



ಕರ್ನಾಟಕ ರಾಜ್ಯಪತ್ರ

ಅಧಿಕೃತವಾಗಿ ಪ್ರಕಟಿಸಲಾದುದು

ಬೆಂಗಳೂರು ರಾಜ್ಯ ಪತ್ರಿಕೆ

ಭಾಗ- IV-A	ಬೆಂಗಳೂರು, ಮಂಗಳವಾರ, ನವೆಂಬರ್ ೧೭, ೨೦೧೫ (ಕಾರ್ತೀಕ ೨೬, ಶಕ ವರ್ಷ ೧೯೩೭)	ನಂ. ೧೩೮೮
Part- IV-A	Bengaluru, Tuesday, November 17, 2015 (Kartheka 26, Shaka Varsha 1937)	No. 1388

**Karnataka Electricity Regulatory Commission
Bengaluru-560 001**

Draft Notification No. CT/01/15 dated 16th November, 2015

The Karnataka Electricity Regulatory Commission, in exercise of powers conferred under Section 181 of the Electricity Act, 2003(36 of 2003), and all other powers enabling it in this behalf, here by makes the following Regulations, namely, "Karnataka Electricity Regulatory Commission (Forecasting, Scheduling, Deviation settlement and related matters for Wind and Solar Generation sources) Regulations, 2015".

As required under Sub-Section (3) of Section 181 of the Electricity Act, 2003 the draft of the proposed Regulations is here by published for information of the general public and all stake holders and notice is hereby given that the draft Regulations will be taken in to consideration after **30 days** from the date of its publication in the **Official Gazette**. Any objections/ suggestions/views on the proposed draft shall be furnished within **30 days** from the date of its publication to the Secretary at the following address:

The Secretary
Karnataka Electricity Regulatory Commission.
No. 9/2, 7th Floor Mahalakshmi Chambers
Mahatma Gandhi Road.
BENGALURU - 560001

Preamble:

The percentage share of wind Energy in Karnataka is about 15.94 % of total installed capacity of 15052 MW including the State's share from CGS in the State as on 31-03-2015. More wind generation capacity is being added every year. The installed capacity of solar generation in the State is about 83 MW and another about 800 - 1000 MW capacity is proposed to be added during FY16 and FY17. A big solar power park of 2000 MW capacity is proposed to be established in Pavagada Taluka of Tumukuru district of the State.

Karnataka State is having substantial agricultural loads and these loads will be minimum (sometimes zero) during monsoon season when the wind generation will be maximum. During this period, the system loads in the Karnataka will be minimum and further there will be substantial quantum of generation from the mini and major hydro plants under normal monsoon conditions. In the last two years, many of the wind generation plants were backed down during high wind and low load monsoon periods for the grid operational issues of high system frequency. The problem will become more acute in the coming years due to addition of more wind and large scale solar power generation. The wind generation is infirm power and there will be frequent ramp up and ramp down in its generation due to varying wind speed. The thermal plants generation cannot be reduced below certain capacity due to technical reasons. Grid operation becomes a big challenge when facilitating large scale integration of variable nature of Renewable Energy Sources (RES), like wind and solar without compromising on the stability and security of the Grid. Moreover, the entire Country is deploying strict grid disciplinary measures and moving towards a tighter operational frequency band. At present the wind, solar and other RES generators (excluding Bio-mass and Co-generation plants of 25 MW & above) are exempted from the purview of Unscheduled Interchange (UI) and Deviation Settlement Mechanism (DSM) within the State. In the circumstances, it is essential that

the Grid operator has information in advance regarding the quantum of wind and solar energy expected to be injected into the grid, for maintaining the grid stability and security as envisaged under IEGC and KEGC (Karnataka Electricity Grid Code). Hence it is found necessary to formulate Karnataka Electricity Regulatory Commission (**Forecasting, Scheduling, Deviation settlement and related matters for Wind and Solar Generation sources**) Regulations, 2015 for the optimal utilization of wind and solar generations.

1.0. Title and commencement -

- (1) These Regulations may be called the Karnataka Electricity Regulatory Commission (**Forecasting, Scheduling, Deviation settlement and related matters for Wind and Solar Generation sources**) Regulations, 2015.
- (2) These Regulations shall come into force from the date of their publication in the Karnataka Gazette.

2.0. Definitions and interpretation -

- (1) In these Regulations, unless the context otherwise requires -
 - (a) **'Act'** means The Electricity Act, 2003;
 - (b) **'Actual Drawal'** in a time block of 15 minutes means electricity drawn by a buyer, as the case may be, measured at the interface meters;
 - (c) **'Actual injection'** in a time block of 15 minutes means electricity generated or supplied by the seller, as the case may be, measured by interface meters;
 - (d) **'Aggregator'** means an entity registered with SLDC/RLDC to provide aggregation of one or more services like Providing schedules with periodic revisions as per this Regulations, being responsible for metering, data collection & transmission, communication, coordination with DISCOMs, RLDC, SLDC, RPC and other agencies, undertaking commercial settlement of all the charges on behalf of wind and solar generators including payments to the regional / State UI pool accounts through the concerned RLDC/SLDC and undertaking commercial settlement of any other charges on behalf of **wind and solar** generators as may be mandated from time. Aggregator may be one of the generators or any other mutually agreed agency registered with SLDC;
 - (e) **'Beneficiary'** means a person purchasing electricity generated from a generating station;
 - (f) **'Buyer'** means a person, including a beneficiary, purchasing electricity through a transaction schedule in accordance with the Regulations applicable for short term, medium term and long term open access;
 - (g) **'CERC'** means the Central Electricity Regulatory Commission referred to in sub section(1) of Section 76 of the Act;
 - (h) **'Deviation'** in a time block, for a seller means his total actual injection of energy minus his total scheduled generation and for a buyer means his total actual drawal of energy minus his total scheduled drawal;
 - (i) **'% Error'** means the absolute value of the error in the actual generation of wind or solar power generators with reference to the scheduled generation as calculated using the following formula for each 15 minutes time block;

$$\% \text{ Error} = \frac{(\text{Actual Generation} - \text{Scheduled Generation}) \times 100}{(\text{Scheduled Generation})}$$

- (j) **'Gaming'** in relation to these Regulations means, 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) **'KEGC'** means the Karnataka Electricity Grid Code specified by the Karnataka Electricity Regulatory Commission under clause (h) of sub Section 86 of the Act;
- (l) **'IEGC'** means the Grid code specified by the CERC under clause (h) of sub Section(1) of Section 79 of the Act;
- (m) **'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;
- (n) **'Open Access Regulations'** means the Central Electricity Regulatory Commission (Open Access in inter- State Transmission) Regulations, 2008 as amended from time to time;
- (o) **'Pool Account'** means the State's account for receipts and payments on account of deviation by buyers or sellers including wind and solar generators, and it shall be maintained by the SLDC;

- (p) **'Pooling station'** means the substation where pooling of generation of individual wind generators or solar generators is done for interfacing with next higher voltage level, provided that where there is no separate pooling station for a wind / solar generator and the generating station is connected through common feeder and terminated at a substation of ESCOM (Electricity Supply Company) / STU (State Transmission Utility) / CTU (Central Transmission Utility), the substation of ESCOM / STU/CTU shall be considered as the pooling station for such wind and solar generator as the case may be;
- (q) **'Qualified Coordinating Agency (QCA)'** means the agency coordinating on behalf of wind or solar generators connected to a pooling station and shall be deemed to be a state entity. QCA may be one of the generator or any other mutually agreed agency for the following purposes:
- (i) Providing schedules with periodic revisions as per these Regulations, on behalf of all the wind and solar generators connected to the pooling station.
 - (ii) Being responsible for metering, data collection & transmission, communication, coordination with DISCOMs, RLDC, SLDC, RPC and other agencies.
 - (iii) Undertaking commercial settlement of all the charges on behalf of wind and solar generators including payments to the regional / State UI pool accounts through the concerned RLDC/SLDC.
 - (iv) Undertaking de-pooling of payments received on behalf of the wind and solar generators from the Regional / State UI pool and settling them with individual generator.
 - (v) Undertake commercial settlement of any other charges on behalf of generators as may be mandated from time;
- (r) **'Regional Load Dispatch Center (RLDC)'** means the Regional Load Dispatch Centre established under sub Section (1) of Section 27 of the Act, responsible for coordinating scheduling of regional entities in accordance with the provisions of IEGC;
- (s) **'Regional Pool Account'** means the regional account for receipts and payment regarding (i) UI account (ii) Reactive energy exchanges (iii) Congestion charges, as the case may be;
- (t) **'Scheduled generation'** at any time or for a time block or any period means schedule of Generation in MW or MWh or kWh ex-bus given by the SLDC (State Load Dispatch Center);
- (u) **'Scheduled drawal'** at any time or for a time block or any period means schedule of dispatch in MW or MWh or kWh ex-bus given by the concerned Load Dispatch Centre;
- (v) **'Seller'** means a person including a generating station, supplying electricity through transaction schedule in accordance with the Regulations applicable for a short term, medium term and long term open access;
- (w) **'State Commission'** means the Karnataka State Electricity Regulatory Commission;
- (x) **'State Entity'** means an entity which is in the SLDC control area and whose metering and energy accounting is done at the State level;
- (y) **'State Load Dispatch Centre (SLDC)'** means Load Dispatch Centre of the State, established under sub Section(i) of Section 31 of the Act, responsible for coordinating scheduling of the State entities in accordance with the provisions of the KEGC;
- (z) **'Time - Block'** means a time block of 15 minutes for which specified electrical parameters and quantities are recorded by special energy meter with the 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 any other Regulations of KERC or the KEGC shall have the meaning assigned to them respectively in the Act or any other Regulation or KEGC

Part -1

3.0. General-

3.1. **Objective-**The objective of these Regulations is to facilitate large scale integration of Wind and Solarpower while maintaining the grid stability, reliability and security as envisaged under Grid Code, through forecasting, scheduling and commercial mechanism for deviation settlement of Wind and Solar generators.

3.2. Applicability-

These Regulations are applicable to:

- (a) All Wind Generators having a combined installed capacity of 10 MW and above at the pooling station whether they are supplying power to ESCOMs or to third party consumers through open access or for captive consumption through open access within or outside the State.
- (b) All Solar Generators with an installed capacity of 5 MW and above at the pooling station whether they are supplying power to ESCOMs or to third party consumers through open access or for captive consumption through open access within or outside the State.

Part-2

4.0. Forecasting and Scheduling-

The forecasting is an estimation of probable generation of wind and solar power plants. Forecasting is an essential pre-requisite for scheduling of the **wind and solar** generation.

4.1. The existing wind and solar power plants shall, either by themselves **or** through QCAor through an Aggregator establish forecasting tools within three months from the date of publication of theseRegulations in the officialGazette.

4.2. All the new wind and solar generators shall either by themselves **or** through QCA or through an Aggregator, establish forecasting toolsbefore commissioning of their plants and connecting to the Stategrid.

4.3. Alternatelyservices of REMCs (Renewable Energy Management Centers)may be availed by both existing and new wind and solar generators for installing forecasting tools and forecasting their generation schedules.

4.4. The forecast by the wind and solar generators shall be wind-farm/solar facility centric and shall form the basis of scheduling

4.5. The wind and solar power generators shall, either by themselves **or** through QCAor through an Aggregator, furnish week ahead, day ahead and intraday generation schedules for each pooling station or each generating station as the case may be, by using respective forecasting tools at their wind-farm / solar facility centric to the SLDC.The day-ahead forecast shall include wind and solar energy generation forecast at regular intervals of 15 minutes time block for the next day from 00:00 hours of the day for all the 96 numbers of 15 minutes time blocks. Week ahead forecast shall contain the same information for the next seven days.

4.6. Frequency of Revisions -

The Wind and Solar generators are permitted to revisethe dayahead schedules for a maximum of 16 revisions during the intraday, one each in one and half hour time slot starting from 00:00 hours during the day with prior notice of at least 60 minutes for each revision.

4.7. Priority for RES generation schedule:

The wind, solar power and other RES shall be given first priority in generation scheduling and dispatching under normal power system operating conditions.

4.8. The Grid operator (SLDC) shall consider the forecasted wind and solar, power generation in the midterm to long term, day-ahead and intra-day operation planning processes of scheduling and fully make use of the flexibility from conventional power plants as well as the capacity of inter grid tie-lines to accommodate the maximum wind and solar power while maintaining system security, stability and reliability.

4.9. The Principal generator/ QCA/Aggregator involved for connectivity, long-term open access and medium-term open access in intra-State transmission and related matters including long term agreements with ESCOMs shall undertake all operational and commercial responsibilities for the wind and solar generating stations.

4.10. Any commercial impact on account of deviation from the schedule based on the forecast, shall be borne by the wind and solar generators, either directly or the QCA or the aggregator when transacted through him.

Part-3

5.0. Metering and sharing of data / Telemetry -

5.1. Metering:

SEMs (**Special Energy Meters 0.2s class of accuracy**) shall be provided at the pooling station of wind and solar power plants, with a provision for recording and storing all the load survey and billing parameters for every 15 minutes interval block period. Monthly meter readings shall be forwarded to the SLDC in addition to data acquisition through SCADA, for energy accounting.

5.2. Telemetry-

Data telemetry shall be adopted at the turbine/inverter level. Parameters such as turbine availability, power output and real-time weather measurements (wind speed, temperature, pressure etc) shall be provided by each wind and solar Principal generator or QCA or Aggregator

5.3. Communication-

- (i) The wind and solar Principal generator or QCA or Aggregator whose scheduling is done by the SLDCs, shall provide full data telemetry and communication facilities to the concerned SLDC.
- (ii) A preparatory window shall be provided by SLDC for the wind and solar Principal generator or QCA or Aggregator to ensure installation of **data measurement and telemetry equipment** and for SLDCs to prepare their systems and teams for receipt of regular data and schedules.

5.4. Procedure for data telemetry and communication requirements-

The SLDC shall evolve the detailed procedure for data telemetry and communication requirements, publish it on their website to solicit public comments and seek necessary approval of the Commission for such procedure within two months from the publication of these Regulations in the official Gazette.

Part-4

6.0. Compliance to Technical Standards-

All wind and solar generators shall comply with the technical standards such as for fault ride through, etc. as per the CEA (**Technical Standards for Connectivity of the Distributed Generation Resources**) Regulations, 2013, whose scheduling is done by the SLDC.

Part-5

7.0. Deviation Settlement Mechanism for wind and solar generators- The wind and solar generators shall henceforth be under purview of DSM.

7.1. Computation of error quantity-

The following formula shall be adopted for this purpose:

$$\% \text{ Error (deviation)} = \frac{(\text{Actual Generation} - \text{Scheduled Generation}) \times 100}{(\text{Scheduled Generation})}$$

7.2. Tolerance limits and deviation bands:

The permissible deviation for all the wind and solar plants shall be **± 15 %** (with in the limits of >85% & <115%) of the schedule. There shall not be any DSM charges, if the deviation of generation is within the specified limits of **± 15 %** (ie between 85% to 115% of schedule).

7.3. The energy charges shall be paid to the generators as per the actual energy supplied, irrespective of the schedule quantum of energy.

7.4. DSM charges in case of deviations beyond the permissible limits:

Wind and Solar generators having PPA with ESCOMs or directly supplying power to consumers within or outside the State by availing Open access for wheeling the power, shall be liable to pay to DSM pool account for any deviations of the schedules at the rates shown in the following table:

Sl No	Particulars	Deviation range		Payment to DSM account by generators
1	For wind and solar generators having PPAs with ESCOMs and / or supplying power to consumers availing open access facilities for wheeling the power within or outside the State	$> \pm 15\%$	$\leq \pm 25\%$	Rs 0.50 per kWh for the quantum of short fall or excess energy beyond $\pm 15\%$ and up to $\pm 25\%$ % of deviation from the schedule (ie $\pm 10\%$ above tolerable limits of $\pm 15\%$)
2		$> \pm 25\%$	$\leq \pm 35\%$	Rs 0.50 per kWh up to $\pm 25\%$ % deviation + (plus) Rs 1.0 per kWh for the remaining quantum of short fall or excess of energy for deviation from schedule beyond $\pm 25\%$ & up to $\pm 35\%$ %
3		more than $> \pm 35\%$		Rs 0.50 Ps per kWh up to $\pm 25\%$ % deviation + (plus) Rs 1.0 per kWh for the remaining quantum of short fall or excess of energy from deviation to schedule beyond $\pm 25\%$ % up to $\pm 35\%$ + (plus) Rs 1.50 per kWh for the quantum of short fall or excess of energy beyond $\pm 35\%$ % deviation from schedule

7.5. The SLDC shall maintain the pool account of collection of the DSM charges.

8.0. Schedule of payment of charges for deviation-

- (a) The payment of charges for deviation shall have a high priority and the concerned constituent shall pay the indicated amounts, within 10 (ten) days of the issue of Statement of charges for deviation by the SLDC, into to the 'State Deviation Pool Account Fund'.
- (b) If the payments against the Charges for Deviation are delayed by more than two days i.e., beyond 10 (Ten) days from the date of issue of the Statement by SLDC the defaulting constituent shall have to pay simple interest at 0.04% for each day of delay.

9.0. Application of fund collected through Deviations-

The amount collected in the Deviation Pool Account Fund by the SLDC as on last day of the financial year shall be transferred to a separate Fund called as 'Power System Development Fund' to be utilized for the purpose as specified by the State Commission.

10.0. Power to relax-

The State Commission may by general or special order for reasons to be recorded in writing and after giving an opportunity to the parties concerned likely to be affected by grant of any 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.

11.0. Power to issue directions-

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

12.0. Miscellaneous -

The provisions in these Regulations -

- (a) are in addition to and not in derogation of the KERC ORDER No. B/09/5 dated 20th June, 2006 on intra State ABT; and
- (b) shall have full effect notwithstanding any inconsistency contained in the KERC ORDER No. B/09/5 dated 20th June, 2006 on intra State ABT.

SECRETARY

Karnataka Electricity Regulation Commission
Bangalore-560 001