# Jammu and Kashmir

# Draft Policy

*for*

# Grid Connected Rooftop

# Solar Photovoltaic Power Plants-2016

## Jammu & Kashmir Energy Development Agency

## Department of Science and Technology
## Government of Jammu and Kashmir

The Government of Jammu & Kashmir has already notified the J&K Solar Power Policy-2013 which, inter alia, provides for encouraging solar power generation to harness vast solar potential in the State and to promote large scale Grid Connected Solar Power Plants to achieve the collective targets set by the Ministry of New Renewable Energy (MNRE) by the year 2022.

Solar energy offers clean, climate-friendly abundant and inexhaustible energy resource to mankind. The MNRE has also designated Jammu and Kashmir Energy Development Agency (JAKEDA) as the nodal agency to undertake the solar rooftop program in the State for the domestic, government, institutional and industrial & commercial sectors through Grid interconnectivity and sale of power to the State Utility (DISCOM) on Net Metering basic. In view of the issuance of draft Regulations on Net metering for Gird Interactive Rooftop Solar PV Systems by Jammu and Kashmir State Electricity Regulatory Commission (JKSERC) and to achieve the target of 450MW by the year 2022 set by the Ministry (MNRE) for the State of J&K, JAKEDA is pleased to notify a draft 'Policy on net metering for Grid Interactive Roof-Top Solar Photo Voltaic Power Plants' which shall be effective from the date of is notification in the official Gazette.

## 1. SCOPE AND APPLICATION:-

1.1 This Policy shall apply to the Distribution Licensee and consumers of Distribution Licensee of the State of Jammu and Kashmir.

1.2 The eligible consumer may install the Rooftop Photovoltaic System under net metering arrangement which;

i) Shall be within the permissible rated capacity as defined under this Policy.
ii) Shall be located in the consumer's premises.
iii) Shall interconnect and operate safely in parallel with the Distribution Licensee network.

1.3 This Policy shall remain applicable unless repealed or substituted with new Policy.

1.4 The incentives of J&K Solar Power Policy-2013 shall also apply to solar power plants under this Policy.

## 2. OBJECTIVES:-

The State Government introduces this Policy with the following objectives:

2.1 To contribute to solar capacity addition and fulfillment of Solar targets set by the Ministry.

2.2 To optimally utilize the available solar energy resource in the State.

2.3 To encourage development and promotion of environment benign solar energy generation contributing to sustainable development.

2.4 To enable stakeholders in reducing greenhouse gas emissions.

2.5 To attract private sector participation in solar energy sector.

2.6 To build favorable environment for setting up Grid Connected Rooftop Solar Photovoltaic Power Plants.

2.7 To enhance skills and create employment opportunities.

2.8 To contribute to productive utilization of available rooftop spaces.

2.9 To spread environmental awareness amongst the general public of J&K.

## 3. ELIGIBILITY:-

3.1 All the consumers of the State Distribution Licensee who intend to generate solar energy and set up solar PV plants on available roof-tops of Individual households, Industries, Government of Semi-Government or Local Body offices, Commercial establishments, Institutions, Residential complexes, shall be eligible with project capacity ranging from minimum 1kWp up to 500 kWp (AC side) with or without battery back-up support. Consumers may generate solar power for self-consumption and may feed excess power into the grid to be adjusted as per clause 13 of this Policy.

3.2 Notwithstanding the provisions of this Policy, relevant State authorities shall have the right to undertake rooftop solar projects above 500 kW Peak (kWp) capacity through alternative mechanisms.

## 4. THIRD PARTY OWNED ROOFTOP PV SYSTEM, NET METERING MODEL:-

4.1 In the third party owned Rooftop PV Net Metering model, the developers or intermediaries lease out solar PV systems to the interested rooftop owners. This can be a popular model for residential home owner, where turnkey installers lease Rooftop Systems to

individual owners who, in turn, pay them a monthly lease rental. The owner of the house provides the rooftop and engages a turnkey installer to design and install the system. Alternatively, the installers can also offer an integrated service of leasing, commissioning and maintaining the systems to owners and guaranteeing standards of performance. The electricity generated from such a system is used to meet the rooftop owner's internal electricity needs while the excess generation is fed into the grid on net metering basis. This model has the following benefits:-

i) Benefits to rooftop owner: The household owner avoids large upfront investment for the solar equipment and on occasion avoids assuming technology or performance risk of solar systems. Net metering allows the rooftop owner to save on power consumed from the grid to the extent of solar generation. A part of saving in energy bill of power consumption is shared with the developer by way of lease rentals.

ii) Benefits to developer: The leasing company generates revenues by way of lease rental from the rooftop owner under a contract. As it continues to be owner of the equipment, it also qualifies for claiming depreciation on the capital cost of the PV systems with associated direct tax benefits.

iii) However, for all intent and purpose, the Distribution Licensee shall deal with the Rooftop Owner or Consumer only and

arrangement between rooftop owner and developer shall be personal to them.

## 5. NET- METERING:-

5.1 The distribution licensee shall allow on-discriminatory net-metering arrangement on first-cum-first serve basis for both self-owned and third party owned Rooftop PV Systems as long as the total capacity (in kWp) does not exceed the target capacity determined.

5.2. The distribution licensee shall accept the Solar PV Power for 25 years as per the useful life of the SPV system.

## 6. CAPACITY TARGETS FOR DISTRIBUTION LICENSEE:-

6.1 Maximum cumulative capacity to be installed under this Policy shall be decided by the commission on yearly basis. The shortfall in any year shall be carried forward to the next succeeding year provided that the cumulative capacity to be allowed at a particular distribution transformer shall not exceed 20% of the rated capacity of the distribution transformer; on first-come-first served basis. The applications not considered will lapse and consumer will have to apply afresh in the next financial year. However, consumers who want to utilize the energy generated from the Rooftop Solar Power Plants can use it for their captive use pending the net metering apparatus/ infrastructure being put in place by the Licensee DISCOM.

6.2 The Distribution Licensee shall update distribution transformer level capacity available for connecting rooftop solar systems under net metering arrangement on 1st April every year and shall provide the information on its website as well as to the Commission and JAKEDA by 30th of April.

## 7. INSTALLED CAPACITY:-

The maximum capacity of the Roof Top Solar PV System, as mentioned on AC side at the output of inverter based on rated inverter capacity, shall not be more than 50% of the Sanctioned Load of the consumer provided that the minimum capacity shall not be less than 1 kWp and the maximum not more than 500 kWp.(for KVA conversion to KW use a power factor of 0.9) Eligible Consumers shall assess their rooftop solar PV plant capacity based on the shadow less clear roof top area or vacant spaces or Sanctioned Load or Actual Annual Energy Consumption pattern and the capacity of Distribution Transformer.

## 8. SPV PLANT AND METERING:-

All the equipment associated with solar plant installation like solar PV panels, inverters; synchronizer, MPPT, batteries, transformers, cables, junction boxes etc shall be brand new and as per latest specified Indian/IEC standards. Bidirectional energy meter with CTs and PT, if required, having the feature of recording both the import and export of energy, besides other parameters, shall be as per JKSERC metering

regulations and of the make & specifications as approved by Distribution Licensee shall be installed at the cost of the SPV plant owner at the point where interconnection is made between Consumer System and Distribution Licensee system. The Plant owner has an option to install the meter and metering equipment procured by Distribution Licensee or can procure from vendors approved by the Distribution Licensee. If metering system is procured by Plant owner, then the testing and installation of meters including CTs and PT shall be got carried out from Distribution Licensee as per the latest departmental instructions and no meter rentals shall be charged. The Distribution Licensee shall seal the tested bidirectional energy meters as per its prevailing practice. Details of Energy Meters is given at **Annexure-I**.

## 9. CONNECTIVITY AND PROTECTION:-

9.1 The interconnection of the Rooftop PV Solar Power Plant with the network of the distribution licensee shall be made as per the technical specifications and standards for connectivity provided in the Central Electrical Authority (Technical Standards for connectivity of the Distributed Generation Resources) Regulations, 2013, as amended from time to time.

9.2 The Solar Power Plant shall utilize the same service line for excess power injection into the Grid which is currently being used by the consumer for drawl of power from utility network and shall operate in

synchronization with Distribution Licensee system provide that such injection of power from the rooftop Solar PV system shall not be more than 90% of the total consumption of the consumer from the Licensee's supply in a Settlement Period. The connectivity levels at which the Rooftop PV Solar Power Plants shall be connected with the grid are as specified below:

| **S.No.** | **Connected load of Eligible Consumer** | **Connectivity level** |
|---|---|---|
| 1 | Upto 5 kWp | 240 V-Single phase |
| 2 | Above 5 kWp and upto 100 kWp | 415 V-Three phase |
| 3 | Above 100 kWp | HT/EHT level |

9.3 The Solar Energy Generator shall be responsible for safe operation, maintenance and rectification of defect of its system up to the interconnection point beyond which the responsibility of safe operation, maintenance and rectification of any defect in the system including the Net Meter rests with the Distribution Licensee.

9.4 The consumer shall be solely responsible for any accident to human being/animals, whatsoever, (fatal/nonfatal) that may occur due to back feeding from the Solar Plant when the Grid supply is off. The Distribution Licensee reserves the right to disconnect the consumer's installation at any time in the event of such exigencies to prevent accident or damage to men and material.

9.5 The Rooftop PV Solar Power Plant should be capable of detecting an unintended islanding condition. These systems must have anti-islanding protection to prevent any unfavorable conditions including failure of supply. IEC-62116 shall be followed to test islanding prevention measure for grid connected photovoltaic inverters.

9.6 Every Rooftop PV Solar Power Plant shall be equipped with automatic synchronization device :

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

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

i. Over and under voltage trip functions if voltage reaches above 110% or below 80% respectively with a clearing time upto two seconds; however, appropriate licensee may prescribe a narrower range of voltage for the purpose.

ii. Over and under frequency trip functions, if frequency reaches 50.5 Hz or below 47.5 Hz with a clearing time upto 0.2 seconds;

however, appropriate licensee may prescribe a narrower range of frequency for the purpose.

iii. The Rooftop PV Solar Power Plant shall cease to energize the circuit to which it is connected in case of any fault in this circuit.

iv. A voltage and frequency sensing and time delay function to prevent the Rooftop PV Solar Power Plant from energizing a de-energized circuit and to prevent the Rooftop PV Solar Power Plant from reconnecting with electricity system unless voltage and frequency is within the prescribed limits and are stable for at least sixty seconds; and

v. A function to prevent the Rooftop PV Solar Power Plant from contributing to the formation of an unintended island, and cease to energize the electricity system within two seconds of the formation of an unintended island.

9.8 The equipment of the Rooftop PV Solar Power Plant shall meet following requirements, namely :

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 PV Solar Power Plant and associated equipment shall be designed so that the failure of any single device or

component shall not potentially compromise the safety and reliability of the electricity system.

iii. Paralleling device of the Rooftop PV Solar Power Plant shall be capable of withstanding 220% of the normal voltage at the interconnection point.

9.9 Every time the Rooftop PV Solar Power Plant of the Eligible Consumer is synchronized to the electricity system, it shall not cause voltage fluctuation greater than $\pm$ 5% at the point of inter connection.

9.10 Prior to synchronization of the Rooftop PV Solar Power Plant for the first time with electricity system, the applicant and the appropriate licensee agree on the protection features and control diagrams.

9.11 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 technical standards, power quality standards and inverter standards shall be as per **Annexure-II & III** or any other standards as may be specified by CEA from time to time.

## 10. SOLAR RENEWABLE PURCHASE OBLIGATION:-

The quantum of electricity consumed by eligible consumer, who is not defined as obligated entity, from the Rooftop Solar System under Net-metering arrangement shall qualify towards compliance of Renewable Purchase Obligation (RPO) for the Distribution Licensee.

## 11. APPLICABILITY OF OTHER CHARGES:-

The rooftop Solar System under Net-metering arrangement, whether self-owned or third party owned installed on eligible consumer premises, shall be exempted from banking and wheeling charges, losses, cross subsidy and additional surcharge etc. and Monthly Minimum Charges shall be applicable as per sub-clause (5) of clause13.

## 12. ELIGIBILITY TO PARTICIPATE UNDER RENEWABLE ENERGY CERTIFICATE MECHANISM:-

The issuance of renewable energy certificate shall be as per the eligibility criteria specified under Central Electricity Regulatory Commission (Terms and Conditions for recognition and issuance of Renewable Energy Certificate for Renewable Energy Generation) Regulations, 2010 as amended from time to time.

## 13. BANKING MECHANISM AND BILLING:-

13.1 On commissioning of the Solar Rooftop System and at the end of each of the billing cycle/settlement period, Distribution Licensee shall take energy meter readings for import or drawl and export or injection of power and work out the net energy flow quantum from or to the consumer. In case the net flow is towards the Utility Network i.e. the consumer has injected/exported the net surplus energy to the

Distribution Licensee systems, such quantum will be treated as energy banked by the consumer with Distribution Licensee in the current billing cycle. In such scenario, the consumer will be issued Energy Account Statement along with the bill for charges like meter rentals, service charges etc., and banked energy will be carried forward for accounting in the next billing cycle. If the net energy flow is from the Distribution Licensee Network, then the consumer will be issued the Energy Account Statement and Energy Bill for the net power drawn in the billing cycle plus other charges.

13.2 The Energy Account Statement to be issued to consumer by Distribution Licensee for each billing cycle shall show quantum of export/ injected energy from Rooftop Solar PV System, Import/drawl of energy from Distribution Licensee in the billing period, banked energy of the previous billing cycle, net billed energy for payment by the consumer for that billing period or net banked energy carried forward to the next billing period separately. The Energy Bill for import will be prepared as per the retail supply tariff as approved by the JKSERC for the category to which the consumer belongs. The energy exported to Distribution Licensee from the Rooftop Solar PV system shall be set-off against the energy imported from the Utility grid at the JKSERC approved retail supply tariff applicable to the particular consumer category.

13.3 At the end of the next and subsequent billing cycles / end of settlement period, Distribution Licensee will take the energy meter reading and work out the net flow taking into consideration the energy banked in the previous billing cycle if any, along with the readings of import and export of power for current billing cycle and work out the net energy account bill, as the case may be. The Procedure will be repeated at the end of every billing cycle. The settlement of net energy including any banked energy shall be done at the end of each settlement period based on 90% of the consumption. At the beginning of each settlement period, cumulative carried over injected energy shall be reset to zero.

13.4 All Rules and regulations including tariff shall be governed by the orders of JKSERC and terms and conditions prescribed in Application &Agreement (A&A) form. An additional form or MOU shall be signed between the Licensee and Seller of such Roof-top Solar PV sources and shall include necessary terms and conditions of meter reading, meter-rent, billing, payment, payment security arrangements, rate of delayed payment surcharge etc. and shall become the part of A&A Form.

13.5 All the instruction, rules and regulations applicable to the consumers of the Distribution Licensee for the applicable class/category including but not limited to the Tariff rates, Payment Schedule, Late payment surcharge, Connected load/Contract demand, Load

Surcharge, Peak load restriction, Advance Consumption Deposit etc., shall also be applicable to the Roof Top Solar plant owner as a consumer of Distribution Licensee. Electricity duty shall be levied as per Govt. of J&K instructions amended from time to time.

As long as the consumer having set-up the solar power plant consumes power from Utility Grid and/or generated from solar plant or banked solar energy up to or more than the Monthly Minimum Charges level in any billing period, MMC shall not be livable.

## 14. PROCEDURE:-

**14.1** The Eligible Consumers who proposes to install a Solar Rooftop System in his premises shall apply in the application form **[Annexure-V(a)],** available on the distribution licensee and JAKEDA websites, at the relevant sub-divisional office of the Distribution Licensee, with an intimation to JAKEDA, along with the application / processing fee of Rs.100 /kWp subject to a maximum of Rs.10,000/.

14.2 The Licensee shall acknowledge the receipt of the application form **[Annexure V(b)]** and register the application and shall process the application in the order of the receipt.

14.3 Within fifteen (15) working days of receipt of the Eligible Consumer's application, the Distribution Licensee shall provide written notice that it has received all documents required by the standard interconnection agreement or indicate how the application is deficient.

14.4 The Distribution Licensee shall assess the feasibility and intimate the same to the Eligible Consumers within thirty (30) days from the receipt of completed application. The feasibility shall be valid for a period of six months, unless extended by the Distribution Licensee.

Provided that if the distribution Licensee determines that an interconnection study is necessary as per sub clause 14.5, the Distribution Licensee shall intimate feasibility or otherwise within sixty (60) days from the receipt of complete application.

14.5 While intimating the feasibility for the connection of Rooftop PV Solar Power Plant as specified in sub clause 14.4, the Distribution Licensee shall also intimate the Eligible Consumer

a) The details of documents to be submitted by the Eligible Consumer.
b) Particulars of any deficiencies, if notices, along with instructions to remove such defects.
c) Details of any interconnection study required.

14.6 The Distribution Licensee shall, on receipt of the report on removing defects, if any, and the documents submitted under sub clause 14.5, convey the approval within 10 (ten) days from the date of receipt.

Provided that if the deficiency as per sub clause 14.5 is not removed by the Eligible Consumer within sixty (60) days from the date of receipt of such intimation to the Eligible Consumer, the application

shall stand cancelled and the application / processing fee shall be forfeited.

The consumer shall set up the plant and submit the work completion report along with Single Line Diagram of the synchronizing and protection arrangement issued by the plant supplier/EPC contractor that the plant has been installed as per approved standards and specifications within 180 days. After site verification, the Distribution Licensee shall and seal the Bi-directional energy meter(s) within 10 days of the submission of report and plant will be treated as commissioned for net-metering commercial operations from that date. In case of delay the consumer shall have to get further extension from Distribution Licensee. Such extension will be granted for a maximum period of 2-months only and the approval granted will lapse automatically if the project is not set-up even in the extended 2-months period. However, he will be eligible to apply in the next financial year but his application will be kept at the bottom of the list of applicants and he will be permitted to set-up the plant only if all the applicants above him are selected and there is still capacity available for allotment.

14.7. The interconnection agreement **[Annexure V(c)]** shall be executed by the Distribution Licensee with the eligible consumer within thirty (30) days of the accord of approval under clause 14.6.

## 15. RESTRICTIONS OF LEVEL OF OVERALL OR LOCAL GRID PENETRATION:-

15.1 Net-metering based Rooftop Solar Systems are small capacity systems and can be expected to proliferate fast when the policy and procedures are conducive. The impact and level of proliferation of Net-metering based Rooftop would have an impact on the local grid which has to address technical, safety and grid security issues arising out of possible reverse flow of electricity in the local grids. The Distribution Licensee shall provide net metering arrangement to all eligible consumers as long as the cumulative capacity to be allowed for a particular distribution transformer shall not exceed 20% of the rated capacity of the distribution transformer.

15.2 The Distribution Utility to which the consumer is connected can be given the benefit of deemed RPO for self-consumption of electricity by consumers.

## 16. APPLICATION FEE:-

The applicant shall pay application fee of Rs.100/kWp subject to a maximum of Rs.10000/- along with the application to the Distribution Licensee. No parallel operation charges shall be leviable on these projects.

## 17. TECHNICAL AND INTERCONNECTION REQUIREMENTS:-

**Given at Annexure-IV.**

## 18. OPERATION AND MAINTENANCE:-

18.1 The Solar Plant shall comply with the relevant standards specified by the MNRE/BIS and CEA. The responsibility of operation and maintenance of the Solar Photovoltaic Power Plant including all accessories and apparatus lies with the consumer. The design and installation of the Rooftop SPV System should be equipped with appropriately rated protective devices to sense any abnormality in the system and carry out automatic isolation of the SPV from the grid. The inverters used should meet the necessary quality requirements and should be certified for their quality by appropriate authority; the protection logics should be tested before commissioning of the plant.

18.2 The Automatic Isolation or Anti-islanding protection of SPP should be ensured for, no grid supply and low or over voltage conditions and within the required response time. Adequate rated fuses and fast acting circuit breakers on input and output side of the inverters and disconnect/isolating switches to isolate DC and AC system for maintenance shall be provided. The consumer should provide for all internal safety and protective mechanism for Earthing, Surge, DC ground fault, Transients etc.

18.3 To prevent back feeding and possible accidents when maintenance works are carried out by DISCOM personnel, Double pole/Triple pole with neutral isolating disconnect switches which can be looked by DISCOM personnel should be provided. Thisis in addition to automatic sensing and isolating on grid supply failure etc and in addition to internal disconnect switches. In the event of DISCOM LT/HT supply failure, the consumer has to ensure that there will not be any solar power being fed to the LT/HT grid of DISCOM. The consumer is solely responsible for any accident to human beings/ animals whatever (fatal/not fatal/departmental /non departmental) that may occur due to back feeding from the SPV Plant when the grid supply is off. DISCOM reserves the right to disconnect the installation at any time in the event of damage to its Grid, Meter, etc. or to prevent accident or damage.

18.4 The consumer shall abide by all the codes and regulations issued by the Commission to the extent applicable and in force from time to time. The consumer shall comply with JKSERC/DISCOM/CEA requirements with respect to safe, secure and reliable function of the SPV Plant and the Grid. The power injected into the grid shall be of the required quality in respect of wave shape, frequency, absence of DC components etc.

18.5 The consumer shall restrict the harmonic generation within the limit specified in the agreement or specified by the Central Electricity Authority as and when such regulation is issued.

18.6 The Consumer (Individual homes/Commercial establishments) may establish LT Grid Interactive Solar Power Plant in the Rooftop or elevated surface with the following options:

(i) Grid Interactive solar PV system without battery.

(ii) Grid interactive solar PV system with battery backup.

However, in both the options, features as per section clause (18.2) & (18.3) above shall be available so as to ensure Anti-islanding of the SPV system & prevent back feeding to the Utility Grid.

18.7 The inverter standard shall be such that it should not allow solar power/battery power to extend to DISCOM's LT grid on failure of DISCOM's grid supply, irrespective of the LT connectivity options. The required inverter standard for three phase and single phase solar power are furnished in **Annexure-III**.

18.8 The inverter should be a since wave inverter. Harmonic standards shall be as per IEEE 519.

## 19. PENALTY OR COMPENSATION:-

In case of failure of net metering system, the provisions of penalty or compensation shall be as per the provisions of the standard of performance regulations for distribution licensee.

## 20. POWER TO INTERPRET, RELAX AND AMEND:-

The Administrative Secretary, Science and Technology Department, shall be final authority to interpret any of the provisions and may by general or special order, relax any of the provisions of this Policy and from time to time add, vary, alter, suspend, modify, amend or repeal any provisions of this Policy.

## 21. SUBSIDY:-

21.1 The consumers interested in setting up of Solar Rooftop PV Project shall approach JAKEDA for grant of applicable subsidy from MNRE, GoI, as per the prevailing instructions/Policy.

21.2 The Solar Power Plant will be eligible for the fiscal and other incentives as per J&K Solar Power Policy- 2013.

22. **MANDATORY FOR GOVT INSTITUTIONS**:

Considering the advisory issued by the PMO, in this regard, it would be mandatory for all Government Departments/Institutions to install Solar Rooftop Systems on their buildings.

## 23. DEFINITIONS

23.1 Following expressions used in the Policy would have meanings assigned to them as defined here under:

| | | | |
|---|---|---|---|
| i. | J&K | : | Jammu & Kashmir |
| ii. | MNRE | : | Ministry of New and Renewable Energy |
| iii. | JAKEDA | : | Jammu & Kashmir Energy Development Agency |
| iv. | DISCOM | : | Distribution Utility |
| v. | JKSERC | : | Jammu & Kashmir State Electricity Regulatory Commission |
| vi. | kWp | : | Kilo watt peak |
| vii. | SCL | : | Sanctioned Connected Load |
| viii. | CD | : | Contract Demand |
| ix. | MPPT | : | Maximum Power Point Tracking |
| x. | CT | : | Current Transformer |
| xi. | PT | : | Potential transformer |
| xii. | RPO | : | Renewable Power purchase obligation |
| xiii. | A&A | : | Application & Agreement |
| xiv. | ED | : | Electricity Duty |
| xv. | MMC | : | Monthly Minimum Charges |
| xvi. | EPC | : | Engineering, Procurement & Construction |
| xvii. | BIS | : | Bureau of Indian Standard |
| xviii. | CEA | : | Central Electricity Authority |
| xix. | CFA | : | Central Financial Assistance |
| xx. | IEEE | : | Institute of Electrical and Electronics Engineers |
| xxi. | Developer | : | A person who develops electricity and transfers it to consumer |
| xxii. | GoJK | : | Government of Jammu and Kashmir |

xxiii. JNNSM : Jawaharlal Nehru National Solar Mission
xxiv. SPPs : Solar Power Plants
xxv. PMO : Prime Minister's Office

**ANNEXURE-I**

**(See Clause 8)**

**Energy Meter(s) Detail**

| Serial No. | Meter Description | Accuracy | Load of Consumer | Voltage / Frequency Level |
|---|---|---|---|---|
| 1 | SinglePhase10-60A, whole current | Class-I | Up to 5KW | Single PhaseLT230V/ 50±5% |
| 2 | 3 Phase 10-60 A, whole current | Class-I | More than 5 KW &upto15KW | Three PhaseLT415V / 50±5% |
| 3 | LT AC 3-Phase 4-Wires CT operated static DLMS Compliant energy meter | Class-0.5s Or better | More than 15 KW &upto100KW | Three PhaseLT415V / 50±5% |
| 4 | HT CT-PT Meter, DLMS Compliant & AMR Compatible | Class-0.5s Or better | More than 100KW | Three Phase HT / EHV / 50±5% |

**Annexure-II**

**(See Clause 9.11)**

## Harmonics Standard

As per the standard of IEEE 519, the permissible individual harmonics level shall be less than 3% (for both voltage and current harmonics) and Total Harmonics Distortion (THD) for both voltage and current harmonics of the system shall beless than 5%.

**ANNEXURE–III**

**(See Clause 9.11)**

## Inverter Standards

Inverter should comply with IEC 61683/ IS 61683 for efficiency and Measurements and should conform to IEC60068-2 (1,2,14,30) /Equivalent BIS Standard for environmental testing and IEC 62116 for Anti-Islanding feature. Inverter should supervise the grid condition continuously and in the event of grid failure (or) under voltage (or) over voltage, Solar System should be disconnected by the circuit breaker/ auto switch provided in the inverter.

**ANNEXURE–IV**
**(See Clause 17)**

**Technical and interconnection requirements**

| Parameter | Reference | Requirement |
|---|---|---|
| **Overall conditions of service** | State Distribution/Supply Code | State Distribution/ Supply Code |
| **Overall Grid Standards** | Central Electricity Authority (Grid Standard) Regulations 2010 | Central Electricity Authority (Grid Standard) Regulations2010 |
| **Equipment** | BIS/ IEC / IEEE | BIS/ IEC / IEEE |
| **Meters** | Central Electricity authority (Installation & operation of meters) Regulation 2006 as amended time to time | Central Electricity authority (Installation &operation of meters) Regulation 2006 as amended time to time |
| **Safety and supply** | Central Electricity Authority (measures of safety and electricity supply) Regulations,2010 | Central Electricity Authority (measures of safety and electricity supply) Regulations,2010 |
| **Harmonic Requirements** **Harmonic Current** | IEEE 519 CEA (Technical Standards for Connectivity of the Distributed Generation Resources) Regulations2013 | IEEE519 CEA (Technical Standards for Connectivity of the Distributed Generation Resources) Regulations-2013 |
| **Synchronization** | IEEE519 CEA (Technical Standards for Connectivity of the Distributed Generation Resources) Regulations 2013 | Photovoltaic system must be equipped with a grid frequency synchronization device. Every time the generating station is synchronized to the electricity system. It shall notcause voltage fluctuation greater than +/-5% at point of connection. |

| | | |
|---|---|---|
| **Voltage** | IEEE 519<br>CEA (Technical Standards for Connectivity of the Distributed Generation Resources) Regulations2013 | The voltage-operating window should minimize nuisance tripping and should be under operating range of 80% to 110% of the nominal connected voltage. Beyond a clearing time of 2second, the photovoltaic system must isolate itself from the grid. |
| **Flicker** | IEEE519<br>CEA (Technical Standards for Connectivity of the Distributed Generation Resources) Regulations2013 | Operation of Photovoltaic system should not cause voltage flicker in excess of The limits stated in IEC 61000 standards or other Equivalent Indian standards, if any. |
| **Frequency** | IEEE519<br>CEA(Technical Standards for Connectivity of the Distributed Generation Resources) Regulations2013 | When the Distribution system frequency deviates Outside the specified conditions (50.5Hz on upper side and 47.5 Hz on lower side), There should be over and under frequency trip functions with a clearing time of 0.2seconds. |
| **DC injection** | IEEE519<br>CEA (Technical Standards for Connectivity of the Distributed Generation Resources) Regulations 2013 | Photovoltaic system should not inject DC power more than 0.5% of full rated output at the interconnection point or 1% of rated inverter output current into distribution system under any operating conditions. |
| **Power Factor** | IEEE519<br>CEA (Technical Standards for Connectivity of the Distributed Generation Resources) Regulations2013 | While the output of the inverter is greater than 50%, a lagging power factor of greater than 0.9 should operate. |

| | | |
|---|---|---|
| **Anti-Islanding andDisconnection** | IEEE519<br>CEA (Technical Standards for Connectivity of the Distributed Generation Resources)Regulations 2013 | The photovoltaic system in the event of fault, voltage or frequency variations must disconnect itself within IEC standard on stipulated period. |
| **Overload and Overheat** | IEEE519<br>CEA (Technical Standards for Connectivity of the Distributed Generation Resources) Regulations 2013 | The inverter should have the facility to automatically switch off in case of overload or overheating and should restart when normal conditions are restored. |
| **Paralleling Device** | IEEE519<br>CEA (Technical Standards for Connectivity of the Distributed Generation Resources)Regulations2013 | Paralleling device of photovoltaic system shall be capable of withstanding 220% of the normal voltage at the interconnection point. |

**Note:-**

The standards/specifications shall be subject to amendments/ revisions from time to time as duly notified by Distribution Licensee / JKSERC on its website.

**Annexure-V(a)**

## FORMAT FOR APPLICATION FOR SOLAR POWER CONNECTIVITY

To:
The Sub-Division Officer/Designated Officer,
Distribution Licensee

[Name of Office]
Date: [dd mm yyyy]

I / we herewith apply for a solar energy net-metering connection at the service connection and for the Solar PV Plant of which details are given below:

| | | |
|---|---|---|
| 1 | Name of applicant | |
| 2 | Address of applicant | |
| 3 | Service connection number /consumer ID | |
| 4 | a) Sanctioned load<br>b) Contracted Load /demand | |
| 5 | Service connection tariff | |
| 6 | Telephone number(s) | |
| 7 | Email ID | |
| 8 | Solar PV Plant capacity in kWp | |
| 9 | Solar grid inverter make and type | |
| 10 | Solar grid inverter has automatic isolation protection (anti islanding) (Y/N) | |
| 11 | Has a Solar Generation Meter been installed (Y / N) | |
| 12 | Expected date of commissioning of Solar PV System | |
| 13 | Details of test certificates of Solar PV plant /inverter for standards required under the Policy. | |

Name:

Signature

**Annexure-V(b)**

Received an application for a solar energy net-metering connection from:

Name:

Date:

Service Connection number / Consumer ID:

Application Registration No:

Solar Plant Capacity :

Name of Officer :

Signature:

Designation / (Name of Discom)

**Annexure-V(c)**

# Net Metering Inter Connection Agreement

This Agreement is made and entered into at (location) _____ on this (date) _____ day of (month) _____ year _____ between
The Eligible Consumer, by the name of _____ having premises at (address) _____ as first party

AND

Distribution Licensee (hereinafter called as Licensee) and represented by _____ (designation of office) and having its registered office at (address)_____ as second party of the agreement.
And whereas, the Licensee agrees to provide grid connectivity to the Eligible Consumer for injection of the electricity generated from his SPV plant of capacity _____ kilowatts peak into the power system of Licensee and as per conditions of the agreement and JKSERC (Grid Interactive Rooftop Solar Photovoltaic Systems based on Net Metering ) Regulations, 2015, issued by the Jammu and Kashmir State Electricity Regulatory Commission.
Both the parties hereby agree to as follows :

## 1. Eligibility

1.1 Eligibility for net-metering has been specified in the relevant clauses of the Jammu & Kashmir Energy Development Agency's policy for Grid Connected Rooftop Solar Photo Voltaic Power Plants-2015. Eligible Consumer has to meet the standards and conditions for being integrated into grid/distribution system.

## 2. Technical and Interconnection Requirements

2.1 The Eligible Consumer agrees that his solar generation plant and net metering system will conform to the standards and requirements specified in Jammu & Kashmir Energy Development Agency's policy for Grid Connected Rooftop Solar Photo Voltaic Power Plants-2015 and in the following codes as amended from time to time

i. CEA's (Technical Standards for connectivity of the Distributed Generating Resources) Regulations, 2013
ii. Central Electricity Authority (Installation and Operation of Meters) Regulation 2006
iii. JKSERC Electricity Regulatory Supply Code – 2011

2.2 Eligible Consumer agrees that he has installed or will install, prior to connection of photovoltaic system to Licensee's distribution system, an isolation device (both automatic and inbuilt within inverter and external manual relays) and agrees for the Licensee to have access to and operation of this, if required and for repair & maintenance of the distribution system.

2.3 Eligible Consumer agrees that in case of a power outage on Licensee's system, photovoltaic system will disconnect/isolate automatically and his plant will not inject power into Licensee's distribution system.

2.4 All the equipment connected to distribution system shall be compliant with relevant international (IEEE/IEC) or Indian standards (BIS) and installations of electrical equipment must comply with Central Electricity Authority (Measures of Safety and Electricity Supply) Regulation, 2010.

2.5 Eligible Consumer agrees that licensee will specify the interface/interconnection point and metering point.

2.6 Eligible Consumer and licensee agree to comply with the relevant CEA & JKSERC Regulations in respect of operation and maintenance of the point, drawing and diagrams, site responsibility schedule, harmonics, synchronization, voltage, frequency, flicker etc.

2.7 Due to Licensee's obligation to maintain a safe and reliable distribution system, Eligible Consumer agrees that if it is determined by the Licensee that Eligible Consumer's photovoltaic system either causes damage to and/or produces adverse effects affecting other consumers or Licensee's assets, Eligible Consumer will have to disconnect photovoltaic system immediately from the distribution system upon direction from the Licensee and correct the problem at his own expense prior to a reconnection.

2.8 The consumer shall be solely responsible for any accident to human being / animals whatsoever (fatal/non-fatal) that may occur due to back feeding from the solar plant when the grid supply is off. The licensee reserves the right to disconnect the consumer's installation at any time in the event of such exigencies to prevent accident or damage to life and property.

## 3. Clearances and Approvals

3.1 The Eligible Consumer shall obtain all the necessary approvals and clearances (environmental and grid connection related) before connecting the photovoltaic system to the distribution system.

## 4. Access and Disconnection

4.1 Licensee shall have access to metering equipment and disconnecting means of the solar photovoltaic system, both automatic and manual, at all times

4.2 In emergency or outage situation, where there is no access to the disconnecting means, both automatic and manual, such as a switch or breaker, Licensee may disconnect service to the premises of the Eligible Consumer.

## 5. Liabilities

5.1 Eligible Consumer and Licensee shall indemnify each other for damages or adverse effects from either party's negligence or intentional misconduct in the connection and operation of photovoltaic system or Licensee's distribution system.

5.2 Licensee or Eligible Consumer shall not be liable to each other for any loss of profits or revenues, business interruption losses, loss of contract or loss of goodwill, or for indirect, consequential, incidental or special damages, including, but not limited to, punitive or exemplary damages, whether any of the said liability, loss or damages arise in contract, or otherwise:
Provided that in case of any dispute in respect of clause 5.1 and 5.2 above, the decision of the Commission shall be final and binding on both the parties.

5.3 Licensee shall not be liable for delivery or realization by Eligible Consumer for any fiscal or other incentive provided by the Central / State Government beyond the scope specified by the Commission in its relevant Order.

5.4 The Licensee may consider the quantum of electricity generation from the rooftop solar PV System under net metering arrangement towards RPO. (Applicable only in case of Eligible Consumer who is not defined as an Obligated Entity).

5.5 The proceeds from CDM benefits shall be retained by the Licensee.

## 6. Commercial Settlement

6.1 All the commercial settlement under this agreement shall follow the Net Metering Regulations, 2015 issued by JKSERC and Grid Connected Rooftop SPV Policy , 2015 issued by JAKEDA.

## 7. Connection Costs

7.1 The Eligible Consumer shall bear all costs related to setting up of photovoltaic system including metering and interconnection costs. The Eligible Consumer agrees to pay the actual cost of modifications and upgrades to the service line required to connect photovoltaic system to the grid in case it is required.

## 8. Termination

8.1 The Eligible Consumer can terminate agreement at any time by providing Licensee with 30 days prior notice.

8.2 Licensee has the right to terminate Agreement on 30 days prior written notice, if Eligible Consumer commits breach of any of the term of this Agreement and does not remedy the breach within 30 days of receiving written notice from Licensee of the breach.

8.3 Eligible Consumer shall upon termination of this Agreement, disconnect the photovoltaic system from Licensee's distribution system in a timely manner and to Licensee's satisfaction.

In witness, whereof, Mr._____ for and on behalf of _____ (Eligible Consumer) and Mr._____ for and on behalf of _____(Licensee) sign this agreement in two originals.

| | |
|---|---|
| Eligible Consumer<br>Name | Distribution Licensee<br>Name |
| Address | Designation |
| Service Connection No. /<br>Consumer ID | Office Address. |

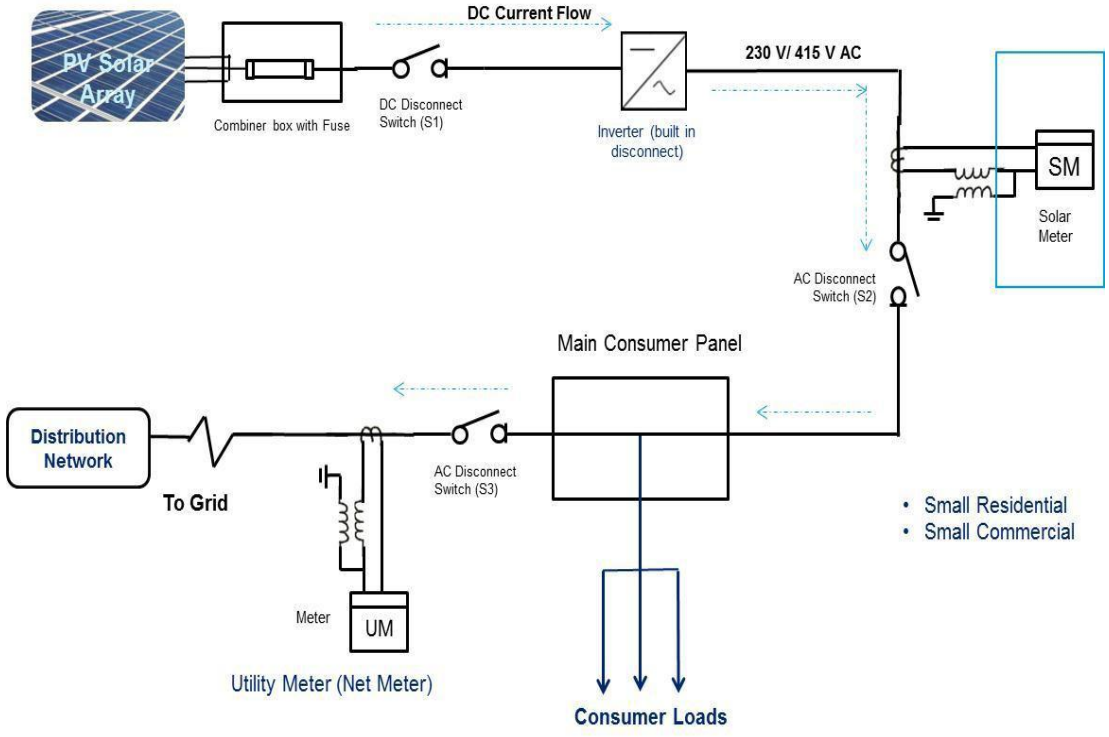
**ANNEXURE-VI**

## Meter Configuration options

The metering system for Rooftop Solar System, under net-metering arrangement, shall be as elaborated below which should be applicable till such time the Central Electricity Authority notifies the standards in this matter.

### a) Two Meter Configuration without Storage

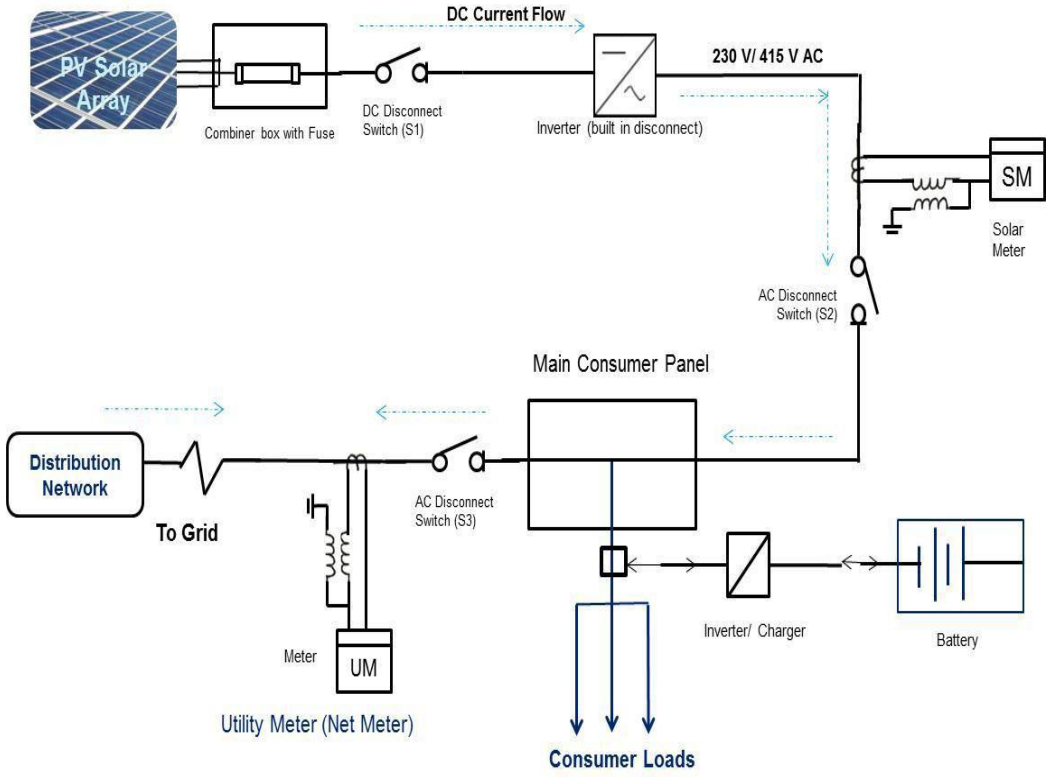
The metering protocol for 'Grid Connected Rooftop Solar PV System without storage' and location of solar meter and consumer meter shall be in accordance with the schematic below:-




The utility meter (Net-meter) has to be bi-directional meter to register both import of grid electricity amount as well as export of solar electricity amount.

## b) Two Meter Configuration with Storage

The metering protocol for 'Grid Connected Rooftop Solar PV System with storage' and location of Solar Meter (SM) and Utility Meter (UM) shall be in accordance with the schematic below:-




The utility meter (Net-meter) has to be bi-directional meter to register both import of grid electricity amount as well as export of solar electricity amount