



Jharkhand Bijli Vitran Nigam Limited

(CIN:U40108JH2013SGC001702)

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Letter no. 677

Date 01.06.16

To,

All General Manager-cum-Chief Engineer,

All Electric Supply Area.

All Electrical Superintending Engineer

All Electric Supply Circle

Sub: Instruction/Guidelines regarding rooftop solar PV Grid interactive systems and Net metering.

In compliance to JSERC (rooftop solar PV) regulations 2015 notified by Gazette 20th January, 2016 for increasing solar power generation to harness vast solar potential in the State, JBVNL is pleased to formulate instructions on Net metering for Grid interactive rooftop solar photo voltaic power plants. The salient features of the policy are detailed below:-

All the consumers of the JBVNL who intend to setup rooftop solar PV plants in their premises shall be eligible to do so with project capacity ranging from minimum 1 kWp upto 1MWp (AC side). Third party owned solar PV plant system where developers or intermediaries or turnkey installers who lease rooftop systems to individual owners and the owners in turn, pay them monthly lease rental shall also be eligible. In case of third party on solar PV Plant the arrangement i.e. signing of and agreement for lease of rooftop system between Rooftop owner and developer or intermediary or turnkey installer will be personal to them. For all intent and purposes, JBVNL will deal with the consumer only, in case of Net-metering.

The maximum peak capacity of the grid connected rooftop solar PV system to be installed by any eligible consumer shall not exceed 100% of the sanctioned load / contract demand of the consumer and shall be more than one kilo watt peak minimum.

The capacity to be allowed in the area fed from the distribution transformer or any other transformer from which power is fed to the eligible consumer shall not exceed 15% of the rated capacity of such transformer(s).

1. Procedure/salient features

- I. The eligible consumer or third party owner hereinafter referred to as applicant who intends to install grid interactive rooftop solar PV system in his/her premises shall apply in the application form at Annexure- I along with the application fees as specified in Annexure-II. Consumers shall submit the application to the concerned Electric Supply Sub-Division along with a copy to JREDA officer in the district.

- II. AEE of the concerned Sub-Division will prepare the feasibility report in the form of Annexure-III, with approval from the competent authority as per table –I. After checking the feasibility the concerned AEE shall issue approval letter to the feasibility cleared applicant within 30 days of receipt of application. (Annexure-IV, letter of approval).

TABLE – I

Connected Demand Consumer	Load/Contract of Eligible	Connectivity Level	Competent Authority to check the feasibility
Upto 5 kW		Single Phase at 230 V	AEE/Supply
5 kW and above up to 50 kW/ 67 HP		3 Phase, 4 Wire at 415 V	EEE/Supply
Above 50 kW and up to 1 MW		3 Phase at 6.6 kV or 11 kV	ESE/Supply

- III. AEE of concerned sub-divn shall issue approval letter to the feasibility cleared applicant within 30 days of receipt of application (Annexure - IV).
- IV. 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 within 180 days envisaging that the plant has been installed as per the approved standards and specifications as per Annexure-VII. In case of delay, the consumer shall have to get further extension from JBVNL within original (180 days) allowed period. Such extension shall be granted for a maximum period of 2-months only and the approval granted shall lapse automatically if the project is not set-up even in the extended 2- months period and the fee deposited by the consumer shall be forfeited. Such consumer shall have to apply afresh.
- V. Competent authority to approve the single line diagram, protection arrangements and site verification of the solar plant to be set up by the consumer shall be as per the table – I.
- VI. After approval of Rooftop Solar PV System by the competent authority as above , the applicant shall apply for registration of the scheme for rooftop solar PV system by completing the registration form provided at Annexure-V of this circular, along with the registration fees as specified in Annexure-II of this circular. JBVNL shall install and seal the Bi-directional or unidirectional or both energy meter(s) as required (**as per ESIM Clause 53**) within 10 days of the submission of work completion report and shall be treated as commissioned for commercial operations from that date for net-metering.
- VII. For the applicant who has applied under the net metering scheme the inter connection agreement provided at Annexure-VI of this circular shall be executed

by the JBVNL within thirty (30) days of issue of Registration number to the eligible applicant.

2. **Metering**

All the meters shall adhere to the standards and provisions specified in CEA (Installation and Operation of Meters), Regulations, 2006 and subsequent amendments thereof.

The appropriate meter(s) shall be single phase or three phase as per requirement. All the meters to be installed shall be of the same or better Accuracy Class Index than the existing meter installed at the premises.

The appropriate meter(s) at the premises of the consumer shall be procured, installed and maintained by the JBVNL at the cost of the eligible consumer. However if the eligible consumer wishes to procure the appropriate Meter(s), he may procure such meter(s) and present the same to the JBVNL for testing and installation.

The location of appropriate meter(s) shall be in accordance with the CEA (Installation and Operation of Meters), Regulations, 2006 as amendments from time to time and the JSERC (Electricity Supply Code) Regulations, 2005 as amendments from time to time.

The installation of check meters shall be mandatory for rooftop solar PV system having rated capacity more than 50 kWp. The charges for testing, installation and maintenance of the check meter shall be borne by the eligible consumer. The JBVNL shall own the check meter.

For installations having rated capacity up to 50 kWp, the eligible consumer or the JBVNL who so ever if desires, may install check meter at their own cost. The JBVNL shall own the check meter.

The check meter shall be installed after the inverter of the solar rooftop system.

The specification and standards of the check meter shall be same as or better than the consumer meter installed at the premises of the eligible consumer.

All the meters installed shall be jointly inspected and sealed on behalf of both the parties.

Provided that the meter reading taken by the JBVNL shall be the basis of commercial settlement .

3. **Energy Accounting and Settlement**

Meter readings shall be taken as per the applicable cycle as provided in the JSERC (Electricity Supply Code) Regulations 2005 and subsequent amendments thereof; The energy accounting and settlement procedure for consumers installing and operating rooftop solar PV system under net metering arrangement shall be as per the following procedure:

- i. For each billing period, the Licensee shall show the quantum of electricity injected by the rooftop solar PV system in the billing period, supplied

electricity by JBVNL in the billing period, net billed electricity for payment by the consumer for that billing period and net carried over electricity to the next billing period separately;

- ii. If the electricity injected exceeds the electricity consumed during the billing period, such excess injected electricity shall be carried forward to next billing period as electricity credit and may be utilized to net electricity injected or consumed in future billing periods but within the settlement period;
- iii. If the electricity supplied by the JBVNL during any billing period exceeds the electricity generated by the eligible consumer's rooftop solar PV system, the JBVNL shall raise invoice for the net electricity consumption after taking into account any electricity credit balance remaining from previous billing periods;
Provided, in case the eligible customer is under the ambit of time of day tariff, as determined by the Commission from time to time, the electricity consumption in any time block (e.g., peak hours, off-peak hours, etc.) shall be first compensated with the electricity generation in the same time block. Any excess generation over consumption in any time block in a billing cycle shall be carried forward to the corresponding time block in the subsequent month for adjustment purpose.
- iv. Provided also that the excess electricity measured in kilo-watt hour may only be utilized to offset the consumption measured in kilo-watt hour and may not be utilized to compensate any other fee and charges imposed by the JBVNL as per the instructions of Commission.
- v. Provided also at the end of each settlement period, any electricity credits, which remain unadjusted, shall be paid at a rate of Rs 0.50/kWh by the JBVNL or as notified by the Commission from time to time.
- vi. Provide further that at the beginning of each settlement period, cumulative carried over electricity credits shall be reset to zero.
- vii. When an eligible consumer leaves the system, that consumers unused electricity credits shall be paid at a rate of Rs 0.50/kWh by the JBVNL or as notified by the Commission from time to time.
- viii. Regardless of availability of electricity credits with the eligible consumer during any billing period, the consumer shall continue to pay applicable charges such as fixed/ demand charges, Government levy etc.
- viv. The JBVNL shall necessarily provide the following details along with the electricity bill relating to each billing period:
 - a) Quantum of electricity generated from the rooftop solar PV system.
 - b) Quantum of electricity injected into the distribution system by the rooftop solar PV system.
 - c) Quantum of electricity supplied by the JBVNL to the eligible consumer.
 - d) Quantum of net electricity that has been billed for payment by the eligible consumer.

e) Quantum of electricity credits available to the eligible consumer which is carried over from the previous billing period.

f) Quantum of electricity injected into the distribution system in excess of the drawl by the eligible consumer (quantum of electricity credits) which shall be carried forward to the next billing period.

In case of any dispute in billing it would be settled by the Consumer Grievance Redressal Forum and if issue still remains unresolved, it shall be settled by the Ombudsman following appropriate procedure.

APPLICABILITY OF OTHER CHARGES

In rooftop solar PV system under net metering scheme, whether self-owned or third party owned and installed on eligible consumer premises shall be exempted from wheeling and cross subsidy surcharge.

All charges on net electricity consumed in case of Net metering from JBVNL shall be leviable as usual. All the instructions rules and regulations applicable to the consumers of the JBVNL for the applicable class/category including but not limited to the tariff rates, payment schedule, late payment surcharge, connected load / contracted demand, load surcharge, peak load restrictions, security Consumption Deposit etc., shall also be applicable to the Roof Top Solar plant owner as a consumer of JBVNL.

This has got the approval of competent authority.

Note:

These instructions / guidelines shall be read with provisions of JSERC Regulation 2015 for Rooftop Solar PV Grid Interactive System and Net/ Gross Metering and in case of any inconsistency the provision of Regulation shall prevail.

Sd/-

**Chief Engineer (Commercial & Revenue)
JBVNL, Ranchi**

Annexure-I

**APPLICATION FOR INTENT TO SEEK CONNECTIVITY OF
ROOFTOP SOLAR PV SYSTEM**

1.	Name Full Address of Consumer Applicant		
2.	Consumer No. (CA.NO.) (Owner of the premises)		
3.	Category (Domestic / Non Domestic / Commercial etc. specify) (Owner of the premises)		
4.	Telephone No	Res:	Mob:
5.	E-mail address		
6.	Sanctioned Load		
7.	Capacity of Rooftop Solar PV System proposed to be connected		
8.	Whether the Consumer is under ToD billing system (Owner of the premises)	Yes/No	
9.	Whether the Consumer or third party owner shall avail accelerated depreciation benefits on the Rooftop Solar PV system	Yes/No	
10.	Type of Rooftop Solar PV System proposed (Net Metering)		
11.	Location and address of Proposed Rooftop Solar PV System (rooftop, ground, any other – specify)		
12.	Preferred mode of Communication (Post/By Hand/Electronic etc. – specify)		

Place:

Signature of Eligible Consumer/Third Party owner

ACKNOWLEDGEMENT

Application Number.....

Received the application for connectivity of Rooftop Solar PV System

Name:.....

Consumer No.:.....

Date....., Time....., Serial No.....

Application Fee Paid or Not:.....

Rooftop Solar PV Plant Capacity:.....

Mode of payment (Cheque / DD / RTGS / NEFT):

Details of Cheque / DD / RTGS / NEFT:

Name of Officer

Signature

(Designation of Officer)

(To be specified at the time of signing)

Annexure-II

APPLICATION FEES

Sl. No.	Connected Load / Contract Demand of Eligible Consumer	Amount
1.	Up to 50 kW / 63 kVA	Rs. 250
2.	Above 50 kW and up to 1 MW	Rs. 750

The amount of application fee for eligible consumer and third party other than the owner of the premises shall be the amount mentioned above.

REGISTRATION FEES

Sl. No.	Connected Load / Contract Demand of Eligible Consumer	Amount
1.	Up to 50 kW / 63 kVA	Rs. 1000
2.	Above 50 kW and up to 1 MW	Rs. 2500

The amount of registration fee for eligible consumer and third party other than the owner of the premises shall be the amount mentioned above.

Annexure-III

TECHNICAL DATA FORM FOR FEASIBILITY CLEARANCE OF ROOF TOP SPV POWER PLAN

(To be filled by JEE/AEE/Area Incharge)

1.	Name of Consumer:	
2.	Name of Address/Location:	
3.	Contact No. and E-mail ID:	
4.	Consumer No.:	
5.	Application No:	
6.	Name of Sub-Division :	
7.	Name of Division:	
8.	Name of Circle:	
9.	Sanctioned load / CD of Consumer with category and supply voltage	
10.	Capacity of proposed SPVPP (in kW):	
11.	Name /Location of feeding Transformer:	
(i)	Capacity of above Transformer:	
(ii)	Connected Load (kVA) on the Transformer:	
(iii)	Maximum Demand in Amps:	
(iv)	No. of LT Ckts. :	
12.	Length of LT Feeder:	
(i)	Size of conductor (sq. mm)	
(ii)	Maximum Demand in Amps	
13.	Name of feeder:	
(i)	Size of Conductor / Capacity	
14.	Name of feeding Sub-Station:	
15.	SPVPPs already connected on this Distribution Transformer (in kW/kVA):	
16.	Senior pending SPVPPs to be connected on the T/F:	
17.	Capacity of proposed SPVPP on this T/F (in kW/kVA): (As per column no. 6.2 of PSERC Notification)	
18.	Total load on this T/F (in kW/kVA) = Sum total of columns (14+15+16): (It should not be more than 15% of the T/F Capacity)	
19.	Recommendation of Field Office: (Whether capacity of SPVPP as per column – 9 approved or not, if approved mention the approved capacity, if not assign the reasons)	

Date:

Signature of Authorized Officer

Signature of JBVNL Official

Annexure-IV

Letter of Approval

To

Mr. / Ms. / M/s.....

Consumer No.....

Memo No.....

Dated:.....

Ref: Your request of Application No.....

Your request for installing Rooftop PV system for.....kWP capacity is considered and approval is accorded with the following conditions: -

1. You 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 approved plant supplier/EPC contractor that the plant has been installed as per approved standards and specifications within 180 days. In case of delay you shall have to get further extension from JBVNL. 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, you will be eligible to apply in the next financial year but your application will be kept at the bottom of the list of applicants and you will be permitted to set-up the plant only if all the applicants above you are selected and there is still capacity available for allotment.

2. You will abide by the guidelines for Grid Interactive Rooftop Solar Photo Voltaic Power Plants issued by Govt. of Jharkhand/JSERC/ JBVNL/JREDA.

3. 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 photo voltaic (SPV) generator including all accessories and apparatus lies with the consumer. The design and installation of the rooftop SPV 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 logic should be tested before commissioning of the plant.

4. The automatic isolation or islanding protection of SPV 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.

To prevent back feeding and possible accidents when maintenance works are carried out by JBVNL personnel, Double pole / Triple pole with neutral isolation disconnection switches which ever applicable can be locked by JBVNL personnel should be

provided. This is in addition to automatic sensing and isolating on grid supply failure etc and in addition to internal disconnection switches. In the event of JBVNL 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 JBVNL. You will be solely responsible for any accident to human beings/animals whatsoever (fatal/non) fatal/departmental/non departmental) that may occur due to back feeding from SPV plant when the grid supply is off. JBVNL have the right to disconnect the rooftop solar system at any time in the event of possible threat/damage, from such rooftop solar system to its distribution system, to prevent any accident or damage, without any notice.

You shall abide by all the codes and regulations issued by the Commission to the extent applicable and in force from time to time and shall comply with JSERC/JBVNL/CEA requirements with respect safe, secure and reliable functioning 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.

The inverter standard shall be such that it should not allow solar power / battery power to extend to JBVNL's Grid on failure of JBVNL's Grid supply irrespective of connectivity options.

You shall restrict the harmonic generation within the limit specified in IEEE 519 or as may be specified by the Central Electricity Authority.

AEE/Supply

Sub Division.....

JBVNL.....

Annexure-V

APPLICATION FOR REGISTRATION OF THE SCHEME FOR ROOFTOP SOLAR SYSTEM

1.	Name	
2.	Address for Communication	
3.	Consumer No.,	
4.	Telephone No.,	
5.	E-Mail	
6.	Application No./Date	
7.	Letter of Approval Memo No. / Date	
8.	Contract Demand of Consumer	
9.	Capacity of Rooftop Solar PV System to be connected (Capacity not to exceed as approved by the JBVNL and as per RSPV Regulation 2015)	
10.	Technical specifications and other particulars of Renewable Panel, Grid Tied Inverter and Interlocking System etc. proposed to be installed – whether attached (Yes/No)	
11.	Technical specifications and other particulars of Renewable energy meter to be installed – whether attached (Yes/No)	
12.	Whether Consumer opts to purchase meter himself or from Distribution Licensee	
13.	Drawings for installing the Rooftop Solar PV System – whether attached (Yes/No)	
14.	Date of completion of the installation	

Place:

Signature of Eligible Consumer / Third Party Owner

ACKNOWLEDGEMENT

Received the application for registration of the scheme for Rooftop Solar PV System

Name:

.....

Date:

.....

Registration Number:

.....

Consumer Number:

.....

Solar Energy Plant Capacity:

.....

Mode of payment (Cheque / DD / RTGS / NEFT):

.....

Details of Cheque / DD / RTGS / NEFT:

.....

Name of Officer

**Signature Seal
(Designation of Officer)**

Annexure-VI

Inter connection agreement (Net Metering Arrangement)

This Agreement is made and entered into at (location)on this (date)day of (month)yearbetween

The Eligible Consumer by the name ofhaving or leasing the premises at (address)as first party

AND

JBVNL (herein after called as Licensee) and represented by (Designation of office) and having its registered office at Engineering Building, H.E.C., Dhurwa, Ranchi-834004 as second party of the agreement

And whereas, the Jharkhand Bijli Vitran Nigam Limited agrees to provide grid connectivity to the eligible consumer for injection of the electricity generated from his SPV plant of capacity kilowatts into the power system of Licensee and as per conditions of this agreement and net/gross - metering regulations/orders issued by the Jharkhand 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 JSERC (Rooftop Solar PV Grid Interactive System Gross / Net Metering) Regulations, 2015 (hereinafter referred to as RSPV Regulations, 2015). Eligible consumer is required to be aware, in advance, of the standards and conditions his system has to meet for being integrated into grid/distribution system.

2. Technical and Interconnection Requirements

2.1. The eligible consumer agrees that his Rooftop Solar PV generation plant and net metering system will conform to the standards and requirements specified in these regulations and in the following Regulations and codes as amended from time to time.

- i. Central Electricity Authority (Technical Standards for connectivity of the Distributed Generating Resources) Regulations, 2013 and subsequent amendments thereof;
- ii. Central Electricity Authority (Installation and Operation of Meters) Regulation 2006 and subsequent amendments thereof;
- iii. Central Electricity Authority (Measures of Safety and Electricity Supply) Regulations, 2010 and subsequent amendments thereof;
- iv. JSERC State Grid Code, 2008 and subsequent amendments thereof to the extent specified in the JSERC RSPV Regulations 2015;
- v. JSERC Supply Code Regulations 2005 and subsequent amendments thereof;
- vi. Any other provisions applicable to the electricity consumer of the Distribution Licensee.

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) Regulations, 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 and JSERC Regulations in respect of operation and maintenance of the plant, 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.

3. Clearances and Approvals

3.1. The eligible consumer agrees to 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 will 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 and eligible consumer will 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.

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 towards RPO.

6. Commercial Settlement

6.1. All the commercial settlement under this agreement shall follow the RSPV Regulations, 2015 issued by the JSERC.

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 90 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

Name
Address
Service connection No.

JBVNL

Name
Designation
Office Address

Annexure-VII

INFORMATION RELATED TO TECHNICAL & INTERCONNECTION STANDARDS

Parameter	Reference	Requirement
Overall conditions of Service	State Electricity Supply Code	Reference to State Electricity Distribution Code
Overall Standards	Central Electricity Authority (Grid Standard) Regulations 2010	Reference to regulations
Equipment	BIS/IEC/IEEE	Reference to standards
Meters	Central Electricity Authority (Installation & operation of meters) Regulation 2006	Reference to regulations and addition conditions issued by the Commission.
Safety and supply	Central Electricity Authority (measures of safety and electricity supply) Regulations, 2010	Reference to regulations
Harmonic Current	IEEE 519 CEA (Technical Standards for Connectivity of the Distribution Generation Resources) Regulations 2013	Harmonic current injection from a generating station shall not exceed the limits specified in IEEE 519
Synchronization	IEEE 519 CEA (Technical Standards for Connectivity of the Distribution Generation Resources) Regulations 2013	Rooftop Solar PV System must be equipped with a grid frequency synchronization device. Every time the generating station is synchronized to the electricity system. It shall not cause voltage fluctuation greater than +/- 5% at point of connection.
Voltage	IEEE 519 CEA (Technical Standards for Connectivity of the Distribution Generation Resources) Regulations 2013	The voltage operation 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 2 second, the Rooftop Solar PV System must isolate itself from the grid.

Flicker	IEEE 519 CEA (Technical Standards for Connectivity of the Distribution Generation Resources) Regulations 2013	Operation of Rooftop Solar PV System should not cause voltage flicker in excess of the limits stated in ICE 61000 standards or other equivalent Indian standards, if any.
Frequency	IEEE 519 CEA (Technical Standards for Connectivity of the Distribution Generation Resources) Regulations 2013	When the Distribution system frequency deviates outside the specified conditions (50.5 Hz on upper side and 47.5 Hz on lower side), There should be over and under frequency trip functions with a clearing time of 0.2 seconds.
DC injection	IEEE 519 CEA (Technical Standards for Connectivity of the Distribution Generation Resources) Regulations 2013	Rooftop Solar PV 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 operation conditions.
Power Factor	IEEE 519 CEA (Technical Standards for Connectivity of the Distribution Generation Resources) Regulations 2013	While the output of inverter is greater than 50%, a lagging power factor of greater than 0.9 should operate.
Islanding and Overheat	IEEE 519 CEA (Technical Standards for Connectivity of the Distribution 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	IEEE 519 CEA (Technical Standards for Connectivity of the Distribution Generation Resources) Regulations 2013	Paralleling device of Rooftop Solar PV System shall be capable of withstanding 220% of the normal voltage at the interconnection point.

Single Line Diagram of Rooftop Facility for Net Metering Interconnection

