8	16	1	1	8	2
55	Punjab-II	220	Makhu	Punjab	8	Amritsar-2, Batala-2, Nakodar-2, Muktsar-2	24	24	16	32	1	1	16	4
56	Punjab-II	220	Batala	Punjab	4	Makhu-2 Nakodar-2	12	12	8	16	1	1	8	2
57	Punjab-II	220	Nakodar	Punjab	8	Batala-2 Rajpura gen-2, Talwandi-1, Moga-1 Makhu-2	24	24	16	32	1	1	16	4
58	Central-I, NR	220	Pithoragarh	POWERGRID	2	Dhauliganga,Bareilly	6	6	4	8	1	1	4	1
59	Central-II, NR	400	Gorakhpur	POWERGRID	8	Lko(PG)-1&2,3,4,Gorakhpur(up)-1&2,Muzaffarpur-1&2	24	24	16	32	1	1	16	4
60	Central-II, NR	400	Auriya	NTPC	4	Kanpur-1&2,Agra-1&2(PG)	12	12	8	16	1	1	8	2
61	Central-II, NR	400	Bairasiul	NHPC	2	Pong-1,Joasor	6	6	4	8	1	1	4	1
62	Central-II, NR	400	UR-II	NHPC	2	Uri-I & Wagoora	6	6	4	8	1	1	4	1
63	Central-II, NR	400	Tapovan Vishnugad	NTPC	2	Srinagar-1 &2	6	6	4	8	1	1	4	1
64	Central-II, NR	400	Meerut-765	POWERGRID	2	Agra-1, Bhiwani	6	6	4	8	1	1	4	SAS 1
65	Central-II, NR	400	Bhiwani-765	POWERGRID	3	Jattikalan, Moga, Jaipur	9	9	6	12	1	1	6	SAS 2

URTDSM Project Phase-II



URTDSM Project Phase-II List of Substations under Northern Region for PMU placement															
S.No	Project Phase	KV S/s	Name of Station	Owner Utility	No. of feeders	Name of Feeder	Phasor Quantities to be Measured by the PMUs						Substations having SAS with bay kiosk	Tentative no of PMUs	
							3-Phase Voltage Phasors (Vr, Vy, Vb)	3-Phase Current Phasors (Ir, Iy, Ib)	Positive Sequence Voltage & Current	Digital Inputs (Dis)	Freq uency	ROCOF			Analog Values (MW & MVAR)
						No of signals ----->	3	3	2	4	1	1	2		
66	Central-II, NR	220	Salal	NHPC	6	Kishanpur-1,2,3&4,Jammu-1&2	18	18	12	24	1	1	12		3
						Total	774	774	516	1032	66	66	516		135

पावर सिस्टम ऑपरेशन कॉर्पोरेशन लिमिटेड
(भारत सरकार का उद्यम)
POWER SYSTEM OPERATION CORPORATION LIMITED
(A Govt. of India Enterprise)



पंजीकृत एवं केन्द्रीय कार्यालय : प्रथम तल, बी-9, कुतुब इंस्टीट्यूशनल एरिया, कटवारिया सराय, नई दिल्ली-110016
Registered & Corporate Office : 1st Floor, B-9, Qutab Institutional Area, Katwaria Sarai, New Delhi -110016
CIN : U40105DL2009GOI188682, Website : www.posoco.in, E-mail : posococc@posoco.in, Tel.: 011- 41035696, Fax : 011- 26536901

Ref. No.: POSOCO/NLDC/SO/PMU/ 296

Date: 03rd Feb 2020

To,

Director (Operations)
Power Grid Corporation of India Limited
Saudamini, Sector 29,
Gurgaon (Haryana)

Sub: Provisioning of Phasor Measurement Units (PMU) on HVDC and FACTS device locations for understanding behavior of these devices during perturbations in the power system as well as study model validation

Reference:

1. POSOCO communication with Ref. POSOCO/NLDC/SO/1412 dated 17th Mar 2017
2. ED (RPT)-POWERGRID letter with Ref. RPT HVDC HQ-BLGR/RP 800/2020/10 dated 2nd Jan 2020

Madam,

HVDC and FACTS devices are important transmission components in Indian power system. As these power electronic devices are known to enhance the stability of the grid, therefore understanding behavior of these devices during perturbations or faults in the power system, is very important besides controller-controller interactions. Apart from local high resolution recording already available at these installations, the high resolution data provided by the Phasor Measurement Units (PMUs) can be very helpful in carrying out the necessary analysis/studies. The availability of PMU data will also enhance the visualization of the system parameters and help in taking appropriate timely actions by RLDCs/NLDC and also validation of study models by both RLDCs/NLDC as well as CTU/CEA.

The Unified Real Time Dynamic State Measurement (URTDSM) project is at near completion stage and PMUs have been installed at various locations across the Indian power system. It is important to mention that even with presence of such large number of PMUs, the visibility of HVDC and FACTS devices is still low at control centres. The status of availability of PMU data from HVDC and FACTS devices at RLDC/NLDC is enclosed as *Annexe-1*. It may be observed that many stations, though having PMU placed at AC bus of the station but non wired to record current of HVDC or FACTS devices. The wiring of bays associated with these devices to PMU would be helpful i.e. PMU placement at AC-DC interconnection feeder for HVDC or coupling transformer for STATCOM. It is also inferred from the

Mansingha contd/-

Provisioning of Phasor Measurement Units (PMU) on HVDC and FACTS device locations

Page 1

स्वहित एवं राष्ट्र हित में ऊर्जा बचायें
Save Energy for Benefit of Self and Nation

Annexe-1 that many stations associated with these elements do not have PMUs and therefore, require additional PMUs to be arranged to cover the relevant stations.

This issue of provisioning of PMU has been flagged by RLDCs at the Regional Power Committee for also. The summary of discussions at RPC level on the subject issue and communications between RLDCs and POWERGRID is enclosed as *Annexe-2*. It may be observed that issue has regularly been deliberated at RPC level, though the effective implementation is yet to be realized on account of various minor operational issues. It is good to mention that in Eastern Region, the SVC & STATCOM PMU data has been wired and reporting to ERLDC. However, for Pugalur HVDC terminal, it was a surprise to receive a communication from Executive Director-RPT HVDC project to Executive Director-SRLDC requesting us to take up the issue in Standing Committee Meeting (Copy of communication enclosed at *Annexe-3*).

Significant investments have been undertaken in the commissioning of HVDC and FACTS devices like STATCOM, SVC etc. The controllers in these devices are expected to operate during the critical sub-second interval when there is a fault or perturbation in the system. In absence of PMUs, monitoring of these installations creates a gap in understanding the behavior of these devices besides validation of the study models. A similar requirement comes for the 765 / 400 / 220 kV pooling stations associated with wind and solar evacuation (at interconnection point, generally at 220 kV bus), to observe the Fault Ride Through(FRT) and other capabilities of Voltage and Frequency control.

It is requested that the matter of provisioning of PMUs at these locations may kindly be addressed at your level in the interest of better operation of the power system and proper utilization of these assets.

Thanking you

Yours sincerely,


(S. R. Narasimhan) 3/2/2020
Director (SO)-POSOCO

Encl: As above

Copy :

1. Member(PS), CEA, New Delhi
2. Chief Engineer,(GM & NPC),CEA, New Delhi
3. Chief Engineer, (SP & PA-1)/(SP & PA-2), CEA, New Delhi
4. Member Secretary, NRPC /WRPC /SRPC/ERPC /NERPC
5. COO-CTU, POWERGRID, Gurugram
6. Executive Director, NRLDC/WRLDC/SRLDC/ERLDC/NERLDC.

Annexe-1

Annexe-1

PMU Data Availability on HVDC installed in Indian Power System				
S.No.	HVDC station	Region	PMU installed in Substation (Y/N)	PMU data of DC-AC Inter Connector Reporting to RLDC (Y/N)
1	Talcher	ER	Yes	No
2	Kolar	SR	Yes	Yes
3	Bhadravathi West Bus	WR-SR	Yes	Yes
4	Bhadravathi South Bus	WR-SR	Yes	No
5	Gazuwaka East Bus	ER-SR	Yes	Yes
6	Gazuwaka South Bus	ER-SR	Yes	No
7	Chandrapur	WR	Yes	Yes
8	Phadge	WR	No	No
9	Mundra	WR	No	No
10	Mahendergarh	NR	No	No
11	Champa	WR	Yes	Yes
12	Rihand	NR	yes	yes

Annexe-1

PMU Data Availability on HVDC installed in Indian Power System				
S.No.	HVDC station	Region	PMU installed in Substation (Y/N)	PMU data of DC-AC Inter Connector Reporting to RLDC (Y/N)
13	Dadri	NR	yes	yes
14	Balia	NR	yes	No
15	Bhiwadi	NR	yes	no
16	Kurukshetra	NR	Yes	Yes
17	Vindhyachal West Bus	WR-NR	No	No
18	Vindhyachal North Bus	WR-NR	No	No
19	Agra	NR	Yes	No
20	Alipurduar	ER	Yes	Yes
21	BNC	NER	No	No
22	Sasaram East Bus	ER-NR	Yes	Yes
23	Sasaram North Bus	ER-NR	Yes	Yes

Last updated on 17th January 2020

Annexe-1

PMU Data Availability on STATCOM installed in Indian Power System				
S.No.	Statcom station	Region	PMU installed in Substation (Y/N)	Coupling Transformer PMU data Reporting to RLDC (Y/N)
1	KISHANGANJ	ER	Yes	Yes
2	RANCHI	ER	Yes	Yes
3	JEYPORE	ER	Yes	Yes
4	ROURKELA	ER	Yes	Yes
5	LUCKNOW	NR	Yes	No
6	NALLAGARH	NR	Yes	No
7	TRICHY	SR	Yes	No
8	UDAMALPET	SR	No	No
9	Hyderabad	SR	No	No
10	NP KUNTA	SR	Yes	No
11	AURANGABAD	WR	Yes	No
12	SOLAPUR	WR	Yes	No
13	GWALIOR	WR	Yes	No
14	SATNA	WR	Yes	No

Last updated on 17th January 2020

Annexe-1



PMU Data Availability on SVC installed in Indian Power System						
S.No.	Statcom station	ID	Rating	Region	PMU installed in Substation (Y/N)	Coupling Transformer PMU data Reporting to RLDC (Y/N)
1	400kV KANPUR	SVC-1	+140 / - 140	NR	Yes	No
2	400kV KANPUR	SVC-2	+140 / - 140	NR	Yes	No
3	400 kV Ludhiana	SVC-1	600	NR	Yes	No
4	400 kV Ludhiana	SVC-2	-400	NR	Yes	No
5	400 kV Kankroli	SVC-1	400	NR	Yes	No
6	400 kV Kankroli	SVC-2	-300	NR	Yes	No
7	400 kV New Wangpoh	SVC-1	300	NR	No	No
8	400 kV New Wangpoh	SVC-2	-200	NR	No	No

Last updated on 17th January 2020


Annexe-1

PMU Data Availability on TCSC installed in Indian Power System						
S.No.	Element Name	Compensation	TCSC station	Region	PMU installed in Substation (Y/N)	PMU data of TCSC Ckt at installed station reporting to RLDC (Y/N)
1	Gorakhpur-Muzaffarpur 1	40% (fixed) & 5-15% (Dynamic)	Gorakhpur	ER	NO	NO
2	Gorakhpur-Muzaffarpur 2	40% (fixed) & 5-15% (Dynamic)	Gorakhpur	ER	NO	NO
3	Raipur-Raigarh- 1	40% Fixed & 5-15% dynamic	Raipur	WR	Yes	Yes
4	Raipur-Raigarh- 2	40% Fixed & 5-15% dynamic	Raipur	WR	Yes	Yes
5	Purnea-Muzaffarpur 1	40% fixed, +15%/-5% dynamic	Purnea	ER	Yes	Yes
6	Purnea-Muzaffarpur 2	40% fixed, +15%/-5% dynamic	Purnea	ER	Yes	Yes

Last updated on 17th January 2020

WRPC deliberation regarding placement of PMU at HVDC/FACTS locations					
S.No.	Meeting	Date	Agenda Item No.	Brief about deliberation	Weblink to Agenda/MoM
1	505 OCC	21-03-18	8	POWERGRID was advised to install PMU at all the four STATCOM locations in WR for observability of composite response of STATCOM+MSR+MSC at WRLDC.	http://wrpc.gov.in/occ/505OCC_Minute.pdf
2	506 OCC	19-04-18	6	POWERGRID informed that feasibility for integration of STATCOM to existing PMUs would be checked and would be communicated to WRLDC.	http://wrpc.gov.in/occ/506OCC_Minute.pdf
3	9 th PRM of URTDSM	27-04-19	3.5	WRLDC further raised the PMU data for STATCOM locations at Aurangabad, Satna, Solapur and Gwalior. GM(LD&C) suggested to get the preliminary survey done by GE team for assessing actual requirement of cable/ Hardware required. If the cables and required hardware is arranged by WR-I/II, GE shall help in making the STATCOM data available via PMUs.	
4	507 OCC	16-05-18	4	POWERGRID informed that installation of PMU at STATCOM locations is not in the scope of URTDSM, but has agreed to integrate the STATCOM in the existing PMU with extension of CT/PT wiring and joint survey by POWERGRID and GE would be done for feasibility of integration of STATCOM to existing PMUs. WRLDC informed that POWERGRID to consider the installation of PMU for future STATCOM projects in the planning stage itself for observability of dynamic performance of STATCOMs	http://wrpc.gov.in/occ/507OCC_Minute.pdf
5	508 OCC	14-06-18	12	POWERGRID informed that the STATCOMs can be integrated with the existing PMUs by replacing any one of the feeders integrated to PMU. WRLDC informed that the list of lines to be replaced with STATCOMs for integration with existing PMUs would be forwarded to POWERGRID.	http://wrpc.gov.in/occ/508OCC_Minute.pdf
6	509 OCC	17-07-18	8	WRLDC informed feeders connections to PMU may be removed and extend to STATCOM 1.400 kV Satna-Bina ckt-1 or ckt-11 at Satna 2.400 kV Aurangabad-Boisarckt-1 or ckt-11 at Aurangabad 3.400 kV Solapur-Karad at Solapur	http://wrpc.gov.in/occ/509_OCC_Minute.pdf
7	510 OCC	10-08-18	3(iii)	POWERGRID informed that joint survey report on feasibility to extend the CT/PT wiring to PMU would be submitted soon and installation of PMUs shall be expedited.	http://wrpc.gov.in/occ/510_occ_minute.pdf
8	9 th PRM of URTDSM	13-12-18	1	Issue of installation of PMUs at STATCOM locations of Solapur, Aurangabad, Gwalior & Satna was discussed. ED(LD&C) suggested that this work is under additional scope and shall be routed through WRPC. POWERGRID shall include PMU for these locations in URTDSM Phase-II or as new project as directed by WRPC.	
9	514 OCC	12-12-18	9.2	For observation and monitoring performance of STATCOM it is proposed to install PMUs at these locations. The matter has been discussed in various OCC meetings. Without sub second data, the dynamics of STATCOM could not be monitored and STATCOM cannot be utilized for real time grid operation.	http://www.wrpc.gov.in/occ/514_OCC_Minute.pdf

Annexe-2

S.No.	Meeting	Date	Agenda Item No.	Brief about deliberation	Weblink to Agenda/MoM
10	Spl Meeting	22-01-19	3	PMU Installation at STATCOM locations: The installation of PMUs at STATCOM locations has been discussed in various forums like PRM-URTDSM, OCCM & also through separate communication with POWERGRID. However no PMU is available at any of the STATCOM locations for analysis of dynamic behaviour. During the discussion, WRLDC informed that one PMU is available at Satna site (which was earlier installed during pilot project) and PGCIL agreed to install the same at Satna PG STATCOM control room in HV side of the coupling transformer as an interim measure till PMUs are purchased for STATCOM separately. This may be taken up by PGCIL, WR-II on a priority basis.	
11	518 OCC	25-04-19	9.6	POWERGRID informed that PMU has been received at Satna substation. WRLDC enquired about target date for making PMU connections to STATCOM. POWERGIRD informed that OEM support is required making PMU connection to STATCOM. POWERGRID stated that IVT voltage of Satna STATCOM shall be provided to WRLDC SCADA by June'19.	http://www.wrpc.gov.in/occ/518_OCC_MINUTE.pdf
12	519 OCC	15-05-19	9.2	POWERGRID informed that price quote from OEM M/s Kalkitech for installation of PMU at STATCOM was asked. After receiving price quote the work shall be started. WRTS-2, POWERGRID informed that IVT voltages of Gwalior and Satna STATCOMs shall be integrated to WRLDC SCADA by July'19.	http://www.wrpc.gov.in/occ/519_OCC_MINUTE.pdf
13	520 OCC	13-06-19	9.9	POWERGRID informed that before next OCCM the PMU would be commissioned and PMU shall report data to RLDC. IVT voltages of Satna and Gwalior STATCOMs shall be provided to WRLDC at the earliest.	http://www.wrpc.gov.in/occ/520_OCC_MINUTE.pdf
14	521 OCC	16-07-19	9.4	POWERGRID informed that commissioning of PMU at Satna STATCOM was completed and data was reporting to WRLDC. WRLDC informed that integration IVT voltage of STATCOM in WRLDC SCADA was still pending, POWERGRID stated that IVT voltage shall be integrated by end of July 19. However, presently data not reporting to WRLDC (it was informed to POWERGRID via saperate email, no update as on date.)	http://www.wrpc.gov.in/occ/521_OCC_MINUTE.pdf
15	During FTC	11-12-19	-	During FTC of Raigarh-Pugalur Pole-1,2,3,4. PMU requirement was informed to POWERGRID. Communiation in this regard attached saperately. Further letter dtd 02-01-2020 POWERGRID requested details where PMUs to be installed and number of PMUs, accordingly WRLDC WAMS mail dtd 16-01-2020 we have informed to POWERGRID. Installation is pending	Attachement shared saperately

*Other nodes where PMUs installation in required in HVDCs and STATCOMs is mentioned in WRLDC Quarterly feedback on transmission Constraint dtd 23.01.2020 in. Chapter 7

Annexe-2

SRPC deliberation regarding placement of PMU at HVDC/FACTS locations					
S.No.	Meeting	Date	Agenda Item No.	Brief about deliberation	Weblink to Agenda/MoM
1	36 SRPC	12-Jul-19	26	PGCIL (SR II) was requested to coordinate for the training on Analytical Applications by IITB. For PMU at STATCOM at Udumalpet, Hyderabad, Trichy, etc SRLDC was requested to identify the locations and possibility of shifting will be explored by PGCIL- SR I & SR II. SRLDC vide letter dated 01st July 2019 (Annexure-XXIX) requested PGCIL to look into the issues and take necessary actions to make all Analytical Applications operational at SRLDC. SRPC approved the recommendation of TCC that the charges towards shifting of PMU would be booked by PGCIL under O&M or any other project.	http://www.srpc.kar.nic.in/website/2019/meetings/srpc/m36srpcm.pdf
2	156 OCC	11-Jun-19	3.5	For PMU at STATCOM at Udumalpet, Hyderabad, Trichy, etc SRLDC was requested to identify the locations and possibility of shifting will be explored by SR I and SR II.	http://www.srpc.kar.nic.in/website/2019/meetings/occ/m156occm.pdf
3	160 OCC	15-Oct-19	4.46	SR I & SR II agreed to shift the PMUs to STATCOM locations (Hyderabad, Udumalpet and Trichy).	http://www.srpc.kar.nic.in/website/2019/meetings/occ/m160occm.pdf

Annexe-2

ERPC deliberation regarding placement of PMU at HVDC/FACTS locations					
S.No.	Meeting	Date	Agenda Item No.	Brief about deliberation	Weblink to Agenda/MoM
1	39 TCC	16-11-18	3.1	Power Grid would first explore the possibilities by diverting the unutilized PMUs under URTDSM project and would complete the work on urgent basis. If adequate no. of PMUs are not available under URTDSM project, balance PMUs will be implemented under project "Upgradation of SCADA / RTUs / SAS in the Central sector stations and strengthening of OPGW network".	http://erpc.gov.in/wp-content/uploads/2018/06/39ERPC_TCC-Minutes.pdf
2	153 OCC	21-01-19	B.2	Powergrid informed that M/s GE had agreed to supply and install of 4 nos PMUs for 4 STATCOMs in the Eastern Region within the quantity variation clause under the existing URTDSM Project.	http://erpc.gov.in/wp-content/uploads/2019/01/153OCCMINUTES.pdf
3	154 OCC	21-02-19	B.6	In 153rd OCC, Powergrid informed that M/s GE had agreed to supply and install of 4 nos PMUs for 4 STATCOMs in the Eastern Region within the quantity variation clause under the existing URTDSM Project. And Powergrid informed that they would send the updated status to ERPC within a week	http://erpc.gov.in/wp-content/uploads/2019/03/154OCCMINUTES.pdf
4	157 OCC	20-05-19	C.14	Powergrid informed that the work would be completed by July 2019.	http://erpc.gov.in/wp-content/uploads/2019/06/157OCCMINUTES.pdf
5	158 OCC	27-06-19	C.14	In 157th OCC Meeting Powergrid informed that the work would be completed by July 2019.	http://erpc.gov.in/wp-content/uploads/2019/07/158OCCMINUTES-3.pdf
6	159 OCC	19-07-19	C.21	Powergrid informed that the work would be completed by 15 th August 2019.	http://erpc.gov.in/wp-content/uploads/2019/07/159OCCMINUTES.pdf
7	160 OCC	09-08-19	C.15	Powergrid informed that the work would be completed by 15th August 2019.	http://erpc.gov.in/wp-content/uploads/2019/07/160OCCMINUTES.pdf
8	161 OCC	20-09-19	C.14	In 159th OCC Meeting Powergrid informed that the work would be completed by 15th August 2019. PMU at Raurkela and Ranchi has been commissioned.	http://erpc.gov.in/wp-content/uploads/2019/10/161OCCMINUTES.pdf
9	162 OCC	22-10-19	C.9	PMU for STATCOMs at Rourkela and Jeypore have been commissioned in Aug 2019. Powergrid informed that material supplied at Ranchi and Kishanganj were damaged. New material would be supplied by November 2019.	http://erpc.gov.in/wp-content/uploads/2019/11/162nd-OCC-Minutes_final.pdf
10	163 OCC	15-11-19	C.9	Powergrid informed that material supplied at Ranchi and Kishanganj were damaged. New material would be supplied by November 2019. Powergrid updated that the work would be completed by December 2019.	http://erpc.gov.in/wp-content/uploads/2019/12/163OCCMINUTES1.pdf
11	164 OCC	23-12-19	C.8	Powergrid informed that material supplied at Ranchi and Kishanganj were damaged. New material would be supplied by November 2019.	http://erpc.gov.in/wp-content/uploads/2020/01/164-OCC-MINUTES.pdf

****PMUs at Ranchi and Kishanganj were installed on 02/01/2020 and 19/11/19 respectively.**

Annexe-2

Communication for PMU Placement between POSOCO and POWERGRID				
S.No.	From	To	Date	Subject
Southern Region				
1	GM(URTDSM,IT& TS)-SRLDC	CGM(AM)-SRTS-II,POWERGRID	08-Nov-19	Status of URTDSM PMU shifting as agreed in 36th SRPC meeting
2	GM(URTDSM,IT& TS)-SRLDC	CGM(AM)-SRTS-I,POWERGRID	08-Nov-19	Status of URTDSM PMU shifting as agreed in 36th SRPC meeting
3	Sr. GM(ULDC & IT)-SRTS-I	GM(URTDSM,IT& TS)-SRLDC	18-Nov-19	Status of shifting of URTDSM PMU
4	CGM(AM)-SRTS-II,POWERGRID	GM(URTDSM,IT& TS)-SRLDC	19-Nov-19	Status of shifting of URTDSM PMU
5	GM(URTDSM,IT& TS)-SRLDC	CGM(AM)-SRTS-II,POWERGRID	25-Nov-19	Status of URTDSM PMU shifting as agreed in 36th SRPC meeting
6	GM(URTDSM,IT& TS)-SRLDC	Sr. GM(ULDC & IT)-SRTS-I	25-Nov-19	Status of URTDSM PMU shifting as agreed in 36th SRPC meeting
7	ED(RPT Project)-HVDC	ED(SRLDC)	02-Jan-20	Regarding installation of PMUs at Pugalur HVDC station of RP 800 project
8	ED(SRLDC)	ED(RPT Project)-HVDC	17-Jan-20	Regarding installation of PMUs at Pugalur HVDC station of RP 800 project
Western Region				
1	GM(WRLDC)	GM(AM)-WRTS-I	26-Mar-18	Installation of PMU in coupling transformers at Satna,Aurangabad,Gwalior and Solapur
2	GM(WRLDC)	GM(AM)-WRTS-I	28-Jun-18	Installation of PMU at Satna,Aurangabad,Gwalior and Solapur on STATCOM coupling transformers HV side by extending CT/PT wiring
3	GM(WRLDC)	GM(AM)-WRTS-II	28-Jun-18	Installation of PMU at Satna,Aurangabad,Gwalior and Solapur on STATCOM coupling transformers HV side by extending CT/PT wiring
4	ED(RPT Project)-HVDC	ED(WRLDC)	02-Jan-20	Regarding installation of PMUs at Pugalur HVDC station of RP 800 project



Annexe-3
पावर ग्रिड कॉर्पोरेशन ऑफ इंडिया लिमिटेड
(भारत सरकार का उद्यम)
POWER GRID CORPORATION OF INDIA LIMITED
(A Government of India Enterprise)

Ref No: RPT HVDC HQ-BLGR/ RP 800/2020 /30

Date: 02/01/2020

Shri. Abhimanyu Gartia,
Executive Director, SRLDC
POSOCO, 29, Race Course Cross Road,
Bangalore – 560009

Sub.: Regarding Installation of PMU's at Pugalur HVDC Station of RP 800 Project – Reg.

Dear Sir

Wishing a Very Happy New Year 2020

It is our immense pleasure to inform that we have successfully completed Open Line Test of Bipole-1 (Pole-1 & Pole-2) of \pm 800kV Pugalur HVDC Terminals with your kind support and co-operation extended to us.

While processing our First Time Charging application request of Pugalur Bipole-1 HVDC Terminals, SRLDC/NLDC has raised a query about availability of PMU's at Pugalur HVDC Station. In this regard, it is to inform that No PMU's were envisaged in existing contract of \pm 800kV, 6000 MW Raigarh – Pugalur HVDC Terminals. However, the other sides of the line bays connected to Pugalur 400kV GIS S/s which is within the premises of Pugalur HVDC Station are envisaged with PMU's.

In view of SRLDC/NLDC opinion to install PMU's at Pugalur HVDC station, Kindly suggest us the Number of PMU's to be installed along with the detailed technical specification, Standards etc. for taking necessary action at our end to materialize the same. SLD of Pugalur HVDC Terminal is attached herewith for kind information.

Further, it is also requested to your Good Office to kindly flag your requirement of Installation of PMU's at Pugalur HVDC Terminals in the Standing Committee Meeting.

Thanking You,

Yours faithfully



(A K Mishra)

Executive Director, RPT HVDC Project,
Bangalore

CC: Executive Director, NLDC, POSOCO

Executive Director, CC – HVDC Engg., POWERGRID

आरपीटी एचवीडीसी परियोजना कार्यालय: लेवल - 4, समनविधा कॉम्प्लेक्स, 12/13/14, मयूरा स्ट्रीट, आउटर रिंग रोड, हेबबल, बेंगलूर - 560 094. दूरभाष : 080-2341 1063 / 65

RPT HVDC Project Office: Level 4, Samanvitha Complex, 12/13/14, Mayura Street, Outer Ring Road, Hebbal, Bengaluru - 560 094, Phone : 080-2341 1063 / 65

केन्द्रीय कार्यालय : "सौदामिनी", प्लॉट नं.: 2, सेक्टर-29, गुरुग्राम-122001, (हरियाणा), दूरभाष 0124-2571700-719

Corporate Office : "Saudamini", Plot No. 2, Sector-29, Gurugram-122001, (Haryana) Tel. : 0124-2571700-719

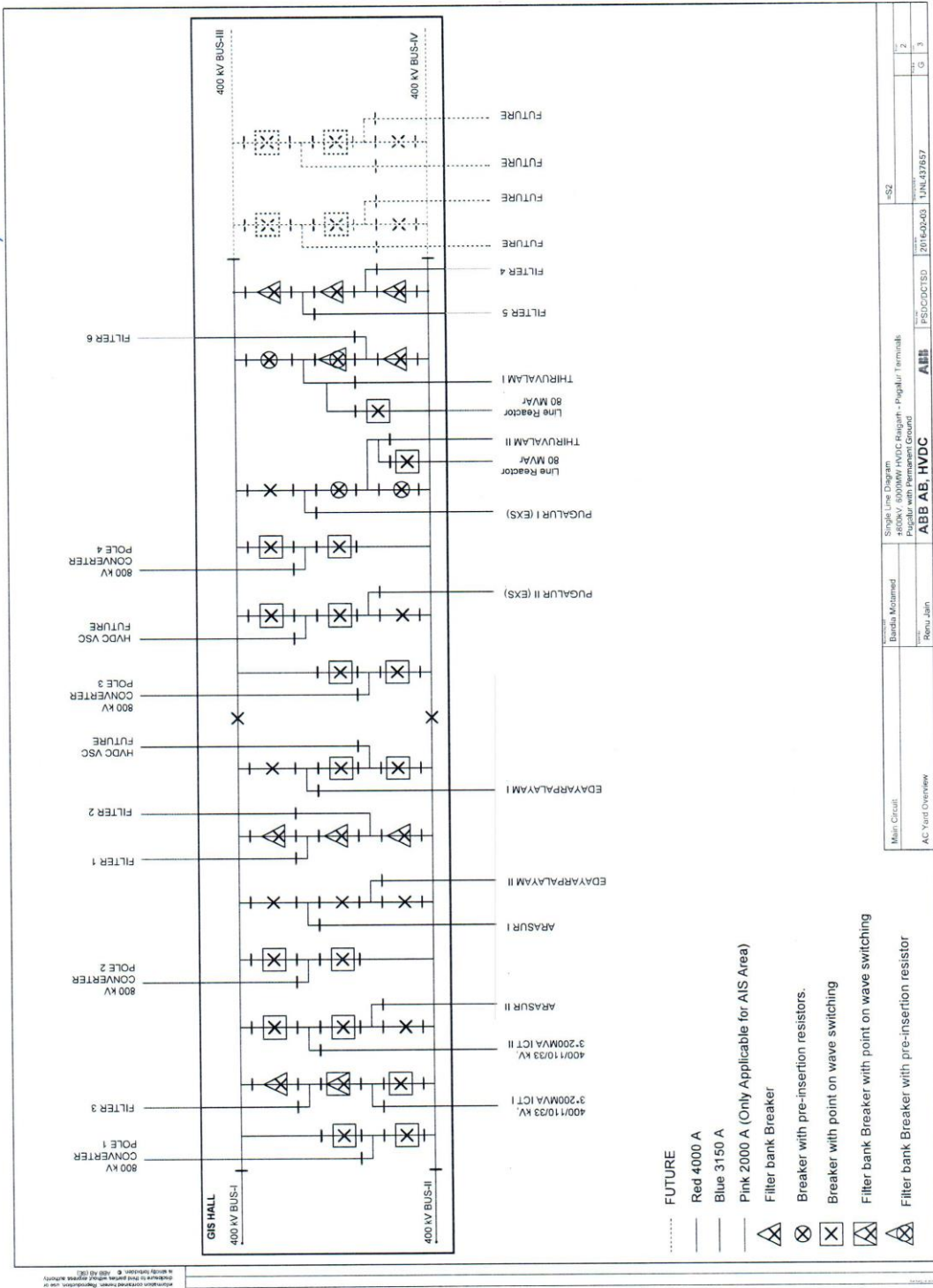
पंजीकृत कार्यालय : कुतुब इंस्टीट्यूशनल एरिया, कटवारिया सराय, नई दिल्ली - 110 016 दूरभाष : 011-26560112, 26560121, 26564812, 26564892, सीआईएन : L40101DL1989GOI038121

Registered Office : Qutab Institutional Area, Katwaria Sarai, New Delhi-110 016. Tel. : 011-26560112, 26560121, 26564812, 26564892, CIN : L40101DL1989GOI038121

Website : www.powergridindia.com

SFD of 400kV GIS s/s at PUGALUR HVDC STATION

Annexe-3



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Project Name: Design of 400kV GIS at Pugalur HVDC Station - Pugalur Terminals	Sheet No: 02
Client: ABB AB, HVDC	Scale: 1:1
Project Manager: Barada Mohan	Date: 2016-03-03
Author: Barada Mohan	Project No: LNL437657
Reviewer: Renu Jain	Sheet No: 02
Project No: LNL437657	Sheet No: 03