Checklist for Net Meter Application

Feasibility assessment for renewable energy system

TPDDL Business Services Group
JUNE 2015

Checklist for consumers to comply with process and documentation needed for grid-connected rooftop solar PV plant with TPDDL Distribution System through Net Meter as per DERC Guidelines for Net Metering
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## 1. Checklist for grid-connected rooftop solar PV

### 1.1 Documents to be submitted by the Consumer

<table>
<thead>
<tr>
<th>Number</th>
<th>Description</th>
<th>Complete? YES/NO</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Application form <em>(Section 1.2)</em> as per DERC</td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>Registration form <em>(Section 1.3)</em> as per DERC</td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>List of approvals / clearances required from respective authorities / agencies for installation of Renewable Energy System including Electrical Inspection Clearance as per CEA <em>(Measures relating to Safety and Electric Supply) Regulations, 2010</em></td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td>Connection Agreement duly signed by consumer <em>(Annexure 1)</em> as per DERC guidelines for Net Metering</td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td>Renewable Energy System line diagram for grid connectivity, the consumer will provide engineering drawings applicable to be verified by TPDDL</td>
<td></td>
</tr>
<tr>
<td>6.</td>
<td>All the components including panels, inverters will need to be listed clearly from the sourcing accompanied with requisite verifiable certification and test certificates</td>
<td></td>
</tr>
<tr>
<td>7.</td>
<td>Undertaking for compliance to stipulated technical specifications including the essential safety features</td>
<td></td>
</tr>
</tbody>
</table>
1.2 Net Metering Application for Rooftop Grid-Connected Solar PV

The consumer shall submit an application, seeking connectivity under the Net Metering Regulations, 2014 in the specified format as shown below along with an application fee of Rs. 500/- (Rupees Five Hundred) to the concerned Distribution Licensee (in this case, TPDDL) for feasibility analysis.

Annexure-I
Application Form Number .................................

APPLICATION FOR INTENT TO SEEK CONNECTIVITY OF RENEWABLE ENERGY SYSTEM
(Regulation 5.1)

1. Name
   Full Address of Consumer

2. Consumer No. (CA. No.)

3. Category (Domestic / Non Domestic/Commercial etc – SPECIFY)

4. Telephone No  Res: Mob:

5. E-mail address

6. Sanctioned Load

7. Renewable Energy Source (Solar, wind , etc.)

8. Capacity of Renewable Energy System proposed to be connected

9. Whether the Consumer is under ToD billing system  Yes/No

10. Type of Renewable Energy System proposed (Solar, Wind, Biomass etc – specify)

11. Location and address of Proposed Renewable Energy System
    (roof top, ground mounted, any other – specify)

12. Capacity of Renewable Energy System proposed to be connected

13. Preferred mode of Communication
    (Post/ By Hand/ Electronic etc – specify)

Place: Delhi: Signature of Consumer

---------------------------------------------

ACKNOWLEDGEMENT
Application Number.................................

Received the application for connectivity of Renewable Energy System

Name .......................................................... CA. No. ..........................
Date  ................................................... Time .........................., Serial no. ..........................
Application Fee Paid or Not
Renewable Energy Plant Capacity ..................... Renewable Energy Type .....................
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)
1.3 Registration Form Post Feasibility Analysis by TPDDL

On successful completion of feasibility analysis by for the grid-connected rooftop solar PV under Net Metering regulation, the consumer shall furnish the following documents including registration.

APPLICATION FOR REGISTRATION OF THE SCHEME FOR RENEWABLE ENERGY SYSTEM

<table>
<thead>
<tr>
<th></th>
<th>Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>Address for Communication</td>
</tr>
<tr>
<td>3</td>
<td>Consumer No.,</td>
</tr>
<tr>
<td>4</td>
<td>Telephone No.,</td>
</tr>
<tr>
<td>5</td>
<td>E-mail</td>
</tr>
<tr>
<td>6</td>
<td>Renewable Energy Source</td>
</tr>
<tr>
<td>7</td>
<td>Application No.</td>
</tr>
<tr>
<td>8</td>
<td>Serial No. of receipt of Application</td>
</tr>
<tr>
<td>9</td>
<td>Contract Demand of Consumer</td>
</tr>
<tr>
<td>10</td>
<td>Capacity of Renewable Energy System to be connected (Capacity not to exceed as approved by the Discom)</td>
</tr>
<tr>
<td>11</td>
<td>Technical specifications and other particulars of Renewable Panel, Grid Tied Inverter and Interlocking System etc. proposed to be installed – whether attached (Yes/No)</td>
</tr>
<tr>
<td>12</td>
<td>Technical specifications and other particulars of Renewable energy meter and Net Meter to be installed – whether attached (Yes/No)</td>
</tr>
<tr>
<td>13</td>
<td>whether Consumer opts to purchase meter himself or from Distribution Licensee</td>
</tr>
<tr>
<td>14</td>
<td>Drawings for installing the Renewable Energy System – whether attached (Yes/No)</td>
</tr>
<tr>
<td>15</td>
<td>Proposed date of completion of the installation</td>
</tr>
</tbody>
</table>

Place: 
Delhi: 
Signature of Consumer

Acknowledgement
Received the application for registration of the scheme for Renewable Energy System
Name ...........................................................................................................................................
Date .............................................................................................................................................
Registration Number ..................................................................................................................
Consumer No. ..............................................................................................................................
Renewable Plant Capacity ...........................................................................................................
Mode of payment (Cheque / DD/NEFT/RTGS) ..............................................................................
Details of Cheque/DD/RTGS/NEFT ............................................................................................

Name of Officer 
Seal 
Designation of Officer 
Signature
1.4 Requirements as per DERC guidelines under Net Meter regulation:

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Reference</th>
<th>Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall conditions of Service</td>
<td>State Distribution/Supply Code</td>
<td>Reference to State Distribution Code</td>
</tr>
<tr>
<td>Overall Grid Standards</td>
<td>Central Electricity Authority (Grid Standard) Regulations 2010</td>
<td>Reference to regulations</td>
</tr>
<tr>
<td>Equipment</td>
<td>BIS / IEC / IEEE</td>
<td>Reference to standards (Ref to Section 1.4 and 1.5)</td>
</tr>
<tr>
<td>Meters</td>
<td>Central Electricity authority (Installation &amp; operation of meters) Regulation 2006</td>
<td>Reference to regulations and additional conditions issued by the Commission.</td>
</tr>
<tr>
<td>Safety and supply</td>
<td>Central Electricity Authority(measures of safety and electricity supply) Regulations, 2010</td>
<td>Reference to regulations</td>
</tr>
<tr>
<td>Harmonic Current</td>
<td>IEEE 519 CEA (Technical Standards for Connectivity of the Distributed Generation Resources) Regulations 2013</td>
<td>Harmonic current injections from a generating station shall not exceed the limits specified in IEEE 519</td>
</tr>
<tr>
<td>Synchronization</td>
<td>IEEE 519 CEA (Technical Standards for Connectivity of the Distributed Generation Resources) Regulations 2013</td>
<td>Renewable Energy 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.</td>
</tr>
</tbody>
</table>
2. Compliance to Technical Specifications

The consumer will provide undertaking to comply with below mentioned Technical specifications as per below format

“I_____________________________________________________/We hereby undertake to comply with below mentioned Standards for Technical Compliance for the Solar Plant to be installed and to be connected with TPDDL Distribution System through Net Meter as per DERC Guidelines.

I/We also undertake to comply with any subsequent amendment to these standards of Technical Compliance as notified by competent authority and any other technical standards relevant for compliance in respect to Solar Project to be connected to TPDDL Distribution System.”

Consumer signature: Date:

2.1 Standards for photovoltaic systems and other components

<table>
<thead>
<tr>
<th>SOLAR MULTI-CRYSTALLINE PHOTOVOLTAIC PANELS</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>CERTIFICATION</strong></td>
</tr>
<tr>
<td>---------------------</td>
</tr>
<tr>
<td>IEC 61215/IS14286</td>
</tr>
<tr>
<td>IEC 61730 (P1 - P2)</td>
</tr>
<tr>
<td>IEC 61701/ IS 61701</td>
</tr>
<tr>
<td>IEC 61727</td>
</tr>
<tr>
<td>IEC 60068-2 (1, 2,14,30) / Equivalent BIS Std.</td>
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<tr>
<td>IEC 61683</td>
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<tr>
<td>IEEE 929</td>
</tr>
</tbody>
</table>
### SOLAR MULTI-CRYSTALINE PHOTOVOLTAIC PANELS

<table>
<thead>
<tr>
<th>CERTIFICATION</th>
<th>CERTIFICATION DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>IEC - 62109-1 (2010/4)</td>
<td>Product safety standard</td>
</tr>
<tr>
<td>IEC - 62109-2 (2011/6)</td>
<td></td>
</tr>
<tr>
<td>IEC 61000-6-3&gt;16 Amps IEC 61000-6-4</td>
<td>Electromagnetic compatibility &amp; Electro Magnetic Interference</td>
</tr>
<tr>
<td>IP 65 (for outdoor)/ IP 21 (for indoor) As per IEC 529</td>
<td>Ingress protection</td>
</tr>
</tbody>
</table>

*If the Charge controller is not built in the inverter, IEC 62093 test is required separately for Charge controller.*

### OTHER COMPONENTS SUCH AS CABLES, EARTHING AND JUNCTION BOXES

<table>
<thead>
<tr>
<th>CERTIFICATION</th>
<th>CERTIFICATION DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>IEC 60227 / IS 694 IEC 60502 / IS 1554 (Part. I &amp; II)</td>
<td>CABLES: General Test and Measuring Method PVC insulated cables for working voltage up to and including 1100 V and UV resistant for outdoor installation</td>
</tr>
</tbody>
</table>

### OTHER COMPONENTS SUCH AS CABLES, EARTHING AND JUNCTION BOXES

<table>
<thead>
<tr>
<th>CERTIFICATION</th>
<th>CERTIFICATION DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>IP 65 (for outdoor)/ IP 21 (for indoor) As per IEC 529</td>
<td>JUNCTION BOXES/ ENCLOSURES FOR CHARGE CONTROLLERS/ LUMINARIES: General Requirements</td>
</tr>
<tr>
<td>IEC 69947</td>
<td>Standard test and measuring methods for PVC insulated cables for working voltages up to and including 1100V, UV resistant for outdoor applications</td>
</tr>
<tr>
<td>IEEE 519-1992</td>
<td>Recommended practices and requirements for harmonic control in electric power systems</td>
</tr>
<tr>
<td>IEC 62446</td>
<td>Grid connected PV systems - minimum requirements for system documentation, commissioning tests and inspection</td>
</tr>
<tr>
<td>IEC 62116</td>
<td>Test procedure of islanding prevention measures for utility-interconnected PV inverters</td>
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### 2.2 Specifications of Inverter/Power Conditioning Unit (PCU)

*Ref CEA (Technical Standards for Connectivity of the Distributed Generation Resources) Regulations 2013*

<table>
<thead>
<tr>
<th>Detailed Specifications of Inverter/Power Conditioning Unit</th>
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<tbody>
<tr>
<td><strong>OUTPUT VOLTAGE</strong></td>
</tr>
<tr>
<td><strong>OUTPUT FREQUENCY</strong></td>
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<tr>
<td><strong>POWER FACTOR</strong></td>
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<tr>
<td><strong>WAVEFORM</strong></td>
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<td><strong>HARMONICS</strong></td>
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<tr>
<td><strong>RIPPLE</strong></td>
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<tr>
<td><strong>CASING PROTECTION LEVELS</strong></td>
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<td><strong>PROTECTIONS</strong></td>
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- For 3-Phase output supply, Power Conditioning Unit (PCU) shall include a facility to convert the DC energy produced by solar array to AC voltage, through DC bus, using its Maximum Power Point Tracking (MPPT) control to extract maximum energy from solar array and produce AC power at 415V AC, 3 phase, 50 Hz.
2.3 Interconnection Guidelines to comply to:

1. All work must be carried out as per the following:
   A. Indian Electricity Act and rules therein
   B. Indian Electricity Grid Code
   C. Regulations of Chief Electrical Inspector

2. The other major components of the proposed interconnection arrangements are:
   D. Unidirectional inverter/power conditioning unit
   E. Cables
   F. Earthing
   G. Lightening arrestors
   H. Energy meter
   I. Data logger

3. One copy each of the approved drawings and diagrams showing important equipment, protection and control features shall be signed by representative of the consumer and TPDDL and shall be in possession of the consumer and TPDDL.

4. Certain precautions prescribed by the CEA shall also be incorporated into the solar PV system (CEA Technical standards for connectivity of DG resources, 2010). The equipment of the generating station shall meet following requirements, namely:
   (a) 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.
   (b) Distributed generation resource 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.
   (c) Paralleling-device of distributed generation resource shall be capable of withstanding, 220% of the nominal voltage at the interconnection point.
2.4 Energy Meter

For each power plant, TPDDL will be provided with an energy meter for accurate periodical readings of AC energy generated and fed to the grid. This meter shall be of approved make of the off-taker and shall conform to the requirements laid down by the CEA’s (Installation and Operation of Meters) Regulation, 2006. This shall be inspected, tested and calibrated by TPDDL

2.5 Statutory clearances to be arranged by the consumer

1. Building and architectural drawings approval
2. Approval on drawings, wherever necessary
3. Electrical system approval (Electrical inspector Clearance)
4. Fire system approval
5. All statutory requirements for working at the site etc.
3 Appendix

3.1 Connection agreement

Within thirty (30) days from the date of registration, the Distribution Licensee and the Consumer shall execute a Connection Agreement. The Connection Agreement shall include clauses relating to interconnectivity, billing and settlement, dispute resolution and Standards as per Net Metering Regulations, 2014, relevant Guidelines, Orders thereof, as amended from time to time.

Draft Connection Agreement is attached as Annexure I.

3.2 Regulatory Context

Following are the complete list of guidelines and regulation that the consumer can refer to for questions and procedures to be applied for grid connected solar PV rooftop in TPDDL territory

6) CERC (Deviation Settlement Mechanism and related matters) Regulations, 2014 and subsequent amendments.

The aforesaid documents are attached as Annexure II.