TAMIL NADU ELECTRICITY REGULATORY COMMISSION

(Constituted under section 82 (1) of the Electricity Act, 2003)
(Central Act 36 of 2003)

PRESENT:

ThiruM.Chandrasekar .... Chairman

Dr.T.PrabhakaraRao …. Member

and

Thiru.K.Venkatasamy …. Member (Legal)

P.P.A.P. No.2 of 2018

Tamil Nadu Energy Development Agency
Represented by the General Manager
E.V.K. SampathMaaligai, 5th Floor
No.68, College Road
Chennai – 600 006.

… Petitioner
(ThiruSankara Narayanan
General Manager,
representing the
Petitioner)Versus

CMD, TANGEDCO … Respondent
(ThiruM.Gopinathan,
Standing Counsel for TANGEDCO)

Dates of hearing :18-09-2018; 31-01-2019; 22-10-2019; 10-12-2019 and 28-01-2020

Date of order : 10-11-2020

The P.P.A.P. No.2 of 2018 came up for final hearing before the Commission on 28-01-2020 and the Commission upon perusing the petition and connected records and after hearing the submissions of both sides passes the following:-

ORDER

1. Prayer in P.P.A.P. No.2 of 2018:-

The prayer of the petitioner in this P.P.A.P. No.2 of 2018 is-

(i) to treat Irumbai Village Solar PV Plant Project as a Special Joint Research and Study Project of TEDA and TANGEDCO for the following purposes as envisaged in the Government of Tamil Nadu's G.O. (Ms.) No.65 dated 30-10-2015 and as decided in the subsequent meetings;

(ii) to create awareness on sustainable development in general and renewable energy in particular;

(iii) to integrate RE Power at distribution transformer level and study the impact of energy conservation and economic efficiency.

(iv) to study the benefit of Distributed Generation and quantify the Transmission and Distribution losses.

(v) to provide uninterrupted three phase electricity to rural areas and study the socio-economic impact on livelihood, education and diversion of economy.

(vi) to approve a tariff of Rs.3.11 per unit for selling the power to TANGEDCO from the proposed 170 KW (1x 95kWp unit plus 1 x 75 kWp unit) Solar PV plants or to determine any other tariff as the Commission deem fit and appropriate considering this special nature of the project.

(vii) to consider the special nature of this Research Project and for the reasons submitted herein before to exempt this project from the 30% limit penetration of DT capacity as specified in Clause 6.1 of the

Commission's Net Metering Order No.3 of 2013 dated 13-11-2013 since this project is not a net metering project and for the reasons submitted herein before.

2. Facts of the Case:-

This petition has been filed for tariff determination and approving exemptions from certain Grid Connectivity norms for the proposed 170 kWpIrumbai Solar Village Project under section 62 and 61 (h) of the Electricity Act, 2003 read with regulation 16 (i) of the Tamil Nadu Electricity Regulatory Commission's Conduct of Business Regulations,2004.

3. Contentions of the Petitioner:-

3.1. The Irumbai Solar Village Project is a pilot project that aims to demonstrate how villages in Tamil Nadu can tap locally available solar resources and thus generate renewable energy at the village itself. The G.O. states that "*The proposed pilot project is expected to demonstrate that rural areas can be provided with 24x7 uninterrupted electricity in a sustainable manner and will therefore act as a model that can be implemented on a large scale."*

3.2. In a meeting held on 12-01-2017, the TEDA and TANGEDCO had agreed thatsince Irumbai Solar Village is a pilot project, to test in the field, a new and innovative technical and social economic proposition for which Government had given approval through the G.O on 30-10-2015, the project would be undertaken jointly by TEDA and TANGEDCO as a field research project.

3.3. TANGEDCO confirmed that the required changes in the local distribution network will be made and that one distribution transformer will be upgraded as required for the project. It was also decided that TEDA would file a petition before TNERC to obtain approval for certain facilities needed for the project.

3.4. The Government of Tamil Nadu has sanctioned an expenditure of Rs 206.10 lakhs in the said Government Order.

3.5. The Irumbai Solar Village Project envisages the study of energy conservation and efficiency measures with a total capacity of 170kWp comprisingoflx95kWp unit plus lx75kWp units. The solar PV systems will be connected to the existing TANGEDCO LT distribution network of the village after making necessary modifications in the local Distribution network.

3.6. The important objectives of this project are-

(i) To study Socio-economic impact of energy conservation and efficiency measures.

(ii) To study Socio-economic impact of availability of uninterrupted three phase electricity, impact on livelihood, education, migration to urban areas, diversion of economy.

(iii) Awareness creation on sustainable development in general and renewable energy in particular.

(iv) RE integration in the local grid at distribution transformer level to reduce transmission and distribution losses.

3.7. The salient features of the projects are-

(i) Erection and Commissioning of 170 kWp Ground Mounted Solar PV System comprising of 1 x 95kWp unit plus 1 x 75kWp units.

(ii) Erection of two separate LT feeders to connect the Solar PV units to the LT side of the 500 KVA Irumbai 55-IV Distribution Transformer fed by 22KV Auroville Urban feeder.

(iii) The solar energy generated by the solar village project will be sold to TANGEDCO and revenue realized would be utilized for the research and development of the project.

3.8. The total existing Distribution Transformers capacity at Irumbai Village is 400 KVA comprising 2 Numbers 100KVA DT and 1Number 200KVA DT.Out of which TANGEDCO is enhancing 1 No. 100 KVA IrumbaiSS-IV DT into 1No.500 KVA DT.

3.9. In Order No. 3 of 2013 dated 13.11.2013 in the matter of " LT connectivity and net metering" the Commission has specified the following restrictions for roof top solar power feeding into a Distribution Transformer.

a. "Clause 6.1:At the local distribution level connectivity to rooftop solar /solar systems shall be restricted to 30% of the distribution transformer capacity on the basis of first come first served".

b. In the proposal of Solar Village Park at Irumbai, 170kWp solar power is fed into 500KVA DT with a penetration level of 34% resulting in 4% excess penetration. Though technically there is no significant impact on the DT, for the sake of compliance with the said order of the Commission, the exemption is sought for. Installing additional Transformers for this project so as to reduce the penetration to 30% will make this research project economically unviable. Considering the special nature of this project, TEDA humbly requests theCommission to exempt this project from 30% limit of DT capacity.

c. TheIrumbai Solar Village Project is not a Net Metering Project and hence 30% penetration limit in DT capacity will not apply. The cumulative capacity permitted to DTs in Telengana is 50% and in AndhraPradesh is 60%.

3.10. The Commission in its Order No.5 of 2018 dated 28.03.2018, determined a tariff of Rs.3.11 per unit for Solar PV projects without Accelerated Depreciation(AD).

3.11. TANGEDCO shall procure solar power from Irumbai 170 KW solar project at the rate of 3.47per unit(tender discovered rate). As per the latest feed-in Tariff order issued by the TNERC vide Order No. 5 of 2018 dated 28.3.2018, the new tariff rate is Rs.3.11 per unit (without Accelerated Depreciation benefit) which is lesser than the Tender rate of Rs 3.47 per unit. In view of the above, TANGEDCO shall procure solar power from 170 KW Irumbai solar power at the rate of Rs.3.11 per unit.

Hence it is requested to revise the MoU accordingly. On revision of MoU, the MoU will be authenticated by the Superintending Engineer, Solar Energy.

4. Contentions of the Additional Affidavit filed by the Petitioner:-

In the additional affidavit filed by the petitioner on 25-03-2019, the petitioner has submitted as follows:-

4.1. Type of Irumbai Village - Rural

Total No. of Village Population - 2375 (as per the data ascertained from VAO)

Total no of service connections with tariff wise details including No. of agricultural service connection with load.

The tariff wise load details for Irumbai SS I and SS IV are given hereunder:-

Tariff	Nos.	Load in KW
IA	128	110.47
IB	7	1.8
IIA	5	16.37
II B	2	1.89
II C	2	13
III B	1	16
IV	17	114
V	15	17.08
TOTAL	**176**	**291.09 KW**
IA	43	32.6
II A	2	6.
III A St. Light	1	0.8
TOTAL	**46**	**39.4 KW**

- No. of agriculture service in Irumbai SS 1-17 Nos. - 114 KW
- No. of agricultural service in Irumbai SS IV – Nil

4.2. Monthly maximum load and minimum load in kW / with Amps feeder war during the period from April 2017 to March 2018:-

Sl. No.	Month	Maximum Loading in					Minimum Loading in					Consumption in kwhr.
		KW	AMPS	Volt in KV	Date	Time	KW	AMPS	Volt in KV	Date	Time	
1	Apr-17	4503.3	135	21.4	12-04-17	11.00	514.4	15	22	13-04-17	12.00	2040000
2	May-17	4316.3	130	21.3	19-05-17	16.00	519.1	15	22.2	27-05-17	15.00	2088000
3	Jun-17	3943.7	115	22	01-06-17	09.00	179.2	5	23	10-06-17	20.00	1038000
4	Jul-17	1243.9	35	22.8	11-07.17	09.00	180.4	5	23.1	29-07-17	05.00	618000
5	Aug-17	2085.6	60	22.3	19-08-17	09.00	358.5	10	23	26-08-17	23.00	528000
6	Sep-17	1247	40	20	22-09-17	10.00	179.2	5	23	24-09-17	18.00	510000
`7	Oct-17	1211.1	35	22.2	03-10-17	11.00	185.4	5	23.8	06-10-17	03.00	438000
8	Nov-17	996.1	30	21.3	23-11-17	11.00	178.4	5	22.9	5-11-17	01.00	372000
9	Dec-17	1123.8	35	20.6	29-12-17	10.00	177.7	5	22.6	24-12-17	02.00	450000
10	Jan-18	5455.8	160	21	28-01-18	12.00	361.6	10	23.2	07-01-18	24.00	924000
11	Feb-18	5237.5	160	21	11-02-18	18.00	162.8	5	20.9	06-02-18	12.00	1272000
12	Mar-18	4626.5	140	21.2	31-03-18	15.00	350.7	10	22.5	14-03-18	03.00	894000
												11172000

4.3. A single Line diagram for the work involved in the Scheme Report of the DCW Estimate approved by CE/Distribution / Villupuram indicating the providing of links, modifications to be done in dotted lines with existing old linearrangements, feeder Breaker modifications if any.

(1) Existing Irumbai SS I 200 kVA is to be linked with 22 kV Auroville feeder. The link line proposed for a distance of 170 mtrs. (i.e) to convert Existing Irumbai SSI 200kVA/22kV from Existing 22kV Rural feeder to 22 kV Urban feeder supply

(2) Existing Irumbai SS I 200 kVA is to be isolated from the existing 22 kV Kazhuperumbakkam rural feeder by link line proposed for a distance of 50mtrs.

(3) Existing Irumbai SS IV 100kVA is proposed to be enhanced from 100kVA to 500kVA for effecting LTCT 2Nos service load of 80 kW and 70 kW. Pertaining to the generated solar energy.

4.4. The impact on providing 24 x 7 power supply to the existing Irumbai SSI 200kVA / 22 kV existing 22kV Rural feeder to 22 kV urban feeder supply. Extending 24 x 7 power supply will not have any impact on the existing system, if Irumbai SS I 200kVA / 22 kV is additionally added to the 22 kV Auroville feeder.

4.5. In Solar Policy 2019, clause 15.3 states that “Solar or other renewable energy projects installed for study, research or pilot purpose may be given special priorities and exemptions by the TNERC and the Distribution Licensee on the recommendation of the Government.

5. Contentions of TANGEDCO:-

The TANGEDCO in its counter affidavit filed on 11-12-2019 contended as follows:-

5.1. TEDA has proposed to erect two nos. LTfeeders to connect the proposed 1X95 KWp and 1X75 KWp solar power plantsrespectively to the LT side of the 500 KVA Irumbai, distribution transformer-IV for power evacuation with metering arrangements. As per the petition filed by TEDA, the energy export recorded in the meter shall be paid by the TANGEDCO at the rate of Rs.3.11 per unit as per TNERC Order No.5 of 2018 dated 28-03-2019.

5.2. The connectivity norms proposed by TEDA for evacuating solar power from the proposed 170 KWp solar power plant is by injecting power through LT network. As per the Intra State Open Access Regulations, 2014 issued by the Commission, injection of power is permitted only in HT network. As the 170 KWpIrumbai solar power plant is a field research project (Minutes of the meeting held on 12.01.2017 in PWD Conference Hall, Secretariat), TANGEDCO subjectively agrees to inject generated solar power in LT side of distribution transformer for power evacuation for this project alone.

5.3. The plea of TEDA for injection of solar energy from the proposed 170 KWp solar power plant at the LT side of the distribution transformer and subsequent purchase of such power at the rate to be approved by the Commission shall not be a reference for any such projects in Tamil Nadu. Hence, that this case may not be considered as precedence to others.

5.4. TANGEDCO has already intimated TEDA vide letter dated 22.05.2018 for the procurement of solar power generated from the proposed 170 KWp solar power plant at the rate of Rs.3.11 per unit as per Commission Order No.5 of 2018 dated 28.03.2018. As per the latest preferential tariff order issued by the Commission vide Order No.5 of 2019 dated 29.03.2019, the tariff rate of Rs.3.04 per unit without Accelerated Depreciation (AD) benefit and Rs.2.80 per unit with AD benefit shall be applicable for SPV plants. Hence, the applicable tariff shall be at the prevailing preferential tariff rate (without AD benefit) fixed by the Commission or at the prevailing tender rate, whichever is less, at the time of commissioning the proposed 170 KWpIrumbai solar power plant.

5.5. The Government of Tamil Nadu has announced the Tamil Nadu Solar Energy Policy, 2019 on 04.02.2019, which provides as follows:-

> *"The solar energy is used for self-consumption with the surplus, if any, being exported to the grid. A bidirectional service connection energy meter will be installed by the distribution licensee to record the imported and exported energy. The imported energy is debited at the applicable consumer tariff while the exported energy is credited on the basis of a consumer solar energy tariff to be determined by TNERC. The consumer pays the difference between the debit and credit amounts. If the cumulative credit amount exceeds the debit amount during any billing cycle, the net credit is carried over to the next billing cycle. At the end of 12 month settlement period as may be determined by TNERC, the net credit, if any, the consumer has the*

option to receive payment of the net credit balance. Solar energy net feed-in will be available to all low tension (LT) electricity consumer categories subject to TNERC regulations as may be determined from time to time".

5.6. The Commission has issued order on "Roof top Solar Generation" vide Order No.3 of 2019 dated 25.03.2019. In this order, Clause 8 states that “At local distribution level, connectivity to roof top solar systems shall be restricted to 90% of the distribution transformer capacity on the basis of first come first served." Hence, TEDA plea for exemption from 30% limit penetration of DT capacity based on the Commission’s order on “LT connectivity and net metering" issued vide Order No.3 of 2013 dated 13-11-2013, does not arise for this project.

6. Findings of the Commission:-

6.1 The petitioner has stated that the Irumbai Village Solar Project is a pilot project as per the G.O Ms. No.65 dated 30.10.2015 that aims to demonstrate how villages in Tamil Nadu can tap locally available solar resources and thus generate renewable energy at the village itself.

6.2 Further, the project is to demonstrate that rural areas can be provided with 24x7 uninterrupted electricity in a sustainable manner and will therefore act as a model that can be implemented on a large scale.

6.3 The project would be undertaken jointly by TEDA and TANGEDCO as a field research project.

6.4 The total cost of the project is Rs 229.33 lakhs. The State Planning Commission has accepted the proposal of TEDA to install 170 KWp Grid connected Solar Photovoltaic Power Plants without battery at Irumbai village of VanurTaluk in Villupuram District subject to the condition that 10% of the total project cost has to be contributed by the Local body.

6.5 The solar energy generated by the solar village project will be sold to TANGEDCO and revenue realized would be utilized for the research and development of the project.

6.6 To implement the above project, the following important works are to be carried out:

(i) Erection and Commissioning of 170 kWp Ground Mounted Solar PV System comprising of 1 x 95 kWp unit plus 1 x 75kWp unit.

(ii) Enhancement of existing Irumbai SS IV Transformer from 100 kVA to 500 kVA for effecting LTCT 2 Nos services.

(iii) Erection of two separate LT feeders to connect the Solar PV units to the LT side of the 500 KVA Irumbai SS-IV Distribution Transformer fed by 22 KV Auroville Urban feeder.

(iv) Conversion of Existing Irumbai SSI 200kVA / 22kV Rural feeder supply to 22 kV Urban feeder supply by providing link arrangement with Auroville feeder.

6.7. TEDA has proposed to erect two nos. LT feeders to connect the proposed 1X95 KWp and 1X75 KWp solar power plants respectively to the LT side of the 500 KVA Irumbai, Distribution transformer-IV for power evacuation with metering arrangements.

6.8 All links, modifications required in the existing TANGEDCO network will be carried out under DCW system by TEDA in coordination with TANGEDCO.

6.9. The Petitioner has stated that with solar power 24X7 hours uninterrupted power supply will be given to the Irumbai village which is a rural area and the Petitioner will study the socio economic impact on their livelihood, education and diversion of economy.

6.10. To implement the above project successfully, the petitioner is in need of the following special approvals from TNERC:

(i) To integrate RE power at Distribution level and study the impact of energy conservation, economic efficiency and to study the effect of Distributed generation and quantify Transmission and Distribution loss.

(ii) To exempt the project from the 30% limit penetration of distribution transformer capacity as specified in clause 6.1 of the Commission's net

metering Order No.3 of 2013 dated 13.11.2013 considering specific nature of this research project

(iii) To approve a tariff of Rs.3.11 for sale of power to TANGEDCO from the Solar PV plants or determine any other tariff as the Commission deems appropriate.

6.11 The above issues for which specific approvals of the Commission are required as mentioned in para 9 are discussed below:

(i) Issue No.I and II are interrelated and are taken up together.

The project to install 170 kWp grid connected solar power plant at Irumbai village of VanurTaluk in Villupuram is under the State Innovation Scheme with sanction accorded by Government of Tamil Nadu in G.O Ms. No.65 Energy (D2) Department dt.30.10.2015 as a pilot project to study on providing sustainable power. TANGEDCO has submitted that the connectivity norms proposed by TEDA is for evacuating solar power from the proposed 170 kWp solar power plant (1 x 95 KWp plus 1 x 75 kWp) by injecting power through LT network. Specific approval has been sought to integrate RE power at Distribution level.

6.1.2 Integrating RE power in LT network is already in place through Commission's orders on net metering in Order No.3 of 2013 dated 13-11-2003 and the net feed-in scheme in Order No.3 of 2019 dated 25-03-2019.

6.1.3 Statutory provisions on integration of RE power in the grid are as follows:

(i)TNERC Grid Connectivity and Intra State Open Access Regulations 2014: Regulation 9(6) of the said Regulation provides as follows:-

"*Open Access shall be allowed to the intra State transmission system subject to the satisfaction of the conditions contained in the Act and in these Regulations. Having regard to operational constraints and other relevant factors, open access shall be allowed to all EHT & HT consumers within their contracted demand subject to the terms and conditions of supply. In case generation of electricity from new and renewable sources, open access shall be allowed as specifically permitted by the Commission in its relevant regulations/orders in force."*

Order on generic tariff for Solar Power and related issues – Order No.9 of 2020 dated 16-10-2020:-

This order is applicable to utility scale projects - projects of capacity 1 MW and above.

Order No.3 of 2013, dated 13.11.2013 and Order No.3 of 2019 dated 25.3.2019.

The above orders are applicable with respect to LT distributed generation.

6.14 It may be stated that the above said order dated 13.11.2013 is the solar order under net metering concept and the order No.3 of 2019, dt.25.3.2019 is the solar order with respect to solar net feed-in projects. In both the cases, the solar power generated is either utilized by the consumer or injected to the distribution licensee thereby integrating renewable energy in the LT distribution network. The above orders have put in place Distributed Energy Generation in the grid.

6.15 The case of TEDA is that of a Distributed power generator supplying power to the LT consumers connected to the same Distribution transformer as that of the

power plant and to function as a research project. To strengthen the case for approval, TEDA has cited clause 15.3 of TN Solar Energy Policy 2019.

Extract of clause 15.3 of Tamil Nadu Solar Energy Policy 2019:

"15.3 Solar or other renewable energy projects installed for study, research or pilot purposes may be given special priorities and exemptions by the TNERC and the distribution licensee on the recommendation of the Government.

6.16 The project being a research project and approved by the Government of Tamil Nadu, as also recognized in the Solar Policy 2019, and integration of Solar power is already happening at the LT distribution network, Commission accords approval for installation of the 170 KWp Solar plant connected to the Distribution transformers as envisaged in the petitions of TEDA and agreements with TANGEDCO. This approval shall not be taken as a precedence for any other case of similar nature. The power generated from the plant shall be injected to TANGEDCO's network at the point of connection.

6.17 On granting of exemption from the clause on restriction of grid penetration at 30% of DT capacity, it may be noted that Commission has issued Order No. 3 of 2019 dated 25.3.2019 which is applicable now. This order restricts connectivity of rooftop solar systems upto 90% of DT capacity on a first come first served basis. The petitioner has proposed for enhancement of the present capacity of DT from 100 KVA to 500 KVA with line strengthening to connect the solar power plants and there should be no difficulty for TEDA and TANGEDCO in injecting and evacuating power. In any case, this is a special approval for the purpose of research and study

and therefore, Commission approves grid penetration to the extent of 100% of capacity of DT.

6.18 The Commission further directs that TEDA and TANGEDCO shall make provisions in place for measurement of gross generation of the solar power plant, to record/compute, as the case maybe, the consumption of all categories of LT services connected to the DT, measurement of the generated energy that is stepped up and sent out from the DT/ feeder by affixing DT meters and feeder meters, the unit consumed after sunshine hours/when the plant is not generating, and arrive at the transmission and distribution losses saved every month as well as the financial gain in average power purchase cost. To verify the effect of reduction of losses, the current loss levels shall be measured.

6.19 Issue III - Though approval has been sought as a research project, TEDA has requested to approve the tariff at which the Distribution licensee will procure the power from the Solar power plant. Government of Tamil Nadu has approved installation of the project at a cost of Rs.206.10 Lakhs. The cost of the total project is Rs.229.33 Lakhs. Since the contribution of 10% of the project cost is by the Local body which is also from the fund, and the rest of the cost is a grant, in order to encourage research projects utilising renewable energy, Commission fixes a levelised tariff of Rs.0.96 per unit. considering the net capital cost funding of 10% of solar power project cost.

6.20 The works of linking of Irumbai SSI of 200 KVA capacity to the 22 KV Aurovillefeeder for urban feeder supply, enhancement of Irumbai SSII, strengthening of lines have been detailed in the petition. However,issues of metering have not been discussed. The Commission, therefore issues the following directions:-

(i) Metering shall be in accordance with the CEA(Installation and Operation of Meters) Regulations 2006 and its amendments issued from time to time.

(ii) Both the solar power plants shall have bidirectional meters of appropriate rating.

(iii) Any drawal of energy from TANGEDCO shall be adjusted with solar generation and in case of any drawal above the generation from TANGEDCO, the energy drawn shall be charged at LT Industrial Tariff(IIIA1).

(iv) The provisions contained in Central Electricity Authority (Technical Standards for Connectivity of the Distributed Generation Resources) Regulations,2013 and its amendments, CEA's Safety Regulations, and CEA's Regulations in respect of operation and maintenance of the plant, drawing and diagrams, site responsibility schedule, harmonics, synchronization, voltage frequency, flicker etc shall be complied with.Harmonic generation, flicker may be restricted within the limit specified in the relevant regulations issued by the Central Electricity Authority.

(v) All the necessary approvals and clearances (environmental and grid connected related) before connecting the rooftop solar photovoltaic system to the distribution system shall be obtained.

(vi) TEDA shall furnish quarterly status reports on execution of works for installation of the project by 10th of every quarter to the Commission.

(vii) TANGEDCO shall identify the consumers and demarcate the area of supply from the 170 kWp solar power plant.

(viii) TANGEDCO and TEDA shall record the observations made, the improvement in T&D losses and furnish quarterly reports to the Commission.

(ix) The revenue realized from the project shall be utilized by TEDA for further research and development of projects.

With the above directions and orders, the P.P.A.P. No.2 of 2018 is finally disposed of.

(Sd.....)	(Sd.....)	(Sd.....)
(K.Venkatasamy)	**(Dr.T.PrabhakaraRao)**	**(M.Chandrasekar)**
Member (Legal)	**Member**	**Chairman**

/True Copy /

Secretary
Tamil Nadu Electricity
Regulatory Commission