



# ಕರ್ನಾಟಕ ರಾಜ್ಯಪತ್ರ

ಅಧಿಕೃತವಾಗಿ ಪ್ರಕಟಿಸಲಾದುದು

ಬೆಂಗಳೂರು ರಾಜ್ಯ ಪತ್ರಿಕೆ

ಭಾಗ-IVA Part-IVA	ಬೆಂಗಳೂರು, ಬುಧವಾರ, ಜೂನ್ ೧, ೨೦೧೬ (ಜ್ಯೇಷ್ಠ ೧೧, ಶಕ ವರ್ಷ ೧೯೩೮) Bengaluru, Wednesday, June 1, 2016 (Jyeshtha 11, Shaka Varsha 1938)	ನಂ. ೭೮೩ No. 783
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## KARNATAKA ELECTRICITY REGULATORY COMMISSION

No. 9/2, 6<sup>th</sup> & 7<sup>th</sup> Floor, Mahalaxmi Chambers, M.G.Road, Bengaluru - 560 001

### NOTIFICATION

KERC/CT/1/15, Dated: 31 May 2016

Karnataka Electricity Regulatory Commission (**Forecasting, Scheduling, Deviation settlement and related matters for Wind and Solar Generation sources**) Regulations, 2015.

#### Preamble:

The Commission had issued a draft Karnataka Electricity Regulatory Commission (**Forecasting, Scheduling, Deviation settlement and related matters for Wind and Solar Generation sources**) Regulations, 2015, inviting comments from stakeholders. The Commission also held a Public hearing in the matter on 21-04-2016. After considering the view/comments/suggestions of the Stakeholders in the matter, the Commission, in exercise of the powers conferred by the clause (zp) of sub-section (2) of Section 181 of the Electricity Act, 2003 (Central Act 36 of 2003,) hereby makes the following Regulations.

Karnataka Electricity Regulatory Commission (**Forecasting, Scheduling, Deviation settlement and related matters for Wind and Solar Generation sources**) Regulations, 2015.

#### 1.0. Title and commencement.

- (1) These Regulations shall 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' means in a time block of 15 minutes' electricity drawn by a buyer, as the case may be, measured at the interface meters;
  - (c) 'Actual injection' means in a time block of 15 minutes' electricity generated or supplied by the seller, as the case may be, measured by interface meters;
  - (d) 'Aggregator' means an entity registered with the 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 and 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 of commercial settlement of any other charges on behalf of wind and solar generators as the case

may be mandated from time to time. Aggregator may be one of the generators or any other mutually agreed agency registered with the SLDC;

- (e) **'Available Capacity (AvC)'** means for wind or solar generators 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 purchasing electricity generated from a generating station;
- (g) **'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;
- (h) **'CERC'** means the Central Electricity Regulatory Commission referred to in sub-section (1) of Section 76 of the Act;
- (i) **'Deviation'** means in a time block, for a seller, 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;
- (j) **'% 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;

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

- (k) **'Existing plants'** means such Wind and Solar power plants which are already commissioned and supplying power to the ESCOMs or to the third party consumers or captive consumption within or outside the State before the effective date of these Regulations;
- (l) **'Gaming'** in relation to these Regulations means, an intentional wrong/mis-declaration of available capacity or schedule by any seller in order to make an undue commercial gain through charge for deviations;
- (m) **'KEGC'** means the Karnataka Electricity Grid Code specified by the Karnataka Electricity Regulatory Commission under clause (h) of sub-Section 86 of the Act;
- (n) **'IEGC'** means the Grid Code specified by the CERC under clause (h) of sub-Section (1) of Section 79 of the Act;
- (o) **'Interconnecting /Interface points'** means a point at which an individual Wind / Solar Generating plant or a group of such generating plants and associated equipment connects to Transmission system or Distribution system as the case may be;
- (p) **'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;
- (q) **'New plants'** means such Wind and Solar power plants which will be commissioned and connected to the Transmission / Distribution system after the effective date of these Regulations;
- (r) **'Open Access Regulations'** means the Central Electricity Regulatory Commission (Open Access in inter- State Transmission) Regulations, 2008 as amended from time to time;
- (s) **'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;
- (t) **'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;
- (u) **'Qualified Coordinating Agency (QCA)'** means an 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 responsible 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 the Solar generators from the Regional / State UI pool and settling them with the individual generator.
  - (v) Undertake commercial settlement of any other charges on behalf of generators as may be mandated from time to time;
  - (v) **'Regional Load Dispatch Center (RLDC)'** means one 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;
  - (w) **'Regional Pool Account'** means the regional account for receipts and payment regarding (i) UI/(DSM) account, (ii) Reactive energy exchanges or (iii) Congestion charges, as the case may be;
  - (x) **'Scheduled Generation'** means, Schedule of Generation in MW or MWh or kWh ex-bus given by the SLDC (State Load Dispatch Center) at any time or for a time block or any period means);
  - (y) **'Scheduled drawal'** means, Schedule of dispatch in MW or MWh or kWh ex-bus given by the concerned Load Dispatch Centre at any time or for a time block or any period;
  - (z) **'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;
  - (aa) **'State Commission'** means the Karnataka State Electricity Regulatory Commission;
  - (ab) **'State Entity'** means an entity which is in the SLDC control area and whose metering and energy accounting is done at the State level;
  - (ac) **'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;
  - (ad) **'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 the KERC or the KEGC shall have the meaning assigned to them respectively in the Act or any other Regulations or KEGC.

#### Part -1

### 3.0. General-

#### 3.1. Objective:

The objective of these Regulations is to facilitate large scale integration of Wind and Solar power 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 the 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 the 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 the scheduling of the wind and solar generation.

- 4.1. The existing wind and solar power plants shall, either by themselves or through a QCA or through an Aggregator establish forecasting tools and week-ahead, day-ahead forecasting & Scheduling to be furnished to SLDC within **six months** from the date of publication of these Regulations in the official Gazette.
- 4.2. All the new wind and solar generators which will be commissioned after **six months** from the effective date of these Regulations shall either by themselves or through a QCA or through an Aggregator, establish forecasting tools before commissioning of their plants and connecting to the State grid and week-ahead, day-ahead forecasting & Scheduling to be furnished with effect from effective date of these Regulations.
- 4.3. All the new wind and solar generators which will be commissioned within six months from the effective date of these Regulations and connecting to the State grid shall either by themselves or through a QCA or through an Aggregator, establish forecasting tools and week-ahead, day-ahead forecasting and Scheduling to be furnished to the SLDC with effect from six months from the effective date of these Regulations.
- 4.4. Alternately services of REMCs (Renewable Energy Management Centers) as may be set up in the state may be availed by both existing and new wind and solar generators for installing forecasting tools and forecasting their generation schedules.
- 4.5. The forecast by the wind and solar generators shall be the wind-farm/solar facility centric and shall form the basis of the scheduling.
- 4.6. The wind and solar power generators connected to the State grid shall, either by themselves or through a QCA or 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.
- 4.7. The SLDC shall also undertake forecasting of wind and solar power that is expected to be injected into the State grid, by engaging a forecasting agency if required, with an objective of ensuring secure grid operation by planning for the requisite balancing resources, and any wind and solar generators will have the option of accepting such forecast for preparing their schedule or provide the SLDC with a schedule based on their own forecast.
- 4.8. The wind and Solar generators either by themselves or through the Aggregators / QCAs may opt for aggregation of Forecasting and Scheduling of different pooling stations to enable larger geographical integration and furnish scheduling of integrated pools at 15 minutes' time block to SLDC, and in such case any pooling and depooling of the DSM charges shall be done only at their level.
- 4.9. **Frequency of Revisions:**  
The wind and solar generators may revise the day ahead schedules for a maximum of 16 revisions during the intra-day, one each in one and half hour slot starting from 00.00 hrs and such revisions shall be effective from 4<sup>th</sup> time block, the first being the time-block in which notice was given. (For the revisions to be effective from 4<sup>th</sup> time block, the notice shall be given in the first time block)
- 4.10. **Priority for Renewable Energy Sources generation schedule:**  
The wind, solar power and other renewable energy sources shall be given first priority in generation scheduling and dispatching under normal power system operating conditions.
- 4.11. 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.
- 4.12. All such generators currently responsible for connectivity, long-term open access and medium-term open access in intra-State transmission and related matters including long term agreements with ESCOMs on behalf of other wind and solar generators either by themselves or through a QCA or an Aggregator undertake all operational and commercial responsibilities of the wind and solar generating plants relating to forecasting, scheduling and commercial settlement.

- 4.13. 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 through the QCA or through the aggregator when transacted through such entities.

**Part-3**

**5. 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 / at the inter face points of STU/ESCOMs, 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 the SCADA, for energy accounting. The SEMs (**Special Energy Meters 0.2s class of accuracy**) shall be complying with the provisions of Central Electricity Authority (Installation and Operation of Meters) Regulations, 2006.

**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 generator directly or through their QCA or Aggregator to the SLDC.

**5.3. Communication:**

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

**5.4. Procedure for data telemetry and communication requirements:**

The SLDC shall evolve a detailed procedure for (i) Data telemetry and communication requirements, (ii) Standard procedures and necessary formats for furnishing forecasts and scheduling data to the SLDC and (iii) formats for furnishing details about specific turbine or Wind and Solar farm parameters, and publish them on their website to solicit public comments and seek approval of the Commission for such procedure requirements and formats within three months from the effective date of these Regulations.

**Part-4**

**6. Compliance to Technical Standards:**

Every wind and solar generator 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. **Deviation Settlement Mechanism (DSM) for wind and solar generators:** Every wind and solar generator as referred in the clause 3.2 Applicability shall henceforth be under purview of DSM.

**7.1. Computation of error quantity-**

The following formula shall be adopted for this purpose:

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

Where, Available Capacity (AvC) is the cumulative capacity rating of the Wind turbines/ Solar inverters that are capable of generating power in a given time-block. AvC shall be equal to the Installed Capacity, unless one or more turbines/inverters are under maintenance or shutdown. Any event of wrong/mis-declaration, that is, declaration of capacity when it is actually not available due to reasons of maintenance or shutdown etc shall be treated as gaming and shall be liable for action under the appropriate provisions of the Act or the Regulations.

- 7.2. The Generators either by themselves or through their Coordinating Agencies (QCAs) or Aggregator, shall mandatorily provide to the SLDC, in a format as prescribed by SLDC, the technical specifications at the beginning and whenever there is any change, the data relating to power system output and parameters and weather related data as applicable shall also be mandatorily provided by such generators to the SLDC in real time.

**7.3. Tolerance limits and deviation bands:**

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

**7.4. The energy charges shall be paid to the generators,.**

(a) As per the **actual energy** supplied irrespective of the Schedule quantum of energy for the generators for **intra - State** Transactions

(b) As per the **Schedule energy** for the **inter - State** transactions which are governed by the CERC Regulations.

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

The Wind and Solar generators having PPA with the ESCOMs or directly supplying power to consumers within 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 the State	$>\pm 15\%$	$\leq \pm 25\%$	<b>Rs 0.50</b> per kWh for the quantum of short fall or excess energy beyond $\pm 15\%$ and <b>up to <math>\pm 25\%</math></b> of deviation from the schedule ( <b>ie <math>\pm 10\%</math></b> above tolerable limits of $\pm 15\%$ )
2		$>\pm 25\%$	$\leq \pm 35\%$	Rs 0.50 per kWh <b>up to <math>\pm 25\%</math></b> deviation + <b>(plus) Rs 1.0 per kWh</b> 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 <b>up to <math>\pm 25\%</math></b> deviation + <b>(plus) Rs 1.0 per kWh</b> for the remaining quantum of short fall or excess of energy from deviation to schedule beyond $\pm 25\%$ up to $\pm 35\%$ + <b>(plus) Rs 1.50 per kWh</b> for the quantum of short fall or excess of energy beyond $\pm 35\%$ deviation from schedule

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

**8. 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 the SLDC, the defaulting constituent shall have to pay simple interest at 0.04% for each day of delay.

**9. Application of fund collected through Deviations-**

The amount collected in the Deviation Pool Account Fund by the SLDC as on the 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. Power to relax:**

The State Commission may by a 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. 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. Miscellaneous:**

The provisions in these Regulations,

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

By Order of the Commission

**Captain. Dr. K. Rajendra**  
**SECRETARY**

Karnataka Electricity Regulatory Commission