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TELANGANA STATE ELECTRICITY REGULATORY COMMISSION, HYDERABAD

No. TSERC/06/2016

Dated 16.11.2016

Regulation No. 06 of 2016

**Regulation for connectivity with the Grid and sale of electricity from
the Roof- top Solar Photovoltaic System**

The Commission is vested with the powers under the Electricity Act, 2003 (Act No.36 of 2003) to promote the generation of electricity from the Renewable sources of energy in the state of Telangana. In exercise of powers conferred under Sections 61, 66, 86 (1) (e) and 181 of the Electricity Act, 2003 and all other powers enabling it in this behalf, the Commission hereby makes the following Regulation for the grid connected Solar Rooftop Photovoltaic System

1 Short title, and commencement:

1.1 This regulation shall be called the Telangana State Electricity Regulatory Commission (Net Metering Rooftop Solar PV Grid Interactive Systems) Regulation, 2016.

1.2 This regulation shall come into force from the date of its notification in the Official Gazette.

1.3 It extends to the entire state of Telangana.

2 Definitions and interpretations:

2.1 In this regulation, unless the context otherwise requires,

(1) **“Act”** means the Electricity Act, 2003 (Act No.36 of 2003) as amended from time to time;

(2) **“Agreement”** means a connection agreement entered into between the Distribution Licensee and the consumer;

(3) **“Area of Distribution” or “Area of Supply”** means the area stated in the Distribution Licence within which a Distribution Licensee is authorized to operate and maintain a Distribution System for supplying electricity to the consumers in its / his area of supply;

Provided that area of supply in respect of a deemed licensee shall be the whole area of supply within which the deemed licensee is authorised to supply electricity under the Act.

(4) **“Average Power Purchase Cost”** (APPC) means the Weighted Average Pooled Price at which the distribution licensee has purchased the electricity including the cost of self-generation, if any, in the previous Financial Year from all the energy suppliers on long-term and medium-term basis, but excluding the energy purchased from the renewable energy sources;

(5) **“Billing Cycle or Billing Period”** means the period for which the regular electricity bills are prepared for different categories of consumers by the Distribution licensee as specified by the Commission;

(6) **“Commission”** means the Telangana State Electricity Regulatory Commission constituted under the Act;

(7) **“Consumer”** means a consumer as defined in sub-section (15) of Section 2 of the Act;

(8) **“Connected load”** expressed in Kilowatt (kW), Kilo Volt Ampere (kVA) or Horse Power (HP), refers to aggregate of the consumer's rated capacities of all the energy consuming devices or apparatus connected with the distribution licensee's service line on the consumer's premises as specified

in the Agreement entered into between the Distribution Licensee and a consumer.

Explanation:

(A) In case of a consumer who availed of supply under the Low Tension, the connected load and the contracted load are same.

(B) In case of a consumer who availed of supply under the High Tension, the connected load and the contracted load are different.

(C) For the purpose of levy of any charges and for deciding the supply voltage, the contracted load shall be determined as per the method specified by the Telangana State Electricity Regulatory Commission in the Regulation from time to time;

(9) **“Contracted load”** or **“Sanctioned load”** or **“Contracted demand”** means the maximum demand in Kilowatt (kW), Kilo Volt Ampere (kVA) or Horse Power (HP), agreed to be supplied by a Distribution licensee or a Deemed Licensee and specified in the agreement executed between such licensee and the consumer;

(10) **“Distribution Licensee”** means a person authorised by a Distribution Licence to operate and maintain a distribution system for supply or conveyance or wheeling of electricity to the consumers in his / its area of supply and shall include a Deemed Licensee;

(11) **“Electricity Supply Code”** means the Telangana State Electricity Regulatory Commission Regulation, (No.1 of 2014) adopting the erstwhile Andhra Pradesh Electricity Regulatory Commission’s Electricity Supply Code Regulation, 2004 (No. 5 of 2004) and its amendments under Section 50 of the Act;

(12) **“Eligible Consumer”** means a consumer of electricity in the area of supply of the distribution licensee or the deemed licensee, who uses or proposes to use a Rooftop Solar PV System, which can be self-owned or a third party owned to offset a part or all of the consumer's own electrical requirement including a consumer catering to a common load such as common services in a Housing Society.

(13) **“Financial Year”** or **“Year”** means the period beginning from the first (1st) of April and ending on thirty first (31st) of March of the next year;

(14) **“Gross Metering”** means the arrangement of measurement of energy in a system under which the entire energy generated from the rooftop solar PV system installed at an eligible consumer premises is delivered to the distribution system of the Distribution Licensee;

(15) **“Interconnection Point”** means the interface of a Rooftop Solar PV System with the outgoing terminal of the meter / Distribution Licensee cut out / switch gear fixed in the premises of eligible consumer of a distribution licensee or a deemed licensee;

Provided that an Eligible Consumer connected at the High Tension (‘HT’) level, the ‘inter-connection point’ shall mean the interface of the Rooftop Solar PV System with the outgoing terminals of the Distribution Licensee’s metering cubicle placed before such Consumer’s apparatus.

(16) **“Invoice”** means either a Regular Bill / Supplementary Bill or a Regular Invoice/ Supplementary Invoice raised by a distribution licensee;

(17) **“Net Metering”** means an arrangement under which a Rooftop Solar PV System installed at an Eligible Consumer’s premises *and* delivers surplus electricity, if any, to a Distribution Licensee after off-setting the quantum of electricity supplied by the distribution licensee to such Eligible Consumer during the applicable billing period.

(18) **“Net meter”** means an appropriate energy meter which is capable of recording both import and export of electricity or a pair of energy meters one each for recording the import and export of electricity, as the case may be;

(19) **“Net Metering Arrangement”** means an arrangement under which a Rooftop Solar PV System with Net Meter installed at an Eligible Consumer’s premises delivers surplus electricity, if any, to the Distribution Licensee after setting off the quantum of electricity supplied by such Licensee during the applicable Billing Period ;

(20) **“Net Metering Connection Agreement”** means an agreement entered into by a Distribution Licensee and an Eligible Consumer for executing a Net Metering arrangement;

(21) **“Obligated entity”** means an entity required to fulfill a Renewable Purchase Obligation (‘RPO’) as specified by the Commission in

Regulation governing such Obligation (‘the RPO Regulations’);

(22) **“Premises”** means and includes rooftops or elevated areas on the land, building or infrastructure or part or combination thereof in respect of which a separate meter or metering arrangements have been made by a licensee for supply of electricity;

(23) **“Rooftop Solar PV Power Plant” or “Rooftop Solar PV System”** means the Solar Photo Voltaic Power Plant including a small solar system, installed on the rooftops or ground mounted or open land owned and operated on a consumer premises or operated by a third party owner on a consumer’s premises that uses the sunlight for direct conversion into electricity through the photovoltaic technology;

(24) **“Renewable Energy Certificate (REC)”** means the certificate issued in accordance with the procedures specified by the Central Electricity Regulatory Commission;

(25) **“Renewable Energy System”** means the system to generate the electricity from such source(s) which are recognized as renewable energy source(s) by the Ministry of New & Renewable Energy (MNRE) or any agency notified by the Govt. of India or the Commission;

(26) **“State Nodal Agency”** means the Telangana New & Renewable Energy Development Corporation Limited (TNREDCL) or any other agency designated by the Commission for the purpose of this Regulation;

(27) **“Tariff Order”** in respect of a Distribution licensee means the most recent Retail Supply Tariff Order issued by the Commission for that licensee indicating the rates to be charged by the licensee to various categories of consumers for supply of electrical energy and services;

(28) **“Third party owner”** means a developer who is generating solar energy on a rooftop from the Rooftop solar PV system but does not own the rooftop but enters into a lease / commercial agreement with the rooftop owner. Where a consumer installs the rooftop solar PV system in his premises through a third-party owner and intends to avail of net metering arrangement, then, only an eligible consumer shall enter into an agreement with the Distribution Licensee;

2.2 Interpretations

- a. The Words and expressions used and not defined in this Regulation but defined in the Act, shall have the meanings assigned to them in the Act. Expressions used herein but not specifically defined in this Regulation or in the Act but defined under any regulations made by the Commission or under any law passed by a competent legislature and applicable to the electricity industry in the state, shall have the meaning assigned to them in such law.
- b. In the interpretation of this Regulation, unless the context otherwise requires:
- i. words in the singular or plural term, as the case may be, shall also be deemed to include the plural or the singular term, respectively;
 - ii. references herein to the Regulation shall be construed as a reference to this Regulation as amended or modified by the Commission from time to time in accordance with the applicable laws in force;
- c. the headings are inserted for convenience and may not be taken into account for the purpose of interpretation of this Regulation;
- d. References to the statutes, regulations or guidelines shall be construed as including all statutory provisions consolidating, amending or replacing such statutes, regulations or guidelines, referred to.

3 Scope and Application

3.1 This Regulation shall apply to a distribution licensee, an eligible consumer and a third party owner of a Roof Top Solar PV System in the state of Telangana.

3.2 An Eligible Consumer may install a Rooftop Solar PV System under the net metering arrangement which:

- a. shall be within the permissible rated capacity as specified in this Regulation;
- b. shall be located in the consumer's premises;
- c. shall interconnect and operate safely in parallel with the distribution licensee network;
- d. Priority for connectivity to the network distribution of the Licensee shall be accorded to an eligible consumer who has installed the Rooftop Solar PV system before the commencement of this Regulation, provided such consumer complies with the conditions of this Regulation.

3.3 This Regulation does not preclude the right of a Distribution licensee or the State Government Department / authorities to undertake the Rooftop Solar PV projects above 1 MWp capacity through the alternative mechanisms.

4 General Principles:

4.1 The distribution licensee shall permit the net metering arrangement to an eligible consumer who has installed or intends to install the grid connected Rooftop Solar PV System in its area of supply on a non-discriminatory and first come first serve basis.

4.2 The inter-connection of Roof-top Solar PV System with the Network of the Distribution Licensee shall be undertaken in accordance with the standards and norms specified in the Central Electricity Authority (CEA) (Technical Standard for Connectivity of the Distributed Generation Resources) Regulations, 2013 and any amendments thereto from time to time.

4.3 An eligible consumer shall install the grid connected Rooftop Solar PV System of the rated capacity as specified in this Regulation;

4.4 The tariff payable to an eligible consumer under the net-metering arrangement shall be the average power purchase cost of a Distribution Licensee.

4.5 The net metering facility, as far as possible, of an eligible consumer shall be in three phase service.

4.6 A single phase consumer is also eligible for net metering upto 5 KW.

4.7 The capacity of a Rooftop Solar PV System to be installed at the premises of an eligible consumer shall not be less than one Kilo Watt peak (1kWp) and a maximum of One (1) MWp [One Mega Watt peak].

4.8 No distribution losses shall be applicable to an eligible consumer.

4.9 An eligible consumer including a third party owner availing of net metering arrangement under this regulation shall not be allowed to apply for gross metering arrangement within the same premises or vice versa.

4.10. Without prejudice to Sub-Paras 4.1 to 4.8, an eligible consumer has the option of choosing the gross metering at 11 kV and above at an average

rate or price from the latest Solar Power Purchase Agreements entered into by the Distribution Licensee and notified on their website in the financial year prior to the financial year of supply of electricity. In the absence of any latest Solar Power Purchase Agreement, a rate / price notified by the distribution licensee at the beginning of every financial year on its website which shall be the average power purchase cost of the Distribution Licensee or the price per unit in the Solar PPAs of preceding year(s) other than the financial year prior to financial year in which supply is made, whichever is less. The guidelines for gross metering shall be issued by the Distribution Licensee after obtaining the prior approval of the Commission.

4.11 The facility of net metering or gross metering, as the case may be, shall be applicable to an eligible consumer of the Rooftop Solar PV System for a period of *Twenty five (25)* years from the date of connection with the Grid of the Distribution Licensee.

4.12 An eligible consumer intending to install a Rooftop Solar PV System having the capacity in excess of 75 kW shall insure the Rooftop Solar PV system and obtain the certificate from the Chief Electrical Inspector to the Government (CEIG), who shall test and certify the safety and protection within Fifteen (15) working days from the date of receipt of the information.

Provided that the Solar PV System having capacity up to 75 KW shall be inspected, tested and self certified by the eligible consumer with regard to the safety and protection.

4.13 An eligible consumer intending to install a Roof Top Solar PV system having capacity in excess of 75 kW and up to 1 MW can connect to 11 kV or 33 kV feeder of a Distribution Licensee from which the feeder of an eligible consumer is availing of supply of power.

5 Capacity limits of distribution transformer level at 11 kV Feeder and 33 kV Feeder.

5.1 The distribution licensee shall allow the Net metering arrangement to an Eligible Consumer.

Provided that the cumulative capacity of all the Rooftop Solar PV Systems

of LT eligible consumers under the Net Metering Arrangements connected to a particular Distribution Transformer of the Licensee shall not exceed 50% of its rated capacity;

Provided further that the cumulative capacity of all the Rooftop Solar PV Systems of 11 kV or 33 kV HT consumers as the case may be under the Net Metering Arrangements connected to a particular 11 kV feeder or 33 kV feeder of the Distribution Licensee shall not exceed 50% of its maximum load permitted on that particular 11 kV Feeder / 33 kV feeder, as the case may be;

Provided further that the Distribution Licensee may allow the Net Metering connectivity exceeding 50% of such rated capacity upon consideration of a detailed load study carried out by it.

5.2 The Distribution Licensee shall provide information on its website regarding the capacity available on each Distribution Transformer and 11 kV feeder of a substation and 33 kV feeder for connecting the Rooftop Solar PV Systems under the Net Metering arrangements within three months from the notification of this Regulation. The Distribution Licensee shall thereafter update the Distribution Transformer-wise, 11 kV feeder-wise and 33 kV feeder-wise capacity available and the cumulative capacity of the Rooftop Solar PV Systems installed under the Net Metering arrangements quarterly and provide the information on its website in the month following the close of the relevant quarter.

6 Eligible Consumer and individual Solar project capacity:

6.1 An Eligible Consumer for a Rooftop Solar PV System with the Net Metering shall:

- i. be a consumer of the local distribution licensee;
- ii. own or be in legal possession of the premises including the rooftop or terrace or elevated areas on land, building or infrastructure or part or combination thereof on which the Solar PV System is proposed to be installed;
- iii. connect the proposed Rooftop Solar PV System to the

Distribution System of the Licensee;

iv. consume the entire electricity generated from the Rooftop Solar PV System at the same premises wherein it is installed and generating the solar power. If the consumer is not able to consume the entire generated electricity in the same premises, then, he / it shall be governed by the energy accounting and settlement provisions of this Regulation.

6.2 The maximum Rooftop Solar PV System capacity to be installed at any Eligible Consumer's premises shall be as under:

- i. For Residential and Government consumers: up to a maximum of 100% of the consumer's sanctioned load;
- ii. For Industrial, Commercial and Other Consumers: up to a maximum of 80% of the sanctioned load / contracted demand of the consumer.

Provided that the installed capacity shall not be less than 1 kWp and shall not exceed 1 MWp and the installed capacity is aligned with the provisions for permitting the consumer connections as stipulated in the Electricity Supply Code notified by the Commission.

6.3 High Tension (HT) (11 kV and 33 kV) eligible Consumers may install and connect the Rooftop Solar PV System at their LT Bus Bar System and the Net Meter shall be installed on the HT side of interconnecting point where the present metering cubicle is existing.

6.4 An Eligible Consumer may install or enhance the capacity of, or upgrade the Roof-top Solar PV Systems at different locations within the same premises:

Provided that the total capacity of such Systems within the same premises shall not exceed the individual capacity limits specified in this Regulation.

7 Procedure for Application, Registration and approval by the Distribution Licensee:

7.1 An Eligible Consumer who proposes to install a Rooftop Solar PV System in his premises shall submit an application to the Distribution Licensee along with the necessary documents specified by the Distribution

Licensee and the applicable fee which is as under.

System Size	Applicable fee per connection
For all LT consumers	Rs.2,500
For all HT consumers	Rs.15,000

7.2 The nodal point of contact for the Solar Net Metering programme shall be the local Divisional Engineer (Operations) of the Licensee who has the jurisdiction over the premises of the eligible consumer. The Consumer can download the Solar Net Metering Rooftop Application from the official website of Telangana State Distribution Licensees (DISCOMs) and submit the filled in Application to the Asst. Divisional Engineer (Operations) concerned of the Licensee for LT consumers and Divisional Engineer (Operations) concerned for HT consumers.

7.3 The Distribution licensee shall acknowledge the receipt of the application form and register the application and shall process the application in the chronological order of the receipt.

7.4 Within seven (7) working days of the receipt of the Eligible Consumer's application, the distribution licensee shall provide a written notice that it has received all the documents required for the interconnection point or furnish the deficiencies in the application.

7.5 The Distribution Licensee shall assess the feasibility of interconnection point and the relevant distribution transformer capacity and / or relevant 11 kV / 33 kV feeder capacity (in case of HT consumer) and communicate the same to the Eligible Consumer within Twenty One (21) working days from the receipt of proper application. The feasibility so communicated shall be valid for a period of four (4) months, unless extended by the Distribution Licensee for a reasonable cause. Any application not acted up by the Distribution Licensee as per sub-para 7.4 of this regulation within Twenty One (21) working days from the date of receipt shall be deemed to have been approved.

Provided that the feasibility communicated by the Distribution Licensee shall not exceed a period of Ten (10) months including the extended time from the date of first feasibility communication.

7.6 While communicating the feasibility for the connection of Rooftop

Solar PV System, the Distribution Licensee shall communicate the Eligible Consumer:

- (a) Particulars of deficiencies with reference to interconnection of the proposed Rooftop Solar PV System with the Distribution System of Licensee;
- (b) Cost estimate for removal of such deficiencies including augmentation of the transformer / distribution system, if required.

7.7 The Eligible Consumer shall pay the estimated amount to the distribution licensee within Fifteen (15) days of receipt of such communication from the distribution licensee.

Provided that if the sum as per sub-para 7.6 is not paid by the Eligible Consumer within *Fifteen (15)* days from the date of receipt of such communication to the Eligible Consumer, the application shall stand cancelled and the application fee shall be forfeited.

Provided further that where approval cannot be granted due to inadequate Distribution Transformer capacity or 11 kV / 33 kV Feeder capacity (in case of HT consumer), the application may be considered, in chronological order of seniority and if the consumer so opts, after such capacity becomes available.

7.8 The Distribution Licensee, on receipt of the estimate amount, shall promptly remove the deficiencies in the distribution system including augmentation of the transformer / distribution network within Fifteen (15) days.

Provided the augmentation of the system shall be in accordance with the time period specified in the standards of performance notified by the Commission, if the period exceeds Fifteen (15) days as provided above.

7.9 On removal of such deficiencies including augmentation of distribution transformer / distribution network, the distribution licensee shall immediately convey the approval for interconnection of the proposed Rooftop Solar PV System to the Eligible Consumer. A copy of such approval shall also be forwarded to the State Nodal Agency and the Chief Electrical Inspector by the distribution licensee for necessary action by them as per

this Regulation.

7.10 The Net metering agreement as devised by the Distribution Licensee shall be executed by the Eligible Consumer with the distribution licensee within Fifteen (15) days of receipt of the approval.

8. Interconnection with the Distribution Network / Grid: Standards and Safety:

8.1 The Distribution Licensee shall ensure that the inter-connection of the Rooftop Solar PV System with its Network conforms to the specifications, standards and other provisions specified by the Central Electricity Authority (CEA) in (Technical Standard for Connectivity of the Distributed Generation Resources) Regulations, 2013, the CEA (Measures relating to Safety and Electric Supply), Regulations, 2010 and the State Grid Code.

Provided that a variation in the rated capacity of the system within a range of five percent (5%) shall be allowed;

8.2 A Solar Rooftop PV system should qualify the technical requirements for the grid interconnection with the network of the distribution licensee and it shall be separately grounded / earthed.

Provided that an eligible consumer may use his Rooftop Solar PV system in Island mode for his own consumption only.

8.3 The connectivity levels at which a Rooftop PV Solar System shall be connected with the grid are as specified below:

Sr. No.	Connected load of Eligible Consumer	Connectivity level
1.	Upto 5 kW	240 V- single phase
2.	Above 5 kW and upto 75 kW	415 V-Three phase
3.	Above 75 kW / KVH	High Tension (HT)

8.4 The connectivity norms at sub-para (8.3) shall be applicable to all the Rooftop Solar PV Systems seeking connectivity with the network of the distribution licensees. The HT consumers may install the Rooftop Solar PV System at Low Tension (LT) / High Tension (HT) voltage and have to connect them to their LT / HT system for interconnection of the Rooftop Solar PV System with the local distribution licensee's grid subject to confirmation to

standards at sub-para 3.1.

8.5 The Rooftop Solar PV Energy Generator shall be responsible for safe operation, maintenance and rectification of defect of its system upto the **interconnection point** beyond which the responsibility of safe operation, maintenance and rectification of any defect in the system including the net meter shall rest with the distribution licensee.

8.6 The eligible consumer shall be solely responsible for any accident to human being or animals (fatal / non-fatal / departmental / non-departmental) that may occur due to back feeding from the Rooftop Solar PV System when the grid supply is off. The distribution licensee reserves the right to disconnect the consumer's installation at any time to prevent any accident or damage to men and material. The Licensee shall not be responsible to pay any ex-gratia on account of fatal accidents or non-fatal accidents occurring on account of the Rooftop Solar PV System in the premises of the eligible consumer.

Provided that the distribution licensee may require the eligible consumer to rectify any defect within two days of intimation to the eligible consumer.

8.7 The tests shall be done as per the standards stated in this sub-para and in accordance with the distribution licensee's standards of the Commission to ensure the quality of power generated from the Rooftop Solar PV Systems:

(A) DC Power Injection:

- IEC 61727, 2nd Ed. (2004)

- CEA's (Technical Standards for Connectivity of the Distributed Generation Resources) Regulations, 2013.

(B) Harmonic Injection:- CEA's (Technical Standards for Connectivity of the Distributed Generation Resources) Regulations, 2013.

- IEEE 519 (2014), "Recommended practice and requirements for harmonic control in electric power systems.

(C) Flicker:

- IEC 61000 series

(D) Power Factor:

- IEC 61215. 2nd Ed, (2005-04)
- IEC 61646. 2nd Ed, (2008-05)
- IEC 62108. 1st Ed, (2007-12)
- IEC 61730-1, Ed. 1.2 (2013-03)
- IEC 61730-2, Ed. 1.1 (2012-11)

8.8 Any alternate source of supply shall be restricted to the consumer's network and the consumer shall be responsible to take adequate safety measures to prevent battery power or diesel generator power or back-up power extending to the distribution licensee's LT / HT grid on failure of the distribution licensee's grid supply. Safety measures may include isolation of net metering arrangement from the grid.

8.9 The distribution licensee shall have the right to disconnect the Rooftop Solar PV System of an eligible consumer from its system at any time on the following situations / conditions:

- (i). Emergencies or maintenance requirement of the distribution licensee's electric system;
- (ii). Hazardous conditions existing on the distribution licensee's system due to operation of the Rooftop Solar PV System or the protective equipment as determined by the Distribution Licensee / Transmission Licensee / State Load Despatch Centre (SLDC);
- (iii). Adverse electrical effects, such as power quality problems, on the electrical equipment of other consumers of the distribution licensee caused by the Rooftop Solar PV System as determined by the distribution licensee.

8.10 The Rooftop Solar PV System should be capable of detecting an unintended island condition and must have an anti-islanding protection to prevent any unfavourable conditions including failure of supply. IEC 61727, 2nd Ed. (2004) & IEC 62116, 2nd Ed. (2014-02) shall be followed to test the island prevention measure for the grid connected photovoltaic inverters.

8.11 Every Rooftop Solar PV System shall be equipped with the automatic synchronization device.

Provided that the Rooftop Solar PV System using the inverter shall not be required to have a separate synchronization device, if the same is inherently built into the inverter.

8.12 The Rooftop Solar PV System operating in parallel with the electricity system shall be equipped with the following protective functions to sense the abnormal conditions on the electricity system and cause the Rooftop Solar PV System to be automatically disconnected from the electricity system or to prevent the Rooftop Solar PV System from being connected inappropriately to the electricity system;

- (i). Over and under voltage trip functions if voltage reaches above 110% or below 80% respectively with a clearing time upto two (2) seconds;
- (ii). Over and under frequency trip functions, if frequency reaches 50.3 Hz or below 49.2 Hz with a clearing time upto 0.2 seconds;
- (iii). The Rooftop Solar PV System shall cease to energize the circuit to which it is connected in case of any fault in the circuit;
- (iv). A voltage and frequency sensing and time delay function to prevent the Rooftop Solar PV System from energizing a de-energized circuit and to prevent the Rooftop Solar PV System from reconnecting with the electricity system unless voltage and frequency is within the prescribed limits and are stable for at least sixty (60) seconds; and
- (v). A function to prevent the Rooftop Solar PV System from contributing to the formation of an unintended island and ceases to energize the electricity system within two (2) seconds of the formation of an unintended island.

8.13 The equipment of the Rooftop Solar PV System shall meet the following safety requirements:

- (i). Circuit Breakers or other interrupting equipment shall be suitable for their intended application with the capability of interrupting the maximum available fault current expected at their location,
- (ii). The Rooftop Solar PV System and the associated equipment shall be so designed that the failure of any single device or component shall not potentially compromise the safety and reliability of the electricity system and
- (iii). Paralleling device of the Rooftop Solar PV System shall be capable of withstanding 220% of the nominal voltage at the interconnection point.

8.14 Every time the Rooftop Solar PV System of the Eligible Consumer is synchronized with the distribution system, it shall not cause the voltage fluctuation greater than $\pm 5\%$ at the point of inter connection.

8.15 After considering the maintenance and the safety procedures, the distribution licensee may require an eligible consumer of a Rooftop Solar PV

System to provide a manually operated isolating switch between the Rooftop Solar PV System and the electricity system, which shall meet following requirements:

- (i) Allow visible verification that separation has been accomplished;
- (ii) Include indications to clearly show open and closed positions;
- (iii) Be capable of being reached quickly and conveniently twenty four (24) hours a day by the licensee's personnel without requiring the clearance from the eligible consumer;
- (iv) Be capable of being locked in the open position;
- (v) May not be rated for load break and may not have a feature of over-current protection; and
- (vi) Be located at a height of at least 2.44 m above the ground level.

8.16 Prior to synchronization of the Rooftop Solar PV System for the first time with the distribution system of the licensee, the eligible consumer and the licensee shall agree on the protection features and the control mechanism.

8.17 The power conditioning unit shall have the features of filtering out harmonics and other distortions before injecting the energy into the system of the distribution utility. The Total Voltage Harmonic Distortion (THD) shall be within the limits specified in the Indian Electricity Grid Code (IEGC). The technical standards, power quality standards and inverter standards shall be specified by the Distribution Licensee before entering into an agreement with the eligible consumer or any other standards as may be specified by the CEA from time to time.

9 Net Metering arrangement

9.1 The Net Meter shall conform to the standards specified by the Central Electricity Authority (CEA) (Installation and Operation of Meters Regulations), 2006 as amended from time to time. Further, a bi-directional meter of the same accuracy class as the eligible consumer's existing meter before the commissioning of the Rooftop solar PV System shall be installed in replacement of the existing meter. A single bi-directional meter shall be installed for export and import. This bi-directional meter should have the following characteristics:

- i. Separate registers for export and import with the Meter Reading Instrument (MRI) downloading facility.
- ii. kVAr, kWh, kVA, kVAh measuring registers for capacity above 10 kW.
- iii. Advanced Metering Infrastructure (AMI) facility with RS232 (or higher) communication port.
- iv. Class 1 accuracy meters for Rooftop Solar PV Systems up to 10 kW, 0.5 accuracy class meters for Rooftop Solar PV Systems above 10 kW and 0.2 class accuracy meters for High Tension (HT) systems (56 kW and above).
- v. Meters should be certified by the Bureau of Indian Standards (BIS).
- vi. Current Transformer (CT) functionality meters for the Rooftop Solar PV Systems above 56 kW.

9.2 The Net Meter in the premises of the Eligible Consumer may be procured and installed by the Distribution Licensee at its own cost and in accordance with the provisions of the Electricity Supply Code.

Provided that where the Eligible Consumer is within the ambit of Time-of-Day (ToD) Tariff, the Net Meter installed shall be capable of recording ToD consumption and generation:

Provided further that an Eligible Consumer may opt to procure, at his cost, the Net Meter for testing and installation by the Distribution Licensee.

9.3 The Distribution Licensee shall be responsible for the supply, installation, testing and maintenance of the metering equipment, and its adherence to the applicable standards and specifications.

9.4 An Eligible Consumer shall install, at his own cost, a Solar Generation Meter conforming to the CEA Regulations at an appropriate location, and also conforming to the rules or regulations made by any authority under the Electricity Act, 2003 measure the energy generated from the Rooftop Solar PV system, if he is an Obligated Entity and desires that such energy be counted towards meeting its RPO.

9.5 The Distribution Licensee shall install, at its own cost and with the

consent of the Eligible Consumer, a Solar Generation Meter conforming to the CEA Regulations at an appropriate location, and also conforming to rules or regulations made by any authority under the Electricity Act, 2003 to measure the energy generated from the Rooftop Solar PV System if it desires that such energy be counted towards meeting its RPO.

9.6 The Net Meter and the Solar Generation Meter shall be installed at such locations in the premises of the Eligible Consumer as would enable easy access to the Distribution Licensee's personnel for meter reading.

10 Energy Accounting and Settlement:

10.1 The accounting of electricity exported and imported by the Eligible Consumer shall become effective from the date of connectivity of the Rooftop Solar PV System with the distribution Network of the Licensee.

10.2 For each Billing Period, the Distribution Licensee shall show separately:-

(a) The quantum of electricity Units exported by the Eligible Consumer;

(b) The quantum of electricity Units imported by the Eligible Consumer;

(c) The net quantum of electricity Units billed for payment by the Eligible Consumer;

(d) The net quantum of electricity Units carried over to the next Billing Period; and

Provided that if the quantum of electricity exported exceeds the quantum imported during the Billing Period, the excess quantum shall be carried forward to the next Billing Period as credited Units of electricity and the eligible consumer shall get a monthly minimum bill;

Provided further that if the quantum of electricity Units imported by the Eligible Consumer during any Billing Period exceeds the quantum exported, the Distribution Licensee shall raise its invoice for the net electricity consumption after adjusting the credited Units of electricity.

(e) There shall be no deemed generation charges payable to the eligible consumer or the third party owner of the PV solar rooftop system by the Distribution Licensee.

(f) The billing period and the due date of the bills shall be the same as that of the eligible consumer in whose premises the solar system has been installed.

10.3 The unadjusted net credited Units of electricity shall be settled by the Licensee twice in a year viz., in June and December. The net export units credited for the six month period shall be settled at its average cost of power purchase as approved by the Commission for that year. The sum so arrived shall be either adjusted in the next month electricity bill or deposited in the bank account of the eligible consumer furnished to the Licensee at the time of filing of the application.

Provided that at the beginning of each of the Settlement Period, the cumulative quantum of injected electricity carried forward shall be re-set to zero.

10.4 Where an Eligible Consumer is within the ambit of Time of Day (ToD) tariff, the electricity consumption in any time block, i.e. peak hours, off-peak hours, etc., shall be first compensated with the quantum of electricity injected in the same time block. Any excess injection over and above the consumption in any other time block in a Billing Cycle shall be accounted as if the excess injection had occurred during off-peak hours.

10.5 The Eligible Consumer shall have recourse, in case of any dispute with the Distribution Licensee regarding the billing, to the mechanism specified in sub- Sections (5) to (7) of Section 42 of the Act for the redressal of grievances.

10.6 In case the applicable tariff provides for billing on kVAh basis, the net drawl or injection of energy shall also be measured in kVAh.

10.7 When an eligible consumer cancels the Net metering Agreement entered into with the Distribution Licensee after giving a month's notice, then, unused electricity credits shall be paid at a rate of Rs 0.50/kWh by the Distribution Licensee or at a rate as notified by the Commission from time to time and ceases to be an eligible consumer thereafter.

10.6 Reporting Requirements by Distribution Licensee:

The Distribution Licensee shall report the following information, by June

1 of each year and shall also be placed on its website:

- a) Total Number of eligible consumer's interconnections at the end of the previous Financial Year;
- b) Total kW capacity of the eligible consumer's interconnected at the end of previous Financial Year;
- c) Total kWh capacity of the eligible consumer from the Distribution Licensee by month and by year for the previous Financial Year;
- d) Total kWh of solar energy generated by the eligible consumer by month and by year for the previous Financial Year;
- e) Total kWh delivered by the eligible consumer to the Distribution Licensee as per billing cycle and by year for the previous Financial Year;
- f) For each eligible consumer interconnection:
 - (i) Solar technology utilized;
 - (ii) Gross power rating;
 - (iii) Geographic location (District Wise); and
 - (iv) Date of interconnection.

11 Solar Renewable Power Purchase Obligation (SRPPO)

11.1 The quantum of electricity consumed by an Eligible Consumer from the Rooftop Solar PV System under the Net Metering Arrangement shall qualify towards his compliance of RPPO, if such Consumer is an Obligated Entity.

11.2 The quantum of electricity consumed by the Eligible Consumer from the Rooftop Solar PV System under the Net Metering arrangement shall, if such Consumer is not an Obligated Entity, qualify towards meeting the RPPO of the Distribution Licensee:

Provided that the Distribution Licensee shall, with the consent of the Eligible Consumer, make all the necessary arrangements, including for additional metering, as may be required for the accounting of the solar energy generated and consumed by the Eligible Consumer.

11.3 The unadjusted surplus Units of the Solar energy purchased by the Distribution Licensee under the provisions of sub-para 10.3 shall qualify towards meeting its RPPO.

12 Applicability of other charges and incentives:

12.1 The Rooftop Solar PV System under the net metering arrangement, whether self-owned or third party owned installed on the Eligible Consumer's premises, shall be exempted from Transmission Charge,

Transmission Loss, Wheeling Charge, Wheeling Loss, Cross Subsidy Surcharge and Additional Surcharge.

12.2 All incentives or subsidy provided by the Government of India through *the* Ministry of New and Renewable Energy (MNRE) under the National Solar Mission or other schemes and any incentive or subsidy provided by the Government of Telangana state from time to time shall belong to the eligible consumer or on authorisation of the eligible consumer to the vendor of the Rooftop Solar PV system and can be claimed after installation of the Rooftop Solar PV power net metering arrangement from the State Nodal Agency.

12.3 An eligible consumer or a vendor of the Rooftop Solar PV system on authorisation from an eligible consumer shall produce the latest net metering bills for two months raised by a Distribution Licensee for the release of the subsidy or incentive. These bills shall be counter signed by the concerned Divisional Engineer of the Licensee and the District Manager of the State Nodal Agency. The Nodal Agency shall make the payment of subsidy or incentive within *thirty (30)* working days of the receipt of claim of subsidy / incentive.

13 Inspection by Distribution Licensee:

a) The Distribution Licensee on inspection at the time of *according* of permission to install the net metering arrangement or at any time thereafter, finds that, the eligible consumer has installed equipment not confirming to the standards published by the International Electro-technical Commission (IEC) or Bureau of Indian Standards (BIS) as a part of the net metering arrangement in the consumer's premises, the vendor of the equipment shall be blacklisted and the same shall be notified to the MNRE. Further, the Licensee reserves the right to withdraw the *permission* to the net metering arrangement and cancel the net metering agreement with the eligible consumer after giving an opportunity in writing.

b) The eligible consumer shall install any additional equipment or additional Solar panels after obtaining prior permission in writing from the Distribution Licensee, failing which, the Distribution Licensee may cancel the Net Metering Agreement after giving an opportunity in writing.

14 Sharing of Clean Development Mechanism (CDM) benefits:

The *Eligible Consumer* shall retain the entire proceeds of CDM benefits in the first year after the date of commercial operation of the generating station. In the second year, the share of the Distribution Licensees shall be 10% which shall be progressively increased by 10% every year till it reaches 50%, where after, the proceeds shall be shared in equal proportion by the *Eligible Consumer* and the Distribution Licensees.

15 Restriction and Control Measures:

In the event of the Distribution licensee being directed to impose restriction and control measures under section 23 of the Act, the distribution licensee shall not refuse injecting of solar power generated from a rooftop solar PV system installed by the residential and the government consumers.

16 Energy Accounting during Meter defects:

In case of failure of the meter recording export of energy, the meter shall be replaced within 15 days of the notice of the failure. The number of units to be billed during the period in which the meter ceased to function or became defective, shall be determined by taking the average of the electricity exported during the preceding three billing cycles to the billing cycle in which the said meter ceased to function or became defective provided that the condition with regard to export of electricity during the said three billing cycles was not different from that which prevailed during the period in which the Meter ceased to function or became defective.

17 Compensation

In case of failure of the net metering arrangement, compensation shall be payable as per the provisions of the Telangana State Electricity Regulatory Commission (Licensees' Standards of Performance) Regulation, 2016 as amended from time to time.

18 Issue of orders and practice directions:

(1) Subject to the provisions of the Electricity Act, 2003 and this Regulation, the Commission may, from time to time, issue orders and

practice 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.

(2) In particular, the Commission may authorize the Commission staff or any independent agency to conduct periodical checks, monitor the compliance of the Standards by the Licensees and report to the Commission.

19 Power to remove difficulties:

If any difficulty arises in giving effect to any of the provisions of this Regulation, the Commission may, by a general or special order, do or undertake or direct the Licensees to do or undertake things which in the opinion of the Commission are necessary or expedient for the purpose of removing the difficulties.

20 Power to Amend:

(1) The Commission may at any time, vary, alter, modify, or amend any provisions of the Regulation.

(2) In particular the Commission may review these standards after a period of three years or at any other time, if considered necessary. This Regulation shall however continue to be in force till it is modified based on such review.

(BY ORDER OF THE COMMISSION)

Hyderabad,
16-11-2016.

Dr. K. SRINIVAS REDDY,
*Commission Secretary,
Telangana State Electricity,
Regulatory Commission.*

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