



**Office of the Chief Engineer / SLDC  
SLDC Building, Ablowal, Patiala-147001**

**Draft Procedure  
For  
Forecasting, Scheduling and Deviation Settlement  
of Solar & Wind Generation**

In accordance with  
Punjab State Electricity Regulatory Commission (Forecasting, Scheduling, Deviation  
Settlement and Related Matters of Solar and Wind Generation Sources)  
Regulations, 2019

**Prepared by  
Punjab State Load Despatch Centre**

**To be approved by  
Punjab State Electricity Regulatory Commission**

## 1. OUTLINE:-

This procedure is in accordance with the Punjab State Electricity Regulatory Commission (Forecasting, Scheduling, Deviation Settlement and Related Matters of Solar and Wind Generation Sources) Regulations, 2019, hereinafter referred as "the Regulations". All applicants shall abide by the provisions of the Regulations .

## 2. Definitions and Interpretation

- i. **'Absolute Error'** means the absolute value of the error in actual generation of wind or solar generators with reference to scheduled generation and the 'Available Capacity (AvC)', as calculated using the following formula for each 15minute time block;

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

- i. **'Act'** means the Electricity Act, 2003 (36 of 2003);
- ii. **'Actual drawal'** in a time-block means the electricity drawn by a buyer, as the case may be, as measured by the interface meters
- iii. **'Actual injection'** in a time-block means electricity generated or supplied by the seller, as the case may be, measured by the Interface meters;
- iv. **'Available Capacity (AvC)'** for wind or solar generators, which are State Entities, means the cumulative rating of wind turbines or solar inverters that are capable of generating power in a given time-block;
- v. **'Beneficiary'** means a person purchasing electricity generated from a generating station including a captive generating station;
- vi. **'Buyer'** means a person, including beneficiary, distribution licensee or open access consumer, purchasing electricity through a transaction scheduled in accordance with the regulations applicable for short-term open access, medium-term open access and long-term access
- vii. **'Central Commission (CERC)'** means Central Electricity Regulatory Commission referred to in subsection (1) of Section 76 of the Act
- viii. **'Commission'** means Punjab State Electricity Regulatory Commission constituted under sub-section (1) of section 82 of the Act
- ix. **'Deviation'** in a time-block for a Seller means its total actual injection minus its total scheduled generation and for a Buyer means its total actual drawal minus its total scheduled drawal.
- x. **'Deviation Settlement Mechanism (DSM)'** means the mechanism in accordance with the regulation 6.0 of the regulations.
- xi. **'Existing RE Generator'** shall mean Wind or Solar Generator that has been commissioned prior to the date of notification of the Regulations;

- xii. **'Forecasting'** means the projection of likely future electricity generation based on scientific analysis of meteorological data and other relevant parameters
- xiii. **'Gaming'** in relation to the regulations, shall mean an intentional mis-declaration of available capacity or schedule by any seller in order to make an undue commercial gain through deviation charges;
- xiv. **'Grid Code or State Grid Code'** means the Grid Code specified by the Commission under clause (h) of sub-section (1) of Section 86 of the Act;
- xv. **'Indian Electricity Grid Code (IEGC)'** means the Grid Code specified by CERC under clause (h) of sub-section (1) of section 79 of the Act;
- xvi. **"Special Energy Meter (SEM) or Availability Based Tariff (ABT) Meter or Interface meter"** means the interface meter capable of recording data at 15-minute interval as defined in Central Electricity Authority (Installation and Operation of Meters) Regulations, 2006, as amended from time to time;
- xvii. **'Interconnection/Interface Point'** means a point at which an individual wind/solar generating plant or a group of such generating plants are connected to the transmission or distribution system, as the case may be;
- xviii. **'New RE Generator'** shall mean Wind or Solar Generator that has been commissioned subsequent to the date of notification of the Regulations.
- xix. **'Northern Regional Power Committee (NRPC)'** means a committee established by resolution by the Central Government for a Northern region for facilitating the integrated operation of the power systems in northern region.
- xx. **'Open Access Regulations'** means Punjab State Electricity Regulatory Commission (Terms and Conditions of Intra-State Open Access) Regulations, 2011, as amended from time to time;
- xxi. **'Pooling Station'** means the sub-station where pooling of generation of individual wind or solar generators is done for interfacing with the 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/dedicated feeder and terminated at a Sub Station of distribution company/STU, the sub-station of the distribution company/STU shall be considered as the pooling station for such wind or solar generator, as the case may be
- xxii. **'Qualified Coordinating Agency (QCA)'** means the agency coordinating on behalf of wind/solar generators connected to a pooling station to perform the functions and discharge the obligations as specified in the regulations.
- xxiii. **PSPCL'** means Punjab State Power Corporation Limited, a successor company of erstwhile Punjab State Electricity Board (PSEB), notified as the Distribution Licensee (discom) by Government of Punjab and entrusted with the work of Generation and Distribution business of erstwhile PSEB.

- xxiv. **'PSTCL'** means Punjab State Transmission Corporation Limited, a successor company of erstwhile Punjab State Electricity Board (PSEB), notified as State Transmission Utility (STU) by Government of Punjab and entrusted with the work of transmission business of erstwhile PSEB and responsibility to operate the SLDC. The objectives of PSTCL are to build, maintain & operate the intra-state transmission system at voltage level of 132 KV & above, undertake transmission of electricity through the intra-state transmission system, discharge all functions of planning and coordination related to the intra state transmission system, provide non-discriminatory open access and operate the SLDC.
- xxv. **'Scheduled Generation'** at any time or for a time block or any period means schedule of generation in MW or MWh ex-bus given by the State Load Despatch Centre (SLDC)
- xxvi. **'Scheduled Drawal'** at any time or for a time block or any period time block means schedule of dispatch in MW or MWh ex-bus given by the State Load Despatch Centre (SLDC).
- xxvii. **'Seller'** means a person, including a generating station, supplying electricity through a transaction scheduled in accordance with the regulations applicable for short-term open access, medium-term open access and long-term access
- xxviii. **'State Entity'** means an entity which is in the SLDC control area and whose metering and energy accounting is done at the State level
- xxix. **'State Load Despatch Centre' or 'SLDC'** means the Load Despatch Centre of the State established under sub section (1) of section 31 of the Act, responsible for co-ordinating scheduling of the state entities in accordance with the provisions of State Grid Code
- xxx. **'State Pool Account'** means a separate account to be maintained by SLDC for receipts and payments on account of deviation, specified by the Commission
- xxxi. **'Time-Block'** means a time block of 15 minutes or such shorter duration, as may be specified by the Commission, for which specified electrical parameters and quantities are recorded by Special Energy Meter, with first time block starting at 00.00 hrs.
- xxxii. **'Unscheduled Interchange (UI)'** means the deviation as per sr.no. x above.

### 3. Applicability:-

This Procedure shall be applicable to all wind and solar generators with individual capacity of 5 MW and above connected to the State Transmission System or distribution system or wind and solar generators of any capacity connected through pooling stations to the State Transmission System or distribution system with combined capacity of 5 MW and above, supplying power to the distribution company (ies) or to the third party through open access or for captive consumption through open access within or outside the State.

#### 4. The Qualified Coordinating Agency (QCA):

- i. The qualified Coordinating Agency (QCA) shall be nominated based on consensus and mutually agreed terms and conditions amongst the wind and solar generators. The wind and solar generators shall also inform SLDC to this effect. On submission of consent letter from the generators and upon meeting the stipulated requirements, the Agency shall be registered as QCA for that pooling station/common feeder/dedicated feeder.
- ii. QCA shall be the single point of contact with SLDC on behalf of its coordinated generator(S) connected to a pooling station for the following purpose:
  - a. Provide schedules with periodic revisions as per the Regulations on behalf of all the Wind/Solar Generators connected to the pooling station.
  - b. Responsible for coordination with STU/SLDC and other agencies for metering, data collection and its transmission and communication.
  - c. Undertake commercial settlements on behalf of the generators, of such charges pertaining to generation deviations only including payments to the State pool account through the concerned SLDC.
  - d. Undertake de-pooling of payment received on behalf of the generators from the State Pool account and settling them with the individual generators in accordance with the Regulations.
  - e. Undertake commercial settlement of any other charges on behalf of the generators as may be mandated from time to time.
  - f. All other ancillary and incidental matters.

QCA shall be treated as an intra-state entity for the purpose of the Regulations 2019.

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

#### 5. Qualifying Requirement for QCA:

- 5.1 As per Regulation 4.0 of PSERC (Forecasting, Scheduling, Deviation Settlement and Related Matters of Solar and Wind Generation Sources) Regulations, 2019, Wind/Solar Generators at a Pooling Sub-station shall appoint one amongst themselves or any other entity as QCA. The QCA shall be a company incorporated in India under the Companies Act, 1956/2013.

*Draft procedure in accordance with the PSERC (Forecasting, Scheduling, Deviation Settlement and Related Matters of Solar and Wind Generation Sources) Regulations, 2019*

5.2 In case of appointment of entity other than Generator(s) at Pooling Sub-Station, the Generators shall 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 F&S framework in the State.

**Operational requirements-**

- i The QCA shall have fully functional forecasting and scheduling tools to obtain the desired output.
- ii The QCA shall have the experience in the field of Wind and/or Solar Power forecasting and scheduling for 100 MW projects (including cumulative pilot projects) and a minimum period of one (1) year with appropriate accuracy levels in forecasting.
- iii The QCA shall have an experience in working in different terrain & regions, as Wind /Solar generation depends on these factors and such experience facilitates better scheduling.
- iv The QCA shall have capability to handle multiple plant owners connected to a pooling station in order to be well positioned to de-pool deviation charges.
- v The financial strength of the QCA shall be such that it shall be in a position to handle the risk of penalties due to deviation charges applicable to RE generator. Considering this, the net worth of the QCA shall be a least RS. 1.50 Crores in the previous financial year (Net worth = Share Capital + Reserve - Revaluation Reserve - Intangible Asset - Misc. Expenditure to the extent not written off - Carried Forward Losses - Liabilities), which shall reflect from its audited accounts duly certified by the Chartered Accountant.
- vi The QCA shall have a compatible system in place for seamless flow of information to and from SLDC in order to facilitate forecasting, scheduling and revision of schedule, intimation of outages/grid constraints etc. and it shall have capability to provide real time monitoring systems in place for seamless flow of information to and from SLDC.
- vii QCA shall have an established team of Renewable Resource Analysts, modeling Statisticians, Energy modelers and 24\*7 operation and monitoring team.
- viii QCA shall possess/provide the authorization/ consent letter and consent from all the RE generators connected to the pooling station or directly connected to the state network for being appointed as the QCA and from the concerned beneficiary(ies).
- ix The corresponding supporting certificates/ documents justifying qualification should be submitted along with the application for registration.
- x 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.

## 6. Roles & Responsibilities of QCA:

- i As per the Punjab State Electricity Regulatory Commission (Forecasting, Scheduling, Deviation Settlement and Related Matters of Solar and Wind Generation Sources) Regulations, 2019, QCA shall be a state entity and shall be the single point of contact between the SLDC and the RE Generators to whom it is representing in the Pooling Sub-Station.
- ii Operational head/ In-charge of Solar and Wind Generation Sources or QCA shall be responsible for scheduling for their generating station and shall notify the name, designation and contact details (phone, fax, mobile and e-mail) of Scheduling Officer for their Plant to SLDC from time to time.
- iii 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 communication with SLDC and Wind/ Solar Generators with voice recording facilities, Fax machine and inter net connection available for all the 24 hours. The QCA shall comply the instructions of the System Operator in normal condition as well as during emergencies, appropriate decisions taken by the System Operators in view of Grid security and safety.
- iv The QCA shall establish alternate voice, text and data communication with SLDC and protocol for communication with individual generators to implement the instructions of System Operators and SLDC.
- v QCA shall be responsible for declaration of Available Capacity of the Generating Station to SLDC to which it is representing.
- vi QCA shall provide pooling station wise or standalone RE generator wise Day ahead & Week ahead forecast (based on their own forecast or on the forecast done by SLDC) and Schedule as per **Annexure – VI** through a web-based application maintained by SLDC.
- vii Till the web-based application is made operational, the day ahead and week ahead schedule for each generating station or each pooling station shall be provided to the SLDC Control Room through Fax/e-mail)  
 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.  
 Provided that separate schedule for inter and or intra state transaction shall be supplied.  
 Provided further that, Generators/ QCA and Buyers shall maintain Buyer-wise schedule information and protocol for sharing the same.
- viii QCA shall provide WTG's / Inverter's static data and pooling stations details as per the proforma at **Annexure-IA** for wind, **Annexure-IB** for solar & **Annexure-IC** for pooling stations and further any change in the information furnished earlier shall be shared with SLDC within 7 working days from the change.

- ix QCA in coordination with Generator shall provide real time data for power generation parameters (at Pooling Sub-Station level) and real time generation data (turbine and inverter level) and weather data wherever available as per **Annexure-VA & VB**.
- x In case of non-availability of Real Time Data (at Turbine Level /inverter Level), QCA in coordination with Generator shall maintain and provide time block wise generation data at (turbine and inverter level) and weather data on Weekly basis:
- For wind plants, at the turbine level:  
Average wind speed, Average power generation at 15-min time block 'level
  - For solar plants, for all inverters\*  $\geq 1$  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.*
- xi QCA shall be responsible for metering and data collection, transmission and co-ordination with SLDC, RLDC, STU (PSTCL), CTU, PSPCL and other agencies as per SGC/ IEGC and PSERC/ CERC Regulations.
- xii QCA shall be responsible for the settlement of Deviation charges with the SLDC for the pooling stations/ Generators and it shall be liable to pay & receive Deviation Charges.
- xiii 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. DSM charges shall be de-pooled by the QCA amongst constituent generators on the basis of methodology mutually agreed upon by them.
- xiv QCA shall be responsible for all commercial settlements with the SLDC on behalf of wind and solar generators under its control connected to the pooling station and RE generators.
- xv 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.
- xvi QCA shall use Automatic meter reading (AMR) technologies for transfer, analysis and processing of interface meter data to SLDC in line with Metering /AMR protocol and Metering/AMR standards to be finalized by PSTCL/ PSPCL in accordance with provisions of Metering Code and CEA Metering Regulations, as amended from time to time. STU (PSTCL)/ SLDC/ distribution licensee (PSPCL), as the case may be, shall co-ordinate, facilitate and provide necessary support to Generators/ QCA for installation of Meters and AMR facilities as per the Orders/ directions of the Commission from time to time. However, until AMR system is established, the monthly energy meter reading



- shall be downloaded by the field office of PSPCL/PSTCL along with a representative of the QCA as per standard practices including ABT/Load Survey data of directly through AMR.
- xvii QCA shall abide by Punjab state Electricity Regulatory Commission (Forecasting, Scheduling, Deviation Settlement and Related Matters of Solar and Wind Generation Sources) Regulations, 2019 as amended from time to time.
  - xviii QCA Shall furnish the PPA rates on notarized affidavit as per **Annexure-IVA**, for the purpose of Deviation charge account preparation to SLDC supported by copy of the PPA.
  - xix QCA shall submit the indemnity bond on Non Judicial Stamp paper of value notified by the State Government from time to time, duly attested by Notary Public, (as per **Annexure-IV B**) to keep the 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.
  - xx QCA shall coordinate for periodical testing and calibration of SEMs as per CEA metering Regulations and procedures of the PSTCL/ PSPCL.

#### **7. Roles & Responsibilities of Generators:**

- i. In case of individual generators (other than in case of pooling-substation/ QCA), the roles & responsibilities shall be same as that of QCA as per Sr.No. 7 above.
- ii. The Generators in the Pooling Sub-Station shall appoint QCA and give authorization/ consent for a period of at least 2 years as per **Annexure-III** for registration of QCA at SLDC.
- iii. 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 generator.
- iv. In case of non-consensus among the generators connected through a 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.
- v. Once the QCA is registered, the generator/s shall not re-appoint another QCA, at least within two (2) 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 three (3) month to SLDC and the process of registration of new QCA shall be carried in accordance with the regulations and procedures.

- vi. All RE generators (Wind & Solar) shall save & store the block wise generator injection data or any other data desired by 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.
- vii. The QCA and RE generators shall mutually decide professional charges for scheduling and deviation settlement payable to QCA.
- viii. Non- performance of function by QCA under the Punjab state Electricity Regulatory Commission (Forecasting, Scheduling, Deviation Settlement and Related Matters of Solar and Wind Generation Sources) Regulations, 2019 as amended from time to time and this procedure, shall not in any manner absolve the solar and wind generator from meeting their responsibility provided under the Regulations and procedure.

#### **8. Roles & Responsibilities of SLDC/ STU (PSTCL):-**

- i. SLDC shall develop a web-based Software for use by QCA with login and password facility for:
  - Online registration/de-registration of QCA
  - Uploading of Day Ahead and Week Ahead Generation Forecasts/ Schedules
  - Uploading of the revisions in Schedules in accordance with these Procedures and Regulations.
  - Communication of Grid Constraints and curtailments if any.
  - Mechanism for monitoring deviations in Scheduled & Actual generation along with commercial impact for SLDC and QCAs' along with acquisition of Meter Reading of all the Interface points in the State for calculation of Deviations and Charges thereof.

Till the web-based application is made operational, the day ahead and week ahead schedule/ revisions for each generating station or each pooling station shall be provided to the office of SE/ SLDC Operations, PSTCL, Ablawal, Patiala through Fax/e-mail, at the designated contact no./ e-mail ID ( 0175-2367490, [scheduling@punjabsldc.org](mailto:scheduling@punjabsldc.org) or as notified from time to time.

- ii. SLDC shall be responsible for scheduling, communication, coordination with QCAs'. Forecasting of the renewable energy generation may be done by the SLDC by availing the services of a Forecasting Agency, however till such services are availed, the pooling station wise or standalone RE generator wise Day ahead & Week ahead forecast submitted by QCA/ Generator(s) shall be accepted by SLDC.

- iii. SLDC shall maintain records and accounts of the time block-wise Schedules, the actual generation and the deviations, for the Pooling Sub-Station and the individual Generators separately.
- iv. SLDC shall prepare/ issue Energy Account Statement (for declared Available Capacity, Scheduled Energy & Actual Injection) and DSM accounts in respect of each Pooling Station/ Standalone generator (separately for intra-state and inter-state transactions) and maintain record of the same.
- v. The following offices of SLDC/ PSTCL shall be responsible to handle the various assigned tasks in connection with implementation of Punjab State Electricity Regulatory Commission (Forecasting, Scheduling, Deviation Settlement and Related Matters of Solar and Wind Generation Sources) Regulations:-
  - a. System Operation wing (Presently headed by SE/ SLDC (Operations)) shall be responsible for
    - Day-ahead Scheduling under supervision and control of SE/SLDC (Operations).
    - Revision of schedule on real time basis.
  - b. System Logistics & IT wing (Presently headed by SE/ SLDC (Projects & Services)) shall be responsible for ensuring the real-time availability of Voice, text and real time Data Acquisition System facility provided by every wind and solar generator or QCA for transfer of information to SLDC.
  - c. Market Operation wing (Presently headed by SE/ SLDC (Open Access)), shall be responsible for preparation of Deviation Settlement Account of Solar and Wind Generation Sources.  
  
The State Energy Accounts shall be prepared by Sr.Xen/ Scheduling & Energy Accounting (presently posted under SE/ SLDC (Operations)).
  - d. Accounts Wing (Presently headed by Accounts Officer/ SLDC), shall be responsible for maintaining State Deviation Pool Account and receipt and disbursal of deviation charges.
  - e. Until Automated Meter Reading (AMR)/ remote data downloading facilities/ infrastructure is established at SLDC and recommendations of SAMAST report are implemented, Concerned Sr.Xen/DS & Sr.Xen/MMTS of PSPCL shall be responsible for timely downloading and supply of ABT/ SEM meter data (duly signed hard copy & soft copy) to the office of SE/Open Access, SLDC, PSTCL, Patiala for preparation of UI/ Deviation accounts. In case of Solar/ Wind Generators directly connected to PSTCL and selling power to 3<sup>rd</sup> party under open access or wheeling power for captive use within the

State or outside the State, concerned Sr.Xen/ P&M of PSTCL shall be responsible for downloading and supply of ABT/ SEM meter data (duly signed hard copy & soft copy) to the office of SE/Open Access, SLDC, PSTCL, Patiala in coordination with the concerned field officers of PSPCL (Sr.Xen/ DS/ MMTS).

## 9. Registration and De-Registration Procedure for QCA:

### 9.1 Registration as a QCA:-

The procedure for registering a QCA is as follows:

- i The prospective QCA shall submit application accompanied with prescribed fee as per the proforma (**Annexure-II**) for registration. After operationalization of the SLDC's web-based software, the application should be submitted online through web-based Software and copy of printed application shall be supplied to SLDC along with required documents.
- ii The QCA shall submit separate application for each Pooling Sub-Station. For each Pooling Sub-Station only one application shall be accepted from the QCA.
- iii The Application for Registration shall be accompanied by a non-refundable processing fee of Rs. 20,000/- (Twenty Thousand Rupees Only) payable through RTGS/ NEFT

In case of deposit/ receipt of less amount than the prescribed fee, the application shall not be processed until full payment is received in the account. Bank Charges, if any, shall be borne by the Open Access Customer.

**The present account details of Accounts Officer/ SLDC are State Bank of India A/c No. 65111588221 (IFSC Code: SBIN0050012).**

Any change in these account details or procedures will be conveyed to the concerned through uploading on Punjab SLDC website.

#### iv Each application for registration shall be accompanied with the following documents:-

- a. Consent letters from all the generators connected to the respective QCA pool and beneficiary (ies). A proforma consent letter attached as **Annexure-III**.
- b. WTG's/Inverter's static data and pooling Stations details as per **Annexure-IA, IB & IC**. Further, if there is any change in the information furnished, then the updated information shall be furnished to the SLDC within 7 working days.
- c. Undertaking on Non-Judicial Stamp paper of value notified by the State Government from time to time (attested by Notary) in regard to compliance for PSERC Regulations and its procedure as per **Annexure-IV B**.
- d. Certified PPA rates on notarized affidavit as per **Annexure-IVA**, for the purpose of Deviation charge account preparation to SLDC supported by copy of the PPA.

- e. Copy of Board Resolutions for Authorized Signatory/ Power of Attorney/ Authorization Letter, duly certified/ attested by Company Secretary/ C.A. in respect of the signing authority of QCA and Generator(s).
- f. CA audited balance sheets/Financial Statements/Audit reports of previous years showing net worth of QCA.
- g. Experience certificates in respect of Sr.no. 5.2 (b) &(c) above.

Note: All the photocopies supplied along with the application shall be self-attested by authorized signatory.

- v. All applications for registration complete in all respects , shall be submitted in the following office: -  
**Chief Engineer/SLDC, PSTCL**  
**SLDC Building, 220KV Sub Station, Ablowal,**  
**Patiala-147001. (E-mail:“ce-sldc@pstcl.org”)**
- vi. The time period for registration of QCA shall be (15) working days from the date of receipt of all the documents & information complete to SLDC.
- vii. Within one week from the date of registration, an interest-free corpus towards payment security shall be submitted by the QCA along with the application for the estimated amount of deviation charges. The amount of the corpus should cover DSM charges for 20% of Installed Capacity of Solar/ Wind Generator(s) @ Average Power Purchase Cost (APPC) at National Level (as determined by CERC) for 60 days, subject to minimum of Rs. 25,000/- (Twenty Five Thousand Rupees only) per MW for Solar Generation and Rs. 50,000/- (Fifty Thousand Rupees only) per MW for Wind Generation.

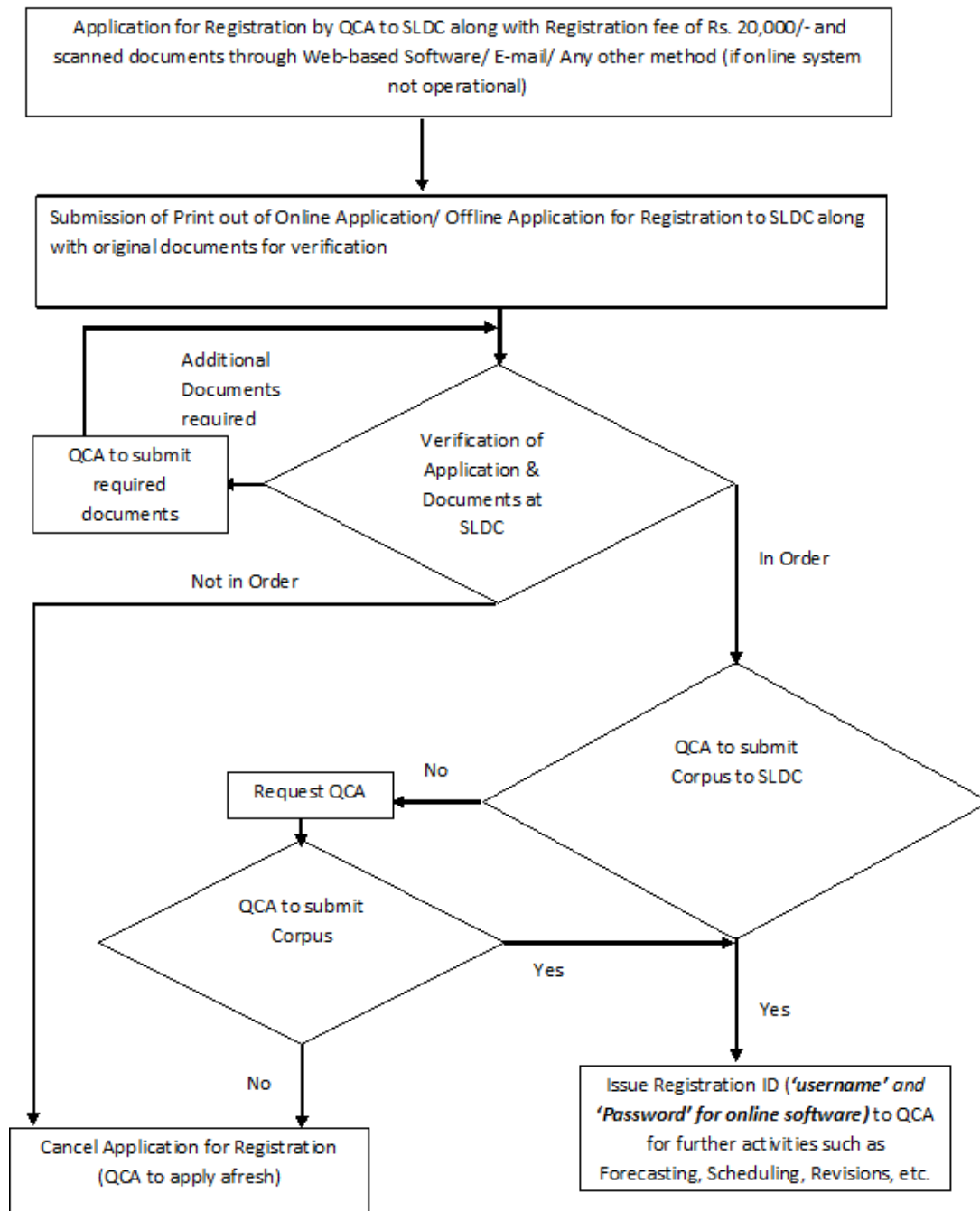
If the QCA fails to pay deviation charges within Sixty (60) days from the issue of the accounts and billing, SLDC shall utilize the corpus.

In case of insufficient/exhausted corpus, QCA shall make up corpus amount within seven (7) days from receipt of such information from SLDC. Failure to make up corpus amount within prescribed time limit, the Wind/Solar generation which QCA is representing shall not be scheduled.

- vii Once the application supplied by QCA along with the requisite documents is found in order and corpus is received, the same may be accepted by the SLDC and QCA may be allowed to schedule power for its constituent generators/pooling stations for which the necessary Registration ID (login ID and password for web-based application) shall be provided by SLDC for accessing the further activities such as uploading of day ahead/weak ahead scheduling/revisions.

- viii Incomplete application shall be liable for rejection. The reason for rejection shall be communicated to the applicant.
- i A flow-chart depicting the process for registration as QCA is given below:-

### Flow Chart for Registration of QCA



**9.2. De-Registration as a QCA:****Case - 1: Own De-registration:**

- i. The QCA may request SLDC for de-registration as QCA, however, in such case, it shall be the responsibility of the QCA to settle all the commercial obligations of both SLDC and Generators to whom it is representing.
- ii. Three (3) months prior notice to be served to all the generators to whom it is representing for de-registration with copy to SLDC.
- iii. 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.

**Case - 2: De-registration due to non-authorization of Generator:**

- iv. Three (3) months prior notice to be served by the generator to the QCA for non-authorization with copy to SLDC, subject to Clause No. 7 (ii).
- v. 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.
- vi. Before de-registration, the generator(s) shall ensure that all the commercial settlements pertaining to it has been completed by the QCA with SLDC.

**Case - 3: De-registration under default condition:**

- vii. The SLDC shall initiate the process of de-registration, if the condition(s) as per Clause No. 6 is/are violated by the QCA,
- viii. The SLDC shall initiate the process of de-registration, in case of default conditions mentioned at Clause No. 15(i).
- ix. In such case, the process of de-registration shall be initiated as per Clause No. 15 (ii).
- x. 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.

**10. Data & communication protocol:-**

In view of large volume of information needed to be exchanged in a time bound manner, the transfer of information between SLDC and Users of intra-State transmission system (IPPs/ PSPCL) shall be through internet only. However, in case of contingencies like internet failure etc., the transfer of information may be communicated through alternate mode i.e., fax/telephone on request of SLDC/ Users.

SCADA from the turbine level to Pooling Sub-Station in real time shall be provided up to the Pooling Sub-Station by QCA/ Generators. The data from the Pooling Sub-Station to SLDC shall be transmitted with IEC: 101/104 protocol along with communication without any interruption by QCA. QCA shall be responsible for providing a redundant and reliable communication link between Pooling Sub-Station and SLDC shall be made and maintained by the QCA.

The requirements for data visibility and interfacing requirements at SLDC are detailed out in **Annexure- V A & VB**.

**11. Available Capacity (AvC):**

- i. It is mandatory for a QCA to declare the block wise AvC for each plant (wind/solar) on behalf of their generators. The AvC shall be declared on day ahead basis and can be revised during the submission of intra-day schedules.
- ii. The Available Capacity (AvC) for a wind generating plant shall be applicable for the entire 24 hours in a day. Whereas considering the availability of solar irradiation only during the day, the AvC for solar generating plants shall be applicable only between 05:30 AM till 19:30 PM. Plants having mixed capacity of wind and solar generation shall consider the AvC accordingly.

**12. Forecasting & Scheduling Procedures:**

- i. Wind and solar generators, either by themselves or represented by QCAs, shall mandatorily provide to the SLDC, in a format attached (Annexure-IA, IB & IC), the technical specifications of the generating units and all other associated equipment of wind/solar generator at the beginning and thereafter, whenever there is any change in such technical specifications. The data relating to the power generation parameters and



weather related data, as applicable, shall also be mandatorily provided by such generators or QCA appointed by it, to the SLDC in real time.

- ii. Forecasting shall be done by every wind and solar generator connected to the Grid, either by itself or by a QCA on its behalf. The QCA shall coordinate the aggregation of schedules of all its generators connected to a pooling station and communicate the same to the SLDC.

Further, all existing wind and solar generators or QCA on their behalf shall establish the forecasting tools and furnish day ahead, week ahead forecasting and scheduling to SLDC within six months from the date of coming into force of the regulations and all new wind and solar generators or QCA on their behalf, shall establish the forecasting tools before commissioning of the plant and connecting to the State Transmission System or Distribution system, as the case may be. Forecasting of Wind/Solar injection on Pooling Sub-Station basis shall also be done by the SLDC for overall planning of resource requirements on day ahead basis in view of secure grid operation, by availing services of a forecasting agency. However, till such services are availed by SLDC, pooling station wise or standalone RE generator wise Day ahead & Week ahead forecast submitted by QCA/ Generator(s) shall be accepted by SLDC.

- iii. The QCA shall mandatorily provide Pooling Sub-Station wise forecasting for the Wind/Solar generators connected to Pooling Sub-Station to SLDC based on their own forecast. The QCA/ generators shall be at liberty to exercise option of adopting forecast carried out by SLDC after such forecasting is initiated by SLDC by availing services of forecast provider. In such case of QCA adopting forecast provided by SLDC, charges amounting to Rs. 3,000/- per Pooling Sub-Station per day, shall be paid by the QCA to SLDC.
- iv. Every wind and solar generator or a QCA shall submit a day ahead and week ahead schedule for each generating station or each pooling station on ex-bus basis, as the case may be **(Annexure-VI)**. Day ahead schedule shall contain wind or solar energy generation schedule at intervals of fifteen (15) minutes time-block for next day, starting from 00.00 hours of the day and prepared for all ninety six (96) time blocks of the day. Week-ahead schedule shall contain the same information for next seven days. The week will commence from Monday.
- v. The forecast/ schedules shall be in MW up three Decimal places. The fourth Decimal place shall be rounded off to 3<sup>rd</sup> Decimal place as per standard practice. Deviation Volume and Value shall be calculated accordingly.

- vi. The schedule of wind and solar generators connected to the State Grid, excluding collective transactions, may be revised by giving advance notice to SLDC. Such revisions shall be effective from fourth (4th) time block, the first being the time-block in which notice was given (**Annexure-VII**). There may be one revision for each time slot of one and half hours starting from 00.00 hours of particular day subject to maximum of sixteen (16) revisions during the day.
- vii. Process for submission of a day ahead Forecast for Intra-State Transactions shall be as per the provisions of State Grid Code read with the provisions of the Regulations.
- viii. Until start of Web Based Scheduling, the schedule will be supplied in hard copy as well as soft copy (excel) through e-mail and the receipt/ time of receipt of schedule shall be got confirmed from SLDC on telephone. SLDC shall also maintain record of such receipt of schedule in log books. Similar record will be maintained by every RE generator.
- ix. It shall be incumbent upon the RE Generator or QCA as the case may be to schedule plant capabilities faithfully, i.e., according to their best assessment. Any intentional mis-declaration of Available Capacity or schedule to the SLDC for its own undue commercial gain through deviation charges or that of a generator shall be considered as gaming and shall be liable to action under appropriate provisions of the Act or the Regulations.
- x. The operating & maintenance log books of the generating station shall be available for review by the SLDC. These books shall keep record of machine operation and maintenance.
- xi. The schedules provided by the QCA/ generator(s) shall be accepted by SLDC without any revision (being must-run generating stations) except in case of real time curtailment. Such schedules in respect of all RE Generators shall be collectively uploaded on Punjab SLDC website.
- xii. The Revision No. shall start from -1 (for first DC to be submitted by 10:00 Hrs of preceding day) and will be increased step-by-step as 0, 1, 2, 3.....n (for subsequent revisions).
- xiii. The last (nth) revision shall be considered as Implemented schedule by SLDC for preparation of State Energy Account & deviation account, based on which payment of Energy Charges shall be made by discom(s) to RE Generators in line with the provisions of PPA.

- xiv. In case the schedule for the next day is not received by specified time, SLDC shall prepare the same on its behalf based on the previous day schedule/ net quantum tied-up for injection under PPA.
- xv. In the event of contingencies, transmission constraints, congestion in network, threat to system security, the transaction of RE generators already scheduled by SLDC may be curtailed as per the provisions of State Grid Code for ensuring secure and reliable system operation **(Annexure-VIII)**.
- xvi. If, at any point of time, SLDC observes that there is need for revision of the schedules in the interest of better system operation, it may do so on its own and in such cases, the revised schedules shall become effective from the 4th time block, counting the time block in which the revised schedule is issued by SLDC to be the first one.
- xvii. To discourage frivolous revisions, SLDC may, at its sole discretion, refuse to accept requisition schedule/capability changes of less than two (2) percent of previous schedule/capability.
- xviii. In case of any grid disturbance, the schedule generation of all the generating stations and schedule drawl of the discom shall be deemed to have been revised to be equal to their actual generation/drawl for all the time blocks affected by the grid disturbance and its duration shall be done by SLDC.
- xix. Generation schedules and drawal schedules issued/revised by SLDC shall become effective from designated time block irrespective of communication success.
- xx. RE Generators shall promptly inform SLDC of the tripping of a Generating Unit, with reasons & shall submit a more detailed report of Generating Unit tripping to SLDC on monthly basis.
- xxi. SLDC shall carry out scheduling and accounting for Pooling Sub-Station as a whole and the QCA shall de-pool the deviation charges among respective generators separately based on the mechanism developed within themselves. However, in case of Intra and Inter-State transactions, separate feederwise forecast (for Intra & Inter-State) shall be submitted by the QCA. In such case, SLDC shall separately schedule the power accordingly.
- xxii. The final/ implemented schedules issued by SLDC shall be open to all Users for any checking / verification, for a period of 7 days. In case any mistake / omission is detected

by SLDC or pointed out by User, the SLDC shall forthwith make a complete check and rectify the same. PSPCL shall be responsible to verify the same and inform SLDC for any correction.

- xxiii. Intra-State Open Access transactions by RE generators shall be governed as per the provisions of PSERC (Terms & Conditions for Intra-State Open Access) Regulations, 2011, as amended from time to time. Similarly Inter-State Open Access transactions by RE generators shall be governed as per the provisions of CERC (Open Access in Inter-State Transmission) Regulations, 2008, as amended from time to time. Provisions of PSERC (Harnessing of Captive Power Generation) Regulations, 2009 shall also be applicable for captive use of RE generation.

### **13. Metering Requirement:**

- i. Concerned RE Generators shall be responsible for providing & maintaining required metering equipment along with specified communication facilities as per CEA metering regulations for the purpose of proper Energy Accounting in line with State Grid Code requirement. Automated Meter Reading (AMR) system shall be used for communicating interface data at SLDC. Internal clock of the interface meter shall be time synchronised with GPS.
- ii. Concerned field offices of PSPCL (Sr.Xen/ DS & Sr.Xen/ MMTS) shall be responsible for time to time checking/ testing of metering equipment, thus ensuring healthiness of metering equipment & correctness of ABT data. IPP shall be responsible for commissioning GPS time synchronization and monitoring metering equipment from time to time. The detection and Correction of Real Time Clock (RTC) time drift of ABT meters shall be done by concerned Sr.Xen/ MMTS in line with the prescribed procedures developed by metering organization of PSPCL. In case of Solar/ Wind Generators directly connected to PSTCL and selling power to 3<sup>rd</sup> party under open access or wheeling power for captive use, concerned Sr.Xen/ P&M of PSTCL shall be responsible for checking/ testing of metering equipment, detection and Correction of Real Time Clock (RTC) time drift in coordination with the concerned field officers of PSPCL (Sr.Xen/ DS/ MMTS).
- iii. In case of any problem or reported defectiveness/fault in metering equipment, the matter shall be referred to concerned field office (Sr.Xen/ DS) of PSPCL, which will investigate and take up the matter with concerned Nodal Officer of PSPCL (PP&R). If required, RE Generators shall refer/take-up the matter in the Protection Co-ordination Committee (PCC), depending upon the nature of issue. In case of any defect/ change in metering equipment, SLDC shall be intimated immediately.

- iv. QCA shall provide data telemetry at the turbine/inverter level to the SLDC and shall ensure the correctness of the real-time data. The proforma data telemetry requirement for RE Generators is enclosed at Annexure-VA & VB.

#### **14. Energy Accounting & UI/ Deviation Settlement:**

- i. The day-wise energy scheduled as per implemented schedules shall form a part of State Energy Account. Monthly provisional State Energy Account (SEA) up to 25<sup>th</sup> of month will be issued by SLDC by last day of the month which will be uploaded on Punjab SLDC website for any comments/ objections/corrections. The provisional SEA will be followed by Final SEA, to be issued by 7th day of succeeding month. SLDC will be authorized to revise the Provisional as well as Final Energy Account.
- ii. Monthly State Energy accounts for Punjab prepared by SLDC shall be uploaded on SLDC website, for raising bills by all concerned. Such energy accounts shall be subject to inspection/ verification/checking and raising any objection within 15 days of date of issue. If no objection is raised, energy accounts shall be considered finalized. In case, any objection is raised, the energy accounts shall be revised accordingly. However the disputed matters shall be deliberated in Commercial and Metering Committee and finalized as per their decision. Supplementary bills/credit note shall also be raised accordingly.
- iii. The UI/ Deviation accounting shall be undertaken on the basis of the data recorded by the Special Energy Meters (SEM) installed at HV side of Generator's ex-bus/ LV side of Pooling Sub-Stations capable of recording the energy in 15-minute time blocks. The SEM shall be under the control of SPD/ Pooling Sub-Station of PSTCL/ PSPCL. Automated Meter Reading (AMR) system shall be used for communicating data/ remote downloading of data at SLDC. Internal clock of the interface meter shall be time synchronized with GPS. Besides, downloaded meter data readings shall also be forwarded to the SLDC.
- iv. The UI/ DSM account for RE Generators shall be in line with the provisions of PSERC (Forecasting, Scheduling, Deviation Settlement and Related Matters of Solar and Wind Generation Sources) Regulations, as amended from time to time. Similarly Reactive Energy Accounts shall be prepared in line with provisions of State Grid Code/ IEGC.

- v. **Weekly Energy Accounting and UI/ Deviation Settlement in accordance with Regulation 8 of the Regulations, to be operationalized after implementation of Automated Meter Reading (AMR) as per the recommendation of SAMAST:-**
- a. **By 00:00 hours on every Thursday**, the QCA shall furnish weekly meter readings of Wind/Solar generators connected to Pooling Sub-Station of the previous week starting from Monday 00:00 hrs to Sunday 24:00 Hrs, to the SLDC, in addition to the data provided to the Supervisory Data and Control Acquisition (SCADA) Centre, through the software developed for communication & data exchange with QCAs' for the purpose of energy accounting under the Regulations.
  - b. SLDC shall process the data provided by all the QCAs' and prepare the weekly Energy Account Statement (for declared available capacity, scheduled energy and actual energy injected by the RE generator(s)), **by 24:00 hours of next Tuesday**, which shall be uploaded on SLDC website. The QCA may raise weekly bills, for the energy injected/scheduled by Pooling Sub-Station or the stand-alone Generator, as the case may be, for Intra-State/ Inter-State transactions respectively in accordance with the regulations and PPA.
  - c. SLDC shall prepare the weekly UI/ DSM account for the Pooling Sub-Station or the stand-alone Generator, as the case may be, **within 7 days of issue of DSM account by NRPC for the concerned week** {e.g. if NRPC issues the DSM account for the period of Monday 00:00 hrs (say 1<sup>st</sup> day of the month) to Sunday 24:00 Hrs (say 7<sup>th</sup> day of the month) on next Tuesday (i.e. 16<sup>th</sup> day of the month), the Intra-State UI/ DSM account shall be issued by SLDC on next to next Tuesday (i.e. 23<sup>rd</sup> day of the month)}.
  - d. **Methodology for Intra-State Transactions:**  
Following criteria/ methodology shall be adopted by SLDC for preparation of DSM account in case of Intra State transactions by RE generators:-
    - 1) SLDC shall consider the Deviation Charges (D) for the State as a whole at the periphery of the State as issued by NRPC weekly DSM bills.
    - 2) SLDC shall compute the absolute error for each Pooling Sub-Station and for Generators injecting Power individually, and shall calculate the deviation charges in accordance with Regulation 6 of the regulations. The % error shall be calculated on the basis of available capacity and deviation as actual - schedule and shall be calculated by rounding up to second decimal place.

- 3) Charges towards sale of Energy shall be settled by the Procurer on the basis of actual generation, whereas the charges towards deviation of Energy from its given schedule shall be settled by the Generator in line with Regulation 6.1 (ii) (Table-I) of the Regulations.

Illustrative example for calculation of deviation for five Pooling Sub-Stations/ Stand-alone Generators in case of Intra-State transaction is given at **Table - 1A** below:-

**Table-1 A**

Pooling Sub-Station/ Generator wise deviation charge calculation for Intra-State Transactions (for One Time block)										
Pooling Station/ Individual Generator	Available Capacity (kWh)	Schedule (kWh)	Actual Injection (kWh)	Deviation (kWh)	Absolute Error (%)	Deviation apportioned on the basis of Absolute Error (kWh)				Deviations payable by individual Pooling Station/ Generator (Rs.)
						Upto 15%	15 to 25%	25 to 35%	>35%	
	(A)	(B)	(C)	(D) = C-B	(E) = Dx100/A	(F)	(G)	(H)	(I)	(J) = 0xF+0.5xG+1xH+1.5xI
P.S.-1	35000	25000	32500	7500	21.43%	5250	2250	0	0	2250x0.5 =1125
P.S.-2	80000	50000	52500	2500	3.13%	2500	0	0	0	0
P.S.-3	120000	75000	90000	15000	12.50%	15000	0	0	0	0
G-1	90000	50000	47500	-2500	-2.78%	2500	0	0	0	0
G-2	55000	37500	20000	-17500	-31.82%	8250	5000	3750	0	5000x0.5+3750 =6500
<b>Total</b>	<b>380000</b>	<b>237500</b>	<b>242500</b>	<b>ABS 45000</b>	<b>11.84%</b>					<b>7625</b>
Net Exchange	380000	237500	242500	5000						

- 4) Deviation charges (D) for the State as a whole at State periphery shall be allocated amongst the distribution licensee/OA consumers/conventional generators/RE generators (pooling station) in proportion to their respective absolute deviation.

Provided that the shortfall/excess in Sustained Deviation charges of the State as a whole, shall be allocated to the concerned State entities, wherever applicable, based on their actually calculated amount of Sustained Deviation charge as per CERC (Deviation Settlement Mechanism & related matters) regulations, as amended from time to time.

- 5) SLDC shall determine the impact of deviation of Wind & Solar injection at Pooling Sub-Station from schedule and its contribution on the total deviation charges at the State periphery as per NRPC weekly DSM bills.
- 6) In order to calculate impact of RE deviation at State Periphery, a virtual pool of all Pooling Sub-Stations and Stand-alone Generators shall be formed.
- 7) To determine the impact of RE deviation at State periphery, the part of DSM weekly bill issued by the NRPC shall be apportioned to the net deviation of RE generation on the basis of applicable composite per unit rate (inclusive of additional DSM or capping DSM charge) for particular time block, as detailed hereunder via example:-
- Net Deviation of RE generation at State Periphery : 5000 kWh
  - Avg. Deviation rate at State periphery : Rs.3.00/- per kWh
  - Total Deviation Charges on account of RE deviation at State periphery (D4) : Rs. 15,000/-
  - Total Deviation Charges collected from RE generators as per Regulations (R1) : Rs. 7,625/-
  - Shortfall of deviation charges on account of RE generators (D4-R1) : Rs. 7,375/-
- 8) Any such shortfall/ excess (D4-R1) in the aggregate amount of Deviation Charge payable by Solar and Wind Energy Generators at the State periphery (D4) and the amount receivable from them by the Pool Account (R1) shall be paid by the respective QCAs in proportion to their deviation reflected at the State periphery.
- 9) The apportionment of deviations of RE Pooling Sub-Stations shall be carried out for absolute deviation. Deviation percentage of each Pooling Sub-Station shall be carried out in percentage basis with respect to total absolute deviation of virtual pool (considering absolute deviations of all the Pooling Sub-Stations/ Stand-alone Generators together), as explained at **Table-1B** below:-



**Table-1 B**

Pooling Station/ Generator wise apportionment of shortfall to all Pooling Stations/ Generators in proportion to their deviation									
Pooling Station/ Individual Generator	Available Capacity (kWh)	Schedule (kWh)	Actual Injection (kWh)	Deviation (kWh)	Absolute Error (%)	Deviation Charges payable by individual Pooling Station/ Generator (Rs.)	Apportionment of Net Shortfall in Deviation Charges of State due to RE generation (Rs.7375) amongst different Pooling Stations/ generators		Total Deviation Charges payable by individual Pooling Station/ Generator (Rs.)
							% Contribution in RE Deviation	Apportioned Deviation Charges (Rs.)	
	(A)	(B)	(C)	(D) = C-B	(E) = $D \times 100 / A$	(F)	(G) = $D \times 100 / \text{ABS Total of D}$	(H) = $7375 \times G / 100$	(I) = F+H
P.S.-1	35000	25000	32500	7500	21.43%	1125	16.67%	1229	2354
P.S.-2	80000	50000	52500	2500	3.13%	0	5.56%	410	410
P.S.-3	120000	75000	90000	15000	12.50%	0	33.33%	2458	2458
G-1	90000	50000	47500	-2500	-2.78%	0	5.56%	410	410
G-2	55000	37500	20000	-17500	-31.82%	6500	38.89%	2868	9368
<b>Total</b>	<b>380000</b>	<b>237500</b>	<b>242500</b>	<b>ABS 45000</b>	<b>11.84%</b>	<b>7625</b>	<b>100%</b>	<b>7375</b>	<b>15000</b>
Net Exchange	380000	237500	242500	5000					

10) The RE Pooling Sub-Stations having deviations within +/- 15 % may not contribute to Pooling Sub-Station level deviation pool, however, this Pooling Sub-Station shall contribute to impact of RE deviation at State Periphery.

**e. Methodology for Inter-State Transactions:**

Following criteria/ methodology shall be adopted by SLDC for preparation of DSM account in case of Inter State transactions by RE generators:-

- 1) Inter-State transactions at a Pooling Sub-Station shall be permitted only if the concerned Generator or group of generators is connected through a separate feeder.
- 2) The Generator(s), through the QCA, shall submit a separate Schedule for its energy injection at Pooling Sub-Station, in accordance with these Regulations, to the SLDCs.

- 3) The Inter-State Schedule submitted by the QCA shall be grossed-up to State Periphery by applicable transmission losses at par with conventional procedures and further shall be forwarded to Regional Load Despatch Centre (RLDC) to in-convert in the State drawl schedule.
- 4) Charges towards sale of Energy shall be settled by the Procurer on the basis of scheduled generation, whereas the charges towards deviation of Energy from its given schedule shall be settled by the Generator in line with Regulation 6.2 (Table-II & III at Appendix-I) of the Regulations (*subject to the conditions specified by CERC in CERC(Deviation Settlement Mechanism & related matters) Regulations, 2014, as amended from time to time*), as explained at **Table-2A** below:-

**Table-2 A**

Pooling Sub-Station/ Generator wise deviation charge calculation for Intra-State Transactions (for One Time block)										
Pooling Station/ Individual Generator	Available Capacity (kWh)	Schedule (kWh)	Actual Injection (kWh)	Deviation (kWh)	Absolute Error (%)	Deviation apporportioned on the basis of Absolute Error (kWh)				Deviation Charges payable(+)/ receiveable(-) by individual Pooling Station/ Generator, considering PPA rate/APPC @ ₹ 3.53 per kWh (₹)
						Upto 15%	15 to 25%	25 to 35%	>35%	
	(A)	(B)	(C)	(D) = C-B	(E) = Dx100/A	(F)	(G)	(H)	(I)	(J) = 3.53xF+ 1.1x3.53xG+ 1.2x3.53xH+ 1.3x3.53xI (For Under-Injection)  3.53xF+0.9x3.53xG +0.8x3.53xH +0.7x3.53xI (For Over-Injection)
P.S.-1	35000	25000	32500	7500	21.43%	5250	2250	0	0	<b>-25681</b>
P.S.-2	80000	50000	52500	2500	3.13%	2500	0	0	0	<b>-8825</b>
P.S.-3	120000	75000	90000	15000	12.50%	15000	0	0	0	<b>-52950</b>
G-1	90000	50000	47500	-2500	-2.78%	2500	0	0	0	<b>8825</b>
G-2	55000	37500	20000	-17500	-31.82%	8250	5000	3750	0	<b>66364</b>
<b>Total</b>	<b>380000</b>	<b>237500</b>	<b>242500</b>	<b>ABS 45000</b>	<b>11.84%</b>					<b>-12267</b>
Net Exchange	380000	237500	242500	5000						

- 5) Deviation charges (D) for the State as a whole at State periphery shall be allocated amongst the distribution licensee/OA consumers/conventional generators/RE generators (pooling station) in proportion to their respective absolute deviation. Provided that the shortfall/excess in Sustained Deviation charges of the State as a whole, shall be allocated to the concerned State entities, wherever applicable, based on their actually calculated amount of Sustained Deviation charge as per CERC (Deviation Settlement Mechanism & related matters) regulations, as amended from time to time.
- 6) SLDC shall determine the impact of deviation of Wind & Solar injection at Pooling Sub-Station from schedule and its contribution on the total deviation charges at the State periphery as per NRPC weekly DSM bills.
- 7) In order to calculate impact of RE deviation at State Periphery, a virtual pool of all Pooling Sub-Stations and Stand-alone Generators shall be formed.
- 8) To determine the impact of RE deviation at State periphery, the part of DSM weekly bill issued by the NRPC shall be apportioned to the net deviation of RE generation on the basis of applicable composite per unit rate (inclusive of additional DSM or capping DSM charge) for particular time block, as detailed hereunder via example:-
- Net Deviation of RE generation at State Periphery : 5000 kWh
  - Avg. Deviation rate at State periphery : Rs.3.00/- per kWh
  - Total Deviation Charges on account of RE deviation at State periphery (D4) : Rs. 15,000/-
  - Total Deviation Charges paid to RE generators as per Regulations (R1) : - Rs. 12,267/-
  - Shortfall in deviation charges on account of RE generators (D4-R1) : Rs. 27,267/-
- 9) Any such shortfall/ excess (D4-R1) in the aggregate amount of Deviation Charge payable by Solar and Wind Energy Generators at the State periphery (D4) and the amount receivable from them by the Pool Account (R1) shall be paid by the respective QCAs in proportion to their deviation reflected at the State periphery.
- 10) The rate for deviation settlement in case of Inter-State transactions shall be based on PPA rates or in case of multiple PPAs, it will be based on

Weighted Average PPA Rate, which shall be supplied by the QCA/ Standalone generator on notarized affidavit. The inter-state transactions and their accounting shall be primarily governed by the provisions of Open Access Regulations and Deviation Settlement Mechanism regulations issued by CERC.

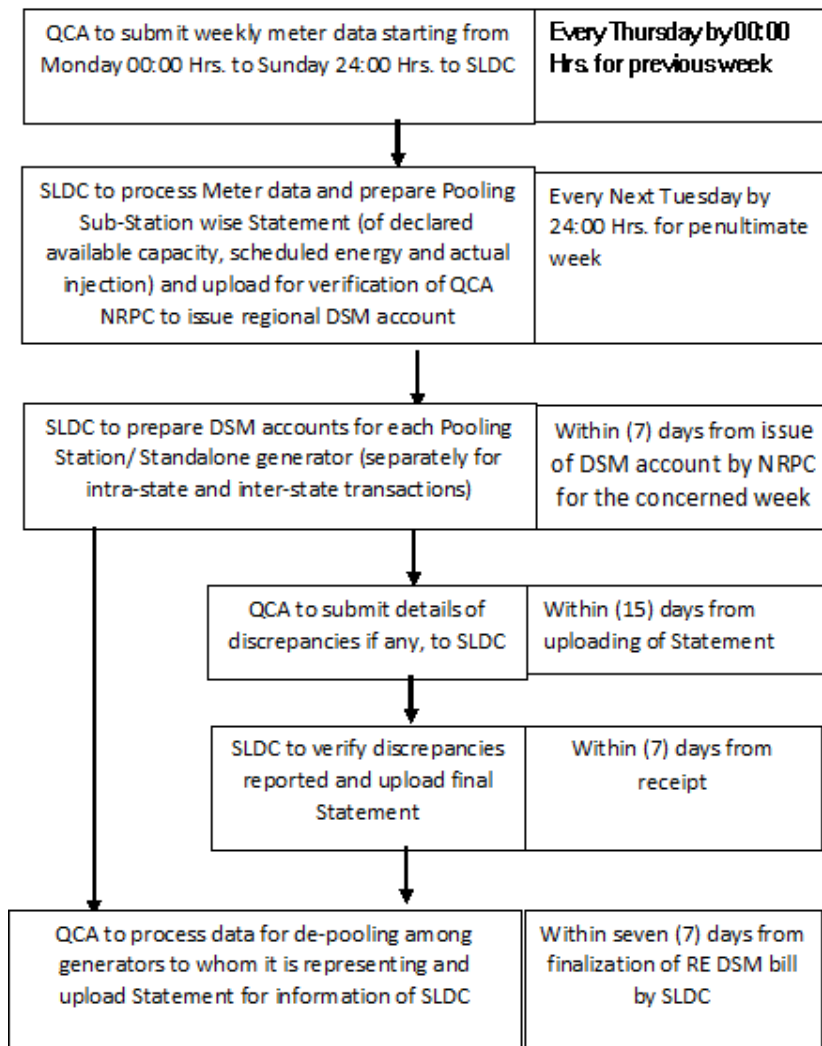
- 11) The apportionment of deviations of RE Pooling Sub-Stations shall be carried out for absolute deviation. Deviation percentage of each Pooling Sub-Station shall be carried out in percentage basis with respect to total absolute deviation of virtual pool (considering absolute deviations of all the Pooling Sub-Stations/ Stand-alone Generators together), as explained at **Table-2B** below:-

**Table-2 B**

Pooling Station/ Generator wise apportionment of shortfall to all Pooling Stations/ Generators in proportion to their deviation									
Pooling Station/ Individual Generator	Available Capacity (kWh)	Schedule (kWh)	Actual Injection (kWh)	Deviation (kWh)	Absolute Error (%)	Deviation Charges payable by individual Pooling Station/ Generator considering PPA rate/APPC @ ₹ 3.53 per kWh (₹) (Rs.)	Apportionment of Net Shortfall in Deviation Charges of State due to RE generation (Rs.27267) amongst different Pooling Stations/ generators		Total Deviation Charges payable by individual Pooling Station/ Generator (Rs.)
							% Contribution in RE Deviation	Apportioned Deviation Charges (Rs.)	
	(A)	(B)	(C)	(D) = C-B	(E) = $D \times 100 / A$	(F)	(G) = $D \times 100 / \text{ABS Total of D}$	(H) = $27267 \times G / 100$	(I) = F+H
P.S.-1	35000	25000	32500	7500	21.43%	<b>-25681</b>	16.67%	4545	-21136
P.S.-2	80000	50000	52500	2500	3.13%	<b>-8825</b>	5.56%	1515	-7310
P.S.-3	120000	75000	90000	15000	12.50%	<b>-52950</b>	33.33%	9089	-43861
G-1	90000	50000	47500	-2500	-2.78%	<b>8825</b>	5.56%	1515	10340
G-2	55000	37500	20000	-17500	-31.82%	<b>66364</b>	38.89%	10604	76968
<b>Total</b>	<b>380000</b>	<b>237500</b>	<b>242500</b>	<b>ABS 45000</b>	<b>11.84%</b>	<b>-12267</b>	<b>100%</b>	<b>27267</b>	<b>15000</b>
Net Exchange	380000	237500	242500	5000					

- 12) Deviations in respect of Inter-State and Intra-State transactions shall be accounted separately at each Pooling Sub-Station.
- 13) The SLDC shall provide separate DSM accounts for Inter-State and Intra-State transactions to the QCA, who shall settle the Deviation Charges with the concerned Generators.

- f. Calculation of impact of Wind/Solar generators at State Periphery shall be subject to revision in case the NRPC post facto revise DSM account for concern week at any time.
- g. In case of calculation of impact of Wind/Solar generators at State periphery, an amount payable to Wind/Solar generators shall be paid if sufficient balance amount is available in RE DSM pool account. However, in case sufficient balance amount is not available, payment to Wind/Solar generators on account of impact at State periphery shall be paid when sufficient balance is made up in RE DSM pool account.
- h. The QCA/ RE Generator, as the case may be, shall communicate any discrepancies to SLDC within 15 days of issue of account, which shall be corrected forthwith by SLDC, if required, within 7 days from date of receipt of such discrepancy. Any of the discrepancies reported after 15 days shall not be considered by SLDC and in such case, the account prepared by SLDC shall be final.
- i. The process-chart pertaining to timelines for accounting by SLDC is summarized as under:-



- vi. **Monthly Energy Accounting and UI/ Deviation Settlement in accordance with Section 14.1 of the State Grid Code, being operationalized till implementation of Automated Meter Reading (AMR) as per the recommendation of SAMAST:-**
- j. For the purpose of preparation of UI Energy Accounts, the joint meter reading(s) of SEMs/ ABT Main & Check/ Standby Meters shall be downloaded by concerned field officers of PSPCL (Sr.Xen/ DS & Sr.Xen/ MMTS) in presence of representative of RE Generator, on 1<sup>st</sup> of every month at inter connection points between STU and IPPs. After duly verification & checking, the data shall be supplied by Sr.Xen/ MMTS to SLDC (in duly signed hard copy & soft copy) through the concerned Nodal office of PSPCL in person or via. e-mail [energyaccounting@punjabslcd.org](mailto:energyaccounting@punjabslcd.org) & [se-opac@pstcl.org](mailto:se-opac@pstcl.org) by 5<sup>th</sup> of every month or as per the provisions of PPA, whichever is earlier. The readings shall include Load-Survey (15-min) & Mid-Night (24 Hrs) data of ABT Main Meter & Check Meter installed at feeders emanating from IPPs and corresponding data of standby meters (i.e. ABT meters installed at HV Side of Generator Transformers and HV side of Station Auxiliary Transformers) or LV Side of Pooling Station, as the case may be. Copy of ABT main & check meter data shall also be forwarded to concerned CBC of PSPCL.
  - k. Based on the ABT data received, energy account statement for the actual energy injected by RE generators shall be issued by SLDC **by 10<sup>th</sup> of every month** (subject to receipt of timely data) and uploaded on SLDC website for QCAs to raise monthly bills.
  - l. Based on the ABT data received and implemented schedules, UI/ DSM Accounts for a month shall be prepared by the office of SE/ Open Access, SLDC, PSTCL, Patiala and issued on monthly basis **by last day of next month (provided that DSM accounts for the complete month have been issued by NRPC and master SEM frequency data is available)**. The methodology for preparation of DSM accounts for Intra-State as well as Inter-State transactions of Solar & Wind Generators/ Pooling Stations shall be same as elaborated in Sr.No. 14 (v) (d) & (e) above. The accounts shall be uploaded on SLDC website. Such energy accounts shall be subject to inspection/ verification/checking and raising any objection within 15 days of date of issue. If no objection is raised, energy accounts shall be considered finalized, or otherwise accounts shall be corrected forthwith by SLDC, if required, within 7 days from date of receipt of such discrepancy.
- vii The disputed matters, if any, shall be deliberated in Commercial and Metering Committee and finalized as per their decision.
- viii The QCA shall process data for de-pooling among generators to whom it is representing and supply Statement to SLDC for information within 7 days of issue of UI/ DSM account by SLDC.

**14. Deviation Charges Payment Mechanism:**

- i All the commercial transactions shall be through Electronic Clearance System (ECS) only.
- ii The QCA shall open Bank Account in any Nationalized Bank and intimate the details of the same to SLDC.
- iii The Deviation Charges shall be paid by the QCA within ten (10) days from the issue of the accounts by the SLDC.
- iv If the QCA fails to pay charges within 12 days from the date of issue of DSM account by SLDC, the defaulting generator shall pay simple interest @ 0.04% for the each day of delay.
- v The QCA shall pay the Deviation Charges to SLDC and collect it from the concerned Generators in proportion to their actual generation.
- vi All payments to the State Entities on account of charges for deviation shall be made within 2 working days of receipt of the payments in State Pool account.
- vii The responsibility of ensuring the payment of the Deviation Charges to the SLDC by the QCA shall remain to that of the concerned Generators.
- viii After successful registration of the QCA, it shall be the responsibility of the QCA to deposit corpus to ensure payment security mechanism.

**15. Mechanism For Monitoring Compliance**

The Event of breach or default of procedure and consequences thereof shall be as under:

**i. Following events shall constitute breach by QCA/ Generators:**

- a. Non-payment or delay in payment of Deviation Charges.
- b. Non-compliance of any of the terms. conditions/ rules outlined under this procedure.
- c. Non-compliance of any of the directive issued by SLDC, so long as such directives are not inconsistent with any of the provisions of PSERC (Forecasting, Scheduling, Deviation Settlement and Related Matters of Solar and Wind Generation Sources) Regulations 2019.
- d. Obtaining registration on the basis of false information or by suppressing material information.
- e. RE Generator or QCA fails to provide schedules for continuously for 10 days.
- f. Non-availability of real time data continuously for three (3) days without justified reason.
- g. In case the Available Capacity (AvC) is intentionally and repeatedly mis-declared by the QCA.

- h. Non-submission of accounts to SLDC relating to de-pooling of deviations charges prepared by the QCA.
- i. Non-payment of RE DSM charges to RE DSM Pool by QCA for consecutive three (3) weeks.
- j. In case the QCA has become insolvent/ bankrupt.
- k. In case of continued default for statutory compliance leading to declaration of wilful defaulter by Competent Authority

**ii. Consequences for event of default:**

- a. If schedule is not provided by the RE generator/QCA then the previous day's schedule for those non-submission days shall be considered and DSM charges shall be computed accordingly. The non-submission of schedule shall attract scheduling charges as per the provisions of the SLDC's ARR approved by Hon'ble PSERC as amended from time to time.
- b. In case of default, the SLDC shall issue a notice of period not less than 15 days for revocation of registration of QCA, nonscheduling of Pooling Sub-Station to which said QCA represents and disconnection from the grid and adequate opportunity to QCA/Generator to present its case before SLDC.  
In case QCA/Generator fails to address/rectify the breach expressed by the SLDC in the Notice within stipulated time, the SLDC shall proceed with revocation of registration of QCA and disconnection from grid. The payment security corpus may be forfeited in such case and the QCA/ Generator may also be debarred for a period of 2 years.

**16. SLDC Fees & Charges and other Charges:**

SLDC fee and charges including scheduling and operating charges shall be payable by QCA or RE generator, as the case may be, as specified/decided by the Punjab state Electricity Regulatory Commission. The other Charges shall be levied as per the applicable PSERC Regulations/Orders. Details of QCA Registration Fee, Forecasting fee, Schedule Revision Charges and Corpus for Payment Security enclosed at **Annexure-IX** (which shall be levied subject to approval of Hon'ble PSERC).

The payment/ billing of charges shall be in accordance with the relevant regulations (e.g. forecasting, scheduling & dsm regulations, open access regulations etc.) issued by Hon'ble PSERC from time to time.



**17. Application of Losses and Charges:**

Transmission and Distribution charges and losses shall be applicable as specified by the PSERC/ CERC from time to time.

**18. Re-dressal Mechanism:**

Any dispute in scheduling, metering, billing/ energy accounting & Commercial Settlement shall be first referred to Commercial & Metering Committee (CMC) formulated under State Grid Code. All users shall abide by the decision of CMC. The Committee shall investigate and endeavor to resolve the grievance within 30 days, and if the Committee is unable to redress the grievance, it shall be referred to the Commission by the Committee. Pending the decision of the commission, the directions of the SLDC shall be compiled by the QCA and concerned generator(s)

**19. Removal of difficulties:**

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.

**20. General:**

- i. All costs/expenses/ charges associated with the application, including bank charges, Affidavits etc. shall be borne by the applicant.
- ii. The Generators and QCA shall abide by the provisions of the Electricity Act, 2003, the PSERC Regulations and Indian Electricity Grid Code and PSERC (State Grid Code) Regulation - 2013, and applicable CERC and PSERC regulations as amended from time to time.
- iii. 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 these procedures. In order to resolve the same, this procedure shall be reviewed or revised by the SLDC with prior approval of Commission.
- iv. After approval of procedure by Hon'ble PSERC, SLDC shall undertake development of software for RE DSM and after go-live of RE DSM software there shall be trial run period of (8) weeks for ensuring implementation of RE DSM as envisaged in the regulation. Actual commercial settlement shall commence from start of week immediately after end of trial run period or from such other date to be notified separately.

**21. Annexures & Formats:**

List of Annexures and Formats are listed below:

Sr.No.	Particulars	Annexure/ Format No.
1.	Technical Data of individual Generators	
(a)	For Wind Generators	Annexure - I A
(b)	For Solar Generators	Annexure - I B
(c)	For Pooling Stations	Annexure - I C
2.	Application for Registration of QCA	Annexure - II
3.	Consent/Authorization Letter from Generator & beneficiary for appointment of QCA	Annexure-III
4.	Notarized Affidavit/ Undertakings on Stamp Paper	
(a)	PPA details of individual Generators in the Pooling Sub-Station	Annexure - IV A
(b)	Format for Indemnity Bond to be submitted by QCA	Annexure - IV B
5.	Real-time Data Telemetry requirement	Annexure - V A & V B
6.	Format for submission of Forecast/ Schedule	Annexure - VI
7.	Format for revision of Forecast/ Schedule	Annexure - VII
8.	Format for curtailment of Forecast/ Schedule by SLDC	Annexure - VIII

**Proforma for static data for wind turbine generating plants**

<b>S. No.</b>	<b>Particulars</b>
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
	Rated electrical power at Rated wind speed
	Cut in speed
	Cut out Speed
	Survival speed {Max wind speed}
	Ambient temperature for out of operation
	Ambient temperature for in operation
	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
	Hub type
	Rotor diameter
	Number of blades
	Area swept by blades
	Rated rotational speed
	Rotational Direction
	Coning angle
	Tilting angle
	Design tip speed ratio
33	Blade
	Length
	Diameter
	Material
	Twist angle

- 38 Generator  
 Generator Type  
 Generator no. of poles  
 Generator speed  
 Winding type  
 Rated Gen. Voltage  
 Rated Gen. Frequency  
 Generator current  
 Rated Temperature of generator  
 Generator cooling  
 Generator power factor  
 KW /MW@ Rated Wind speed  
 KW /MW@ peak continuous
- 51 Frequency Converter
- 52 Filter generator side
- 53 Filter grid side
- 54 Transformer  
 Transformer capacity  
 Transformer cooling type  
 Voltage  
 Winding configuration
- 59 Weight  
 Rotor weight  
 Nacelle weight  
 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 SLDC, if applicable
- 70 Distance above mean sea level
- 71 Electrical Single Line Diagram and Plant Layout
- 72 Any other data required from time to time

Note: Any change in aforementioned data/ information shall be conveyed to SLDC immediately.

**Sign & Stamp of Authorized Signatory of QCA/ Generator(s)**

**Proforma for Static data for Solar generating -Plants**

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
17. Any other data required from time to time

Note: Any change in aforementioned data/ information shall be conveyed to SLDC immediately.

**Sign & Stamp of Authorized Signatory of QCA/ Generator(s)**

**Proforma for Technical Data for Pooling Stations:-****WIND/SOLAR (132 kV GSS)/ WIND/SOLAR (220 kV GSS)/ WIND/SOLAR (400 kV GSS.)**

Sr.No.	Name of Receiving Station	Name of Company	Wind/Solar capacity in MW

Note: Any change in aforementioned data/ information shall be conveyed to SLDC immediately.

**Sign & Stamp of Authorized Signatory of QCA/ Generator(s)**

## Annexure-II

Tel :

Fax :

Email:

State Load Dispatch Centre  
Punjab State Load Dispatch Centre**QCA Registration Form  
(Regn No. \_\_\_\_ of the PSERC Regulations)**

Tick relevant box

New Registration	Change of registration	Cancel registration
------------------	------------------------	---------------------

Tick relevant box

Wind Generation	Solar Generation
-----------------	------------------

Tick relevant box

Individual	On behalf of Group of generators*
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\* If on behalf of Group of generators, attach consent/ Authorization form and copy of agreement executed with generators, if any.

Tick relevant box

Intra-State Pooling Station	Inter-State Pooling Station	Mixed Pooling Station
-----------------------------	-----------------------------	-----------------------

1	Name of the Entity			
2	Primary business (brief description)			
3	Business address			
Phone	Mobile	Fax	Email	website
4	Postal Address			
5	Contact person &			

*Draft procedure in accordance with the PSERC (Forecasting, Scheduling, Deviation Settlement and Related Matters of Solar and Wind Generation Sources) Regulations, 2019*

	designation			
Phone	Mobile	Fax	Email	
6	Name of Directors	Position	Mobile	E-mail
A				
B				
7	Financial details			
8. Pooling station represented				
Pooling station Name, Type & Address	Total installed capacity	PSTCL/ PSPCL Injecting Grid Sub Station	Voltage Level	Type (Wind/Solar)
Agreement & Appointing letter from the legal owners of WTGs.(Enclose copies)				
9. Details of Generator(s)				
Name of Generator (s)	Location of Generator(s) (Village, Tal, District)	Total unit-wise Installed Capacity (MW)	Type of transaction (Intra-State/ Inter-State)	Detail of beneficiary/ drawl point (Attach Notorized affidavit as per Format-IVA)
10. Metering Details				
Point of Injection	Main Meter	Check Meter	CT Ratio	PT Ratio



11.	Details of Registration Fee  (RTGS/ NEFT No.)			
12.	Details of Security deposit Corpus  (RTGS/ NEFT UTR No.)	Solar	MW capacity	Amount
		Wind	MW capacity	Amount
13.	Bank account Details of QCA for handling DSM mechanism	A.C No.		
		IFSC Code		
		Name of the Bank		
		Address		

Authorized Signature  
And Official Seal  
(For QCA)

Note: Any change in aforementioned data/ information shall be conveyed to SLDC immediately.

**Performa Consent Letter**

To,  
Chief Engineer,  
State Load Dispatch Centre,  
PSTCL, Ablowal

Sub: Appointment of QCA as per PSERC Forecasting, Scheduling, Deviation Settlement and related matters for wind and Solar Generation sources Regulations, 2019.

Respected Sir,

We would like to inform you that we as the Wind/Solar power generator at (name) polling station have decided to exclusively appoint ..... only as the Qualified Coordinating Agency (QCA) for Forecasting, Scheduling and Commercial Settlement, as per PSERC (Forecasting, Scheduling, Deviation settlement and related matters for wind and Solar Generation sources) Regulations, 2019

Kindly find below the details of our capacity at .....(Name) polling station having .....MW.

S.No.	Customer Name	No of WTGs/Panels	Contact Person	Mail ID & Contact No	Capacity in MW
1					...

We would like to state that hence forth the role of QCA at .... (Name) Poling station will be taken care by .....

**Contact Person (Generator 1):**.....

Address: .....

Phones (o) : ..... (M) : ..... (E-mail) : .....

**Contact Person 2 (Generator 2):** .....

(Address: .....

Phones (o) : ..... (M) : ..... (E-mail) : .....

**Contact Person 3 (Generator 3):** .....

Address: .....

Phones (o) : ..... (M) : ..... (E-mail) : .....

**Forecast Operations Desk :** .....

(o) : ..... (E-mail) : .....

This is for your kind information and records.

Regards,

<<Signing Authority Name>>

**Contact Person (Beneficiary)**  
**(concerned procurement agency)**

Address: .....

Phones (o) : .....

(M):.....(E-mail): .....

&lt;&lt;Signing Authority Designation&gt;&gt;

**Annexure-IV A**

(To be submitted on Notarized Affidavit)

Pooling Sub-Station Name: \_\_\_\_\_

Name of QCA: \_\_\_\_\_

Sr.No.	Name of Generator	Installed Capacity (MW)	PPA with	Effective Date	PPA validity Date	Rate per Unit (Rs./ kWh)

Date: \_\_\_\_\_

Sign: \_\_\_\_\_

Place: \_\_\_\_\_

Authorized Signatory

Name: \_\_\_\_\_

Designation: \_\_\_\_\_

Name of QCA: \_\_\_\_\_

Seal:

### UNDERTAKING TO BE GIVEN BY PROSPECTIVE QCA AT THE TIME OF REGISTRATION

Name: M/s \_\_\_\_\_ (Name of QCA), \_\_\_\_\_ (Postal address) \_\_\_\_\_

---

(To be provided by the QCA on a stamp paper attested by Notary Public)

1. We, as a QCA will be regulated by PSERC (Forecasting, Scheduling, Deviation Settlement and Related Matters of Solar and Wind Generation Sources) Regulations, 2019 on Wind and Solar from time to time.
2. The Deviation Settlement charges shall be as per the PSERC guidelines for which we as QCA will be responsible for the pooling stations/RE Generator for which we represent as a QCA.
3. We as QCA fulfill all the Operational requirements as per Sr. no. 5.2 of detailed procedure, as under:-
  - i We have fully functional forecasting and scheduling tools to obtain the desired output.
  - ii We have the experience in the field of Wind and/or Solar Power forecasting and scheduling for 100 MW projects (including cumulative pilot projects) and a minimum period of one (1) year with appropriate accuracy levels in forecasting.
  - iii We have an experience in working in different terrain & regions, as Wind /Solar generation depends on these factors and such experience facilitates better scheduling.
  - iv We have capability to handle multiple plant owners connected to a pooling station in order to be well positioned to de-pool deviation charges.
  - v Our financial strength of the QCA is in a position to handle the risk of penalties due to deviation charges applicable to RE generator. Our net worth is more than Rs. 1.50 Crores in the previous financial year, which reflects from our audited accounts duly certified by the Chartered Accountant.
  - vi We have a compatible system in place for seamless flow of information to and from SLDC in order to facilitate forecasting, scheduling and revision of schedule, intimation of outages/grid constraints etc. and we have capability to provide real time monitoring systems in place for seamless flow of information to and from SLDC.
  - vii We have an established team of Renewable Resource Analysts, modeling Statisticians, Energy modelers and 24\*7 operation and monitoring team.

4. As per the PSERC Regulations, we as a QCA, agree to provide the forecasting schedules to SLDC on day-ahead basis on behalf of Wind and Solar pooling stations/RE Generator connected to STU/DISCOM.
5. We as QCA agree to provide the authorization/ consent letter from all the generators connected to the pooling station/RE Generator and beneficiary(ies) for being appointed as the QCA.
6. We understand that we can revise the day ahead schedules for a maximum of 16 revisions as per the regulations.
7. We agree that if there is any deviation from the schedule, then for such energy, Deviation charges will be applicable as per the regulations and amended from time to time.
8. We shall be responsible for commercial settlements with the SLDC on behalf of wind and solar generators under its control connected to the pooling station and RE generators.
9. We understand the SLDC will compute the comprehensive Deviation charges and raise bill for the deviation on a monthly basis.
10. DSM Account shall be prepared as per PSERC (Forecasting, Scheduling, Deviation settlement and Related Matters of Solar and Wind Generation sources) Regulations, 2019
11. We as QCA will be able by PSERC (Forecasting, Scheduling, Deviation settlement and Related Matters of Solar and Wind Generation sources) Regulations, 2019 as amended from time to time for all transactions.
12. We shall establish necessary SCADA data of the inter face point and other turbine/plant data for the purpose of monitoring and billing as per procedure.
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 procedure.
14. We agree to pay Corpus for the amount equivalent to DSM charges for 20% of installed capacity @ Average Power Purchase Cost (APPC) at National Level (as determined by CERC from time to time) for 60 days period subject to minimum of Rs.25,000/MW for solar generation and Rs. 50,000/MW for wind generation.
15. We agree to provide WTG's/ Inverter's static data and pooling stations details as per the formats specified by SLDC.
16. We agree, if payments against the Charges for Deviation Charges are delayed by more than two days, i.e. beyond seven (7) working days from the date of issue of final DSM account by SLDC, the defaulting QCA shall have to pay simple interest@ 0.04% per day in addition and in case the payment is not made even after a lapse of 60 days from issuance of final DSM account, process to invoke BG shall be initiated.
17. We will be responsible to ensure healthiness of metering equipment during the period of schedule/ injection of power and will inform SLDC about defect/ change in metering equipment within 24 hrs of such defect coming to notice/ change of metering

equipment. In absence of timely receipt of such information from us, We will be responsible for any loss to SLDC/ PSTCL on this account.

18. We agree to accept the decision of Commercial & Metering Committee/ appropriate commission (CERC/PSERC)
19. We agree to bear any loss to SLDC/ PSTCL incurred on account of misrepresentation/ concealment of facts by me/us.

We undertake all operational and commercial responsibilities on behalf of the Constituents as per the prevalent PSERC Regulations and are agreeing for the above terms and conditions for registering as /QCA with SLDC, Punjab.

Details of Payment Security is enclosed

(Name and Postal address of QCA) \_\_\_\_\_

\_\_\_\_\_

For Pooling Station:

PSPCL/DISCOM 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.

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

***Note: Copy of Board Resolution of Authorized Signatory/ Power of attorney/ Authorization Letter in respect of signing authority to be enclosed.***

**GUIDELINES FOR PROVIDING TELEMETRY DATA AND COMMUNICATION SYSTEM AT SLDC, PATIALA.**

The following guidelines shall be adopted by those who are applying for Grid connectivity to provide telemetry data and communication system to SLDC, Patiala.

Documents to be furnished while applying:

- a) Single line Diagram
- b) Block diagram indicating information flow with brief details of each element

Information to be provided at actual port:

(Data to be provided on two communication channels on real time basis)

- a) Meter readings:
  - 1) Power flow (Both active and reactive)
  - 2) Voltage
  - 3) Frequency
- b) Status of Circuit Breaker
- c) Status of Isolator (Optional)

**Real-time Data Telemetry requirement for plants**

**Wind turbine generating plants**

- 1. Turbine Generation (MW/MVAR)
- 2. Wind Speed (meter/second)
- 3. Generator Status(on/off-line)-this is required for calculation of availability of the WTG
- 4. Wind Direction (degrees from true north)
- 5. Voltage (Volt)
- 6. Ambient air temperature (°C)
- 7. Barometric pressure (Pascal)
- 8. Relative humidity (in percent)
- 9. Air Density (kg/m<sup>3</sup>)

**For Solar generating Plants**

1. Solar Generation unit/Inverter.wise (MW and MVAR)
2. Voltage at interconnection point (Volt)
3. Generator/Inverter Status(on/offline)
4. Global horizontal irradiance (GHI)-Watt per meter square
5. Ambient temperature (°C)
6. Diffuse Irradiance-Watt per meter square
7. Direct Irradiance- Watt per meter square
8. Sun-rise and sun settimings
9. Cloud cover-(Okta)
10. Rainfall (mm)
11. Relative Humidity (%)
12. Performance Ratio



**Detailed Information/Guidelines for Integration of Sub-station data including RES (renewable energy sources) plants data (i.e. solar power, bio-mass, wind power etc.) with SCADA system at Punjab SLDC, Patiala.**

Integration of data with SLDC system involves termination of Field Signals, such as RTU's at Sub-stations, Solar Power Plants, other control centres etc. in the Communication Front End (CFE) equipment(s) housed in the SLDC Complex which is further connected with the SCADA system. The said SCADA system supports both IEC 60870-5-101 & IEC 60870-5-104 protocols.

The IEC 60870-5-101/104 protocols define two data classes. Class 1 data is used for time tagged or spontaneously transmitted ASDUs. Class 2 data contains periodic, cyclic data.

**I. Details of various parameters of protocols used for data communication from field to SCADA system are as under:**

**i) IEC 101/104 Protocol Parameter Details:**

Protocol Id i.e. IEC 870-5-101(Unbalanced) or IEC 870-5-104
Info object address size i.e. 2 or 3 Bytes
Info Object Address Format i.e. Structure
Link and ASDU Address Size i.e. 1 byte Link and 1 byte ASDU for <b>IEC 101</b> 0 byte Link and 2 byte ASDU for <b>IEC 104</b>
Baud Rate i.e 200 or 300 etc.(for IEC 101 only)
Character Size i.e 8(normal) (for IEC 101 only)
Configuration Type i.e. Point to point (all protocols)
Parity e.g even parity (for IEC 101 only)
Telegram Max Retries i.e. 3
Telegram Time-Out Value i.e. 10 seconds

**ii) Valid ASDU data Types for Digital Points/Binary Points:**

Type ID 1: M_SP_NA_1 – Single Point Information
Type ID 2 :M_SP_TA_1 – Single-point information with time tag
Type ID 3: M_DP_NA_1 – Double Point Information
Type ID 4: M_DP_TA_1 – Double-point information with time tag
Type ID 30:M_SP_TB_1 – Single point information with time tag CP56Time2a
Type ID 31:M_DP_TB_1 –Double point information with time tag CP56Time2a
Type ID 45 : C_SC_NA_1 – Single Command
Type ID 46 : C_DC_DA_1 – Double Command
Type ID 47 : C_RC_NA_1 – Regulating Step Command.
Type ID 58 : C_SC_TA_1 – Single Command with Time Tag (104 only)
Type ID 59 : C_DC_TA_1 – Double Command with Time Tag (104 only)
Type ID 100: C_IC_NA_1 – (General-) Interrogation command
Type ID 103: C_CS_NA_1 – Clock synchronization command

iii) **Valid ASDU data Types for Analog Points :**

Type ID 9: M_ME_NA_1 – Measured Value, normalized value
Type ID 11: M_ME_NB_1 – Measured Value, scaled value
Type ID 13: M_ME_NC_1 – Measured Value, short floating point value
Type ID 15: M_IT_NA_1 – Integrated totals

Further, Telegram addresses are provided by the vendor(s)/ RES data integrator(s). Analog Signal address to be started from 8448, Circuit Breaker address from 256 and Isolator address from 376, and Remote Control Addresses to start from 33024 etc.

II. For the purpose of integration of RTUs/SAS/RES data with the said SCADA system, all the concerned are requested to kindly go through the following information/general guidelines as reference. **Before finalising/submitting telemetry scheme to PSPCL/PSTCL for approval, the concerned person/system integrator is advised to visit Punjab SLDC, Near 220KV Grid Sub-station, Ablowal, Patiala for space requirement for their equipment.**

a) **List of Documents as required for approval :-**

- 1) Detailed Data telemetry scheme
- 2) System Architecture
- 3) Details of tools/software(s) etc. to be used to counter data hacking/cyber-attacks.
- 4) Data communication route/scheme details
- 5) Latest Single Line Diagram of Plant/Sub-Station( indicating inverter capacity in MW )
- 6) Database/telegram addresses of each type of signal( as per details given in Para (B) Below.
- 7) Test Reports of all hardware to be installed by the firm.
- 8) Any other document(s) as deemed necessary from time to time

**Note :** Documents to be submitted should be arranged as per the above order/sequence.

b) **Details of Signals**

1) Analog Signals

- a. **Generating Units/Inverters :** Unit wise Active & Reactive Power (MW & MVAR)
- b. **Lines :** Active & Reactive Power (MW & MVAR)
- c. **Bus Bar:** Voltage (KV)
- d. **Frequency - Hz.**

2) **Digital Signals**

- a. Circuit Breaker Status (On/Off)
- b. Isolator Status (On/Off)
- c. Sequence of Events
- d. Remote Control of Circuit Breakers (if any)

3) **Energy Meter data (KW/KWH)**

- a. Import
- b. Export
- c. Net

**c) Telemetry system/Infrastructure Requirements :**

- 1) RTUs/SAS/RES vendor(s)/system integrator shall be required to provide/install & commission required telemetry system/ Infrastructure at their own risk & cost at their respective site(s) and at SLDC, Ablowal, Patiala (i.e. hardware, communication connectivity, mounting arrangements, cables/wires etc. including tools/software(s) to counter data hacking/cyber-attacks etc. as per the approval conveyed by PSPCL/PSTCL/SLDC for successful integration of their remote plant(s)/site(s) data. They shall ensure strict compliance of standard industry practises/safety provisions as required to complete their work to the satisfaction of PSTCL/SLDC.
- 2) RTUs/SAS/RES vendor(s)/system integrator(s) shall ensure redundancy of the telemetry system as well as Communication Link /Connectivity for round the clock availability of telemetry data of their plant(s)/site(s) in Punjab SLDC.

**Note(s):**

1. Due to space constraint in SLDC Building as mentioned above, it shall not be binding upon the PSPCL/PSTCL/SLDC to consider/approve an independent telemetry system/infrastructure for each and every RTUs/SAS/RES vendor(s)/system integrator as proposed by them.
2. As an alternative to the above, RTUs/SAS/RES vendor(s)/system integrator(s) may use existing data integration facilities as provided, as per the terms & conditions mutually agreed upon. Details of the system integrator(s) are tabled below:-

S.No	Name of Firm	Concerned Person	Cell No.	E-mail
1	Dynamic Engineers Pvt. Ltd.,Noida	Rahul Verma	9555591964	rahul.verma@depl.biz
2	MB Controls & System Pvt Ltd, Kolkata	Supriyo Paul	9811037172	spaul@mbcontrol.com
3	Process & Machines Automation Systems, Jaipur	CP Raghav	9829399928	violasupport@pmas.in
4	Rhythm Automation Limited,Noida	Anil Sharma	9818228587	anil.sharma@rhythmautomation.com
5	Secure Meters Ltd., Udaipur	Uday Gupta	9872007535	Uday.Gupta@securemeters.com
6	SmarTech Energy Services, Ghaziabad	Ashish Aggarwal	7290078297	ashish.aggarwal@smartechenergy.in
7	TAS India Private Ltd.,Pune	Vilas Pacharne	9823509550	vilas.pacharne@tasind.com

3. PSTCL(SLDC) is also in the process of creating data integration facilities (in near future) common for all vendors/ system integrator(s) details of which including modalities/charges/terms & conditions etc. as applicable shall be notified later on.
4. RTUs/SAS/RES vendor(s)/system integrator(s) shall be liable to upgrade/replace their existing telemetry system (at their own cost & risk) in compliance to meet with regulations/statutory requirements as issued by any Government agency/ CEA/CERC/PSERC/PGCIL/NRPC/FOLD/PSPCL/PSTCL/SLDC etc. from time to time. There shall be no financial implications to PSPCL/PSTCL/SLDC.

5. RTUs/SAS/RES vendor(s)/system integrator(s) shall be liable to pay the charges (in addition to the above), if any, as decided/levied by Government of India/Punjab/CEA/CERC/PSERC/FOLD/PSPCL/PSTCL/SLDC etc. from time to time.

**d) Other General Requirements (for RTUs/SAS/RES vendor(s)/system integrator(s)) :**

- 1) They shall be required to get all the requisite prior approval from concerned offices of PSPCL as well as PSTCL(Punjab SLDC Office) before taking up any activity ( in hand).
- 2) They shall be fully responsible for proper upkeep and maintenance of their telemetry system so as to ensure round the clock availability of telemetry data in Punjab SLDC. **PSTCL/Punjab SLDC shall not be responsible in any way.**
- 3) Telemetry Data as integrated with SCADA system at SLDC Ablawal shall remain under observation for its quality /continuous availability at SLDC Control centre, Ablawal, (Patiala) for a period of minimum of 30 days from the date of it's integration before declaring the said telemetry system as "Successfully Integrated with SCADA system"
- 4) They shall also ensure cyber security audit of their telemetry system from the third party Independent agencies registered with Indian Computer Emergency Response Team, which is a functional organisation of Ministry of Electronics and Information Technology, Government of India (<http://www.cert-in.org.in/>) or other agencies only authorised by government time to time in compliance against cyber security threats and accordingly shall submit certified reports to this office within 30 days of integration of their RTU/SAS/plant data with SCADA system and subsequently submit certified reports as above every year.
- 5) In case of any failure of SCADA system/ any loss of data either due to non -compliance of Sr. no. 4 above or any other lapses in the telemetry system provided by RTUs/SAS/RES etc. vendor(s)/system integrator(s), they shall be liable to pay damages/penalties as per the provisions of various acts in place and as decided by competent authority.
- 6) They shall have to comply with the instructions issued by CEA/CERC/PSERC/PSPCL/PSTCL or any other statutory body etc. from time to time. In case of any dispute regarding hardware/software/or any other technical issues, the decision of PSTCL (SLDC) shall be applicable whatsoever.
- 7) Contact details/ e-mail Ids of all the concerned persons, including office contact details of Company(owner of plant), site engineer, Control room Number and that of the

PSTCL/PSPCL sub-station, to which RES power is proposed to be injected, shall be made available to this office & may be updated after every 3 months.

**III Contact Details of Officers/Officials of Punjab SLDC are as follows:**

S.No.	Name	Designation	Contact No.	E-mail ID
1	Er. Jatinder Singh	SE/SLDC(P&S)	9646118007	<a href="mailto:se-sldcprojects@punjabsldc.org">se-sldcprojects@punjabsldc.org</a>
2	Er. Harinder Pal	ASE/SCADA-EMS	9646112561	<a href="mailto:srxen-sldc2@pstcl.org">srxen-sldc2@pstcl.org</a>
3	Er. Ankit Bedi	AE/SCADA-EMS	9646105014	
4	Er. Narinder Sharma	AAE/SCADA-EMS	9646112817	

**ANNEXURE-VI****Format for day ahead schedule submitted by Wind/Solar Generator or QCA**

Date: \_\_\_\_\_

Name of the wind/solar Generator or QCA _____					
schedule for dated _____					
Revision No. _____					
Time of Revision _____ Hrs					
Time of Receipt by SLDC -----Hrs					
Time-Period			Available Capacity Day Ahead	Day Ahead Forecast	Day Ahead Schedule
Block	From (Hrs: MM)	To (Hrs: MM)	(MW)*	(MW)*	(MW)*
1	0:00	0:15			
2	0:15	0:30			
3	0:30	0:45			
4	0:45	1:00			
-	-	-			
-	-	-			
-	-	-			
-	-	-			
93	23:00	23:15			
94	23:15	23:30			
95	23:30	23:45			
96	23:45	24:00			
<b>Total in MWhr (for 24 Hrs)</b>					
<b>Maximum during the day (MW)</b>					
<b>Minimum during the day (MW)</b>					
<b>Average during the day (MW)</b>					
* All figures at Ex-Bus Periphery.					
<b>(Name, designation &amp; Signatures of Scheduling Officer-Incharge)</b>					

**ANNEXURE-VI cont..****Format for week- ahead schedule submitted by Wind/Solar Generator or QCA**

Date: \_\_\_\_\_

Name of the wind/solar Generator or QCA \_\_\_\_\_

schedule for weak \_\_\_\_\_

Revision No. \_\_\_\_\_

Time of Revision \_\_\_\_\_ Hrs

Time of Receipt by SLDC \_\_\_\_\_Hrs

Time-Period			Schedule for weak ahead (Day wise)						
			Day1	Day2	Day3	Day4	Day5	Day 6	Day 7
Block	From (Hrs: MM)	To (Hrs: MM)	(MW)*	(MW)*	(MW)*	(MW)*	(MW)*	(M W)*	(M W)*
1	0:00	0:15							
2	0:15	0:30							
3	0:30	0:45							
4	0:45	1:00							
-	-	-							
-	-	-							
-	-	-							
-	-	-							
93	23:00	23:15							
94	23:15	23:30							
95	23:30	23:45							
96	23:45	24:00							
<b>Total in MWHr (for 24 Hrs)</b>									
<b>Maximum during the day (MW)</b>									
<b>Minimum during the day (MW)</b>									
<b>Average during the day (MW)</b>									

\* All figures at Ex-Bus Periphery.

(Name, designation &amp; Signatures of Scheduling Officer-Incharge)

**ANNEXURE-VII****Format for Revision on the day of Actual Generation submitted by Wind/Solar Generator or QCA**

Date: \_\_\_\_\_

Name of the wind/solar Generator or QCA _____						
schedule for dated _____						
Revision No. _____						
Time of Revision _____ Hrs						
Time of Receipt by SLDC -----Hrs						
Time-Period				Day Ahead Schedule	Current Available Capacity	Revised Schedule
Block	From (Hrs: MM)	To (Hrs: MM)	(MW)*	(MW)*	(MW)*	
1	0:00	0:15				
2	0:15	0:30				
3	0:30	0:45				
4	0:45	1:00				
-	-	-				
-	-	-				
-	-	-				
-	-	-				
93	23:00	23:15				
94	23:15	23:30				
95	23:30	23:45				
96	23:45	24:00				
<b>Total in MWhr (for 24 Hrs)</b>						
<b>Maximum during the day (MW)</b>						
<b>Minimum during the day (MW)</b>						
<b>Average during the day (MW)</b>						
<b>* All figures at Ex-Bus Periphery.</b>						
<b>(Name, designation &amp; Signatures of Scheduling Officer-Incharge)</b>						

**ANNEXURE-VIII****Format for curtailment schedule Issued by SLDC during contingency**

Date: \_\_\_\_\_

Name of the wind/solar Generator _____ or QCA _____ schedule for dated _____ Revision No. _____ Time of Revision _____ Hrs				
Time-Period				Required Schedule after curtailment
Bloc k	From MM)	(Hrs:	To MM)	(Hrs: (MW)*
1	0:00		0:15	
2	0:15		0:30	
3	0:30		0:45	
4	0:45		1:00	
-	-		-	
-	-		-	
-	-		-	
-	-		-	
93	23:00		23:15	
94	23:15		23:30	
95	23:30		23:45	
96	23:45		24:00	
<b>Total in MWhr (for 24 Hrs)</b>				
<b>Maximum during the day (MW)</b>				
<b>Minimum during the day (MW)</b>				
<b>Average during the day (MW)</b>				
<b>* All figures at Ex-Bus Periphery.</b>				
<b>(Name, designation &amp; Signatures of Scheduling Officer-Incharge)</b>				



**Abstract of Payment to be made by the QCA to SLDC**

<b>Sr. No.</b>	<b>Reason for Payment</b>	<b>Amount (Rs.)</b>	<b>Time of Payment</b>
1	Registration Charges	20,000/-	For each Pooling Sub-Station with Application for Registration
2	Scheduling Charges	2,000/-	For each day
3	Revision in Schedules	2,000/-	For every revision
4	Forecasting services	3,000/-	Per day, if availed and provided by SLDC
5	Corpus for Payment Security	Equivalent to DSM charges for 20% of installed capacity @ Average Power Purchase Cost (APPC) at National Level (as determined by CERC from time to time) for 60 days period subject to minimum of Rs.25,000/MW for solar generation and Rs. 50,000/MW for wind generation	During Registration
6	Top-up of Corpus	As required	In the event of reduction in Corpus as per Sr. No. 5
7	Any other charges	As required	As required