



TAMIL NADU ELECTRICITY REGULATORY COMMISSION

Generic Tariff Order for Grid Interactive PV Solar Energy Generating System (GISS)

Order No. 8 of 2021 dated 22-10-2021



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BEFORE THE TAMIL NADU ELECTRICITY REGULATORY COMMISSION

PRESENT: Thiru M.Chandrasekar - Chairman

Thiru K.Venkatasamy - Member (Legal)

Order No.8 / 2021, dated 22-10-2021

**In the matter of: Generic Tariff Order for Grid Interactive
PV Solar Energy Generating System (GISS)**

In exercise of the powers conferred by Sections 181, 61 (h) and 86 (1) (e) of the Electricity Act 2003, (Act 36 of 2003), read with the National Electricity Policy, the Tariff Policy and Commission's Power Procurement from New and Renewable Sources of Energy Regulations, 2008, the Commission, after issue of consultative paper for public view on "Generic Tariff Order for Grid Interactive PV Solar Energy Generating System (GISS)" inviting comments from stakeholders and after examining the views of all stakeholders, the views expressed by the Members of the State Advisory Committee (SAC) on the Consultative Paper in the meeting held on 17-09-2021, and on consideration of the views of the stakeholders and the SAC Members on the Consultative Paper, passes this Tariff Order on Solar Power.

This order shall take effect on and from 22nd of October, 2021.

Sd./-
(K.Venkatasamy)
Member(Legal)

Sd./-
(M.Chandrasekar)
Chairman

(By Order of the Tamil Nadu Electricity Regulatory Commission)

Sd./-
(S.Chinnarajalu)
Secretary

TAMIL NADU ELECTRICITY REGULATORY COMMISSION

Order on Generic Tariff Order for Grid Interactive PV Solar Energy Generating System (GISS)

1.0 Overview

The Commission in exercise of the powers vested under the Electricity Act, 2003 and in compliance with the mandate of the Act to promote renewable energy has been issuing tariff orders in respect of various sources of renewable energy since 2006. These orders on renewable energy sources covered tariff determination for purchase of power by the Distribution licensee, its promotional aspects and related issues. The conducive policies of the Central and State Government for promotion of renewable power has helped the sector achieve remarkable progress.

1.1. The importance of grid connected solar energy generation system

- 1.1.1. The Tamil Nadu Solar Energy Policy 2019 includes a consumer category solar energy target of 3,600 MW by 2023. As of 31st March 2021, only 9.03 % of this target has been achieved. The Tamil Nadu Solar Energy Policy 2019 introduced two metering mechanisms for rooftop/ ground mounted solar energy systems; net feed-in and gross feed-in, whereby the consumers could opt between the two metering mechanisms.
- 1.1.2. The Commission had issued Tariff Order No. 3 of 2019 (Order on Rooftop Solar Generation) dated 25-03-2019. The tariff was determined as 75% of: i) pooled cost of power purchase for the respective financial year, or ii) the last feed-in tariff determined by the Commission, or iii) the tariff discovered in latest bidding, whichever is less. For the financial year 2021-2022, this works out to be INR 2.08 per kWh.
- 1.1.3. Clause 9.2 of the Tamil Nadu Solar Energy Policy states that the Commission may introduce time-of-the-day (TOD) solar energy feed-in tariffs to encourage solar energy producers and solar energy storage operators to feed energy into the grid when energy demand is high. With the declining cost of battery energy storage systems it is expected that prosumers will install consumer category solar energy system coupled with battery storage. These battery energy storage systems at the prosumer level (behind-the-meter) can provide essential grid services such as peak shaving, peak shifting and voltage support.
- 1.1.4 Energy fed into the grid from Grid Interactive PV Solar Energy Generating System

(herein after called GISS) and behind the meter energy storage systems does not require transmission and significantly reduces distribution losses since most of the generated energy is consumed at, or near to the point of generation. This is expected to reduce the Licensee's average cost of supply. Additional benefits include:

- (a) voltage improvements;
- (b) reduction of transmission capacity charges;
- (c) Reduction of stress on lines and equipments;
- (d) deferral of infrastructure up gradation.

1.2. Need for the generic tariff order for Grid Interactive Solar energy generating System (GISS)

1.2.1 As of 31 March 2021, there is an installed capacity for rooftop solar energy of 325 MW. To achieve the target set for 2023, another 3,275 MW will need to be added. As on 31st March 2021, Tamil Nadu has a total installed power generation capacity of 33,695 MW (CEA, Executive Summary on Power Sector, March 2021). The rooftop solar energy capacity installed in Tamil Nadu as of 31st March 2021 represents 0.96% of the total installed power capacity and approximately 0.20% of the total energy consumption in the State.

Month and Year	Rooftop solar capacity (MW)	% of 2023 target	Capacity addition required to meet the 2023 target (MW)
March 2019	142.95	3.97	3,457
March 2021	325.06	9.03	3,275

1.2.2 The price determined by the methodology formulated in the Commission's Tariff Order No.3 of 2019 (Order on Rooftop Solar Generation) dated 25-03-2019 has not yielded desired results towards meeting the above target. The subsequent bidding process undergone by the TANGEDCO by fixing the ceiling price as Rs.3.00 pursuant to the order of the Commission for 500MW project, failed to materialise due to poor response from bidders. Thus it becomes necessary for the Commission to evolve and determine the preferential tariff for the solar energy in order to rejuvenate the segment and promote its development appropriately to meet the target set by the Government.

1.2.3 Electricity (Rights of Consumers) Amendment Rules 2021 of GoI has furthered avenue for Net metering, gross metering and net billing and contemplates TOD meter in line with Tamil Nadu Solar Policy as follows:

“ The arrangements for net-metering, gross-metering, net-billing or net feed-in shall be in accordance with the regulations made by the State Commission, from time to time:

Provided that where the regulations does not provide for net-metering, net-billing or net feed-in, the Commission may allow net metering to the Prosumer for loads up to five hundred Kilowatt or up to the sanctioned load, whichever is lower and net-billing or net feed-in for other loads:

Provided further that in the case of Prosumers availing net-billing or net feed-in, the Commissions may introduce time-of-the-day tariffs whereby Prosumers are incentivised to install energy storage for utilization of stored solar energy by them or feeding into the grid during peak hours thus helping the grid by participating in demand response of the Discoms:

Provided also that in case of net-metering or net-billing or net feed-in, the distribution licensee may install a solar energy meter to measure the gross solar energy generated from the Grid Interactive rooftop Solar Photovoltaic system for the purpose of renewable energy purchase obligation credit, if any:

Provided also that the Commission may permit gross-metering for Prosumers who would like to sell all the generated solar energy to the distribution licensee instead of availing the net-metering, net-billing or net feed-in facility and the Commission shall decided for this purpose the generic tariff for gross-metering as per tariff Regulations.”

The above conditions and mandatory requirements require a generic tariff order to be evolved on charges for net-metering, gross-metering, net-billing as contemplated besides creating a substantial consumer awareness and information campaigns for the diverse set of consumers / prosumers / generators to achieve the objective of the solar policy.

1.2.4 In order to accelerate the deployment of consumer category solar energy systems and to meet the State’s target of 3,600 MW by 2023 a new grid connected solar energy tariff order that applies to all categories of metering mechanisms is proposed. Additionally, the introduction of a ToD (time-of-the-day) feed-in tariff premium aims at promoting the uptake of grid-interactive prosumer energy storage systems.

1.2.5 With the proposed revision of norms of gross metering and net feed-in

mechanism the tariff applicable to the exported energy has been delinked from consumer tariffs.

1.2.6 Consumers may benefit from the self-consumption of solar energy, depending on the consumer retail tariff, the quantity of solar energy self-consumption and the times of the day of self-consumption. Daytime energy demand is different for each consumer and changes throughout the year. Consumer may benefit from encashing the excess energy in respective category. Solar energy feed-in tariffs must be based on the cost of distributed solar energy generation and should not be linked to consumer tariffs or perceived or estimated self-consumption benefits. In this regard what matters is the energy transactions that takes place at the common point of service connection where both the energy import from the grid and energy export to the grid takes place. Whether the consumer reduces consumption by installing energy efficient equipment, changing lifestyles or using a part of the generated solar energy for own consumption, is not relevant for arriving at a feed-in tariff for the exported solar energy.

1.2.7 **Distributed Generation:** The concept of Distributed Generation particularly by means of GISS plants has assumed greater importance contributing to the dual objective of meeting the power demand and significant reduction of technical loss. Gross metering mechanism is perfectly suitable to entail distributed generations in a big way. Such models of GISS plants under gross metering mechanism can very well be established in big open areas in a fashion of solar park and export power to nearby grid. It is pertinent to recommend at this point that agricultural feeders are an ideal avenue to effectively leverage the potential of solar energy. The segment of agricultural network has been the perennial loss pocket with lengthy lines and wide LT network. There are around 4000 Agricultural feeders in the State. The continuing bad performing trend of agricultural feeders plagued by inefficiency over the decades, could be reversed if every agricultural feeder were taken over by GISS plants of one MW capacity, through gross metering mechanism by establishing a power evacuation line as an interface between the GISS set up in open area and the nearby network of agricultural feeder.

1.3 **Technologies and standards under consideration:** Each of these technologies have different cost implications based on their efficiency, reliability, durability and other requirements. The final selection of the technology shall be left to the consumer / prosumer / generator. The minimum technical requirements

would be as per the regulations/specifications issued by the Central Electricity Authority, State Regulatory Commission and Ministry of New and Renewable Energy and the eligible consumers/ prosumers/ generators shall adhere to them.

- 1.4** Commission issued a consultative paper dated 17.08.2021 discussing the implementation of the three categories of metering mechanism, eligibility of consumers, determination of tariff and wheeling/network charges and related issues of Grid Interactive PV Solar Energy Generating System and invited comments from stakeholders. Commission also held a State Advisory Committee (SAC) meeting on 17.09.2021 and discussed the proposals and related issues contemplated in the consultative paper. The list of stakeholders who furnished comments, the gist of their comments/objections/ suggestions and the analysis and decision of the Commission for issues raised are annexed to this order as Annexure II. The list of participants of SAC meetings, issues discussed and responded by the Commission are annexed to this order as Annexure III.

2 Legal provisions

2.1 Related Provisions of Electricity Act, 2003

- 2.1.1 Section 3(1):** *“The Central Government shall, from time to time, prepare the National Electricity Policy and tariff policy, in consultation with the State Governments and the Authority for development of the power system based on optimal utilisation of resources such as coal, natural gas, nuclear substances or materials, hydro and renewable sources of energy”.*

- 2.1.2 Section 61:** *“The Appropriate Commission shall, subject to the provisions of this Act, specify the terms and conditions for the determination of tariff, and in doing so, shall be guided by the following, namely:*

- (a) the generation, transmission, distribution and supply of electricity are conducted on commercial principles;*
- (b) the factors which would encourage competition, efficiency, economical use of the resources, good performance and optimum investments;*
- (c) Safeguarding of consumers' interest and at the same time, recovery of the cost*
- (d) the promotion of cogeneration and generation of electricity from renewable sources of energy;*
- (e) the National Electricity Policy and tariff policy:”*

2.1.3 Section 86(1)(e): *“The State Commission shall promote cogeneration and generation of electricity from renewable sources of energy by providing suitable measures for connectivity with the grid and sale of electricity to any person, and also specify, for purchase of electricity from such sources, a percentage of the total consumption of electricity in the area of a distribution licensee;”*

2.2 Relevant provisions of National Electricity Policy are reproduced below:

2.2.1 Section 5.2.20: *“Feasible potential of non-conventional energy resources, mainly small hydro, wind and bio-mass would also need to be exploited fully to create additional power generation capacity. With a view to increase the overall share of non-conventional energy sources in the electricity mix, efforts will be made to encourage private sector participation through suitable promotional measures.”*

Section 5.12.2:*“The Electricity Act 2003 provides that co-generation and generation of electricity from non-conventional sources would be promoted by the SERCs by providing suitable measures for connectivity with grid and sale of electricity to any person and also by specifying, for purchase of electricity from such sources, a percentage of the total consumption of electricity in the area of a distribution licensee. Such percentage for purchase of power from non-conventional sources should be made applicable for the tariffs to be determined by the SERCs at the earliest. Progressively the share of electricity from non-conventional sources would need to be increased as prescribed by State Electricity Regulatory Commissions. Such purchase by distribution companies shall be through competitive bidding process. Considering the fact that it will take some time before non- conventional technologies compete, in terms of cost, with conventional sources, the Commission may determine an appropriate differential in prices to promote these technologies.”*

2.3 Relevant sections of the Power Procurement from New and Renewable Sources of Energy Regulation, 2008:

2.3.1 Regulation 4(2): *“While deciding the tariff for power purchase by distribution licensee from new and renewable sources-based generators, the Commission shall, as far as possible, be guided by the principles and methodologies specified by:*

- (a) Central Electricity Regulatory Commission*
- (b) National Electricity Policy*
- (c) Tariff Policy issued by the Government of India*
- (d) Rural Electrification Policy*
- (e) Forum of Regulators (FOR)*
- (f) Central and State Governments”*

2.3.2 Regulation 4 (3): *“The Commission shall, by a general or specific order, determine the tariff for the purchase of power from each kind of new and renewable sources- based generators by the distribution licensee.”*

“Provided where the tariff has been determined by following transparent process of bidding in accordance with the guidelines issued by the Central Government, as provided under section 63 of the Act, the Commission shall adopt such tariff.”

2.3.3 Regulation 4(5):

While determining the tariff, the Commission shall adopt appropriate financial and operational parameters.

2.3.4 Regulation 4(6):

While determining the tariff the Commission may adopt appropriate tariff methodology.

2.3.5 Regulation 8:

Issues related to captive use and third party sale:

While issuing the general or specific tariff order, the Commission may consider appropriate criteria/ procedure/parameters/charges for each type of new and renewable source, on the following issues, for sale of power to distribution licensee, captive use and third party sale of power by the new and renewable source generators.

- 1) Applicable demand charges*
- 2) Applicable energy charges*
- 3) Grid availability charges*
- 4) Scheduling and system operation charges*
- 5) Transmission & wheeling charges and line losses*
- 6) Reactive power charges*
- 7) Adjustment of peak and off peak power*
- 8) Power factor incentive / disincentive*
- 9) Payment of security deposit by the captive/third party user*
- 10) Billing and payment to the generators by distribution licensee*
- 11) Applicable open access registration fee and open access agreement fee*
- 12) Any other related issues.*

2.4 Relevant provision of the Tamil Nadu Electricity Supply Code: 2.4.1 Regulation 4(i-a) Charges recoverable by the licensee:

(i-a) The wheeling charges / Network charges shall be payable by the HT / LT consumer category in accordance with the rates as the Commission may fix time to time for

different category of consumers (to recover the cost incurred by the Licensee for its Distribution wire business).

Provided that the Wheeling charges / Network charges may be denominated in terms of Rs/kWh (or) Rs/kVAh (or) Rs./kW/month (or) Rs./kVA/month for the purpose of recovery from the Distribution network user or any such denomination as may be stipulated by the Commission.

3. Relevant provisions of the Electricity (Rights of Consumers) Rules 2020, read with the Electricity (Rights of Consumers) Amendment Rules 2021.

3.1 Rule 2 (ia): *“‘gross-metering’ means a mechanism whereby the total solar energy generated from Grid Interactive rooftop Solar Photovoltaic system of a Prosumer and the total energy consumed by the Prosumer are accounted separately through appropriate metering arrangements and for the billing purpose, the total energy consumed by the Prosumer is accounted at the applicable retail tariff and total solar power generated is accounted for at feed-in tariff determined by the Commission;”*

Rule 2 (ja): *“‘net-billing or net feed-in’ means a single bidirectional energy meter used for net-billing or net feed- in at the point of supply wherein the energy imported from the Grid and energy exported from Grid Interactive rooftop Solar photovoltaic system of a Prosumer are valued at two different tariffs, where-*

- (i) the monetary value of the imported energy is based on the applicable retail tariff;*
- (ii) the monetary value of the exported solar energy is based on feed-in tariff determined by the Commission;*
- (iii) the monetary value of the exported energy is deducted from the monetary value of the imported energy to arrive at the net amount to be billed (or credited / carried-over)”;*

Rule 2 (jb): *“‘net-metering’ means a mechanism whereby solar energy exported to the Grid from Grid Interactive rooftop Solar Photovoltaic system of a Prosumer is deducted from energy imported from the Grid in units (kWh) to arrive at the net imported or exported energy and the net energy import or export is billed or credited or carried-over by the distribution licensee on the basis of the applicable retail tariff by using a single bidirectional energy meter for net-metering at the point of supply;”*

3.2 Rule 11, sub-rule 4: *“The arrangements for net-metering, gross-metering, net-billing or net feed-in shall be in accordance with the regulations made by the State Commission, from time to time:*

Provided that where the regulations do not provide for net-metering, net-billing or net feed-in, the Commission may allow net metering to the Prosumer for loads up to five hundred Kilowatt or up to the sanctioned load, whichever is lower and net-billing or net feed-in for other loads:

- 3.3** *Provided further that in the case of Prosumers availing net-billing or net feed-in, the Commissions may introduce time-of-the-day tariffs whereby Prosumers are incentivised to install energy storage for utilization of stored solar energy by them or feeding into the grid during peak hours thus helping the grid by participating in demand response of the Discoms:*
- 3.4** *Provided also that in case of net-metering or net-billing or net feed-in, the distribution licensee may install a solar energy meter to measure the gross solar energy generated from the Grid Interactive rooftop Solar Photovoltaic system for the purpose of renewable energy purchase obligation credit, if any:*
- 3.5** *Provided also that the Commission may permit gross-metering for Prosumers who would like to sell all the generated solar energy to the distribution licensee instead of availing the net-metering, net-billing or net feed-in facility and the Commission shall decide for this purpose the generic tariff for gross-metering as per tariff regulations:”*
- 3.6** *Rule 13: “The solar energy generated by prosumer shall be adjusted against energy consumed and bill amount as per regulations made by the Commission for Grid Interactive rooftop Solar Photovoltaic system.”*

4 Tariff determination process

With regard to tariff determination process, the relevant portion of Regulation 4 of the TNERC’s Power Procurement from New and Renewable Sources of Energy Regulation, 2008 is reproduced below:

“The Commission shall follow the process mentioned below for the determination of tariff for the power from new and renewable sources-based generators, namely;

- a) Initiating the process of fixing the tariff either suo motu or on an application filed by the distribution licensee or by the generator.*
- b) Inviting public response on the suo motu proceedings or on the application filed by the distribution licensee or by the generator.*
- c) xxx*
- d) Issuing general / specific tariff order for purchase of power from new and renewable sources-based generators.”*

5 Tariff pricing and methodology

5.1 Tariff / Pricing Methodology specified in Regulation 4 of the Commission's Renewable energy 2008 Regulation is reproduced below.

“(1) While deciding the tariff for power purchase by distribution licensee from new and renewable sources-based generators, the Commission shall, as far as possible, be guided by the principles and methodologies specified by:

- a) Central Electricity Regulatory Commission*
- b) National Electricity Policy*
- c) Tariff Policy issued by the Government of India*
- d) Rural Electrification Policy*
- e) Forum of Regulators(FOR)*
- f) Central and State Governments*

(2) The Commission shall, by a general or specific order, determine the tariff for the purchase of power from each kind of new and renewable sources-based generators by the distribution licensee.

(3) While determining the tariff, the Commission may, to the extent possible consider to permit an allowance / disincentive based on technology, fuel, market risk, environmental benefits and social impact etc., of each type of new and renewable source.

(4) While determining the tariff, the Commission shall adopt appropriate financial and operational parameters.

(5) While determining the tariff the Commission may adopt appropriate tariff methodology.”

6 Tariff Determination and Components

6.1 Tariff determination, based on a levelized cost of energy calculation is proposed for all the three category of metering mechanisms contemplated by the Electricity (Rights of Consumers) Rules 2020 as amended. This is also in line with Regulation 4(6) of “Power Procurement from New and Renewable Sources of Energy Regulations 2008”.

6.2 The tariff determined in a cost-plus scenario, would depend significantly on the following operating and financial parameters:

- 1. Capital cost
- 2. Debt-equity ratio

3. Loan term and interest
4. Capacity Utilisation Factor (CUF)
5. Operation and maintenance cost
6. Insurance
7. Depreciation rate applicable and average solar panel degradation
8. Interest on working capital
9. Economic life of plant and machinery
10. Grid availability factor

These parameters are discussed in the section below:

6.2.1 **Capital Investment:** Ministry of New and Renewable Energy has published benchmark costs for rooftop solar PV systems for the year 2021-22 as per table below:

Capacity Range	Benchmark cost (INR per Watt)
1 kW	51.1
>1 kW to 2 kW	46.98
>2 kW to 3 kW	45.76
>3 kW to 10 kW	44.64
>10 kW to 100 kW	41.64
>100 kW to 500 kW	39.08

The Commission proposes to use three capacity categories and capital costs for the tariff determination.

- (i) System capacities from 1 to 10 kW : INR 44.64 per Watt
- (ii) System capacities from 11 to 150 kW : INR 41.64 per Watt
- (iii) System capacities from 151 to 999 kW: INR 39.08 per Watt

The Capital cost as proposed shall be inclusive of all equipment costs and labour cost for the design and installation of the GISS.

6.2.2 **Debt - equity ratio and return on equity:** The National Tariff Policy lays down a debt equity ratio of 70: 30 for power projects. The Commission has considered 30% equity funding for the net capital cost and proposes a return on equity of 14%.

- 6.2.3 **Term of loan and interest:** The Commission proposes to adopt a loan tenure of 10 years which includes a one-year principal repayment moratorium and an interest rate of 9.50%. The Commission has proposed to adopt the same term of loan an interest rate.
- 6.2.4 **Capacity utilization factor:** The Commission proposes to consider a CUF of 21.00% taking into account of the output AC capacity and additionally a grid availability factor of 96.00% for loads relating to LT voltage level and 98% for loads relating to HT voltage level.
- 6.2.5 **Operation and Maintenance Cost:** Commission proposes to adopt 1.40% of gross capital cost as the O&M cost with an annual increase of 5.72%.
- 6.2.6 **Insurance:** The Commission considers 0.35% of depreciated gross capital cost as insurance cost.
- 6.2.7 **Depreciation and Average Annual Solar Panel Degradation:** The Commission proposes an annual depreciation rate of 3.60% on the net capital cost, which results in a residual value of 10.00%. The Commission considers 0.75% of average annual solar panel degradation.
- 6.2.8 **Interest on Working Capital:** The commission proposes working capital requirements of one month for O&M costs and two months for receivables with a working capital interest rate of 10.50%.
- 6.2.9 **Discount Factor:** Commission proposes to adopt a discount factor of 8.67%.
- 6.2.10 **Life of plant and machinery:** Commission considers an economic life of 25 years as adopted in its earlier orders on rooftop solar generation.

7 Tariff Rate

7.1 Net feed-in and gross feed-in tariffs

The financial and operational parameters proposed are tabulated below:

Tariff Components	Values
Capital cost for solar PV system; capacity range: 1 – 10 kW	INR 44640 per kW
Capital cost for solar PV system; capacity range: 11 – 150 kW	INR 41640 per kW
Capital cost for solar PV system; capacity range: 151 – 999 kW	INR 39080 per kW
Capacity Utilisation Factor (CUF)	21.00%
Daytime Grid availability factor	96.00% up to 150kW and 98% above 150kW
Average Annual Solar Panel Degradation	0.75%
Operation and maintenance expenses	1.40% of gross capital cost
Operation and maintenance annual cost escalation	5.72%
Insurance	0.35% on depreciated gross capital cost
Debt-Equity ratio	70:30
Life of plant and machinery	25 years
Return on Equity	14%
Term of Loan	10 years with 1 year moratorium period
Interest on loan	9.50%
Depreciation / Average Annual Solar Panel Degradation	3.60% per annum / 0.75% per annum
Working Capital components	one month O&M cost and two months receivables
Interest on working capital	10.50%
Discount factor	8.67 %
Levelised cost of energy for solar PV systems; capacity range: 1- 10 kW	INR 3.61 per kWh
Levelised cost of energy for solar PV systems; capacity range: 11- 150 kW	INR 3.37 per kWh
Levelised cost of energy for solar PV systems; capacity range: 151 to 999 kW	INR 3.10 per kWh

7.1.1 The solar energy tariffs computed with the above-mentioned parameters are INR

3.61 per kWh (25 years fixed) for solar system capacities up to 10 kW, INR 3.37 per kWh for solar system capacities from 11 to 150 kW, INR 3.10 per kWh for solar system capacities from 151 to 999 kW.

7.1.2 The solar energy tariff determined herein will apply to grid connected in solar energy systems commissioned during this control period specified in this order for respective categories of consumers / prosumers / generators except for special schemes like Kusum C etc. for which specific orders are issued by the Commission.

7.2 Time of Day tariffs

7.2.1 **Clause 9.2 of the Tamil Nadu Solar Energy Policy reads as follows:** “9.2 TNERC may introduce time-of-the-day (ToD) solar energy feed-in tariffs to encourage solar energy producers and solar energy storage operators to feed energy into the grid when energy demand is high”. Sub-rule 4 of Electricity (Rights of Consumers) Amendment Rules, 2021 provides that “in the case of prosumers availing net-billing or net feed-in, the Commission may introduce time-of-the-day tariffs whereby prosumers are incentivised to install energy storage for utilization of stored solar energy by them or feeding into the grid during peak hours thus helping the grid by participating in demand response of the Discoms”.

7.2.2 The Commission proposes to introduce a time-of-day premium tariff during high demand periods, to promote and incentivise investments in solar energy storage systems. The ToD solar energy feed-in tariffs will be higher than the proposed LCOE (Levelling Cost Of Energy) based tariffs and shall apply for evening peak hours (18:00h – 21:00h).

7.2.3 The ToD feed-in tariff will be determined by adding a percentage premium to the standard solar feed-in tariffs to account for the additional capital investment by the prosumer for the hybrid inverter and the energy storage system. The ToD solar feed-in tariff is proposed to be 20% higher than the feed-in tariffs of this order.

7.2.4 This works out peak hour ToD feed-in tariffs as follows:

- | | | |
|-------|--------------------------------------|---------------------------|
| (i) | System capacities up to 10 kW | : INR 4.33 per kWh |
| (ii) | System capacities from 11 to 150 kW | : INR 4.04 per kWh |
| (iii) | System capacities from 151 to 999 kW | : INR 3.72 per kWh |

7.2.5 It is to be mentioned that the proposed peak hour ToD feed-in tariffs are lower than the average cost of supply of TANGEDCO and are therefore a beneficial proposition for all stakeholders. It is expected that with this tariff structure, consumers/prosumers/generators will be encouraged to install energy storage systems whereby with the estimated quantum of energy export during peak hours from these systems, their energy storage investment becomes viable.

8 Net work charges:

- 8.1. Section 61 of the Electricity Act insists that the generation, transmission, distribution and supply of electricity are conducted on commercial principles. Regulation 4 (5) of the Commission's Power Procurement from New and Renewable Sources of Energy Regulation 2008, stipulates that while determining the tariff, the Commission shall adopt appropriate financial and operational parameters.
- 8.1.1 Grid interactive support is the ingredient component of any grid connected solar system, without which the solar generating system would become non-functional.
- 8.1.2 While the development of solar has been on the rise in the past decade with isolated investments of individual projects, the supportive Grid on which these solar systems depend on their operation, had been developed with huge investment and being maintained with equally huge recurring expenditure.
- 8.1.3 When a dual investment is made for network system and solar system collectively in order to make them to co-exist and complement each other to operate in tandem, the substantial investment pertaining to half portion of the system cannot be ignored.
- 8.1.4 Thus the component of the charges pertaining to essential linkage of grid to generate solar power has to be necessarily made a part of charges to be determined holistically for generic solar tariff.
- 8.2 This network charges shall be applicable to consumers of net-metering and net-billing mechanism for the total units generated by the solar systems. Such charges to be recovered from the prosumers will be covered within the total Aggregate Revenue Requirement as envisaged in the amendment to the Terms and conditions for Tariff Regulation 2005 as notified vide TNERC/TR/5/3 dated 26.05.21.

- 8.3 Net work charges shall not be applicable for eligible consumers / generators of gross metering mechanism as it involves direct sale of the units generated by their solar system to the Licensee.
- 8.4 Net work charges shall be applicable to all existing and new consumers except for consumers who sell the generated units directly to the Licensee under Gross metering mechanism.
- 8.5 Net work charges shall be applicable to the prosumers categorised under net metering or net billing or net feed in mechanism, as determined by the commission under regulation 70 of TNERC (Terms and conditions for determination of Tariff) Regulations 2005, from time to time.
- 8.6 To encourage the growth of solar power in domestic sector, the Commission proposes to levy 20% of network charges for domestic consumers of up to 10KW and 75% of network charges for the domestic consumers of above 10KW.
- 8.7 100% net work charges shall be applicable to all other category of consumers / prosumers (except agriculture consumers for which separate orders will be issued) covered under net feed-in mechanism.
- 8.8 The total units recorded in the meter provided to measure the gross generation of solar power shall be reckoned for calculation of network charges.

8.9 Determination of Network charges:

- 8.9.1 As envisaged above, the investment made for 'Distribution Network system' is recoverable from the prosumer for availing the support of network system. In this connection, as regulated under TNERC Grid Interactive Solar PV Energy Generating System (GISS) Regulations 2021, the 'Network charges' is applicable for the units generated by the GISS categorized under "Net-metering" mechanism and "Net feed-in/Net billing" mechanism.

Under the provisions of Regulation 70 of TNERC (Terms and conditions for Determination of Tariff) Regulations 2005, the Network charges falling within the scope of operation and maintenance expenses shall be determined based on the accounting records furnished by the Licensee towards the cost of the Distribution Wires Business. TANGEDCO submitted the allocated network cost duly apportioning the Aggregate Revenue Requirement between Distribution Wire

business and Retail supply business based on its Audited Annual accounts for the FY 2019-20 to arrive at the Network charges.

8.9.2 TANGEDCO has considered segregation of network cost into HT and LT levels in the ratio of 70:30. The HT level infrastructure (i.e., 70%) is the network for the ultimate use of both HT & LT level consumers. Hence, the cost of such (70%) common infrastructure is apportioned between HT & LT level sales, based on the ratio of sales to HT & LT category consumers. The remaining portion of the Network cost in HT level as well as the 30% of the segregated cost towards LT level to be appropriated to LT category Sales. Adopting such methodology and after thorough verification of audited accounts furnished by the TANGEDCO, the Commission disallowed certain items and approved the Network cost as below:

Sl. no.	Expenses	(Rs. In Crores)	FY 2019-20		Disallowed items (Rs. In Crores)	Network cost approved by the TNERC (Rs. In Crores)
			Ratio for Wire Business as per Reg.70 of Tariff Regulations	Proportionate expenses for Wire business (Rs. In Crores)		
1	Operation and Maintenance expenses	8161.25	65%	5304.81		5304.81
2	Interest on Loan capital & other interest & Finance charges	4402.64	90%	3962.38	1386.83	2575.54
3	Depreciation	1405.7	90%	1265.13		1265.13
4	Interest on Working Capital	63.51	10%	6.35		6.35
5	Return on Equity	491.8	90%	442.62	442.62	0.00
6	Other Debits	32.91	10%	3.29	3.29	0.00
	Total Network Cost	14557.81		10984.58	1832.74	9151.84

The TANGEDCO submitted that it has incurred Rs.10,984.58 Crores towards Distribution Wire business during the FY 2019-20; out of this, certain expenses are found abnormal compared with the true up data for the year 2015-16 and ARR for the year 2018-19 of the Commission's Tariff order dated 11-08-2017.

8.9.3 The Commission considered the Depreciation, Interest on Working capital and O&M expenses and found reasonable comparing with the cost approved for the year 2015-16; and other items are restricted for the reasons stated below:

- (i) **Interest on Loan capital:** According to allocation matrix given under the Tariff Regulations 2005, Rs.3962.38 has been claimed under Interest on Loan capital. At the time of issuing the T.O. for the year 2017-18, in its True up process for the FY 2015-16, the Commission observing the discrepancy in bifurcation of Gross Fixed Assets between the companies, based on certain assumptions restricted the Interest on Loan capital, which was around 65% against its claim. Considering the true up exercise pending for the FY 2016-17 to 2018-19, the Commission is inclined to restrict the Interest on Loan capital up to 65% only.

- (ii) **Return on Equity:** In the T.O. dated 11-08-2017, the Commission had its view that TANGEDCO is mixing the Revenue account with Capital account and the equity approved may again be diverted to Revenue Account; the actual borrowings were significantly higher than capital expenditure. Hence, the Commission in line with decision taken in Suo motu Order dated 11th December 2014, adopted the same approach while approving the RoE; no RoE was considered in T.O. dt.11-08-2017 too. Therefore in the absence of any justification towards claim of Return on Equity in this petition, the Commission disallowed the same.

- (iii) **Other Debts:** In the absence of any norms for Other Debts and adequate details in the petition, the Commission disallowed the same.

8.9.4 Considering the Network cost arrived at as above, the Commission approves 'Network charges' as shown below.

Sl. No.	Details		HT level	LT level	Total
1	Ratio of Network cost	(a)	70%	30%	100%
2	Apportioned Network cost (Rs.Crores)	(b)	6406.29	2745.55	9151.84
3	Proportionate Network cost for HT @ Sales ratio (Rs.Crores)	$(6406.29) * (14867 / 77391) =$ (c)	1230.66		
4	Remaining Network cost belongs to LT (Rs.Crores)	$(9151.84 - 1230.66) =$ (d)		7921.18	
5	Energy sent through (in MU)	(e)	14867	62524	77391
6	Network charges / kWh (in Rs.)	HT level= $(c)/(e)$ LT level= $(d)/(e)$	0.83	1.27	

8.9.5 The Network charges towards the Distribution wire business is chargeable to HT prosumers at 83 Paise / kWh and for LT prosumers at Rs.1.27 / kWh. The above charges is applicable to all existing and new prosumers as specified under respective category until the 'Network charges' is revised by the Commission in the next Tariff Order or in any other special order.

8.10. Detailed analysis on the sanctity and justification of Net work Charges:-

8.10.1.Regulation 4(i-a) of the Tamil Nadu Electricity Supply Code under the caption of

Charges recoverable by the licensee is reproduced as below:

(i-a) The wheeling charges / Network charges shall be payable by the HT / LT consumer category in accordance with the rates as the Commission may fix time to time for different category of consumers (to recover the cost incurred by the Licensee for its Distribution wire business).

Provided that the Wheeling charges / Network charges may be denominated in terms of Rs/kWh (or) Rs/kVAh (or) Rs./kW/month (or) Rs./kVA/month for the purpose of recovery from the Distribution network user or any such denomination as may be stipulated by the Commission.

8.10.2. Regulation 4(6) of the Power Procurement from New and Renewable Sources of Energy Regulations 2008 of the TNERC is reproduced as below:

While determining the tariff the Commission may adopt appropriate tariff methodology.

8.10.3. Regulation 4(5) of the Power Procurement from New and Renewable Sources of Energy Regulations 2008 of the TNERC is reproduced as below:

While determining the tariff, the Commission shall adopt appropriate financial and operational parameters.

8.10.4. Regulation 8 of the Power Procurement from New and Renewable Sources of Energy Regulations 2008 is reproduced as follows:

Issues related to captive use and third party sale:

While issuing the general or specific tariff order, the Commission may consider appropriate criteria/ procedure/parameters/charges for each type of new and renewable source, on the following issues, for sale of power to distribution licensee, captive use and third party sale of power by the new and renewable source generators.

- 1) Applicable demand charges*
- 2) Applicable energy charges*
- 3) Grid availability charges*
- 4) Scheduling and system operation charges*
- 5) Transmission & wheeling charges and line losses*
- 6) Reactive power charges*
- 7) Adjustment of peak and off peak power*
- 8) Power factor incentive / disincentive*
- 9) Payment of security deposit by the captive/third party user*
- 10) Billing and payment to the generators by distribution licensee*
- 11) Applicable open access registration fee and open access agreement fee*
- 12) Any other related issues.*

The wheeling /network charges stem from the concept of using the electrical network as an indispensable supporting mechanism to generate solar power as well as transmitting the power so generated from generating point to load point destinations.

8.10.5. This related issue of wheeling/ Network charges of the Grid Interactive Solar Generation System (GISS) covered in the ambit of Sl.No.2 of Regulation 8, requires to be dealt with appropriate financial and operational parameters to determine the tariff as stipulated in regulation 4(5).

- 8.10.6. The said appropriate financial and operational parameters involved in GISS , constitute to warrant an in depth analysis to understand the sanctity behind wheeling/ Network charges to set the base to further determine the wheeling/ Network charges. In a conventional generation plant (without Grid interaction system) , set up and connected to the Grid network, the power generated is wheeled from the generation point to the load points of the end user destinations through a non discriminatory common carrier, in accordance with the regulations enacted by the State Commissions as specified by section 42 of the Electricity Act.
- 8.10.7. In case of sale of power to the distribution Licensee, the transmission and wheeling charges are embedded in the preferential tariff. In case of captive transactions, the transmission and wheeling charges alone are collected as there is no supply of power by the generator to the Licensee and hence the Licensee in such cases is a mere carrier. Insofar as the GISS , it is unique in the context that it is neither a case of full-fledged captive generation nor entire sale to Licensee , (barring gross metering category for which wheeling/ network charges are not applicable). Therefore it is a mix of captive consumption and sale to Licensee but the fact remains that the usage of network essentially required by the GISS for both needs has to be charged for its operation to generate power and inject it to the grid for which it has become necessary to evolve the wheeling/ network charges. The Net-metering and Net-Billing modes of GISS are primarily installed / developed for their self consumption. The excess energy above the self consumption is exported to the grid.
- 8.10.8. While the conventional generation plants so established are statutorily obligated to pay the wheeling/Network charges and other allied charges as per section 42 of the act and Regulation 8 of the Power Procurement from New and Renewable Sources of Energy Regulations 2008, the GISS which solely depends on the same network as a supporting operational parameter, stands on the same footing as far as the Wheeling/Network charges are concerned.
- 8.10.9. The GISS essentially needs a reference system voltage to operate. The supporting system is indispensable for the GISS for its coupled operation. When the network is down without power, the couple breaks and the dependant solar system that operates in tandem with the live network, also becomes dead stalling its operation instantly.

8.9.10. If the GISS were to be delinked and operated on its own without relying on the Licensee network as a supporting system, it would have to be established with a massive supportive battery station by the user of GISS with huge investment of their own as an equivalent supporting system to enable its operation. By freely accessing and readily using the Discom's network as a supporting system, the users of GISS saves huge investment , space and O&M charges which otherwise would have to be spent by them towards the supporting battery system.

8.10.11. Looking at the other angle, it is pertinent to bear in mind that the Licensee's network has been developed over the decades brick by brick with consistent investment of thousands of crores of Rupees solely by the Licensee themselves. Thus the network of Licensee that constitute the essential part of the operation of the GISS is an integral component of the operating parameter of the GISS. This crucial operating parameter needs to be dealt with appropriately while determining the tariff mandated by aforesaid regulations.

8.10.12. Using the network therefore is the basic operational parameter that forms the corner stone of the entire subject. While the wheeling charges are mandated to be charged to use the network, the same charges are squarely and automatically applicable for generating the solar power for the same purpose of using the same network.

8.10.13. In the present era of delicensed generation, the issue has another dimension with regard to the trend likely to be set by the growing GISS with wider ramification which has to be foresighted. If the wheeling/ network charges were not determined and mandated, the emerging growth of the GISS would lead to a stage where people would gradually switch over to GISS and freely use the Licensee network just as a back up battery, leaving the Licensees to end up as mere owner of the net work, left with no income neither for its service for universal supply obligation to other underprivileged consumers nor for its own survival. This would cause a serious discrimination where one stakeholder is gaining by freely using a property while the other stakeholder is losing despite owning the same property.

It is at this juncture, it is pertinent to refer to the Section 61 of the Electricity Act 2003 which states as follows:

The Appropriate Commission shall, subject to the provisions of this Act, specify the terms and conditions for the determination of tariff, and in doing so, shall be guided by the following, namely:-

- (a) the principles and methodologies specified by the Central Commission for determination of the tariff applicable to generating companies and transmission licensees;*
- (b) the generation, transmission, distribution and supply of electricity are conducted on commercial principles;*
- (c) the factors which would encourage competition, efficiency, economical use of the resources, good performance and optimum investments;*
- (d) safeguarding of consumers' interest and at the same time, recovery of the cost of electricity in a reasonable manner;*
- (e) the principles rewarding efficiency in performance;*
- (f) multi year tariff principles;*
- (g) that the tariff progressively reflects the cost of supply of electricity and also, reduces cross-subsidies in the manner specified by the Appropriate Commission;*
- (h) the promotion of co-generation and generation of electricity from renewable sources of energy;*
- (i) the National Electricity Policy and tariff policy:*

8.10.14. In the quest of promoting the renewable sources of energy as mandated in Section 61 (h) and providing commercial incentives to encourage its growth, the basic and underlying objective of sub section (c) of the same section in governing the efficiency, economical use of the resources, good performance and optimum investments etc., cannot be lost sight of. It is for this reason the wheeling/network charges is sought to be contemplated to ensure a level playing field to serve the interest of all stake holders and fulfill objectives of Section 61 in totality. The conjoint reading of section 86 (1)(e) and 61(b) makes it clear that there must be a harmonious balancing between promoting the Renewable energy and the safeguarding the interest of the Licensee. This fair balancing is entailed by the wheeling/ network charges. While the prosumer is replacing the high cost grid power with low cost solar power resulting in considerable saving, (even after payment of marginal network charge), the Licensee is compensated with the network charges.

8.10.15. In other words, in order to ensure economical use of the resources of the Licensees in developing the huge network and maintaining them with recurring expenditure as mandated by section 61(c) of the Electricity Act , the due charges for such economical use of network needs to be evolved. To evolve such charges, the related issues of sale of power to distribution licensee, captive use of GISS as per regulation 8 of the New and Renewable Sources of Energy Regulations 2008 and the scope of clause 2 – “ Applicable energy charges” of the Regulation 8 have to be taken in to consideration. Regulation 68 of the Terms and conditions for the tariff regulation 2005 stipulates the

wheeling charges/ Network Charges as one of the components of energy charges. Usage of network for dependant operation of GISS squarely qualify to be the appropriate financial and operational parameters specified by sub regulation 4(5) of the Power Procurement from New and Renewable Sources of Energy Regulation, 2008. Conjoint reading of these regulations and the Act makes it clear that the wheeling / network charges contemplated for every unit of solar power generated is technically justified and commercially essential.

8.10.16. The validity of charges relating to net work charges having been well covered under Regulation 8 of the New and Renewable Sources of Energy Regulations 2008 the wheeling/ network charges are part of energy charges of clause 2 , for statutorily compensating the Licensee who owns and maintains the network to enable generation and transmission of solar energy by GISS. As regards the question of employing the tariff methodology and financial parameters for the same, the power to resort to such exercise flow from Regulations 4(5) and 4(6) of the Renewable Sources of Energy Regulations 2008 which read as follows:

4. Determination of Tariff:

- 1) xxx
- 2) xxx
- 3) xxx

(5) While determining the tariff, the Commission shall adopt appropriate financial and operational parameters.

(6) While determining the tariff the Commission may adopt appropriate tariff methodology.

8.10.17. Summing up, the prosumer is obligated to pay the Distribution network cost (Distribution wire business) under “Network/Wheeling charges” which will be adjusted in the Aggregate Revenue Requirement of the Distribution Licensee at the time of approval.

8.10.18. Having concluded that the wheeling /network charges are statutorily applicable for usage of network, the ancillary question that arises is whether to restrict the exported power alone in the ambit of usage of network and hence the corresponding network charges.

8.10.19. The usage of network cannot be restricted to a narrow interpretation to mean only the exported power in to the Licensee grid from GISS, but it should also be expanded holistically to bring within the ambit of the captive consumption by the

GISS user as the GISS is entirely dependent on the network of the Licensee for every unit it generates and such dependency on the network shall also fall within the meaning of usage.

8.10.20. There is a misplaced conception that the wheeling/ network charges relating to the solar power generated in GISS as elaborately discussed above is already covered in the fixed cost / demand charges being charged as part of tariff component for supply of electricity by the Licensee to the consumers.

8.11.1. The objective of charging the Network / Wheeling charges are to collect charges for the usage of the network. However it is being sought to be confused with fixed/ demand charges. There lies a subtle distinction and to be more precise, discernible distinction. The demand charges as the name implies by itself is levied towards the obligation on the part of the Licensee to supply and distribute electricity at all times to the quantum of the sanctioned load/ demand to the individual consumers. The fixed/ demand charges are used synonymously for the same purpose. The only difference is that the fixed charge relates to LT consumers while the demand charges is applicable to HT consumers.

8.11.2. Regulation 68 of the Terms and conditions for the tariff regulation 2005 that lists out the following components of tariff for supply of electricity categorically separating the Fixed/ demand charges from wheeling / Net work charges. It reads as follows:

1) The charges for the electricity supplied by the distribution licensee may include

- a) *Fixed charges/ demand charges*
- b) *Charges for actual electricity supplied*
- c) *Rent or other charge in respect of meter or electrical plant provided by the Distribution Licensee*
- d) *Wheeling charges/ Network Charges.*

8.11.3. The objective behind splitting the energy charges in to components is to realise the due charges of Distribution wire business for using the network by the distribution/supply Licensees in case of emergence of multiple Licensee in the same area of operation. This objective is squarely applicable for GISS operations of same perspective also in view of using the network for generation of solar power.

8.11.4. During the year 2019-2020, the Fixed cost incurred by the licensee viz.,

Operation & maintenance expenses, Interest on Debt, Depreciation, Interest on Working Capital, Income tax and other expenses worked out to Rs.35072 Crores. (Based on Audited Accounts).

- 8.11.5. Whereas the income realized under “Fixed / Demand charges” by the Distribution Licensee from the LT & HT consumers is only Rs.14,059 (10523 + 3536) Crores during this year.
- 8.11.6. There is a gap of Rs.21,013 Crores (Rs.35072 Cr. – Rs.14059 Cr.) in realisation of Fixed cost. The Sale of power during the year 2019-20 was 77,390 Million Units. From the above, it is apparent that though the licensee has incurred the Fixed cost of Rs.4.53 / Unit, it has realised the income under Fixed / Demand charges of Rs.14,059 Crores i.e., Rs.1.82 / Unit. The Gap under the head “Fixed / Demand charges” is of Rs.2.71 / Unit which is still unrecovered.
- 8.11.7. The Fixed / Demand charges were earlier fixed during August’2017, at that time the HT & LT network infrastructure was around 7.81 lakh circuit Kilometers (as on 31st March 2016); but the Distribution Licensee has further created around 67,000 Circuit Kilometers of HT/LT lines (as on 31-03-2020) i.e., 8.48 lakh Circuit Kilometers. This shows the apparent additional fixed expenses incurred by the Licensee which is to be recovered under Fixed / Demand charges.
- 8.11.8. Though the actual fixed cost is around Rs.4.53 / Unit, the realization from the LT consumers is only Rs.1.09 / Unit, thus there is a gap of Rs.3.44 per Unit from the consumers under 112 KW categories. Only 25% of Distribution & network cost is recovered from the consumers and 75% of Distribution network cost is not met out of it.
- 8.11.9. Now, in this Order the Commission has proposed to recover only the Distribution Network cost belonging to Distribution wire business, which has been worked out as Rs.0.83 / Unit in respect of HT consumers and Rs.1.27 in respect of LT consumers. Though there is a gap of Rs.3.44 / Unit in fixed cost, the Commission has not proposed for the recovery of entire fixed cost in order to encourage the Renewable power generation and to achieve the target, taking into account of various promotional measures considered in the policies of the Government of India as well as the Government of Tamil Nadu.
- 8.11.10. The Commission has proposed the Network/Wheeling charges at Rs.0.83 / Unit and Rs.1.27 / Unit for HT and LT consumers respectively; and it is further subsidised @ 20% / 75% in respect of Domestic category. For example, if 1000 MW were to be effected under GISS for various category of Consumers during a

financial year, the licensee would fetch a revenue of Rs.200 Crores under this head of charges, as explained below, which is around 1% only against the Fixed cost gap of Rs.21,013 Crores.

	Domestic	Industrial	Commercial	Total
Assumed addition of Solar GISS during a year	350 MW	500 MW	150 MW	1000
Generation @ 19% CUF (in MU)	582.54	832.20	249.66	1664.40
Generation cost @ Rs.3.5/Unit (Rs. Crores)	203.89	291.27	87.38	582.54
ABR tariff realisation	384.48	528.45	200.98	1113.90
Diff. in revenue lost by TANGEDCO	180.59	237.18	113.60	531.36
Network / wheeling charges @ Rs.1.27 / Unit on 1664.4 MU				211.38 Say Rs.200 crores

8.11.11. If the above exercise of determining Network/Wheeling charges were to be taken up after filing/approval of the ARR of 2020-21 the network charges would still be higher than what has been proposed now based on the 2019-20 figures. However, Commission likes to ensure a balanced approach between the interest of the prosumers and other consumers and hence intends to impose the cost at lower level.

8.11.12. The prosumer is enjoying the savings of Rs.3.11 to Rs.4.81 per unit by opting to GISS as above; even considering the Network/wheeling charges of Rs.0.25 per Unit in the case of Domestic 'Net-metering' consumer and Rs.1.27 in case of other HT category, the prosumer has the saving of Rs.2.86 / Unit to Rs.3.54 / Unit. In the subsequent years, if the retail tariff is revised on the higher side, the prosumer is likely to get more benefit than the present level of savings, as detailed in the table below:-

	2019-20		
	Present Retail tariff – Energy charges (A)	Average Solar tariff fixed (B)	Difference (C) = (A) – (B)
	(Rs. / Unit)		
Domestic (Above 500 units consumption)	6.60	3.49	3.11
Industrial	6.35	3.24	3.11
Commercial	8.05	3.24	4.81

8.11.13. As per the prevailing tariff, entire fixed cost is not recovered through 'Demand/Fixed charges' collected from the consumer; other way it can be said that it is partly recovered through 'Energy charges'. Therefore, if a prosumer is consuming the power through GISS, the energy charge is entirely foregone by such prosumer. As the energy charge is foregone by a prosumer, part of fixed component of "Network cost" is thus stands unrecovered, which necessitates the levy of 'Network / wheeling charges' on the prosumers, which the prosumer is obligated to pay for the usage of Distribution network.

8.11.14. To the extent of capacity added under the prosumer category, the sale of power by the Distribution Licensee reduced. Resultantly, the Distribution licensee lose the considerable revenue from the "Subsidizing consumers" viz., Industrial and Commercial category consumers. Thus, the 'Network/wheeling charges' recoverable from the prosumers is reasonable and justifiable.

8.11.15. And also, the following benefits are available to a Solar GISS prosumer –

- (i) While a consumer prefer an Solar GISS arrangement, the consumer save Rs.3 to Rs.5 per Unit against its retail supply tariff
- (ii) A consumer / prosumer / generator
 - a. Not liable to pay the cross subsidy surcharge charged to an Open Access consumer
 - b. No need to pay the Transmission charges, wheeling charges, Scheduling charges, System Operation charges like a Captive generator / OA consumer.

- (iii) The prosumer is provided with 24 x 7 back up supply arrangement from the Distribution licensee during every stop / start of supply
- (iv) Banking of unutilised energy / carryover of credit cost throughout the settlement period
- (v) 20% additional tariff during evening peak hours based on ToD.

Therefore, the prosumers who are availing of all these benefits are liable to pay for the “Network / wheeling charges” for availing the grid support, to offset the cost incurred by the Distribution licensee.

9. Applicability.

9.1 Net- metering : All domestic consumers are eligible for Net metering mechanism up to the level of sanctioned load/ contracted demand.

Domestic consumers have an additional option of choosing the net-feed in mechanism.

Domestic consumers who have been provided with the solar net-feed-in facility as per TNERC Order No.3 of 2019 shall have option to migrate to the solar energy net metering mechanism as provided for in this order to avoid discrimination within the same category of consumers.

9.2 Net billing or net feed-in: The solar energy net billing or net feed-in mechanism will be available to all electricity consumer categories (except hut and agriculture) irrespective of tariff and voltage levels up to the level of sanctioned load/contracted demand up to a maximum capacity of 999 kW.

9.3 Gross Metering: The existing and new consumers of all categories except domestic category and also the generators are eligible for gross metering mechanism irrespective of tariff. The minimum size of the Solar System that can be set up under Gross Metering mechanism shall be 151 kWp up to a maximum capacity of 999 kW.

9.3.1 LT consumers are not eligible for gross metering.

9.3.2 New generators who are not existing consumers but desire to set up GISS in a premise or an open area and sell entire generated power to Licensee are eligible for gross metering mechanism up to a maximum capacity of 999kW. The existing sanctioned load / contracted demand do not arise for such cases for the purpose of capping the plant capacities applied.

9.3.3 Provided that the installation of gross-metered GISS on the eligible

consumer/generator premises intending to inject its total generated power into the grid shall use separate service line for the purpose of evacuation of power. The service line shall be connected to the nearest HT feeder without having to be extended till the sub-station.

- 9.3.4 A separate service connection is not required for purpose like security in night hours etc. The same can be drawn from the existing power evacuation system itself. The import energy shall be billed under HT Industrial Tariff for energy alone. No demand charge to be levied.
- 9.3.5 Such service line for evacuation of power up to the nearest HT feeder network, shall be laid and maintained by the eligible consumer at his cost. Since it is proposed to allow the prosumer / generator to connect the solar system in the existing HT feeder, Automatic Meter Reading shall be provided by the prosumer / generator in consultation with the licensee. The remote switching of ON / OFF of the breaker and switch of GISS shall be provided to the feeding substation by the prosumer / generator.
- 9.4 The Solar plant capacity in all categories shall be reckoned as the capacity on AC side.
- 9.5 The feed-in price has been determined with 21% CUF taking into account of the AC output capacity and corresponding capital cost. Addition of capacity of DC panels is left to the option of eligible consumer / prosumer / generator to the extent of the sanctioned GISS plant capacity (AC output capacity) which will be reckoned by the AC output demand reached and recorded in the Gross Generation meter for the given billing cycle.
- 9.6 Consumers with pending arrears / outstanding due with the Distribution Licensee shall not be eligible for provisions under this regulation.
- 9.7 Eligible consumers/ prosumers/ generators of respective categories are eligible to apply for additional loads with total loads not exceeding the sanctioned load/ contracted demand or 999 kW whichever is lower, subject to the technical feasibility.
- 9.8 Domestic consumers who have been provided with the solar net-feed-in facility as per TNERC Order No.3 of 2019 shall have option to migrate to the solar energy net metering mechanism as provided for in this order to avoid discrimination within the same category of consumers.

- 9.9 Electricity consumers who have been provided with the solar net-metering facility under the Tamil Nadu Solar Energy Policy 2012 may add additional solar energy capacity and retain the solar energy net-metering facility, provided that the total solar energy capacity shall not exceed the sanctioned load of the service connection as already provided for in the Commission's Order dated 22-12-2020 in M.P. no. 32 of 2020.
- 9.10 The existing parallel operation mechanism shall be converted in to net feed-in mechanism that shall enable the prosumer to export the excess power to the Licensee Grid and encash them with feed-in tariff. The reverse power relay shall be removed. While the net work charges is applicable for the generated power, the parallel operation charges shall cease to exist upon such conversion. The prosumer shall be benefitted to export the entire solar power generated during non production period like holidays besides exporting excess power during normal days.

10 Energy Metering

- 10.1 **Net-metering mechanism and Net feed-in mechanism:** At service connection point, a single bidirectional energy meter to record the energy import from the TANGEDCO grid and energy export to the TANGEDCO grid shall be provided. This shall be a digital four quadrant vector summation energy meter configured for bidirectional energy measurement whereby both imported and exported active energy readings and allied parameter are programmed to be displayed. The bidirectional energy meter shall have programmable ToD (time-of-the-day) registers with a minimum of four energy import ToD registers and four energy export ToD registers.
- 10.2 **Gross-metering mechanism:** An energy meter to record the gross solar energy generation shall be provided. This meter is to be installed immediately after the solar grid inverter. The energy meter shall have programmable ToD (time- of-the-day) registers with a minimum of four energy export ToD registers. The total solar power generated is accounted for feed-in tariff determined by the Commission from time to time. The energy drawn from grid and consumed by the prosumer / generator is metered and accounted separately at applicable HT industrial tariff under single part tariff with energy charges only. Demand charges shall not be billed.

Energy meters shall be of class 1.0 accuracy and shall comply with applicable

CEA (Central Electricity Authority) and BIS (Bureau of Indian Standards) standards.

11 Energy Billing and accounting process

11.1 Net metering :

11.1.1 The solar energy exported to the Grid from grid connected solar photovoltaic system is deducted from energy imported from the grid in units to arrive at the net imported or exported energy.

11.1.2 An eligible consumer / prosumer under the net metering / net billing or feed-in mechanism shall be entitled to use the power generated from GISS at his premises and the surplus generated energy shall be injected to the distribution licensee at the inter connection point.

11.1.3. If the generated energy is more than the consumption in a given billing cycle, such surplus energy generated / exported shall be carried over to the next billing cycle for credit and adjustment. This carry over credit in case of excess generation shall continue till the end of settlement period.

11.1.4 At the end of settlement period, the net surplus generation if any available shall get lapsed. If the consumption is more than the generation in any given billing cycle, the net consumption units shall be charged under retail tariff fixed by the Commission from time to time.

11.1.5 This process shall continue until the end of the settlement period i.e.31st March. At the end of the settlement period, credit i.e the net units of surplus generation available if any shall get lapsed.

11.1.6 Domestic category deserves the facility of net metering where the solar energy generated during the day time does not have scope to be fully consumed in view of the fact that the lighting load predominantly used in domestic usage takes place only in night. Section 5.12.2 of the Electricity Act 2003 emphasises that progressively the share of electricity from non-conventional sources would need to be increased as prescribed by State Electricity Regulatory Commissions. Hence this commission is of the view that in order to accelerate the pace of growth of solar system in domestic sector and encourage the potential domestic consumers to widely opt for the solar energy and also to meet the target set by the State Government, the net metering facility shall be made eligible for all domestic category consumers to the limit of individual sanctioned load.

11.1.7 20% of network charges for domestic consumers of up to 10KW and 75% of network charges for the domestic consumers of above 10KW is applicable for the total generated units.

11.2 Net billing or Net feed-in:

11.2.1 An eligible consumer / prosumer under the net metering / net billing or feed-in mechanism shall be entitled to use the power generated from GISS at his premises and the surplus generated energy shall be injected to the distribution licensee at the inter connection point.

11.2.2 The energy imported from the grid and the energy exported to the grid are valued at two different tariffs. The values are netted at the end of the billing cycle. The monetary value of the imported energy (Debit) is calculated at the applicable retail tariff; the monetary value of the exported energy (Credit) is calculated at the feed-in tariff determined by the Commission. The monetary value of the exported energy is deducted from the monetary value of imported energy to arrive at the net amount to be billed.

11.2.3 If the monetary value of the export energy (credit) exceeds the monetary value of the import energy (debit) in any billing cycle, the net credit amount shall be carried over to the next billing cycle.

11.2.4 If the monetary value of the export energy is lesser than the monetary value of the import energy – the prosumer shall pay for the net bill value arrived at on the same month.

11.2.5 The net credit amount arrived as above, shall be carried over to next billing cycle and adjusted against the net bill amount in the subsequent billing months. This process shall continue till the end of the settlement period. At the end of a settlement period, the consumer has the option to receive payment of the net credit balance (if any) or have such credit balance carried-over to the next settlement period.

11.2.6 The solar energy net feed-in mechanism will be available to all electricity consumer categories (except hut and agriculture) of all tariff and voltage levels.

11.2.7 100% of network charges is applicable for the total energy generated.

11.3 Gross-metering:

11.3.1 Gross metering is permitted for eligible consumers/prosumers/generators who opts to sell all generated solar energy to the distribution licensee instead of

availing the net- metering or net feed-in facility. The exported solar energy is credited at the feed in tariff determined by the Commission. The amount is credited in the operators/consumers electricity bill for every billing cycle.

11.3.2 The energy drawn from grid and consumed by the prosumer/generator is metered and accounted separately at applicable retail tariff.

11.4 General:

For the purpose of billing the import, export and net energy, the units and other allied parameters recorded in the respective import and export and net register of the consumer bidirectional meter shall be reckoned respectively. The maximum demand recorded in the gross generation meter or inverter as the case may be shall not exceed the sanctioned/ contracted plant capacity of GISS in any billing cycle. If the demand exceeds the sanctioned limit in any billing cycle , the quantum of exported units recorded in the bidirectional meter during the respective slots in case of gross metering and respective billing cycle in case of net-metering and net billing, proportionate to the portion of demand that exceeded over the sanctioned limit, shall be treated as inadvertent injection in to the grid and shall not be eligible for payment by the Licensee.

11.5 Further, regulation 5.4 and 5.5 of Grid Interactive Solar PV Energy Generating Systems (GISS) Regulations, 2021 stipulates the following:

For consumers up to the sanctioned load of 10 kW, the generation of solar energy shall be computed based on the stipulated CUF or energy recorded in the inverter which ever is lower in lieu of installation of gross meter for such assessment. If any dispute arises over such method of computation of energy and assessment of demand, the aggrieved party can install the generation meter at his cost to enable actual assessment of readings relating to the generation;

For existing consumers of more than 10 KW the Licensee shall issue notice to consumer to install the generation meter of required capacity, facility and specification. Till the meter is installed the generation shall be assessed based on CUF for the purpose of collecting network charges and RPO. For new applicants of more than 10KW, the generation meter with demand recording facility shall be installed at the cost of the applicant as a part of GISS system. For Gross generation metering , a four quadrant TOD meter with AMR facility shall be installed at the cost of the applicant . The rating and specification of the generation meter shall be communicated to the applicant by the Licensee along with the sanction/ approval of the load/connectivity;

11.6 **Belated Payment Surcharge:** The Licensee shall make payment to the prosumers / generators within two months from the date of receipt of invoices, failing which a belated payment surcharge at the rate of one percent for every month of delay is payable by the Licensee to such prosumers/generators.

12. Standards and Technical Requirements

- 12.1 The GISS and the interconnection with the TANGEDCO grid shall comply with all applicable regulations and standards of the Central Electricity Authority (CEA), Grid Codes and the Tamil Nadu Electricity Distribution Code with latest amendments.
- 12.2 The solar plant capacity shall not exceed the sanctioned load / contracted demand.
- 12.3 The total capacity of GISS connected shall not exceed 90% of the distribution transformer capacity and 70% of the Power Transformer capacity.
- 12.4 Distribution licensees shall update the status of the cumulative solar energy system capacity connected and solar energy generated by each system at each distribution transformers on their website every month.
- 12.5 Where ever separate meter measuring the gross solar generation is not available at present in existing grid connected solar system of more than 10KW, Licensee shall take prompt action to install them as mandated.
- 12.6 The solar power generator and equipment shall meet the requirement specified in the CEA's (Technical Standards for connectivity of the Distributed Generation Resources) Regulations, 2013 and as amended from time to time. The responsibility of operation and maintenance of the solar power generator including all accessories and apparatus lies with the solar power generators. The design and installation of the GISS should be equipped with appropriately rated protective devices to sense any abnormality in the system and carryout automatic isolation of the GISS from the grid. The inverters used should meet the necessary quality requirements. The protection logics should be tested before commissioning of the plant. Safety certificates for the installation should be obtained from the appropriate authorities.
- 12.7 The automatic isolation of the GISS 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. as per the CEA regulation/standards.

- 12.8 The inverter should be a sine wave inverter suitable for synchronizing with the distribution licensee's grid.
- 12.9 To prevent back feeding and possible accidents when maintenance works are carried out by distribution licensee's personnel in his network, suitable isolator/ isolating disconnect switches which can be locked by distribution licensee personnel should be provided. This is in addition to automatic sensing and isolating on grid supply failure etc. and in addition to internal disconnect switches. In the event of distribution licensee's LT supply failure, the GISS should have automatic isolation mechanism to prevent any solar power being fed to the LT grid of distribution licensee.
- 12.10 The consumer / prosumer / generator is solely responsible for any accident to human being/animals whatsoever (fatal/non-fatal/departmental/non departmental) that may occur due to back feeding from the GISS when the grid supply is off. The distribution licensee reserves the right to disconnect the consumer installation at any time in the event of such exigencies to prevent accident or damage to men and material.
- 12.11 The consumer/ prosumer/ generator shall abide by all the codes and regulations issued by the CEA / Commission to the extent applicable and in force from time to time. The consumer / prosumer / generator shall comply with CEA/TNERC/CEIG/ distribution licensee's requirements to the extent it is applicable with respect to safe, secure and reliable function of the GISS 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.
- 12.12 The GISS shall restrict the harmonic generation, flicker within the limit specified in the relevant regulations issued by the Central Electricity Authority.
- 12.13 Any battery backup shall be restricted to the consumer's network and the consumer shall be responsible to take adequate safety measures to prevent battery power/Diesel Generator(DG) power/backup power extending to distribution licensee's LT grid on failure of distribution licensee's grid supply.
- 13.0 Grid-interconnection application process**
- 13.1 For commissioning of GISS of capacity higher than 10 kW the issuance of safety certificate by the Chief Electrical Inspectorate (CEIG) is presently required which may be amended from time to time.

- 13.2 Application for Solar Power connectivity shall be in Form-1 and shall be submitted on line or to the respective section officer/designated officer of the distribution licensee along with a registration fee as stipulated in the Regulation. The licensee shall acknowledge the receipt of the application.
- 13.3 Both the parties shall sign an agreement in Form-2, Annexed.
- 13.4 The Distribution licensee will install the required energy meters and commission the solar metering facility within 30 days of completing the work of installation by the applicant.
Applicant shall have the option of purchasing the bidirectional meter from the authorized suppliers and shall be tested and installed by the Licensee.
- 13.5 The distribution licensee will enhance and update its metering and billing system in line with the requirement of above mandates such that relevant parameters pertaining to solar energy gross generation, export, import, net units and demand etc. are assessed and furnished clearly in the electricity consumers' bills. Distribution licensees shall make available online all of the above billing data for each prosumer, along with a sample bill explaining the various billing components.
- 13.6 The distribution licensee shall implement online applications both for new and additional plant capacities for all categories of Grid interactive solar generation scheme. The status of all applications received online or offline shall be displayed in their website. The licensee shall maintain section wise data base of applications received, approval status, installation and commissioning details.
- 13.7 Wherever the meter for measuring the gross generation of solar units is not available at present, the same shall arranged to be installed by Licensee for loads above 10KW. Till such time the units and demand recorded in the inverter will be accounted for the purpose.
- 13.8 For all new solar systems of more than 10 kW, the applicant shall install the meter to measure the gross generation along with installation of solar system at his cost.

14.0 Operative Control Period

This order shall come into force from the date of issue of this order. The tariffs determined shall be applicable for all consumer categories and is applicable for a control period up to 31.03.23.

The tariff determined shall be valid for 25 years for the GISS which are commissioned during the said control period.

As far as the net work / wheeling charges are concerned the rate specified in this

order is valid up to the next revision.

15.0 The terms and conditions stipulated in the Tamil Nadu Electricity Regulatory Commission (Grid Interactive Solar PV Energy Generating System) Regulations 2021 are applicable to this order.

16.0 Acknowledgement

The Commission acknowledges with gratitude the contribution of the officers and staff of the Commission, the valuable guidance provided by the SAC members, intense involvement, remarkable co-operation and elaborate suggestions offered by the stake holders. The Commission is thankful to the views and valuable inputs offered by the Tamil Nadu Generation and Distribution Corporation Ltd.

Enclosure: 1. Annexure I (Highlights of the order)

2. Annexure II (Comments of the stakeholders / analysis and decision of the Commission)

3. Annexure III (Comments of participants of SAC meeting / analysis and decision of the Commission)

(By order of the Tamil Nadu Electricity Regulatory Commission)

Sd./-
(S.Chinnarajalu)
Secretary

GISS_ Solar power_tariff calculator

LCOE Calculations

components		Unit	1-10 kW	11-150 kW	151-999 kW
1	Solar PV system capacity	kW	1.00	1.00	1.00
2	MNRE benchmark cost	INR / kW	-	-	-
3	Gross capital cost before subsidies	INR / kW	44,640	41,640	39,080
4	MNRE subsidy	%	0.00%	0.00%	0.00%
5	Government of Tamil Nadu subsidy	%	0.00%	0.00%	0.00%
6	Equity (% of net capital cost after subsidies)	%	30.00%	30.00%	30.00%
7	Return on equity	%	14.00%	14.00%	14.00%
8	Interest on loan	%	9.50%	9.50%	9.50%
9	Loan tenure	Year	10	10	10
10	Loan moratorium	Year	1	1	1
11	Solar PV system CUF	%	21.00%	21.00%	21.00%
12	Daytime grid availability	%	96.00%	96.00%	98.00%
13	Average annual solar panel degradation	%	0.75%	0.75%	0.75%
14	O&M (percentage of capital cost)	%	1.40%	1.40%	1.40%
15	O&M annual increase	%	5.72%	5.72%	5.72%
16	Insurance (% of depreciated asset value)	%	0.35%	0.35%	0.35%
17	Annual depreciation	%	3.60%	3.60%	3.60%
18	Depreciation on <i>net</i> capital cost after subsidies?	Y/N	Y	Y	Y
19	Working Capital - O&M	Month	1	1	1
20	Working Capital - receivables	Months	2	2	2
21	Interest on Working Capital	%	10.50%	10.50%	10.50%
22	Discount factor	%	8.67%	8.67%	8.67%
23	Economic life of system	Years	25	25	25
LCOE		INR / kWh	3.61	3.37	3.10

Annexure – I

Highlights of Generic Order on GISS								
Category	Eligibility	Metering Mechanism			Net Work Charges	Feed in Tariff		
		Net Metering	Net Feed-in	Gross Metering		0-10 kW	11-150 kW	151-999 kW
Domestic LT Category	Up to sanctioned load	✓	✓	✗	20% up to 10 kW; 75% above 10 kW			
Other than domestic category in LT	Up to sanctioned load	✗	✓	✗	Rs.1.27 per kWh on total generation	Rs.3.61	Rs.3.37	
Consumers of more than 150 kW	151-999 kW	✗	✓	✓	Re.0.83 per kWh for Net Feed-in. No charges for Gross Metering			Rs.3.10
Generator other than consumer	151-999 kW	✗	✗	✓	Nil			

Billing Methodology:

Net Metering:

Energy exported is deducted from energy imported in units to arrive at the net imported or exported energy. The net imported or exported energy is billed or credited or carried over on the basis of retail tariff.

Net billing Feed-in-Tariff:

The monetary value of the imported energy is debited at retail tariff; The monetary value of exported energy is credited at feed-in tariff.

The monetary value of the exported energy is deducted from the monetary value of imported energy to arrive at the net amount to be billed.

Gross Metering:

Gross metering involves selling entire solar energy generated to licensee. The exported solar energy is credited at the feed in tariff.

Annexure II

List of Stakeholders who have offered their views

Sl.No.	Name of Stakeholder
1.	M/s.National Solar Energy Federation of India
2.	M/s.Amp Energy India Pvt Ltd
3.	Thiru.B.Jeyaraman Former Member / TNERC
4.	M/s.CEAT Tyres
5.	M/s.Fourth Partner Energy
6.	Thiru.S. Nataraj / Swelects
7.	Thiru.S.Neelakantapillai
8.	CEO - National Solar Federation of India
9.	M/s.Solar Energy Developers Association
10.	M/s.Swelect Energy Systems Limited
11.	M/s.Tamil Nadu Spinning Mills Association (TASMA)
12.	M/s. Tamil Nadu Electricity Consumers' Association(TECA)
13.	M/s. Auroville Consulting
14.	Associate General Superintendent / CMC / Vellore
15.	M/s.First Plant Engineering
16.	Managing Director / Sai Sun Solar Energy Pvt Ltd
17.	Thiru.S. Narayanasamy / Former Member (Generation) of TANGEDCO.
18.	Tamil Nadu Generation and Distribution Corporation Limited (TANGEDCO)
19.	Thiru.P.Muthusamy
20.	M/s. The Southern India Mills Association(SIMA)

Gist of comments/objections/suggestions received from various stakeholders on *Consultative Paper on Generic Tariff order for Grid Interactive Solar Energy generation System (GISS) 2021* and remarks of the Commission in reply.

1. Adoption of Net metering:

National Solar Energy Federation of India

It is proposed that the facility of Net Metering be extended to other category of prosumers (i.e. prosumer for loads up to 500 kW or up to the sanctioned load, whichever is lower)

AMP Energy India Private Limited

It is proposed that appropriate metering mechanism be allowed for all consumer in line with Electricity (Rights of consumer) Amendment rules 2021. All consumers should be allowed net metering up to 500KW.

Thiru. B.Jeyaraman

It is appreciable to restore Net-metering to benefit and encourage the consumers to install Rooftop Solar PV systems.

CEAT Tyres

Applicability of net metering for all Rooftop plants up to the size of contracted demand should be ensured. There should not be any restriction on the size of roof top plant.

Fourth Partner Energy

Commission should approve it for all consumer without any cap in capacity up to contract demand to achieve the rooftop solar target of TN.

Swelect Energy

Adoption of Net Metering Scheme for HT & LT Consumer Category is the key to achieve the Solar Rooftop target of 3275 MW under Consumer Category. Compensation provision for the lapsed energy to be made.

Thiru. S.Neelakantapillai

Banking of energy or amount should not be entertained .The settlement should be done based on the same billing cycle period. If any excess amount after adjustment of charges in the current billing cycle should be credited to advance CC charges.

Tamil Nadu Solar Energy Developers Association

At the end of the settlement period, credit i.e the net units of surplus generation available if any shall be paid at the prevailing rate of average pooled power cost.

SIMA

The net units of surplus generation can be allowed for encashment @ 75% of the applicable feed-in tariff as available now, during normal time and @ 100% during the R&C Periods, if any enforced.

Facility of Net Metering Mechanism is not made to the other types of consumers, like High Tension and Low Tension Consumers of industrial/ commercial categories.

This way of differentiating would lead to discriminating other category consumers and restricting them from the scheme of open access as ensured under the Electricity Act 2003.

All the categories of Consumers should also be allowed for availing the facility of Net Metering.

The ceiling limit of Net Metering Mechanism, up to the level of sanctioned load / contracted demand, is not correct.

If at all the Hon'ble Commission wants to limit and matches it with sanctioned load / contracted demand, the actual CUF needs to be factored completely.

This has to be considered fairly based on the lowest CUF of the Solar Plants.

Tamil Nadu Electricity consumers' Association

The way of differentiating the domestic consumers and rejecting such facility for other categories of consumers, would lead to discriminating them and restricting them from the scheme of open access as ensured under the Electricity Act 2003.

All the categories of Consumers should also be allowed for availing the facility of Net Metering.

There should not be ceiling limit to Net metering.

In the scheme of Net Metering the net units of surplus generation can be allowed for encashment @ 75% of the applicable feed-in tariff as available now, during normal time and @ 100% during the R&C Periods, if any enforced.

Auroville consulting

At the end of the settlement period, the consumer maybe given the option to receive payment for the net units of surplus (if any) or have such credit balance carried-over to the next settlement period. If the consumer opts for receiving a payment for the net units, the net feed-in tariffs as determined in this order are applicable.

Sri sun solar Energy Pvt Ltd

Commission may permit Net metering for all eligible consumers.

TANGEDCO

The Net metering/Net billing or Net feed-in shall be extended to the respective categories of consumers up to a sanction load/ contracted demand of 10 KW only beyond which they shall be eligible for gross metering only due to financial loss to TANGEDCO in view of adjustment of low cost solar units with consumption at applicable tariff.

Solar power exported shall be capped at 90% of the electricity consumption at the end of settlement period. Excess energy generated beyond the cap shall be treated as lapsed as per TNERC Order No 03/2019 dt 25.03.19.

SIMA

Commission may consider providing net metering for HT/LT industries up to the limit of 500KW and for loads of above 500KW, net billing may be considered to encourage industrial units particularly MSME.

Thiru.A.RadhaKrishnan

Net metering is not beneficial to any category. Only gross metering is beneficial.

Ambus solar solutions Private Ltd

Net metering to be extended to all category up to 500KW.

Analysis and Decision of the Commission:

The amendment rules 2021 contemplate provision of five hundred kilowatt or up to the sanctioned load only *where the regulations do not provide for net-metering, net-billing or net feed-in.*

Whereas the Regulation is notified by the Commission providing for net-metering, net-billing or net feed-in. Hence the condition of Rules does not apply as far as the State of TN and TNERC is concerned in view of provisions made in the Regulation.

Secondly, the Amendment states, "Commission **may** allow" obviously as an enabling option for the State Commission but leaving the decision to the State Commission to stipulate the capping for the net metering taking in to account of the various factors involved in the respective States.

The capping for the net-metering is contemplated accordingly.

The facility of net metering is provisioned to Domestic category where the solar energy generated during the day time does not have scope to be fully consumed in view of the fact that the lighting load predominantly used in domestic usage takes place only in night. Section 5.12.2 of the Electricity Act 2003 emphasises that progressively the share of electricity from non-conventional sources would need to be increased as prescribed by State Electricity Regulatory Commissions. Hence this commission is of the view that

in order to accelerate the pace of growth solar system in domestic sector and encourage the potential domestic consumers to widely opt for the solar energy and also to meet the target set by the State Government, the net metering facility is made eligible for all domestic category consumers to the limit of individual sanctioned load.

Also, as the issue of supply - demand match , would pose a serious challenge to the grid if the net metering were to be provided to all categories in one go , net metering is restricted to domestic category for the present.

For other categories, the net feed in is provided for the present in which the excess generation can be encashed.

Regarding the suggestion that the excess energy generated and in credit at the end of settlement period should be encashed, the Commission is of the view that the concept of net metering is primarily for self consumption but not for selling energy with commercial principle. Adjustment of excess generation from billing cycle to billing cycle within settlement period itself is an advantage for the domestic consumers as this advantage is not in implementation in many States.

From Licensee point of view, it is to be noted that even though the GISS user is replacing the retail cost of grid power by the low cost solar power, the Licensee is saving the cost of generation and supply (in the range of Rs.9 per unit) for every such unit so adjusted at load end, besides avoiding the line loss. Only issue to be faced by the Licensee is to tackle the demand- supply management pursuant to the revised conditions during day/ night due to growing GISS.

2. Adoption of group net metering (surplus energy exported in one location to be adjusted on any other service connection of the consumer)

and

Virtual Net metering (All energy produced by a collectively owned solar system will be fed into the grid through an energy meter and the exported energy as recorded by that meter will be pro-rata credited in the electricity bill of each participating consumer on the basis of beneficial ownership)

are suggested by the following stake holders:

- (i) **National Solar Energy Federation of India**
- (ii) **Swelect Energy**

Analysis and Decision of the Commission:

A comprehensive proposal after examining the methodology and implementation aspects require to be evolved and put in public domain for comments and views of stake holders for further consideration. These aspects were not covered in the draft

regulation / consultative paper floated in the public domain and hence cannot be considered now.

3. Bench mark cost and other components of tariff:

Following stake holders have insisted to adopt the latest MNRE bench mark cost published for the year 1921-22 :

- (i) National Solar Energy Federation of India
- (ii) AMP Energy India Private Limited
- (iii) Swelect Energy
- (iv) Tamil Nadu Solar Energy Developers Association
- (v) Auroville consulting

TANGEDCO

This concept of tariff determination may be adopted for the projects above 10 KW since, the total capital cost for 10kW works out to Rs.4.10 lakhs only.

Hence, it is suggested that for this quantum of investment, the tariff need not be determined taking all components.

Moreover, the probable prosumers who will be installing the roof top solar panels with the cost of Rs.4.10 lakhs may not be belonging to economically backward.

Hence, the tariff for the solar power generators with capacity of up to 10kw may be continued with the existing rate as specified in Order No.3 of 2019, dt.25.03.2019

Certain parameters such as Rate of interest on loan, Rate of interest on working capital, annual increase in O&M expenses, and tenure of loan are objectionable to TANGEDCO due to not matching with prevailing market condition/CERC norms hence, needs reconsideration.

Separate Insurance allowance (0.35%) need not be given as it is part of O&M expenses.

One of the Components of Working capital “Receivables” need not be considered for net feed-in & net metering, as there is no receivable to prosumers and credit alone is carried over to end of the settlement period.

Considering the above factors the revised LCOE works out as below

	1-10KW	11-100KW	101-500KW	501-999KW
*LCOE (in Rs)	3.50	3.25	3.08	2.74

The working sheet is enclosed .

In the recent past, TANGEDCO signed PPA's for 500MW and 1000MW at the rate of Rs.2.78/unit and Rs.2.61/unit respectively and the average cost including T&D loss works out to Rs.3.21/unit.

The domestic tariff in Tamil Nadu is lowest in the country. Hence, the tariff fixed for Net feed –in should not be more than the ARR of TANGEDCO collects from its Consumers.

Thiru.S.Narayanasamy

It looks out of place to award Return on Equity on the investment under Clause 6.2. Depreciation, working capital interest are all irrelevant factors. The interest rate indicated is very high. Suppliers offer at a cheap rate of about 8.00 % and a service charge of 1% may be added. The grid availability at HT services is about 98% and at LT services is about 95%. A figure of 95% may be adopted. No insurance provision is required for domestic solar power plant. Half the Operation and Maintenance charges for normal commercial solar park may be adopted. No working capital is required and may be deleted. While solar power is available for Rs. 2.00 and below in other states, the offered tariff of more than Rs.3.00 and up to Rs.3.99 per unit, is double the normal solar tariff.

The tariff / billing principles issued under T.O. No.3 of 2019 dated 25-3 -2019 and indicated in Para 1.1.2 of this paper is sufficient and no new working is required. However, in order to attract more consumers to install solar power plant to supplement TANGEDCO, a tariff of 75% or less of the Average Cost of Selling by TANGEDCO may be considered.

Analysis and Decision of the Commission:

Commission is in agreement to take in to account of the Bench mark cost published by MNRE, latest for the year 2021-22 as proposed by many stake holders. However TANGEDCO and some of the stakeholders have commented that the proposed tariff is on higher side.

It is also suggested that the Return on Equity of 16.96% adopted in the consultative paper is on higher side and the ROE of 14% is reasonable which has been recommended in the FOR meeting also.

The CUF of 21% is factored taking in to account of the AC output capacity for which the bench mark cost correlates.

Similarly the Grid availability factor of 90% adopted in the consultative paper is on the lower side contrary to the improved ground reality and needs to be revised. The SAIDI / SAIFI periodical returns submitted by the TANGEDCO also indicate grid availability factor of more than 96%. Hence day time grid availability factor of 96% for LT and 98% for HT category is adopted.

The average annual solar panel degradation is taken as 0.75%.

The loan term is accounted as 10 years.

Other parameters adopted remain in consonance to the parameters adopted by the Commission in determining the generic tariff for other RE powers.

Accordingly the LCOE has been reworked and revised after taking in to account of the above new bench mark cost of MNRE for the year 2021-22 , revised ROI of 14% and Grid availability factor of 96% for LT and 98% for HT category.

4. Validity period of Regulation and generic order

Following stake holders have insisted to continue the Regulation and generic tariff order without amendments for 25 years:

- (i) National Solar Energy Federation of India**
- (ii) Swelect Energy**
- (iii) Tamil Nadu Solar Energy Developers Association**
- (iv) Fourth Partner Energy**

Analysis and Decision of the Commission:

It cannot be considered in view of changing network charges for every year and dynamic nature of other allied factors involved.

5. Parrallel operation :

National Solar Energy Federation of India

Adoption of Parallel Operation without export energy is suggested. There shall be no capacity restriction. Should be eligible in dedicated as well as common feeders

Fourth Partner Energy

Without export and for captive use by paying parallel operation charges is basic right of consumers. This should continue.

CMC/Vellore

It is requested to allow generators to install capacity's up to the sanctioned demand / contract demand for consumers who opt for Parallel operation

Tamil Nadu Solar Energy Developers Association

Parallel operation without export energy should be well defined.

TANGEDCO

It is suggested that the POC shall be applicable to the consumers coming under net-metering and net feed-in category who have been provided with grid paralleling facility

for their systems. Moreover, the prosumers under net metering or net feed-in shall import energy during the non-generation period. This charge shall have to be applicable for all consumers irrespective of category and load. In order to encourage the growth of Solar roof top among domestic category, the PoC may be levied at concessional rate on par with network charges.

Ambus solar solutions Private Ltd

Parallel operation to continue to HT consumers to their sanctioned demand without need for separate feeder .

Analysis and Decision of the Commission:

It is made clear that the captive use of the power generated by GISS shall continue. It is also made clear that in all categories the GISS is allowed up to the sanctioned load/contracted demand as the case may be subject to the capping of 999kW. There is no condition for a separate feeder or a dedicated feeder for the loads up to 999kW. However capacity restriction is necessary for load management and to maintain network parameters within safe limits.

The core intent of the Commission is to replace the parallel operation charges by net work charges in view of the fact that it is going to be beneficial both for the prosumer and Licensee.

When the parallel operation mechanism is replaced by the Net billing or Net feed-in mechanism, the reverse power blocking from generator to Grid which is inherent in parallel operation gets removed. There shall not be reverse power relay any more. As a result, the prosumer under Net billing or Net feed-in mechanism is freed from the barrier of reverse power with a leverage to export power during holidays or during reduced load conditions of the industry even during normal days and thereby encash the quantum of energy so exported. It will be beneficial particularly for industries and MSME units.

On the other hand, Licensee is suitably compensated with the network charges for the total units generated towards usage of their network by the prosumers for the said power generation.

6. Net feed in/Parallel operation

National Solar Energy Federation of India

It is proposed that the unutilized energy which gets injected in to the grid shall be treated as deemed injected energy and it shall be claimed by the Generator at prevailing Average Pooled Power Purchase Cost.

TASMA and TECA

The unit generated should be allowed for adjustment by the CGP only by units. Going with a concept of adjusting the units by cash, by way of Feed-In-Tariff and Retail Tariff against Open Access, as provided under the Electricity Act 2003.

The TN Solar Energy Policy 2019, is still in effect and if any Regulations or Tariff Order proposed, such newly introduced Regulations or Tariff Orders should remain consistent with the TN Solar Energy Policy 2019 also, on the reason that the TN Solar Energy Policy 2019 is an outcome of Section 108(1) of the Electricity Act 2003 and needs to be treated as a Policy Directive issued by the State Government to the State Commission.

TANGEDCO

All categories of existing consumers except domestic category governed under the net metering as per TNERC Order No 03/2013 shall be migrated to net feed in category to avoid discrimination.

May be limited to the consumers with the connected load of 150 KW instead of permitting to all categories of consumers irrespective of load.

Since, several HT consumers may install the roof -top plants and thereby it will severely hit the revenue of TANGEDCO.

Besides, permitting the consumers with higher capacity under the category net billing or net feed-in, will severally affect the Demand Supply maintenance operation as TANGEDCO is obligated to maintain the uninterrupted supply to all categories of consumer 24x7.

Further, as per the provisions of the Tamil Nadu Solar Policy, 2019, Solar Net feed in is allowed only to all Low Tension electricity consumers.

The net export units under net feed-in tariff may be carried over based on the retail tariff of the respective slab rates.

Analysis and Decision of the Commission:

The basic objective of State policy of 2019 is to accelerate the pace of growth of Renewable solar energy. With the State and Central Governments taking consistent measures over the years in the direction of propelling the Renewable energy, the Electricity (Rights of Consumers) Amendment Rules, 2021, notified by Ministry of Power, New Delhi in the Gazette of India, after taking in to account of the current status and changing factors, has formulated certain metering mechanisms in general, to be enforced by the individual State Commission in the form of regulations tailored to suit the conditions of the respective States.

Section 181 of the Electricity Act, 2003 empowers the State Commissions to make Regulations consistent with the Act and the Rules prescribed to carry out the provisions of the Act. So the Rules notified by GoI has to be followed while framing the regulations. Section 11(3) of the Rules mandates the Commission to lay down relevant Regulations.

Therefore the State Commission is required to take a broad and holistic view of Act, policies, and rules and conjointly consider their ingredients to ultimately evolve a decisive methodology and derive a generic tariff to meet their objectives and balance the interest of all stakeholders in the process besides fulfilling the allied mandatory requirements.

It is with this principle and wide analysis coupled with careful consideration of all other factors involved , the encashing methodology of the exported units and its pricing methodology in net billing or Net feed-in methodology have been consciously evolved and determined by the Commission besides taking in to account of views of all stakeholders.

As far as the issues raised and apprehended by the TANGEDCO is concerned , the concerns expressed by TANGEDCO regarding loss of revenue due to setting up of Rooftop SPV system by subsidising category of consumers under Net Metering is appreciated. The retail tariff is based on cross subsidy regime and any reduction in sale to such segment of consumers leads to burden on the other consumers who are not opting for these systems. But at the same time GISS is not entirely disadvantageous to TANGEDCO. The net work cost contemplated by the Commission makes good the revenue to the Licensee to some extent. The RPO obligation of the Licensee gets fulfilled simultaneously. It is also not to be forgotten that the exported solar energy from GISS is mostly consumed in nearby vicinity itself saving significant transmission and distribution loss thereby leading to better network efficiency and additional commercial saving to the Licensee on account of reduced technical loss.

7. Gross metering

Auroville consulting

Consumer with larger rooftops and a sanctioned load higher than 999 kW may be allowed to install rooftop systems under the net feed-in or gross feed-in tariff up to the sanctioned load. A capping of the allowed rooftop solar capacity at 999 kW has no technical justification

The service line of the consumer is already capable of carrying the sanctioned load. By having a separate service line, the distribution losses of exported solar energy will be higher since this energy first has to travel to the distribution transformer or service connection pole and from there to other consumer loads. If at any time the service line cannot absorb the exported solar energy (due low instantaneous demand), the surplus alone will travel automatically to the nearest LT sub-feeder or to the distribution transformer. There is no need of a separate line for this. The requirement of a separate service line may therefore be deleted.

Thiru. S.Neelakantapillai :

The injection point in the gross metering which is allowed up to 999 KW, may not be a load centre. The line loss from injection point to load centre shall be to TANGEDCO. Hence to be clarified. As per definition 2(1) (s) prosumer cannot opt for gross metering as specified in section 4.3 due to separate point of supply.

Analysis and Decision of the Commission:

From the definition of gross metering spelt out by the Electricity (Rights of Consumers) Amendment Rules, 2021, it can be inferred that the generated and consumed energy have to be accounted and billed separately. Further the gross metering option is open to those who wish to establish a GISS , generate solar power and sell to Licensee without needing to receive and consume power from Licensee. In fact, such models of GISS plants can be established in big open areas in a fashion of solar park and export power to nearby HT portion of grid. It is pertinent to recommend at this point that agricultural feeders are ideally suited to effectively utilize the potential of solar energy through the gross metering mechanism. The segment of agricultural network has been the perennial loss pocket with lengthy lines and wide LT network. The continuing bad performing trend of agricultural feeders plagued by inefficiency over the decades, could be reversed if the feeders are taken over by GISS through gross metering by establishing a service line of power evacuation as an interface between the GISS of open area and the nearby agricultural HT feeder concerned.

It is with this concept and the independent accounting mechanism for generated units specified by the Rules, the necessity of the separate service line arises.

Regarding the distance between the generation point and Load Centre and the line loss etc, it is proposed to evacuate the solar generation to nearest HT feeder of the licensee net work . Thus the load will be very much nearer to the generation point and hence the very meagre line loss component is not considered.

8. Net work charges:

National Solar Energy Federation of India

It is suggested that the network charges be fixed upon due filing of ARR by TNERC for the Current Year.

Thiru. S. Neelakantapillai

Exemption from net work charges for capacity up to 3 KWp may be considered.

Thiru. B.Jeyaraman

The LT Network charges can not be applied to the prosumers of Rooftop Solar PV Systems.

Rooftop Solar energy exported in LT is utilised in the immediate neighbourhood itself requiring negligible network and also due to the reasons pointed out in para 1.2.2

Fourth Partner Energy

The Network charges can be applied for exported units alone. 0.83/Unit is higher side with current industrial tariff.

CEAT

The units consumed for captive use by the plant itself does not even enter the Grid, so any charge on the same is not justified.

AMP Energy India Private Limited

Network charges shall be made applicable to gross metered Prosumers.

Network charges shall not be applicable to Consumers net metering and net billing.

Prosumers who have availed approval for Parallel Operation of solar with grid ("Behind the Meter") should not be liable to pay any network charges.

Tamil Nadu Solar Energy Developers Association

The net work charges determined by the Commission for respective HT/LT category shall be payable by all new consumers/ prosumers after the notification of this regulation. Network charges can be arrived by commission after TANGEDCO files current ARR and accepted by the commission after following due process. Net work charges to all existing consumers is legally untenable. Net work charges on the basis of sanctioned solar PV capacity, instead of paying Net work charges per kWh of total generation may be considered. Hence, the Hon'ble Commission may be considered to fix the 50% network charges for all LT consumers (except domestic consumers), instead of 100%.

Also, it is suggested that the Hon'ble Commission may be considered to waive off the Net work charges for domestic consumers, since the installed capacity under this category is very low as of now.

TASMA

The Network Charge can be removed, as already sufficient fixed charges are being collected by the TANGEDCO, for providing and maintaining their infrastructure by way of Demand Charges or Fixed Charges in respect of Consumers. The current Solar Tariff Order mandates levying and demanding of Parallel Operation Charges. Then that being the case, levying network charge is nothing but a duplication and therefore, it should be removed for all reasons.

TECA

The Network Charge as found newly attempted to be proposed in the Consultative Paper, can be removed, as already sufficient fixed charges are being collected by the TANGEDCO, for providing and maintaining their infrastructure by way of Demand Charges or Fixed Charges in respect of Consumers.

Auroville consulting

The proposed additional network charge for rooftop solar system is not justified, as the consumers already pay for network charges. The network charges already being paid are in fact payments for the right to access the grid with a certain capacity (the sanctioned load), irrespective of the actual quantum of energy that is being imported or exported.

Network charges will result in higher solar energy feed-in tariffs. If 'network' charges or any other charges are levied on the gross generation of rooftop solar under the net metering and net feed-in mechanisms, these charges would cause the cost of generation. Adding the network charges (for domestic consumers at 20% of the proposed network charges for LT, which results in INR 0.25 INR/kWh) to this cost, the total cost of generating one unit of solar energy for systems below 10 kW becomes INR 4.24 /kWh. Current energy charges levied on domestic consumer slabs 1, 2 and 3 are below this cost of INR 4.24/kWh, thus making rooftop solar unviable for these domestic consumers. Network costs will be different for each financial year and this requires frequent revisions of the network charges. If network charges are levied on energy produced, the net cost of that energy will also be subject to revisions. This defeats therefore the whole purpose of having LCOE-based, long term fixed feed in tariffs and investments in solar PV systems will dry up as a result of this cost and the resulting financial viability uncertainty.

Thiru. S.Narayanaswamy

Network charges is a must and it may be applied on the units exported by the service and not on the solar energy generated by the service. Similar to Open Access Rules, network loss may also be added and collected. System operating charges may be ignored. Further free 100 units given to these domestic consumers may please be withdrawn.

TANGEDCO

The network charges are arrived based on FY 2019-2020 which needs to be updated based on FY 2021-2022 estimated cost .

The interest on debt to an extent of 25% and total Return on Equity(RoE) are disallowed which needs to be revisited and to be allowed to the extent of actual Equity brought in by TANGEDCO. The analogy for disallowances considered in retail tariff order could not be applied for specific categories of solar PV roof tops.

As per the revised workings the network charges for HT Rs.0.99/unit and LT Rs.1.57/unit for FY 2019-2020 instead as given in consultative paper as Rs.0.83/unit for HT and Rs.1.27/unit for LT.

The network charges based on provisional estimation for FY 2021-22 is arrived as below:

HT	Rs.1.09/unit
LT	Rs.1.67/unit

The 25% Concession given in the network charges to domestic consumers with a capacity more than 10KW solar roof top, need not be considered, as they are mostly high end consumers and not economically weaker section of society.

Thiru. P. Muthusamy

Imposing the “network charges” on the existing prosumers is not legally justifiable. This is an additional tariff/charges which has not been contemplated in the original investment proposals of the prosumers and it affects their economic viability.

The generating capacity of existing prosumers governed by the provisions in the Order No.3 of 2013 dt 13.11.2013 is very meagre and their excess generation will be consumed locally. The chances of their excess generation using the entire LT network is also very remote. Hence, such prosumers may be exempted from the network charges

SIMA

When there is a fixed charges collection, there should not be any collection of network charges from domestic consumers. If at all Commission considers providing network charges, it should be of 20% only in respect of consumers above 10KW instead of 75%.

Network charges for the period of two to three years ii could be nil rated and subsequently it shall be fixed at a concessional rate from 20%.

As already fixed and demand charges are paid, network charges will bring additional burden which will nor encourage to achieve targets.

Analysis and Decision of the Commission:

The wheeling /network charges stem from the concept of using the electrical network as an indispensable supporting mechanism to generate solar power as well as transmitting the power so generated from generating point to load point destinations.

This related issue of wheeling/ Network charges of the Grid Interactive Solar Generation System (GISS) covered in the ambit of SI.No.2 of Regulation 8 of Power Procurement

from New and Renewable Sources of Energy Regulations 2008 requires to be dealt with appropriate financial and operational parameters to determine the tariff as stipulated in regulation 4(5).

The said appropriate financial and operational parameters involved in GISS, constitute to warrant an in depth analysis to understand the sanctity behind wheeling/ Network charges to set the base to further determine the wheeling/ Network charges .

In a conventional generation plant (without Grid interaction system) , set up and connected to the Grid network, the power generated is wheeled from the generation point to the load points of the end user destinations through a non discriminatory common carrier, in accordance with the regulations enacted by the State Commissions as specified by section 42 of the Electricity Act.

In case of sale of power to the distribution Licensee, the transmission and wheeling charges are embedded in the preferential tariff . In case of captive transactions, the transmission and wheeling charges alone are collected as there is no supply of power by the generator to the Licensee and hence the Licensee in such cases is a mere carrier. Insofar as the GISS , it is unique in the context that it is neither a case of fully fledged captive generation nor entire sale to Licensee (barring gross metering category for which wheeling/ network charges are not applicable). Therefore It is a mix of captive consumption and sale to Licensee but the fact remains that the usage of network essentially required by the GISS for both needs has to be charged for its operation to generate power and inject it to the grid for which it has become necessary to evolve the wheeling/ network charges.

While the conventional generation plants so established are statutorily obligated to pay the wheeling/Network and other allied charges as per section 42 of the act and Regulation 8 of the Power Procurement from New and Renewable Sources of Energy Regulations 2008, the GISS which solely depends on the same network as a supporting operational parameter, stands on the same footing as far as the Wheeling/Network charges are concerned.

The GISS essentially needs a reference system voltage to operate. The supporting system is indispensable for the GISS for its coupled operation. When the network is down without power, the couple breaks and the dependant solar system that operates in tandem with the live network, also becomes dead stalling its operation instantly.

If the GISS were to be delinked and operated on its own without relying on the Licensee network as a supporting system, it would have to be established with a massive supportive battery station by the user of GISS with huge investment of their own as an equivalent supporting system to enable its operation. By freely accessing and readily using the Licensee's network as a supporting system, the users of GISS save huge investment , space and O&M charges which otherwise would have to be spent by them towards the supporting battery system.

Looking at the other angle, it is pertinent to bear in mind that the Licensee network has been developed over the decades brick by brick with consistent investment of thousands of crores of Rupees solely by the Licensee themselves. Thus the network of Licensee that constitute the essential part of the operation of the GISS is an integral component of the operating parameter of the GISS. This crucial operating parameter needs to be dealt with appropriately while determining the tariff mandated by aforesaid regulation.

Using the network therefore is the basic operational parameter that forms the corner stone of the entire subject. While the wheeling charges are mandated to be charged to use the network, the same charges are squarely and automatically applicable for generating the solar power for the same purpose of using the same network.

In the present era of delicensed generation, the issue has another dimension in regard to the trend that is likely to be set by the growing GISS causing wider ramification in future which needs to be foresighted. If the wheeling/ network charges were not be determined and mandated, the emerging growth of the GISS would lead to a stage where people would gradually switch over to GISS and freely use the Licensee network just as a back up battery, leaving the Licensees to end up as mere owner of the network, left with no income neither for its service for universal supply obligation nor for its own survival. This will result in a serious discrimination where one stakeholder is gaining by freely using a property which the other stake holder is losing despite owning the same property.

In the quest of promoting the renewable sources of energy as mandated in Section 61 (h) of Electricity Act 2003 and providing commercial incentives to encourage its growth, the basic and underlying objective of sub section (c) of the same section in governing the efficiency, economical use of the resources, good performance and optimum investments etc., cannot be lost sight of. It is for this reason the wheeling/network charges is sought to be contemplated to ensure a level playing field to serve the interest of all stake holders and fulfill objectives of Section 61 in totality. The conjoint reading of section 86 (1)(e) and 61(b) makes it clear that there must be a harmonious balancing between promoting the Renewable energy and the safeguarding the interest of the Licensee. This fair balancing is entailed by the wheeling/ network charges. While the user is replacing the high cost grid power with low cost solar power resulting in considerable saving, with marginal network charge from that savings, the Licensee is compensated with the network charges.

In other words, in order to ensure economical use of the resources of the Licensees in developing the huge network and maintaining them with recurring expenditure as mandated by section 61(c) of the Electricity Act, the due charges for such economical use of network needs to be evolved. To evolve such charges, the related issues of sale of power to distribution licensee, captive use of GISS as per regulation 8 of the New and Renewable Sources of Energy Regulations 2008 the scope of clause 2 – “ Applicable energy charges” of the Regulation 8 has to be taken in to consideration. Regulation 68

of the Terms and conditions for the tariff regulation 2005 stipulates the wheeling charges/ Network Charges as one of the components of energy charges. Usage of network for dependant operation of GISS squarely qualify to be the appropriate financial and operational parameters specified by sub regulation 4(5) of the Renewable Sources of Energy Regulations 2008. Conjoint reading of these regulations and the Act makes it clear that the wheeling / network charges contemplated for every unit of solar power is technically justified and commercially essential.

The validity of charges relating to net work charges having found sanction in Regulation 8 of the New and Renewable Sources of Energy Regulations 2008 the wheeling/ network charges are part of energy charges of clause 2 , for statutorily compensating the Licensee who owns and maintains the network to enable generation and transmission of solar energy by GISS. As regards the question of employing the tariff methodology and financial parameters for the same, the power to resort to such exercise flow from Regulations 4(5) and 4(6) of the Renewable Sources of Energy Regulations 2008 which read as follows:

4. Determination of Tariff:

(5) While determining the tariff, the Commission shall adopt appropriate financial and operational parameters.

(6) While determining the tariff the Commission may adopt appropriate tariff methodology.

Summing up, the prosumer is obligated to pay the Distribution network cost (Distribution wire business) under “Network/Wheeling charges” which will be adjusted in the Aggregate Revenue Requirement of the Distribution Licensee at the time of approval.

Having concluded that the wheeling /network charges are statutorily applicable for usage of network, the ancillary question that arises is whether to restrict the exported power alone in the ambit of usage of network and hence the corresponding the network charges.

The usage of network cannot be restricted to a narrow interpretation to mean only the exported power in to the Licensee grid from GISS, but it should also be expanded holistically to bring within the ambit of the captive consumption by the GISS user as the GISS is entirely dependent on the network of the Licensee for every unit it generates and such dependency on the network shall also fall within the meaning of usage.

There is a misplaced conception that the wheeling/ network charges as elaborately discussed above is already covered in the fixed cost / demand charges being charged as part of tariff component for supply of electricity by the Licensee to the consumers.

The objective of charging the Network / Wheeling charges are to collect charges for the usage of the network. However it is being sought to be confused with fixed/ demand

charges. There lies a subtle distinction and to be more precise, discernible distinction. The demand charges as the name implies by itself is levied towards the obligation on the part of the Licensee to supply and distribute electricity at all times to the quantum of the sanctioned load/demand to the individual consumers. The fixed/ demand charges are used synonymously for the same purpose. The only difference is that the fixed charge relates to LT consumers while the demand charges is applicable to HT consumers.

It is necessary to recover such network cost towards infrastructure created for the prosumers; or otherwise it will add to the burden of the other consumers, leading to discrimination.

Regulation 68 of the Terms and conditions for the tariff regulation 2005 categorically separates the Fixed/ demand charges from wheeling/Net work charges which is squarely applicable for GISS operations also.

During the year 2019-2020, the Fixed cost incurred by the licensee worked out to Rs.35072 Crores. (Based on Audited Accounts) , whereas the income realized through Fixed / Demand charges by the Licensee from the LT & HT consumers is only Rs.14,059 resulting in a gap of Rs.21,013 Crores.

In other words, the actual fixed cost is around Rs.4.53 / Unit, the realization from the LT consumers is only Rs.1.09 / Unit, thus there is a gap of Rs.3.44 per Unit from the consumers under 112 KW category. Only 25% of Distribution & network cost is recovered from the consumers and 75% of Distribution network cost is not met out of it.

Now, in this Order the Commission has proposed to recover only the Distribution Network cost belonging to Distribution wire business, which has been worked out as Rs.0.83 / Unit in respect of HT consumers and Rs.1.27 in respect of LT consumers. Though there is a gap of Rs.3.44 / Unit in fixed cost, the Commission has not proposed for the recovery of entire fixed cost in order to encourage the Renewable power generation and to achieve the target, taking into account of various promotional measures considered in the policies of the Government of India as well as the Government of Tamil Nadu.

The Commission has proposed the Network/Wheeling charges at Rs.0.83 / Unit and Rs.1.27 / Unit for HT and LT consumers respectively; and it is further subsidised @ 20% / 75% in respect of Domestic category. If 1000 MW were to be effected under GISS for various category of Consumers during a financial year, the licensee would fetch a revenue of Rs.200 Crores under this head of charges, which is around 1% only against the Fixed cost gap of Rs.21,013 Crores.

If the above exercise of determining were to be taken up after filing the ARR of 2020-21 as suggested by some of the stake holders the network charges would work out still higher than what has been worked out now taking in to the account of 2019-20 figures. Commission likes to ensure a balance between the interest of the developers and

Licensee and hence intends to impose the cost at lower level to begin with the implementation of the concept.

9. DT capacity:

TANGEDCO

At the local distribution level, connectivity to rooftop solar systems shall be restricted to 90% of the DT capacity on the basis of first come first served as per TNERC order No.03/2019.

Analysis and Decision of the Commission:

This can be taken in to consideration.

10. Following stakeholders suggested that a specified timeline for processing the GISS application may be stipulated in the Regulation

CEAT

Fourth Partner Energy

Analysis and Decision of the Commission:

Time line have been incorporated in the regulation

11. Generation meter :

Tamil Nadu Solar Energy Developers Association

Net work charges can be billed on the computed generation based on the solar capacity approved. Separate Renewable Generation Meter need not be insisted. Fixing of renewable Generation Meter and making it accessible will be practically difficult and will also increase capital cost and unnecessary disputes with field officials.

Auroville consulting

Generation-based network charges for rooftop solar systems will require a gross generation meter, which comes with the following issues: Higher capital costs to the prosumer and therefore the need of a higher feed-in tariff. The distribution licensee has to maintain and read two energy meters instead of one. In the case of institutional or Government campuses with a single TANGEDCO service connection and multiple solar PV systems on different rooftops, there would be a requirement of reading multiple gross energy meters for a single service connection. It is proposed to install the gross generation meter immediately after the inverter. This addresses technical and economic issues that would have been faced if the gross generation meter(s) would have to be located at the service connection point.

TANGEDCO

Provision for recovery of charges for assessment of units from gross generation meter to be made in the regulation.

Analysis and Decision of the Commission:

Gross generation meter is not a new concept. This methodology is already in practice in many States in line with the mandatory requirement. Assessment of generation of solar power is an essential documentation for basic statistics as well as a source data for innumerable technical, commercial and regulatory requirements. More importantly, it is to be precisely assessed for every billing cycle for calculation of net work charges without giving scope for ambiguity, error and dispute.

Compared to the overall cost of the installation GISS plant, a gross generation meter at the cost of applicant will not be burdensome as it forms part and parcel of the GISS system. It is exempted for lower range up to 10 KW. Regarding assessment of gross generation, individual generation meter for each inverter /set of inverters in each spot/place/building inside a premises can be installed and assessed individually to be added together (both energy and maximum demand recorded for each billing cycle) to one value of gross generation for one service connection. This kind of assessment is already in place for street light services under one service connection with multiple energy meters and hence easily implementable. The overall cumulative demand shall not exceed the sanctioned/ contracted limit.

For consumers up to 10 KW, the generation of solar energy shall be computed based on the stipulated CUF or by assessment from the Inverter reading whichever is lower. If any dispute arises over such method of computation, the aggrieved party can install the generation meter at his cost to enable actual assessment of generation. For consumers of more than 10 KW the Licensee shall install the generation meter of required capacity, facility and specification.

For all new applicants of more than 10kW, the generation meter shall be installed by the applicant as part of the GISS system.

12. TOD Tariff

Tamil Nadu Solar Energy Developers Association

TNSEDA welcome this initiative. However, the additional capital cost for Hybrid Solar Rooftop Systems will be twice of the Grid interactive Rooftop Solar System (Without battery) as per the market price. Hence, the ToD solar feed- in tariff is not practically feasible. Therefore ToD solar feed- in tariff as 50% higher than the feed- in- tariffs may be considered instead of 20%.

Auroville consulting

Introduction of ToD feed-in tariff to incentivise grid export of solar energy from energy storage systems is a highly laudable proposition by Hon'ble Commission. However, the proposed 20% premium over the solar feed-in tariffs is unlikely to achieve the desired incentivization effect.

TASMA

ToD related issues may be dropped totally from the Tariff Order proposed. Solar SPV with Battery Storage and other infra will cost additionally 30% - 40% on CAPEX and hence, the Solar Power Promoters are not keen to invest on such Battery Storages at present, unless still a comfortable Tariff Order with ensured RoI is provided.

Thiru. S.Narayanasamy

Roof top solar power plants are not commercial ventures that demand special treatment when supplied at Peak hours. If 20% additional tariff is proposed, then the same principle shall be applied on the consumption by domestic consumers, who supply solar energy at day time and avail at Peak hours. Their consumption tariff at peak hour is also to be charged at 20% premium. Therefore it is suggested to ignore this and not complicate the billing procedure.

The suggestion is impracticable

TANGEDCO

TOD tariff has been arrived by adding 20% of the proposed tariff considering that the TOD feed in tariff is lower than the average cost of supply. The Average cost of supply includes both overheads and power purchase cost. Therefore, ToD tariff may have to be arrived based on the pooled cost of power purchase or considering the average cost during respective peak in the exchanges.

TOD is yet to be introduced in retail tariff except HT industries. Hence may be considered once TOD is introduced in retail tariff for all retail consumers.

SIMA

Commission may fix initially at 50% extra tariff from the proposed tariff of 20% which will encourage the industry to opt for it.

Analysis and Decision of the Commission:

The next phase of technological development in the modern era of renewable power penetration is the storage battery system that has already started spreading its wings in our country. Therefore a foresight is required to sense the growing need of the sector and provide a catalytic incentive to kick-start the technology for wider implementation in future. At the same time, care and caution needs to be exercised to foresee the commercial implication, the premium tariff would cause. Given these conditions, the Commission is of the view to facilitate initial incentive as a mark of providing fillip to the concept and may consider further increase of the premium in due course after assessing the development on this count.

13. Safety certificate

Tamil Nadu Solar Energy Developers Association

For commissioning of consumer category solar PV systems of capacity higher than 10 kW the issuance of safety certificate by the Chief Electrical Inspectorate (CEIG) is presently required which may be amended from time to time.

In line with the Operational Guidelines of Phase- II of Grid Connected Rooftop Solar Programme, Ministry of New and Renewable Energy (MNRE), the Hon'ble commission may advise the Government of Tamil Nadu for the exemption of CEIG safety certificate up to 500 KW.

Decision of the Commission:

It is an issue to be dealt by the GoTN not by the Commission. However, during the SAC meeting this issue was raised by one of the members of SAC and duly referred to the Energy Secretary to the Govt who participated in the meeting. It was assured by the Energy Secretary that the issue will be addressed.

14.CUF/Plant Capacity

Solar Energy Developers Association:

Solar capacity will be sum of all AC inverter capacity DC capacity will be left to customer decision (as per MNRE) direction

TASMA and TECA

Limiting the capacity of solar power generator, with that of the level of sanctioned load / contracted demand, is not fair, as long as the CUF getting not factored and considered properly. Therefore, the ceiling can be removed totally. At the maximum, the capacity can be limited to the extent of the average level of consumption as found in last few years, when the conditions are identical, without any lockdown or closure.

Since the Capacity Utilization Factor (CUF) of a Solar PV System is taken as 19%, without any practical study and by sheer estimations. It requires a scientific study to fix the CUF correctly on Solar PV System.

Based on the capacity of the Solar Energy Generation, as reported by the SLDC during the period from 01.09.2020 to 31.08.2021, works out to the extent of 13.79% only. Therefore, adopting by an "estimated CUF of 19%", CUF can be calculated based on actual.

Decision of the Commission:

The performance of solar power plants is defined by the Capacity Utilization Factor (CUF) , which is the ratio of the actual electricity output from the plant, to the maximum possible output during the year.

The CUF depends on several factors including the solar radiation, temperature, air velocity apart from the module type and quality, angle of tilt(or tracking), design parameters like cable losses and efficiencies of inverters and transformers. There are some inherent losses which can be reduced through proper designing but not completely avoided. Thin film modules perform better than the crystalline modules in high temperature zones. The estimated capacity factor varies from 16 to 20% in various parts of the country as per the studies conducted. At locations in Rajasthan and Gujarat it is around 20%. In overall most of the other places including Tamil Nadu, it is around 19% going by such studies conducted and published in CERC site. Even projects performed under IPDS with installations of 30KW and 50KW in the roof top of TANGEDCO office buildings yielded 19% CUF for an year with continuous operation. The overall output of the entire plants of the State could be taken for CUF assessment, only with the condition that all plants in the entire State are functioning continuously at all times throughout the year without defect in inverter or other kinds of defects. Such condition is highly theoretical. The data of duration of down time of every individual plant need to be taken in to account if the CUF were to be assessed for the entire plants put together overall the State. If the overall CUF of the entire State is below 19%, the correct approach has to be to find out the reasons for the lower CUF than the potential 19% and improve the efficiency to achieve 19% rather than slashing the CUF to the inefficient level of lower CUF.

Considering the comments of the stakeholders and the advisory of the MNRE , the Commission is of the view that the plant capacity shall be represented by the AC capacity of the solar plant and the option of DC panel capacity is left to the consumer in order to achieve the permitted AC output capacity of the plant. Having decided the plant capacity as output AC capacity , the CUF must be factored to the AC output capacity.

The 19% CUF has been so far factored, taking in to account of the DC capacity. In order to realistically fix the CUF to entail the optimum output of the GISS and to match the sanctity behind the MNRE bench mark cost and guidelines, the Commission decides to adopt a CUF of 21% and determine the tariff accordingly.

The maximum demand recorded in the gross generation meter shall not exceed the sanctioned/ contracted plant capacity of GISS in any billing cycle. If the demand exceeds the sanctioned limit , the quantum of exported units in the respective billing cycle proportionate to the portion of demand exceeded over the sanctioned limit shall be treated as inadvertent injection and shall not be eligible for payment by the Licensee .

15.Excess energy injection

TASMA and TECA

Considering the promotional aspect of the renewable energy, it is suggested that any excess injection over and above the consumption, in any other time blocks in a billing cycle, can be allowed for unit to unit adjustment on "higher slot to lower slot basis" as found in wind energy adjustments and any further excess injection can be treated as excess injection occurred during off-peak hours.

Decision of the Commission:

Not considered as the open access is not contemplated by the Commission in the GISS system.

16.Interest on Working Capital

TASMA and TECA

Interest on Working Capital-Receiveables are calculated by considering a period of 2 months. But in actual reality, it is more than a year and no payment is received within the period of two months, as found provided in the last Tariff Order as well as in the Consultative Paper. Therefore, this has to be worked out taking in to real position of payments made by TANGEDCO.

Analysis and Decision of the Commission:

Not considered by the Commission for the present, since the licensee is to pay the belated payment surcharge for the delay more than two months.

17. RPO and Depreciation

SIMA:

The solar energy generators who are generating solar power would be entitled to get a credit on the RPO, i.e., when the TANGEDCO make compliance under RPO for the injection of units from the solar generation, the generator should be provided share.

The depreciation rate may be considered as 5% instead of 3.6%.

Analysis and Decision of the Commission:

The units of solar energy generated under all categories shall qualify towards meeting the RPO of the respective GISS developer of obligated entity.

The cumulative units of solar energy generated under all categories of GISS of the entire State shall qualify towards meeting the RPO of the Distribution Licensee.

The depreciation rate is considered based on the Commissions previous orders of Determination of Tariff on RE power.

The average annual panel degradation is considered as 0.75%.

18. Control Period

Thiru.S.Narayanasamy

May be limited up to 31.03.23

Decision of the Commission:

Merits consideration.

Annexure III

State Advisory Committee Meeting held on 17-09-2021

Members / Participants Present

Sl.No.	Name
1.	Thiru. M.Chandrasekar, Chairman, TNERC
2.	Thiru. K.Venkatasamy, Member, TNERC
3.	Principal Secretary to Government, Energy Department, Secretariat, Chennai – 600 009.
4.	Chairman & Managing Director, Tamil Nadu Generation and Distribution Corporation Limited (TANGEDCO), No.144, Anna Salai, Chennai – 600 002.
5.	Chairman and Managing Director, Tamil Nadu Energy Development Agency, 5th Floor, EVK Sampath Maaligai, College Road, Chennai 600 006.
6.	Thiru.Ashok Sekaran, Vice President, Tamil Nadu Small and Tiny Industries Association (TANSTIA), No.10, GST Road, Guindy, Chennai 600 032.
7.	Chief Electrical Engineer, Southern Railways, Chennai 600 003.
8.	Dr. A.S. Kandasamy, 15/52 Sairam Thottam, Athanur (Post), Rasipuram Taluk, Namakkal 636 301.
9.	Dr. K. Selvarajan, New No.12, Thiru Nagar, Singanallur, Coimbatore 641 005.
10.	Thiru K.E. Ragunathan, The Convenor, The Consortium of India Associations Jayalakhmipuram First Street Nungambakkam, Chennai-600034.
11.	Thiru. P.Ashok Kumar, The Managing Director M/s KCP Solar, 5/338-S Arumugapillai Garden Annathnapatty, Salem 636 006.
12.	Thiru K. Venkatachalam, Chief Advisor, Tamilnadu Spinning Mills Associagion No.Karur Road, Modern Nagar Dindigul 624001.

Gist of comments/ objections/ suggestions of SAC members and participants offered during the meeting held on 17.09.2021 on “Consultative Paper on Grid Interactive Solar Energy Generation System” and remarks of the Commission.

1. Thiru.Ashok Sekaran, Vice President, TANSIA

Proposal benefits only domestic sector. It should be extended to MSME also with net metering and open access facilities.

Analysis and Decision of the Commission:

Reason for providing the net metering mechanism to domestic sector has been well explained in the order. As far as the MSME industries are concerned the net feed in facility has been provided in which the generated power can be used for a captive purpose and as an additional benefit , the excess energy can be exported and encashed. The benefits of net feed is explained in the order more elaborately.

2. Chief Electrical Engineer, Southern Railway, Chennai

TANGEDCO treats the services of Southern Railways as a commercial connection. Separate consideration of Railway services is required for net metering.

Analysis and Decision of the Commission:

Railway services are provided with an exclusive tariff, not with commercial tariff. The reason for providing the net metering of the domestic category is explained in the order. Extending net metering facility to railways will create discrimination among Government departments / services.

3. Dr.A.S.Kandasamy, SAC Member

Net metering facility to domestic consumers is a welcome step. Network charges should be rounded to nearest 5 paise as per IS. It is reiterated that the solar energy must be vigorously promoted as per the policies of the Government and also for future generation. Technically Grid Interactive Solar Energy Generation System (GISS) minimise the line loss significantly. The potential of Tamil Nadu for solar generation should be exploited. Disparity between net metering and net billing has to be dispensed. Target of the Government should be attained at any cost.

Analysis and Decision of the Commission:

The proposal contemplates provision of metering mechanism as per rules of the Ministry of Power with a parallel objective of promoting the solar power generation. The other factors suggested by the member have been taken into consideration.

4. Thiru.Selvarajan Krishnasamy

No specific comments. Tariff can be increased for industrial and power production people, it will benefit all.

Analysis and Decision of the Commission:

Tariff has been evolved under stipulated tariff determination process.

5. General Manager / Tamil Nadu Energy Development Agency (TEDA)

The net work charges newly introduced in the consultative paper need not be applied on the Government pilot projects for agricultural consumers under PM KUSUM scheme.

Analysis and Decision of the Commission:

The proposal merits consideration.

6. Thiru. Raghunathan, MSME

At the time of recession in the economy due to the pandemic in which both the industrial sector as well as the licensee are suffering in the financial front, such proposal on the generic tariff for the renewable energy must be evolved with care and caution. It should balance the interest of all stakeholders involved. MNRE guidelines is only an approximation. The actual capital cost incurred by the end user must be taken into account. The network charge proposed is already covered in the fixed and demand charges. If network charges were to be implemented it should not be a shock to the consumers by sudden implementation. It should be implemented in phases by splitting the consumers by categories based on loads like 1000 MW and 1001 to 2000 MW. The early bird consumers who help to contribute to meeting the target must be incentivised with less network charges. The incentive proposal for domestic consumers is discriminatory. The same provision of net metering must be extended to MSME also upto 150 KW. TANGEDCO should not consider the solar power generation against their potential revenue.

Analysis and Decision of the Commission:

Commission is in agreement that the MSME and industries must be encouraged. At the same time the Commission has to balance the interest of all stakeholders including the distribution licensee. For Industries the benefit of injecting the excess energy into the Grid and encashing the same has been facilitated through net feeding mechanism. The other factors suggested by the member have been taken into consideration.

7. Thiru.Ashok Kumar, President of Tamil Nadu Solar Energy Association

The cost of generation meter should be added to the capital cost. For LT consumers only 50% of the network charges should be levied. For application of additional load, procedure to be formulated, under all categories.

Analysis and Decision of the Commission:

Provision for processing the application for additional load shall be incorporated in the regulation. The methodology and applicability of network charges is well explained in the order.

8. Thiru. Venkatachalam, Chief Advisor, TASMA, Dindigul.

State Energy policy has to be modified to accommodate the metering mechanism formulated by the rules of MoP/Gol. Regulation should come first followed by tariff order. Net metering facility to be extended to all categories including HT. Benchmark cost of MNRE for 2021-22 should be adopted. CUF works out to 13.79% as per the data available with SLDC which is far lesser than 19% specified in consultative paper. Network charges are already covered in demand charges. The rate of working capital interest has to be reconsidered. The upper limit has to be fixed taking into consideration of CUF.

Analysis and Decision of the Commission:

All the above comments/ suggestions that have received through written submission have been considered and duly explained in the order.

9. Thiru.Vishnu Mohan Rao, Consumer and Civic Action Group.

Network charges should not be levied. Commission should devise the ways and measures to reduce losses of TANGEDCO. Time of Day (ToD) tariff has to be fixed

taking into the actual cost of storage units. Consumers should be allowed to purchase meter in the market. He suggested in Para No.1.2.4 of Consultative Paper on Generic Tariff order to Grid - interactive Solar Energy generation system (GISS) on the delink of gross, net and feed in, the delinking of Gross, Net feed in mechanism alone shall be mentioned.

Analysis and Decision of the Commission: Para No.1.2.4 shall be appropriately revised. Provision for purchase of meter from market by the consumer shall be provisioned in the Regulation.

10. Thiru. Rajesh Lakhoni, CMD, TANGEDCO

Tariff rate in the State of Tamil Nadu is already lowest among all states of India. So it should be borne in mind in determining the tariff. Both installed capacity of conventional energy and renewable energy is 16500 MW being almost equal. Thus we have the lowest tariff and highest renewable generation in the country. Commission deserves appreciation for bringing out the concept of network charges in view of huge amount being spent to maintain the network by TANGEDCO. Recent solar power purchased by TANGEDCO is in the range of Rs.2.61/-. To the maximum TANGEDCO can afford to pay by way of feed in tariff may be in the range of Rs.3/- taking into account of transmission losses beyond which any cost is going to make loss to TANGEDCO and prove to be detrimental to its revenue. Average Rate of Revenue (ARR) up to 500 units realised is 3.90/- but the rate contemplated in the Consultative paper is 3.99/- which is more than what TANGEDCO is getting towards supply of energy to the consumer. The higher net feed in tariff given by TANGEDCO is adjusted against the low tariff paid by the consumer. Transmission loss due to transmission of renewable energy is also borne by TANGEDCO. Maintenance charges accounted in the consultative paper is 1.40% which is higher than that of across the world which is 0.5 to 0.75%. Various components to arrive at the cost has to be relooked. Particularly return on equity being adopted is high. Increase in generation of RE power to be absorbed in the network has the potential to affect the grid stability and possess challenge to maintain the grid. TANGEDCO faces financial implication in view of using the subsidising consumers to switch over from grid power to solar power. There should be a balance of consideration between consumer and licensee in determining the tariff. The installation of solar should be concentrated in

the lower segment of consumer consuming less than 100 units which accounts to 78 lakhs of consumers and less than 500 unit which account to 1.3 Cr. of consumers. Subsidy should be given to deserving consumers while encouraging solar power. Compensation of charges being paid by TANGEDCO towards grid stability, Deviation Settlement Mechanism (TANGEDCO in the range of around 20 to 30 crores per month, should be loaded to network charges. The limit and category of net metering and gross metering should be revisited. The prime aim of solar plants must be for captive use and should not be converted as a business model for commercial gain.

Analysis and Decision of the Commission: The solar rate discovered through bidding from the mega project cannot be taken as reference to equate the same to pay to the small segment roof top projects. However, the components of tariff determination of the tariff shall be revisited. The suggestion of relooking the applicability of gross metering shall be considered. The deliberation of the financial aspects are discussed in detail in the order.

11.Thiru.Dharmendra Pratap Yadav, Energy Secretary

The Government perspective takes a different look on any issue since the consumer and reliable energy are dual prime motive for the Government. The Government of India is pushing for growth of renewable energy in the State. Hence, the TANGEDCO has to foresee for transition to renewable energy. 7500 MW RPO for solar, 3600 MW for roof top solar have to be added as targeted. If fixed charges are already there ,it should be explained as to how wheeling charges may arise. At least for roof top solar where energy will be consumed in the same place, net work charges should not be levied or insisted. 90% of energy should go through solar to agricultural consumers who account 18% to 19% of the total consumers in Tamil Nadu. Facility has to be provided to achieve targets as per the government commitment and ultimately has to benefit consumer. The tariff should facilitate the promotion of solar since there is a real demand in Tamil Nadu. Tamil Nadu Government is very well aware of MSME because of the non availability of renewable energy, they are facing lot of problems and those issues has to be considered by the Commission. Regarding the logic of tariff there is no net out flow to consumer from TANGEDCO hence payment need not be done by TANGEDCO. But it needs to be done to the growth of solar energy if necessary. Considering maintenance charges and interest charges depreciation charges, the cost of the panel in arriving the tariff will justify

the rates. The realistic quotation from market who supply in large scale in the range of 100 MW is entirely different from for small consumers of little capacities.

12. Chairman / TNERC

Regarding the proposal of one of the members to exempt inspection of Electrical Inspector for inspection of GISS in LT services , Hon'ble Chairman /TNERC conveyed to the Energy Secretary that State Government is empowered to give such directions to CEIG exempting their inspection to LT services up to 150 KW to avoid unnecessary delay on this account.

Energy Secretary acknowledged the request of Chairman / TNERC.

13. Director (Engineering) / TNERC

Director (Engineering) TNERC conveyed vote of thanks to all the members of SAC and all participants for their valuable suggestions and officers of TNERC for successful conduct of the meeting.