PROCEDURE FOR

FORECASTING, SCHEDULING AND DEVIATION

SETTLEMENT OF WIND AND SOLAR GENERATION

IN ACCORDANCE WITH

KARNATAKA ELECTRICITY REGULATORY COMMISSION

(FORECASTING, SCHEDULING, DEVIATION SETTLEMENT AND RELATED MATTERS FOR WIND AND SOLAR GENERATION) REGULATIONS, 2015

PREPARED BY

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Note: All the comments/suggestions may be sent to this email Id: ceesldc.kptcl@karnataka.gov.in and eeremc.kptcl@karnataka.gov.in on or before 05.06.2020

PROCEDURE FOR FORECASTING, SCHEDULING & DEVIATION SETTLEMENT OF WIND & SOLAR GENERATION REGULATIONS, 2015

1.0 OUTLINE

1.1 The Karnataka Electricity Regulatory Commission (Forecasting, Scheduling, Deviation Settlement and related matters for Wind & Solar Generation Sources) Regulations, 2015 was issued vide Notification No. KERC/CT/1/15 Dated 31.05.2016 published in Karnataka Gazette No 783 dated 01.06.2016 (hereinafter referred as "REDSM Regulations 2015).

1.2 This procedure and formats are issued in pursuance to the Regulations 5.4 of REDSM Regulations, 2015, which specifies the following:

(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.

1.3 This procedure shall be read in conjunction with Indian Electricity Grid Code (IEGC), Karnataka Electricity Grid Code (KEGC), Inter/Intra State Open Access Regulations and subsequent amendments issued thereof.

2.0 APPLICABILITY:

2.1 This procedure shall be applicable to all wind generators having combined installed capacity of 10 MW & above and all solar generators having combined installed capacity of 5 MW & above at the pooling station level coming under the purview of Deviation and Settlement mechanism in accordance with Regulation 3.2 of the RE DSM Regulations, 2015 (excluding Rooftop PV Solar power projects) 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.

2.2 Whenever the Commission notifies amendments to the RE DSM Regulations, irrespective of any amendment issued to this procedure, the provisions in amendments to the RE DSM Regulations shall be followed.

2.3 All applicants shall abide by the provisions of the RE DSM Regulations, 2015 (as amended from time to time) and the procedures/formats issued thereunder.

3.0 QUALIFIYING CRITERIA FOR THE QCA:

3.1 Qualified Coordinating Agency (QCA)/Aggregators is an agency/entity appointed by majority of generators in terms of their installed capacity at a pooling sub-station. The generators shall appoint one amongst themselves or any other entity as QCA/Aggregator in accordance with the Regulation 2(d)/2(u) of the KERC REDSM Regulations, 2015, which provides the definition and specifies the responsibility of the Aggregators and the QCAs, respectively. Further, a QCA who may be one of the generators or any other mutually agreed agency shall perform the functions and discharge the obligations as specified in the RE DSM Regulations, 2015.

3.2 Any Agency/Entity, whether any company or body corporate or an association or body of individuals or an artificial juridical person, whether incorporated or not, shall be eligible to act as a QCA. In case of appointment of agency other than Generator(s) at Pooling Sub-Station, the Generators may consider following guiding principles for appointment of QCA. Adherence to these guiding principles for appointment of QCA would be in the interest of Generators and would facilitate smooth implementation of Forecasting & Schedules framework in the State.

3.2.1 The QCA shall have the capabilities of Modelling wind energy generation potential on seasonal time scales with impact surfaces, a tool to visualize the wind energy generation potential in "Climate Space".

3.2.2. The QCA shall have the experience in the field of Wind/Solar Power forecasting and scheduling in different terrain and regions for minimum period of two (2) years including pilot project work with appropriate accuracy levels in forecasting. However, in case of the Wind Turbine Manufacturer or individual Wind/Solar generator is acting as QCA, the experience clause is not applicable.

3.2.3. The financial strength of the QCA must be such that it should be in a position to handle the risk of penalties due to deviation charges applicable to generator. Considering this, the average Net Worth of the QCA for forecasting & scheduling services must be in positive amounting to at least Rs.2.75 Crores (Net worth = Share Capital + Reserve – Revaluation Reserve – Intangible Asset – Misc. Expenditure to the extent not written off – Carried Forward Losses –Liabilities) in the current financial year which should reflect from its audited balance sheet or CA's certificate.

3.2.4. QCA should have an established team of Renewable resource analyst, Modelling statisticians, Energy model, Software developers and access of operation and monitoring team all the time.

The corresponding supporting certificates/documents justifying qualification should be submitted along with the application for registration.

3.3. It is envisaged that Generators acting as QCA themselves, shall also strive to build requisite skillsets, capacity and technical competence adhering to qualification requirements over the period of two years.

3.4. The QCA shall be well conversant with the Rules and Regulations issued by CERC, KERC and CEA from time to time and shall abide by the provisions the Regulations pertaining to implementation of RE DSM Regulations.

4.0. ROLES AND RESPONSIBILITIES OF THE QCA:

4.1 The QCA registered with SLDC, shall be treated as a State Entity in accordance with Regulation 2(u) of the REDSM Regulations, 2015.

4.2 The QCA shall be single point of contact between Karnataka SLDC and generators to whom it is representing at the Pooling Sub-station.

4.3 The QCA shall establish a Control Center round the clock and shall have complete control over Wind/Solar injection feeders connected to Pooling Sub-stations. The Control Centre shall have facilities of voice and data communication with SLDC, Fax machine and internet connection available for all the 24 hours.

4.4 The QCA shall have a necessary infrastructure to schedule & monitor the pooling stations round the clock.

4.5 The QCA shall establish protocol for communication with Individual Generators to implement the instructions of System/Grid operator. The QCA shall comply with the instructions of the System/Grid operator in normal condition as well as during emergencies, appropriate decisions taken by the System Operators in view of Grid security and safety.

If the QCA disobeys the instruction of grid operator during emergencies, appropriate decision will be taken by the Grid operator in view of grid security and safety.

4.6 In case of any curtailment planned by STU/ESCOMs/SLDC and as communicated by the SLDC due to line maintenance or other reasons in certain time blocks of a day, the QCA shall be responsible for curtailing the generation at site and amending the Schedules accordingly, failing which the SLDC shall revise the schedules accordingly.

4.7 QCA shall be responsible for declaration of Available Capacity of the Generating Station to SLDC to which it is representing and provide the schedules to SLDC on week-ahead & day-ahead and intraday revisions on behalf of Wind/Solar pooling stations as per the REDSM Regulations, 2015.

4.8 The QCA shall furnish week-ahead, day-ahead and intraday generation schedules for each pooling station or each generating station as the case may be to REMC web portal.

4.9 The QCA shall also provide aggregated Day-ahead & Week-ahead forecast (based on their own forecast or on the forecast done by SLDC) and intraday Schedules as per **Format-A & Format-B** through a web-based application of REMC/SLDC.

Provided that if the QCA is representing on behalf of the multiple Pooling Sub-stations, the Scheduling, Energy accounting and Deviation monitoring for each Pooling Sub-station of wind and/or solar power generation shall be undertaken separately.

4.10 QCA in coordination with Generator shall provide real time availability and generation data (at both pooling station & Inverter/WTG level) as per **Annexure – III.**

4.11 In case of non-availability of real time data (at Turbine Level/inverter level), QCA in coordination with Generators shall maintain and provide time block-wise generation data at (turbine and inverter level) and weather data on weekly basis:

(i) For wind plants, at the turbine level:

Average wind speed, Average power generation at 15-min time block level

(ii) For solar plants, for all inverters >= 1 MW:

Average Solar Irradiation, Average power generation at 15-min time block level. (if a solar plant uses only smaller string inverters, then data may be provided at the plant level)

4.12 QCA shall undertake commercial settlement of all deviation-settlement charges and any other charges on behalf of the concerned generators, as applicable under RE DSM Regulations 2015.

4.13 QCA shall maintain records and accounts of the time block-wise Schedules, the actual generation injected and the deviations, for the Pooling Sub-station and the individual Generators separately.

4.14 The QCA shall accept the Energy and Deviation accounts for intra-State transactions prepared by the SLDC. The QCA may intimate in writing if any discrepancies are observed in deviation account within five days, or otherwise, it is deemed to be accepted by QCA/Generator.

4.15 The QCA shall submit undertaking as per Annexure-IV for acceptance of Terms & Conditions for registration of QCA (To be provided by the QCA on Rs.200/- stamp paper).

4.16 QCA/Generator shall facilitate Automatic Meter Reading (AMR) technologies for transfer, analysis and processing of interface ABT meter data to SLDC in line with Metering/ AMR protocol and AMR/Metering Standards to be finalised by STU in accordance with provisions of Metering code and CEA Metering Regulations, as amended from time to time.

4.17 The QCA shall perform commercial settlement beyond the connection point (De-pooling arrangement among each generator in the Pooling Sub-station) and technical coordination amongst the generators within the Pooling Sub-station and up to the connection point as the case may be.

4.18 The QCA shall furnish Static and technical data of individual generators of Solar & wind farms as per Annexure-II and also the billing meter data of generators & other statistics information shall be uploaded to the SLDC through respective user access portal in the REMC/SLDC web portal on operationalization of REMC.

4.19 The QCA, within seven (07) days, shall inform the details to SLDC in case there is any change in:

i. The Generating Station (in case of individually connected generator),
ii. Pooling Sub-station
iii. Individual generators in the Pooling Sub-station
iv. Reduction in authorization from generators in a Pooling Sub-station below majority of generators in terms of the total installed Capacity of the Pooling Sub-station.

4.20 Keep SLDC indemnified at all times and shall undertake to indemnify, defend and save the SLDC harmless from any and all damages, losses including commercial losses due to forecasting error, claims and actions including those relating to injury to or death of any person or damage to property, demands, suits, recoveries, costs and expenses, court costs, attorney fees, and all other obligations by or to third parties, arising out of or resulting from the transactions undertaken by the Generators. The QCA shall submit the indemnity bond (**Format – C**) on Non-Judicial Stamp Paper of value notified from time to time by the State Government at the time of registration

4.21 The QCA shall have equivalent systems in place for seamless flow of information to and from SLDC in order to facilitate scheduling, revision of schedule, intimation of outages/grid constraints, curtailment etc.

4.22 QCA shall have to ensure confidentiality of all the data provided by the SLDC and the data shall not be shared without written permission from SLDC.

4.23 The QCA shall be responsible for furnishing monthly meter readings (Load survey data for every 15 minutes' interval block period) to the SLDC in addition to data acquisition through the SCADA, for energy accounting, failing which the SLDC shall consider the SCADA data as actual and zero in case of non-availability of Meter/SCADA data.

4.24 The QCA shall maintain 5 years' historical data, all necessary and required records, registers and accounts in respect of forecasting, scheduling and deviation settlement and shall furnish to SLDC on request. Further, QCA shall be responsible for maintaining records and accounts of the time block-wise schedules, the actual generation injected and the deviations, for the Pooling Sub-station and the individual Generators separately.

4.25 QCA shall record and transmit the data of operation of LVRT & HVRT on monthly basis.

4.26 QCA shall ensure periodical testing and calibration of billing meters as per the Central Electricity Authority (Installation and Operation of Meters) Regulations, as amended from time to time, and procedures of KPTCL.

4.27 The QCA shall possess/provide consent letters from all the Generators connected in the Pooling Sub-station in terms of their combined installed capacity for appointment as QCA. (Not applicable if the Generator himself is a QCA) at the time of Registration.

4.28 QCA shall furnish a Bank Guarantee with one-year validity period and 3 months claim period or irrevocable Letter of Credit for the amount equivalent to Rs. 10600.00 per MW for solar generation and Rs. 43200.00 per MW for wind generation. Extension of Bank Guarantees shall be furnished within validity period to maintain the QCA registration **in force or else, SLDC may revoke BGs in the claim period**.

4.29 QCA shall furnish Pooling station-wise Bank guarantee or Letter of Credit to the SLDC (i.e.one BG or LC per pooling station). In the event of Non-payment or delay in payment of Deviation Charges by QCA **for more than sixty days**, the BG or LC will be encashed without any further notice.

4.30 In case of insufficient/exhausted LC amount, QCA shall make up LC amount within seven (7) days from receipt of such information from SLDC. The pooling station is liable for disconnection in case of failure to make up LC amount within prescribed time limit.

4.31 QCA shall be responsible for coordination with STU / ESCOMs / SLDC for installation of Special Energy Meters (SEM) and QCA shall also be responsible for metering, data collection and transmission, communication, coordination with DISCOMs, RLDC, SLDC, RPC & other agencies, undertaking commercial settlement of all the charges on behalf of wind & 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 & solar generators as the case may be mandated from time to time as per IEGC/KEGC/CERC/KERC Regulations.

4.32 In case of non-receipt of the metered data online or AMR facility then QCA shall coordinate with DISCOM/ STU for manual data downloading through MRI

and submit the same as decided by SLDC/ within 2 days from the date of intimation.

4.33 Only one QCA will be allowed within a pooling station with common energy meter. The Wind & 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 de-pooling of the DSM charges shall be done only at their level.

5.0 ROLES & RESPONSIBILITIES OF GENERATORS

5.1 Wind and Solar Generators who have common Interface Billing meter, shall appoint and submit a consent letter to the "QCA" who shall be responsible for coordinating on behalf of all the generators connected to the pooling station or connected to Grid SS through a dedicated or common feeder on issues like SCADA, metering, scheduling, deviation charges, and other responsibilities specified in the RE DSM Regulations. All Wind and Solar Generators connected to the pooling station and connected to Grid SS through common feeder shall provide all the required support to the Coordinating Agency.

5.2 The Generator shall not appoint and authorize multiple QCAs for a particular Pooling Sub-station. In such case, the authorization provided by the Generator shall be treated as invalid & SLDC shall process the application of the QCA as per the provisions of this procedure and the decision of SLDC on registration of QCA shall be binding on such generators.

5.3 Once the QCA is registered, the generator/s shall not re-appoint another QCA, at least within one (1) years from the date of successful registration of the QCA at SLDC.

Provided that in case of defaults by the QCA, the generator/s can re-appoint another QCA by giving prior notice of one (1) month to SLDC and the process of registration of new QCA shall be carried in accordance with REDSM Regulations and procedures.

5.4 All the generators shall save and store the block-wise generator injection data or any other data as desired by the SLDC and make available the same to their respective QCA, so that it could be sent to SLDC within (7) days from the date of demand from SLDC.

5.5 Wind and Solar Generators connected to the Grid SS through a Pooling Station or through a common feeder shall appoint a Qualified Coordinating Agency (QCA) with a consensus among the Generators in that pooling Station or Generators connected to common feeder or one of the Generator may act

as a lead generator with the consensus among the generators and shall be registered as a QCA at SLDC.

5.6 Wind and Solar Generators (single legal owner) connected to the Grid SS/ DISCOM SS through a dedicated feeder may appoint a QCA or may act as a QCA and shall be registered as a QCA at SLDC.

5.7 In case of non-consensus among the generators connected through a common Pooling Sub-Station or common feeder for appointment of QCA, then such generators shall take separate connectivity from STU/DISCOM and furnish the schedules by appointing separate QCA in accordance with the Regulations and procedure.

6.0. ROLES AND RESPONSIBILITIES OF SLDC, KARNATAKA:

6.1 SLDC shall provide a web-based portal for use by QCA with user ID for accessing the REMC web portal for

a) Uploading of Day-ahead and Week-ahead Generation Forecasts
b) Uploading of the revisions in Schedules in accordance with this Procedure and Regulations.
c) Communication of Grid Constraints and curtailments if any.

6.2 The SLDC shall be responsible for scheduling, communication, coordination with QCAs. The generation forecast shall be done on the basis of the weather data provided by the weather Forecasting Agency.

6.3 The SLDC shall maintain records and accounts of the time block-wise Schedules, the actual generation injected and the deviations, for the Pooling Sub-station and the individual Generators separately.

6.4 The SLDC shall maintain State Deviation Settlement Account for Wind and Solar Generations.

6.5 REMC web portal of SLDC will forecast the wind and solar generation in the SLDC control area and publish in the REMC portal. However, the forecast by the SLDC shall be with the objective of ensuring secure grid operation.

6.6 The wind or solar generator or QCA will have the option of adopting the SLDC's forecast for preparing its schedule or provide the SLDC with a schedule based on its own forecast. Any commercial impact on account of deviation from schedule based on the forecast shall be borne by the wind or solar generator either by itself or through the representing QCA.

6.7 The SLDC shall validate, process the Billing meter data and compute the net injections by each pooling station. The SLDC will monitor such that there is no gaming (gaming is an intentional mis-declaration of AVC by any generating station or QCA in order to make an undue commercial gain).

7.0 REGISTRATION OF QCA WITH SLDC, KARNATAKA:

7.1 The QCA shall obtain the consent letter from all the generators who have appointed him as a QCA and then apply for registration.

7.2 QCA shall submit separate application (Registration form) for each pooling station. Only one application per pooling station will be accepted from the QCA.

7.3 QCAs have to register with SLDC duly submitting the following documents,

a) QCA Registration Form..... Annexure-I
b) Static data of Solar & Wind farms..... Annexure-II
c) Acceptance of terms & conditions for registration of QCA (To be provided by the QCA on a Rs.200/- stamp paper)- Annexure-IV
d) Proof of registered address & the financial statements and technical capability statements to prove capability to do business have to be submitted by the QCA.
e) Consent/authorization letter from generators for appointment of QCA.
f) Provisional inter-connection approval of STU.
g) Bank Guarantee or Letter of Credit in favour of CEE, SLDC to an extent of Rs. 10,600.00 per MW for solar generation and Rs. 43,200.00 per MW for wind generation to be furnished towards payment security.

7.4 The application for Registration shall be made as per the application format for registration (Annexure -1) and shall contain details such as,

(a) Location of the generation (Village, Taluka, District)
(b) Total Capacity of the Generation and inter-connection arrangement with In STS.
(c) Authorization/ consent letter from majority of the Generators connected in the Pooling Sub-station in terms of their combined installed capacity for appointment as QCA. (Not applicable if Generator is connected through dedicated inter-connection facility with the Grid)
(d) Names along with individual installed capacity of generation of the constituents to whom QCA is representing
(e) Metering arrangements (ABT Meter with other associated details.)
(f) Communication arrangements with SLDC for Real time Generation, Meter reading for accounting etc.

7.5 The details of Nodal Officers from SLDC for processing applications for Registration and day to day activities towards forecasting, Scheduling and Revisions thereof shall be displayed on SLDCs website for smooth implementation of the procedure.

7.6 After duly verifying the documents submitted by QCA, SLDC will register and allot a unique registration number to each eligible QCA for handling RE DSM.

An incomplete Application, and/or an Application not found to be in conformity with the Procedure and Regulations, shall be rejected.

7.7 The time period for registration of QCA shall be fifteen (15) working days from the date of receipt of all the documents & information in complete to SLDC.

7.8 The QCA Registration is valid for 3 years. QCA shall renew the registration one month before the expiry date.

7.9 The Application for registration and renewal shall be accompanied by a non-refundable processing fee of Rs. 5000/- (Five Thousand Rupees only) plus applicable GST in favour of CEE, SLDC, by DD/NEFT/RTGS.

7.10 In case QCA has obtained registration on the basis of false information or by suppressing material information and the registration of such entity is revoked.

8.0 DE-REGISTRATION OF QUALIFIED CO-ORDINATING AGENCY (QCA):

(a) Own De-registration:

1) The QCA may request the SLDC for de-registration as QCA, however, in such cases it shall be the responsibility of the QCA to settle all the commercial obligations of both SLDC and Generators to whom it is representing.
2) One (1) month prior notice to be served to all the generators to whom it is representing for de-registration with copy to SLDC.
3) The generator/s shall be responsible for appointing new QCA and ensure registration of new QCA at SLDC within this notice period.

(b) De-registration due to non-authorization of Generator:

1) One (1) month prior notice to be served by the generator to the QCA for non-authorization with copy to SLDC subject to procedure 5.3.
2) The generator/s shall be responsible for appointing new QCA and ensure registration of new QCA at SLDC within this notice period, post which generation shall not be scheduled.
3) Before de-registration, the generator shall ensure that all the commercial settlements pertaining to it has been completed by the QCA with SLDC.

(C) De-registration under default condition:

1) The SLDC shall initiate the process of de-registration, as per Clause No. 14.1 is violated by the QCA and also in the event of breach of default of the procedure and consequences for event of default

2) The generator/s shall be responsible for appointing new QCA and ensure registration of new QCA at SLDC within one (1) month notice period, post which generation shall not be scheduled.

9.0 SLDC FEES & CHARGES AND OTHER CHARGES:

9.1 SLDC fee and charges including scheduling and operating charges shall be payable by QCA as specified in the ARR of the SLDC as approved by the Commission from time to time. Scheduling charges shall be applicable per Pooling Sub-Station. The other charges shall be levied as per the applicable KERC Regulations/Orders.

10.0 DATA TELEMETRY AND COMMUNICATION REQUIREMENT:

10.1 The RE Generator shall integrate evacuation bay along with tariff energy meters at Grid SS (Grid Sub Station) to KPTCL SCADA network duly paying integration charges as notified by KPTCL to provide real time generation data such as MW, MVAr, MWHr, Voltage and status of Circuit Breaker with control.

10.2 The WTG level and Inverter level SCADA data of the Pooling substation to be made available to SLDC. Providing the data to SLDC from the Pooling substation along with the communication requirement is in the scope of Generator, who can provide the data either directly or through his Aggregator/QCA as per Annexure-III.

10.3 The data from the Pooling substation to SLDC shall be transmitted with secured File Transfer Protocol (FTP) in *.csv (coma separated value) format using public network. Communication media with latency less than 800ms may be used for data transmission. The Pooling substation data shall be sent to SLDC at every five minutes (5Mins) interval in the approved format of SLDC at present and this interval will be changed according to the requirement of SLDC.

Alternatively, from pooling station, the data as per Annexure-III to be made available to SLDC/REMC on 60870-5-104 protocol using any public communication media.

10.4 The Generators/QCA shall submit complete proposal along with schematic diagram, mode of data communication and format for transmission of data to SLDC for approval.

10.5 Completion of all above is under the scope and responsibility of RE generators/QCA. Redundant and reliable communication link between Pooling substation and SLDC shall be maintained by QCA.

11.0 FORECASTING & SCHEDULING

11.1 RE Forecasting will be done by the SLDC for overall planning of resource requirements on day ahead basis in view of securing grid operation. The SLDC will forecast the wind and solar generation in the SLDC control area and publish in the REMC portal.

11.2 All the wind and Solar generators shall submit the week ahead, day-ahead generation forecast and Available Capacity (AVC) in 15 mins block time interval to the SLDC through a QCA or one of the generators acting as a lead Generator in case of more than one Generator is connected to the Interface point and having common Interface Billing Meter.

11.3 The forecasting shall be given at the Interface point at Grid SS. The generators who are having a common Interface Billing Meter at interface point will not be allowed to provide individual schedules as the actual generation (Energy Meter reading) is not separately readable for each generator from the Common Interface Billing meter.

11.4 The forecast by a wind or solar generator or the QCA, as the case may be, shall be provided separately for each Pooling station. One Schedule from one pooling station is allowed from the QCA or Lead generator as all the generation is pooled up in the Pooling Station and at common Interface Billing meters as applicable.

11.5 The QCA may aggregate Schedules of more than one Interface Billing Meters i.e., pooling Station as a virtual pool. But within a Pooling Station more than one schedule is not allowed.

11.6 QCA have to submit week – ahead (on every Saturday), day- ahead (before 8 AM of previous day) & intraday schedules (Maximum16 revisions) with AVC in a prescribed format (Format A & B) to SLDC.

11.7 The Pooling Sub-station wise day ahead, week ahead & revision schedules submitted by QCA shall be on 15 minutes' time block basis in MW up to three decimal places. The fourth decimal place rounded off to third decimal place as per standard practice.

11.8 The QCA may revise schedules for the current day provided that, such revisions shall be effective from the fourth (4th) time block and a maximum of sixteen (16) revisions during the day starting from 00.00 hours of a particular day.

11.9 QCA has to furnish all Schedules to SLDC through e mail till REMC WEB portal becomes fully operational. SLDC will arrive at the final implemented schedules incorporating all 16 revisions per day.

11.10 In the event of QCA adopting forecast provided by REMC, charges amounting to Rs. 40,000/- plus applicable GST per Pooling Sub-station per year, shall be paid by the QCA to SLDC. (as notified from time to time)

The consequences of any error in such forecast provided by SLDC which results in a deviation from scheduling shall be borne by the concerned Generators through their QCA and QCA shall indemnify SLDC on account of the commercial impact.

12.0 ENERGY DEVIATION & BILLING:

12.1 Time Block wise (15 minutes) implemented schedules will be prepared by the SLDC based on the schedules and intraday revisions provided by the QCA.

12.2 At interconnection point, the QCA along with KPTCL/ESCOMS & Developers representative shall jointly download the data of actual generation (Time block wise load survey data) from the Billing meter on monthly basis before 5th of every month and furnish the same to SLDC through official email before 10th of every month.

12.3 QCA shall coordinate with DISCOM / STU data collection & communication to SLDC for purpose of energy accounting under the Regulations and procedure.

12.4 A statement of energy accounting i.e., energy deviations and corresponding deviation charges for each pooling station shall be prepared by the SLDC on monthly basis, based on schedule generation submitted by the QCA and actual generation as per billing meter data received from QCA & the concerned DISCOM/STU.

12.5 SLDC shall compute the absolute error for QCA and shall calculate the DSM charges in accordance with the Regulation 7.1 of RE DSM Regulations 2015 and issue deviation bills to the QCAs.

12.6 SLDC shall provide aggregated day-wise, block-wise Deviation Charges, Schedule and Actual to each QCA after 20th of every month.

12.7 The QCA shall communicate any discrepancies to SLDC within Five (5) days receiving the data from SLDC. In case any discrepancies in energy account and same shall be corrected forthwith by SLDC after due verification and revised RE DSM Bill will be issued by SLDC.

12.8 All accounts relating to de pooling of deviations charges among the generators shall be carried out by the QCA.

12.9 Billing meter data may be uploaded to the REMC web portal once the REMC is fully operational.

13.0 STATE POOL ACCOUNT:

13.1 State Pool Account means a separate account will be created, maintained and operated by SLDC in accordance with the provisions of the RE DSM Regulations 2015.

13.2 Deviation Charges shall be levied under the RE DSM Regulation 2015 and interest, if any, received for late payment shall be credited to the State Pool Account.

13.3 QCA shall undertake commercial settlement of forecasting deviations including payment of deviation charges to the State Pool Account on behalf of the concerned generators.

13.4 QCA shall undertake commercial settlement of any other charges on behalf of the generators connected to a pooling station, as may be mandated from time to time.

13.5 QCA shall undertake any other ancillary and incidental matters notified by the Commission from time to time.

13.6 Payment of all charges on account of energy accounting of Pooling Station of Wind and Solar plants shall have a high priority and the concerned QCA shall pay the indicated amounts within 10 (ten) days from the date of issue of the accounts by the SLDC.

13.7 If payments against the charges on account of energy accounting of Pooling station are delayed by more than two days, i.e., beyond ten (10) days from the date of issue of the bill by the SLDC the defaulting QCA shall have to pay simple interest @ 0.04% for each day of delay.

14.0 EVENT OF BREACH OR DEFAULT AND CONSEQUENCES THEREOF:

14.1 Event of Breach or Default

Following events shall constitute event of breach or default by QCA /Generators,

14.1.1 Non-payment or delay in payment of Deviation Charges by QCA/Generators.

14.1.2 Non-compliance of any of the terms/conditions/rules outlined under this procedure and RE DSM Regulations 2015 by QCA/Generators.

Non-compliance of any of the directives issued by SLDC, so long as such directives are not inconsistent with any of the provisions of RE DSM Regulations and under this procedure.

14.1.3 Obtaining registration on the basis of false information or by suppressing material information

14.1.4 QCA fails to provide schedules continuously for 10 days.

14.1.5 In case the QCA has become insolvent.

14.1.6 In case of continued default of statutory complaints leading to declaration of wilful defaulter by competent authority

14.1.7 In case the Available Capacity (AVC) is intentionally and repeatedly mis-declared by the QCA (Gaming)

14.1.8 If the QCA fails to pay deviation charges even after a lapse of **60 days from the date issue of RE DSM bill, Process to encash the BG/LC amount shall be initiated** beside any other action as permissible under law / regulations by SLDC

14.2 Consequences for Event of Default:

14.2.1 If schedule is not provided by the QCA, then the previous day's schedule for those non-submission days shall be considered and DSM charges shall be computed accordingly.

14.2.2 In case of default for acts in the event of breach or default of the procedure without prejudice to other actions as may be taken by SLDC, the SLDC shall issue a notice of period not less than 15 days for revocation of registration of QCA and non- scheduling of pooling Sub-station to which said QCA represents and adequate opportunity shall be given to QCA to present its case before SLDC.

14.2.3 In case QCA fails to address/rectify the breach expressed by SLDC in the Notice within stipulated time, the SLDC shall proceed with revocation of registration of QCA and disconnection of the pooling stations from grid.

15.0 GRIEVANCE REDRESSAL:

15.1 SLDC shall refer the Complaints regarding unfair practices, delays, discrimination, lack of information, supply of wrong information or any other matters to the Commission for redressal.

15.2 Any disputes between QCA and concern generators shall be governed as per dispute resolution mechanism under their mutual agreement.

16.0 REMOVAL OF DIFFICULTIES:

16.1 In case of any difficulty in implementation of this procedure, SLDC may approach the Commission for review or revision of the procedure with requisite details.

17.0 GENERAL:

17.1 All costs/expenses/charges associated with the application, including bank charges, Affidavits etc. shall be borne by the applicant.

17.2 The Generators and QCA shall abide by the provisions of the Electricity Act, 2003, the KERC Regulations and Indian Electricity Grid Code and KERC (State Grid Code) Regulation - 2015, and applicable CERC and KERC regulations as amended from time to time.

17.3 Forecasting being an essential pre-requisite for the scheduling of the wind and solar generation, all the wind and solar power generators connected to the state grid, either by themselves or through a QCA or through an Aggregator shall 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

17.4 This procedure aims at easy and pragmatic Forecasting, Accounting and Settlement of Deviations for Wind and Solar Generations. However, some teething problems may still be experienced. The various implications would be known only after practical experience is gained by way of implementing this procedure. In order to resolve the same, this procedure shall be reviewed or revised by the SLDC with the approval of Commission.

Chief Engineer, Electy.
SLDC, KPTCL, Bengaluru

ANNEXURE-I

Tel :+91 80 22267034
Fax : +91 80 22259719
Email : sldc.kptcl@gmail.com

State Load Dispatch Centre
Karnataka Power Transmission Corporation Limited

Aggregator/QCA Registration Form

KERC NOTIFICATION No. KERC/CT/1/15Dtd. 31st May 2016

Tick relevant box

	New Registration		Change of registration		Cancel registration

Tick relevant

	Wind Generation		Solar Generation

1	Name of the Entity	

2	Primary business (brief description)	

3	Business address	

Phone	Mobile	Fax	Email	website

4	Postal address	

5	Contact person & designation			
Phone	**Mobile**	**Fax**	**Email**	

6	Name of Directors	Position	Mobile	Email
a				
b				
c				
d				
e				

8	Financial details	

9	No. of Pooling stations represented				
Pooling station Name and address	**Total Installed capacity**	**KPTCL/ESCOM Injecting station**	**Voltage Class**	**Type (Wind/Solar)**

Note :- Details as per Annexure A for each pooling station to be enclosed

10	Details of FBG/LC/Security deposit	**Solar**	**MW capacity**	**Amount**
		Wind	**MW capacity**	**Amount**

Declaration: All that is stated in the above is true and correct

Authorized Signature
and official Seal
(for Aggregator/QCA)

Annexure -II

Details to be submitted by QCAs	
Type: Wind/Solar Generator	
Individual / on Behalf of Group of generators	
If on Behalf of Group of generators , then details of consent letters to be attached	
Total Installed Capacity of Generating Station	
Total Number of Units with details	
Physical Address of the RE Generating Station	
Whether any PPA has been signed: (Y/N)	If yes ,then attach details
Connectivity Details	Location/Voltage Level
Metering Details	Meter No. 1. Main 2. Check
Connectivity Diagram	(Please Enclose)
Static data	As per attached sheet
Contact Details of the Nodal Person	Name : Designation : Number: Landline Number, Mobile Number, Fax Number E - Mail Address :
Contact Details of the Alternate Nodal Person	Name : Designation : Number: Landline Number, Mobile Number, Fax Number E - Mail Address :

Static Data to be submitted by the QCA For Wind turbine generating plants (Pooling Stations)

S No	Particulars
1	**Type**
2	Manufacturer
3	Make
4	Model
5	Capacity
6	commissioned date
7	Hub height
8	total height
9	RPM range
10	Rated wind speed
11	**Performance Parameter**
12	Rated electrical power at Rated wind speed
13	Cut in speed

14	Cut out Speed
15	Survival speed (Max wind speed)
16	Ambient temperature for out of operation
17	Ambient temperature for in operation
18	survival temperature
19	**Low Voltage Ride Through (LVRT) setting**
20	**High Voltage Ride Through (HVRT) setting**
21	lightning strength (KA & in coulombs)
22	Noise power level (db)
23	**Rotor**
24	Hub type
25	Rotor diameter
26	Number of blades
27	Area swept by blades
28	Rated rotational speed
29	Rotational Direction
30	Coning angle
31	Tilting angle
32	Design tip speed ratio
33	**Blade**
34	Length
35	Diameter
36	Material
37	Twist angle
38	**Generator**
39	Generator Type
40	Generator no of poles
41	Generator speed
42	Winding type
43	Rated Gen. Voltage
44	Rated Gen. frequency
45	Generator current
46	Rated Temperature of generator
47	Generator cooling
48	Generator power factor
49	KW/MW @ Rated Wind speed
50	KW/MW @ peak continuous
51	Frequency Converter
52	Filter generator side
53	Filter grid side
54	Transformer
55	Transformer capacity
56	Transformer cooling type
57	Voltage
58	Winding configuration
59	**Weight**
60	Rotor weight
61	**Nacelle weight**
62	Tower weight
63	**Over speed Protection**
64	**Design Life**
65	**Design Standard**
66	Latitude

67	Longitude
68	COD Details
69	Past Generation History from the COD to the date on which DAS facility provided at RLDC, if applicable
70	Distance above mean sea level

For Solar generating Plants

Static data points:

1. Latitude
2. Longitude
3. Turbine Power Curve
4. Elevation and orientation angles of arrays or concentrators
5. The generation capacity of the Generating Facility
6. Distance above mean sea level etc.
7. COD details
8. Rated voltage
9. Details of Type of Mounting: (Tracking Technology If used, single axis or dual axis, auto or manual)
10. Manufacturer and Model (of Important Components, Such as Turbine, Concentrators, Inverter, Cable, PV Module, Transformer, Cables)
11. DC installed Capacity
12. Module Cell Technology
13. I-V Characteristic of the Module
14. Inverter Rating at different temperature
15. Inverter Efficiency Curve
16. Transformer Capacity & Rating , evacuation voltage, distance form injection point

ANNEXURE-III

Real-time Data Telemetry requirement

Wind turbine generating plants

1. Generator Status : whether On-line/Off-line - (for individual WTGs) this is required for calculation of availability of the WTG.
2. Turbine Generation (MW/MVAR) –(for individual WTGs)
3. Total Generation of the Pooling station : MW and MVAr
4. Wind Speed(meter/second) –(PSS wise)
5. Wind Direction (degrees from true north) –(PSS wise)
6. Voltage(Volt) at Interconnection point-(PSS Wise)
7. Ambient air temperature ($_{o}$C) -(PSS Wise)
8. Barometric pressure (Pascal) -(PSS Wise)
9. Relative humidity(in %) -(PSS Wise)
10. Air Density (kg/m3) -(PSS Wise)

For Solar generating Plants

1. Solar Generation unit/ Inverter-wise (MW and MVAR)
2. Voltage at interconnection point (Volt) -(PSS Wise)
3. Generator/Inverter Status (on/off-line)
4. Total Generation of the Pooling station : MW and MVAr
5. Global horizontal irradiance (GHI)- Watt per meter square -(PSS Wise)
6. Ambient temperature ($_{o}$C) -(PSS Wise)
7. Diffuse Irradiance- Watt per meter square -(PSS Wise)
8. Direct Irradiance- Watt per meter square -(PSS Wise)
9. Sun-rise and sunset timings -(PSS Wise)
10. Cloud cover-(Okta) -(PSS Wise)
11. Rainfall (mm) -(PSS Wise)
12. Relative humidity (%)-(PSS Wise)
13. Performance Ratio- -(PSS Wise)

TERMS AND CONDITIONS FOR REGISTRATION OF AGGREGATOR/QCA

Name : M/s..... (Name ofAggregator/QCA), ...(Postal address) .....

.....

[To be provided by the Aggregator/QCA on a Rs.200/- stamp paper]

1. We, as an Aggregator/QCA will be regulated by KERC regulations on Wind and Solar from time to time.
2. The Deviation Settlement charges shall be as per the KERC guidelines for which we as Aggregator/QCA will be responsible for the pooling stations for which we represent as an Aggregator/QCA.
3. As per the KERC regulations, we as an Aggregator/QCA, agree to provide the forecasting schedules to SLDC on week-ahead and day-ahead basis on behalf of Wind and Solar pooling stations connected to STU/ESCOM having a combined capacity of 10MW and more in case of Wind generation and 5 MW and more in case of Solar generation.
4. We as Aggregator/QCA agree to provide the authorization letter from all the generators connected to the pooling station for being appointed as the Aggregator/QCA.
5. We understand that we can revise the day ahead schedules for a maximum of 16 revisions as per the regulations.
6. We agree that if there is any deviation from the schedule, then for such energy, Deviation charges will be applicable as per the regulations including the amendments from time to time.
7. We shall be responsible for commercial settlements of the deviation charges to SLDC on behalf of wind and solar generators connected to the pooling station.
8. We understand that SLDC will compute the comprehensive Deviation charges and raise bills for the deviation on a monthly basis.
9. Payment will be regulated as per KERC norms.
10. We understand that we will take the monthly meter reading as per IEGC/standard practices including ABT/Load Survery data.
11. We as Aggregator/QCA will abide by KERC Gazette Notification No KERC/CT/1/15 dated 31.5.2016, regulations for all transactions.
12. We shall establish necessary SCADA data of the IF point and other turbine/plant data for the purpose of monitoring and billing as per KERC guidelines.
13. In the event of any fault in generating system resulting in lower generation then, we will revise the schedule and the same shall be intimated to SLDC as per the KERC Gazette notification No KERC/CT/1/15 dated 31.5.2016.
14. We agree to pay a Bank Guarantee for the amount equivalent to Rs.10600/MW for solar generation and Rs.43200/MW for wind generation.

15. We agree to provide Turbine/panel and pooling stations details as per the format specified by SLDC

We are agreeing for the above terms and conditions for registering as Aggregator/QCA with SLDC, KPTCL, Karnataka

Details of Bank Guarantee/LC/security deposit is enclosed

.....(Name and Postal address of Aggregator/QCA).....

.....

.....

Aggregator for Pooling station :

KPTCL/ESCOM Injecting Station :

Voltage level at injecting point :

List of generators connected to the pooling station along with installed capacity for which consent is obtained :

1.
2.
3.
4.
5.
6.
.
.
.
.
.
.
.

Declaration: All that is stated in the above is true and correct

Aggregator/QCA

Authorized Signatory

Forecast and Schedule Data to be submitted by QCA for Wind and Solar Generation

Format: A (To be submitted a week/day in advance)

15 min time block (96 Blocks in a day)	Time	Available Capacity (MW)- Week/ Day Ahead	Week/ Day Ahead Forecast (MW)	Week/Day Ahead Schedule
1	00:00-00:15			
2	00:15-00:30			
3	00:30-00:45			
4	00:45-01:00			
5				
95				
96				

Note: The forecast should ideally factor forecasting errors. As such schedule should ordinarily be same as forecast.

Format: B

To be submitted on the day of actual generation, revision of availability and schedule, if any, shall be done as per KERC (Forecasting, Scheduling, Deviation Settlement and related matters for Wind & Solar Generation Sources) Regulations, 2015.

15 min time block (96 Blocks in a day)	Time	Day Ahead Schedule (MW)	Current Available Capacity (MW)	Revised Schedule (MW)
1	00:00-00:15			
2	00:15-00:30			
3	00:30-00:45			
4	00:45-01:00			
5				
95				
96				

Format – C

(On the Non-Judiciary Stamp Paper)

INDEMNIFICATION

The Renewable Energy generator and QCA shall keep Karnataka SLDC indemnified at all time and shall undertake to indemnify, defend and save the Karnataka SLDC harmless from any and all damages, losses, claims and actions, including those relating to injury to or death of any person or damage to property, demands, suits, recoveries, costs and expenses, court costs, attorney fees and all other obligations by or to third parties, arising out of or resulting from the Registration of QCA under DSM Mechanism. The Renewable Energy generator and QCA shall keep Karnataka SLDC indemnified at all time and shall undertake to indemnify, defend and save the Karnataka SLDC harmless from any and all damages, losses, claims and actions, arising out of disputes with Karnataka SLDC, as well as with generators and QCA inclusive of confidentiality issues.

Date: _____

Sign: _____

Place: _____

Authorized Signatory Name: _____

Designation: _____

Name of QCA: _____

Seal