

TAMIL NADU GENERATION AND DISTRIBUTION CORPORATION LTD.

(Technical Branch)

O/o. Chief Engineer/Commercial.

Memo.No.CE/Comml/EE/R&C/AEE1/F.Solar NM/D. 023/14, dt.17.02.2014

Sub: Elec. – Tamil Nadu Solar Energy Policy-2012 – Order on LT connectivity and Net-metering issued by the TNERC – Working instruction for the implementation of LT connectivity/Net-Metering – Reg.

- Ref:
1. Tamil Nadu Solar Energy Policy-2012.
 2. G.O (Ms) No. 121/Energy (C2)/dated 19-10-2012 Government of Tamil Nadu.
 3. Hon'ble TNERC's Order No.3 of 2013 dt.13.11.2013.
 4. CE/NCES U.O.No.CE/NCES/EE/SCB/AEE3/F.LT Connectivity – TNERC order/D.858/2013, dt.21.11.2013.

Pursuant to the Solar roof-top net metering policy announced by GoTN vide reference (4) cited, TNERC issued an order dated 13.11.2013 vide ref (2) for implementing Solar roof-top net metering policy to encourage large scale generation in the sector and speedy implementation in the state. In this regard the following working instructions are hereby issued to the field for effective implementation.

1. At present Solar Net Metering arrangement is permitted for the categories of consumers covered under HT tariff II-A, HT tariff III, LT tariff I-A, LT tariff I-C, LT tariff II-A, LT tariff II-B (1) and LT tariff – V as per TNERC orders.

2. Consumers can avail Government of Tamil Nadu subsidy and MNRE (Ministry of New and Renewable Energy) subsidy, as applicable, for solar power Photo Voltaic (PV) Systems through TEDA (Tamil Nadu Energy Development Agency).

3. The nodal point of contact for solar net metering programme shall be the local Executive Engineer(O&M)/TANGEDCO (Nodal Officer). The consumer can download solar net metering rooftop application from the TANGEDCO website and

submit the application to the Nodal officer along with the Registration fee of Rs.100/-.

4. The approved formats for the Solar Net Metering application, agreement, approval letter, technical feasibility and inspection are herewith enclosed.

5. The nodal officer shall complete the feasibility analysis of the Distribution Transformer capacity within **10** working days from the date of receipt of completed Application Form and shall ensure that the solar net metering application are processed expeditiously so that the solar energy targets set by the Govt. of Tamil Nadu will be realised.

6. The Nodal officer shall accord solar net metering approvals on a first come first served basis until the grid connected Solar PV installed Capacity reaches 30% of the closest upstream Distribution Transformer rated capacity based on the verification by the Assistant Executive Engineer/O&M concerned. The priority for such applications shall be maintained at division level for which a separate register shall be maintained.

7. The solar PV capacity shall not exceed the service connection capacity / sanctioned load. If a consumer proposes to install a solar PV system with the capacity that exceeds the service connection sanctioned load, a service connection enhancement application shall be submitted by the consumer in addition to the solar net metering application. Service connection enhancement applications shall be processed as per the existing standard procedures.

8. If the application for solar net metering is feasible, approval shall be granted to the Consumer for grid connectivity of the Solar PV System. This approval shall contain the minimum permissible capacity of the Solar PV System. The consumer shall install a Solar PV System (within permitted Capacity limits) and request the TANGEDCO authorities for inspection within 6 months on receipt of approval otherwise the application will be liable for cancellation. An extension of this time limit may be considered by the nodal officer for a maximum period of another 3 months, if he finds that the Solar System has been procured and under installation. The time limit for Government Organisations shall be 12 months.

9. When the Consumer has installed the Solar PV System, he shall intimate his readiness by post/by e-mail or in person at the Section Office. The Section Officer shall acknowledge the readiness intimation immediately. Readiness intimation shall be followed by safety inspection and commissioning of Solar Net-metering to be carried out as outlined in this working instructions.

10. The interconnection schematic diagram approved by the TNERC is attached in Annexure-I. The consumer shall install the components as shown in this schematic diagram as applicable. The bi-directional service connection meters shall be installed by TANGEDCO or under the supervision of TANGEDCO.

11. Safety inspection for grid connected Solar PV installation should be obtained from the appropriate authorities (the inspection authority). For Solar PV Systems below 10 KW the AEE/O&M, TANGEDCO shall be the inspecting authority. For Solar PV System of 10 KW and above, the electrical inspectorate of Tamil Nadu Government shall be the inspection authority. Safety inspections shall be carried out by the inspection authority within **10** (Ten) working days from the date of readiness intimation by the Consumer. Safety certificates shall be issued within **5** (five) working days from the date of safety inspection or rectification of defects, if any. The nodal officer shall ensure that the safety inspection of Solar PV System of 10 KW and above by the Electrical Inspectorate takes place as per the above mentioned time schedule through close co-ordination with the Electrical Inspectorate.

12. Mandatory safety precautions/features which have to be taken into consideration as part of the grid connected solar PV system installations are:-

(a) An inbuilt Inverter relay which trips on grid failure and thus prevents any solar power injection to the Grid when there is no power in Grid (anti islanding protection shall be tested by the respective section officer during routine service connection inspections), and necessary protection arrangements shall be made when there is no grid supply on single/two/three phases. The Section Officer shall ensure the protection before commissioning. The consumer's installation shall be disconnected in the event of such exigencies to prevent accident or damage to men and material.

(b) The Solar PV system should be separately grounded/ earthed. Lightning Arrestor also to be provided for SPV. Manual isolator switch with locking facility shall be provided at 'Ground Floor'.

13. A single bi-directional service connection meter shall be installed to measure import and export (Kwh) separately. For existing service connections, the uni-directional service connection meter shall be replaced with a bi-directional service connection meter. Bi-directional service connection meter accuracy and facilities shall be the same as applicable to the standard uni-directional meters for the relevant type of service connection and tariff.

14. Solar generation meter to measure gross solar PV energy generation is mandatory for consumers who are availing GBI (Generation Based Incentive) and is optional for other consumers. The installation of solar generation check meter in addition to the solar generation meter shall be mandatory for solar PV systems of more than 20 KW for which GBI is proposed to be availed. The GBI meter shall be properly sealed. Solar Generation meters shall be located at Ground floor adjacent to the bidirectional meter. Solar Generation meter shall be calibrated periodically (annually).

15. Upon receiving the consumer's request for effecting Solar net metering along with the copy of the Safety Certificate and the signed net metering agreement, the Solar PV System shall be connected to the grid by the section officer within 10 (Ten) working days and the bidirectional service connection meter shall be sealed. The closing meter reading of the old service connection meter and opening meter reading of the new bidirectional service connection meter should be properly recorded.

16. Caution Stickers shall be used with the green back ground and the text "Solar PV Systems" written in white letters. The size of these stickers shall be 10 CM (width) x 7 CM (height) with the text clearly printed in the centre of the sticker. All SPV owning consumers should have a mandatory sign board fitted near the existing meter reading terminal stating that '**This service is fitted with a LT grid**

connected SPV plant’. The Solar PV System Caution Stickers shall be fixed under the supervision of the Section Officer in the following locations.

(a) On or near to, the service connection meter of service with grid connected Solar PV System;

(b) On the Consumer main switch, of a service connection with a grid connected Solar PV System;

(c) On LT poles with grid connected Solar PV Systems at height of about 1.50 metre from the ground;

(d) On LT feeder pillars with grid connected Solar PV System on the street – facing door of the feeder pillar.

(e) On each of the LT take off poles of a Distribution Transformer to which Solar PV Systems are connected.

(f) On substation end of HT feeder having Solar PV system.

17. A List of service connections with grid connected Solar PV Systems shall be available at the Section Office, office of the nodal officer and the H.T. substations.

(a) The Section Officer shall verify periodically the expected generation with the Solar Generation Meter and also compare the inverter meter reading with Solar Generation Meter reading to avoid malpractices.

(b) A record may be maintained at the Section Office level of each SPV plant commissioning date and other details including whether the inverter is a sine wave inverter and comply with Harmonic requirements as seen in the test certificate.

(c) The SPV connection details of pole/pillar box/DT/SS feeder end wise may be maintained at Section level as these information are vital.

18. TANGEDCO personnel reserve the right to inspect the solar PV system plant and grid connection routinely in accordance with the provision of Electricity Act, 2003.

19. Meter Reading & Billing

(a) The service connection meter readings of solar service connections can be taken along with the readings of other service connections as per the standard meter reading schedule. The settlement period for final settlement of net-metered energy shall be 12 months. The settlement period in respect of 'even cycle' consumer and generator is during the period of August – June (6 bi-monthly billing/12-monthly billing) as the case may be (i.e. 8,10,12,2,4&6). The settlement period in respect of 'odd cycle' consumer and generator is during the period of September – July (6 bi-monthly billing/12-monthly billing) as the case may be (i.e.9,11,1,3,5&7).

(b) In case of a net import bill, the Consumer shall settle the same as per existing norms and the applicable service connections tariff. If in any billing cycle energy exported exceeds energy imported, the surplus of export Kwh over import Kwh shall be carried over to the next billing cycle for adjustment against the import Kwh of that billing cycle. A meter card to record separately the service connection 'import' Kwh and export Kwh and the readings of the Solar Generation Meter and Solar Generation Check meter (where ever applicable) with a facility to incorporate both the assessors and Consumers initials shall be provided by TANGEDCO.

(c) Electricity generated from a Solar P.V. System and injected into the TANGEDCO grid shall be capped commercially at 90% of the electricity consumption (Import Kwh) by the eligible Consumer at the end of each settlement period . Excess energy exported to the grid beyond the 90% Cap during a particular settlement year shall be treated as lapsed.

(d) If solar net metering has been commissioned during the settlement period, the 90% capping shall be on the energy drawn by the consumer from the date of effecting Solar net-metering to the end of the respective settlement period.

(e) The Net-metering injection is not eligible for REC (Renewable Energy Certificate). The energy adjusted against Net-metering arrangement shall qualify as deemed RPO (Renewable Purchase Obligation) for the distribution licensee.

20 (a) For SPGs (Solar Power Generator) above 112 KW shall be connected at HT/EHT level through ABT meters of 0.2 class accuracy along with 0.2s metering system subject to connectivity norms.

(b) In case of Hybrid generators separate sets of meters have to be installed and readings of each generator have to be taken.

21. The eligible consumers may supply the meter at their option as per specifications available in the TANGEDCO website.

All the Chief Engineers and Superintending Engineers Distribution are requested to follow these working instructions and make solar net metering a success in Tamil Nadu.

(BY ORDER OF CHAIRMAN AND MANAGING DIRECTOR).

Sd/xxxxxxx
SUPERINTENDING ENGINEER / COMMERCIAL.

Encl :-

1. Annexure – I Net Metering Configuration.
2. Form – 1 Net Metering Connection Application along with Net Metering Application Acknowledgement.
3. Form – 2 Net – metering connection agreement.
4. Annexure – II Declaration.
5. Annexure – III Format for Solar Net-metering Technical Feasibility Report
6. Annexure – IV Format for Feasibility intimation Letter to Consumer.
7. Annexure – V Inspection Report Format

To
All Chief Engineers/Distribution Region.
All Superintending Engineers/EDC.

Copy submitted to Director/Distribution.
Copy submitted to Director/Generation.
Copy submitted to Director/Operation.
Copy submitted to Director/Transmission & Projects.
Copy submitted to Director/Finance/TANTRANSCO & TANGEDCO.
Copy to the Chief Engineer/ R&D, Planning and Operation.
Copy to the Chief Engineer/NCES.

The CE/NCES shall arrange to communicate to the field on the following:

- i. Procedures to be followed in arriving the maximum cumulative capacity to be limited to the extent prescribed in the Tamil Nadu Solar Energy Policy 2012 and by the Renewable Purchase Obligation (RPO) specified in the Commission's Regulation on year to year basis.
- ii. The details to be sent to the TEDA and the officials contact details.

Copy to the Chief Engineer/Material Management.

The CE/MM is requested to arrange to procure bi-directional service connection meters in consultation with CE/NCES, and also arrange to publish the list of approved bi-directional service connection meters along with specifications on the TANGEDCO website so that consumers have the option of procuring the bidirectional service connection meters directly.

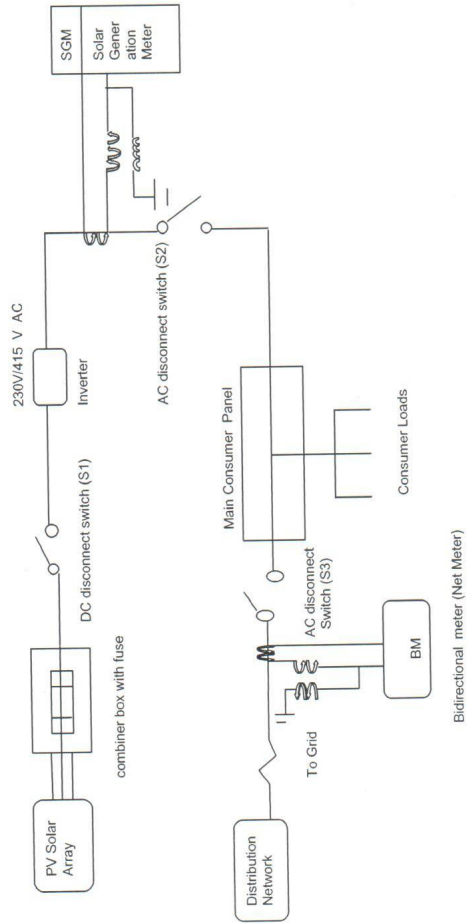
Copy to the Chief Engineer/IT

The CE/IT shall effect suitable changes in the billing software to capture the impact of above guidelines immediately in consultation with CFC/Revenue/TANGEDCO and communicate the same to circle offices.

Copy to the Chief Financial Controller / Revenue / TANGEDCO.

Copy to the Financial Controller/Revenue/TANGEDCO.

Annexure - I
 Net-metering configuration



Form – 1
Net Metering Connection Application.

To:

The Executive Engineer,
O & M / _ _ _ _ _

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
4. Service connection tariff
5. Telephone number(s)
6. Email ID
7. Solar PV plant capacity (Watts)
8. Solar grid inverter make and type
9. Solar grid inverter has automatic isolation protection (Y/N)?
10. Has a Solar Generation Meter been installed (Y/N)?.
11. Expected date of commissioning of solar PV system.

Name:

Signature

Date

Net-metering Application Acknowledgement

Received an application for a solar energy net-metering connection from,
(To be filled by the applicant)

Name.

Date:

Service Connection number:

Solar Plant Capacity

Your application for setting up of solar grid interactive roof-top and small SPV power plant under policy on net metering in accordance with of G.O.No.121, Dt. 19.10.2012 read with TNERC order NO-3 Dt:13.11.2013 has been received along with registration fee.

(To be filled in office).

The details of payment are as below:

Application registration no.:

Signature

Name of Officer

Executive Engineer,
O & M / TANGEDCO,

Annuxure – II

Declaration

I hereby declare that the information furnished above is true to the best of my knowledge and behalf. If false, TANGEDCO has the right to reject/cancel the application. Further, I hereby agree with the specifications, terms and conditions stipulated by TANGEDCO for the selection and installation of roof-top solar power plant. I also confirm that I am aware of the conditions stipulated in the CEA regulations on Technical Standards for connectivity of the Distributed Generation Resources) Regulations 2013 and confirms that I will abide by the same.

Place:

Signature:

Date:

Name:

Encl :-

1. Copy of Electricity Bill (YES/NO)

Annexure - III

Format for Solar Net Metering Technical Feasibility Report

A. Name of the applicant

1. S/C No
2. Category
3. Distribution
4. Pole number
5. Section
6. Address
7. Mobile No

B. Distribution Transformer Details

1. Name of the SS
2. Name of the Feeder
3. DTR capacity in KVA
4. Voltage ratio
5. Maximum load reached in the LT feeder
6. Type and size of the Exg. conductor in the LT feeder
7. Current carrying capacity of the above feeder
8. Total Connected load on the DTR (in KVA)
9. Addl. Loads sanctioned so far (in KVA)
10. Already proposed loads (in KVA)
11. Total Load on DTR : $X=8+9+10$ (in KVA)
12. SPV Generators already connected capacity in KW
13. Proposed SPV generators capacity in KW
14. Total generation capacity $Y=11+12$ (in KW)

15.Y should be restricted to 30% of the DT capacity

(i.e.) Y is less than or equal to 30% of (3).

Remarks :- Whether technically feasible or not to export the power from proposed SPV generator (Yes or No)

C. FEEDER DETAILS

1. Name of the feeder
2. Name of SS from which the feeder is
Emanating with voltage ratio
3. Type and size of the conductor
4. Current carrying capacity of the feeder
5. Maximum load reached on the feeder in Amps & KVA
6. Total connected DTR capacity on this 11KV
feeder(KVA)
7. SPV generators connected on this feeder, if any, and
their capacity in KW.

Remarks : Whether technically feasible or not to export the power from proposed SPV generator (Yes or No)

Encl:- LT Sketch

Executive Engineer
O&M, -----

Annexure – IV

Format for Feasibility intimation Letter to Consumer

From

To

The Executive Engineer,
O & M,

(Consumer name and address).

Lr.No.EE/O&M/ /TANGEDCO/F.Solar Roof Top/Doc No. /D.No. /14, dt.

Sir,

Sub: Elecy-TANGEDCO-O&M Division-Installing of KW solar roof top
SPV generator- (Name), situated at SC No. /
Distribution, _____, _____(Village / Town),_____(Dist)-
Approval – Reg.

Ref: Your application NO. _____ , dt. _____

With reference to your application for installation of solar SPV generator for
____KW on your roof top proposed at H.No ____ , Village _____ , _____
(Dist) is inspected by the undersigned on _____ and found feasible. Hence
approved vide No.____ / dt._____.

You are further requested to approach this office with relevant documents
(Meter, SPV modules, Grid Tie Invertor, Protective system, Sine wave invertor with
harmonic requirements as per CEA norms) after completion of installation of SPV
generator and obtaining CEIG approval wherever required for further processing.

Executive Engineer,
O&M,

Annexure – V
Inspection Report Format

A. Name of the applicant

- 1 S/C No
- 2 Category
- 3 Distribution / Transformer
- 4 Pole number
- 5 Section
- 6 Address
- 7 Mobile No

B. Meter Details (main/check/SPV Gen)

- 1 Meter make
- 2 Serial number
- 3 Capacity
- 4 Meter constant
- 5 Initial reading (Tri vector parameters)
- 6 i) Import
- 7 ii) Export
- 8 Name of the laboratory where the meter is tested (copy of test results to be enclosed)

C. Grid Tie Inverter / Connector

- 1 Make
- 2 Serial number
- 3 Capacity
- 4 Input voltage
- 5 Output voltage

6 If grid supply fails, status of contactor (on or off)

D. SPV Module

1 Make

2 Serial number

3 Type of module

4 Capacity of each module

5 Number of modules

6 Total capacity of module

E. Details of protective system available

(feasibility shall be given only on availability of the above)

Encl:- 1) Single line diagram of SPV generator

2) Specification sheets of all equipments

Executive Engineer

O&M, -----

Form – 2

Net – metering connection agreement

This Agreement is made and entered into at (location) _____ on this

(date) _____ day of (month) _____ between

The Eligible Consumer, _____ residing

at

(address) as first party

AND ----- distribution Licensee (herein after called as TANGEDCO) and having its registered office at (address) as second party of the agreement

And whereas, the TANGEDCO agrees to benefit the eligible consumer for the electricity generated from his SPG plant of capacity _____ watts and as per conditions of this agreement and net- metering regulations/orders issued by the Tamil Nadu Electricity Regulatory Commission.

Both the party hereby agrees to as follows:

1. Eligibility

1.1 Eligibility for net-metering has been as specified in the relevant order of the Tamil Nadu Electricity Regulatory Commission. 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 solar generation plant and net metering system will conform to the standards and requirements specified in the following Regulations and 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) Tamil Nadu Electricity Distribution Code

(iv) Tamil Nadu Electricity Distribution Supply Code

2.2 Eligible consumer agrees that he has installed or will install, prior to connection of Photovoltaic system to TANGEDCO's distribution system, an isolation device (both automatic and inbuilt within inverter and external manual relays) and agrees for the TANGEDCO 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 TANGEDCO's system, photovoltaic system will shut down, automatically and his plant will not inject power into Licensee's distribution system.

2.4. All the equipment connected to distribution system must 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 agrees to comply with the relevant CEA 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 TANGEDCO's obligation to maintain a safe and reliable distribution system, eligible consumer agrees that if it is determined by the TANGEDCO that eligible consumer's photovoltaic system either causes damage to and/or produces adverse effects affecting other consumers or TANGEDCO's assets, eligible consumer will have to disconnect photovoltaic system immediately from the distribution system upon direction from the TANGEDCO 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 connected related) before connecting the photovoltaic system to the distribution system.

4. Access and Disconnection

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

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

5. Liabilities

5.1 Eligible consumer and TANGEDCO 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 TANGEDCO's distribution system.

5.2 TANGEDCO 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 TANGEDCO 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.

6. Commercial Settlement

6.1 All the commercial settlement under this agreement shall follow the Net metering order issued by the TNERC.

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 in case it is required.

8. Termination

8.1 The eligible consumer can terminate agreement at any time by providing TANGEDCO with 90 days prior notice.

8.2 TANGEDCO has the right to terminate Agreement on 30 days prior written notice, if eligible consumer breaches a term of this Agreement and does not remedy the breach within 30 days of receiving written notice from TANGEDCO of the breach.

8.3 Eligible consumer agrees that upon termination of this Agreement, he must disconnect the photovoltaic system from TANGEDCO's distribution system in a timely manner and to TANGEDCO's satisfaction.

In the witness, whereof of Mr. ----- for and on behalf of

----- (Eligible consumer) and Mr. ----- for and on behalf of-----
(TANGEDCO) sign this agreement in two originals.

Eligible Consumer Name

Assistant/Junior Engineer

Address

Designation

Service connection Number

Office Address

O/o Chief Engineer/Commercial

Note continued:

Revised draft working instructions incorporating the remarks of CE/R&D, CE/MM & CFC/REV in pre-page 3,5&7 of this note file is put up below for kind perusal and approval.

If approved the same will be communicated to all CEs/Distribution and SEs/Distribution Circles.

EE/R&C

SE/Comml.

CE/Comml CE/NCES CE/R&D CE/MM CFC/Rev.

Dir/Fin.

Dir/Gen.

Dir/Distn.

CMD