

**HIMACHAL PRADESH ELECTRICITY REGULATORY COMMISSION, SHIMLA**

Suo-Moto Petition No.: 57/2019

**CORAM**

**Sh. S.K.B.S. Negi**  
**Chairman**

**Sh. Bhanu Pratap Singh**  
**Member**

**(Date of Order: 08.07.2019)**

**IN THE MATTER OF:-**

**Determination of generic levelled tariffs for Solar PV Projects for first six months of FY 2019-20 under Himachal Pradesh Electricity Regulatory Commission (Promotion of Generation from the Renewable Energy Sources and Terms and Conditions for Tariff Determination) Regulations, 2017.**

**ORDER**

1. The Commission notified the Himachal Pradesh Electricity Regulatory Commission (Promotion of Generation from the Renewable Energy Sources and Terms and Conditions for Tariff Determination) Regulations, 2017, on 23<sup>rd</sup> November, 2017 in the Rajpatra, Himachal Pradesh (hereinafter referred to as “RE Tariff Regulations, 2017”), which have come into force from 1<sup>st</sup> October, 2017;
2. The Commission, in due discharge of the mandate under regulation 18 of RE Tariff Regulations, 2017 issued the proposal for determination the generic levelled tariff of solar PV projects and associated terms and conditions for first six months of FY 2019-20;
3. The Commission invited objections/suggestions from public on its aforesaid proposal, by way of insertions in two News Papers i.e. “The Tribune” and “Daink Bhaskar” on 23<sup>rd</sup> May, 2019. The text of said proposal was also made available on the Commission’s website [www.hperc.org](http://www.hperc.org).

4. The Commission, vide letter dated 23.05.2019, requested the major stakeholders, including Consumer representative, State Government, Directorate of Energy, HIMURJA, HPPCL and HPSEB Limited i.e. Distribution Licensee to send their objections/suggestions as per the aforesaid public notice.
5. In response, written comments/suggestions were received from the following stakeholders:-
- (i) The Himachal Pradesh Power Corporation Ltd. (HPPCL), Himfed Building, BCS, New Shimla-171009(HP).
  - (ii) The Himachal Pradesh State Electricity Board, Vidyut Bhawan, Shimla-171004.
  - (iii) Shri K.S. Dhaulta, Consumer Representative, House No. 62-A, Sector-2, Phase-1, Main Road, New Shimla-09 (HP).
6. As per the aforesaid public notice the public hearing was held on 14<sup>th</sup> June, 2019. No other stakeholders except HPSEBL and Consumer Representative attended the said public hearing. We now proceed to consider the comments/suggestions of stakeholder(s) made in their written submission(s) and to finalize its views:-

**(A) CAPITAL COST.-**

**(i) Per MW cost.-**

**Himachal Pradesh Power Corporation Ltd.** have submitted that the Capital Cost proposed in the Determination of Generic Levellised Tariffs for Solar PV Projects for first six months of FY 2019-20 is even lesser the capital cost of the previous year orders of Determination of Generic Levellised Tariffs for Solar PV Projects.

It has also been suggested that on the consent and Power Purchase Agreement with HPSEBL, the HPPCL had floated tender for design, supply, construction & erection, testing commissioning and operation & maintenance for 5 (five) years of 5 MW solar power project at Berra Dol, Teh. Sh. Naina Devi Ji, Bilaspur (HP) the L-I bid finalized for the tender is amounting to Rs. 28.34 Cr.

(excluding land cost, Evacuation cost up to interconnection point cost, Preliminary and pre-operative expenses).

Sr. No.	Particulars	Capital Cost norm	
		Rs. Lakh/ Mw	Rs. Lakh/ Mw
		As per HPERC	As per actual for 5 MW solar power project at Berra Dol
1	PV Module	180.30	319.195
2	Land Cost	126	27.754 (land cost is less as the land has been transferred by GoHP to HPPCL)
3	Preliminary and pre-operative expenses		10.518
4	Mounting Structure		
5	Civil and General Works		53.118
6	Power Conditioning Units	30	194.487
7	Evacuation cost up to interconnection point	50	17.89 (the cost is less as Berra Dol Project is getting connected to existing evacuation system of HPSEBL)
	<b>Total Capital Cost</b>	<b>386.30</b>	<b>622.962</b>

HPPCL has suggested that, the Capital Cost proposed should be on the higher side so that the focus of Solar Power Stakeholder to invest in development of Solar Power in the State can be attracted.

**Commission’s View:-**

The solar PV module cost has been worked out as per the International solar PV module weekly spot prices and the same is further enhanced by 10% to cover various miscellaneous cost/taxes and degradation of cells etc. The Commission considered the liberal normative cost associated with the commissioning of plant like evacuation cost, power conditioning units cost and other costs i.e. civil and general works including mounting structure etc. The KERC has considered capital cost as Rs. 350 Lakhs per MW for FY 2019-20 whereas Maharashtra and Rajasthan has considered capital cost as Rs. 262 Lakhs per MW and Rs. 335 Lakhs per MW for FY 2019-20.

We also observe that since the price of solar PV module, in International market, is showing a declining trend, the per MW Capital Cost has to be lower than what was decided for the previous year. As regard the rate quoted under

L-I bid of HPPCL, we feel that rate so quoted is essentially on higher side and not justifiable in the present time frame. This can by no means be taken as bench-mark of deciding the Capital Cost to be allowed for the purposes of this Order.

**ii) Differential Treatment for Urban/Industrial Area in relation to Capital Cost.-**

- (i) HPSEBL has submitted that in the Section 4.1 Capital Cost of the Suo-Motu Petition the Commission has determined the normative capital cost and further classified the cost into two categories viz-

Category 1: Projects to be set-up in areas other than urban areas and industrial areas; and

Category 2: Projects to be set-up in urban areas and industrial areas

HPSEBL submits that categorization of costs into “Urban/Industrial Areas” and “Areas other than Urban/Industrial Area” will lead to additional ambiguity and require unnecessary certification on whether the project is to be classified under “Urban/Industrial Area” or “Areas other than Urban/Industrial Area”. Even if the provision is made for the developer to submit a certificate in the same, vetting of the same will still be required from the Distribution Licensee’s end. This also leads to determination of separate tariffs for each capacity class in the two identified categories.

It has been suggested that to avoid such complexity and to bring in ease of doing business the tariff categorization into “Urban/Industrial Areas” and “Areas other than Urban/Industrial Area” should be removed and instead a common tariff across the state be proposed for each individual capacity class.

- a) Shri. K.S. Dhaulta, Consumer Representative has submitted that the proposal to allow two different rates for rural and urban areas may be reconsidered and the Commission may allow a uniform tariff/rate as done**

earlier, to avoid any complication in implementation and have a uniformity of tariffs in the State.

**Commission’s View:-**

The commission has proposed marginally higher cost in respect of solar PV projects to be set up in the Urban and Industrial areas notified by State Government so as to encourage installation of such plants in these areas and also keeping in view the fact that the cost of land in such areas shall normally be significantly higher than the other area of the State. We feel that the location of plants in these areas will not only help the Discom to utilize power from such plants in optimal manner but may also reduce the distribution losses. We don’t foresee any problem in implementing such proposal in view of the explanation incorporated in regulation 4.1 of the draft regulations in relation to the definition of the terms urban areas and industrial areas. The objector have also not specifically brought out the nature of the problem or ambiguity, if any, envisaged by them in implementing the proposal. In view of the above, we find it appropriate to retain this concept. However, the Commission shall be inclined to sort out any procedural problems if referred to it by the Discom alongwith complete details and proposal.

In view of the above, the Commission after taking into consideration the issues raised by the stakeholders and State specific conditions, the capital cost is proposed as under:

<b>Sr. No.</b>	<b>Category</b>	<b>Capital Cost norm (Rs. Lakhs/MW)</b>
<b>1</b>	<b>Projects to be set up in areas other than urban areas and industrial areas</b>	
(a)	Upto 1.00 MW	392.09
(b)	Above 1.00 MW & upto 5.00 MW	386.30
<b>2</b>	<b>Projects to be set up in urban areas and industrial areas</b>	
(a)	Upto 1.00 MW	402.24
(b)	Above 1.00 MW & upto 5.00 MW	396.30

## **B. Other Comments:**

No other comments on any other parameters of the Order were received. However, a few following miscellaneous comments/suggestions have been received from Shri. K.S. Dhaulta, Consumer Representative:

- (i) The Commission's proposal for determination of generic levelled tariff for solar PV projects in the State to promote solar power generation by ensuring appropriate tariffs for these projects is a welcome step.
- (ii) In future, it is suggested that the Commission should go for competitive biddings to ensure reasonable tariffs in a transparent way for the larger benefits of the consumers.
- (iii) The DISCOM while purchasing solar power, may accord preference to solar power generated by farmers, unemployed youths & individuals etc., to encourage them to generate solar power & protect their crops etc, from wild animals & monkey menace by installing solar fencings around their fields under govt. scheme having handsome subsidy. The Commission may direct HIMURJA to also encourage these people in the rural areas apart from focusing in existing PPs etc.

### **Commission's View:-**

The present Order is being issued in discharge of the mandate given to the Commission in the regulation 18 of RE Regulations, 2017 and the generic tariff is being determined only for first six months of FY 2019-20. As regards the suggestions to go for competitive bidding for future, the Commission shall take suitable view at appropriate future stage.

As regards, the suggestion to accord preference to certain categories of people, we feel that this is subject matter of State/Centre Policy and is therefore outside the scope of the present exercise of determination of levelled generic tariff for first six months of the FY 2019-20.

In view of the above, we find that no changes are required in the proposal being finalised in this Order.

7. In view of the above, we find that no changes are required in the proposal being finalised in this Order. Accordingly, we determine the generic levellised tariffs for Solar PV Projects for first six months of FY 2019-20 under Himachal Pradesh Electricity Regulatory Commission (Promotion of Generation from the Renewable Energy Sources and Terms and Conditions for Tariff Determination) Regulations, 2017 as per **Annexure-I** of this Order.

Sd/-

(Bhanu Pratap Singh)  
**Member**

Sd/-

(S.K.B.S. Negi)  
**Chairman**

**Generic Levellised Tariffs for Solar PV Projects for first six months of FY 2019-20 under RE Tariff Regulations, 2017.-**

1. The Commission notified the Himachal Pradesh Electricity Regulatory Commission (Promotion of Generation from the Renewable Energy Sources and Terms and Conditions for Tariff Determination) Regulations, 2017, on 23<sup>rd</sup> November, 2017 in the Rajpatra, Himachal Pradesh (hereinafter referred to as “RE Tariff Regulations, 2017”), which have come into force from 1<sup>st</sup> October, 2017. The regulation 18 of the RE Tariff Regulations, 2017, provides that:-

“18 (1).....xxxxxxxxxxxx.....

(2) Where the technological specific parameters and other terms and conditions, including the tariff period and useful life of the project, have not been specified, the Commission may, by an order, at any time and at such intervals as it considers appropriate to do so, fix the same:

Provided that.....xxxxxxx.....

Provided further that the Commission may, by order, categorise the renewable energy projects, other than small hydro projects, under the respective renewable energy technologies specified in sub-regulation (1), based on the capacity of projects, the available subsidy schemes and such other factors as may be considered appropriate by it:

Provided further that the Commission may, in order to promote such technologies for smaller capacities, follow, mutatis mutandis, upto the limits as it may consider necessary separately for each such technology but not exceeding 5 MW for any such technology, any or all of the technological specific parameters, including capital cost, and other terms and conditions or the tariff, in respect of the relevant part of the control period for the relevant renewable energy technology, as it may deem fit -

- (a) as specified or adopted by the Central Commission for determining project specific tariff for any project(s) or generic levellised tariff for any category of project(s); or
- (b) the rate discovered through competitive bidding undertaken by any Government agency; or
- (c) the inputs available from any other sources, as the Commission may find appropriate:

Provided further that the financial norms, except for capital cost, as specified under Chapter-IV of these Regulations shall also be considered as ceiling norms.

(3) The Commission may, after having fixed the norms/parameters and other related terms and conditions as per sub-regulation (2), determine, or otherwise fix, by order, either generic levellised tariff(s) for any or all categories of such renewable energy technology(ies):

Provided that the Commission may, by order, fix, at such time intervals as it may consider appropriate, the ceiling rates and associated terms and conditions to be used by the licensee for reverse bidding for procurement of power from the projects based on such technologies.

(4) .....xxxxxxxxxxxx..... .

(5) .....xxxxxxxxxxxx..... .



2. In view of above provisions contained in regulation 18 of the RE Tariff Regulations, 2017, we decide to categorize and also to fix the technological specific norms and generic levelled tariff for procurement of power by the distribution licensee from solar PV plants and detailed in the succeeding paragraphs.

**3. Categorization.-**

The 2<sup>nd</sup> proviso of sub-regulation (2) of regulation 18 of RE Tariff Regulations, 2017 provides that the Commission may, by order, categorize the renewable energy technologies other than SHPs based on capacity of the projects, the available subsidy scheme and such other factors as may be considered appropriate by it. We feel that in view of the geographical and topographical conditions in the State and in order to promote smaller capacities of solar PV plants at different locations across the State, it may be appropriate to create a separate category of solar PV projects upto 1.00 MW capacity. The capacity of such projects in the second category shall be limited to 5.00 MW as we expect that for higher capacities, the Distribution Licensee shall preferably purchase solar power through Solar Energy Corporation of India or else through the competitive bidding route. All the solar PV projects with a capacity of more than 5.00 MW shall accordingly fall under the third category. We after taking into account various related factors, categorized these projects vide its order 06.07.2016. We decide to retain similar categorization for the solar PV generation capacity for the purposes of normative capital cost and determination of levelled tariffs for the period under consideration as well under the RE Tariff Regulation, 2017. Accordingly, the solar PV projects are to be categorized as under:-

<b>Capacity</b>	<b>Capacity of Solar PV Project at one site</b>
I	Upto 1 MW capacity
II	Above 1 MW to 5 MW capacity
III	Above 5 MW capacity

**4. Technology Specific Parameters.-**

The sub-regulation (2) of regulation 18 of the RE Tariff Regulations, 2017 provides that the Commission may, in order to promote such technologies for smaller capacities, follow, mutatis mutandis, upto the limits as it may consider necessary separately for each such technology but not exceeding 5.00 MW for any such technology, the technological specific parameters, including capital cost, and other terms and conditions, or the tariff as specified or adopted by the Central Commission for determining project specific tariff for any project(s) or generic levelled tariff for any category of project(s); or the inputs available from any other sources, as the Commission may find appropriate.

The Central Commission has notified their RE Regulations, 2017 i.e. Central Electricity Regulatory Commission (Terms and Conditions for Tariff Determination for Renewable Energy Sources) Regulations, 2017 (hereinafter referred as “CERC RE Tariff Regulations, 2017. The Central Commission has specified the technological parameters i.e. normative Capacity Utilization Factor (CUF) for solar PV projects as 19%, normative auxiliary consumption as 0.25% of gross generation. However, for capital cost and O&M expenses, the CERC RE Tariff Regulations, 2017 provides that for these parameters, only project specific parameter(s), based on prevailing market trends, shall be taken into consideration.

The CERC has not made any provision for determination of normative (benchmark) capital cost for solar PV projects and its RE Tariff Regulations, 2017 do not envisage such a generic tariff determination. Accordingly, we decide to evolve its own technology specific parameters after taking into account the various available inputs, including those notified by CERC and considered by the HPERC in its solar PV tariff order dated 25.07.2018.

#### 4.1 CAPITAL COST.-

The website pvinsights reports the latest solar PV Module Weekly Spot Price accessed on 04.03.2019 as under:

<i>USD/Watt</i>					
Item	High	Low	Average	Avg. change	Avg. change%
Poly Solar Module	0.310	0.200	0.215	-0	-0%
Thin Film Solar Module	0.330	0.230	0.244	-0	-0%

We fix the cost of Solar PV Module as Rs. 163.90 Lakh/ MW considering the exchange rate of Rs. 71.287/USD based on the average of six months, i.e. 1<sup>st</sup> October, 2018 to 29<sup>th</sup> March, 2019 and module cost of 0.230 USD/Watt. We decide to adopt an all inclusive solar PV module rate of Rs. 180.30 Lakhs/MW after escalating the above rate by about 10% to cover various miscellaneous cost/taxes etc. etc.

After taking into account the State specific features, we fix the normative capital cost for the solar PV projects above 1.00 MW to 5.00 MW capacity as under:-

Sr. No.	Particulars	Capital Cost norm (Rs. Lakh/MW)
1	PV Modules	180.30
2	Preliminary and Pre-operative expenses, Land Cost, Civil & General Works and Mounting Structures	126.00
3	Power Conditioning Units	30.00
4	Evacuation cost upto interconnection point	50.00
	Total Capital Cost	386.30

The normative capital cost for the solar PV projects upto 1.00 MW is fixed by allowing an increase of about 1.5% on the normative cost for the projects above 1.00 MW and upto 5.00 MW as mentioned above. Accordingly the normative capital cost for the solar PV projects upto 1.00 MW is fixed as Rs. 392.09 Lakhs per MW.

We also decide to allow marginally higher capital cost in respect of Solar PV project(s) to be set up in Urban areas and Industrial areas notified by the State Government so as to encourage installation of such plant in such areas, keeping in view the fact that location of plants in such areas may generally help the distribution licensee to utilize the power from such plant in more optimum manner. As such the additional capital cost for these area specific solar PV project(s) is fixed at rate of Rs. 10.00 Lakhs per MW (for capacity above 1.00 MW and upto 5.00 MW) over and above the normative capital cost of project(s) to be set up in the areas other than Urban and Industrial areas. This additional cost of Rs. 10.00 Lakhs per MW shall however be further increased by 1.5% for plants upto 1.00 MW located in the urban areas and industrial areas.

Explanation;-

For the purpose of this tariff order-

- (a) The “Urban Areas” mean the areas covered under a Municipal Corporation, Municipal Council or a Nagar Panchayat set up by the State Government under any law enacted by the State Legislative Assembly and shall also include the area falling under the Cantonment Board constituted by the Central Government under the Cantonment Act, 2006.
- (b) The “Industrial areas” mean the areas notified as such by the State Government through its Industries Department or through any such other department/agency authorized by it.
- (c) For this purpose, a solar PV project shall be considered to be situated in the urban area or industrial area, as the case may be, if any one or both of the main components of the project i.e. the generating plant and the interconnection point fall in any such area(s) on the date of filing the petition for approval of PPA.

Accordingly, Normative Capital Cost for respective categories of Solar PV plant is tabulated as under:-

<b>Sr. No.</b>	<b>Category</b>	<b>Capital Cost norm (Rs. Lakhs/MW)</b>
<b>1</b>	<b>Projects to be set up in areas other than urban areas and industrial areas</b>	
(a)	Upto 1.00 MW	392.09
(b)	Above 1.00 MW & upto 5.00 MW	386.30

<b>2</b>	<b>Projects to be set up in urban areas and industrial areas</b>	
(a)	Upto 1.00 MW	402.24
(b)	Above 1.00 MW & upto 5.00 MW	396.30

#### 4.2 **OPERATION AND MAINTENANCE EXPENSES.-**

The Commission considered the O&M expenses as Rs. 7.82 Lakhs/MW with escalation @ 5.72% for FY 2018-19 in its solar PV tariff order dated 25.07.2018.

The O&M expenses of Rs. 8.27 Lakh/MW are fixed for FY 2019-20. These normative O&M charges shall also be escalated @ 5.72% per annum over the tariff period as per the RE Tariff Regulations, 2017.

#### 4.3 **NORMATIVE NET SALEABLE ENERGY.-**

The CERC RE Tariff Regulations, 2017 provides that the annual normative Capacity Utilization Factor (CUF) of solar PV plant shall be 19%. We decide to adopt this norm on net basis. Accordingly no deduction shall be made on account of auxiliary consumptions etc. However the annual net saleable energy shall be worked out on normative basis by considering energy losses @ 0.7% of the generation, to cover the losses on the project line, upto the interconnection point on normative basis and the annual CUF of 19%. No other deduction, except Govt. supply if any, shall be made to arrive at the net saleable energy on normative basis.

4.4 The other technological specific parameters viz useful life of the project and tariff period, have already been specified in the RE Tariff Regulations, 2017, which are otherwise in line with the CERC Regulations also and the same shall be followed accordingly.

5. After finalizing the technological specific parameters as above, we now proceed to determine the generic levellised tariffs, based on the provisions of RE Tariff Regulations, 2017 for solar PV projects for first six months of FY 2019-20 under regulation 18 of the RE Tariff Regulations, 2017. The main details of the tariffs are as follows:-

#### 5.1 **TARIFF STRUCTURE.-**

Regulation 12 of the RE Tariff Regulations, 2017 stipulates that single part levellised tariff structure, comprising of the following fixed cost components shall be followed and that in case, where, no fuel cost component is involved in power generation, the following parameters shall be considered:-

- (a) Return on Equity;
- (b) Interest on loan capital;
- (c) Depreciation;
- (d) Interest on working capital.

Accordingly, single part generic levellised tariffs have been worked out for the respective categories of solar PV projects by adopting the methodology, discussed in succeeding paragraphs.

#### **5.2 TECHNOLOGICAL SPECIFIC PARAMETERS.-**

The normative parameters for capital cost, O&M charges, CUF, applicability of tariff as discussed in para 4.0 above, have been followed.

#### **5.3 USEFUL LIFE AND TARIFF PERIOD.-**

Regulation 10, read with clause (ac) of sub-regulation (1) of regulation 2 of the RE Tariff Regulations, 2017, specifies the 'useful life' and tariff period in relation to a Solar PV plant as 25 years from the date of commencement of operation of the project. Accordingly, the useful life and tariff period has been taken as 25 years which is also in line with CERC RE Tariff Regulations, 2017.

#### **5.4 DEBT EQUITY RATIO.-**

The normative debt equity ratio has been considered as 70:30 in accordance with regulation 23 of the RE Tariff Regulations, 2017.

#### **5.5 RETURN ON EQUITY.-**

Regulation 26 of the RE Tariff Regulations, 2017, provides that the value base for the equity shall be 30% of the normative capital cost as determined under regulation 21 and that the normative return on equity shall be 17% per annum on pre-tax basis and shall not be subject to any adjustment on account of any taxes, or changes in the tax rates, under Income Tax Act.

#### **5.6 INTEREST ON LOAN.-**

The sub-regulation (1) of regulation 24 of the RE Tariff Regulation, 2017 provides that the loan tenure of 13 years, inclusive of moratorium period, if any, is to be considered for the purpose of determination of tariff for RE projects. Sub-regulation (2) of the said regulation provides for computation of rate of interest of loan as under:-

##### **“(2) Interest Rate.-**

(a) The loans arrived at in the manner indicated in the regulation 23 shall be considered as gross normative loan for calculation for interest on loan. The normative loan outstanding as on 1<sup>st</sup> April of every year shall be worked out by deducting the cumulative repayment upto 31<sup>st</sup> March of previous year from the gross normative loan.

(b) For the purpose of computation of tariff(s) under these Regulations, normative interest rate of two hundred (200) basis points above the average State Bank of India Marginal Cost of Funds based Lending Rate (MCLR) (one year tenor) prevalent during the last available six months, prior to the respective date(s) from which such tariff(s), or the respective generic levellised tariffs are to be made applicable, shall be considered:

Provided that in case where project specific tariff xxxxxxxxxxxxxxxxxxxx .

(c) Notwithstanding any moratorium period availed by the renewable energy generator, the repayment of loan shall be considered from the first year of the tariff period and shall be equal to the annual depreciation allowed.”

- (ii) In view of above, interest rate of 10.53% per annum has been worked out by the adding 200 basis points above the average of Marginal Cost of Funds based Lending Rate (MCLR) (one year tenor) of State Bank of India (SBI) prevalent during the last available six months preceding the date of applicability of this order i.e. 01.04.2019 as shown in the table below:-

Month	Tenor-wise MCLR of SBI
October, 2018	8.50
November, 2018	8.50
December, 2018	8.55
January, 2019	8.55
February, 2019	8.55
March, 2019	8.55
Avg. for last available 6 months.	8.53

#### 5.7 DEPRECIATION.-

- (i) Regulation 25 of the RE Tariff Regulations, 2017 provides as under: For the purpose of tariff determination, depreciation shall be computed in the following manner, namely:-

“(a) the value base for the purpose of depreciation shall be the normative capital cost (for generic tariff) or the capital cost of the project as admitted by the Commission (for project specific tariff), as the case may be;

(b) the salvage value of the asset shall be considered as 10% and depreciation shall be allowed up to maximum of 90% of the capital cost of the asset;

(c) depreciation per annum shall be based on ‘Differential Depreciation Approach’. For tariff purposes, the depreciation shall be allowed @ 5.28% per annum till such time the requirement for repayment of loan component of the capital cost as per regulations 21, 23 and 24 after adjusting the amount of subsidy as per regulation 22, is fully provided and the remaining depreciation shall be spread over the residual useful life of the project on straight line method;

(d) depreciation shall be chargeable from the first year of commencement of operation of the project.”

- (ii) In accordance with the above, the rate of depreciation has been considered as 5.28% per annum for meeting the requirements of loan repayment and balance amount of depreciation has been equally spread over the remaining tariff period. For the year in which the loan gets totally repaid, the depreciation has been provided to the extent of the actual requirement for loan repayment or the average value of balance period whichever is higher.

5.8 No adjustment has been made on account of subsidy in the tariff calculations and as such the rate of depreciation for the first 13 years has been considered as

5.28% and the rate of depreciation from the 14<sup>th</sup> year onwards has been spread over the balance useful life as under:-

Details	Solar PV Power Plant
Useful life (in years)	25
Rate of depreciation for 13 years (%)	5.28%
Rate of depreciation after first 13 years (%)	1.78%

**5.9 INTEREST ON WORKING CAPITAL.-**

(i) In accordance with the regulation 27 of the RE Tariff Regulations, 2017, the working capital requirement of the SHPs has been considered by including the following:-

- “(a) operation and maintenance expenses for one month;
- (b) receivables equivalent to 2 (two) months of energy charges for sale of electricity calculated on the net saleable energy corresponding to the CUF considered for tariff determination on normative basis;
- (c) maintenance spare @ 15% of operation and maintenance expenses.”

(ii) Interest rate on working capital as 11.53% per annum has been worked out by the adding 300 basis points above the average of Marginal Cost of Funds based Lending Rate (MCLR) (one year tenor) of State Bank of India (SBI) prevalent during the last available six months preceding the date of applicability of this order i.e. 01.04.2019.

**5.10 SUBSIDY OR INCENTIVE OR GRANT/BUDGETARY SUPPORT BY THE CENTRAL/ STATE GOVERNMENT.-**

(i) The sub-regulation (1) of regulation 22 of the RE Tariff Regulations, 2017 provides as under:-

“(1) While determining the generic levellised or project specific levellised tariff, as the case may be, for the renewable energy project(s) under these Regulations, the Commission shall take into consideration any incentive and/or subsidy and/or grant available under the schemes of the Central or State Government or its agencies, but excluding accelerated depreciation benefit under the Income Tax Act:

Provided that for tariff determination, only 75% of the capital subsidy available to the project as per applicable scheme of the MNRE/State Government shall be considered:

Provided further that the Commission may evolve suitable mechanism(s) for incorporating impact of the subsidy component for determination or adjustment of generic levellised tariffs for various categories of projects:

Provided further that the capital subsidy under the schemes of the Central or State Government or its agencies, shall, unless the circumstances otherwise warrant, be ordinarily adjusted in the middle of first 12 months from the commencement of the tariff period against the principal component of the loan amount as additional reduction apart from the normal payment:

.....xxxxxxx.....”

- (ii) In accordance with sub-regulation (3) of regulation 22 of RE Tariff Regulations, 2017, the amount of subsidy shall be considered for each renewable source as per the applicable policy of the MNRE/State Government and if the amount and/or mechanism of subsidy is changed by the MNRE/State Government, consequent corrections in tariffs may be carried out by the Commission in accordance with regulation 20 of the RE Tariff Regulations, 2017.

5.11 No capital subsidy or incentive or grant/budgetary support etc. have been considered in the calculations. In case, a solar PV project is entitled to any incentive and/or subsidy and/or grant available, subsidy/budgetary support/grant/generation based incentive (GBI)/ viability gap funding (VGF), under the schemes of the Central or State Government or their agencies, the same shall be adjusted by the distribution licensee, at the time of signing the PPA, as per regulation 22 of RE tariff Regulations, 2017. The benefit, if any, on account of AD is however not to be considered as provided with RE Regulations, 2017.

#### 5.12 DISCOUNT FACTOR.-

In accordance with sub-regulation (4) of regulation 12 of the RE Tariff Regulations, 2017, the discount factor equivalent to the post tax weighted average cost of capital considered for the purpose of levelled tariff computation. The discount factor has been calculated on this basis by following the normative debt equity ratio (70:30). For this purpose, the interest rate for the loan component (i.e. 70%) of capital cost has been considered as 10.53% which has been adjusted for the corporate tax. For equity component (i.e. 30% of the capital cost) the post tax RoE has been computed as 13.56% by adjusting the normative RoE of 17.00% per annum with average of MAT rate considered by CERC in its RE Tariff Order for FY 2019-20 i.e. 20.26% per annum. The discounted factor has been calculated as 9.22%. The Corporate tax has been taken as 29.12% (25% IT rate+ 12% Surcharge+ 4% Health & Education cess).

#### 6. GENERIC LEVELLED TARIFFS AND ASSOCIATED TERMS & CONDITIONS.-

In light of the discussions made in the preceding paragraphs, the generic levelled tariffs and the associated terms and conditions for solar PV power plant for first six months of FY 2019-20 under the RE Regulations, 2017 are as under:-

- A. The generic levelled tariffs for Solar PV power plants for first six months of FY 2019-20 shall be as under:-

Sr. No.	Capacity	Generic levelled tariff (Rs. Per kWh)
1	Projects to be set up in other than industrial areas and urban areas	



(a)	Upto 1.00 MW	3.98
(b)	Above 1.00 MW & upto 5.00 MW	3.94
<b>2</b>	<b>Projects to be set up in industrial areas and urban areas</b>	
(a)	Upto 1.00 MW	4.06
(b)	Above 1.00 MW & upto 5.00 MW	4.02

- B. These tariffs shall be subject to the RE Tariff Regulations, 2017 and the orders as may be issued by the Commission thereunder from time to time.
- C. These tariffs are applicable to solar photovoltaic (PV) power projects which directly convert Solar Energy into Electricity, using the crystalline silicon or thin film technology or any other technology as approved by the Ministry of New and Renewable Energy and are connected to the Grid.
- D. These tariffs do not take undercount any capital subsidy or any incentive or grant/budgetary support etc. and the adjustment in this regard shall be carried out in accordance with the RE Regulations.
- E. These tariffs shall be applicable in cases where the following conditions are met:-
- (i) the joint petition for approval of PPA has been submitted to the Commission on or after 01.04.2019, but not later than 30.09.2019.
  - (ii) such project is commissioned on or before 31.03.2021.
- F. These tariffs shall not be applicable in cases where the distribution licensee procures power through Solar Energy Corporation of India or through competitive bidding at its level in accordance with Section 63 of the Electricity Act, 2003.
- G. These tariffs shall not be applicable in case of the solar PV plants which are installed by the consumers within their premises (rooftop or ground mounted) under net metering scheme.
- H. We decide to compute the generic levellised tariffs for various categories of Solar PV project(s) in respect of remaining six months of FY 2019-20 (i.e. 01.10.2019 to 31.03.2020) by taking into account the provisions of RE Regulations applicable for that period.
- I. In case where the generic levellised tariff is required to be fixed for FY 2019-20, keeping in view the provisions of the Power Purchase Agreement (PPA) in relation to delayed commissioning of the project(s), the generic levellised tariff for the respective categories of solar PV plants, based on capacity and their location, in respect of the period 01.04.2019 to 30.09.2019 or 01.10. 2019 to 31.03.2020, whichever is higher shall be considered as tariff for FY 2019-20 for such purposes.

8. The detailed computations for generic levelled tariffs for categories of solar PV power plants for first six months of FY 2019-20 as well as illustrations thereof are attached as per Appendix – “I & II” and “III & IV”.

**Assumption Parameters for Solar PV Power Projects upto 1 MW**  
(for project(s) to be setup in areas other than industrial areas and Urban areas)

Sr. No	Assumption Head	Sub Head	Sub Head(2)	Unit	Value
1	Power Generation	Capacity	Installed Generation Capacity	KW	1000
			Capacity Utilisation Factor	%	0.19
			Auxiliary Consumption	%	0
			Transmission losses	%	0.7
			Useful Life	%	25
2	Project Cost	Capital Cost /MW	Project Cost	Rs. Lacs/MW	392.09
3	Project Financing	Debt Equity	Tariff Period	Year	25
			Debt	%	70
		Debt Component	Equity	%	30
			Loan Amount	Rs. Lacs/MW	274.463
			Moratorium Period	Year	0
			Repayment Period	Year	13
		Equity Component	Interest Rate	%	10.53
			Equity Amount	Rs. Lacs/MW	117.627
			Return of equity for first 10 Years	%	17
Return of equity from 11th Years onwards	%	17			
4	Subsidy	Subsidy			0
5	Depreciation	Depreciation	Recovery of Depreciation	%	90
			Annual Rate of Depreciation till completion of Loan Repayment (balance spread in remaining years) 14th year Onward	%	5.28
6	Operation & Maintenance		Total O&M Expenses	Rs. Lacs/MW	8.27
			Annual Escalation	%	5.72
7	Working Capital		O&M Charges	Months	1
			Maintenance Spares	% of O&M expenses of a Year	15
			Receivables	Months	2
			Interest on Working capital	%	10.99
9	Discount Factor		Discount Rate	%	9.22

		<b>Determination of Tariff for Solar PV Power Projects up to 1 MW</b>																			Sheet of Appendix I							
<b>Unit Generation</b>	<b>unit</b>	<b>year</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>	<b>9</b>	<b>10</b>	<b>11</b>	<b>12</b>	<b>13</b>	<b>14</b>	<b>15</b>	<b>16</b>	<b>17</b>	<b>18</b>	<b>19</b>	<b>20</b>	<b>21</b>	<b>22</b>	<b>23</b>	<b>24</b>	<b>25</b>	
Installed Capacity	KW		1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	
Gross generation	MU		1.664	1.66	1.66	1.66	1.66	1.66	1.66	1.66	1.66	1.66	1.66	1.66	1.66	1.66	1.66	1.66	1.66	1.66	1.66	1.66	1.66	1.66	1.66	1.66	1.66	
Losses	MU		0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	
Net Generation	MU		1.653	1.65	1.65	1.65	1.65	1.65	1.65	1.65	1.65	1.65	1.65	1.65	1.65	1.65	1.65	1.65	1.65	1.65	1.65	1.65	1.65	1.65	1.65	1.65	1.65	
<b>Fixed Cost</b>		<b>year</b>																										
O&M Expences	Rs lacs		8.27	8.743	9.24	9.77	10.33	10.92	11.55	12.21	12.91	13.64	14.42	15.25	16.12	17.04	18.02	19.05	20.14	21.29	22.51	23.80	25.16	26.60	28.12	29.72	31.43	
Depriciation	Rs lacs		20.70	20.70	20.70	20.70	20.70	20.70	20.70	20.70	20.70	20.70	20.70	20.70	20.70	6.98	6.98	6.98	6.98	6.98	6.98	6.98	6.98	6.98	6.98	6.98	6.98	6.98
Interest on Term Loan	Rs lacs		27.79	25.57	23.34	21.12	18.90	16.67	14.45	12.23	10.00	7.78	5.56	3.33	1.11	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
Interest on Working Capital	Rs lacs		1.65	1.63	1.61	1.59	1.57	1.56	1.55	1.53	1.52	1.52	1.51	1.50	1.50	1.27	1.31	1.36	1.41	1.46	1.51	1.57	1.63	1.69	1.76	1.83	1.91	
Return on Equity	Rs lacs		20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00
Total fixed Cost	Rs lacs		78.41	76.64	74.89	73.18	71.50	69.85	68.24	66.67	65.13	63.64	62.19	60.79	59.43	45.29	46.30	47.38	48.52	49.72	50.99	52.34	53.76	55.27	56.85	58.54	60.31	
<b>Levellised CoG</b>																												
Per unit CoG	Unit	<b>levellised</b>																										
O&M Expences	Rs/kWh	0.83	0.50	0.53	0.56	0.59	0.63	0.66	0.70	0.74	0.78	0.83	0.87	0.92	0.98	1.03	1.09	1.15	1.22	1.29	1.36	1.44	1.52	1.61	1.70	1.80	1.90	
Depriciation	Rs/kWh	1.06	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	0.42	0.42	0.42	0.42	0.42	0.42	0.42	0.42	0.42	0.42	0.42	0.42	
Interest on Term Loan	Rs/kWh	0.80	1.68	1.55	1.41	1.28	1.14	1.01	0.87	0.74	0.61	0.47	0.34	0.20	0.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Interest on Working Capital	Rs/kWh	0.09	0.10	0.10	0.10	0.10	0.10	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.08	0.08	0.08	0.09	0.09	0.09	0.09	0.10	0.10	0.11	0.11	0.12	
Return on Equity	Rs/kWh	1.21	1.21	1.21	1.21	1.21	1.21	1.21	1.21	1.21	1.21	1.21	1.21	1.21	1.21	1.21	1.21	1.21	1.21	1.21	1.21	1.21	1.21	1.21	1.21	1.21	1.21	
Total CoG	Rs/kWh	3.98	4.74	4.6369	4.53	4.43	4.33	4.23	4.13	4.03	3.94	3.85	3.76	3.68	3.60	2.74	2.80	2.87	2.94	3.01	3.09	3.17	3.25	3.34	3.44	3.54	3.65	
Discounted factor	%		1	0.92	0.84	0.77	0.70	0.64	0.59	0.54	0.49	0.45	0.41	0.38	0.35	0.32	0.29	0.27	0.24	0.22	0.20	0.19	0.17	0.16	0.14	0.13	0.12	
<b>levellised Tariff</b>	<b>Rs/kWh</b>	<b>3.98</b>	4.74	4.2455	3.80	3.40	3.04	2.72	2.43	2.18	1.95	1.74	1.56	1.39	1.25	0.87	0.82	0.76	0.72	0.67	0.63	0.59	0.56	0.52	0.49	0.47	0.44	

**Assumption Parameters for Solar PV Power Projects above 1 MW upto 5 MW**  
(for project(s) to be setup in areas other than Industrial areas and Urban areas)

Sr. No	Assumption Head	Sub Head	Sub Head(2)	Unit	Value
1	Power Generation	Capacity	Installed Generation Capacity	KW	1000
			Capacity Utilisation Factor	%	0.19
			Auxiliary Consumption	%	0
			Transmission losses	%	0.7
			Useful Life	%	25
2	Project Cost	Capital Cost /MW	Project Cost	Rs. Lacs/MW	386.3
3	Project Financing	Debt Equity	Tariff Period	Year	25
			Debt	%	70
		Debt Component	Equity	%	30
			Loan Amount	Rs. Lacs/MW	270.41
			Moratorium Period	Year	0
			Repayment Period	Year	13
		Equity Component	Interest Rate	%	10.53
			Equity Amount	Rs. Lacs/MW	115.89
			Return of equity for first 10 Years	%	17
		Return of equity from 11th Years onwards	%	17	
4	Subsidy	Subsidy			0
5	Depreciation	Depreciation	Recovery of Depreciation	%	90
			Annual Rate of Depreciation till completion of Loan Repayment (balance spread in remaining years) 14th year Onward	%	5.28
				%	1.78
6	Operation & Maintenance		Total O&M Expenses	Rs. Lacs/MW	8.27
			Annual Escalation	%	5.72
7	Working Capital		O&M Charges	Months	1
			Maintenance Spares	% of O&M expenses of a Year	15
			Receivables	Months	2
			Interest on Working capital	%	10.99
9	Discount Factor		Discount Rate	%	9.22

		<b>Determination of Tariff for Solar PV Power Projects above 1 MW upto 5 MW</b>																				Sheet of Appendix II						
<b>Unit Generation</b>	<b>unit</b>	<b>year</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>	<b>9</b>	<b>10</b>	<b>11</b>	<b>12</b>	<b>13</b>	<b>14</b>	<b>15</b>	<b>16</b>	<b>17</b>	<b>18</b>	<b>19</b>	<b>20</b>	<b>21</b>	<b>22</b>	<b>23</b>	<b>24</b>	<b>25</b>	
Installed Capacity	KW		1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	
Gross generation	MU		1.664	1.66	1.66	1.66	1.66	1.66	1.66	1.66	1.66	1.66	1.66	1.66	1.66	1.66	1.66	1.66	1.66	1.66	1.66	1.66	1.66	1.66	1.66	1.66	1.66	
Losses	MU		0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	
Net Generation	MU		1.653	1.65	1.65	1.65	1.65	1.65	1.65	1.65	1.65	1.65	1.65	1.65	1.65	1.65	1.65	1.65	1.65	1.65	1.65	1.65	1.65	1.65	1.65	1.65	1.65	
<b>Fixed Cost</b>		<b>year</b>																										
O&M Expences	Rs lacs		8.27	8.743	9.24	9.77	10.33	10.92	11.55	12.21	12.91	13.64	14.42	15.25	16.12	17.04	18.02	19.05	20.14	21.29	22.51	23.80	25.16	26.60	28.12	29.72	31.43	
Depriciation	Rs lacs		20.40	20.40	20.40	20.40	20.40	20.40	20.40	20.40	20.40	20.40	20.40	20.40	20.40	6.88	6.88	6.88	6.88	6.88	6.88	6.88	6.88	6.88	6.88	6.88	6.88	6.88
Interest on Term Loan	Rs lacs		27.38	25.19	23.00	20.81	18.62	16.43	14.24	12.05	9.86	7.67	5.48	3.29	1.10	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
Interest on Working Capital	Rs lacs		1.63	1.61	1.59	1.57	1.56	1.54	1.53	1.52	1.51	1.50	1.50	1.49	1.49	1.26	1.30	1.35	1.40	1.45	1.50	1.56	1.62	1.69	1.75	1.83	1.90	
Return on Equity	Rs lacs		19.70	19.70	19.70	19.70	19.70	19.70	19.70	19.70	19.70	19.70	19.70	19.70	19.70	19.70	19.70	19.70	19.70	19.70	19.70	19.70	19.70	19.70	19.70	19.70	19.70	19.70
Total fixed Cost	Rs lacs		77.38	75.64	73.93	72.25	70.60	68.99	67.41	65.87	64.37	62.91	61.49	60.12	58.80	44.88	45.90	46.97	48.11	49.32	50.59	51.93	53.36	54.86	56.45	58.13	59.91	
<b>Levellised CoG</b>																												
Per unit CoG	Unit	<b>levellised</b>																										
O&M Expences	Rs/kWh	0.83	0.50	0.53	0.56	0.59	0.63	0.66	0.70	0.74	0.78	0.83	0.87	0.92	0.98	1.03	1.09	1.15	1.22	1.29	1.36	1.44	1.52	1.61	1.70	1.80	1.90	
Depriciation	Rs/kWh	1.04	1.23	1.23	1.23	1.23	1.23	1.23	1.23	1.23	1.23	1.23	1.23	1.23	1.23	0.42	0.42	0.42	0.42	0.42	0.42	0.42	0.42	0.42	0.42	0.42	0.42	
Interest on Term Loan	Rs/kWh	0.78	1.66	1.52	1.39	1.26	1.13	0.99	0.86	0.73	0.60	0.46	0.33	0.20	0.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Interest on Working Capital	Rs/kWh	0.09	0.10	0.10	0.10	0.10	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.08	0.08	0.08	0.08	0.09	0.09	0.09	0.10	0.10	0.11	0.11	0.12	
Return on Equity	Rs/kWh	1.19	1.19	1.19	1.19	1.19	1.19	1.19	1.19	1.19	1.19	1.19	1.19	1.19	1.19	1.19	1.19	1.19	1.19	1.19	1.19	1.19	1.19	1.19	1.19	1.19	1.19	
Total CoG	Rs/kWh	3.94	4.68	4.5766	4.47	4.37	4.27	4.17	4.08	3.99	3.89	3.81	3.72	3.64	3.56	2.72	2.78	2.84	2.91	2.98	3.06	3.14	3.23	3.32	3.42	3.52	3.62	
Discounted factor	%		1	0.92	0.84	0.77	0.70	0.64	0.59	0.54	0.49	0.45	0.41	0.38	0.35	0.32	0.29	0.27	0.24	0.22	0.20	0.19	0.17	0.16	0.14	0.13	0.12	
<b>levellised Tariff</b>	<b>Rs/kWh</b>	<b>3.94</b>	4.68	4.1902	3.75	3.36	3.00	2.69	2.40	2.15	1.92	1.72	1.54	1.38	1.23	0.86	0.81	0.76	0.71	0.67	0.63	0.59	0.55	0.52	0.49	0.46	0.44	

**Assumption Parameters for Solar PV Power Projects upto 1 MW**  
(for project(s) to be setup in Industrial areas and Urban areas)

Sr. No	Assumption Head	Sub Head	Sub Head(2)	Unit	Value
1	Power Generation	Capacity	Installed Generation Capacity	KW	1000
			Capacity Utilisation Factor	%	0.19
			Auxiliary Consumption	%	0
			Transmission losses	%	0.7
			Useful Life	%	25
2	Project Cost	Capital Cost /MW	Project Cost	Rs. Lacs/MW	402.24
3	Project Financing	Debt Equity	Tariff Period	Year	25
			Debt	%	70
		Debt Component	Equity	%	30
			Loan Amount	Rs. Lacs/MW	281.568
			Moratorium Period	Year	0
			Repayment Period	Year	13
		Equity Component	Interest Rate	%	10.53
			Equity Amount	Rs. Lacs/MW	120.672
			Return of equity for first 10 Years	%	17
Return of equity from 11th Years onwards	%	17			
4	Subsidy	Subsidy			0
5	Depreciation	Depreciation	Recovery of Depreciation	%	90
			Annual Rate of Depreciation till completion of Loan Repayment (balance spread in remaining years) 14th year Onward	%	5.28
6	Operation & Maintenance		Total O&M Expenses	Rs. Lacs/MW	8.27
			Annual Escalation	%	5.72
7	Working Capital		O&M Charges	Months	1
			Maintenance Spares	% of O&M expenses of a Year	15
			Receivables	Months	2
			Interest on Working capital	%	10.99
9	Discount Factor		Discount Rate	%	9.22

		<b>Determination of Tariff for Solar PV Power Projects up to 1 MW</b>																		Sheet of Appendix III								
<b>Unit Generation</b>	<b>unit</b>	<b>year</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>	<b>9</b>	<b>10</b>	<b>11</b>	<b>12</b>	<b>13</b>	<b>14</b>	<b>15</b>	<b>16</b>	<b>17</b>	<b>18</b>	<b>19</b>	<b>20</b>	<b>21</b>	<b>22</b>	<b>23</b>	<b>24</b>	<b>25</b>	
Installed Capacity	KW		1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	
Gross generation	MU		1.664	1.66	1.66	1.66	1.66	1.66	1.66	1.66	1.66	1.66	1.66	1.66	1.66	1.66	1.66	1.66	1.66	1.66	1.66	1.66	1.66	1.66	1.66	1.66	1.66	
Losses	MU		0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	
Net Generation	MU		1.653	1.65	1.65	1.65	1.65	1.65	1.65	1.65	1.65	1.65	1.65	1.65	1.65	1.65	1.65	1.65	1.65	1.65	1.65	1.65	1.65	1.65	1.65	1.65	1.65	
<b>Fixed Cost</b>		<b>year</b>																										
O&M Expences	Rs lacs		8.27	8.743	9.24	9.77	10.33	10.92	11.55	12.21	12.91	13.64	14.42	15.25	16.12	17.04	18.02	19.05	20.14	21.29	22.51	23.80	25.16	26.60	28.12	29.72	31.43	
Depriciation	Rs lacs		21.24	21.24	21.24	21.24	21.24	21.24	21.24	21.24	21.24	21.24	21.24	21.24	21.24	7.16	7.16	7.16	7.16	7.16	7.16	7.16	7.16	7.16	7.16	7.16	7.16	7.16
Interest on Term Loan	Rs lacs		28.51	26.23	23.95	21.67	19.39	17.11	14.82	12.54	10.26	7.98	5.70	3.42	1.14	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
Interest on Working Capital	Rs lacs		1.68	1.66	1.64	1.62	1.60	1.59	1.57	1.56	1.55	1.54	1.53	1.53	1.52	1.28	1.32	1.37	1.42	1.47	1.52	1.58	1.64	1.71	1.78	1.85	1.92	
Return on Equity	Rs lacs		20.51	20.51	20.51	20.51	20.51	20.51	20.51	20.51	20.51	20.51	20.51	20.51	20.51	20.51	20.51	20.51	20.51	20.51	20.51	20.51	20.51	20.51	20.51	20.51	20.51	20.51
Total fixed Cost	Rs lacs		80.21	78.38	76.58	74.81	73.07	71.37	69.70	68.06	66.47	64.92	63.41	61.95	60.54	46.00	47.02	48.09	49.23	50.43	51.71	53.05	54.47	55.98	57.57	59.25	61.02	
<b>Levellised CoG</b>																												
Per unit CoG	Unit	<b>levellised</b>																										
O&M Expences	Rs/kWh	0.83	0.50	0.53	0.56	0.59	0.63	0.66	0.70	0.74	0.78	0.83	0.87	0.92	0.98	1.03	1.09	1.15	1.22	1.29	1.36	1.44	1.52	1.61	1.70	1.80	1.90	
Depriciation	Rs/kWh	1.09	1.29	1.29	1.29	1.29	1.29	1.29	1.29	1.29	1.29	1.29	1.29	1.29	1.29	0.43	0.43	0.43	0.43	0.43	0.43	0.43	0.43	0.43	0.43	0.43	0.43	
Interest on Term Loan	Rs/kWh	0.82	1.72	1.59	1.45	1.31	1.17	1.03	0.90	0.76	0.62	0.48	0.34	0.21	0.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Interest on Working Capital	Rs/kWh	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.09	0.09	0.09	0.09	0.09	0.09	0.08	0.08	0.08	0.09	0.09	0.09	0.10	0.10	0.10	0.11	0.11	0.12	
Return on Equity	Rs/kWh	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	
Total CoG	Rs/kWh	4.06	4.85	4.7426	4.63	4.53	4.42	4.32	4.22	4.12	4.02	3.93	3.84	3.75	3.66	2.78	2.84	2.91	2.98	3.05	3.13	3.21	3.30	3.39	3.48	3.58	3.69	
Discounted factor	%		1	0.92	0.84	0.77	0.70	0.64	0.59	0.54	0.49	0.45	0.41	0.38	0.35	0.32	0.29	0.27	0.24	0.22	0.20	0.19	0.17	0.16	0.14	0.13	0.12	
<b>levellised Tariff</b>	<b>Rs/kWh</b>	<b>4.06</b>	4.85	4.3423	3.88	3.47	3.11	2.78	2.48	2.22	1.99	1.78	1.59	1.42	1.27	0.88	0.83	0.78	0.73	0.68	0.64	0.60	0.56	0.53	0.50	0.47	0.44	



**Assumption Parameters for Solar PV Power Projects above 1 MW upto 5 MW**  
(for project(s) to be setup in Industrial areas and Urban areas)

Sr. No	Assumption Head	Sub Head	Sub Head(2)	Unit	Value
1	Power Generation	Capacity	Installed Generation Capacity	KW	1000
			Capacity Utilisation Factor	%	0.19
			Auxiliary Consumption	%	0
			Transmission losses	%	0.7
			Useful Life	%	25
2	Project Cost	Capital Cost /MW	Project Cost	Rs. Lacs/MW	396.3
3	Project Financing	Debt Equity	Tariff Period	Year	25
			Debt	%	70
		Debt Component	Equity	%	30
			Loan Amount	Rs. Lacs/MW	277.41
			Moratorium Period	Year	0
			Repayment Period	Year	13
		Equity Component	Interest Rate	%	10.53
			Equity Amount	Rs. Lacs/MW	118.89
			Return of equity for first 10 Years	%	17
		Return of equity from 11th Years onwards	%	17	
4	Subsidy	Subsidy			0
5	Depreciation	Depreciation	Recovery of Depreciation	%	90
			Annual Rate of Depreciation till completion of Loan Repayment (balance spread in remaining years) 14th year Onward	%	5.28
				%	1.78
6	Operation & Maintenance		Total O&M Expenses	Rs. Lacs/MW	8.27
			Annual Escalation	%	5.72
7	Working Capital		O&M Charges	Months	1
			Maintenance Spares	% of O&M expenses of a Year	15
			Receivables	Months	2
			Interest on Working capital	%	10.99
9	Discount Factor		Discount Rate	%	9.22

		<b>Determination of Tariff for Solar PV Power Projects above 1 MW upto 5 MW</b>																				Sheet of Appendix IV							
<b>Unit Generation</b>	<b>unit</b>	<b>year</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>	<b>9</b>	<b>10</b>	<b>11</b>	<b>12</b>	<b>13</b>	<b>14</b>	<b>15</b>	<b>16</b>	<b>17</b>	<b>18</b>	<b>19</b>	<b>20</b>	<b>21</b>	<b>22</b>	<b>23</b>	<b>24</b>	<b>25</b>		
Installed Capacity	KW		1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	
Gross generation	MU		1.664	1.66	1.66	1.66	1.66	1.66	1.66	1.66	1.66	1.66	1.66	1.66	1.66	1.66	1.66	1.66	1.66	1.66	1.66	1.66	1.66	1.66	1.66	1.66	1.66	1.66	
Losses	MU		0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	
Net Generation	MU		1.653	1.65	1.65	1.65	1.65	1.65	1.65	1.65	1.65	1.65	1.65	1.65	1.65	1.65	1.65	1.65	1.65	1.65	1.65	1.65	1.65	1.65	1.65	1.65	1.65	1.65	
<b>Fixed Cost</b>		<b>year</b>																											
O&M Expences	Rs lacs		8.27	8.743	9.24	9.77	10.33	10.92	11.55	12.21	12.91	13.64	14.42	15.25	16.12	17.04	18.02	19.05	20.14	21.29	22.51	23.80	25.16	26.60	28.12	29.72	31.43		
Depriciation	Rs lacs		20.92	20.92	20.92	20.92	20.92	20.92	20.92	20.92	20.92	20.92	20.92	20.92	20.92	7.05	7.05	7.05	7.05	7.05	7.05	7.05	7.05	7.05	7.05	7.05	7.05	7.05	7.05
Interest on Term Loan	Rs lacs		28.09	25.84	23.59	21.35	19.10	16.85	14.61	12.36	10.11	7.86	5.62	3.37	1.12	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
Interest on Working Capital	Rs lacs		1.66	1.64	1.62	1.60	1.59	1.57	1.56	1.54	1.53	1.53	1.52	1.51	1.51	1.27	1.32	1.36	1.41	1.46	1.52	1.57	1.64	1.70	1.77	1.84	1.92		
Return on Equity	Rs lacs		20.21	20.21	20.21	20.21	20.21	20.21	20.21	20.21	20.21	20.21	20.21	20.21	20.21	20.21	20.21	20.21	20.21	20.21	20.21	20.21	20.21	20.21	20.21	20.21	20.21	20.21	20.21
Total fixed Cost	Rs lacs		79.16	77.36	75.59	73.86	72.15	70.48	68.85	67.25	65.69	64.17	62.70	61.27	59.89	45.58	46.60	47.68	48.81	50.02	51.29	52.64	54.06	55.56	57.15	58.83	60.61		
<b>Levellised CoG</b>																													
Per unit CoG	Unit	<b>levellised</b>																											
O&M Expences	Rs/kWh	0.83	0.50	0.53	0.56	0.59	0.63	0.66	0.70	0.74	0.78	0.83	0.87	0.92	0.98	1.03	1.09	1.15	1.22	1.29	1.36	1.44	1.52	1.61	1.70	1.80	1.90		
Depriciation	Rs/kWh	1.07	1.27	1.27	1.27	1.27	1.27	1.27	1.27	1.27	1.27	1.27	1.27	1.27	1.27	0.43	0.43	0.43	0.43	0.43	0.43	0.43	0.43	0.43	0.43	0.43	0.43	0.43	
Interest on Term Loan	Rs/kWh	0.80	1.70	1.56	1.43	1.29	1.16	1.02	0.88	0.75	0.61	0.48	0.34	0.20	0.07	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	
Interest on Working Capital	Rs/kWh	0.09	0.10	0.10	0.10	0.10	0.10	0.10	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.08	0.08	0.08	0.09	0.09	0.09	0.10	0.10	0.10	0.11	0.11	0.12		
Return on Equity	Rs/kWh	1.22	1.22	1.22	1.22	1.22	1.22	1.22	1.22	1.22	1.22	1.22	1.22	1.22	1.22	1.22	1.22	1.22	1.22	1.22	1.22	1.22	1.22	1.22	1.22	1.22	1.22	1.22	
Total CoG	Rs/kWh	4.02	4.79	4.6807	4.57	4.47	4.37	4.26	4.17	4.07	3.97	3.88	3.79	3.71	3.62	2.76	2.82	2.88	2.95	3.03	3.10	3.18	3.27	3.36	3.46	3.56	3.67		
Discounted factor	%		1	0.92	0.84	0.77	0.70	0.64	0.59	0.54	0.49	0.45	0.41	0.38	0.35	0.32	0.29	0.27	0.24	0.22	0.20	0.19	0.17	0.16	0.14	0.13	0.12		
<b>levellised Tariff</b>	<b>Rs/kWh</b>	<b>4.02</b>	4.79	4.2856	3.83	3.43	3.07	2.74	2.45	2.19	1.96	1.76	1.57	1.41	1.26	0.88	0.82	0.77	0.72	0.68	0.63	0.60	0.56	0.53	0.50	0.47	0.44		