Sub: **In the matter of Rajasthan Electricity Regulatory Commission (Forecasting, Scheduling, Deviation Settlement and Related Matters of Solar and Wind Generation Sources) Regulations, 2017.**

Date: 14.09.2017

Order-Sheet

80. The GoI has planned for 100 GW of solar and 60 GW of wind power by 2022. Most of the existing Renewable Energy (RE) capacity (mainly wind and solar) comes under the control of the States. In alignment with the above GoI plan and potential available, it is apparent that there will be large additions of Renewable Energy (RE) capacities- wind and solar energy in particular in the country as well as State.

81. Wind and solar energy sources are variable, uncertain and intermittent in nature, which not only poses a challenge to the system operator in operation of the power system but also in maintaining the load-generation balance in it at any given point of time. Thus, integration of variable generation from solar and wind sources is a real challenge for a system operator which is to ensure reliability and security of the power system. In order to facilitate large scale integration of generation from such sources, the Forecasting and Scheduling of electricity generated from these sources is needed.

82. In order to overcome the difficulties in managing variable RE power, CERC has also notified the Framework on Forecasting, Scheduling and Imbalance Handling for Variable RE Sources (Wind and Solar) on 7.08.2015 by making the following Amendments to the Indian Electricity Grid Code (IEGC) and the DSM Regulations:

- Central Electricity Regulatory Commission (Indian Electricity Grid Code) (Third Amendment) Regulations, 2015.

- Central Electricity Regulatory Commission (Deviation Settlement Mechanism and related matters) (Second Amendment) Regulations, 2015.

83. With CERC Framework already in place, a similar framework at the State level is also desirable in order to accommodate integration of the RE Capacity in the State. The implementation of such Framework at the State level would bring in synergy and optimization in harnessing the wind and solar power generation. Further, Rajasthan is a RE rich State having vast potential for solar power and wind power. In order to facilitate smooth and seamless integration of such sources with the State grid, Commission proposed to frame the Rajasthan Electricity Regulatory Commission (Forecasting, Scheduling, Deviation Settlement and Related Matters of Solar and Wind Generation Sources) Regulations, 2016.

84. The draft Regulations along with Explanatory Memorandum and Public Notices were placed on the website of the Commission for inviting objections/suggestions from the persons likely to be affected. Further, the Public Notices were also published in the following newspapers

S.No.	Name of News Paper	Date of Publication
1.	Dainik Bhaskar	18.02.2016
2.	Dainik Navjyoti	18.02.2016
3.	The Times of India	18.02.2016

85. The last date for submission of objections/suggestions was kept as 08.03.2016.

86. In all, 20 (Twenty) written objections/suggestions, were received on the draft Regulations. The objections/suggestions received are placed in the file.

87. The Commission has considered carefully each of the objection/suggestions received and the provisions of the Electricity Act, 2003 while finalizing the Regulations.

88. Accordingly, the Rajasthan Electricity Regulatory Commission (Forecasting, Scheduling, Deviation Settlement and Related Matters of Solar and Wind Generation Sources) Regulations, 2017 are finalized. The same are placed in the file for issue and publication in the Official Gazette.

Sd/-	Sd/-	Sd/-
(S.C. Dinkar) Member	(R. P. Barwar) Member	(Vishwanath Hiremath) Chairman

RAJASTHAN ELECTRICITY REGULATORY COMMISSION

NOTIFICATION

JAIPUR, 14th September, 2017

No. RERC/Secy./Regulation - …….

In exercise of the powers conferred under Section 181 of the Electricity Act, 2003 and all powers enabling it in this behalf, the Rajasthan Electricity Regulatory Commission makes the following Regulations to facilitate large-scale grid integration of solar and wind generating stations while maintaining grid stability and security as envisaged under the IEGC/REGC, through forecasting & scheduling and providing commercial mechanism for Deviation Settlement of these generators, namely:

1. **Short title and commencement**

(1) These Regulations may be called the Rajasthan Electricity Regulatory Commission (Forecasting, Scheduling, Deviation Settlement and Related Matters of Solar and Wind Generation Sources) Regulations, 2017.

(2) These Regulations shall come into force from the date of their publication in the official gazette**.**

Provided that the commercial mechanism of these Regulations shall come into force from the first (1st) day of January,2018.

2. **Definitions and Interpretation**

(1) In these regulations, unless the context otherwise requires,-

(a) **'Absolute Error'** means the absolute value of the error in the actual generation of wind or solar generators with reference to the scheduled generation and the 'Available Capacity' (AvC), as calculated using the following formula for each 15 minute time block:
Error (%) = 100 X [Actual Generation– Scheduled Generation] / (AvC) ;

(b) **'Act'** means the Electricity Act, 2003 (36 of 2003) and Amendments thereto;

(c) **'Actual drawal'** in a time-block means electricity in MW or MWh ex-bus drawn by a buyer, as the case may be, measured by the interface meters;

(d) **'Actual injection/generation'** in a time-block means electricity in MW or MWh ex-bus generated or supplied by the seller, as the case may be, measured by the Interface meters;

(e) **'Available Capacity or AvC'** for wind or solar generators means the cumulative capacity rating of the wind turbines or solar inverters that are capable of generating power in a given time-block;

(f) **'Beneficiary'** means a person procuring electricity generated from a solar or wind generating station including solar/wind captive generating station;

(g) **'Buyer'** means a person, including beneficiary, purchasing electricity through a transaction scheduled in accordance with the regulations applicable for short-term, medium-term and long-term open access;

(h) '**CERC**' means the Central Electricity Regulatory Commission referred to in sub-section (1) of section 76 of the Act;

(i) '**Deviation**' in a time-block for a seller means its total actual injection minus its total scheduled generation and for a buyer means its total actual drawal minus its total scheduled drawal;

(j) '**Gaming**' in relation to these regulations, shall mean an intentional mis-declaration of available capacity or schedule by any seller in order to make an undue commercial gain through Charge for Deviations;

(k) '**IEGC**' means the Grid Code specified by Central Commission under clause (h) of sub-section (1) of Section 79 of the Act;

(l) '**Interface Meters**' means interface meters as defined by the Central Electricity Authority under the Central Electricity Authority (Installation and Operation of Meters) Regulations, 2006, as amended from time to time;

(m) **'Intra-State Entity'** means an entity which is in the SLDC control area and whose metering and energy accounting is done at the State level;

(n) '**Pooling Station**' means the sub-station where pooling of generation of individual wind generators or solar generators is done for interfacing with the grid/transmission or distribution system:

Provided that where there is no separate pooling station for a wind / solar generator and the generating station is connected through common/dedicated feeder and terminated at a sub-station of distribution company/STU, the sub-station of distribution company/STU shall be considered as the pooling station for such wind/solar generator, as the case may be;

(o) **'Qualified Coordinating Agency or QCA'** means the mutually agreed agency registered with SLDC, to act as a coordinating agency on behalf of Wind/Solar Generators connected to a pooling station and may be one of the generators;

(p) '**Regional Entity'** means such persons who are in the RLDC control area and whose metering and energy accounting is done at the regional level;

(q) '**REGC/State Grid Code**' means the Grid Code specified by Rajasthan Electricity Regulatory Commission under clause (h) of sub-section (1) of Section 86 of the Act;

(r) '**Scheduled Generation'** at any time or for a time block or any period means schedule of generation in MW or MWh ex-bus ;

(s) '**Scheduled drawal'** at any time or for a time block or any period time block means schedule of despatch in MW or MWh ex-bus;

(t) **'Seller'** means a person, including a generating station, either selling electricity to Distribution Licensee or supplying electricity for captive use or through a transaction scheduled in accordance with the Regulations applicable for short-term, medium-term and long-term open access;

(u) **'State Commission'** means Rajasthan Electricity Regulatory Commission;

(v) '**State Pool Account**' means State account for receipts and payments on account of deviation by buyers or sellers including wind and solar generators and shall be maintained by SLDC;

(w) **'State Load Despatch Centre or SLDC'** means Load Despatch Centre of the State, established under sub-section (1) of Section 31 of the Act, responsible for coordinating scheduling of the State entities in accordance with the provisions of the REGC Code;

(x) '**Time-block'** means a time block of 15 minutes, for which specified electrical parameters and quantities are recorded by special energy meter, with first time block starting at 00.00 hrs;

(2) Save as aforesaid and unless repugnant to the context or the subject matter otherwise requires, words and expressions used in these Regulations and not defined, but defined in the Act, or the State Grid Code or any other Regulations of this Commission, shall have the meaning assigned to them respectively in the Act or the REGC or any other Regulation.

PART-1

GENERAL:

3. **Applicability of the Regulations**:

(1) For wind power generators supplying power to the Discoms, or to the third party consumers through Open Access (OA) or for captive consumption through OA within or outside the State:

(a) Wind power generators having individual or combined capacity of 5 MW and above whether connected to the State Grid independently or through pooling stations;

(b) Wind power generators of any capacity connected to the State Grid through pooling station with total capacity of 5 MW and above.

(2) For solar power generators supplying power to the Discoms, or to the third party consumers through Open Access (OA) or for captive consumption through OA within or outside the State:

(a) Solar power generators having Individual or combined capacity of 5 MW and above whether connected to the State Grid independently or through pooling stations and/or solar parks;

(b) Solar power generators of any capacity connected to the State Grid through pooling station and /or solar park with total capacity of 5 MW and above.

Provided that the charges payable for deviation from schedule by the wind and solar generators which are regional entities shall be accounted for and settled in accordance with the provisions of the Central Electricity Regulatory Commission (Deviation Settlement Mechanism and related matters) Regulations, 2014 as amended from time to time:

Provided further that these Regulations may be applied to RE generators with new technologies as considered appropriate by the Commission over the time.

PART – 2

ROLE OF QUALIFIED COORDINATING AGENCY (QCA):

4. The Qualified Coordinating Agency (QCA) as defined at Regulation 2(1)(o) shall be nominated based on consensus and mutually agreed terms and conditions amongst the wind and solar generators. The wind and solar generators shall also inform SLDC to this effect. QCA shall be the single point of contact with SLDC on behalf of its coordinated generator(s) connected to a pooling station for the following purposes:
   (1) Provide schedules with periodic revisions as per these Regulations on behalf of all the Wind/Solar Generators connected to the pooling station.
   (2) Responsible for coordination with STU/SLDC and other agencies for metering, data collection and its transmission, communication.
   (3) Undertake commercial settlements on behalf of the generators, of such charges pertaining to generation deviations only including payments to the State pool account through the concerned SLDC.
   (4) Undertake de-pooling of payments received on behalf of the generators from the State Pool account and settling them with the individual generators in accordance with these Regulations.
   (5) Undertake commercial settlement of any other charges on behalf of the generators as may be mandated from time to time.
   (6) All other ancillary and incidental matters.

QCA shall be treated as an intra-state entity for the purpose of these Regulations.

5. Each pooling station shall have one QCA. However, in case a particular solar or wind generator alone is connected to a pooling station, then such generator shall act as a QCA. .

FORECASTING AND SCHEDULING:

6. These Regulations provide methodology for day-ahead scheduling of wind and solar energy generators which are connected to the State grid and the methodology of handling deviations of such wind and solar energy generators. Appropriate meters shall be provided by STU at the cost of intra-state entities for energy accounting. Telemetry/communication system & Data Acquisition System as may be required by SLDC shall also be provided by the generator concerned for transfer of information to the SLDC.

7. Forecasting shall be done by wind and solar generators connected to the State Grid or by QCAs on their behalf. The SLDC shall also undertake forecasting of wind and solar power that is expected to be injected into the State grid. The forecast by the SLDC shall be with the objective of ensuring secure grid operation by planning for the requisite balancing resources. The forecast by the QCA or wind and solar generator, as the case may be, shall be generator centric. The QCA or wind and solar generators will have the option of accepting the SLDC's forecast for preparing its schedule or providing a schedule to the SLDC based on their own forecast. The QCA shall coordinate the aggregation of schedules of all generators connected to a pooling station and communicate it to the SLDC.

8. The QCA or the wind and solar generator shall submit a day-ahead schedule for each pooling station or each generating station, as the case may be. Day-ahead schedule shall contain wind or solar energy generation schedule at intervals of 15 minutes (time-block) for the next day, starting from 00:00 hours of the day, and prepared for all 96 time-blocks.

   Provided that the wind and solar generators, as the case may be, having multiple transaction under Power Purchase Agreement and intra-state and/ or inter-state Open Access with a common interface meter shall submit schedules with respect to such approved capacities allocated and such capacities alone shall be treated as available capacities ($A_V Cs$) for the purpose of transactions under this Regulation.

9. The schedule of wind and solar generators connected to the State grid (excluding collective transactions) may be revised by giving advance notice to the SLDC. Such revisions shall be effective from 4th time block, the first being the time-block in which notice was given. There may be one revision for each time slot of one and half hours starting from 00:00 hours of a particular day subject to a maximum of 16 revisions during the day.

10. Any commercial impact on account of deviation from schedule based on the forecast shall be borne by the wind and solar generator, either directly or transacted via the representing QCA**.**

Part-3

METERING, TELEMETRY AND DATA COMMUNICATION:

11. Wind and Solar generators covered under these Regulations shall be governed by interface metering with a provision for recording and storing all the load survey and billing parameters for every 15-minute time block. Monthly meter readings shall be forwarded to the SLDC in addition to data acquisition through SCADA for energy accounting.

12. Data telemetry shall be adopted at the turbine/inverter or plant level as considered appropriate by SLDC. Wind and Solar generators, represented via Qualified Coordinating Agencies (QCAs), shall mandatorily provide to the SLDC, in a format prescribed by SLDC, the technical specifications at the beginning and whenever there is any change. The data relating to power system output & parameters and weather related data as applicable or any other data as directed by SLDC shall be mandatorily provided by such generators or QCA to the SLDC in real time:

    Provided that the full data telemetry and communication facilities shall be provided by the wind and solar generator or QCA whose scheduling is done by SLDC.

13. The plan for data telemetry, Communication requirement, formats of forecast submission and other details in this regard shall be provided in the Detailed Procedure prepared by SLDC and approved by the Commission**.**

PART – 4

COMMERCIAL AND DEVIATION SETTLEMENT:

14. The Deviation Settlement Mechanism (DSM) specified under these Regulations shall be applicable to all wind and solar generators covered under these Regulations and connected to the State Grid.

15. The wind or solar generators connected to the State grid and selling power within the State shall be paid by the buyer as per actual energy supplied irrespective of quantum of energy scheduled by it. However, the wind and solar generators connected to the State Grid and selling power outside the State shall be paid by the buyer as per scheduled generation.

16. The wind and solar generator or the QCA, as the case may be, shall provide SLDC with a schedule based on its own forecast or SLDC's forecast, and such schedule shall be used as reference for deviation settlement.

17. The QCA shall undertake commercial settlements related to deviations on behalf of the generator(s) connected to the respective pooling station(s) on a monthly basis. The deviation accounting and settlement shall take place at the pooling station level before the end of succeeding month.

18. In the event of actual generation of a generating station or a pooling station, as the case may be, being less or more than the generation scheduled as per Regulation 16 above, the deviation charges for shortfall or excess generation shall be payable by the wind and solar generator or the QCA, as the case may be, to the State Pool, as prescribed in Table – I below:

Table – I: Deviation Charges in case of under or over-injection for sale of power within the State

S. No.	Absolute Error in the 15-minute time block	Deviation charges payable to the State DSM pool
1.	<=15%	None
2.	>15% but <=25%	At Rs. 0.50 per unit for the shortfall or excess of energy for absolute error beyond 15% and upto 25%
3.	>25% but <=35%	At Rs. 0.50 per unit for the shortfall or excess energy beyond 15% and upto 25% + Rs. 1.0 per unit for balance energy beyond 25% and upto 35%
4.	>35%	At Rs. 0.50 per unit for the shortfall or excess

S. No.	Absolute Error in the 15-minute time block	Deviation charges payable to the State DSM pool
		energy beyond 15% and upto 25% + Rs. 1.0 per unit for shortfall or excess energy beyond 25% and upto 35% + Rs. 1.50 per unit for balance energy beyond 35%.

Provided that deviation charges for under or over injection by wind or solar generator connected to the State grid and selling power outside the State shall be paid or received as per the framework provided in **Appendix – I**. The accounting for this purpose shall be done by the SLDC.

19. The QCA shall also de-pool the energy deviations as well as deviation charges to each generator on the basis of the deviation of each generator or any other methodology /criteria mutually agreed between QCA and generators.

20. Once the accounting procedures as above are put in place, all solar and wind generators shall be treated together as a virtual pool within the State Pool. Deviations for and within this virtual pool shall be settled first at the rates and methodology stipulated above for wind and solar generators.

21. Monthly accounts as mentioned above shall be prepared by the SLDC. The wind and/or solar or QCA or SLDC, as the case may be shall separately account the deviations for multiple transactions under PPA and/or intra-state and/or inter-state Open Access.

22. The State Load Despatch Centre shall maintain separate records and account of time-block wise schedules, actual generation and deviations for all generators, including wind and solar generators.

23. The guidelines in respect of payment mechanism, payment security, curtailment and other matters incidental to these Regulations shall be as provided in the detailed procedure provided by SLDC under **Regulation 13** of these Regulations

PART – 5

MISCELLANEOUS:

24. **Power to Relax**

The Commission may by general or special order, for reasons to be recorded in writing, and after giving an opportunity of hearing to the parties likely to be affected by grant of relaxation, may relax any of the

provisions of these regulations on its own motion or on an application made before it by an interested person.

25. **Power to issue directions**
If any difficulty arises in giving effect to these regulations, the Commission may on its own motion or on an application filed by any affected party, issue such directions as may be considered necessary in furtherance of the objective and purpose of these Regulations.

26. **Power to amend**
The Commission may, at any time, vary, alter, modify or amend any provision of these Regulations.

By Order

(Himanshu Khurana)
Secretary

Appendix –I

Framework for deviation charges for under or over injection by generator connected to the State grid and selling power outside the State

The wind or solar generators connected to the State grid and selling power outside the State boundary shall be settled as per scheduled generation.

a) In the event of actual generation being less than the scheduled generation, the deviation charges for shortfall in generation shall be payable by such wind or solar generator, or the QCA on their behalf, to the State Pool Account as given in Table – I below:

Table – I: Deviation Charges in case of under injection

Sr. No.	Absolute Error in the 15-minute time block	Deviation Charges payable to State DSM Pool
1.	< = 15%	At the Fixed Rate for the shortfall energy for absolute error upto 15%
2.	>15% but <= 25%	At the Fixed Rate for the shortfall energy for absolute error upto 15% + 110% of the Fixed Rate for balance energy beyond 15% and upto 25%
3.	>25% but <=35%	At the Fixed Rate for the shortfall energy for absolute error upto 15% + 110% of the Fixed Rate for balance energy beyond 15% and upto 25% + 120% of the Fixed Rate for balance energy beyond 25% and upto 35%
4.	> 35%	At the Fixed Rate for the shortfall energy for absolute error upto 15% + 110% of the Fixed Rate for balance energy beyond 15% and upto 25% + 120% of the Fixed Rate for balance energy beyond 25% and upto 35% + 130% of the Fixed Rate for balance energy beyond 35%

Where the Fixed Rate is the PPA rate as determined by the Appropriate Commission under section 62 of the Act or adopted by the Appropriate Commission under section 63 of the Act. In case of multiple PPAs, the weighted average of the PPA rates shall be taken as the Fixed Rate. The wind and solar generators shall furnish the PPA rates on affidavit for the purpose of Deviation charge account preparation to respective SLDC supported by copy of the PPA.

Fixed Rate for Open Access participants selling power which is not accounted for RPO compliance of the buyer, and the captive wind or solar plants shall be the Average Power Purchase Cost (APPC) rate at the

National level, as determined by CERC from time to time. For this purpose, the State Commission may also determine any other rate as and when considered appropriate, in that case the same shall be applicable.

b) In the event of the actual generation being more than the scheduled generation, the Deviation Charges for excess generation shall be payable to the wind or solar generator, or the QCA on their behalf, from the State Pool Account as given in Table – II below:

Table – II: Deviation Charges in case of over injection

Sr. No.	Absolute Error in the 15-minute time block	Deviation Charges payable
1	< = 15%	At the Fixed Rate for excess energy upto 15%
2	>15% but <= 25%	At the Fixed Rate for excess energy upto 15% + 90% of the Fixed Rate for excess energy beyond 15% and upto 25%
3	>25% but <=35%	At the Fixed Rate for excess energy upto 15% + 90% of the Fixed Rate for excess energy beyond 15% and upto 25% + 80% of the Fixed Rate for excess energy beyond 25% and upto 35%
4	> 35%	At the Fixed Rate for excess energy upto 15% + 90% of the Fixed Rate for excess energy beyond 15% and upto 25% + 80% of the Fixed Rate for excess energy beyond 25% and upto 35% + 70% of the Fixed Rate for excess energy beyond 35%.

Where the Fixed Rate is the PPA rate as determined by the Appropriate Commission under section 62 of the Act or adopted by the Appropriate Commission under section 63 of the Act. In case of multiple PPAs, the weighted average of the PPA rates shall be taken as the Fixed Rate. The wind and solar generators shall furnish the PPA rates on affidavit for the purpose of Deviation charge account preparation to respective SLDC supported by copy of the PPA.

Fixed Rate for Open Access participants selling power which is not accounted for RPO compliance of the buyer, and the captive wind or solar plants shall be the Average Power Purchase Cost (APPC) rate at the National level, as determined by the CERC from time to time. For this purpose, the State Commission may also determine any other rate as and when considered appropriate, in that case the same shall be applicable.
