TAMIL NADU ELECTRICITY REGULATORY COMMISSION

Comprehensive Tariff Order on SOLAR POWER

Order No 4 of 2014 dated 12-09-2014

BEFORE THE TAMIL NADU ELECTRICITY REGULATORY COMMISSION

PRESENT: **Thiru S. Akshaya Kumar - Chairman**
Thiru S.Nagalsamy - Member
Thiru G. Rajagopal - Member

Order No. 4 /2014, dated 12-09-2014

In the matter of : Comprehensive Tariff Order on Solar Power

In exercise of the powers conferred by Sections 181, 61 (h), 62 and 86 (1) (e) of the Electricity Act 2003, (Act 36 of 2003), read with the National Electricity Policy, the National Tariff Policy and the Power Procurement from New and Renewable Energy Sources Regulations, 2008 of the Commission, after issuing a consultative paper for public view on "Comprehensive Tariff Order on Solar Power" inviting comments from stakeholders till 31-08-2013, after obtaining the views of the Members of the State Advisory Committee (SAC) on the Consultative Paper in the meeting held on 20/1/2014 and after considering the views of all the stakeholders and the SAC Members on the Consultative Paper, the Commission passes this suo motu Comprehensive Tariff Order on Solar Power.

This order shall take effect on and from the 12th of September 2014.

Sd/-	Sd/-	Sd/-
(G. Rajagopal)	**(S. Nagalsamy)**	**(S.Akshaya Kumar)**
Member	**Member**	**Chairman**

(By Order of the Tamil Nadu Electricity Regulatory Commission)

sd/-
(S.Gunasekaran)
Secretary

CONTENTS

TAMIL NADU ELECTRICITY REGULATORY COMMISSION

"Comprehensive Tariff Order on Solar Power"

1. Introduction

1.1 The importance of Solar Energy

1.1.1. Solar energy offers clean, environment-friendly, abundant and inexhaustible energy resource to mankind. Among the various renewable sources, solar energy potential is the highest in the country. It is reported that Tamil Nadu has reasonably high solar insolation of around 5.5 kW/m^2 with around 300 clear sunny days in a year. It is considered important to optimally exploit the solar energy for a sustainable energy base.

1.2. Commission's initiative in promoting renewable energy

1.2.1 To promote generation from renewable energy sources, the Commission has so far issued ten Tariff Orders in respect of various renewable sources of energy in accordance with section 86(1)(e) of the Electricity Act, 2003. The Jawaharlal Nehru National Solar Mission (JNNSM) was announced on 10th January, 2009 by the Government of India through the Ministry of New and Renewable Energy (MNRE). JNNSM aims to promote the development of solar energy for grid connected and off-grid power generation. In pursuance of the above, the Commission in order No. 1 and 2 dated 27/5/2010 & 8/7/2010 respectively determined the tariff for Solar PV and Solar Thermal Power under the Jawaharlal Nehru National Solar Mission (JNNSM). These

orders were issued for the specific purpose of the projects connected at HT level of distribution network (below 33kV) with installed capacity of 1MW and upto 3 MW under JNNSM.

1.3 Need for the Order

1.3.1 The Government of Tamil Nadu has launched the Tamil Nadu Solar Energy Policy 2012 to promote solar energy. It has been envisioned to add about 3000 MW by the year 2015 under the Policy. The Electricity Act, 2003, mandates the State Electricity Regulatory Commissions to promote generation of electricity from renewable sources of energy. In accordance with the provision of the Electricity Act 2003 and the Electricity Policies issued by Government of India (GoI), the Commission issues this **"Comprehensive tariff order on solar power"** for purchase of solar power by distribution licensee from the solar power generators and to deal with other related issues.

2. Technology

2.1.1. Photovoltaics (PV) is the direct method of converting sunlight into electricity through a device known as the "Solar Cell". Many different solar cell technologies such as mono-crystalline and poly-crystalline silicon, thin films such as amorphous silicon, micromorph, cadmium telluride, copper indium gallium selenide and concentrator-based

high-efficiency III-V, etc. are available in the market today. Further, substantial R&D efforts are also underway globally for enhancing efficiencies and reducing costs of these solar cells, as well as developing novel cell technologies.

2.1.2. Solar thermal technologies, also known as concentrated solar thermal (CST) technologies, typically concentrate the direct component of sunlight or the direct normal incidence (DNI) to attain high temperatures and consequently generate electricity. The concentration is achieved typically through various reflection methodologies, which define these technologies. Parabolic trough, linear Fresnel, central receiver and parabolic dish are adopted to be four primary solar thermal technologies . In addition to different types of construction of reflectors, these technologies also differ based on reliability, maturity, and economics.

2.2. Standards

2.2.1 Each of these technologies have different cost implications based on their efficiency, reliability, mounting, tracking, land, water and other requirements. The Commission has decided that the final selection of the technology shall be left to the Solar Power Developers. It is difficult to determine the tariff for each such technology. The Commission has decided to determine the tariff for the technology predominantly used in our country. The minimum technical requirements would be as per the regulations/specifications issued by the Central Electricity Authority and Ministry of New and Renewable Energy and the developers shall adhere to them.

3. Legal provisions

3.1. Related Provisions of Electricity Act, 2003

3.1.1 Relevant provisions of Electricity Act, 2003 are reproduced below.

"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.

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

……

(h) the promotion of cogeneration and generation of electricity from renewable sources of energy;

(i) the National Electricity Policy and Tariff Policy.

Section 62(1): The appropriate Commission shall determine the tariff in accordance with the provisions of this Act for –

(a) Supply of electricity by a generating company to a distribution licensee:

Section 62(2): The appropriate Commission may require a licensee or a generating company to furnish separate details, as may be specified in respect of generation, transmission and distribution for determination of tariff.

Section 62(5): The Commission may require a licensee or a generating company to comply with such procedures as may be specified for calculating the expected revenues from the tariff and charges which he or it is permitted to recover.

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;"

3.2. Related Provisions of National Electricity Policy

3.2.1 Relevant provisions of National Electricity Policy are reproduced below:

"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. Adopting 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."

3.3. Related Provisions of Tariff Policy

3.3.1 Relevant provisions of Tariff Policy are reproduced below.

*" **6.4 Non-conventional and renewable sources of energy generation including co-generation**:*

*(1) Pursuant to provisions of section 86(1)(e) of the Act, the Appropriate Commission shall fix a minimum percentage of the total consumption of electricity in the area of a distribution licensee for purchase of energy from such sources, taking into account availability of such resources in the region and its impact on retail tariffs**.** Such percentage for purchase of energy should be made applicable for the tariffs to be determined by the SERCs latest by April 1, 2006.*

(i) Within the percentage so made applicable, to start with, the SERCs shall also reserve a minimum percentage for purchase of solar energy from the date of notification in the Official Gazette which will go up to 0.25% by the end of 2012-13 and further up to 3% by 2022.

(ii) It is desirable that purchase of energy from non-conventional sources of energy takes place more or less in the same proportion in different States. To achieve this objective in the current scenario of large availability of such resources only in certain parts of the country, an appropriate mechanism such as Renewable Energy Certificate (REC) would need to be evolved. Through such a mechanism, the renewable energy based generation companies can sell the electricity to local distribution licensee at the rates for conventional power and can recover the balance cost by selling certificates to other distribution companies and obligated entities enabling the latter to meet their renewable power purchase obligations. In view of the comparatively higher cost of electricity from solar energy currently, the REC mechanism should also have a solar specific REC.

*(iii) It will take some time before non-conventional technologies can compete with conventional sources in terms of cost of electricity. Therefore, procurement by distribution companies shall be done at preferential tariffs determined by the Appropriate Commission***.**

(2) Such procurement by Distribution Licensees for future requirements shall be done, as far as possible, through competitive bidding process under Section 63 of the Act within suppliers offering energy from same type of non-conventional sources. In the long-term, these technologies would need to compete with other sources in terms of full costs."

3.4. Commission's Regulations on Power Procurement from New and Renewable Sources:

3.4.1 This order has been prepared in consonance with the provisions of the Power Procurement from New and Renewable Sources of Energy Regulations 2008 issued by the Commission.

4. Power position in Tamil Nadu

4.1. The generating capacity connected to the Tamil Nadu's grid including the allocation from Central Generating stations is 12909.10 MW as on 31/5/2014 comprising of 4,660 MW from Tamil Nadu Generation and Distribution Corporation's four thermal stations, 516 MW from four gas turbine stations, 2284 MW from hydro stations, 1154 MW from private generating stations, 68 MW as contribution to Tamil Nadu grid by sale of electricity from captive generating and biomass plants, 4177.10 MW as Tamil Nadu's share from central generating stations and 50 MW as external assistance.

4.2. Generating capacity from privately owned wind farms is 7262 MW as on 31/05/2014. The installed capacity of cogeneration plants is 659.4 MW and biomass power projects is 215.40 MW. The solar generation capacity is 109.26 MW.

4.3 The restriction and control in electricity supply has been lifted from 01/06/2014 in the State. The present demand of power in the State is around 13,000 – 13,500 MW. It is expected to go upto 14,500 MW by the end of 2014 – 15. The demand will be met by the generation from the existing power stations and power from projects to be commissioned in the year 2014 – 15. In addition to the above, TANGEDCO makes long, medium and short term power purchases as and when required.

5. Solar power projects in Tamil Nadu.

5.1. Solar plants commissioned in Tamil Nadu

5.1.1 The first 5 MW grid connected solar photovoltaic power plant was commissioned in Tamil Nadu in Sivagangai District in December 2010 under the Demonstration Programme of Ministry of New and Renewable Energy (MNRE). Out of the 7 projects each of 1 MW capacity sanctioned to Tamil Nadu under the Roof Top PV & Small Solar Power Generation Programme(RPSSGP) of Jawaharlal Nehru National Solar Mission(JNNSM), 6 projects have been commissioned from June 2011 to June 2012. Under the NTPC Vidyut Vyapar Nigam (NVVN) Bundling Scheme, one 5 MW Solar PV Power Project has been commissioned in March 2012. A total of 88.59 MW has been commissioned under REC scheme, 2.435 MW under Roof top scheme and 2.235 MW as grid connected and stand alone in the kW scale roof top projects. The total installed capacity in the State as on 31/7/2014 is 109.26 MW.

6. Applicability of the proposed order

6.1. The Order shall come into force from the date of its issue. The tariff fixed in this order shall be applicable to all solar power plants commissioned during the control period of this Order. The tariff is applicable for purchase of solar power by Distribution Licensee from Solar Power Generators conforming to this order. The open access

charges and other terms and conditions specified in this Order shall be applicable to all the Solar energy generators, irrespective of their date of commissioning.

7. Tariff Determination Process

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

"(1) 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.

d) issuing general / specific tariff order for purchase of power from new and renewable sources based generators."

7.2. In line with the above regulation, the Commission prepared a consultative paper on "Comprehensive tariff order on Solar Power", and hosted the same on 30/7/2013 in the Commission's website. Comments and suggestions were invited from the stakeholders on the consultative paper", till 31/8/2013. An abstract of the important comments received from the stakeholders is annexed with this order as Annexure III. The consultative paper was also presented in the State Advisory Committee(SAC) meeting held on 20/01/2014 and the views of the Members were obtained and enclosed with this

order as Annexure IV. Taking into account the important comments/suggestions received from the stakeholders and the SAC Members, the Commission issues this "**Comprehensive Tariff Order on Solar Power** " .

8. Tariff / Pricing Methodology

8.1. Tariff / Pricing Methodology specified in regulation 4 of the Commission's Power Procurement from New and Renewable Sources of Energy Regulations 2008 is reproduced below:

"(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

(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. In case of small hydro projects with a capacity of more than 5 MW but not exceeding 25 MW capacities, Commission decides the tariff on case to case basis.

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.

(4) While determining the tariff, the Commission may, to the extent possible adopt 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.

(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."

8.2. Project specific or Generalized Tariff

8.2.1. A generalized tariff mechanism would provide incentive to the investors for use of most efficient equipment to maximize returns and for selecting the suitable site while a project-specific tariff would provide each investor, irrespective of the machine type, the stipulated return on equity which, in effect, would shield the investor from the uncertainties involved. This order mainly provides for power purchase by distribution licensees for their Renewable Purchase Obligation (RPO) compliance as specified in the Commission's Regulations. The capacities of the solar plants commissioned and under construction in the State are limited to a few MWs. They have mostly adopted similar technology with minor modifications. Hence the Commission has decided to issue a generalized tariff order for solar Photovoltaic and solar Thermal projects.

8.3. Cost-Plus Tariff Determination

8.3.1. Regulation 4(6) of "Power Procurement from New and Renewable Sources of Energy Regulations 2008" empowers the Commission to adopt "appropriate tariff

methodology" to determine the tariff for solar power. Cost-plus tariff determination is a more practical method and it can be easily designed to provide adequate returns to the investor and a surety of returns will lead to larger investment in solar power plants. Para 6.4 of the Tariff Policy specifies that procurement by the distribution companies shall be done at preferential tariff determined by the Commission till such time the non-conventional technologies compete with the conventional sources in terms of cost of electricity. At the prevailing cost, the cost of solar power is generally higher than the cost of predominant conventional power. Therefore Cost-Plus tariff is adopted for determination of tariff in respect of solar projects.

8.4. Single Part or Two Part Tariff

8.4.1. Two part tariff is generally adopted when the variable component is significant. In the case of solar energy generation, no variable cost like fuel cost is involved. Operation, maintenance and insurance costs could be taken care of by adopting suitable parameters with or without escalation factors. Therefore, the Commission has decided to continue with the single-part tariff for solar energy generation.

8.5. Average or Levelised Tariff

8.5.1 Many stakeholders have suggested to adopt levelised tariff for 25 years. The Commission's order No. 3 dated 15/5/2006 adopted "cost plus single part average

tariff" for wind power. This tariff order was challenged by Wind Power Producers Association before the Hon'ble Appellate Tribunal for Electricity (ATE). The ATE in its order dated 18/12/2007 on appeal No. 205/2006 and 235/2006 directed the Commission that "the tariff for the wind power producers be re-determined within the next two months by taking into consideration the time value of money". The order of the ATE was challenged by the erstwhile Tamil Nadu Electricity Board(TNEB) and by the Commission before the Hon'ble Supreme Court and the Hon'ble Supreme Court had granted stay of ATE's order in its order dated 03-03-2008. The issues on which the appeal numbers 197, 198, 200, 201 & 208/2013 by M/s Beta Wind farms (P) Ltd & others, were preferred, interalia, includes "time value of money". The ATE, in its judgement dated 24/5/2013, on Commission's order No. 6 of 2012 dated 31/7/2012, has reiterated its earlier stand on this issue as follows:

para 170(vii) " Time Value of Money: This issue is decided in favour of the Appellants in terms of this Tribunal's findings in judgement dated 18.12.2007 in Appeal No.205 and 235 of 2006. "

The stay order of the Hon'ble Supreme Court on Civil appeal Nos.1361-1362 of 2008 and 1471-1472 of 2008 is still in force. The above cases are related to Tariff Order on Wind Energy.

8.5.2. The Commission considers that each order is a distinct order and it should be dealt with accordingly. Solar power is in its nascent stage in the State. Time Value of Money has been taken into account by the CERC and most other SERCs while

determining the preferential tariff. Many of the stakeholders have also suggested to determine the tariff taking into account the time value of money. Similarly many stake holders including the SAC members have suggested that the Solar Tariff has to be determined taking into account the accelerated depreciation (AD) benefit. The AD benefit will have a reasonable impact only when the time value of money is taken into account in determination of tariff. Consideration of AD component in the tariff may also give an option to the generator to avail the AD benefit. Considering AD benefit in the tariff determination will also reduce the levelised tariff which may benefit the distribution licensee and consumers. Hence, the Commission has decided to adopt cost plus single part levelised tariff taking into account the AD benefit for solar power in this Order.

9. Tariff Components

9.1. The tariff determined in a cost plus scenario, would depend significantly on the following operational and financial parameters:

1. Capital investment
2. Capacity Utilization Factor
3. Operation and maintenance expenses
4. Insurance cost
5. Debt-equity ratio

6. Rate of Interest and Term of Loan

7. Life of plant and machinery

8. Interest and components of Working Capital

9. Return on equity

10. Depreciation rate applicable

11. Auxiliary consumption

9.1.1. The Commission has taken into account the suggestions of the stakeholders, expert opinions of the SAC Members, parameters adopted by other SERCs and carried out a detailed analysis of the existing policies, procedures and commercial mechanisms in respect of power generation from Solar based power plants. The Commission has also considered the values specified by the CERC in its suo motu order nos 353/2013 and 354/2013 dated 15/5/2014 to arrive at the operational and financial parameters for the issuance of this Tariff Order.

9.2. Capital Investment

9.2.1. The capital cost is one of the most important parameters for tariff determination of power projects. The major components of a photovoltaic power plant are PV modules, Inverters, control panels, switch yard, machineries, equipment etc., Apart from the

above components, the total capital cost includes the cost of land, power evacuation lines and replacement of capital equipment if any during the life time.

9.2.2. Most of the stakeholders have suggested a capital cost of Rs. 8 Crores per MW. Some of the stakeholders have suggested Rs. 7.5 Crores per MW. TANGEDCO have suggested to adopt the capital cost of Rs. 7 Crores as proposed by the Commission in its Consultative paper. The Indian Renewable Energy Development Agency(IREDA) in their letter dated 14/10/2013 has reported a capital cost of Rs. 7 to Rs. 8 Crores per MW. The CERC has issued a suo motu order No. 353/2013 dated 15/5/2014 in the matter of Determination of Benchmark Capital cost norm for Solar PV power projects and Solar Thermal power projects for the financial year 2014-15. In this order the CERC has determined Rs. 6.91 Crores per MW for Solar PV plant. This includes module costs, land cost, cost towards civil and structural works, cost of power conditioning unit and cost of evacuation of power. The capital cost includes additional 0.5% of module cost towards replacement of degraded modules during the life time, preliminary and pre-operational expenses, IDC and replacement of capital equipment during the life time. Taking into account the views of the stakeholders, the Commission decides to adopt a capital cost of Rs. 7 Crores per MW as proposed in the consultative paper which includes all the components.

9.2.3. In the case of solar thermal projects, two stakeholders have proposed a capital cost of Rs. 13 Crores/MW. The CERC in suo motu order no. 353 dated 15/5/2014 has

approved a capital cost of Rs. 12 Crores per MW. The Commission adopts a capital cost of Rs. 12 Crores per MW in this order.

9.3. Capacity Utilization Factor (CUF)

9.3.1. Many of the stakeholders have suggested a CUF of 17 to 18%. Some of the stakeholders have recommended to adopt a CUF of 19%. Stakeholders have also suggested deration of 0.5% to 1% during the life of the plant. The Commission has adopted the capital cost taking into account the cost of replacement of modules in respect of degradation during the life time. The CERC has adopted a CUF of 19% and has not considered any deration in its order. Most of the SERCs have also considered a CUF of 19% in their orders. The Commission decides to adopt the CUF of 19% for solar PV projects and 23% for solar thermal projects. These CUFs are considered taking into account the efficiency factors of equipment, deration etc.,

9.4. Operation and Maintenance Cost (O&M)

9.4.1. The stakeholders have suggested different O&M costs starting from Rs. 9 lakhs to Rs. 12 lakhs per MW per annum with or without escalation. Many stakeholders requested Rs. 11.63 lakhs with an escalation of 5.72% as adopted by CERC. In the consultative paper, the Commission proposed an O&M cost of 1.1% of capital cost with an escalation of 5.72% from the second year. The proposed O&M cost includes

insurance cost. CERC has adopted Rs.12.39 lakhs for the year 2014-15 with an escalation of 5.72% in the latest Solar PV order. The CERC has not accounted for the insurance cost separately. The insurance cost is generally related to net asset value of the plant and machinery. Hence it may not be appropriate to club the Insurance cost with O&M cost. Therefore the Commission decides to introduce insurance cost as a separate parameter. Considering stakeholders' views, O&M cost adopted by CERC and other SERCs, the Commission decides to adopt an O&M cost of 1.4% of capital cost with an escalation factor of 5.72% from the second year in this order while taking into account the insurance cost as a separate parameter in this order.

9.5. Insurance cost

9.5.1. In the Consultative paper, the Commission proposed an O&M cost of 1.1% with an escalation of 5.72% from the second year which includes insurance cost. The Commission decides to separate the insurance parameter from O&M cost in this Order. Accordingly the Commission adopts 0.35% of net asset value as insurance cost in this order. M/s Aditya Birla Management Corporation, has recommended an insurance cost of 0.35% of depreciated value of plant. The Rajasthan Electricity Regulatory Commission has considered 0.3% of depreciated project cost towards insurance cost in their Solar Order. Gujarat Electricity Regulatory Commission has considered 0.35% of the net asset value of the project as insurance charge.

9.6. Debt-equity ratio

9.6.1. One stakeholder has recommended a debt equity ratio of 65:35. The Tariff Policy lays down a debt equity ratio of 70:30 for power projects. The Commission adopts this ratio in this order as specified in its Tariff Regulations 2005 and the earlier tariff orders on new and renewable power.

9.7. Rate of Interest and term of loan

9.7.1 The stakeholders have requested for an interest rate between 13% to 14%. The CERC has adopted an interest rate of 12.7% in their latest order with a loan tenure of 12 years. The IREDA in their letter dated 14/10/2013 have stated that the interest rate for solar PV project is 12.25% to 13% and for Solar Thermal projects it is 12.50% to 13.25%. The Commission decides to adopt 12.7% of interest rate on loan for this order.

9.7.2. Some of the stakeholders have suggested a repayment period of 7 years and some of them have suggested 12 years. Some of them have agreed with the Commission's proposal of 10 years with one year moratorium. The Commission decides to adopt the term as 10 years with 1 year moratorium as adopted by the Commission in its previous orders on Wind, Bagasse and Bio-mass power.

9.8. Life of Plant and machinery

9.8.1. The CERC and other SERCs have adopted a life period of 25 years. The Commission adopts a life period of 25 years in this order for Solar power projects.

9.9. Interest and Components of Working Capital

9.9.1. The stakeholders have recommended different interest rates starting from 13% to 14% for working capital. The CERC has adopted an interest rate of 13.20% in their latest order. The Commission decides to adopt an interest rate of 13.20% for working capital. The Commission decides to adopt one month Operation and Maintenance cost and two months Receivables as working capital components for solar projects.

9.10. Return on Equity (RoE)

9.10.1. The stakeholders have suggested pre tax RoE of 20% upto 10 years and 24% for the balance period as adopted by CERC. TANGEDCO has suggested to adopt a pretax RoE of 19.85%. The Tariff Regulations of the Commission stipulates 14% post tax RoE for conventional fuel based generating stations. With the objective of promoting renewable energy, Commission in its new and renewable energy Tariff Orders issued during 2009 considered 19.85% pre-tax return on equity, where in the RoE was adopted linking it to Minimum Alternate Tax(MAT) and Income Tax(IT). Since these factors are changing frequently, the Commission in its orders issued in 2012

related to determination of tariff for NCES power, adopted a RoE of 19.85% without linking to MAT and IT. Now it is decided to adopt a RoE of 20% (pre tax) per annum for Solar Power Generators(SPGs) without linking it to MAT and IT.

9.11. Depreciation

9.11.1. The CERC has adopted the normative depreciation rate of 5.83 % per annum for initial period of 12 years i.e. equivalent to the loan tenure and at the rate of 1.54% for the balance useful life of the project beyond the initial period of of 12 years. Many stakeholders have requested to adopt the CERC formula. The Commission in its Orders on Wind, Bio-mass and Bagasse based energy issued during the year 2012 has depreciated the value of plant and machinery to 90% of the initial value for the life period using the straight line method. The Commission decides to adopt the same method in this Order for the life period of 25 years. This translates into a rate of 3.6% per annum. In the Consultative paper the Commission proposed that the depreciation would be calculated on 85% of the capital cost. Considering the depreciable components of a solar plant, the Commission decides that the depreciation will be calculated on 95% of the Capital Investment in this order.

9.12. Auxiliary Consumption (AUX)

9.12.1. CERC has considered 10% AUX in respect of solar thermal projects. The Commission decides to adopt the same AUX in respect of solar thermal plant. Many stakeholders have recommended an AUX of 0.25% and some of them have recommended 1% for PV plant. The CERC has not adopted AUX for solar PV plant for determination of tariff. Having considered efficiency related issues in the CUF, the other constituents of AUX such as lighting, general maintenance etc., constitutes negligible consumption of electricity. The CERC has not adopted AUX for solar PV plant for determination of tariff. The Commission has decided not to take into account the AUX for determination of tariff for solar PV plant.

9.13. Tariff Determinants

9.13.1. The financial and operational parameters adopted in respect of Solar Photovoltaic and Solar Thermal projects proposed in this order are tabulated below:

Tariff Components	Solar Photovoltaic	Solar Thermal
Capital cost	Rs. 7 Crores per MW	Rs. 12 Crores per MW
Auxiliary Consumption	-	10%
CUF	19%	23%

Operation and maintenance expenses	1.4% of the capital cost with 5.72 % escalation after 1st year	1.4% of the capital cost with 5.72 % escalation after 1st year
Insurance Cost	0.35% of net asset value	0.35% of net asset value
Life of plant and machinery	25 years	25 years
Term of Loan	10 years +1 yr Moratorium	10 years +1 yr Moratorium
Interest on loan	12.7%	12.7%
Working Capital components	One month O&M cost and two months receivables	One month O&M cost and two months receivables
Interest on working capital	13.2%	13.2%
Return on equity	20% pre tax	20% pre tax
Debt-equity ratio	70:30	70:30
Depreciation rate	3.6% on 95% of the Capital Investment	3.6% on 95% of the Capital Investment
Discount factor	10.07%	10.07%
Tariff	Rs. 7.01	Rs. 11.03
Accelerated Depreciation	Rs. 0.73	Rs. 1.15

10. Solar Power Tariff

10.1. In the SAC meeting the CMD/TANGEDCO suggested that Accelerated Depreciation (AD) may be adopted to decide the preferential tariff for solar power. Similar views were also expressed by other stakeholders. CERC and other SERCs have also adopted the Accelerated Depreciation benefit. Therefore the Commission

decided to determine the tariff taking into account the Accelerated Depreciation in this order.

10.2. Solar power tariff is computed with reference to the determinants supra and listed in Annexure I. The tariff works out to Rs.7.01 per unit for Solar PV projects and Rs. 11.03 per unit for Solar Thermal projects without AD benefit. The AD benefit component of the tariff is Rs.0.73 per unit for solar PV and Rs.1.15 per unit for Solar Thermal. The tariff for the developers / generators availing AD benefit will be the tariff arrived at after deduction of AD benefit from the tariff as determined above. The respective working sheets are enclosed in Annexure IIA and IIB.

10.3. The stake holders have suggested tariff rates from Rs.6.53 to Rs. 10.68 per unit for PV plants. They have cited the TANGEDCO's bidding rate of Rs.6.48 per unit with escalation of 5% per annum for 10 years which works out to a levelised tariff of Rs.8.46 per unit. The competitive solar PV power bidding tariff rate of Rajasthan is Rs.6.45 per unit and that of Andhra Pradesh is Rs.6.49 per unit. In their latest order, the CERC determined a tariff of Rs. 7.72 per unit for solar PV and Rs. 11.88 per unit for solar thermal without AD benefit and Rs. 6.95 per unit for solar PV and Rs. 10.65 for solar thermal projects with AD benefit for the year 2014-15. Considering the tariff rates discovered through competitive bidding by other States, the tariff rates determined in this order are reasonable.

11. Other issues related to power purchase by distribution licensee from SPGs.

1. Quantum of power purchase by the Distribution licensee
2. Plant capacity limitations
3. CDM benefits
4. Billing and Payments
5. Energy Purchase Agreement
6. Control Period and Tariff Period

11.1. Quantum of solar power purchase by the distribution licensee

11.1.1. In the SAC meeting held on 20-01-2014, the Energy Secretary, Government of Tamil Nadu (GoTN) suggested that either the Solar Purchase Obligation (SPO) shall be made within the limit of RPO or to exempt the open access consumers from the RPO/SPO since the SPO and RPO have been challenged by the open access consumers in the Madras High Court. Similar view was expressed by the CMD, TANGEDCO. The Commission's 'Order on Issues related to Tamil Nadu Solar Energy Policy 2012', issued on 7/3/2012 specifies that the SPO is inclusive of RPO for the open access and captive consumers. However, the Hon'ble APTEL has set aside the above order of the Commission and therefore this issue has no relevance. The distribution licensee can purchase solar power at the rate determined by the Commission in this

order from SPGs for their Renewable Purchase Obligation (RPO) requirement on “first come first served basis”. Purchasing solar power at the prevailing cost by the distribution licensee beyond certain quantum will correspondingly increase the overall retail tariff to the consumers on account of the preferential nature of tariff. Renewable energy has to be promoted but at the same time the interest of the consumers shall also be taken into account. Therefore for any procurement in excess of Solar RPO by the distribution licensee, specific approval shall be obtained from the Commission.

11.1.2. Many stakeholders and members of the SAC have suggested that the preferential tariff approved by the Commission in this order may not be made applicable to the rates finalized by the TANGEDCO through Competitive bidding route. In this connection it is stated that the tender rate was discovered under section 63 of the Electricity Act, 2003, as reported by TANGEDCO in their petition filed with the Commission, whereas the preferential tariff rate approved in this order has been determined under section 62 of the Electricity Act, 2003. Hence this order has no relevance to the rates reportedly finalized by the TANGEDCO through competitive bidding.

11.2 Plant Capacity Limitations

11.2.1 The Commission proposed tariff for kilowatt scale solar projects in the Consultative Paper. In the meantime Commission issued “Order on LT Connectivity and Net-metering, in regard to Tamil Nadu Solar Energy Policy 2012”. Certain categories of

consumers with kilowatt scale solar plants are covered under this scheme. Due to economies of scale, power produced from kilowatt scale plants is costlier than the MW scale plants. Considering the high cost of solar power and its impact on retail tariff, the Commission decides to limit the purchase by distribution licensee from solar power plants of 1 MW capacity and above only.

11.3. CDM Benefits

11.3.1. Some of the stakeholders have requested to ignore the CDM benefits. In the earlier orders issued on renewable energy, the Commission adopted the following formula for sharing of CDM benefits as suggested by the Forum of Regulators (FOR).

"The CDM benefits should be shared on gross basis starting from 100% to developers in the first year and thereafter reducing by 10% every year till the sharing becomes equal (50:50) between the developer and the consumer in the sixth year. Thereafter, the sharing of CDM benefits will remain equal till such time the benefits accrue."

11.3.2. The Commission adopted the formula recommended by the Forum of Regulators in its earlier order No. 6 of 2012 dated 31-07-2012. The Commission decides to adopt the same formula in this order also. The distribution licensee shall account for the CDM receipts in the next Aggregate Revenue Requirement filing.

11.4. Billing and payment

11.4.1. When a solar generator sells power to the distribution licensee, the generator shall raise the bill every month for the net energy sold after deducting the charges for power drawn from distribution licensee, reactive power charges etc. The Commission has considered two months receivables as a component of working capital. Therefore the distribution licensee shall make payment to the generator in 60 days of receipt of the bill in complete shape. Some of the stakeholders have requested for 1.25% of Belated Payment Surcharge. TANGEDCO requested for waiver of 1% interest charges for delayed payment. However, the Commission adopts 1% interest per month for any delayed payment by the distribution licensee beyond 60 days.

11.5. Energy Purchase Agreement (EPA)

11.5.1 The format for Energy Purchase Agreement (EPA) shall be evolved as specified in the Commission's " Power procurement from New and Renewable source of Energy Regulations 2008" and as amended from time to time. The agreement shall be valid for 25 years. In their comments, TANGEDCO has reported that they may execute EPA with the solar power generators after finalizing power evacuation. The distribution licensee shall convey his decision on purchase of power in line with this order within a month of receipt of the proposal from the generator for selling his power. In case of refusal to purchase power, valid reason in line with this order shall be communicated to the SPG by the distribution licensee. The EPA shall be executed within the reasonable time in

line with this order. The agreement fees are governed by the Commission's Fees and Fines regulation.

11.6. Control Period and Tariff Period.

11.6.1. Regulation 6 of the Power Procurement from New and Renewable Sources of Energy Regulations, 2008 of the Commission specifies as follows:

"The tariff as determined by the Commission shall remain in force for such period as specified by the Commission in such tariff orders and the control period may ordinarily be two years."

11.6.2. Since the capital cost of solar modules is volatile, the Commission proposed one year control period in its consultative paper. Some of the stake holders have recommended a control period of two years. CERC approved a capital cost of Rs. 8 Crores per MW in the order for the FY 2013-14. However, in the latest order dated 15/5/2014, the CERC has adopted a capital cost of Rs. 6.91 Crores per MW for the year 2014-15. There is a 14% variation in the capital cost in a single year. Therefore the Commission decides to retain the one year control period in this order as proposed in the consultative paper in view of the rate of change of capital cost.

11.6.3. Thiru G. S. Rajamani, SAC member, requested for an early bird incentive for promoting solar energy in the State. The incentive scheme may be meaningful in the case of a long control period. Since the Commission has decided to set one year as the control period, no such incentive scheme has been contemplated in this order.

12. Issues related to Open Access

1. Open Access charges and Line losses
2. Cross subsidy surcharge
3. Reactive power charges
4. Grid availability charges
5. Energy Accounting and Billing Procedure
6. Energy wheeling agreement and fees
7. Security Deposit
8. Power factor disincentive
9. Metering
10. Connectivity and power evacuation.
11. Harmonics
12. Parallel operation charges

12.1. Open Access charges and Line Losses

12.1.1. Regarding Open access charges and line losses, some of the stakeholders have requested to exempt the open access charges indefinitely or for a limited period. Some

of them have suggested open access charge of 5% for HT users and 7.5% for LT user. The argument put forth by the stakeholders for reducing or exempting the open access charges is based on the lower Capacity Utilization Factor of solar plants. In the SAC meeting, the Energy Secretary to GoTN, also opined that the transmission and wheeling charges are to be worked out on per unit basis instead of per MW basis. Charging transmission charges based on units (energy) is not consistent with the Commission's Tariff regulations which states that the transmission charges shall be fixed based on allotted capacity. Such principle has also been upheld by the Hon'ble APTEL. Whether the energy is transmitted for whole year or part of the year, the cost of transmission network established for that purpose has to be recovered from the user, based on the capacity allotted to them. Transmission, Wheeling and Scheduling & System operation charges are generally regulated by the Commission's Tariff regulations, Open access regulations and Commission's order on open access charges issued from time to time. However, as a promotional measure, under sections 61(h) and 86(1) (e) of the Act, the Commission decides to adopt 30% in each of the transmission, wheeling, scheduling and system operation charges to solar power on the respective charges specified in the relevant orders issued by the Commission from time to time. Apart from these charges, the SPGs shall have to bear the actual line losses in kind as specified in the relevant orders of the Commission and as amended from time to time. In respect of the plants availing Renewable Energy Certificate (REC), 100% of the respective charges as specified in the relevant orders will apply.

12.2. Cross subsidy surcharge

12.2.1 In response to the consultative paper, some of the stakeholders have requested waiver of cross subsidy surcharge for a limited or an indefinite period. In the State Advisory Committee(SAC) meeting, the Energy Secretary to GoTN opined that the imposition of cross subsidy surcharge will curtail buying of solar power by open access consumers. He is of the view that only if the landed cost of open access energy is lesser than the cost of energy supplied by the distribution licensee, the cross subsidy surcharge can be imposed. A similar view was expressed by the CMD/TANGEDCO. Irrespective of the landed cost of open access energy, the distribution licensee will be losing the cross subsidy surcharge component if the open access consumer is a subsidizing consumer. This is the underlying principle based on which the Act specifies the cross subsidy surcharge. However as a promotional measure, under sections 61(h) & 86(1) (e), of the Act, the Commission reduced the cross subsidy surcharge by 50% in the consultative paper. The Commission in its earlier tariff orders relating to different renewable power, has ordered to levy 50% of the cross subsidy surcharge for third party open access consumers. Commission decides to adopt the same for Solar power also.

12.3. Reactive Power Charges

12.3.1 Commission decides to adopt the reactive power charges for solar power plants as specified in its Order on Open Access charges issued from time to time

12.4. Grid Availability Charges

12.4.1 Charges for the start-up power supplied by the distribution licensee

12.4.1.1. TANGEDCO has requested the Commission to charge temporary supply tariff rate for startup power drawn by the solar generators. However, the CMD/TANGEDCO suggested in the SAC meeting that since the requirement of power for start up is very meager, adjustment should be on net energy basis. The question of start up power does not arise for solar PV generators. However, the solar PV generator may require power for maintenance of power station especially during night hours. In case of Solar Thermal generators, the start-up may be frequent. Therefore, the drawal of such energy by the Solar Power generator from the distribution licensee shall be adjusted against the generated energy for every billing period. This is applicable both for the SPGs selling power to the distribution licensee and open access consumers. This is also applicable to the existing SPGs from the date of this order.

12.4.2. Stand by charges

12.4.2.1. If the drawal by the captive user or third party buyer exceeds their respective generation, the energy charges and demand charges shall be regulated as per the Commission's Open Access regulation and Commission's Order on ABT and other relevant orders.

12.5. Energy Accounting and Billing Procedure

12.5.1. The stakeholders in their response to the consultative paper have suggested exemption from slot-wise adjustment and Availability Based Tariff (ABT) order for solar power. Commercially viable technology for grid scale electricity storage is not in existence as on date. The electrical energy has a time tag in its price and has to be dealt with accordingly. Some of the stakeholders have requested for banking of solar energy. Though the Commission has not explicitly mentioned about banking, this billing procedure provides for a banking period of one billing cycle. Unlike wind energy, the solar energy is available around 300 plus days in a year. For the reason discussed earlier, the Commission decides not to extend the banking of solar power beyond the billing period.

12.5.2. The energy accounting shall be regulated by the Commission's Regulations on open access, Order on open access charges and Order on ABT. Till such time the ABT is implemented in the State, if a solar energy generator utilizes power for captive use or if he sells it to a third party, the distribution licensee shall raise the bill at the end of the billing period for the net energy supplied. The licensee should record the slot wise generation and consumption during the billing period. Slot-wise adjustment shall be made for the billing period. However, peak hour generation can be adjusted to normal hour or off peak hour consumption of the billing period and normal hour generation can be adjusted to off peak hour consumption of the billing period. Excess consumption will be charged at the tariff applicable to the consumer subject to the terms and

conditions of supply. Regarding the balance energy after adjustment, the stakeholders have requested for payment at 75% of the tariff rate by the distribution licensee. The TANGEDCO have also recommended for such payment in their comments. Accordingly after the billing period, the balance energy may be sold at the rate of 75% of the respective solar tariff fixed by the Commission in this order and it has to be settled within three months of the respective billing period.

12.5.3. Some of the stake holders have requested deemed demand concession for open access consumers. The Commission's regulations have not provided any such parameter. Since the demand charge is meant for the fixed charges incurred by the distribution licensee in providing infrastructure and also in incurring the capacity charges, the Commission decides not to provide any such facility to the open access consumers.

12.5.4. Thiru G.S. Rajamani, SAC member, opined that the SLDC should exercise proper control and separate instructions have to be given so as to dispatch the power from renewable energy sources. The CMD/TANGEDCO clarified that the SLDC does not back down the NCES generation until the grid frequency is on the rise. He also stated that only to maintain grid stability the renewable energy generators have been requested to back down. In this connection, it is pertinent to mention the relevant provisions of the Tamil Nadu Electricity Grid Code as below:

"8(3)(b) SLDC shall regulate the overall State generation in such a manner that generation from following types of power stations where energy potential, if unutilized goes, as a waste shall not be curtailed.

- *Run of river or canal based hydro stations*
- *Hydro-station where water level is at peak reservoir level or expected to touch peak reservoir level (as per inflows).*
- *Wind Power Stations and Renewable energy Sources*
- *Nuclear Power Stations"*

The SLDC shall schedule the renewable power in accordance with the Grid Code.

12.6. Energy Wheeling Agreement and fees

12.6.1. The format for Energy Wheeling Agreement, application and agreement fees, procedure and terms & conditions are governed by Commission's following regulations which are amended from time to time.

1. Tamil Nadu Electricity Regulatory Commission Grid Connectivity and Intra State Open Access Regulation 2014
2. Power procurement from New and Renewable Source of Energy Regulations 2008.

12.7. Security deposit

12.7.1. As regards the security deposit to be paid by captive /third party user, the Commission decides to retain the present arrangements. Accordingly the charges corresponding to two times of the maximum net energy supplied by the distribution licensee in any month in the preceding financial year shall be taken as the basis for the payment of security deposit.

12.8. Power Factor disincentive

12.8.1. Power factor disincentive may be regulated for the power factor recorded in the meter at the user end as specified in the relevant regulations/orders in force.

12.9. Metering

12.9.1. The metering and communication shall be in accordance with the following regulations in force.

(1) Central Electricity Authority (Installation and Operation of Meters) Regulations 2006 and amended from time to time.

(2) Tamil Nadu Electricity Distribution and Supply Codes

(3) Tamil Nadu Electricity Grid Code

(4) Tamil Nadu Electricity Regulatory Commission Grid Connectivity and Intra State Open Access Regulations 2014

Metering procedure is also governed by any specific orders of the Commission on metering and ABT as and when it is issued.

12.10. Connectivity and Evacuation of power

12.10.1. The provisions contained in Central Electricity Authority (Technical Standards for Connectivity to the Grid) Regulations, 2007 and Central Electricity Authority (Technical Standards for Connectivity of the Distributed Generation Resources)

Regulations, 2012 shall be complied with. The connectivity and power evacuation system shall be provided as per the Act / Codes/ Regulations/orders in force.

12.11. Harmonics

12.11.1. Some of the stakeholders have requested not to penalize the injection of harmonics for solar energy generators. SPGs with inverters are prone to inject harmonics. These harmonics will not only affect the grid but also the equipments connected by other consumers connected to the grid. Therefore the Commission decides to follow the relevant CEA regulations in this regard and specify compensation charges to prevent polluting the grid. It is the responsibility of the generator to provide adequate filtering mechanism to limit the harmonics within the stipulated norms. It shall be done before connecting the generator to the grid and the harmonics shall be measured by the respective distribution licensee during the commissioning. If the SPGs inject the harmonics beyond the stipulated limit, they shall pay a compensation of 5% of applicable generation tariff rate to the distribution licensee in whose area the plant is located till such time it is reduced within the stipulated limit. The distribution licensee is responsible for measurement of harmonics with standard meters and issue notices for payment of compensation charges if the harmonics is beyond the stipulated limit. A minimum of 15 days notice period shall be given for payment of compensation charges.

12.11.2. In case of existing solar power generators, an initial notice shall be issued to the solar power generators by the distribution licensee for implementing harmonic

norms within three months. The harmonics shall be measured by the distribution licensee after the three months notice. This enforcement mechanism will come into force after the three months notice period and after such measurement.

12.12. Parallel operation charges

12.12.1. Solar power generators who consume power captively in the same location but wish to avail Renewable Energy Certificate(REC) may opt for paralleling of their generators with the grid without actually wheeling their power. Such generators shall have to pay 30% of applicable parallel operation charges to the respective distribution licensee as specified in the relevant regulations.

13. Directions

13.1. Quarterly reports on the quantum of energy wheeled from the solar generators for captive consumption and third party sale shall be furnished to the Commission by Tamil Nadu Transmission Corporation(TANTRANSCO)/State Load Despatch Centre(SLDC). Similar report on the solar energy purchased shall be furnished by the distribution licensee.

14. Acknowledgement

14.1. The Commission acknowledges with gratitude the contribution of the officers and staff of the Commission, the valuable guidance provided by the SAC members and the efforts taken by the stakeholders in offering their suggestions. The Commission particularly records its thanks to Indian Renewable Energy Development Agency for giving valuable inputs.

Sd/-	Sd/-	Sd/-
(G. Rajagopal)	**(S. Nagalsamy)**	**(S.Akshaya Kumar)**
Member	**Member**	**Chairman**

(By Order of the Tamil Nadu Electricity Regulatory Commission)

Sd/-
(S.Gunasekaran)
Secretary

TARIFF COMPONENTS **ANNEXURE I**

Tariff Components	Solar Photovoltaic	Solar Thermal
Capital cost	Rs. 7 Crores per MW	Rs. 12 Crores per MW
Auxiliary Consumption	-	10%
CUF	19%	23%
Operation and maintenance expenses	1.4% of the capital cost with 5.72 % escalation after 1st year	1.4% of the capital cost with 5.72 % escalation after 1st year
Insurance Cost	0.35% of net asset value	0.35% of net asset value
Life of plant and machinery	25 years	25 years
Term of Loan	10 years +1 yr Moratorium	10 years +1 yr Moratorium
Interest on loan	12.7%	12.7%
Working Capital components	One month O&M cost and two months receivables	One month O&M cost and two months receivables
Interest on working capital	13.2%	13.2%
Return on equity	20% pre tax	20% pre tax
Debt-equity ratio	70:30	70:30
Depreciation rate	3.6% on 95% of the Capital Investment	3.6% on 95% of the Capital Investment
Discount factor	10.07%	10.07%
Tariff	Rs. 7.01	Rs. 11.03
Accelerated Depreciation	Rs. 0.73	Rs. 1.15

Solar PV **[**Annexure II A]

Capital cost: Rs. 7 Crores;
PLF: 19%;
Life period: 25 years
Working Capital: O&M 1month+ Receivables 2 months
Interest on Working capital: 13.2%
Discount factor: 10.07%
O&M : 1.4% with 5.72% escalation

Residual value: 10%
RoE : 20% (pre tax)
Depreciation: 3.6%;
Debt equity ratio: 70.:30
Loan tenure: 10 years + 1 yr moratorium
Insurance : 0.35% of net asset value
Interest on loan: 12.7%

Gross Gen	1664400	1664400	1664400	1664400	1664400	1664400	1664400	1664400	1664400	1664400
Years	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
ROE	4200000	4200000	4200000	4200000	4200000	4200000	4200000	4200000	4200000	4200000
Depriciation	2394000	2394000	2394000	2394000	2394000	2394000	2394000	2394000	2394000	2394000
Insurance cost	245000	236621	228242	219863	211484	203105	194726	186347	177968	169589
Interest on Loan	6223000	6223000	5600700	4978400	4356100	3733800	3111500	2489200	1866900	1244600
O & M	980000	1036056	1095318	1157971	1224207	1294231	1368261	1446526	1529267	1616741
IOWC	326896	328599	316411	304338	292386	280562	268873	257327	245931	234696
Total	**14368896**	**14418276**	**13834672**	**13254572**	**12678177**	**12105698**	**11537360**	**10973399**	**10414066**	**9859626**
	8.633	**8.663**	**8.312**	**7.964**	**7.617**	**7.273**	**6.932**	**6.593**	**6.257**	**5.924**
IOWC										
O & M	81667	86338	91277	96498	102017	107853	114022	120544	127439	134728
Receivables	2394816	2403046	2305779	2209095	2113029	2017616	1922893	1828900	1735678	1643271
Total	2476483	2489384	2397055	2305593	2215047	2125469	2036915	1949444	1863117	1777999
IOWC	326896	328599	316411	304338	292386	280562	268873	257327	245931	234696
Discount Factor	1	0.91	0.83	0.75	0.68	0.62	0.56	0.51	0.46	0.42
Present Value	**8.63**	**7.87**	**6.86**	**5.97**	**5.19**	**4.50**	**3.90**	**3.37**	**2.90**	**2.50**
Levelised tariff	**7.01**									

Determination of Tariff for Solar PV Projects

Gross Gen	1664400	1664400	1664400	1664400	1664400	1664400	1664400	1664400	1664400	1664400
Years	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**
ROE	4200000	4200000	4200000	4200000	4200000	4200000	4200000	4200000	4200000	4200000
Depriciation	2394000	2394000	2394000	2394000	2394000	2394000	2394000	2394000	2394000	2394000
Insurance cost	161210	152831	144452	136073	127694	119315	110936	102557	94178	85799
Interest on Loan	622300									
O & M	1709219	1806986	1910346	2019617	2135139	2257269	2386385	2522886	2667196	2819759
IOWC	223629	212741	216040	219539	223248	227181	231349	235766	240447	245407
Total	**9310358**	**8766558**	**8864838**	**8969229**	**9080082**	**9197765**	**9322670**	**9455210**	**9595821**	**9744965**
	5.594	**5.267**	**5.326**	**5.389**	**5.455**	**5.526**	**5.601**	**5.681**	**5.765**	**5.855**
IOWC										
O & M	142435	150582	159195	168301	177928	188106	198865	210241	222266	234980
Receivables	1551726	1461093	1477473	1494872	1513347	1532961	1553778	1575868	1599303	1624161
Total	1694161	1611675	1636668	1663173	1691275	1721067	1752644	1786109	1821570	1859141
IOWC	223629	212741	216040	219539	223248	227181	231349	235766	240447	245407
Discount Factor	0.38	0.35	0.32	0.29	0.26	0.24	0.22	0.20	0.18	0.16
Present Value	**2.14**	**1.83**	**1.68**	**1.55**	**1.42**	**1.31**	**1.21**	**1.11**	**1.03**	**0.95**

Determination of Tariff for Solar PV Projects

Gross Gen	1664400	1664400	1664400	1664400	1664400
Years	**21**	**22**	**23**	**24**	**25**
ROE	4200000	4200000	4200000	4200000	4200000
Depriciation	2394000	2394000	2394000	2394000	2394000
Insurance cost	77420	69041	60662	52283	43904
Interest on Loan					
O & M	2981049	3151565	3331835	3522416	3723898
IOWC	250660	256226	262120	268362	274972
Total	**9903130**	**10070832**	**10248617**	**10437061**	**10636774**
	5.950	**6.051**	**6.158**	**6.271**	**6.391**
IOWC					
O & M	248421	262630	277653	293535	310325
Receivables	1650522	1678472	1708103	1739510	1772796
Total	1898942	1941102	1985756	2033045	2083120
IOWC	250660	256226	262120	268362	274972
Discount Factor	0.15	0.13	0.12	0.11	0.10
Present Value	**0.87**	**0.81**	**0.75**	**0.69**	**0.64**

Determination of accelerated depreciation benefit - Solar PV project

Determination of accelerated depreciation benefit

Depreciation amount	90%									
Book depreciation rate	5.28%									
Tax depreciation rate	80%									
Income Tax (Normal rate)	33.990%									
Capital Cost	70000000									
Years	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Book Depreciation	2.64%	5.28%	5.28%	5.28%	5.28%	5.28%	5.28%	5.28%	5.28%	5.28%
Bk dep in lakhs	1848000	3696000	3696000	3696000	3696000	3696000	3696000	3696000	3696000	3696000
Accelerated Depreciation										
Opening	100%	50%	5%	1.00%	0.20%	0.04%	0.01%	0.00%	0.000%	
Allowed	50%	45%	4.00%	0.80%	0.16%	0.03%	0.01%	0.000%	0.00	0.00
Closing	50%	5%	1.00%	0.20%	0.04%	0.01%	0.00%	0.000%	0.00	0.00
Accelerated Depreciation	35000000	31500000	2800000	560000	112000	20250	6750	0	0.00	0.00
Net dep benefit	33152000	27804000	-896000	-3136000	-3584000	-3675750	-3689250	-3696000	-3696000	-3696000
Tax benefit	11268365	9450580	-304550	-1065926	-1218202	-1249387	-1253976	-1256270	-1256270	-1256270
Discount factor	1.00	0.91	0.83	0.75	0.68	0.62	0.56	0.51	0.46	0.42
Average discount factor	1.00	0.95	0.87	0.79	0.72	0.65	0.59	0.54	0.49	0.44
Net Energy gen	832200	1664400	1664400	1664400	1664400	1664400	1664400	1664400	1664400	1664400
Energy gen with DCF	832200	1588264.32	1442958.41	1310946.13	1191011.30	1082048.97	983055.30	893118.29	811409.36	737175.76
Tax benft with DCF	11268365	9018276	-264031	-839565	-871721	-812244	-740644	-674116	-612443	-556412
AD benefit	0.73									
Levelised tariff with AD	6.28									

[Annexure II A]

Determination of accelerated depreciation benefit – Solar PV project

Years	11	12	13	14	15	16	17	18	19	20
Book Depreciation	5.28%	5.28%	5.28%	5.28%	5.28%	5.28%	5.28%	2.88%	0.00%	0.00%
Bk dep in lakhs	3696000	3696000	3696000	3696000	3696000	3696000	3696000	2016000	0	0
Accelerated Depreciation										
Opening										
Allowed	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Closing	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Accelerated Depreciation	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Net dep benefit	-3696000	-3696000	-3696000	-3696000	-3696000	-3696000	-3696000	-2016000	0.00	0.00
Tax benefit	-1256270	-1256270	-1256270	-1256270	-1256270	-1256270	-1256270	-685238	0	0
Discount factor	0.38	0.35	0.32	0.29	0.26	0.24	0.22	0.20	0.18	0.16
Average discount factor	0.40	0.37	0.33	0.30	0.27	0.25	0.23	0.21	0.19	0.17
Net Energy gen	1664400	1664400	1664400	1664400	1664400	1664400	1664400	1664400	1664400	1664400
Energy gen with DCF	669733.59	608461.52	552795.05	502221.36	456274.52	414531.22	376606.91	342152.18	310849.63	282410.85
Tax benefit with DCF	-505507	-459260	-417243	-379071	-344391	-312884	-284259	-140865	0	0

[Annexure II A]

Determination of accelerated depreciation benefit – Solar PV project project

Years	21	22	23	24	25
Book Depreciation	0.00%	0.00%	0.00%	0.00%	0.00%
Bk dep in lakhs	0	0	0	0	0
Accelerated Depreciation					
Opening					
Allowed	0.00	0.00	0.00	0.00	0.00
Closing	0.00	0.00	0.00	0.00	0.00
Accelerated Depreciation	0.00	0.00	0.00	0.00	0.00
Net dep benefit	0.00	0.00	0.00	0.00	0.00
Tax benefit	0	0	0	0	0
Discount factor	0.15	0.13	0.12	0.11	0.10
Average discount factor	0.15	0.14	0.13	0.12	0.11
Net Energy gen	1664400	1664400	1664400	1664400	1664400
Energy gen with DCF	256573.87	233100.63	211774.90	192400.20	174798.04
Tax benefit with DCF	0	0	0	0	0

Solar Thermal [Annexure II B]

Capital cost: Rs. 12 Crores;
PLF: 23%;
Depreciation: 3.6%;
Debt equity ratio: 70.:30
Loan tenure: 10 years + 1 yr moratorium
Interest on loan: 12.7%
Insurance : 0.35% of net asset value
O&M : 1.4% with 5.72% escalation

Residual value: 10%
RoE : 20% (pre tax)
Life period: 25 years
Auxiliary Consumption: 10%
Working Capital: O&M 1month+ Receivables 1 month
Interest on Working capital: 13.2%
Discount factor: 10.07%

Gross Gen	2014800	2014800	2014800	2014800	2014800	2014800	2014800	2014800	2014800	2014800
Net Gen.	1813320	1813320	1813320	1813320	1813320	1813320	1813320	1813320	1813320	1813320
Years	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
ROE	7200000	7200000	7200000	7200000	7200000	7200000	7200000	7200000	7200000	7200000
Depriciation	4104000	4104000	4104000	4104000	4104000	4104000	4104000	4104000	4104000	4104000
Insurance	420000	405636	391272	376908	362544	348180	333816	319452	305088	290724
Interest on Loan	10668000	10668000	9601200	8534400	7467600	6400800	5334000	4267200	3200400	2133600
O & M	1680000	1776096	1877689	1985092	2098640	2218682	2345591	2479758	2621601	2771556
IOWC	560393	563312	542419	521723	501233	480963	460925	441131	421597	402336
Total	**24632393**	**24717044**	**23716580**	**22722123**	**21734017**	**20752625**	**19778331**	**18811542**	**17852685**	**16902216**
	13.584	**13.631**	**13.079**	**12.531**	**11.986**	**11.445**	**10.907**	**10.374**	**9.845**	**9.321**
IOWC										
O & M	140000	148008	156474	165424	174887	184890	195466	206647	218467	230963
Receivables	4105399	4119507	3952763	3787021	3622336	3458771	3296389	3135257	2975448	2817036
Total	4245399	4267515	4109237	3952445	3797223	3643661	3491854	3341903	3193914	3047999
IOWC	560393	563312	542419	521723	501233	480963	460925	441131	421597	402336
Discount factor	1	0.91	0.83	0.75	0.68	0.62	0.56	0.51	0.46	0.42
Present value	13.58	12.38	10.80	9.40	8.17	7.08	6.13	5.30	4.57	3.93
Levelised tariff	11.03									

Determination of Tariff for Solar Thermal Projects

Gross Gen	2014800	2014800	2014800	2014800	2014800	2014800	2014800	2014800	2014800	2014800
Net Gen.	1813320	1813320	1813320	1813320	1813320	1813320	1813320	1813320	1813320	1813320
Years	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**
ROE	7200000	7200000	7200000	7200000	7200000	7200000	7200000	7200000	7200000	7200000
Depriciation	4104000	4104000	4104000	4104000	4104000	4104000	4104000	4104000	4104000	4104000
Insurance	276360	261996	247632	233268	218904	204540	190176	175812	161448	147084
Interest on Loan	1066800									
O & M	3034735	3208322	3391838	3585851	3790962	4007805	4237051	4479411	4735633	5006511
IOWC	386895	368432	374301	380525	387122	394116	401528	409383	417705	426522
Total	**16068791**	**15142750**	**15317771**	**15503644**	**15700988**	**15910461**	**16132755**	**16368605**	**16618786**	**16884117**
	8.862	**8.351**	**8.447**	**8.550**	**8.659**	**8.774**	**8.897**	**9.027**	**9.165**	**9.311**
IOWC										
O & M	252895	267360	282653	298821	315913	333984	353088	373284	394636	417209
Receivables	2678132	2523792	2552962	2583941	2616831	2651743	2688793	2728101	2769798	2814020
Total	2931026	2791152	2835615	2882762	2932745	2985727	3041880	3101385	3164434	3231229
IOWC	386895	368432	374301	380525	387122	394116	401528	409383	417705	426522
Discount factor	0.38	0.35	0.32	0.29	0.26	0.24	0.22	0.20	0.18	0.16
Present value	3.39	2.91	2.67	2.46	2.26	2.08	1.92	1.77	1.63	1.50

Determination of Tariff for Solar Thermal Projects

Gross Gen	2014800	2014800	2014800	2014800	2014800
Net Gen.	1813320	1813320	1813320	1813320	1813320
Years	**21**	**22**	**23**	**24**	**25**
ROE	7200000	7200000	7200000	7200000	7200000
Depriciation	4104000	4104000	4104000	4104000	4104000
Insurance	132720	118356	103992	89628	75264
Interest on Loan					
O & M	5292884	5595636	5915707	6254085	6611819
IOWC	435862	445754	456231	467326	479073
Total	**17165465**	**17463747**	**17779930**	**18115039**	**18470156**
	9.466	**9.631**	**9.805**	**9.990**	**10.186**
IOWC					
O & M	441074	466303	492976	521174	550985
Receivables	2860911	2910624	2963322	3019173	3078359
Total	3301985	3376928	3456297	3540347	3629344
IOWC	435862	445754	456231	467326	479073
Discount factor	0.15	0.13	0.12	0.11	0.10
Present value	1.39	1.28	1.19	1.10	1.02

[Annexure II B] .

Determination of accelerated depreciation benefit – Solar Thermal

Depreciation amount	90%
Book depreciation rate	5.28%
Tax depreciation rate	80%
Income Tax (Normal rate)	33.990%
Capital Cost	120000000

Years	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Book Depreciation	2.64%	5.28%	5.28%	5.28%	5.28%	5.28%	5.28%	5.28%	5.28%	5.28%
Bk dep in lakhs	3168000	6336000	6336000	6336000	6336000	6336000	6336000	6336000	6336000	6336000
				Accelerated Depreciation						
Opening	50%	45%	4%	0.80%	0.16%	0.03%	0.006%	0.001%	0.00%	0.00
Allowed	50%	5%	1%	0.20%	0.04%	0.01%	0.002%	0.000%	0.00%	0.00
Closing	60000000	54000000	4800000	960000	192000	36000	12000	1536	0.00%	0.00
AD										
Net dep benefit	56832000	47664000	-1536000	-5376000	-6144000	-6300000	-6324000	-6334464	-6336000	-6336000
Tax benefit	19317197	16200994	-522086	-1827302	-2088346	-2141370	-2149528	-2153084	-2153606	-2153606
Energy gen	906660.00	1813320	1813320	1813320	1813320	1813320	1813320	1813320	1813320	1813320
Discount factor	1	0.91	0.83	0.75	0.68	0.62	0.56	0.51	0.46	0.42
av DCF	1.00	0.95	0.87	0.79	0.72	0.65	0.59	0.54	0.49	0.44
DCF En gen	906660	1730372	1572065	1428241	1297575	1178864	1071013	973029	884009	803134
tax benefit with DCF	19317196.80	15459901.54	-452624.95	-1439254.40	-1494378.28	-1392133.62	-1269589.34	-1155346.66	-1049901.71	-953849.10

AD benefit	1.15
Levelised tariff with AD	9.88

[Annexure II B]

Determination of accelerated depreciation benefit – Solar Thermal

Years	10	11	12	13	14	15	16	17	18	19
Book Depreciation	5.28%	5.28%	5.28%	5.28%	5.28%	5.28%	5.28%	2.88%	0.00%	0.00%
Bk dep in lakhs	6336000	6336000	6336000	6336000	6336000	6336000	6336000	3456000	0.00	0.00
Accelerated Depreciation										
Opening	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Allowed	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Closing	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
AD	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Net dep benefit	-6336000	-6336000	-6336000	-6336000	-6336000	-6336000	-6336000	-3456000	0.00	0.00
Tax benefit	-2153606	-2153606	-2153606	-2153606	-2153606	-2153606	-2153606	-1174694	0.00	0.00
Energy gen	1813320	1813320	1813320	1813320	1813320	1813320	1813320	1813320	1813320	1813320
Discount factor	0.38	0.35	0.32	0.29	0.26	0.24	0.22	0.20	0.18	0.16
av DCF	0.40	0.37	0.33	0.30	0.27	0.25	0.23	0.21	0.19	0.17
DCF En gen	729657	662903	602256	547157	497099	451621	410303	372766	338662	307679
tax benefit with DCF	-866584.08	-787302.70	-715274.55	-649836.06	-590384.36	-536371.72	-487300.56	-241482.97	0.00	0.00

Determination of accelerated depreciation benefit – Solar Thermal

Years	21	22	23	24	25
Book Depreciation	0.00%	0.00%	0.00%	0.00%	0.00%
Bk dep in lakhs	0.00	0.00	0.00	0.00	0.00
Accelerated Depreciation					
Opening	0.00	0.00	0.00	0.00	0.00
Allowed	0.00	0.00	0.00	0.00	0.00
Closing	0.00	0.00	0.00	0.00	0.00
AD	0.00	0.00	0.00	0.00	0.00
Net dep benefit	0.00	0.00	0.00	0.00	0.00
Tax benefit	0.00	0.00	0.00	0.00	0.00
Energy gen	1813320	1813320	1813320	1813320	1813320
Discount factor	0.15	0.13	0.12	0.11	0.10
av DCF	0.15	0.14	0.13	0.12	0.11
DCF En gen	279530	253957	230723	209615	190438
tax benefit with DCF	0.00	0.00	0.00	0.00	0.00

.

Annexure – III

Abstract of comments received from various stakeholders on " Consultative paper on Comprehensive Tariff order for Solar Power"

1. Capital cost/MW in Crores

M/s.Auroville Consulting, Auroville

Capital cost should take into account depreciation of Indian Rupee against USD. Reliance on cheap equipment is not sustainable.

M/s.Moser Baer Engineering and Constructions Limited, New Delhi

Considering the recent trend of rupee vs dollar, has suggested to consider exchange rate of Rs.58 and adjust the capital cost for Solar PV projects; Has stated that the cushion or compensation provided as additional module cost by CERC for degradation and auxiliary consumption may not be added in the capital cost but the effect of the same may be considered separately; Inverter replacement cost may be allowed as an expense in the 13th year from COD.

M/s.Sharadha Terry Products Ltd., Coimbatore

Capital cost of Rs.7 crores is low which is likely to be reversed in 3 months; Cost should include dedicated feeder cost.

Thiru Bhasker Panangadan

Depreciation of Rupee against Dollar has to be taken into account; Capital cost of SPV plant suggested as Rs.7.5 crores; This does not include the cost of replacement which is to be added to the fund flow at the appropriate time. Cost of land in Tamil Nadu is higher than in other States like Gujarat and Rajasthan. Thus, average cost per MW would not be less than Rs.8 crores.

M/s.Suncell Energy Solution, Chennai.

Has stated that cost of inverters in KW scale is high compared to large scale inverters which has an impact on projects less than 5 KW. Has requested to consider Rs.1.2 Lakhs for 5 KW or less.

M/s.Lucky YarnTex India Ltd., Erode, M/s.Chemistar, Tirupur, M/s.Precision Controls, Chennai, M/s.Maris Associates P Ltd., Tuticorin, M/s.United Metal Industries, Chennai, M/s.Ganwinpo Infrastructure P Ltd., Chennai, M/s.Cher n Weaves India P Ltd., Erode, M/s.Mirra and Mirra Industries, Chennai, M/s.IL&FS Development Company Ltd., Gurgaon, M/s.TATA Power Solar, Bangalore

Have all suggested a capital cost of Rs.8.5 crores.

M/s.Sri Ganesh Windpower Engineers P Ltd., Kanyakumari, M/s.Cape Engineers P Ltd., Kanyakumari, M/s.Gamma Tech(India) P Ltd., Kanyakumari, M/s.Hero Future energies Ltd., New Delhi, M/s.Archer Power Products P Ltd., Chennai, M/s. Alectrona Energy P Ltd., Chennai, M/s.Zynergy Solar Projects & Services Pvt.Ltd., Chennai, M/s.Raasi Green earth energy P Ltd., Bangalore, M/s.Solar Energy Equipments Technologies P Ltd., Chennai, M/s.Emami Cement Ltd., Kolkata, M/s. KSK Energy Ventures Ltd., Hyderabad,

M/s.Renew Power Ventures P Ltd., Gurgaon, M/s.Borg Energy India Pvt Ltd, Chennai, Thiru D.S Hanumantha Rao, Chennai

All have suggested a capital cost of Rs.8 crores.

M/s.Green Infra Ltd., New Delhi, M/s.Nordic India Solutions P Ltd., Chennai, M/s.Aditya Birla Management Corporation P Ltd., Mumbai

Have suggested a capital cost of Rs.9 crores.

M/s.Astonfield Renewables, New Delhi.

Has suggested Rs.875 lakhs per MW.

M/s. Larsen & Toubro, Chennai

Capital cost of Rs.8.6 crores for solar PV and Rs.13 crores for solar thermal suggested.

M/s.JUWI India Renewable Energies Pvt. Ltd., Bangalore

Has stated that project cost proposed is too aggressive; Effect of price drop of modules are being wiped out by price increment of steel, copper, aluminium etc.; Has sought splitup based on cost of PV modules, additional module cost against degradation, land cost, power conditioning unit, evacuation cost, civil and general expenses, maintenance, preliminary and pre-operative expenses.

M/s. Rudraksh energy, Jaipur.

Has stated that capital cost should be Rs.7.25-7.5 Crores/MW; Further has sought whether the cost is for 1 MW DC or AC and whether transmission line cost is included.

M/s.Acme Solar Energy P Ltd., Haryana

Has requested for a capital cost of Rs.8.69 crores.

M/s.REX Projects India P Ltd., Chennai

Has suggested a capital cost of Rs.8 crores for SPV and Rs.13 crores for solar thermal.

M/s.Welspun, Mumbai

Capital cost of Rs.10 to 11 crores suggested.

M/s.Refex Energy, Mumbai

Capital cost of Rs.8.05 crores suggested.

M/s.GMR Energy Ltd., Bangalore.

Norm of Rs.7 crores is very much on the lower side; Has requested to revisit the proposal.

M/s.Atha Group, Odisha

Capital cost is unlikely to be below Rs.9 crores/MW.

Citizen Consumer and Civic action group, Chennai.

Has suggested capital cost of Rs.8 crores/MW as per CERC order 2013-2014.

M/s.GRT Group, Chennai

Has sought a revision in capital cost.

M/s.First Solar Power India, New Delhi

Capital cost of Rs.7.5 crores suggested.

M/s.MEMC ,Sun Edison, National Solar Energy Federation of India, Ahmedabad

Capital cost of Rs. 8.4 crores suggested.

M/s.BEE Solar Power Ltd.,Chennai, M/s.OPG Energy, Chennai, M/s.BRICS Solar, Chennai.

Have suggested a capital cost of Rs.12 crores for solar thermal plants and Rs.8 crores for solar PV projects .

Indian Renewable Energy Development Agency.

Has suggested capital cost for Solar PV from Rs.7- 8 crores.

TANGEDCO

Has suggested to adopt the rates as proposed by the Commission in the consultative paper.

2. Capacity Utilization factor

M/s.Moser Baer Engineering and Constructions Limited, New Delhi

Has stated that a pragmatic approach for capturing impact of degradation on tariff would be to consider reduced generation annually, considering annual degradation of 0.5% from fourth year onwards, and suggested CUF at 19%.

M/s.Sharadha Terry Products Ltd., Coimbatore

Has suggested to consider plant utilization factor of 16% as evacuation is not full.

M/s.Lucky Yarn Tex India Ltd., Erode, M/s. Chemistar, Tirupur, M/s.Precision Controls, Chennai, M/s. Maris Associates P Ltd., Tuticorin, M/s.Sri Ganesh Windpower Engineers P Ltd., Kanyakumari, M/s.United Metal Industries, Chennai, M/s.Ganwinpo Infrastructure P Ltd., M/s.Cape Engineers P Ltd., Kanyakumari, M/s.Gamma Tech(India)P Ltd., Kanyakumari, M/s.Cher n Weaves India P Ltd., M/s.Mirra and Mirra Industries, Chennai, M/s.Aditya Birla Management Corporation P Ltd., M/s.Hero Future energies Ltd., New Delhi

Have all suggested a capacity utilization factor of 17%.

M/s.IL&FS Energy Development Company Ltd., Gurgaon, M/s.Green Infra Ltd., New Delhi, M/s.Refex Energy, Mumbai, M/s.Emami Cement Ltd., Kolkata, M/s. TATA Power Solar, Bangalore.

Have suggested a capacity utilization factor of 18%.

M/s. Larsen & Toubro, Chennai

Has requested to consider 17.5 % for ground based solar and 17% for rooftop solar plant.

M/s. Rudraksh energy, Jaipur

Has sought whether the capacity utilization factor of 19% corresponds to installed capacity of say 10 MW DC or 10MW AC.

M/s.REX Projects India P Ltd., Chennai

Average CUF achievable is 17% or less; Has requested to adopt actual CUF of Tamil Nadu.

M/s.Welspun, Mumbai

Has requested to consider a capacity utilization factor of 19% .

M/s.GMR energy Ltd., Bangalore,

Have sought for a revision in the capacity utilization factor.

M/s. Solar energy Equipments Technologies P Ltd., Chennai, M/s.Zynergy Solar Projects & services Pvt. Ltd.,Chennai, M/s.Archer Power products P Ltd., Chennai, M/s.Alectrona Energy P Ltd.,Chennai

To check with TEDA and TANGEDCO on grid connected solar PV plants to find out real life irradiation and net billable generation.

M/s.Atha Group, Odisha

Has stated that CUF wouldn't be more than 17.75%.

M/s.KSK Energy Ventures Ltd., Hyderabad

Has requested to consider a capacity utilization factor close to 18%.

M/s.GRT Group, Chennai

Has requested to consider a capacity utilization factor of 17.5%.

M/s. First Solar Power India, New Delhi

Has suggested a capacity utilization factor of 19%.

Ms/.BEE Solar Power Ltd.,Chennai, M/s. OPG Energy,Chennai, M/s.BRICS Solar,Chennai.

Have suggested a capacity utilization factor of 15.501%.

M/s.Renew Power Ventures Pvt. Ltd., Gurgaon

Has requested to consider a capacity utilization factor of 18%.

TANGEDCO

Has suggested 19% for Solar PV, 23% for Solar thermal and 19% for KW scale projects.

3. De-rating of plant

M/s.Consun energy Solutions Pvt.Ltd.

Has stated that de-rating of plant has not been taken into account.

M/s.Moser Baer Engineering and Constructions Limited, New Delhi

Has suggested deration at 1%.

Thiru T.Karthikeyan, Coimbatore

Has stated that degradation is about 0.5% to 1%.

M/s.IL&FS Energy Development Company Ltd., Gurgaon.

Degradation suggested at 1% p.a for 10 years and 0.65% for balance 15 years.

M/s.Nordic India Solutions P Ltd., Chennai

Has suggested to consider degradation at 0.8%.

M/s. Rudraksh Energy, Jaipur

Has suggested degradation at 0.5% to 0.75%.

M/s.Astonfield Renewables, New Delhi

Has suggested a de-rating factor of 0.5% to 1% p.a.

M/s.REX Projects India P Ltd.,Chennai, M/s.Renew Power Ventures Pvt. Ltd.,Gurgaon

Have suggested a de-rating factor of 0.25% p.a after second year.

M/s.Archer Power products P Ltd.,Chennai, M/s.Zynergy Solar Projects & services Pvt.Ltd.,Chennai , M/s.Alectrona Energy P Ltd.,Chennai, M/s.Solar Energy Equipments Technologies P Ltd.,Chennai.

Have suggested a de-rating factor of 0.25% p.a.

M/s.Hero Future energies Ltd., New Delhi, M/s.Welspun, Mumbai

Have suggested a degradation factor of 1%.

M/s.Refex Energy,Mumbai

Has suggested degradation of 90% upto 10 years and 80% thereafter.

M/s.Emami Cement Ltd.,Kolkata

Has suggested a degradation factor of 0.75% p.a.

M/s.Welspun,Mumbai

Has suggested annual deration of 1% till first 10 years and 0.67% for the next 15 years.

M/s.Aditya Birla Management Corporation P Ltd., Mumbai

Has suggested annual de-rating factor of 0.5%.

M/s.KSK Energy Ventures Ltd., Hyderabad.

Has suggested a degradation of 3.5% in the first year.

Citizen consumer and Civic action group, Chennai

Has suggested de-rating at 0.5% p.a from 4th year to 25th year.

M/s.GRT group, Chennai

Has suggested a degradation of 0.5% p.a.

M/s. First Solar Power India, New Delhi

Has suggested de-ration of 0.5% after 2 years.

Ms/.BEE Solar Power Ltd.,Chennai, M/s. OPG Energy,Chennai, M/s.BRICS Solar,Chennai.

Has suggested degradation at 0.5% p.a.

M/s.Renew Power Ventures P Ltd.,Gurgaon.

Has suggested de-rating at 0.25% every year after 2nd year.

M/s.Larsen & Toubro Ltd.,Chennai

PV modules are subject to degradation at 2.5% during 1 year and 0.75% in later years; Module degradation factor of flat 0.8% per annum throughout the plant's useful life be considered.

Thiru D.S.Hanumantha Rao, Chennai.

Has suggested degradation at 0.5% p.a.

4.Debt-Equity ratio.

M/s.KSK Energy Ventures Limited, Hyderabad.

Debt equity ratio of 70:30 is a good proposition but most banks are reluctant and insist on 65:35, hence will impact the ratios.

M/s.BRICS Solar Power Pvt. Ltd.,Chennai, M/s.OPG Energy Pvt Ltd, BEE Solar Power Pvt Ltd.

Debt equity ratio of 70:30 proposed is in line with tariff policy and existing industry practice.

TANGEDCO

Has suggested that debt equity ratio of 70:30 be adopted.

5. Term of loan

M/s. Maris Associates P Ltd., Tuticorin, M/s.Sri Ganesh Windpower Engineers P Ltd., Kanyakumari, M/s.United Metal Industries, Chennai, M/s.Ganwinpo Infrastructure P Ltd., M/s.Cape engineers P Ltd., Kanyakumari, M/s.Gamma Tech(India)P Ltd., Kanyakumari,

Have stated repayment period to be seven years.

M/s.Borg Energy India Pvt Ltd, Chennai

Has suggested a period of 6 years.

M/s.IL &FS Energy Development Company Ltd, Gurgaon, M/s.Welspun,Mumbai,

Have suggested term of loan for a period of 12 years.

M/s.JUWI India Renewable Energies Pvt Ltd, Bangalore.

Has suggested term of loan for a period of 12 years with 1 year moratorium.

M/s.Astonfield Renewables, New Delhi, M/s.Welspun, Mumbai.

Have suggested term of loan for a period of 15 years.

M/s.GRT Group, Chennai.

Has suggested repayment period of 8 years.

M/s.BRICS Solar Power Pvt. Ltd.,Chennai, M/s.OPG Energy Pvt Ltd, BEE Solar Power Pvt Ltd.

A term loan of 10 years with 1 year moratorium is in line with the existing industry practice.

Thiru.D.S.Hanumantha Rao,Chennai

Has stated that term loan period is less than that prescribed by CERC.

TANGEDCO

Has suggested that term of loan of 10 years with 1 year moratorium be adopted.

6. Interest on Loan

M/s. Auroville Consulting, Auroville.

Has requested to seek PSU banks' comments on the bankability of the projects with the proposed tariff.

M/s.Moser Baer Engineering and Constructions Limited, New Delhi

Has suggested to adopt SBI base rate prevalent during the first six months of the previous year plus 300 basis points i.e 13%.

M/s.Sharadha Terry Products Ltd, Coimbatore.

Has stated that 12% interest rate is not available in any bank.

M/s. Green Infra Ltd, New Delhi.

Has suggested interest on loan to be considered at least 13%.

M/s.Nordic India Solutions Pvt Ltd, Chennai, Larsen & Toubro, Chennai, M/s.JUWI India Renewable Energies Pvt Ltd, Bangalore, M/s.IL&FS Energy,Gurgaon, M/s.First Solar Power India, New Delhi, Ms/.BEE Solar Power Ltd., Chennai, M/s. OPG Energy, Chennai, M/s.BRICS Solar, Chennai, M/s.Hero Future Energies Ltd, New Delhi, M/s.Welspun, Mumbai, M/s. GMR Energy Limited, Bangalore, M/s.Emami Cement Ltd, Kolkata, M/s.MEMC, Sun Edison, M/s.National Solar Energy Federation of India, Ahmedabad, M/s.Renew Power Ventures Pvt Ltd, Gurgaon, M/s.Rudraksh Energy,Jaipur.

Have suggested an annual rate of interest at 13%.

M/s.KSK Energy Ventures Ltd., Hyderabad

Current rates are close to 13% to 14%. Upfront finance charges and loan sanction charges which amount to 1 to 1.5% have been ignored.

M/s. Astonfield Renewables, New Delhi.

Interest rate of 12% is considered reasonable, however linking this to SBI's Prime Lending rate is desirable; Has recommended to calculate interest on average of opening balance and closing balance of the debt for a given year.

M/s. Acme solar energy Pvt Ltd, Haryana, M/s.Refex Energy Ltd.,Mumbai.

Have suggested interest on loan at 13.25%.

M/s.Hero Future Energies Ltd, New Delhi

Has suggested interest rate at 13.5%.

M/s.GRT Group, Chennai.

Has suggested interest rate at 14%.

M/s.Solar Energy Equipments Technologies Pvt Ltd, Chennai., M/s.Zynergy Solar Projects & services Pvt.Ltd.,Chennai , M/s. Archer Power products P Ltd, Chennai, M/s. Alectrona energy Pvt Ltd, Chennai,

IREDA's interest rate is 13% and rate of interest of Power Finance Corporation is 13%. Loans from commercial banks are 14-15% for PV projects.

Citizen consumer and civic action group, Chennai.

Has suggested IREDA rate of 12.25% - 13% for SPV and 12.50% - 13.25% for Solar Thermal.

Indian Renewable Energy Development Agency.

Has requested to consider interest rate for solar PV project at 12.25% to 13% and Solar Thermal Project at 12.50% to 13.25%.

TANGEDCO

Has suggested to adopt a rate of interest of 12%.

7.Return on Equity

M/s.Green Infra Ltd, New Delhi, M/s.Rudraksh Energy, Jaipur, M/s.Acme Solar Energy Pvt Ltd, Haryana, M/s.Emami Cement Ltd, Kolkata.

Have requested to consider a rate of 20% per annum for 10 years and 24% per annum from 11th year onwards.

M/s.Moser Baer Engineering and Constructions Limited, New Delhi

Has requested to adopt norms specified by CERC for Solar PV projects with returns specified in pre-tax terms as 20% and 24% for two sub periods of 10 years and 15 years; In case MAT and IT are not linked, to consider weighted average considering time value of money with the present applicable taxes.

M/s.Astonfield Renewable, New Delhi.

Reasonable to consider ROE of 20% which shall translate to a post tax ROE of 14%; However has requested to keep return on equity and tax provision separate.

M/s.Rudraksh Energy,Jaipur.

Has suggested to consider CERC norms.

M/s.KSK Energy Ventures Limited, Hyderabad.

Has stated that ROE at 20% is achieved only after 7 years against year 1 taken in the calculations.

M/s.Renew Power Ventures Pvt.Ltd.,Gurgaon

Has suggested ROE as specified by CERC,(20% pre-tax for first 10 years and 24% pre-tax from 11th year onwards) or weighted average ROE of 22.4% pre-tax throughout the project life.

Citizen Consumer and Civic action group, Chennai.

Has suggested to consider CERC norms.

M/s.First Solar Power India, New Delhi.

Has requested to consider a rate of 16% post tax.

M/s.BEE Solar Power Ltd.,Chennai, M/s.OPG Energy,Chennai, M/s.BRICS Solar,Chennai.

Have suggested a rate of 21.21%.

M/s.GRT Group,Chennai

Has suggested equity IRR of 16% taking into account various cost inputs, uncertainties and risks attendant.

TANGEDCO.

Has requested to adopt a rate of 19.85% (pre tax) per annum.

8.Life of Plant and Machinery

M/s.Marias Association Pvt Ltd, Tuticorin, M/s.Sri Ganesh Windpower Engineers Pvt Ltd, Kanyakumari, M/s.Gamma Tech(India) Pvt Ltd, Kanyakumari,

Has requested to consider a life period of 20 years.

M/s.Larsen &Toubro, Chennai

Has stated that replacement of inverter in 14th year causes an additional cost of Rs.0.5 crores in the capital cost (Rs.1.03 Cr /MW discounted @ 5% to year 1).

M/s.BRICS Solar Power Pvt. Ltd.,Chennai, M/s.OPG Energy Pvt Ltd, BEE Solar Power Pvt Ltd.

Life of solar plant proposed as 25 years is in line with the practice in other States and CERC, and hence accepted.

M/s.Astonfield Renewables, New Delhi

Has recommended to look at replacement cost of inverters after 10 years; to consider spares at 0.5% of the project cost.

TANGEDCO

Has accepted the views of the Commission.

9. Depreciation

M/s.Moser Baer Engineering and Constructions Limited, New Delhi

Has suggested to allow differential depreciation in such a way that it fully meets the loan repayment obligation of the generator i.e 7% for years 2 to 11(70%) and balance 20% equally in other years.

M/s.Sharadha Terry Products Ltd, Coimbatore.

Has suggested that depreciation be increased to a minimum of 5%.

M/s.IL & FS Energy Development Company Ltd, Gurgaon,

Has suggested to adopt depreciation rate as per CERC's order dt.28.2.2013 on Terms and Conditions for Tariff Determination from renewable energy sources.

M/s. Consun Energy solutions Pvt. Ltd., Bangalore

Has stated that depreciation of 3.6% is very low, and that actually used is 3.06%.

M/s.Green Infra Ltd, New Delhi.

Has suggested a depreciation rate of at least 5.83% for the period equal to loan tenure.

M/s.Rudraksh Energy, Jaipur.

Has suggested a depreciation rate of 5.83% for initial period of 12 years.

M/s.Astonfield Renewables, New Delhi.

Has suggested a rate of 5.83% for first 12 years and 1.54% from 13th year onwards.

M/s.REX Projects India Pvt Ltd, Chennai

Has requested to consider CERC rates.

M/s.Aditya Birla Management Corpn Pvt Ltd.,Mumbai

Has suggested a rate of 6% for initial 10 years as a promotional measure..

M/s.Hero Future Energies Ltd, New Delhi, M/s.Welpun, Mumbai.

Have suggested a rate of 7% for 10 years and 1.33% for rest.

M/s.GMR Energy, Bangalore.

Has requested to link accelerated depreciation with loan tenure.

M/s.Emami Cement Ltd, Kolkata.

Has suggested to consider CERC norms.

M/s.First Solar Power India, New Delhi.

Has suggested a rate of 7% for the first 10 years and 1.25% per annum thereafter.

M/s.Solar Energy Equipment Technologies Pvt. Ltd.,Chennai, M/s. Archer Power products P Ltd, Chennai, M/s. Alectrona energy Pvt Ltd, Chennai, M/s.Zynergy Solar Projects & services Pvt. Ltd., Chennai.

Non depreciable component is not 15% but 10% and hence depreciation should have been allowed on 90% cost; Loan tenures are 10 years and so for a project financed by 70% debt, a depreciation rate of 7% is required.

M/s. MEMC, Sun Edison, M/s.National Solar Energy Federation of India, Ahmedabad.

Have suggested a rate of 7.69%.

M/s.BEE Solar Power Ltd.,Chennai,M/s.OPG Energy,Chennai,M/s.BRICS Solar,Chennai.

Have requested 90% depreciation on full amount of capital investment with depreciation rate during repayment period set at 10% on a straight line method as per Companies Act.

M/s.ACME Solar energy Pvt.Ltd.,Gurgaon, M/s.Hero Future Energies Pvt. Ltd.,New Delhi

Depreciation rate for first 12 years at 5.83% p.a and the remaining to be spread over useful life period of project from 13th year onwards.

M/s.Renew Power Ventures Pvt Ltd., Gurgaon.

Has suggested to consider a rate of 7% per annum for first 10 years and 1.33% for the remaining 15 years.

Thiru.D.S.Hanumantha Rao.

Rate of depreciation reduced to 3.6% for all 25 years of operation will make debt financing on a non-recourse basis a difficult proposition. Depreciation being a non cash expense, the promoter will have only 36% of project cost as against 70% of cost recovery under CERC terms; Has suggested a rate of 3.6% of capital; Accelerated depreciation not considered.

TANGEDCO

Has requested to adopt depreciation rate of 3.6%.

10. O&M expenses per annum

M/s.IL &FS Energy Development Company Ltd, Gurgaon.

Has suggested that O&M Expenses be reconsidered as per CERC and other States..

M/s.Moser Baer Engineering and Constructions Limited, New Delhi

Has proposed that base O&M cost be fixed in absolute terms and at the level with escalations fixed by CERC and has requested to fix as Rs.11.63 Lakhs/MW for 1st year i.e 2013-2014 with escalation at 5.72% per annum without linking it with capital cost.

M/s.Green infra Ltd, New Delhi.

Has suggested O&M Cost of Rs.12 lakhs / MW with per annum escalation.

M/s.Larsen &Toubro, Chennai

Has suggested O&M cost for SPV at 1.25% of capital cost with an escalation of 5.72% p.a and for solar thermal at 1.25 % of Capex with 5.72% of annual escalation.

M/s.Rudraksh Energy, Jaipur, M/s.Acme solar Energy Pvt Ltd, Haryana, M/s.Hero Future Energies Ltd, New Delhi, M/s.Welspun, Mumbai, M/s. Emami Cement Ltd, Kolkata.

Have suggested 11 lakhs /MW with escalation of 5.72% per annum.

M/s.Aditya Birla Management Corporation Pvt Ltd, Mumbai.

Has suggested Rs.12 lakhs / MW with insurance costs per annum of 0.35% of depreciated value of plant.

M/s.Archer Power Products Pvt Ltd, Chennai, M/s.Alectrona Energy Pvt Ltd, Chennai,M/s.Solar energy equipments Technologies Pvt.Ltd.,Chennai, M/s.Zynergy Solar Projects & services Pvt.Ltd.,Chennai.

Have suggested to allow O&M expenses of Rs.9 lakhs / MW.

M/s Astonfield Renewables,New Delhi

Has suggested Rs.11.63 Lakhs/MW for solar PV projects in the first year with escalation of 5.72%.

M/s.Atha Group, Odisha.

Has stated that it is unlikely that the O&M cost would be less than Rs.11.5 lakhs/ MW and even this has to be escalated by 8-10% per annum.

M/s.MEMC, Sun Edison, Hyderabad, M/s.National Solar Energy Federation of India, Ahmedabad

Have suggested O&M cost of Rs.11 lakhs /MW for fixed and Rs.13 lakhs /MW for track with escalation at 5% per annum.

M/s.KSK energy Ventures Ltd.

Has requested to consider O&M cost with an escalation at 6.7%.

M/s.Refex Energy Ltd.,Mumbai

Has suggested Rs.12 Lakhs per MW.

M/s REX Projects India Pvt.Ltd.,Chennai

Has requested to adopt CERC rates.

M/s.BEE Solar Power Pvt Ltd, Chennai, M/s.OPG Energy, Chennai, M/s.BRICS Solar, Chennai

Have suggested O&M cost for SPV at 1.375% of capital cost with an annual escalation of 5.72% and for solar thermal at 1.15% with an annual escalation of 5.72% along with insurance cost @ 0.25% of capital cost.

M/s.Renew Power Ventures Pvt Ltd, Gurgaon.

Has suggested O&M cost of Rs.11.63 lakhs /MW.

M/s.Rudraksh Energy,Jaipur

Has suggested Rs.11 Lakhs/MW for first year with escalation of 5.72% p.a.

M/s.ACME Solar Energy Ltd.,Gurgaon,

Has suggested Rs.11.63 Lakhs/MW with escalation of 5.72%.

TANGEDCO

Has suggested that operation and maintenance cost of 1.1% on the total capital cost be adopted.

11. Insurance Expenditure per annum

M/s.Aditya Birla Management Corporation Pvt Ltd, Mumbai.

Has suggested that insurance cost is 0.35% of depreciated value of plant.

12. Interest and components of working capital

M/s.Moser Baer Engineering and Constructions Limited, New Delhi

Has suggested to follow principles and methodology adopted by CERC.

M/s.Green Infra Ltd, New Delhi.

Has suggested Interest on working capital at 13.5% and to consider receivables equivalent to 3 months.

M/s.Astonfield Renewables, New Delhi.

Has suggested Interest on working capital at 13.5%.

M/s.Larsen & Toubro, Chennai, M/s.Emami Cement Ltd., Kolkata

Has suggested that interest on working capital should be at 13%.

M/s.Lucky YarnTex India Ltd., Erode, M/s.Chemistar, Tirupur, M/s.Precision Controls, Chennai, M/s.Maris Associates P Ltd., Tuticorin, Sri Ganesh Wind Power Pvt Ltd, Kanyakumari, M/s.United Metal Industries, Chennai, M/s.Ganwinpo Infrastructure P Ltd., M/s.Gamma Tech (India) Pvt Ltd, Kanyakumari, Sri. M/s.Cher n Weaves India P Ltd., M/s.Mirra and Mirra Industries, Chennai.

Have suggested interest on working capital at 14%.

M/s.JUWI India Renewable Energies Pvt Ltd, Bangalore.

Has suggested that interest on working capital should be at 13.5% and to consider two months O&M cost and two months receivables as working capital components.

M/s.Acme Solar Energy Pvt ltd, Haryana.

Has suggested interest on working capital of 13.75%.

M/s.Aditya Birla Management Corporation Pvt Ltd, Mumbai.

Has suggested to consider 1.5 months of receivables .

M/s.Refex Energy, Mumbai.

Has suggested that interest on working capital of 14.5%.

M/s.Solar Energy Equipments Technologies Pvt Ltd, Chennai, M/s.Zynergy Solar Projects & services Pvt.Ltd.,Chennai, M/s.Archer Power Products Pvt Ltd, Chennai, M/s.Alectrona Energy Pvt Ltd, Chennai.

Two months receivables and expenses to be funded; Essential that spares for maintenance are provided for in the working capital.

M/s. Welspun, Mumbai

Has requested to consider interest on working capital for 2 months receivables, 1 month O&M expenses plus 15% of O&M expenses towards spares.

M/s.Atha Group, Odisha.

Has suggested interest on working capital at 13.5 – 14.5%.

M/s.First Solar Power India, New Delhi.

Has suggested to consider interest rate as per CERC norms.

M/s.BEE Solar Power Ltd, Chennai, M/s.OPG Energy, Chennai, M/s.BRICS Solar, Chennai.

Have requested to consider two months of receivables in the estimation of working capital; To grant expenses incurred towards maintenance spares at the rate of 15% of O&M expenses as a component of working capital.

TANGEDCO

Has suggested to adopt an interest rate of 12.5% on working capital.

13. Infrastructure Development Charges

Citizen Consumer and Civic Action Group.

Has requested to consider IDC in case of capital cost review.

14.Auxiliary Consumption

M/s.Moser Baer Engineering and Constructions Limited, New Delhi

Has suggested that at least 0.25% may be considered as normative auxiliary consumption as being adopted by GERC, RERC and MPERC.

M/s.Larsen & Toubro, Chennai

Has suggested auxiliary consumption of 0.25% for SPV and 10% for solar thermal.

M/s.Acme Solar Energy P Ltd., Haryana

Has suggested auxiliary consumption at 0.25% of gross generation.

M/s. Archer Power Products P Ltd., Chennai, M/s.Alectrona energy P Ltd., Chennai, M/s.Solar Energy Equipments Technologies Pvt. Ltd., Chennai, M/s.Refex energy, Mumbai, M/s.Emami Cement Ltd, Kolkata, M/s. First Solar Power India, New Delhi, M/s.Astonfield renewable,New Delhi.

Have suggested auxiliary consumption of 0.25%.

M/s. KSK energy Ventures Ltd, Hyderabad

Has suggested auxiliary consumption of 1.01%.

M/s.BEE Solar Power Ltd, Chennai, OPG Energy, Chennai, BRICS Solar, Chennai

Have requested to consider auxiliary consumption as per CERC norms.

M/s.IL&FS Energy Development Company Ltd.,Gurgaon

Has suggested auxiliary consumption component of 1%.

Thiru D.S.Hanumantha Rao,Chennai

Since the project includes AC side also upto pooling station for connectivity, it will be essential that the losses in transformation to AC and the transmission losses are treated as auxiliary consumption for all intents and purposes, since the metering will be at the pooling station.

TANGEDCO

Has concurred with Commission's views.

15. Control period

M/s. Emami Cement Ltd., Kolkata

Has suggested at least a period of two years.

M/s. Raasi Green Earth Energy (P) Ltd., Bangalore

Control period of 1 year is too short a time.

M/s.Moser Baer Engineering and Constructions Limited, New Delhi

Has suggested that the control period be at least two years.

M/s.Welspun, Mumbai

Has suggested a control period of two years.

M/s.Green Infra Ltd, New Delhi.

Has requested to modify control period to two years.

M/s.Auroville Consulting,Auroville

Has recommended that solar power tariff is fixed every year in the month of September for projects that are commissioned during the following financial year.

TANGEDCO

Has suggested a control period of 1 year and a tariff period of 25 years.

16. Banking Mechanism

M/s.Green Infra Ltd, New Delhi

Has suggested that banking facility be allowed.

M/s.Kiran Energy Solar Pvt Ltd, Mumbai.

Has suggested for banking charges of 5% & procurement of lapsed banked energy at 75% of preferential tariff.

M/s. JUWI India Renewable Energies P Ltd, Bangalore

Has requested to extend banking facility.

REX Projects India P Ltd., Chennai

Has suggested banking facility be incorporated.

M/s.Renew Power Ventures P Ltd., Gurgaon

Has suggested banking facility be allowed.

M/s.Aditya Birla Management Corporation Pvt Ltd, Mumbai.

Has requested to state on banking facility.

17.Transmission and Wheeling Charges

M/s.Moser Baer Engineering and Constructions Limited

Has requested that Solar power plants be exempted from Transmission and Wheeling charges.

Sri Ganesh Windpower Engineers Pvt Ltd, Kanyakumari

Has requested to exempt from transmission and wheeling charges.

M/s.Gamma Tech(India) P Ltd, Kanyakumari

Has requested to exempt from transmission and wheeling charges.

M/s.Kiran energy Solar P Ltd.,Mumbai

Has sought for concessional open access charges at 5% for HT and 7.5% for LT.

M/s.Larsen & Toubro, Chennai

Has sought open access charges at 5% for HT and 7.5% for LT (inclusive of transmission, wheeling and scheduling, system operation charges).

M/s.JUWI India Renewable Energies P Ltd, Bangalore

Has suggested 10% as promotional transmission and wheeling charges for 3-4 years; Separate open access charges for Solar projects opting REC route and non REC route.

M/s.REX Projects India P Ltd., Chennai

Has suggested t ransmission & wheeling charges and losses at 5%.

M/s. Solar Energy Equipments Technologies Pvt Ltd, Chennai, M/s.Archer Power Products Pvt Ltd, Chennai, M/s.Alectrona Energy Pvt Ltd, Chennai.

Has requested withdrawal of all open access charges for at least 5 years; Levy of transmission charges which is based on MW and not MWhr causes a disproportionate burden on solar projects vis a vis conventional sources of power.

M/s. First Solar Power India (P) Ltd New Delhi.

Has requested to exempt levy of open access charges for first 3 years of control period until significant capacity addition takes place within the state and therefore levy 30% of transmission and wheeling charges as applicable to conventional power. The transmission / wheeling charges in case of solar power wheeling should be denominated in terms of Rs/kWh instead of Rs/MW/month or Rs/MW/day.

M/s.Renew Power Ventures P Ltd., Gurgaon

Has sought exemption from open access for initial period.

M/s.Tamil Nadu Newsprint and Papers Ltd.,Kagithapuram

Has suggested that no transmission, wheeling charges be levied for the first five years of commissioning and charges equal to 20% wheeling charges of fossil fuel based power levied beyond 5 years; Has sought exemption of SPGs from actual line losses.

Citizen consumer and civic action group, Chennai

Has suggested for cost sharing arrangements between utility and developer for open access; If borne by developer, the same to be reflected in the tariff order.

TANGEDCO

Has suggested to fix 30%(in each) of Transmission ,wheeling charges as applicable to conventional power.

18. Cross subsidy surcharge

M/s. Larsen & Toubro, Mumbai.

Has requested for waiver of entire cross subsidy surcharge.

M/s.Auroville Consulting, Auroville

Has suggested that all plants with a capacity less than 1 MW be exempted from cross subsidy charges.

M/s. GMR Energy Ltd., Bangalore

Has requested not to levy cross subsidy surcharge at least for RPO requirement.

M/s.JUWI India Renewable Energies P Ltd, Bangalore

Cross subsidy should be zero for third party and open access consumer.

M/s. REX Projects India P Ltd., Chennai

Has sought for full waiver of cross subsidy.

M/s.First Solar Power India, New Delhi.

Has sought for exemption of cross subsidy for third party OA.

M/s.Kiran Energy Solar Power Private Ltd.,Mumbai

Has sought waiver of cross subsidy charges.

M/s.Solar Energy Equipments Technologies Pvt Ltd, Chennai.

Has sought withdrawal of cross subsidy charges for at least a period of 5 years.

M/s.Renew Power Ventures P Ltd, Gurgaon.

Has sought for exemption for cross subsidy surcharge for initial period.

TANGEDCO

Has suggested to adopt 50% as cross subsidy surcharge for third party open access consumers.

19. CDM Benefits

M/s.United Metal Industries, Chennai, Lucky Yarn Tex India Ltd, Erode, Chemistar, Tirupur, Precision Controls, Chennai, Sri Ganesh windpower Engineers P Ltd, Kanyakumari, United Metal Industries, Chennai, Gamma Tech(india) P Ltd, Kanyakumari, Cher n Weaves India P Ltd, Mirra and Mirra Industries, Chennai

Have suggested that CDM benefits be ignored.

TANGEDCO

Has concurred with the views of the Commission.

20.Reactive Power Charges

M/s. Auroville Consulting, Auroville

Has requested that all plants with a capacity < 1 MW may be exempted from reactive power charges.

TANGEDCO

Has concurred with the views of the Commission.

21. Grid availability charges

M/s. Auroville Consulting, Auroville

Has requested that all plants with a capacity < 1 MW may be exempted from grid availability charges.

M/s. KSK energy Ventures Ltd, Hyderabad

Has requested that grid availability charges may be considered as 90 – 95%.

22.Scheduling and system operation charges

Sri Ganesh Windpower Engineers, Kanyakumari

Has requested to exempt from system scheduling charges.

M/s. Gamma Tech(India) Pvt Ltd, Kanyakumari

Has requested to exempt from system scheduling charges.

M/s.Kiran Energy Solar Power Pvt Ltd, Mumbai

Has requested that scheduling, system operation charges be waived.

M/s. JUWI India Renewable Energies Pvt Ltd, Bangalore

Has requested that 10% of scheduling charges for 3-4 years be considered.

TANGEDCO

Has suggested to fix 30% of scheduling and system operating charges as applicable to conventional power.

23. Billing and Payment

M/s.Moser Baer Engineering and Constructions Limited

Hon'ble Commission has proposed that the Solar Power Generator(SPG) shall raise the bill every month for the net energy sold after deducting the charges for power drawn from distribution licensee, reactive power charges etc. the proposed provision will double count the deductions which is incorrect as the net energy sold to Distribution licensee would have accounted for the drawal of energy by SPG. Moreover the SPGs regularly need power from the local distribution licensee as there is a limitation for SPGs that it cannot generate during night hours. This drawal can be netted off in the monthly bills to be raised by SPGs. Has requested to consider the above suggestions.

M/s.Emami Cement Ltd, Kolkata

Has requested that rate of interest for delayed payment beyond 30 days be kept at least 5% over SBI rate.

M/s.BRICS Solar Power Pvt. Ltd.,Chennai, M/s.OPG Energy Pvt Ltd, BEE Solar Power Pvt Ltd.

Have requested to allow late payment surcharge of 1.25%.

M/s.Larsen & Toubro Ltd.,Chennai

Has suggested not to implement ABT for solar power projects.

M/s.Auroville consulting, Auroville

For defaults by the Distribution licensee, has suggested an interest rate at 1.2 times the working capital interest rate.

TANGEDCO

Has requested to waive the levy of interest at the rate of 1% for the delayed payment.

24.Payment security and security deposit

TANGEDCO

Has agreed with the views of the Commission.

25. Energy Purchase and Wheeling Agreement

M/s.Welspun,Mumbai

Energy Purchase Agreement (EPA) should reflect payment mechanism, provision for change in capital cost, third party sales, provision for assigning EPA with respect to lenders.

Thiru D.S.Hanumantha Rao,Chennai

Regulation to be amended such that EPA undergoes compulsory review every 5 years.

TANGEDCO

Has suggested that TANGEDCO shall execute PPA with the SPG after finalizing power evacuation.

26. Special treatments, according to project capacity

M/s.Auroville Consulting,Auroville

Specific categories for KW and MW scale projects to be followed as below:

a)above 1 MW(b) 101 KW – 1000 KW, (c) below 101 KW.

Suggested revised rates with revised parameters for calculation of tariff for projects of less than 1MW,101 KW – 1000 KW,KW scale projects, solar thermal projects at levelised tariff; All plants with a capacity less than 1 MW be exempted from open access, cross subsidy, lineloss, reactive power, grid availability and stand by charges; solar tariff to be fixed in the month of September every year for financial closure by projects on the basis of the then prevailing solar tariff.

27. Other Issues

M/s. Auroville Consulting, Auroville

Has suggested to consider escalated model or levelised cost instead of average cost.

M/s.IL & FS Energy Development Company Ltd.,Gurgaon, M/s.Aston filed renewable, New Delhi,M/s.BEE Solar Power Ltd.,Chennai, M/s.OPG Energy,Chennai, M/s.BRICS Solar,Chennai, M/s. JUWI India Renewable Energies Pvt Ltd, Bangalore, M/s/Atha Group, M/s.IL&FS Energy Development Company Ltd.,Gurgaon.

Have suggested adoption of levelised tariff.

M/s.Moser Baer Engineering and Constructions Limited, New Delhi

Metering of solar power generation is done at the outgoing feeder of the SPGs switchyard and the SPGs who will sell power to the Distribution licensee, the losses will be accounted on part of the buyer, distribution licensee. Has requested to amend the provision accordingly.

Has suggested that discount factor be equal to the return on equity; If methodology adopted by CERC is adopted, computation of discount factor has to be considered as post tax cost of debt and post tax cost of equity with each one weighted and has provided various illustrations.

M/s.Renew Power Ventures P Ltd, Gurgaon.

Has requested to determine levelised solar tariff using time value of money instead of using simple average method.

M/s.Green Infra Ltd.,New Delhi

Has requested to fix suitable reference tariff and invite competitive bidding for RPO requirements.

M/s.Aditya Birla Management Corporation Pvt. Ltd., Mumbai

Has suggested calculation of tariffs using levelised cost methodology; Has suggested that tariffs be increased adequately to provide a DCSR of at least 1.5.

M/s.Tamil Nadu Newsprint and Papers Ltd.,Kagithapuram

Has sought exemption from lineloss for SPG; To permit adjustment in any slot for HT; not to levy penalty for exceeding harmonic limit; sought for deemed demand concept and adjustment of 1.5 units of power drawn for 1 unit of solar energy generated.

M/s.Rudraksh Energy,Jaipur

Has requested for metering for energy accounting and billing at transformer output in the generating plant or at the receiving GSS of transmission company; Has requested that solar RPO with equivalent MW capacity be prescribed for 2013-14, 2014-15.

M/s,REX Projects India P Ltd.,Chennai

Has sought for deemed demand benefit; To do away with slotwise adjustment; Adjustment during same billing period proposed; Has suggested sale of balance energy at a rate of 75% of preferential tariff and excess at APPC rate to avail REC.

M/s.Sharadha Terry Products Ltd.,Coimbatore

Has suggested to fix tariff based on IRR or present values methods which are standard accounting procedures.

M/s.Welspun,Mumbai

Has sought for cost plus levelised tariff with a discounting factor of 13.1%.

M/s.Kiran Energy Solar Power Pvt Ltd, Mumbai

Has requested to exempt from TOD slotwise adjustment for initial period; not to apply ABT.

M/s.BGR Energy systems Ltd.,Chennai

Tariff needs upward revision. Has requested review of tariff.

M/s.Emami Cement Ltd.,Kolkata

Has sought for reworking of tariff adopting levelised tariff considering time value of money; Has requested to prescribe solar RPO along with the equivalent MW capacity for 2013-14 & 2014-15 so that according to this capacity PPA may be signed; To cover the tariff arrived by TANGEDCO through bidding process in the order so as to avoid ambiguity. Also, has sought to clarify whether metering for energy accounting & billing will be done at transformer output of the generating plant or at the receiving GSS of the Transmission company.

M/s.BRICS Solar Power Pvt. Ltd.,Chennai, M/s.OPG Energy Pvt Ltd, BEE Solar Power Pvt Ltd.

Has sought concession in standby charges i.e 30 % of the temporary tariff rate proposed; In case of open access, balance energy from a solar generator on a monthly basis shall be charged at the same rate as fixed for normal power generation; TANGEDCO has the first duty to satisfy SPO.

Thiru D.S.Hanumantha Rao,Chennai

Pricing of peak availability to offset peak need with solar power is not recognized; To issue a generalized tariff order for solar photovoltaic and solar thermal projects. With two meters, an export-import meter and a solar energy meter, it is doubtful whether KW scale projects are implementable at the domestic front within a cost of Rs.1 Lakh.

Thiru Akshay Kumar Pradhan,Chennai

If unit to unit adjustment is allowed under clause 12.4.1.1, the generators under RPSSGP scheme will have to pay Rs.18.45/Kwh towards the charges for startup/standby power in contravention of TNERC Tariff order dt.20.6.2013 which says tariff applicable for start up/standby power is Rs.10.68/kwh. Suggested to amend clause 12.4.1.1.

Citizen consumer and civic action group, Chennai

Has requested that whole sale price index of steel and components, IDC and financing cost, erection and commissioning and land and civil works be considered in case of capital cost review.

TANGEDCO

Has sought for separate tariff rate i.e temporary supply tariff for plant start up as in case of bio mass and cogen; Has suggested that upper limit for KW scale projects at LT level be fixed as 20 KW; Has concurred with the views of the Commission on metering, power factor disincentive, connectivity and evacuation of power and harmonics.

Has suggested that at the end of the billing month, the balance energy may be paid at the rate of 75% of the applicable solar tariff rate; Has requested to fix transmission and wheeling charges for mere parallel operation of solar power generator stating that under REC schemes the developers are allowed to connect their solar power plant in the existing HT line feeding their HT connection and the point of solar power injection and point of drawal of captive user will be the same location.