



भारत सरकार
Government of India
विद्युत मंत्रालय
Ministry of Power
केन्द्रीय विद्युत प्राधिकरण
Central Electricity Authority
नवीकरणीय ऊर्जा उद्भव विकास प्रभाग
Renewable Energy Source Development Division
*** ** **

No. CEA/PLG/RES-35/2018/

Date: 17.05.2018

सेवा में/ To: सूची के अनुसार/As per the list attached

विषय: 04-05-2018 को जयपुर, राजस्थान में सदस्य (योजना), के. वि. प्रा. की अध्यक्षता में वास्तविक समयानुसार प्रतिदिन के नवीकरणीय ऊर्जा उत्पादन के आंकड़ें प्रस्तुत करने के बारे में बैठक का कार्यवृत्त.

Subject: Minutes of the Meeting regarding "Furnishing Real Time / Daily Renewable Energy Generation Data" held at Jaipur, Rajasthan on 04-05-2018 under the Chairmanship of Member (Planning), CEA

महोदय/Sir,

Minutes of the Meeting regarding "Furnishing Real Time / Daily Renewable Energy Generation Data" held at Jaipur, Rajasthan on 04-05-2018 under the Chairmanship of Member (Planning), CEA are attached herewith for your kind information and necessary action please.

बैठक के दौरान दी गई प्रस्तुतियां केवल ईमेल पर प्रेषित की जा रही हैं / Presentations made during the meeting are being sent on email only.

कृपया पत्र की पावती दें/ Kindly acknowledge the receipt of the letter.

भवदीय/Yours faithfully,

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8. Sh. Atulya Kumar Naik, AGM (Power Systems), SECI
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10. Dr. Subir Sen, COO (CTU-Plg & SG), CTU/Powergrid
11. Sh G. Chakraborty, DGM, NLDC (POSOCO)
12. Sh. S.S. Mishra, AGM (PE-Solar), and Sh. A.K. Sinha, AGM (OS-SIIS), NTPC Limited
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18. Chief Engineer (GM), CEA
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22. Chief Engineer (PCD), CEA
23. Secretary, CERC, New Delhi.
24. Member-Secretary (NRPC, WRPC, SRPC, ERPC & NERPC)

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- 9) SA to Member (GO&D), CEA
- 10) SA to Member (Power System), CEA
- 11) SA to Member (E&C), CEA
- 12) SA to Member (Thermal), CEA
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Minutes of the Meeting regarding “Furnishing Real Time/Daily Renewable Energy Generation Data” held at Jaipur, Rajasthan on 04-05-2018 under the Chairmanship of Member (Planning), CEA

List of the Participants is at **Annex-1**.

Chief Engineer (Rajasthan SLDC), welcomed Member (Planning), CEA and the Participants.

Chief Engineer (RES), CEA, welcomed Member (Planning), CEA and the Participants. He introduced the brief agenda and requested the Chair to address and guide the participants for deliberations.

The Chair impressed upon all the participants that availability of communication system and transfer of Real Time Operational Data at SLDCs, RLDCs and NLDCs is an essential system requirement for safe, secure and reliable operation of the grid. This is also mandatory as per the appropriate Regulations and Standards in place (The relevant extract of Appropriate Regulations/Standards is placed at **Annex-2**). He also emphasized that, with the growth of variable Renewable Energy (RE) in the grid, real time accurate data sharing is required to determine the quantum of balancing power requirements with different response times. In order to optimise the balancing power requirement, there is a need of Ancillary Services requirement for balancing power on competitive basis. Hydro resources and battery energy storage could bid for response time in seconds. Hydro plants and batteries could bid for response time in minutes and gas based and flexible coal based generating units could bid for balancing requirements of half an hour or more.

He stated that since the last meeting held on 11-09-2017 at New Delhi, on the subject, good progress has been made by Rajasthan, but still 100% receipt of data remains, for which concerted efforts are to be made.

Member (Planning), CEA appreciated the efforts made by the respective SLDC and RLDC in obtaining fast and reliable real time RE data in the last two years. He expressed that a lot of hard work has been done by respective stakeholders, but still some gaps are there in obtaining the full real time RE data.

Main Issues discussed were:

Issues in obtaining real time data from renewable generators. Reliability and availability of communication links. Mode of communication like GPRS, PLCC, Telemetry, VSAT, ABT meters with communicable modems, Radio frequency based modems – performance, reliability etc., Accuracy of data obtained. Difference in SCADA based data and data submitted to Load Despatch Centers (LDCs) by the States and compatibility of Protocol used. Transmission of data from Pooling stations to SLDC and further from SLDC to respective RLDC.

Presentations were made by SLDC Rajasthan, Indian Wind Turbines Manufacturers Association (IWTMA), POSOCO, SRLDC, WRLDC, SLDCs of Maharashtra, Karnataka, Gujarat, Tamilnadu, Madhya Pradesh and Telangana (**Refer Annex A to K**).

CE, Rajasthan SLDC stated that some of the data (less than about 50%) is received from solar and wind power generators at SLDC, through the RTUs installed at their grid Sub-stations (GSS). For remaining 50% RTU installation by RVPNL, the tender process is on, and completion of works is expected by Dec, 2018. They were advised to complete the process soon.

Indian Wind Turbines Manufacturers Association (IWTMA) informed the status of their Scheduling and Forecasting of Wind Power project covering entire Rajasthan. The project is almost complete with the visibility of Real Time Generation for 3450 MW (Wind Power), the work is in progress for balance 790.4 MW capacity. Though the data so arranged is available at the portal/gateway of REConnect (System Integrator appointed by IWTMA) placed at Rajasthan SLDC, its interfacing to the Rajasthan SLDC in the SCADA Compatible format is yet to be done. It was reported that the work is in progress and will be completed by May, 2018. Onward transmission of data to NRLDC shall be ensured.

NRLDC/POSOCO highlighted the Real Time data availability issue and stated that all data should be integrated with SCADA system and made available at SLDC/RLDC. It was stated by them they there are inaccuracies in the data received at their end. RE Generation visibility at NLDC is lacking.

SRLDC gave the status of SCADA data integration in respect of SR states as given below:

SL. No.	State/Utility	Installed Capacity Wind in MW	SCADA data integrated Wind in MW	% SCADA data integrated	Installed Capacity Solar in MW	SCADA data integrated Solar in MW	% SCADA data integrated
1	Andhra Pradesh	3947	3797	96.2	2147	2003	93.29
2	Telangana	100.8	100.8	100	3263.93	3041.8	92.7
3	Karnataka	4419.7	4398.9	99.53	4848.55	4409.55	90.946
4	Tamil Nadu	8152	8000	98.13	1900	708	37.26

It was impressed upon the states that they have to put in efforts to ensure that the communication links are available all the time and real time data is communicated.

WRLDC gave the Wind and Solar Resources (WR) visibility status as given below:

State/Region	Wind			Solar		
	Installed Capacity	Telemetered	% of Visibility / Observability at SLDC/ WRLDC	Installed Capacity	Telemetered Capacity	% of Visibility/ Observability at SLDC/ WRLDC
Gujarat	5575	5339	95.77	1493	1420	95.11
Maharashtra	4776	4460	93.3%	1305	1305	100
Madhya Pradesh	2438	2364	97	1283	1282	100
Chhattisgarh	0	0	-	76	66	86.84
Daman & Diu	0	0	-	10	10	100
DNH	0	0	-	4	0	0
WR	12789	12163	95.10	4171	4083	97.89

WRLDC informed that they are getting 95 % RE data from Gujarat, but data of Maharashtra is not being received on a continuous basis. WRLDC raised the issue of poor reliability of communication links in case of Maharashtra.

Visibility/Observability of Wind RES at WRLDC: 95.10%. Maharashtra Wind Data Integrated through Inter-Control Center Communications Protocol (ICCP) at WRLDC is 93% and solar 100%, but the real time generation data availability is very less due to frequent non-availability of communication links. In association with RE developers Maharashtra has to take up the matter with communication service providers regarding proper maintenance of communication links. Maharashtra assured that the system will be rectified within two months.

SLDC Maharashtra indicated Renewable Energy break up and visibility status as on 30.04.2018 is as under:

Sr. No.	Particular	MW Installed Capacity	Visibility available for MW Capacity	Visibility (MW) Percentage	No. of Plants	No. of Plants Visible	Visibility (Plant) Percentage
1	Wind	4769	4489	94.30	84	72	85.70
2	Solar	1305	1305	100.00	36	36	100
3	Baggase Co-Gen	1949	1822	93.50	111	88	79.20
4	Others (Bio-mass, Small Hydro, Waste)	453	113	24.90	54	8	14.80
		8476	7729	91.18	285	204	71.50

Remaining renewable generators (old wind plants and small hydro/biomass plants) have been asked to provide real time data to SLDC. Though the real time visibility is provided at SLDC by the Renewable Energy generators, communication links from plant to SLDC are not available at times and therefore continuous data is not available.

SLDC Karnataka gave the status of SCADA data in the state as given below:

RE Resource	Voltage Level (kV)						SCADA connected	%SCADA integrated
	220	110	66	33	11	Total		
Solar	1354	1524.675	1473.88	230	266	4848.56	4409.55	90.95
Wind	1855.9	1306.65	966.395	269.61	21.14	4419.695	4398.895	99.53
Total (wind + solar)	3429.9	2941.33	2506.275	532.61	298.14	9268.26	8808.445	95.04

Data communication in Karnataka is on an owned VSAT HUB and Leased Lines for Inter Control Centre Communication as main and VSAT as secondary. This arrangement has helped Karnataka in improved availability of data.

SLDC Gujarat stated that Real-time generation data of all RE generators connected to STU substation are communicated through various communications system. Data connectivity between RE Station injection point (at 66 kV level & above) and STU end Sub-Station with mix of available Technologies are as below:

Type of Communication	Radio Modem	GSM / GPRS	Lease Line	Internet Lease Line	Total
Nos. of Wind station (Main)	6	5	34	27	72
Nos. of Wind station (Standby)	-	51	15	-	72
Nos. of Solar Plant	76	8	2	-	86

In case, where further extended communication is required from STU S/S to Sub SLDC, PLCC, Fiber Optic, Leased Line etc are being utilised.

SLDC Tamilnadu made a presentation (Refer **Annex I**). It was stated that the total wind installed capacity is 8152 MW, as on 31.03.2018, real time data of wind generation is achieved from all the 115 substations. Solar Installed capacity is 1900 MW, real time data achieved for 708 MW (37.26%). There is a need to put in place the data communication system in respect of solar installations.

SLDC Madhya Pradesh stated that SCADA/EMS system & communication in Madhya Pradesh is satisfactory. VSAT / Dedicated Leased Line / PLCC system is used. Pooling Stations are telemetered, however due to some technical difficulties availability of data is 99.35%. Efforts are being made to ensure 100% data availability.

Telemetry and Forecasting status Madhya Pradesh

Telemetry and Forecasting Status					
Type	Installed capacity MW	No of Pooling stations	Telemetered RES CAPACITY at SLDC	% of Visibility/ Observability at SLDC	Forecasting available
WIND	2438	74	2414	99.02	55
SOLAR	1282	45	1282	100	34
SUM	3720	119	3696	99.35	89
Percentage (%) of Forecasting available					74.79

SLDC Telangana gave the Status of RE Data Integration with SLDC in the state as given below:

Sl. No.	Voltage level	No. of Generators	Solar (MW)	Wind (MW)	Total (MW)	Integrated with SLDC	% Integrated with SLDC
1	220 kV	7	708	0	708	708	100
2	132 kV	37	1409.9	100.8	1510.7	1510.7	100
3	33 kV	119	1141.3	0	1141.3	923.9	81
4	11 kV	5	4.75	0	4.75	0	0
Total		168	3263.9	100.8	3364.7	3142.6	93.4%

The real time data is established upto inverter block level for all the RE generators. The control feature upto inverter block level is enabled. The data acquisition of generators connecting at 132 kV Voltage level and above is being done through PLCC / fibre on IEC 101 and 104 protocols. It has been made mandatory for all the generators to establish data connectivity to SLDC before synchronisation of the plant. If the data loss from RE generators happens for a continuous period of one week, they recommend for stoppage of bills, till the data is restored?

Conclusions:

- 100% data availability need to be ensured. The states to ensure that the target of 100% real time generation data is achieved in next two months.
- It was decided that the status of how many of the pooling stations are connected for communication of data and the percentage of availability of Communication link/system should be monitored and reported on a weekly basis. The format for the same is attached at **Annex L**. States agreed to follow the same.
- It was suggested that states can also interact with Gujarat for installation of Radio Modems, which have helped them in data acquisition from remote locations.
- It was suggested that the states which are facing problems in achieving 100% communication of RE generation data could emulate the approach adopted by the States like Gujarat, Madhya Pradesh, Karnataka, Telangana etc.
- Central Electricity Regulatory Commission (Communication System for inter-State transmission of electricity) Regulations, 2017 which have come into force w.e.f. 1.7.2017 should be followed.

The Meeting ended with a Vote of Thanks to the Chair.

Annex-1

List of Participants (Minutes of the Meeting regarding “Furnishing Real Time / Daily Renewable Energy Generation Data” held at Jaipur, Rajasthan on 04-05-2018 under the Chairmanship of Member (Planning), CEA)

Meeting held on 04.05.2018 at Jaipur regarding “Furnishing Real Time/ Daily Renewable Energy Generation Data”					
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Indicative reference of Appropriate Standards and regulations as regard to Telemetry issues and renewable energy generation data availability at SLDCs, RLDCs and NLDC.

- A. Technical Standards for Connectivity to the Grid, (Amendment), regulations, 2012
- B. Technical Standards for Connectivity of the Distributed Generation Resources
- C. Technical Standards for Connectivity to the Grid, 2007

(ref: <http://www.cea.nic.in/connectivityreg.html>)

D. Indian Electricity Grid Code (www.cercind.gov.in/2016/regulation/9.pdf)

IEGC Regulation 5.2 (u)

System operator (SLDC/ RLDC) shall make ***all efforts to evacuate the available solar and wind power and treat as a must-run station.*** However, System operator may instruct the solar /wind generator to back down generation on consideration of grid security or safety of any equipment or personnel is endangered and Solar/ wind generator shall comply with the same. For this, **Data Acquisition System facility shall be provided for transfer of information to concerned SLDC and RLDC.**

- (i) SLDC/RLDC may direct a wind farm to curtail its VAr drawl/injection in case the security of grid or safety of any equipment or personnel is endangered.
- (ii) During the wind generator start-up, the wind generator shall ensure that the reactive power drawl (inrush currents in case of induction generators) shall not affect the grid performance. "

IEGC Regulation 6.2

*This code also provides the methodology for re-scheduling of wind and solar energy generators which are regional entities, on one and half hourly basis and the methodology of handling deviations of such wind and solar energy generators. Appropriate meters shall be provided for accounting of charges for deviation under DSM Regulations. **Telemetry/communication system & Data Acquisition System shall also be provided for transfer of information to the concerned SLDC and RLDC.***

- E. **Central Electricity Regulatory Commission (Communication System for inter-State transmission of electricity) Regulations, 2017. These regulations have come into force w.e.f. 1.7.2017. (<http://www.cercind.gov.in/2017/regulation/134.pdf>)**

Main provisions:

1. **PERIODIC TESTING OF THE COMMUNICATION SYSTEM:** (i) All users that have provided the communication systems shall facilitate for periodic testing of the communication system in accordance with procedure for maintenance and testing to be prepared by CTU within 60 days of notification of Regulations and approved by Commission. (ii) Testing process for communication network security should also be included even for third party system if exists in accordance with procedure for maintenance and testing to be prepared by CTU and approved by Commission. 10. Periodic Auditing of Communication System: The RPC Secretariat shall conduct performance audit of communication system annually as per the procedure finalised in the forum of the concerned RPC. Based on the audit report. RPC Secretariat shall issue necessary instructions to all stakeholders to comply with the audit requirements within the time stipulated by the RPC Secretariat. An Annual Report on the audit carried out by respective RPCs shall be submitted to the Commission within one month of closing of the financial year.

11. FAULT REPORTING: (i) RLDC and SLDC in case of outage of telemeter data, or communication failure shall inform the respective user so that the user shall ensure healthiness of its communication system. In case outage pertains to fault in communication system of other user, the user shall lodge complaints for failure of the communication to the communication system owner for quick restoration. (ii) The communication provider shall explore the possibility for route diversion on the existing facility in close co-ordination with concerned provider in case the fault restoration is prolonged. No separate charges shall be paid for such route diversion or channel re-allocation. However, such rerouting shall be discontinued once the original channel is restored.

12. COMMUNICATION SYSTEM AVAILABILITY: All users of CTU, NLDC, RLDCs, SLDCs, STUs shall maintain the communication channel availability at 99.9% annually: Provided that with back up communication system, the availability of communication system should be 100%.

Cyber Security: (i) Communication infrastructure shall be planned, designed and executed to address the network security needs as per standard specified by CEA and shall be in conformity with the Cyber Security Policy of the Govt. of India, issued from time to time. (ii) NLDC, shall monitor case of cyber security incidences and discuss them at RPC level and take necessary action as deemed fit. (iii) RPC shall ensure that third party cyber security audits shall be conducted periodically (period to be decided at RPC) and appropriate measures shall be implemented to comply with the findings of the audits. The audits shall be conducted by CERT-In certified third party auditors.

- F. **Central Electricity Authority (CEA) had in exercise of its power conferred by Section 7 and clause (b) of Section 73 read with Sub-section (2) of Section 177 of Electricity Act, 2003, notified the Central Electricity Authority (Technical Standards for Connectivity to Grid) Regulations 2007 on 21st Feb, 2007. These**

Regulations are inter-alia applicable to all the generating projects including the renewables, which are getting connected to the grid at voltage level of 33 kV and above. The pertinent **Clauses 6(3)** and **6(4)(b)** of **General Connectivity Conditions** of the said Regulations are reproduced below for ease of reference:

“ 6(3) – The requester and user shall provide necessary facilities for voice and data communication and transfer of on-line operational data, such as voltage, frequency, line flows, and status of breaker and isolator position and other parameters as prescribed by the Appropriate Load Despatch Centre.

6(4) – The requester and user shall cooperate with the Regional Power Committee, and Appropriate Load Despatch Centres in respect of the matters listed below, but not limited to : -

(b) agree to maintain meters and communication system in its jurisdiction in good condition; “

G. Subsequently, CEA had also notified the Central Electricity Authority (Technical Standards for Connectivity of the Distributed Generation Resources) Regulations, 2013 on 30th Sept, 2013. These Regulations are applicable for “distributed generation resource” which means a generating station feeding electricity into the system at voltage level of below 33 kV. Needless to mention that these Regulations also cover the renewable projects connected to the distribution licensee system at voltage level of below 33 kV. The relevant **Clause 4(4)** of **General Connectivity Conditions** of the said CEA Regulations is reproduced below for ready reference :

“ 4(4) – The applicant and the user shall provide necessary facilities in the distributed generation resource for communication and storage of data and other parameters as may be stipulated by the appropriate licensee in a non-discriminatory manner.”

Address List (Minutes of the Meeting regarding “Furnishing Real Time / Daily Renewable Energy Generation Data” held at Jaipur, Rajasthan on 04-05-2018 under the Chairmanship of Member (Planning), CEA)

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