Postal Registration No. N. E.—771/2006-2008

The Gazette of Meghalaya

EXTRAORDINARY

PUBLISHED BY AUTHORITY

No. 383 Shillong, Friday, November 2, 2018 11th Kartika, 1940 (S. E.)

PART-IIA

MEGHALAYA STATE ELECTRICITY REGULATORY COMMISSION

NOTIFICATION

The 31st October, 2018.

No.MSERC/REGULATIONS/F&S/2018/02. - In exercise of the powers conferred under sub-section (3) of Section 32, sub-section (4) of Section 33, Clauses (b),(e) and (h) of sub-section (1) of Section 86, and Clauses (g) and (zp) of sub-section (2) of Section 181 of the Electricity Act, 2003 (36 of 2003) and all other powers hereunto enabling, and after previous publication, the Meghalaya State Electricity Regulatory Commission makes the following Regulations.

PRELIMINARY

1 Short Title, Commencement and Extent

1.1 These Regulations may be called the "Meghalaya State Electricity Regulatory Commission (Forecasting, Scheduling and Deviation Settlement for Solar and Wind Generation) Regulations, 2018".

1.2 These Regulations shall come into force from the date of their publication in the Official Gazette:

Provided that the Commercial Arrangements specified in these Regulations, and the related provisions regarding Deviation Charges and penalty, shall come into force six months thereafter.

2 Definitions

2.1 In these Regulations**,** unless the context otherwise requires:

(a) "Absolute Error" means the difference between the scheduled and the actual generation injected by Solar or Wind Energy Generators in relation to their Available Capacity (AvC) in each time block, and may be computed in percentage terms by applying the following formula:

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

(b) "Act" means the Electricity Act, 2003 (36 of 2003), as amended from time to time;

(c) "Actual Drawal" in a time block means the electricity drawn by a Procurer, as measured by the interface meters;

(d) "Actual Generation" in a time block means the electricity generated and injected into the Grid by a Generator, as measured by the interface meters;

(e) "Available Capacity" (or "AvC") of Wind or Solar Energy Generators means the cumulative capacity of the Wind turbines, Solar inverters or Solar thermal generators that are capable of generating power in a given time block;

(f) "Commission" means the Meghalaya State Electricity Regulatory Commission;

(g) "De-Pooling" means the disaggregation and apportionment of the deviations and the applicable charges among the Generators at a Pooling Sub-Station;

(h) "Deviation" in a time block means the difference between the actual injection of energy and scheduled generation;

(i) "Forecasting" means the projection of likely future electricity generation based on scientific analysis of meteorological data and other relevant parameters;

(j) "Gaming" in relation to these regulations, shall mean an intentional mis-declaration of available capacity or schedule by any generator in order to make an undue commercial gain through Charge for Deviation.

(k) "Grid Code" means the State Grid Code specified by the Commission under Section 86(1) (h) of the Act;

(l) "Indian Electricity Grid Code" (or "IEGC") means the Grid Code specified by the Central Electricity Regulatory Commission under Section 79(1)(h) of the Act;

(m) "Interface Meter" shall have the same meaning as in the Regulations of the Central Electricity Authority governing the installation and operation of Meters;

(n) "Inter-connection point" means the interface point of a generation facility with the transmission or distribution system; and shall mean, in relation to a Wind or Solar Energy facility, the line isolator on the outgoing feeder on the High Voltage (HV) side of the Pooling Sub-Station;

(o) "Pool Account" means the State Account for receipts and payments on account of deviations by Wind and Solar Energy Generators;

(p) "Pooling Sub-Station" means a Sub-Station consisting of a step-up transformer and associated switchgear to the Low Voltage (LV) side of which several Wind or Solar Energy Generators are connected:

Provided that, where a Generating Unit is connected through a common or an individual feeder terminating at a Sub-Station of a Distribution Licensee, the State Transmission Utility or the Central Transmission Utility, such Sub-Station shall be treated as the Pooling Sub-Station for such Wind or Solar Energy Generator for the purposes of these Regulations;

(q) "Procurer" means a person, including a Distribution Licensee, Trading Licensee or an Open Access consumer, procuring electricity through a transaction scheduled in accordance with the Regulations governing Open Access;

(r) "Qualified Co-ordinating Agency" (or "QCA") means the agency appointed by the Wind or Solar Energy Generators connected to a Pooling Sub-Station, or by an individual Generator connected directly to a Sub-Station, to perform the functions and discharge the obligations specified in these Regulations;

(s) "Scheduled Generation", for a time block or other time period, means the Schedule of generation in MW or MWh ex-bus provided by the State Load Despatch Centre;

(t) "Scheduled Drawal" for a time block or other time period means the Schedule of despatch in MW or MWh ex-bus provided by the State Load Despatch Centre;

(u) "Seller" means a person, including a Generating Station supplying electricity through a transaction scheduled in accordance with the Regulations governing Open Access;

(v) "State DSM Pool Account" means the State Account for receipts and payments on account of deviations by Procurers and Sellers including Wind or Solar Energy Generators;

(w) "State Entity" means a Solar or Wind Generator in the area of control of the State Load Despatch Centre and whose metering and energy accounting is undertaken at the State level;

(x) "State Load Despatch Centre" (or "SLDC") means the Load Despatch Centre of Meghalaya established under Section 31(1) of the Act and responsible for coordinating the scheduling of the State Entities in accordance with the provisions of the State Grid Code;

(y) "Time block" means a period of 15 minutes for which specified electrical parameters and quantities are recorded by a Special Energy Meter, with the first time block starting at 00.00 hrs., or such other period as the Commission may stipulate.

2.2 Words or expressions used and not defined in these Regulations shall have the meaning assigned to them in the Act, or the Rules or other Regulations framed thereunder.

PART A

GENERAL

3 Objective

3.1. These Regulations are intended to facilitate Grid integration of Wind and Solar energy generated in Meghalaya while maintaining Grid stability and security as envisaged under the State Grid Code and the Act, through forecasting, scheduling and a mechanism for the settlement of deviations by such Generators.

3.2. In order to maintain system security, stability and reliability, the SLDC shall take into consideration the forecasts of Wind and Solar generation for Week-Ahead, Day-Ahead and intra-Day operations and scheduling, and longer term forecasts for its planning.

3.3. The SLDC shall make use of the flexibility provided by conventional Generating Units and the capacity of inter-Grid tie-lines to accommodate Wind and Solar energy generation to the largest extent possible subject to Grid security.

4 Applicability

4.1 These Regulations shall apply to all Wind and Solar Energy Generators in Meghalaya connected to the Intra-State Transmission System, including those connected through Pooling Sub-Stations, and using the power generated for self-consumption or sale within or outside the State:

Provided that the combined installed capacity of the Solar or Wind Generators connected to a particular Pooling Sub-Station, or that of an individual Generator connected to some other Sub-Station, shall not be less than 1 MW.

4.2 The Commission shall review these Regulations after two years, or earlier if it considers necessary.

PART B

TECHNICAL ARRANGEMENTS: FORECASTING AND SCHEDULING CODE

5 Forecasting and Scheduling Code

5.1. This Forecasting and Scheduling Code specifies the methodology for Day-Ahead scheduling of Wind and Solar Energy Generators connected to the Intra-State Transmission Network, its revisions on a one and a half hourly basis, and the treatment of their deviations from such Schedules.

5.2. The Wind and Solar Energy Generators at each Pooling Sub-Station shall appoint a QCA:

Provided that an individual Generator not connected to a Pooling Sub-Station may opt to be its own or to appoint a separate entity as its QCA.

5.3. The QCA shall be treated as a State Entity.

5.4. Every QCA shall be registered with the SLDC in accordance with the Detailed Procedure prescribed in pursuance of Regulation 5.21.

5.5. Notwithstanding the appointment of a QCA, the onus of complying with the relevant provisions of these Regulations shall remain that of the concerned Generators, and the commercial and other arrangements between them and their QCA shall be governed by their inter-se agreements or terms of engagement.

5.6. The QCA shall be appointed by the Generators for the purposes specified in these Regulations, including but not limited to the following:

a) Meter reading and data collection and its communication, and co-ordination with the Distribution Licensees, the SLDC and other agencies;

b) De-pooling of amounts payable on behalf of the constituent Generator of the Pooling Sub-Station from the State DSM Pool Account and settling them with each Generator;

c) Settlement of the Deviation Charges specified in these Regulations with the SLDC on behalf of the Generators.

5.7. The QCA shall be the single point of contact between the SLDC and its Generators for the purposes of these Regulations.

5.8. The QCA shall furnish the technical specifications of the Generators whom it represents to the SLDC in the prescribed format, at the time of its registration or within such period thereafter as may be stipulated by the SLDC in its Detailed Procedure, and when there is a change in these specifications.

5.9. The QCA shall provide real-time data relating to the power generation parameters and weather-related data, as may be required, to the SLDC.

5.10. Meters shall be installed for energy accounting in accordance with the relevant provisions of the Central Electricity Authority (CEA) Regulations governing metering, along with telemetry /communication and Data Acquisition Systems for the transfer of information to the SLDC by the QCA.

5.11. The QCA shall furnish to the SLDC the aggregated forecasts relating to its Wind and Solar Energy Generators connected to the intra-State Transmission network, with details of their Availability.

5.12. The SLDC shall also undertake forecasting of the Wind and Solar energy generation expected to be injected into the intra-State Transmission network at each location, by engaging forecasting agencies if required, so as to enable it to better plan for the balancing resources required for secure Grid operation.

5.13. The QCA shall aggregate the Schedules of all Generators connected to a Pooling Sub-Station and communicate to the SLDC. QCA can undertake forecasting and scheduling for multiple pooling substations, however scheduling, energy accounting and deviation monitoring for each pooling substation of wind or solar power generation shall be undertaken separately.

5.14. No Wind or Solar energy generation shall be considered for despatch by the SLDC if it is not scheduled by the QCA on behalf of the Generators in accordance with the provisions of these Regulations.

5.15. The QCA may adopt the forecast of the SLDC for preparing its Schedule or provide SLDC with a Schedule based on its own forecast, which shall be the reference Schedule for the purposes of deviation determination and settlement:

Provided that, if the QCA opts to adopt the forecast of the SLDC, the consequences of any error in such forecast which results in a deviation from scheduling shall be borne by the concerned Generators through their QCA.

5.16. The SLDC shall recover such charges as may be approved by the Commission for providing its forecasting services to the QCA; and the amount so recovered shall be treated as ‘other income’ in the Aggregate Revenue Requirement of the SLDC for the determination of its Fees and Charges.

5.17. The QCA shall provide to the SLDC a Day-Ahead and a Week-Ahead Schedule for each Pooling Sub-Station or each stand-alone Generating Station, as the case may be, to enable it to assess the Availability of energy and the margin available in the State Grid.

5.18. The Day-Ahead Schedule shall comprise the Wind or Solar energy generation to be scheduled in each 15-minute time block starting from 00:00 hours of the following day, and for all 96 time

blocks of that day; and the Week-Ahead Schedule shall contain the same information for the next seven days.

5.19. The QCA may revise the Schedule of Generators connected to the Intra-State Transmission Network (excluding collective transactions) by giving advance notice to the SLDC;

Provided that, such revisions shall be effective from the 4th time block following the time block in which notice was given;

Provided further that, there may be one revision for each time slot of one and half hours starting from 00.00 hours of a particular day, subject to a maximum of 16 revisions during the day.

5.20. The plan for data telemetry, formats of forecast submission and other modalities and requirements shall be stipulated in the Detailed Procedure to be submitted by the SLDC within three months, which the Commission shall endeavour to approve within a month thereafter.

Provided that, SLDC shall undertake stakeholder consultation by uploading the Draft Procedure on SLDC's website before submission to the Commission for approval.

5.21. The Detailed Procedure shall address the following aspects:

a) The procedure and requirements, including the payment of fees and penalties for the registration and de-registration of QCAs by the SLDC, payment security mechanism between QCA and SLDC.

b) The information and data, and the formats, required by the SLDC from the QCAs and to be provided by the SLDC to them.

c) The mode and protocol of communication for exchange of information and data between the QCAs and the SLDC.

d) The guidelines for energy and deviation accounting of Wind and Solar energy transactions under the State energy accounting framework, with illustrative examples, in accordance with the principles specified in these Regulations.

e)The mechanism for monitoring compliance of the Forecasting and Scheduling Code by the QCAs.

f) The default conditions in the State Pool Settlement by QCAs and their treatment.

5.22. The commercial impact of deviations from Schedules based on the forecasts shall be borne by the Generators through their QCAs.

5.23. Treatment for Gaming:

a) Any intentional mis-declaration of Available Capacity to the SLDC for its own undue commercial gain or that of a Generator shall be considered as gaming and shall constitute a breach of these Regulations.

b) The QCA shall be liable to pay a penalty of three times the Deviation Charges that would have been applicable had the Available Capacity been correctly declared.

c) The amount of penalty shall be payable by the QCA to the State Deviation Settlement Mechanism (DSM) Pool, through the SLDC.

d) The SLDC may, after giving due notice and as stipulated in the Detailed Procedure, cancel the registration of the QCA upon repeated events of mis-declaration.

6 Principles of appointment of QCA

6.1. The Generators at a Pooling Sub-Station may appoint one amongst themselves or any other entity as a QCA:

Provided that, for each Pooling Station, there shall be only one QCA.

Provided further, that an individual Generator not connected through a Pooling Sub-Station may opt to be its own QCA or to appoint a separate entity.

6.2. The QCA shall be appointed with the approval of at least 51% of the Generators at a Pooling Sub-Station, in terms of their combined installed capacity and on appointment, the QCA shall perform all functions assigned in these Regulations for all generators connected to the Pooling sub-station.

6.3. The Generators shall satisfy themselves that the QCA is technically and financially competent to undertake on their behalf the functions and discharge the obligations specified in these Regulations.

6.4. The terms of engagement of the QCA shall include provisions on the following aspects:

a) The respective roles and responsibilities of the QCA and Generators;

b) The metering, billing and energy accounting arrangements;

c) The modalities for recovery of Deviation Charges from the Generators and their settlement, including the principles for de-pooling;

d) The payment security mechanism and related provisions between QCA and Generators;

e) The events of default and their mitigation.

PART C

COMMERCIAL ARRANGEMENTS

7 Deviation Settlement for Intra-State Transactions

7.1 The sale of power within Meghalaya by Solar and Wind Energy Generators connected to the Intra-State Transmission Network shall be settled by the Procurers on the basis of their actual generation, whereas the Deviation Settlement shall be undertaken as specified in these Regulations.

Solar or Wind Energy Generator who deviates from its given Schedule shall be liable to pay a Deviation Charge under the provisions of these Regulations.

7.2 In respect of sale or self-consumption of power within Meghalaya, if the actual injected generation of a stand-alone Generator or the aggregate of such generation at a Pooling Sub-Station, as the case may be, differs from the scheduled generation, the Deviation Charge for the excess or shortfall shall be payable by the QCA to the Pool Account, through the SLDC, as specified in Table 1 below:

Table 1: Deviation Charge for under- or over-injection, for sale or self-consumption of power within Meghalaya

Sr.No.	Absolute Error in %age terms in 15-minute time block	Deviation Charge payable to Pool Account for Wind/Solar Generation
1	< = 15%	None*
2	>15% but <=25%	At Rs. 0.50 per unit
3	>25% but <=35%	At Rs. 0.50 per unit for the shortfall or excess beyond 15% and upto 25% + Rs. 1.00 per unit for the balance energy beyond 25% and upto 35%
4	>35%	At Rs. 0.50 per unit for the shortfall or excess beyond 15% and upto 25% + Rs. 1.00 per unit for the shortfall or excess beyond 25% and up to 35% + Rs. 1.50 per unit for the balance energy beyond 35%

[* : subject to the conditions specified in Regulation 12]

7.3. The SLDC and the 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.

7.4. The QCA shall undertake de-pooling of the energy deviations and the Deviation Charges against each Generator at the Pooling Sub-Station as specified in Regulation 16.

7.5. The QCA shall undertake the settlement of the Deviation Charges with the SLDC on behalf of the concerned Generators.

7.6. The Deviation Charges for under- or over-injection by Generators connected to the Intra-State Transmission Network and selling or consuming power outside Meghalaya shall be governed by the Regulations of the Central Electricity Regulatory Commission (CERC) governing the Inter-State Deviation Settlement Mechanism and related matters; and the accounting for this purpose shall be done by the SLDC limited to the deviations in the Intra-State Transmission Network resulting from such under- or over-injection.

8 Deviation Settlement for Inter-State Transactions

8.1 The sale or self-consumption of power outside Meghalaya by Solar and Wind Energy Generators connected to the Intra-State Transmission Network shall be settled by the Procurers on the basis of their scheduled generation.

8.2 Inter-State transactions at a Pooling Sub-Station shall be permitted only if the concerned Generator is connected through a separate feeder.

8.3 The Generator shall submit, through the QCA, a separate Schedule for its energy generation, in accordance with these Regulations, to the SLDC and the concerned Regional Load Despatch Centre (RLDC).

8.4 The SLDC shall prepare the deviation settlement account for such Generator on the basis of measurement of the deviation in the energy injected and its impact at the State periphery.

8.5 The Generator shall pay the Deviation Charges applicable within Meghalaya in case of deviations in the State DSM Pool Account, the consequences of such deviation at the Inter-State level being governed by the CERC Regulations governing the Deviation Settlement Mechanism and related matters.

8.6 The Deviation Charges for under- or over-injection by Generators connected to the Intra-State Transmission Network and selling or consuming power outside Meghalaya shall be as specified in the Annexure to these Regulations, the accounting for which shall be done by the SLDC.

9 Deviation Settlement for Inter- and Intra-State Transactions: other provisions

9.1 Deviations in respect of Inter-State and Intra-State transactions shall be accounted for separately at each Pooling Sub-Station.

9.2 The SLDC shall provide separate energy and DSM accounts for Inter-State and Intra-State transactions to the QCA, who shall settle the Deviation Charges with the concerned Generators.

PART D

IMPLEMENTATION ARRANGEMENTS

10 Implementation Procedure

10.1 **Metering**

Every Pooling Station and stand-alone Generator with installed capacity of 5 MW or above shall have a Special Energy Meter (SEM) capable of recording the energy in 15-minute time blocks as specified in the CEA Regulations governing metering.

The QCA shall furnish weekly meter readings to the SLDC by 00.00 hours on the Thursday of the previous week, in addition to the data provided to the Supervisory Data and Control Acquisition (SCADA) Centre, for the purpose of energy accounting under these Regulations.

10.2 **Energy Accounting**

The energy accounting shall be undertaken on the basis of the data recorded by the SEM referred to in Regulation 10.1.

11 Communication between QCA and SLDC

11.1 The Detailed Procedure prescribed by the SLDC shall set out the protocol for communication and exchange of information between the QCA and the SLDC, including with regard to the following aspects:

a) Communication of the Day-Ahead, intra-Day and Week-Ahead Schedule and any revisions to the SLDC.

b) Communication of the real-time generation at the Pooling Sub-Station or by the stand-alone Generator

c) Communication of Grid constraints and curtailments by the SLDC to the QCA.

11.2 The SLDC shall equip itself with the necessary Information Technology (IT)-enabled communication platform and software for communication between it and the QCA.

11.3 The QCA shall provide the IT-enabled communication software log-in details to enable the SLDC to access live data of all Schedules and deviations and facilitate the timely billing and payment of Deviation Charges.

11.4 The IT-enabled communication platform and software should enable the SLDC and QCA to exchange information, including with regard to the following:

a) Generator outages and their reasons;

b) Deviation Charges payable by the QCA;

c) Site characteristics and details of the Wind Turbines, Solar Inverters, etc.;

d) Schedules and generation handled by the QCA.

12 Deviation Accounting

12.1 The methodology for deviation settlement for the State shall be as follows:

a) The Deviation Charge (D) payable or receivable for the State as a whole at the State periphery shall first be computed by the SLDC.

b) The SLDC shall compute the impact of the deviation of the Solar and Wind Energy Generation and its contribution to the Deviation Charge (D) at the State periphery.

c) The SLDC shall compute the Absolute Error, i.e. the difference between the actual and the scheduled energy injected, in respect of each Pooling Sub-Station and each Generator feeding energy directly to another Sub-Station, and shall accordingly determine the amounts payable on account of the Deviation Charge (R) in accordance with Regulations 7 and 8.

d) SLDC shall calculate the deviation for each pooling station and for each generator who is not a part of the pooling station feeding directly to the substation, assuming (i) the share out of state level deviation charge as 'D' and (ii)receipt of deviation charge from each pooling station and for each generator who is not a part of the pooling station feeding directly to the sub-station based on the charges for deviation, as (R). Actual commercial impact for the state as a result of deviation of wind and solar generation would be D minus R.

e) This amount D minus R shall be further allocated to each pooling station and for each generator who is not a part of the pooling station feeding directly to the sub-station in proportion to their deviation.

12.2 **Settlement of Deviation Charges**

The SLDC shall compute the deviations from the Schedule, determine the Deviation Charges payable and bill the QCA accordingly.

13 Payment Mechanism for Deviation Settlement

13.1 The QCA shall pay the amount of Deviation Charges to the SLDC, and collect it from the concerned Generators in proportion to their actual generation:

Provided that the onus of ensuring the payment of the Deviation Charges to the SLDC by the QCA shall remain that of the concerned Generators.

13.2 The Deviation Charges shall be paid within ten days from the issue of the accounts and billing by the SLDC, failing which a late payment surcharge amounting to 1.25% per month shall be levied for the period of delay.

13.3 The wind/solar energy generator/QCA shall provide payment security through an irrevocable letter of credit (LC) in favour of SLDC for an amount equivalent to 1.5 times of average of

weekly deviation amount for the past four settlement periods. The details of the payment security payable shall be covered in the detailed procedure of SLDC to be formulated as per regulation 5.21.

13.4 Notwithstanding levy of interest specified in 13.2 of this regulation, for delay in payment of deviation charges, in case of failure to pay the deviation charges into the State Deviation Pool (wind and solar), the SLDC shall be entitled to encash the LC of the concerned constituent to the extent of default and the concerned constituent shall recoup the LC amount within 3 days.

13.5 All payments to the QCAs/generators entitled to receive any amount on account of charges for deviation shall be made within 2 working days of receipt of payments in the State Deviation Pool Account.

14 Intimation of Curtailment

14.1 Any curtailment imposed on the energy injection for reliable and secure Grid operation in emergency situations shall be communicated by the SLDC to the QCA through an IT-enabled communication, and no Deviation Charges shall be payable for any consequent deviations if the SLDC fails to do so.

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

15 Energy Accounting

15.1 All accounts relating to deviations shall be prepared by the QCA on a weekly basis based on inputs from the SLDC, and be accessible to the SLDC through an IT-enabled system and software.

15.2 The SLDC shall furnish the processed data on a weekly basis by Thursday mid-night for the seven-day period ending on the previous Sunday mid-night to the concerned QCA in the prescribed format, for the preparation of weekly Energy Accounts of energy from the Pooling Sub-Station or the stand-alone Generator, as the case may be.

15.3 Any discrepancy communicated by the QCA within 15 days shall be corrected forthwith by the SLDC after verification.

16 De-Pooling of Deviation Charges

The QCA shall de-pool the energy deviations and the Deviation Charges against each Generator in proportion to its actual generation.

PART E

MISCELLANEOUS

17 Power to Amend

The Commission may, at any time and on such terms as to costs or otherwise, as it may think fit, rectify any defect or error in any proceeding before it, and all acts shall be done for the purpose of determining the real question or issue arising in the proceedings.

18 Power to remove difficulties.

Where any difficulty arises in giving effect to any of the provisions of this Regulation, the Commission may, by general or special order, do anything not being inconsistent with the provisions of the Act, 2003 or Reform Act, 1998, which appears to it to be necessary or expedient for the purpose of removing the difficulties.

19 Power to relax

The Commission may be general or special order, for reasons to be recorded in writing, and after giving an opportunity of hearing to the parties likely to be affected by grant of relaxation, may relax any of the provision of these Regulations on its own motion or on an application made before it by an interested person.

20 Power to issue Practice Directions

Subject to the provisions of the Act, 2003 and this Regulation, the Commission may, from time to time, issue orders and directions in regard to the implementation of the Regulation and procedure to be followed and various matters which the Commission has been empowered by this Regulation to specify or direct, as may be considered necessary in furtherance of the objective and purpose of this Regulation.

J. B. POON,
Secretary
Meghalaya State Electricity Regulatory Commission

Date: 31st October, 2018
Place: Shillong

ANNEXURE

Framework for Deviation Charges for under- or over-injection by Solar and Wind Generators connected to the Intra-State Transmission network and selling or consuming power outside Meghalaya State

1. The Deviation Charges in respect of Solar and Wind Energy Generators connected to the Intra-State Transmission Network and selling or consuming power outside Meghalaya State shall be as follows:

a) If the actual generation is lower than scheduled, the Deviation Charges for the shortfall shall be payable by the QCA to the State DSM Pool Account as given in Table A below:

Table A: Deviation Charges in case of under-injection

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

The 'fixed rate' referred to in Table A is the Power Purchase Agreement (PPA) rate determined by the Commission under Section 62 of the Act or adopted by the Commission under Section 63. In case of multiple PPAs, the fixed rate shall be the weighted average of the PPA rates. The Solar and Wind Energy Generators shall furnish the PPA rates on affidavit to the SLDC for the purpose of preparation of the Deviation Charge account, along with copies of the PPAs.

The fixed rate for Solar and Wind Energy Captive Power Plants or Open Access Generators selling power which is not counted against the Renewable Purchase Obligation (RPO) compliance of the Procurer shall be the Average Power Purchase Cost (APPC) rate at the national level, as determined by the CERC from time to time.

b) If the actual generation is higher than scheduled, the Deviation Charges for the excess generation shall be payable to the Solar or Wind Energy Generator through the QCA from the State DSM Pool Account, as given in Table - B below:

Table B: Deviation Charges in case of over-injection

Sr. No.	%age Absolute Error in 15-minute time block	Deviation Charges payable from State DSM Pool Account
1	< =15%	At the fixed rate for the excess energy upto15%
2	>15% but <= 25%	At the fixed rate for the excess energy upto 15% + 90% of the fixed rate for excess energy beyond 15% and upto 25%
3	>25% but <=35%	At the fixed rate for the excess energy upto 15% + 90% of the fixed rate for excess energy beyond 15% and upto 25% + 80% of the fixed rate for excess energy beyond 25% and upto 35%
4	> 35%	At the fixed rate for the excess energy upto 15% + 90% of the fixed rate for excess energy beyond 15% and upto 25% + 80% of the fixed rate for excess energy beyond 25% and upto 35% +70% of the fixed rate for excess energy beyond 35%

The 'fixed rate' referred to in Table B is the PPA rate determined by the Commission under Section 62 of the Act or adopted by the Commission under Section 63. In case of multiple PPAs, the fixed rate shall be the weighted average of the PPA rates. The Solar and Wind Energy Generators shall furnish the PPA rates on affidavit to the SLDC for the purpose of preparation of the Deviation Charge account, along with copies of the PPAs.

c) The fixed rate for Solar and Wind Energy Captive Power Plants and Open Access Generators selling power which is not counted against the RPO compliance of the Procurer shall be the APPC rate at the national level, as determined by the CERC from time to time. For the balancing of the deemed RPO compliance of Procurers with respect to Schedule, the aggregate deviations by Solar and Wind Energy Generators selling power outside the State shall first be netted off for the entire Pool on a monthly basis, and any remaining shortfall in generation shall be balanced through purchase of equivalent Solar or non-Solar Renewable Energy Certificates (RECs), as the case may be, by the SLDC by utilising funds from the State DSM Pool Account. In case of a positive balance of Solar or Wind Energy generation, equivalent notional RECs shall be credited to the State DSM Pool Account and carried forward for settlement in future.

SHILLONG: Printed and Published by the Director, Printing and Stationery, Meghalaya, Shillong.
(Extraordinary Gazette of Meghalaya) No. 763 - 730 + 10 — 2 – 11 - 2018.
website:- http://megpns.gov.in/gazette/gazette.asp

Postal Registration No. N. E.—771/2006-2008

The Gazette of Meghalaya

EXTRAORDINARY

PUBLISHED BY AUTHORITY

No. 384 **Shillong, Friday, November 2, 2018** **11th Kartika, 1940 (S. E.)**

PART-IIA

MEGHALAYA STATE ELECTRICITY

REGULATORY COMMISSION

NOTIFICATION

The 31st October, 2018.

No.MSERC/POWER-QUALITY/REGULATIONS/2018/04.-In exercise of powers conferred under section 181 of the Electricity Act, 2003 (36 of 2003) read with section 61, section 57 and section 59 thereof and all other powers enabling it in this behalf, the Meghalaya State Electricity Regulatory Commission hereby makes the following regulations, after previous publication namely:

CHAPTER - 1

PRELIMINARY

1. Short Title, Extent and Commencement

(1) These regulations may be called the Meghalaya State Electricity Regulatory Commission (Power Quality) Regulations, 2018;

(2) These Regulations shall extend to the whole of the Meghalaya.

(3) These Regulations shall come into force from the date of their publication in the Official Gazette.

2. Definitions and Interpretations.–In these regulations, unless the context otherwise requires -

(1) **'Act'** means the Electricity Act, 2003 (36 of 2003);

(2) '**Authority'** means the Central Electricity Authority;

(3) **'Consumer'** means any person who is supplied with electricity for his own use by a licensee or the Government or by any other person engaged in the business of supplying electricity to the public under the Act or any other law for the time being in force and includes any person whose premises are for the time being connected for the purpose of receiving electricity with the works of a licensee, the Government or such other person, as the case may be;

(4) **'Central Commission'** means the Central Electricity Regulatory Commission;

(5) **'Commission'** means the Meghalaya State Electricity Regulatory Commission;

(6) **'Continuous Phenomenon'** means deviations from the nominal value that occur continuously over time;

(7) **'Contract Demand'** means demand in kilowatt (kW)/kilovolt ampere (kVA)/Horse Power (HP) as mutually agreed between Distribution Licensee and the Consumer and as entered into in the agreement for which Distribution Licensee makes specific commitment to supply from time to in accordance with the governing terms and conditions contained therein or equal to the sanctioned load, where the contract demand has not been provided through /in the agreement;

(8) **'Declared Supply Voltage (Uc)'** means the voltage at the consumers supply terminals declared by the supplier of electrical energy. Declared supply voltage is usually equal to the nominal voltage;

(9) **'Designated Customers'** means the customers identified as major power quality polluters due to their installed non-linear loads or generation or otherwise under these Regulations and shall interalia include commercial buildings (Healthcare, Hotels, Airports, malls etc.), IT/ITES and Banking, Finance & Service Industries (BFSI), Automobiles, Iron & Steel, Aluminium, Textile, Paper & Pulp, Chlor-Alkali, Petro-Chemical, Cement, Pharmaceuticals, Fertiliser, Food Processing, Plastic & Rubber and Railways/Metros, grid connected distributed generating resource and Electric Vehicle Charging infrastructure etc.;

(10) **'Flicker'** means the impression of unsteadiness of visual sensation induced by alight stimulus whose luminance or spectral distribution fluctuates with time. It is caused under certain conditions by voltage fluctuation changing the luminance of lamps;

(11) **'Flicker Severity'** means intensity of flicker annoyance evaluated by the following quantities:

(a) Short term severity (P_{st}) measured over a period of 10 min;

(b) Long term severity (P_{lt}) calculated from a sequence of twelve P_{st}-values over a 2 hour time interval;

(12) **'Forum'** means as defined under Meghalaya State Electricity Regulatory Commission(Consumer Grievance Redressal Forum & Electricity Ombudsman) Regulations including any amendment thereto in force from time to time ;

(13) **'Frequency'** means the number of alternating cycles per second [expressed in Hertz (Hz)];

(14) **'Grid Code'** means the Grid/Distribution Code as specified by the Meghalaya State Electricity Regulatory Commission;

(15) **'Grid Standards'** means the Grid Standards specified by the Authority;

(16) **'Harmonics'** means the sinusoidal component of a periodic wave, either Voltage or Current waveform, having a frequency that is an integral multiple of the fundamental frequency of 50 Hz;

(17) **'High Voltage'** means the voltage whose nominal r.m.s. value is more than33000 volts but less than or equal to 150000 volts as per IS 12360:1988 standard;

(18) **'Indian Standards (IS)'** means standards specified by Bureau of Indian Standards;

(19) **'IEC Standard'** means a standard approved by the International Electrotechnical Commission;

(20) **'Interconnection Point (Distribution System)'** a point on the electricity system, including a sub-station or switchyard, where the interconnection is established between the customer and the electricity system of the distribution licensee and where electricity injected into or drawn from the electricity system can be measured unambiguously for the customer;

(21) **'licensee'** means the distribution licensee;

(22) **'Low Voltage (LV)'** means the voltage whose nominal r.m.s. value is less than or equal to 1000 Volts as per IS 12360:1988 standard;

(23) **'Medium Voltage (MV)'** means the voltage whose nominal r.m.s. value is more than 1000 volts but less than or equal to 33000 volts as per IS 12360:1988 standard;

(24) **'Maximum demand load current'** means the current value at the point of common coupling calculated as the sum of the currents corresponding to the maximum 15 minute demand during each of the twelve previous months divided by 12;

(25) **'Nominal voltage (of the Distribution System) (Un)'** means the value of voltage by which the electrical installation or part of the electrical installation is designated and identified;

(26) **'Normal Operating Condition' means o**perating condition for an electricity network, where generation and load demands meet, system switching operations are concluded, faults are cleared by automatic protection systems and in the absence of:

i. temporary supply arrangement;

ii. exceptional situations such as:

a. exceptional weather conditions and other natural disasters;

b. force majeure;

c. third party interference;

d. acts by public authorities;

e. industrial actions (subject to legal requirements);

f. power shortages resulting from external events

(27) **'Nominal Frequency'** means the frequency of 50.00 Hz of the supply voltage.

(28) **'Point of Common Coupling (PCC)'** means the point of metering, or any other point on supply system of distribution licensee, electrically nearest to the particular load at which other loads are, or could be, connected. For service to industrial users (i.e., manufacturing plants) via a dedicated service transformer, the PCC is usually at the HV side of the transformer. For commercial users (office parks, shopping malls, etc.) supplied through a common service transformer, the PCC is commonly at the LV side of the service transformer.

(29) **'Power Factor' or 'Displacement Power Factor'** means the cosine of the electrical angle between the voltage and current vectors in an AC electric circuit;

(30) **'Power Quality Meter'** means a device suitable for monitoring and recording of power quality. It shall be capable of accurate measurement, monitoring and recording of harmonics, sags, swells, flickers and other power quality parameters;

(31) **'Rural areas'** mean the areas covered by Gram Panchayats, including major and minor Panchayats;

(32) **'r.m.s. (root-mean-square) value'** means square root of the arithmetic mean of the squares of the instantaneous values of a quantity taken over a specified time interval and a specified bandwidth;

(33) **'Sanctioned load'** means load in kilowatt (kW)/kilovolt ampere (kVA)/Horse Power (HP) for which the Distribution Licensee had agreed to supply from time to time subject to governing terms and conditions;

(34) **'Supply Area'** means the area within which a Distribution Licensee is authorised by his License to supply electricity;

(35) **'Supply Terminals'** means point in a distribution system designated as such and contractually fixed, at which electrical energy is exchanged between the Customer and distribution licensee. This point can differ from the electricity metering point or the point of common coupling.

(36) **'Supply Voltage'** means the r.m.s. value of the voltage at a given time at the supply terminal, measured over a given interval;

(37) **'Supply Voltage Interruption'** is a condition in which the voltage at the supply terminals is completely lost or lower than 10% of the nominal voltage condition. It can be classified as:

a) **Planned or Prearranged Supply Interruptions** means a supply interruption when network users are informed in advance;

b) **Forced or Accidental Supply Interruptions**, caused by permanent or transient faults, mostly related to external events, equipment failures or interference.

c) A Planned or forced supply interruption is classified as:

1) **Sustained or long interruption** means supply interruption is longer than 3 min;

2) **Short interruption** means supply interruption is from 20ms to 3 min;

d) For poly-phase systems, a supply interruption occurs when the voltage falls below 10% of the nominal voltage on all phases (otherwise, it is considered to be a dip).

(38) **'Supply voltage dip'** means a temporary reduction of the r.m.s. supply voltage at a given point in the electrical supply system of 10 to 90% of the declared voltage for a duration from 10 ms up to and including 1 min. Typically a dip is associated with the occurrence and termination of a short-circuit or other extreme current increase on the system or installation connected to it;

(39) **'Supply voltage dip duration'** means time between the instant at which the r.m.s. voltage falls below the start threshold and the instant at which it rises to the end threshold. For poly-phase events, a dip begins when one voltage falls below the dip start threshold and ends when all voltages are equal to or above the dip end threshold.

(40) **'Supply voltage dip end threshold'** means r.m.s. value of the supply voltage specified for the purpose of defining the end of a supply voltage dip;

(41) **'Supply voltage dip start threshold'** means r.m.s. value of the supply voltage specified for the purpose of defining the start of a supply voltage dip;

(42) **'Supply voltage dip Residual Voltage'** means minimum value of r.m.s. voltage recorded during a voltage dip;

(43) **'Supply voltage swells (temporary Power Frequency Overvoltage)**' means temporary increase in the r.m.s. supply voltage at a given point in the electrical supply system above 110 of the declared voltage for a duration from 10 ms up to and including 1 min;

(44) **'Supply voltage swell duration'** means time between the instant at which the r.m.s. voltage exceed the start threshold and the instant at which it falls below the end threshold;

(45) **'Supply voltage swell end threshold'** means r.m.s. value of the supply voltage specified for the purpose of defining the end of a supply voltage swell;

(46) **'Supply voltage swell start threshold'** means r.m.s. value of the supply voltage specified for the purpose of defining the start of a supply voltage swell;

(47) **'System Average Interruption Duration Index' (SAIDI)** means the average duration of sustained interruptions per consumer occurring during the reporting period,

determined by dividing the sum of all sustained consumer interruptions durations, in minutes, by the total number of consumers;

(48) **'System Average Interruption Frequency Index' (SAIFI)** means the average frequency of sustained interruptions per consumer occurring during the reporting period, determined by dividing the total number of all sustained consumer interruption by the total number of consumers;

(49) **'True Power Factor'** means the ratio between total active power used in a circuit (including harmonics) and the total apparent power (including harmonics) supplied from the source. True power factor is always less than displacement power factor if harmonics are present in the system;

(50) **'Transient over voltages'** means short duration oscillatory or non-oscillatory over voltages usually highly damped and with duration of few ms or in microseconds;

(51) **'Total Demand Distortion (TDD)'** means the ratio of the root mean square of the harmonic content, considering harmonic components up to the 50th order, expressed as a percent of the maximum demand current;

(52) **'Total Harmonic Distortion' or 'THD'** means the ratio of the root mean square of the current harmonic content, considering harmonic components up to the 50th order, expressed as a percent of the fundamental;

(53) **'Voltage Events'** means sudden and significant deviations from normal or desired wave shape. Voltage events typically occur due to unpredictable events (e.g. faults) or due to external causes (e.g. weather conditions);

(54) **'Voltage Fluctuation' or 'Voltage Variations'** means series of voltage changes or a cyclic variation of the voltage envelope, the magnitude of which does not normally exceed the specified voltage ranges;

(55) **'Voltage unbalance'** means a condition in a poly-phase system in which the r.m.s. values of the line-to-line voltages (fundamental component), or the phase angles between consecutive line voltages, are not all equal. The degree of inequality is usually expressed as the ratios of negative and zero sequence components to the positive sequence component;

(56) **'Urban Areas'** means the areas covered by all Municipal Corporations and other Municipalities including the areas falling under the various Urban Development Authorities, Cantonment Authorities and Industrial Estate and Townships including those specified by the Government of Meghalaya;

The words and expressions used in these regulations and not defined herein but defined in the Act or any other regulation of the Commission shall have the meaning assigned to them under the Act or any other regulation of the Commission respectively.

CHAPTER – 2

GENERAL

3. Objectives

(1) The Power Quality of the electrical system refers to both the extent of deviation or distortion in pure supply waveform and the continuity of supply. An ideal power supply is never interrupted, always within voltage and frequency tolerances and has a noise free sinusoidal waveform. Poor power quality causes performance degradation and premature failures of electrical equipment. It also results in increased system losses.

(2)Different type of disturbances that affects the power quality include Harmonics (waveform distortion), frequency deviations, voltage unbalance, voltage fluctuations, flicker, supply interruptions, transient overvoltage or surges, voltage dips and voltage swell etc. Each of these disturbances has different causes and effects.

(3)Power quality disturbances can propagate upstream or downstream and could affect other customers connected in the same supply network. Power quality monitors are available to measure all aspects of power quality.

(4)The objective of standards specified in these Regulations is to ensure the quality and reliability of electricity supplied by the distribution licensee to the end consumers and by the designated customers.

(5)Any failure by the Distribution Licensee or Designated Customer to achieve and maintain the power quality parameters specified in these Regulations shall render the Distribution Licensee or Designated Customer liable to payment of compensation under the EA 2003 to an affected entity.

4. Assessment of Power Quality

(1) The assessment of Power Quality shall consist of measuring the various parameters of the power quality and comparing them with the standards specified in these regulations.

(2) Measurement methods for assessment of Power Quality under these Regulations shall be as per applicable notified IS and in absence of IS, it shall be as per IEC 61000 - 4-30:2015

namely 'Testing and measurement techniques – Power quality measurement methods' and as amended from time to time.

(3) For three phase four-wire connections, the line to neutral voltages shall be considered. For three phase three-wire connections the line to line voltages shall be considered. For single phase connections, the supply voltage (line to line or line to neutral, according to the network user connection) shall be considered

5. Scope and extent of application

(1) These Regulations shall apply to Distribution Licensee(s) including Deemed Distribution Licensee(s), distribution franchisees and all Designated Customer(s) of electricity connected at or below 33kV voltage level.

(2) The scope of these Regulations is to specify the main characteristics of power quality of electrical supply at point of common coupling (PCC) or at supply terminals of Customers in distribution system. The characteristics of power quality of electrical supply considered in these Regulations to be controlled by distribution licensee are:

i. Supply voltage variations
ii. Supply voltage flicker
iii. Supply voltage unbalance
iv. Supply voltage dips and swells
v. Supply voltage harmonics
vi. Supply Interruptions

The characteristic of power quality of electrical supply considered in these Regulations to be controlled by designated customers is:

vii. Current harmonics

(3) These regulations unless reviewed earlier, shall remain in force from the date of notification in official gazette.

(4) The limits specified in these Regulations for power quality parameters shall apply only under normal operating conditions.

6. Roles and Responsibilities

(1) Distribution licensee shall be responsible to their consumers for supplying electricity with adequate power quality levels as defined in these Regulations.

(2) Distribution licensee shall identify strategic locations in their electrical network and install the power quality meters at all such locations to maintain power quality in their supply area.

(3) Distribution licensee to identify the designated customers which are major power quality polluters and inject harmonics into the distribution system beyond the limits specified in these Regulations.

(4) The designated customers shall be responsible to control the harmonic injection into the distribution system within the limits specified in these Regulations.

7. Redressal of Consumer Complaints with regard to Power Quality: The consumer complaints in relation to the Power Quality shall be redressed in the following manner in accordance with these Regulations as under:

(1) On receipt of a power quality complaint, the distribution licensee shall demonstrate and satisfy that it meets the requirement of Power Quality standards specified in these Regulations.

(2) In case of complaint on voltage variations, unbalance and voltage harmonics, distribution licensee shall –

i. ensure that the power quality parameters are brought within the specified limits within 2 days of the receipt of a complaint, provided that the fault is identified to a local problem.
ii. ensure that the power quality parameters are brought within the specified limits, within 10 days of the receipt of a complaint, provided that no expansion/ enhancement of the network is involved; and
iii. resolve the complaint within 180 days, provided that if up-gradation of the distribution system is required.

(3) Where, the designated customer is required to demonstrate that he meets the requirement of Power Quality standards, a reasonable period may be given to the designated customer on case to case basis.

(4) The consumer, who is aggrieved by non-redressal of his grievances of Power Quality, may make a representation for the redressal of his grievance to Grievance Redressal Forum and Ombudsman.

(5) The cost of the verification shall be borne by the distribution licensee.

CHAPTER – 3

STANDARDS OF POWER QUALITY

8. Supply Voltage Variations

(1) The supply voltage variations in LV and MV networks from declared voltage shall comply with Table given below and specified with reference to mean r.m.s. values of supply voltage measured over 10 min.

Table 1 – Supply Voltage Variation Limits for LV Systems Interconnected with Transmission System.

Supply Voltage Characteristic	**Reference Time Frame**	**Limits**
Mean r.m.s. value of the supply voltage over 10 min	95% of each period of one week	*Un ± 10 %*
	100% of time	*Un + 10 % / - 15%*

Table 2 – Supply Voltage Variation Limits for MV Systems Interconnected with Transmission System.

Supply Voltage Characteristic	**Reference Time Frame**	**Limits**
Mean r.m.s. value of the supply voltage over 10 min	99% of each period of one week	*Un ± 10 %*
	100% of time	*Un ± 15%*

Table 3 – Supply Voltage Variation Limits for LV and MV Systems not interconnected with Transmission System

Supply Voltage Characteristic	**Reference Time Frame**	**Limits**
Mean r.m.s. value of the supply voltage over 10 min	100% of time	*U*n +10 % / -15 %

Provided that:
The measurements shall be undertaken in accordance with applicable notified IS and in absence of IS, IEC 61000-4-30:2015 as amended from time to time;

For statistical evaluation, voltage variations shall be assessed for the period not less than 7 continuous days. The short time 10 min values (measured as per IEC) are accumulated over periods of one week and the 95th and 99th percentile values (i.e., those values that are exceeded for 5% and 1% of the measurement period) are calculated for each 7-day period for comparison with the recommended limits. The values are measured in normal operating condition.

For poly-phase systems, the voltage variations shall be measured in all phases of supply.

9. Supply Voltage Flicker (P_t)

The voltage flicker shall be assessed in two different severity level: Long-Term severity (P_{lt}) and Short-Term severity (P_{st}). Short term severity shall be measured over a period of 10 min and long term severity shall be calculated from a sequence of twelve P_{st}-values over a 2 hour time interval, according to the following expression:

$$P_{lt} = \sqrt[3]{\sum_{i=1}^{12} \frac{P_{st}^3}{12}}$$

The permissible limits of short-term voltage flicker and long-term voltage flicker severity for distribution licensee shall be 1.0 and 0.8 at all supply terminals 100% of the time respectively.

Provided that:

The measurements shall be undertaken in accordance with IEC 61000-4-30;

For statistical evaluation, voltage flicker shall be assessed for the period not less than 7 continuous days. The short time 10 min values are accumulated over periods of one week and the 95th percentile values (i.e., those values that are exceeded for 5% of the measurement period) are calculated for each 7-day period for comparison with the recommended limits. The values are measured in normal operating condition excluding the time period of a voltage dip.

For poly-phase systems, the voltage flicker shall be measured in all phases of supply.

10. Supply Voltage Unbalance (UB)

(1) The supply voltage unbalance in respect of three phase supply shall be assessed from the ratio of rms value of negative phase sequence component (fundamental) to the rms value of positive phase sequence component

(fundamental) of the supply voltage. The supply voltage unbalance shall be maintained less than or equal to 2% by the distribution licensee.

Provided that:

For statistical evaluation, voltage unbalance shall be assessed for the period not less than 7 continuous days. The short time 10 min values are accumulated over periods of one week and the 95th percentile values (i.e., those values that are exceeded for 5% of the measurement period) are calculated for each 7-day period for comparison with the recommended limits. The values are measured in normal operating condition.

11. Voltage Dip or Sag

(1) The Supply voltage dips shall comply with Table given below and are specified with reference to:

i. Number of events per year

ii. Event duration (t)

iii. Residual Voltage (u)

iv. Declared voltage (Uc)

Table 4: Supply Voltage Dip Limits for LV and MV Networks in Terms of Number of Events per Year.

Residual Voltage (%)	**Duration t (ms)**				
	10 ≤ t ≤ 200	**200 < t ≤ 500**	**500 < t ≤ 1000**	**1000 < t ≤ 5000**	**5000 < t ≤ 60000**
90 > u ≥ 80	30	40	10	5	5
80 > u ≥ 70	30	40	5	5	5
70 > u ≥ 40	10	40	5	5	5
40 > u ≥ 5	5	20	5	5	5

Provided that:

The voltage dips shall be measured in accordance with IEC 61000-4-30 and shall not fall outside the duration from 10 ms up to and including 1 min;
The voltage dips shall be measured in all phases of supply.

12. Voltage Swells

(1) The Supply voltage swell shall comply with Table given below and are specified with reference to:

i. Number of events per year

ii. Event duration (t)

iii. Swell Voltage (u)

iv. Declared voltage (Uc)

Table 5: Supply Voltage swell Limits for LV and MV Networks in Terms of Number of Events per Year

Swell Voltage u (%)	**Duration t (ms)**		
	10 ≤ t ≤ 500	**500 < t ≤ 5000**	**5000 < t ≤ 60000**
u ≥ 120	--	--	--
120 > u ≥ 110	--	--	--

Values may be as per relevant IEC/IEEE Standard

Provided that:

The voltage swell shall be measured in accordance with IEC 61000-4-30 and shall not fall outside the duration from 10 ms up to and including 1 min; The voltage swell shall be measured in all phases of supply.

13. Voltage Harmonics

(1) The voltage harmonic distortion of the supply voltage shall be assessed in terms of the Total Harmonic Distortion (THD_V) considering harmonic components up to the 50^{th} order. THD_V shall be taken as square root of the sum of squares of all voltage harmonics expressed as a percentage of the magnitude of the fundamental measured with following formula:-

$$THD_V = \sqrt{\sum_{h=2}^{N} V_h^2}$$

Where,

V_h represents the percent rms value of the hth harmonic voltage component, and N represents the highest harmonic order considered in the calculation.]

The distribution licensee shall control the value of THD_V measured at Point of Common Coupling (PCC) for LV and MV network to less than or equal to 8% and 5% respectively for 100% of time.

(2) The distribution licensee shall also control the mean rms values of each individual harmonic voltage measured over 10 minutes period up to the 25th harmonic order component to the values as given in table below:

Table 6: Values of Individual Harmonic Voltages of the Supply Voltage in Percent of the Fundamental Voltage

Odd Harmonics (%)						**Even Harmonics (%)**		
Not Multiple of 3			**Multiple of 3**					
harmonic	**LV**	**MV**	**harmonic**	**LV**	**MV**	**harmonic**	**LV**	**MV**
5	6	6	3	5	5	2	2	1.9
7	5	5	9	1.5	1.5	4	1	1
11	3.5	3.5	15	0.5	0.5	6 to 24	0.5	0.5
13	3	3	21	0.5	0.5			
17	2	2						
19	1.5	1.5						
23	1.5	1.5						
25	1.5	1.5						

(3) For statistical evaluation, voltage harmonics shall be assessed for the period not less than 7 continuous days. The short time 10 min values are accumulated over periods of one week and the 95th percentile values (i.e., those values that are exceeded for 5% of the measurement period) are calculated for each 7-day period for comparison with the recommended limits. The values are measured at PCC in normal operating condition.

Provided that:

The limits of each individual voltage harmonics by the distribution licensee in its electricity system, point of harmonic measurement i.e. Point of Common Coupling (PCC), method of harmonic measurement and other matters shall be in accordance with per applicable notified IS and in absence of IS, the IEEE 519-2014 namely

'IEEE Recommended Practices and Requirements for Harmonic Control in Electrical Power Systems', as modified from time to time.

14. Current Harmonics

(1) The designated customers shall limit the value of harmonic currents measured at Point of Common Coupling (PCC) measured over 10 minutes period to the values as given in table below:

Table 7: Values of Current distortion limits (TDD)

Maximum harmonic current distortion in percent of I_L						
Individual harmonic order (odd harmonics)[a, b]						
I_{SC}/I_L	$3 \le h < 11$	$11 \le h < 17$	$17 \le h < 23$	$23 \le h < 35$	$35 \le h \le 50$	TDD
< 20*	4.0	2.0	1.5	0.6	0.3	5.0
20 < 50	7.0	3.5	2.5	1.0	0.5	8.0
50< 100	10.0	4.5	4.0	1.5	0.7	12.0
100< 1000	12.0	5.5	5.0	2.0	1.0	15.0
> 1000	15.0	7.0	6.0	2.5	1.4	20.0

Note: * All power generation equipment is limited to these values of current distortion, regardless of actual I_{SC}/I_L;

[a]Even harmonics are limited to 25% of the odd harmonic limits above;

[b]Current distortions that result in a dc offset, e.g., half-wave converters, are not allowed; where

I_{SC} = maximum short-circuit current at PCC;

I_L = maximum demand load current (fundamental frequency component);

(2) For statistical evaluation, current harmonics shall be assessed for the period not less than 7 continuous days. The short time 10 min values are accumulated over periods of one week and the 95th and 99th percentile values (i.e., those values that are exceeded for 5% and 1% of the measurement period) are calculated for each 7-day period for comparison with the recommended limits. The values of TDD are measured at PCC in normal operating condition.

Provided that:

The weekly 95th percentile short time 10 min harmonic current values should be less than the value given in above Table-7. However, the weekly 99th percentile

short time 10 min harmonic current values should be less than 1.5 times the value given in above Table-7.

The limits of current harmonics injected by the designated customer, point of harmonic measurement i.e. Point of Common Coupling (PCC), method of harmonic measurement and other matters shall be in accordance with per applicable notified IS and in absence of IS, the IEEE 519-2014 namely 'IEEE Recommended Practices and Requirements for Harmonic Control in Electrical Power Systems', as modified from time to time.

The measurements undertaken to determine compliance shall be carried out in accordance with the requirements as specified in IEC 61000-4-7 and IEC 61000-4-30.

15. Short Supply Voltage Interruptions

(1) Short voltage interruptions shall comply with Table given below and are specified with reference to:

i. Number of events per year

ii. Event duration (t)

iii. Declared voltage (Uc)

(3) Table 8: Short Voltage Interruptions Limits (number of events per year) for LV and MV Networks.

Residual Voltage (%)	**Duration t (ms)**				
	10 ≤ t ≤ 200	**200 < t ≤ 500**	**500 < t ≤ 1000**	**1000 < t ≤ 5000**	**5000 < t ≤ 60000**
5 > u	5	20	30	10	10

Provided that:

The short voltage interruptions shall be measured in accordance with IEC 61000-4-30 and shall not fall outside the duration from 10 ms up to and including 1 min;

The voltage swell shall be measured in all phases of supply.

16. Long or Sustained Supply Voltage Interruptions

(1) The Distribution Licensee shall calculate the reliability of its distribution system on the basis of number and duration of sustained or long supply voltage interruptions (longer than 3 min) in a reporting period, using the following indices:

i. System Average Interruption Frequency Index (SAIFI);

ii. System Average Interruption Duration Index (SAIDI);

(2) The Indices shall be computed for the distribution licensees for each month for all the 11kV and 33kV feeders in the supply area, and then aggregating the number and duration of all interruptions in that month for each feeder. The Indices shall be computed using the following formulae:

$$SAIFI = \frac{\sum_{i=1}^{N} A_i * N_i}{N_t}$$

$$\text{SAIDI} = \frac{\sum_{i=1}^{N} \text{B}_i * \text{N}_i}{\text{N}_t}$$

Where,

A_i = Total number of sustained interruptions (each longer than 3 min) on i^{th} feeder for the month;

Bi = Total duration in minutes of all sustained interruptions (longer than 3 min) on i^{th} feeder for the month;

N_i = Number of Customers on i^{th} feeder affected due to each sustained interruption;

N_t = Total number of customers served by the Distribution Licensee in the supply area;

n = number of 11kV and 33kV feeders in the licensed area of supply;

(3) The distribution licensee shall maintain the reliability on monthly basis within the limits specified in table below:

Table 9: Limits for Reliability indices

Reliability Indices	Limits *
SAIDI	600 Minutes per customer
SAIFI	15 interruptions per customer

*Limits may be decided based on area on supply and local conditions by SERC.

Provided that:

The feeders must be segregated into rural and urban and the value of the indices must be reported separately for each month.

While calculating the given reliability indices, the following types of interruptions shall not be taken into account:

i. Momentary outages of duration less than three minutes.
ii. Outages due to Force Majeure events such as cyclone, floods, storms , war, mutiny, civil commotion, riots, lightning, earthquake, lockout, grid failure, fire affecting licensee's installations and activities;
iii. Outages that are initiated by the National Load Despatch Centre/ Regional Load Despatch Centre/State Load Despatch Centre during the occurrence of failure of their facilities;

While calculating the given reliability indices, the interruptions due to scheduled or planned outages shall be taken into account.

The distribution licensee shall capture reliability indices data directly from the feeder monitoring system and there should not be any manual interventions as far as possible.

The Distribution Licensee shall maintain data on the reliability indices specified above for each zone/circle/division/sub-division on a monthly basis.

The Distribution Licensee shall put up, at the end of each month, such monthly information on reliability indices, on website of the Distribution Licensee and shall submit such report quarterly to the Commission.

CHAPTER – 4

MONITORING AND REPORTING OF THE POWER QUALITY

17. Monitoring of Power Quality

(1) PQ measurement shall be implemented in phased manner and during first phase, PQ meters shall be installed at selective representative locations based on voltage level, type of consumers and significance of the power quality in such a way that such measurements should adequately represent the Power Quality and Reliability in the area of supply.

(2) The distribution licensee for the purpose of requirements for the quality of electricity supplied shall identify the locations of 33kV/11kV feeders, Distribution Transformers (DTRs) and designated customers to ensure the measurement of the power quality parameters at sufficient locations in their electrical networks to adequately characterize and report performance in terms of these Regulations. The feeders and DTRs should be identified for PQ monitoring based on type of load connected.

(3) The distribution licensee shall enforce the continuous monitoring of power quality standards at the inter-connection point of identified locations at or below 33kV voltage level for development of profile of power quality measurement in the area of supply;

(4) In the first phase, the distribution licensee shall install Power Quality meters for 50% of total 33kV/11kV feeders, 25% of total DTRs and at all designated customers supply terminals or at point of common coupling (PCC). In the second phase, Distribution Licensee shall cover 100% of 33kV/11kV feeders and at least 60% DTRs. In the third phase 100% DTRs shall be covered.

(5) The measurements undertaken to determine compliance shall be carried out in accordance with the requirements as specified in IEC 61000-4-7 and IEC 61000-4-30. There shall be continuous metering of harmonics with permanent Power Quality

meters complying with the IEC 61000-4-30 Class-A meters for all new installations/connections of identified locations. For existing installations/ connections at identified locations where CTs/PTs are of lower accuracy class than mandated by IEC 61000-4-30 Class-A meters, the meters complying with the IEC 61000-4-30 Class-B may be installed. These meters should be capable of detecting direction of Harmonics (whether it is upstream or downstream) for all new installations at identified locations.

(6) In the event when the distribution licensee receives a customer complaint concerning Power Quality, the distribution licensee shall deploy power quality meter for a particular period for the purpose of verification. Distribution licensee can also measure the level of harmonics generation at PCC of any consumer(s) on receipt of complaint(s) from other affected consumer(s).

(7) These Regulations specifies the minimum requirements for Power Quality meters for measurement at sites directly affecting the quality of the power supplied to the consumer(s). The distribution licensee may require the additional PQ meters to establish the power quality at other bulk supply points and at other major network nodes and to investigate consumer(s) complaints, for which these additional PQ meters may be installed temporarily.

(8) The distribution licensee may opt to integrate the smart grid meters compatible for measurement of the PQ parameters for economic and operational optimization.

18. Compliance of the Power Quality and Reliability Standards

(1) The distribution licensee shall submit the monthly and quarterly report of information collected on PQ parameters extracted from power quality meters and machine based reliability data in standard formats (as specified separately) to the Commission.

(2) It shall be the prime responsibility of the distribution licensee to comply with these Regulations and submit the compliance report every 6 months in standard formats (as specified separately), including transparent data disclosure regarding electrical system, to the Commission. Commission may direct designated agencies to be notified separately, to carry out PQ audit on the basis of compliance reports filed by distribution licensee for verification. The distribution company shall carry out 100% audit by itself once a year and 5% random audit by the independent agency and shall file the audit report along with ARR truing up petition.

(3) The distribution licensee shall publish the reports indicating the compliance with the standards under these Regulations and post all the reports on its website. The distribution licensee shall also seek comments, if any, on the same from the customers availing supply from the distribution licensee.

(4) The Commission from time to time may seek reports on PQ improvements from distribution licensee.

(5) The distribution licensee shall make efforts to improve power quality in their supply area by deploying devices to mitigate power quality issues such as filters or controllers etc. The expenses incurred towards deploying these devices by the distribution licensee shall be considered in the ARR.

(6) The distribution companies shall ensure the data security and the data should only be used for identified purpose and should not be transferred to any other person without the consent of the specific consumer.

CHAPTER – 5

INCENTIVE / DIS-INCENTIVE MECHANISM FOR POWER QUALITY

19. Incentive/dis-incentive mechanism for Power Quality

(1) During the first year after notification of Power Quality Regulations, there shall be monitoring and reporting of power quality parameters by distribution licensee in prescribed standard formats at regular intervals. Therefore, there shall not be any incentive/dis-incentive for the stakeholders during the first year after notification or as may be specified by SERCs.

(2) The expenses incurred towards implementation and monitoring of power quality parameters by the distribution licensee shall be considered in the ARR.

(3) From the second year after notification of PQ Regulations, an incentive/dis-incentive mechanism shall be implemented for distribution licensees and for designated customers. The distribution licensees or designated customers shall be liable to pay compensation.

Provided that the Distribution Licensee shall compensate the affected person(s) in second-next billing cycle. In case the Distribution Licensee fails to pay the compensation or if the affected person is aggrieved by non-redressal of his grievances, he may make a representation for the redressal of his grievance to the concerned Consumer Grievance Redressal Forum.

Provided further that such compensation shall be based on the classification of such failure as determined by the Commission and the payment of such compensation shall be paid or adjusted in the consumer's future bills (issued subsequent to the award of compensation) within thirty (30) days of a direction issued by the Forum or by the Ombudsman, as the case may be.

(4) The Distribution Licensee shall not be excused from failure to maintain the power quality parameters under these Regulations, where such failure can be attributed to negligence or deficiency or lack of preventive maintenance of the

distribution system or failure to take reasonable precaution on the part of the Distribution Licensee.

(5) The designated customers shall be liable to pay compensation for injecting current harmonics in to the supply system beyond the specified limits as given in Table below. In case the designated customer does not take measures to reduce the level of current harmonics (which is measured in terms of total demand distortion), he shall be made liable to pay higher compensation progressively on each continued violation as decided by the Commission separately. When there is no improvement in power quality even after 6 months, such consumers shall be served notice of dis-connection from the supply network and shall be disconnected after approval of the Commission.

(6) Level of compensation payable for failure to meet power quality standards are given in table below:

Table 10: Level of compensation

PQ Parameter	**Standard**	**Compensation Payable**	**Compensation Payable by**
Voltage Variation	As per Table-1, 2 and 3	Rs. 100/- per week or part thereof for which voltage	Distribution Licensee to each consumer connected on the feeder/ designated DTR. These compensations shall be cumulative for each violation.
		variation was beyond the specified limits	
Voltage unbalance		Rs. 100/- per week or part thereof for which voltage unbalance was beyond the specified limits	
Voltage dips or swells	Number of events per year as per Table- 4 and 5	Rs. 50/- per event for which voltage dips or swell was beyond the specified limits	

Voltage Harmonics	for LV for MV and as per Table - 6	Rs. 100/- per week or part thereof for which voltage harmonics was beyond the specified limits	
Current Harmonics	As per Table-7	Compensation shall be 50 paisa per unit for the duration for which current harmonics was beyond the specified limits.	Designated Customer to distribution licensee
Short Voltage Interruptions	Number of events per year as per Table- 8	Rs. 50/- per instance for which voltage dips or swell was beyond the specified limits	Distribution Licensee to each consumer connected on the feeder/ designated DTR. These compensations shall be cumulative for each violation
Long Supply Voltage Interruptions	SAIDI in Minutes per Customer as per Table- 9	5 paisa/min/kW of contract demand for which SAIDI was beyond the specified limits	
Long Supply Voltage Interruptions	SAIFI in interruption per customer as per Table- 9	Rs. 50/- per interruption for which SAIFI was beyond the specified limits	

Provided that such compensation as given in above Table-10 shall not be claimed in ARR by distribution licensee and further the compensation received by the distribution licensee from the designated customers shall be utilized only on the measures taken to improve power quality such as installation of filters, controllers etc.;

CHAPTER – 6

MISCELLANEOUS PROVISIONS

20. Power to Relax. The Commission, for reasons to be recorded in writing, may relax any of the provisions of these regulations on its own motion or on an application made before it by an interested person.

21. Power to Remove Difficulty: If any difficulty arises in giving effect to the provisions of these regulations, the Commission may, by order, make such provision not inconsistent with the provisions of the Act or provisions of other regulations specified by the Commission, as may appear to be necessary for removing the difficulty in giving effect to the objectives of these regulations.

J. B. POON,
Secretary
Meghalaya State Electricity Regulatory Commission

SHILLONG: Printed and Published by the Director, Printing and Stationery, Meghalaya, Shillong.
(Extraordinary Gazette of Meghalaya) No. 765 - 730 + 10 — 2 – 11 - 2018.
website:- http://megpns.gov.in/gazette/gazette.asp