TAMIL NADU ELECTRICITY REGULATORY COMMISSION

Consultative Paper on "Comprehensive Tariff Order on Solar Power"

(Comments/Suggestions are invited on or before 10.03.2016)

1. Introduction

1.1 The importance of Solar Energy

1.1.1 Solar energy is a completely free source of energy and is found in abundance. It is one of the cleanest sources of energy that is ecologically acceptable and helps combat the greenhouse effect caused by the use of fossil fuels. The country has a massive potential of solar energy resource. Tamil Nadu has reasonably high solar insolation (5.5 to 6 kW/m^2) with around 300 clear sunny days in a year. With substantial solar insolation in the state, and an emerging market for solar energy at competitive rates, it is considered essential to utilize this major source of renewable energy.

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 eleven Tariff orders in respect of various renewable sources of energy in accordance with section 86(1)(e) of the Electricity Act, 2003. The Government of India through the Ministry of New and Renewable Energy launched the Jawaharlal Nehru National Solar Mission (JNNSM) in 2009 to promote the grid connected and off grid solar 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 Photo Voltaic (PV) and Solar Thermal power under the Jawaharlal Nehru National Solar Mission .

1.3 Need for the Consultative paper

1.3.1 The Government of Tamil Nadu launched the Tamil Nadu Solar Energy Policy 2012 to promote solar energy. 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 the Government of India, the Commission issued a "Comprehensive Tariff Order on Solar Power" on 12.9.2014, for purchase of solar power by distribution licensees in the State and to deal with other related issues on the matter. The control period of this order was for one year which was further extended by an order dt.1.4.2015 for a period of one year from the date of the said order. As the existing control period comes to a close, the Commission proposes to issue a 'Comprehensive Tariff Order on Solar Power' for the next control period. Hence, Commission has evolved this consultative paper duly inviting comments/suggestions from stakeholders.

2. Technology

2.1 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.

2.2 Solar thermal technologies, also known as concentrated solar thermal (CST) technologies, typically concentrate on the direct component of sunlight 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 the primary solar thermal technologies. In addition to different types of construction of reflectors, these technologies also differ based on reliability, maturity, and economics.

2.3. Standards

2.3.1 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. 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, 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 procedure 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. Considering the fact that it will take some time before non-conventional technologies compete, in terms of cost, with conventional sources, the Commission may determine an appropriate differential in prices to promote these technologies."

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 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 upto 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

This consultative paper has been prepared in consonance with Commission's regulation on "Power Procurement from New and Renewable Sources of Energy Regulations, 2008" notified on 8.02.2008 and its subsequent amendments.

4. Power position in Tamil Nadu

4.1. The generating capacity connected to the TANGEDCO's grid including the allocation from Central Generating stations is 13351 MW as on 31/12/2015 comprising of 4,660 MW from TANGEDCO's four thermal stations, 516 MW from four gas turbine stations, 2288 MW from hydro stations, 320 MW from private generating stations, 68 MW as contribution to Tamil Nadu grid by sale of electricity from captive generating and biomass plants, 5464 MW as Tamil Nadu's share from central generating stations and 35 MW as external assistance.

4.2. Generating capacity from privately owned wind farms is 7506 MW as on 31/12/2015. The installed capacity of cogeneration in sugar mills is 659 MW and biomass power projects is 230 MW. The installed capacity of solar PV project is 409 MW.

4.3. The present demand in the State is around 13700 MW. The expected peak may vary from 14200 MW to 14800 MW. The peak power requirement is

increasing at the rate of around 8% annually in the State and the demand is always exceeding the supply. Therefore any capacity addition at this time will help the State to a great extent to tide over the power shortage prevailing in the State.

5. Solar power projects in Tamil Nadu

5.1 Solar plants commissioned:

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 of 1 MW capacity each 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. Under REC scheme a project of 1 MW capacity has been commissioned in May 2012. Capacity to the tune of 392 MW have been commissioned by private developers.

6. Applicability of the proposed order

6.1 The Order shall come into force from the date succeeding the date of expiry of the control period of the last tariff order No.7 of 2014 dt.12.9.2014 read with order No.4 of 2015 dt.01.04.2015 on Solar power. The tariff fixed in the order shall be applicable to all solar power plants commissioned during the control

period of the Order. The tariff is applicable for purchase of solar power by Distribution Licensee from Solar Power Generators(SPGs). The open access charges and other terms and conditions specified in the proposed Order shall be applicable to all the SPGs, 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 Regulations, 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."

The Commission has prepared this consultative paper to elicit the views and suggestions of the stake holders.

8. Tariff / Pricing Methodology

8.1 Tariff / Pricing Methodology specified in Regulation 4 of the Commission's Renewable 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 decide 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 consider to permit an allowance / disincentive based on technology, fuel, market risk, environmental benefits and social impact etc., of each type of new and renewable source.

(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. The order proposed to be issued is to mainly provide for power purchase by distribution licensees to meet their Renewable Purchase Obligation as specified in the Commission's Regulations. Capacity of most of the Solar Photovoltaic and Solar Thermal

projects is limited to a few MWs. They have mostly adopted similar technology with minor modifications. The Commission proposes 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. 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. The Commission in the last tariff order for solar power adopted cost plus single part levelised tariff taking into account the Accelerated Depreciation(AD) benefit as done by CERC and many other SERCs. The Commission proposes to adopt the same for this order on solar power.

8.4. Single Part vs. 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. Operations, maintenance and insurance cost could be taken care of by adopting suitable parameters. Therefore, the Commission proposes to continue with the single-part tariff for solar energy generation.

9. Tariff Components

9.1 The Commission has carried out a detailed analysis of the existing policies/procedures and commercial mechanisms in respect of power generation from Solar based power plants. The tariff determined in a cost plus scenario, would depend significantly on the following operating and financial parameters:

1. Capital Cost
2. Capacity Utilization Factor
3. Operation and Maintenance expenses
4. Insurance cost
5. Debt – Equity ratio
6. Term of Loan and Interest
7. Life of plant and machinery
8. Interest on Working Capital
9. Return on Equity
10. Depreciation
11. Auxiliary consumption

9.2 Capital Cost

9.2.1 The capital cost is one of the most important parameters for Solar Photovoltaic/ Solar Thermal power projects for tariff determination. The cost of the equipments involved is an important factor in determination of overall cost of the plants. The main components of a photovoltaic power plant are the photo voltaic modules, inverters, module mounting structures, control panels,

switchyard etc. Apart from the above, erection of power plant involves cost of land, civil works and evacuation infrastructure.

9.2.2 The pricing trend in the Photo Voltaic industry indicate continuous drop in cost of PV modules. There is also a decrease in the cost of invertors. With advancements in technology, higher capacity utilization factors have been reported.

9.2.3 The Commission in its earlier tariff order on Solar power issued on 12.9.2014 had fixed a capital cost of Rs.7 Crores/MW and Rs.12 Crores/MW for Solar Thermal power projects respectively. The capital cost adopted by other Commissions inclusive of CERC are tabulated below:

Sl. No	**Agencies**	**Reference**	**Capital cost**	
			Solar PV Rs. Crores/MW	**Solar Thermal Rs. Crores/MW**
1.	CERC	Order dt.31-03-2015	6.0585	12.00
2.	GERC	Order No.3 of 2015 dt.17.08.2015	6.15	12.00
3.	RERC	Order dated 19-06-2015	5.968	11.823
4.	MERC	Draft order dt.01.12.2015	6.0585	12.00
5.	CERC	Draft order on Benchmark capital cost of Solar PV and Solar Thermal dt.23.12.2015	5.0132	12.00

9.2.4. The capital costs of Solar PV power plants are consistently on the decline. The capital cost of Rs.10 Crores/MW for Solar PV was adopted by the CERC in its Order issued on 27.03.2012. However, for solar thermal, the decline in capital cost is less due to its conventional constituent of the capital

equipments. Therefore, the Commission proposes to adopt a Capital Cost of Rs 5.05 Crores per MW in respect of Solar Photovoltaic power projects and Rs.12 Crores per MW for Solar Thermal projects. The Capital cost as proposed is inclusive of all capital work i.e plant and machinery, auxiliaries, costs towards changing inverter during the life-time, land, civil work, erection and commissioning, financing and interest during construction, and evacuation infrastructure. It is upto the developer to identify the appropriate land based on solar insolation and cost.

9.3 Capacity Utilization factor

9.3.1 The CUF adopted by different entities are tabulated below:

Sl. No	Agencies	Reference	Capacity Utilisation factor	
			Solar PV	Solar Thermal
1.	CERC	Order dt.31-03-2015	19%	23%
2.	GERC	Order No.3 of 2015 dt.17.08.2015	19%	23%
3.	RERC	Order dated 19-06-2015	20%	23%
4.	MERC	Draft order dt.01.12.2015	19%	23%

9.3.2 The CUF considered in the earlier tariff order on Solar power dt.12.9.2014 was 19% for Solar PV power plant and 23% for Solar Thermal power plant. The Commission proposes to adopt the same in this order also. The normative CUF proposed in this paper is taking into account the de-ration

of output.

9.4 Operation and Maintenance Cost

9.4.1 The provision made by CERC in respect of O&M Expenses in the Terms and Conditions for determination of tariff from Renewable Energy Sources Regulations 2012, is Rs. 11 Lakhs/ MW for the 1st year of operation with escalation of 5.72% per annum thereafter. The O&M cost adopted by other Commissions inclusive of CERC are tabulated below:

Sl. No	Agencies	Reference	Operation and maintenance in Rs. Lakhs/MW	
			Solar PV	Solar Thermal
1.	CERC	Order dt.31-03-2015	13; escalation at 5.72% p.a	17.72; escalation at 5.72% p.a
2.	GERC	Order No.3 of 2015 dt.17.08.2015	10.9; escalation at 5.72% p.a	18 (1.5% of capital cost); escalation at 5.72% p.a
3.	RERC	Order dated 19-06-2015	13; escalation at 5.85% p.a	17.75; escalation at 5.85% p.a
4.	MERC	Draft order dt.01.12.2015	13; escalation at 5.72% p.a	15; escalation at 5.72% p.a

9.4.2. The Commission in its last Solar Order, adopted O&M expense of 1.4% of capital cost of solar projects with an escalation of 5.72% from the second year. The Commission proposes to adopt the same.

9.5 Insurance cost

9.5.1 In the last tariff order for Solar power, Commission adopted 0.35% of net asset value as insurance cost. The Commission proposes to adopt the same in this order.

9.6. Debt-equity ratio

9.6.1. The Tariff Policy lays down a debt equity ratio of 70: 30 for power projects. The Commission has proposed to adopt this ratio as specified in its Tariff Regulations 2005 and the earlier Orders on new and renewable power.

9.7. Term of the Loan

9.7.1 The term of loan adopted by different entities are tabulated below:

Sl. No	Agencies	Reference	Term of loan	
			Solar PV	Solar Thermal
1.	CERC	Order dt.31-03-2015	12 years	12 years
2.	GERC	Order No.3 of 2015 dt.17.08.2015	10 years	10 years
3.	RERC	Order dated 19-06-2015	12 years	12 years
4.	MERC	Draft order dt.01.12.2015	12 years	12 years

9.7.2 The Commission proposes to adopt a term of 10 years with 1 year moratorium as adopted by the Commission in its previous orders on Wind, Bagasse, Bio-mass power and Solar.

9.8. Rate of Interest

9.8.1 The CERC, MERC, RERC have adopted the normative interest rate as average State Bank of India (SBI) Base rate prevalent during the first six months of the previous year plus 300 basis points. The rates of interest mentioned in the website of IREDA for grid connected Solar PV ranges from 10.20% to 11.40% and that for Solar Thermal ranges from 10.6% to 11.9%. The rates of interest adopted by various entities are tabulated below:

Sl. No	Agencies	Reference	Rate of interest	
			Solar PV	**Solar Thermal**
1.	CERC	Order dt.31-03-2015	13%	13%
2.	GERC	Order No.3 of 2015 dt.17.08.2015	12.7%	12.7%
3.	RERC	Order dated 19-06-2015	13%	13%
4.	MERC	Draft order dt.01.12.2015	13%	13%

9.8.2. The Commission proposes to adopt 13% as the rate of interest.

9.9. Life of Plant and machinery

9.9.1 The Commission proposes a life period of 25 years for Solar power projects as adopted by CERC, GERC, RERC and MERC.

9.10. Interest on Working Capital

9.10.1 In the Order on Renewables by the CERC, the components of working capital have been taken as O&M expenses for one month, receivables for two months and maintenance of spares at 15% of the O&M expenses. The Interest on Working Capital was fixed at interest rate equivalent to the average State Bank of India Base Rate prevalent during the first six months of the previous year plus 350 basis points. The interest rates adopted by various entities are tabulated below:

Sl. No	Agencies	Reference	Rate of interest	
			Solar PV	Solar Thermal
1.	CERC	Order dt.31-03-2015	13.5%	13.5%
2.	GERC	Order No.3 of 2015 dt.17.08.2015	11.85%	11.85%
3.	RERC	Order dated 19-06-2015	12.5%	12.5%
4.	MERC	Draft order dt.1.12.2015	13.5%	13.5%

9.10.2. It is proposed to consider one month Operation and Maintenance cost and two months receivables as working capital components and an interest rate of 13.5%.

9.11. Return on Equity

9.11.1. The CERC has adopted normative Return on Equity(RoE) as 20% per annum for the first 10 years and 24% per annum 11th years onwards. The GERC

has fixed RoE at 14% considering MAT of 20.008% for first 10 years and Corporate tax rate of 32.445% from the 11th year. MERC has proposed RoE for first 10 years at 20.24% and from 11th year at 24.24%.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, wherein the RoE was adopted linking it to MAT and IT. Since these factors are changing frequently, the Commission in its NCES orders issued in 2012, adopted a RoE of 19.85% without linking to MAT and IT and RoE of 20% (pre-tax) in the last tariff order for solar power. The Commission now proposes to adopt a RoE of 20% (pre-tax) per annum for SPG without linking it to MAT and IT.

9.12. Depreciation

9.12.1. 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 the remaining depreciation to be spread over the remaining useful life of the project from the 13th year. GERC has considered a depreciation rate of 6% annually for the first 10 years and 2% for the remaining 15 years. MERC in its draft order has proposed a depreciation rate as adopted by CERC. RERC has adopted a depreciation rate of 5.83% for the first 12 years and a rate of 1.54% for the period after the first 12 years. 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 which translates to 3.6% per annum. The same method was adopted in the last order issued for solar power. Depreciation was calculated on 95% of the capital investment in the last solar order. The Commission proposes to adopt the same method in this Order for the life period of 25 years

9.13. Auxiliary consumption

9.13.1 CERC has not considered auxiliary consumption for Solar PV plants but has considered auxiliary consumption of 10% for Solar thermal power projects. GERC has fixed the auxiliary consumption of 0.25% of energy generation in respect of Solar PV plants and 10% in respect Solar Thermal projects. MERC in its draft order has proposed the same parameters as that of CERC. RERC has not considered auxiliary consumption for Solar Photovoltaic, but has accounted 6.5% towards auxiliary consumption for Solar Thermal projects. Auxiliary consumption is considered to be negligible in the case of solar PV generators and therefore the Commission considers nil auxiliary consumption for PV generators. However, an AUX of 10% is proposed for the Solar Thermal projects considering the auxiliaries involved in such projects.

9.14. Tariff Determinants

9.14.1 The financial and operational parameters in respect of Solar Photovoltaic and Solar Thermal projects proposed in the paper are tabulated below:

Tariff Components	Solar PV	Solar Thermal
Capital Cost	Rs.5.05 Crores per MW	Rs.12 Crores per MW
CUF	19%	23%
Operation and Maintenance expenses	1.4% of Capital cost with escalation at 5.72% p.a from second year	1.4% of Capital cost with escalation at 5.72% p.a from second year
Insurance cost	0.35% of net asset value	0.35% of net asset value
Debt-equity ratio	70:30	70:30
Term of loan	10 years + 1 year Moratorium	10 years + 1 year Moratorium
Interest on Loan	13%	13%
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	13.5%	13.5%
Return on Equity	20% pre tax	20% pre tax
Depreciation	3.6% on 95% of Capital cost	3.6% on 95% of Capital cost
Auxiliary consumption	Nil	10%
Discount rate	10.21%	10.21%
Levelised Tariff without AD	5.10	11.12
Levelised Tariff with AD	4.56	9.95

10. Solar Power Tariff

10.1. Solar power tariff is computed with reference to the determinants listed above. The tariff works out to Rs.5.10 per unit for Solar PV projects and Rs.11.12 per unit for Solar Thermal projects without Accelerated Depreciation(AD). The tariff rates of other SERCs and that of CERC are

tabulated below:

Sl. No	Agencies	Reference	Tariff in Rs. per unit			
			Solar PV		Solar Thermal	
			Without AD	With AD	Without AD	With AD
1.	CERC	Order dt.31-03-2015	7.04	6.35	12.05	10.80
2.	GERC	Order No.3 of 2015 dt.17.08.2015	6.77	6.17	11.22	10.11
3.	RERC	Order dated 19-06-2015	6.74	6.10	11.46	10.30
4.	MERC	Draft order dt.01.12.2015	7.07	6.34	12.03	11.10

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. Power Purchase Agreement
6. Tariff Review Period / Control Period

11.1 Quantum of solar power purchase by the distribution licensee

11.1.2 The distribution licensee can purchase solar power at the rate determined by the Commission from SPG for his RPO requirement on “first come first served basis”. For any procurement in excess of RPO, specific approval shall be

obtained from the Commission.

11.2 Plant Capacity limitations

11.2.1 The Commission in the last tariff order for solar power had limited the purchase by the distribution licensee from solar power plants of 1MW capacity and above. The Commission proposes to adopt the same in this order also.

11.3 CDM Benefits

11.3.1 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 proposes to adopt the same formula in this order also. The distribution licensee shall account for the CDM receipts in the next ARR 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 distribution licensee shall make payment to the generator within 60 days of receipt of the bill. Any delayed payment beyond 60 days is liable for interest at the rate of 1% per month.

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 regulation on Power Procurement from New and Renewable Sources of Energy Regulations, 2008 and as amended from time to time. The agreement shall be valid for 25 years. The distribution licensee shall execute the Energy Purchase Agreement or convey its decision in line with this order within a month of receipt of the proposal from the generator for selling power. The agreement fees are governed by the Commission's Fees and fines regulation.

11.6 Control period / Tariff Review Period.

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

"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."

As the Capital cost is volatile and not yet stabilized, in respect of Solar Power Plants, the Commission decides to keep the control period as one year from the date of coming into force of this order, and the tariff period shall be 25 years.

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 evacuation of power
11. Harmonics
12. Parallel Operation charges

12.1. Open access charges and line losses

12.1.1 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 section 86(1) (e) of the Act, the Commission proposes to adopt 30% (in each) of the transmission, wheeling and scheduling and system operation charges as applicable to the conventional power to the Solar power. Apart from these charges, the SPGs shall have to bear the actual line losses in kind as specified in the respective orders of the Commission and as amended from time to time. In respect of the plants availing Renewable Energy Certificates (REC), 100% of the respective charges as specified in the relevant orders shall apply.

12.2. Cross subsidy surcharge

12.2.1 The Commission in its other tariff orders related to different renewable power and in the last order for solar power, has ordered to levy 50% of the cross subsidy surcharge for third party open access consumers. Commission proposes to adopt the same for Solar power generators.

12.3. Reactive Power Charges

12.3.1 Commission proposes to adopt the reactive power charges 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 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 for open access consumers. This is also applicable for the existing SPGs.

12.4.2. Stand by charges

12.4.2.1 If the drawal by the captive user or third party buyer exceeds

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 energy accounting shall be regulated by the Commission's Regulations on open access, Order on open access and Order on ABT. Till such time the ABT is implemented in the State, if a solar power 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 shall record the slot wise generation and consumption during the billing period. 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. After the billing period, the balance energy may be sold at the rate of 75% of the respective solar tariff fixed by the Commission.

12.6. Energy Wheeling Agreement and fees

12.6.1 The format for Energy Wheeling Agreement, application and agreement fees, procedure and terms & conditions shall be governed by Commission's following regulations in force and as amended from time to time:

1. Tamil Nadu Electricity Regulatory Commission's Grid Connectivity and Intra State Open Access Regulations, 2014

2. Power Procurement from New and Renewable Sources 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 proposes to retain the present arrangements i.e., charges corresponding to two times the maximum net energy supplied by the distribution licensee in any month in the preceding financial year 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 Commission proposes that metering and communication shall be in accordance with the following regulations in force and any specific orders of the Commission on metering and ABT whenever issued:

(1) Central Electricity Authority (Installation and Operation of Meters) Regulations 2006 and as 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's Grid Connectivity and Intra State Open Access Regulations, 2014

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,2013, and its amendments 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 The SPGs shall follow the CEA (Technical Standards for Connectivity of the Distributed Generation Resources) Regulations, 2013 in respect of harmonics. 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 15% 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.

12.12 Parallel operation charges

12.12.1 SPGs who consume power for their captive loads but wish to avail REC may opt for paralleling their generators with the grid without wheeling power. Such generators shall pay 30% of applicable parallel operation charges to the distribution licensee as specified in relevant regulations.

(By order of Tamil Nadu Electricity Regulatory Commission)

(S.Chinnarajalu)
Secretary
Tamil Nadu Electricity Regulatory Commission

Capital cost	50500000
PLF	19.00%
Depreciation	3.60%
Interest	13.000% (10 + 1) yr.
Dt:Eq.	70 &30
O & M	1.4% with 5.72 % escl.
Insurance	0.35 % of net asset value
Residual value	10%
ROE	20.00%
Life of Plant	25 Yr.
Aux.consump.	0%
W.Cap.	O&M 1m +Receivables 2m.
Inst. On W.Cap.	13.50%
Discount factor	10.21%

Solar PV MW scale

Tariff Details--- Solar.(P/V)

Gross Gen	1664400	1664400	1664400	1664400	1664400	1664400	1664400	1664400	1664400	1664400	1664400	1664400	1664400	1664400	1664400	1664400	1664400	1664400	1664400	1664400	1664400	1664400	1664400	1664400	1664400
Years	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
ROE	3030000	3030000	3030000	3030000	3030000	3030000	3030000	3030000	3030000	3030000	3030000	3030000	3030000	3030000	3030000	3030000	3030000	3030000	3030000	3030000	3030000	3030000	3030000	3030000	3030000
Depreciation	1727100	1727100	1727100	1727100	1727100	1727100	1727100	1727100	1727100	1727100	1727100	1727100	1727100	1727100	1727100	1727100	1727100	1727100	1727100	1727100	1727100	1727100	1727100	1727100	1727100
Insurance cost	176750	170705	164660	158615	152571	146526	140481	134436	128391	122346	116302	110257	104212	98167	92122	86077	80032	73988	67943	61898	55853	49808	43763	37718	31674
Interest on Loan	4595500	4595500	4135950	3676400	3216850	2757300	2297750	1838200	1378650	919100	459550														
O & M	707000	747440	790194	835393	883178	933695	987103	1043565	1103257	1166363	1233079	1303611	1378178	1457010	1540351	1628459	1721606	1820082	1924191	2034255	2150614	2273629	2403681	2541171	2686526
IOWC	243756	245013	235772	226616	217549	208576	199703	190935	182279	173741	165328	157046	159481	162064	164802	167705	170782	174043	177499	181160	185038	189146	193497	198105	202985
Total	**10480106**	**10515759**	**10083677**	**9654125**	**9227247**	**8803197**	**8382137**	**7964236**	**7549677**	**7138651**	**6731358**	**6328014**	**6398971**	**6474341**	**6554375**	**6639341**	**6729521**	**6825213**	**6926732**	**7034412**	**7148605**	**7269684**	**7398042**	**7534095**	**7678285**
	6.297	**6.318**	**6.058**	**5.800**	**5.544**	**5.289**	**5.036**	**4.785**	**4.536**	**4.289**	**4.044**	**3.802**	**3.845**	**3.890**	**3.938**	**3.989**	**4.043**	**4.101**	**4.162**	**4.226**	**4.295**	**4.368**	**4.445**	**4.527**	**4.613**
IOWC																									
O & M	58917	62287	65849	69616	73598	77808	82259	86964	91938	97197	102757	108634	114848	121417	128363	135705	143467	151674	160349	169521	179218	189469	200307	211764	223877
Receivables	1746684	1752626	1680613	1609021	1537874	1467200	1397023	1327373	1258280	1189775	1121893	1054669	1066495	1079057	1092396	1106557	1121587	1137536	1154455	1172402	1191434	1211614	1233007	1255683	1279714
Total	1805601	1814913	1746462	1678637	1611473	1545007	1479281	1414336	1350218	1286972	1224650	1163303	1181343	1200474	1220758	1242262	1265054	1289209	1314805	1341923	1370652	1401083	1433314	1467447	1503591
IOWC	243756	245013	235772	226616	217549	208576	199703	190935	182279	173741	165328	157046	159481	162064	164802	167705	170782	174043	177499	181160	185038	189146	193497	198105	202985
Discount Factor	1	0.91	0.82	0.75	0.68	0.62	0.56	0.51	0.46	0.42	0.38	0.34	0.31	0.28	0.26	0.23	0.21	0.19	0.17	0.16	0.14	0.13	0.12	0.11	0.10
Present Value	**6.30**	**5.73**	**4.99**	**4.33**	**3.76**	**3.25**	**2.81**	**2.42**	**2.08**	**1.79**	**1.53**	**1.30**	**1.20**	**1.10**	**1.01**	**0.93**	**0.85**	**0.79**	**0.72**	**0.67**	**0.61**	**0.57**	**0.52**	**0.48**	**0.45**
Levelised tariff	**5.10**																								

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	50500000																							
Years	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**
Book Depreciation	2.64%	5.28%	5.28%	5.28%	5.28%	5.28%	5.28%	5.28%	5.28%	5.28%	5.28%	5.28%	5.28%	5.28%	5.28%	5.28%	5.28%	2.88%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Bk dep in lakhs	1333200	2666400	2666400	2666400	2666400	2666400	2666400	2666400	2666400	2666400	2666400	2666400	2666400	2666400	2666400	2666400	2666400	1454400	0	0	0	0	0	0	0
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	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Closing	50%	5%	1.00%	0.20%	0.04%	0.01%	0.00%	0.000%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Accelerated Depreciation	25250000	22725000	2020000	404000	80800	20250	6750	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Net dep benefit	23916800	20058600	-646400	-2262400	-2585600	-2646150	-2659650	-2666400	-2666400	-2666400	-2666400	-2666400	-2666400	-2666400	-2666400	-2666400	-2666400	-1454400	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tax benefit	8129320	6817918	-219711	-768990	-878845	-899426	-904015	-906309	-906309	-906309	-906309	-906309	-906309	-906309	-906309	-906309	-906309	-494351	0	0	0	0	0	0	0
Discount factor	1.00	0.91	0.82	0.75	0.68	0.62	0.56	0.51	0.46	0.42	0.38	0.34	0.31	0.28	0.26	0.23	0.21	0.19	0.17	0.16	0.14	0.13	0.12	0.11	0.10
Average discount factor	1.00	0.95	0.87	0.79	0.71	0.65	0.59	0.53	0.48	0.44	0.40	0.36	0.33	0.30	0.27	0.24	0.22	0.20	0.18	0.17	0.15	0.14	0.12	0.11	0.10
Net Energy gen	832200	1664400	1664400	1664400	1664400	1664400	1664400	1664400	1664400	1664400	1664400	1664400	1664400	1664400	1664400	1664400	1664400	1664400	1664400	1664400	1664400	1664400	1664400	1664400	1664400
Energy gen with DCF	832200	1587303.89	1440253.96	1306826.93	1185760.76	1075910.32	976236.56	885796.72	803735.34	729276.24	661715.12	600412.96	544789.91	494319.85	448525.41	406973.42	369270.87	335061.13	304020.62	275855.75	250300.11	227111.97	206072.02	186981.24	169659.05
Tax benft with DCF	8129320	6502108	-190123	-603783	-626112	-581412	-530241	-482339	-437655	-397110	-360321	-326941	-296652	-269170	-244234	-221608	-201078	-99518	0	0	0	0	0	0	0
AD benefit	0.54																								
Levelised tariff with AD	4.56																								

Solar Thermal

Proj. cost	120000000
PLF	23.00%
Depreciation	3.60%
Interest	13.000% (10 + 1) yr.
Dt:Eq.	70 &30
O & M	1.4% with 5.72 % escl.
Insurance	0.35 % of net asset value
Residual value	10%
ROE	20.00%
Life of Plant	25 Yr.
Aux.consump.	10%
W.Cap.	O&M 1m +Receivables 2m.
Inst. On W.Cap.	13.50%
Discount factor	10.21%

Tariff Details--- Solar.(Thermal)

Gross Gen	2014800	2014800	2014800	2014800	2014800	2014800	2014800	2014800	2014800	2014800	2014800	2014800	2014800	2014800	2014800	2014800	2014800	2014800	2014800	2014800	2014800	2014800	2014800	2014800	2014800
Net Gen.	1813320	1813320	1813320	1813320	1813320	1813320	1813320	1813320	1813320	1813320	1813320	1813320	1813320	1813320	1813320	1813320	1813320	1813320	1813320	1813320	1813320	1813320	1813320	1813320	1813320
Years	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**
ROE	7200000	7200000	7200000	7200000	7200000	7200000	7200000	7200000	7200000	7200000	7200000	7200000	7200000	7200000	7200000	7200000	7200000	7200000	7200000	7200000	7200000	7200000	7200000	7200000	7200000
Depriciation	4104000	4104000	4104000	4104000	4104000	4104000	4104000	4104000	4104000	4104000	4104000	4104000	4104000	4104000	4104000	4104000	4104000	4104000	4104000	4104000	4104000	4104000	4104000	4104000	4104000
Insurance	420000	405636	391272	376908	362544	348180	333816	319452	305088	290724	276360	261996	247632	233268	218904	204540	190176	175812	161448	147084	132720	118356	103992	89628	75264
Interest on Loan	10920000	10920000	9828000	8736000	7644000	6552000	5460000	4368000	3276000	2184000	1092000														
O & M	1680000	1776096	1877689	1985092	2098640	2218682	2345591	2479758	2621601	2771556	2930089	3097690	3274878	3462201	3660239	3869605	4090946	4324948	4572335	4833873	5110370	5402683	5711717	6038427	6383825
IOWC	579223	582210	560251	538493	516948	495626	474542	453708	433139	412850	392858	373178	378966	385103	391610	398508	405819	413568	421779	430478	439694	449456	459796	470745	482340
Total	**24903223**	**24987942**	**23961212**	**22940494**	**21926131**	**20918488**	**19917948**	**18924918**	**17939828**	**16963131**	**15995307**	**15036865**	**15205476**	**15384572**	**15574753**	**15776652**	**15990941**	**16218328**	**16459562**	**16715435**	**16986785**	**17274496**	**17579505**	**17902801**	**18245429**
	13.733	**13.780**	**13.214**	**12.651**	**12.092**	**11.536**	**10.984**	**10.437**	**9.893**	**9.355**	**8.821**	**8.292**	**8.385**	**8.484**	**8.589**	**8.700**	**8.819**	**8.944**	**9.077**	**9.218**	**9.368**	**9.526**	**9.695**	**9.873**	**10.062**
IOWC																									
O & M	140000	148008	156474	165424	174887	184890	195466	206647	218467	230963	244174	258141	272907	288517	305020	322467	340912	360412	381028	402823	425864	450224	475976	503202	531985
Receivables	4150537	4164657	3993535	3823416	3654355	3486415	3319658	3154153	2989971	2827188	2665885	2506144	2534246	2564095	2595792	2629442	2665157	2703055	2743260	2785906	2831131	2879083	2929917	2983800	3040905
Total	4290537	4312665	4150009	3988840	3829242	3671305	3515124	3360800	3208438	3058151	2910059	2764285	2807152	2852612	2900812	2951909	3006069	3063467	3124288	3188729	3256995	3329306	3405894	3487002	3572890
IOWC	579223	582210	560251	538493	516948	495626	474542	453708	433139	412850	392858	373178	378966	385103	391610	398508	405819	413568	421779	430478	439694	449456	459796	470745	482340
Discount factor	1	0.91	0.82	0.75	0.68	0.62	0.56	0.51	0.46	0.42	0.38	0.34	0.31	0.28	0.26	0.23	0.21	0.19	0.17	0.16	0.14	0.13	0.12	0.11	0.10
Present value	13.73	12.50	10.88	9.45	8.20	7.09	6.13	5.28	4.55	3.90	3.34	2.85	2.61	2.40	2.20	2.02	1.86	1.71	1.58	1.45	1.34	1.24	1.14	1.06	0.98
Levelised tariff	11.12																								-47-

Determination of accelerated depreciation benefit

Depreciation amount	90%
Book depreciation rate	3.60%
Tax depreciation rate	80%
Income Tax (Normal rate)	33.990%
Capital Cost	120000000

Years	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**
Book Depreciation	2.64%	5.28%	5.28%	5.28%	5.28%	5.28%	5.28%	5.28%	5.28%	5.28%	5.28%	5.28%	5.28%	5.28%	5.28%	5.28%	5.28%	2.88%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Bk dep in lakhs	3168000	6336000	6336000	6336000	6336000	6336000	6336000	6336000	6336000	6336000	6336000	6336000	6336000	6336000	6336000	6336000	6336000	3456000	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Accelerated Depreciation																									
Opening	100%	50%	5%	1%	0.20%	0.04%	0.008%	0.002%	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Allowed	50%	45%	4%	0.80%	0.16%	0.03%	0.006%	0.001%	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Closing	50%	5%	1%	0.20%	0.04%	0.01%	0.002%	0.000%	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
AD	60000000	54000000	4800000	960000	192000	36000	12000	1536	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Net dep benefit	56832000	47664000	-1536000	-5376000	-6144000	-6300000	-6324000	-6334464	-6336000	-6336000	-6336000	-6336000	-6336000	-6336000	-6336000	-6336000	-6336000	-3456000	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tax benefit	19317197	16200994	-522086	-1827302	-2088346	-2141370	-2149528	-2153084	-2153606	-2153606	-2153606	-2153606	-2153606	-2153606	-2153606	-2153606	-2153606	-1174694	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Energy gen	906660.00	1813320	1813320	1813320	1813320	1813320	1813320	1813320	1813320	1813320	1813320	1813320	1813320	1813320	1813320	1813320	1813320	1813320	1813320	1813320	1813320	1813320	1813320	1813320	1813320
Discount factor	1	0.91	0.82	0.75	0.68	0.62	0.56	0.51	0.46	0.42	0.38	0.34	0.31	0.28	0.26	0.23	0.21	0.19	0.17	0.16	0.14	0.13	0.12	0.11	0.10
Av DCF	1.00	0.95	0.87	0.79	0.71	0.65	0.59	0.53	0.48	0.44	0.40	0.36	0.33	0.30	0.27	0.24	0.22	0.20	0.18	0.17	0.15	0.14	0.12	0.11	0.10
DCF En gen	906660	1729326	1569119	1423754	1291855	1172176	1063584	965052	875649	794527	720921	654134	593534	538548	488657	443387	402311	365040	331222	300538	272695	247433	224510	203711	184839
Tax benefit with DCF	19317196.80	15450552.87	-451776.62	-1434732.03	-1487790.35	-1384235.81	-1260783.13	-1145875.40	-1039972.11	-943627.72	-856208.80	-776888.48	-704916.51	-639612.11	-580357.60	-526592.51	-477808.28	-236478.27	0.00	0.00	0.00	0.00	0.00	0.00	0.00
AD benefit	1.17																								
Levelised tariff with AD	9.95																								