

HIMACHAL PRADESH ELECTRICITY REGULATORY COMMISSION, SHIMLA

Suo-Motu Petition No.: 01/2024

Date of Order: 14.03.2024

**CORAM: Sh. Devendra Kumar Sharma, Chairman
Sh. Yashwant Singh Chogal, Member (Law)
Sh. Shashi Kant Joshi, Member**

IN THE MATTER OF:-

Determination of Generic Levellised Tariff for Solar PV Projects for FY 2024-25 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 has 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 23rd November, 2017 in the Rajpatra, Himachal Pradesh. The 7th amendment in these Regulations was issued on 22nd September, 2023 applicable from 01.10.2023 wherein financial principles for RE technologies for 4th control period (i.e. 01.10.2023 to 31.03.2027) have been specified (hereinafter jointly referred to as “RE Tariff Regulations, 2017”).
2. The Commission, in due discharge of the mandate under Regulation 18 of RE Tariff Regulations, 2017 issued the proposal dated 27.09.2023 for categorization of Solar PV projects, fixing the technology specific parameters and determination of the Generic Levellised Tariff for Solar PV projects (not exceeding 5.00 MW), alongwith associated terms and conditions, for FY 2024-25.
3. The Commission invited objections/suggestions from the public on the aforesaid proposal, by way of insertions in two News Papers i.e. “Indian Express” and “Divya Himachal” on 8th February, 2024. The text of said proposal was also made available on the Commission’s website www.hperc.org.
4. The Commission, vide letter dated 13.02.2024, also requested the major stakeholders, including the State Government, Directorate of Energy, HIMURJA, the Distribution Licensee i.e. HPSEBL, HPPCL, HPPTCL, SJVNL, the Consumer representative and the Industries Associations etc. to send their objections/suggestions as per the aforesaid public notice on or before 5th March, 2024.
5. In response, the written comments/suggestions were received from the following stakeholders:-
 - (i) The Solar Power Producers and Developers Trust, VPO Dhar Tatoh, Tehsil Sadar, Distt. Bilaspur-174001, (HP).

- (ii) Sh. Roop Lal Sankhyan, VPO Dhar Tatoh, Tehsil Sadar, Distt. Bilaspur-174001, HP.
- (iii) Sh. Kuldeep Singh, VPO: Panjaware, Distt: Una (HP)
- (iv) M/s Barot Valley Hydro Power (P) Ltd., Baragran Road, PO Patlikuhal, Teh. Manali, Distt. Kullu-175129 (HP).

6. The public hearing in the matter was held on 11th March, 2024 in the premises of HPERC at Shimla. The list of stakeholders who participated in the hearing is annexed at **Annexure-“A”**. During the course of public hearing, the following views were expressed:-

- (i) (a) Sh. S.K. Patial, the representative of Solar Power Producers and Developers Trust reiterating the written submissions, further stated that the Commission may consider higher module cost as compared to the cost proposed in the proposal by taking into account the rate of modules available in the market for smaller capacity Solar PV projects. He also stated that 21% CUF considered in the proposal needs to be looked into keeping in view the annual generation data of installed Solar PV project in the State and mentioned that the annual generation from Solar PV projects is about 1.45 MUs/MWp units as compared to the net generation of 1.84 MUs/MWp considered in the proposal. He also pointed out that the interest rates charged by the banks from the project developers are on higher side as compared to the interest rates considered in the proposal.
- (b) The representative also raised the issue that telemetry/RTU should not be mandatory in small solar project upto 1.00 MW and Joint meter reading may be read and signed by the JEs/AEs level for smaller capacity Solar PV projects. The issues of slippages of COD due to COVID and reimbursement of connectivity fee for the project which have not seen the light of day was also highlighted in the hearing.
- (ii) Sh. Pawan Kohli, Barot Valley Hydro Power (P) Ltd. has stated that keeping in view the present scenario i.e. the non-conducive environment of hydro generation in the State, the Solar PV generation may pickup provided due impetus is given to this sector. The stakeholder also submitted that the module cost should be considered as per the prevailing market price of Rs. 160 Lakhs/MW. The other cost component of capital cost need to be enhanced to Rs. 250 Lakhs/MW. CUF of 21% i.e. 1.84 MUs/MW per annum is on higher side and practically it should be around 1.65 MUs/MW.
- (iii) The representative of Distribution Licensee i.e. HPSEBL submitted in the hearing that they have no objection on the proposal of the Commission and the Commission may finalise the same accordingly.

7. We now proceed further to consider the relevant suggestions on the proposal made by the stakeholders in their written submissions as well as in the oral submissions made during the public hearing:-

A. Normative Capital Cost.-

- (i) Sh. Roop Lal Sankhyan has submitted that the Commission in its draft proposal has worked out the average normative price of Solar PV Modules including GST and other taxes as Rs. 127.83 Lakh/MW which means Rs 12.78 per watt. The normative capital cost proposed in the draft, is on lower side. As per the submission of the stakeholder the rate of lowest quoted price per watt is Rs 14.05 + GST 12% (i.e. Rs 15.74 per watt or Rs 157.74 Lakhs/ MW). This rate may rise during the year 2024-25. The stakeholder suggested that the ground level factors may be considered to make the projects viable. The module cost may be considered Rs. 160 Lakhs in place of 127.83 Lakhs/MW.
- (ii) The Solar Power Producers & Developers Trust has submitted that the Commission in its draft proposal has taken average normative price of Solar PV Modules including GST as Rs. 127.83 Lakhs/MW. However, in the market 1.00 MW Solar PV modules are costing at Rs. 180 Lakhs/MW. The stakeholder suggested that the module cost may be considered as Rs.180 Lakhs/MW in place of Rs. 127.83 Lakhs/MW.
- (iii) Sh. Kuldeep Singh has submitted that the Commission in its draft order has taken the cost of modules as Rs. 127.83 Lakhs/MW. The stakeholder mentioned that he is interested to install 500 kW Solar PV project. He suggested that the module cost may be considered as Rs. 180 Lakhs/MW in place of Rs.127.83 Lakhs/MW.
- (iv) M/s Barot Valley Hydro Power (P) Ltd. has submitted that the Solar PV modules considered in the draft order as Rs. 127.83 Lakhs/MW, which is quite lower than prevailing market prices i.e. Rs. 160 Lakhs/MW. The other expenses such as preliminary and pre-operative expenses, land cost, civil & general works and mounting structures, power conditioning units, evacuation cost upto interconnection point etc i.e. Rs. 220 Lakhs/MW need to be enhanced to Rs. 250 Lakhs /MW to make it at par with present day increased costs.

Commission's View:-

The Commission on considering the objections and suggestions of the stakeholders is of the view that the cost of Solar PV module has witnessed a declining trend. So much so, there has been a considerable reduction in the price of Solar PV modules even during last month after the date of floating the proposal.

The Production Linked Incentive (PLI) as well as other budgetary incentives already announced by the Government of India certainly will have impact on the market of solar modules, nationally and internationally.

The Commission feels that all such developments in the recent years have resulted in increasing the production of solar modules at the competitive rates. This trend is likely to continue which may make the rates more and more competitive. Moreover, with the technological advancement, the efficiency parameters of the cells/ modules may also improve. Efficiency level of cells/modules is presently being indicated as around 23% and above. The space requirement may also get reduced with more and more innovative methods of installation of such modules.

All these factors would have overlapping effects and would not only increase the competitiveness but shall definitely impact the market rates at which the Solar PV Cells and Solar PV Modules shall be available from various sources.

The Commission is also of the view that the Solar PV tariff of projects upto 5 MW to be installed in the State of Himachal Pradesh should be competitive to some extent with the tariff discovered through competitive bidding of higher capacity projects at National level as well as State levels. Even in must-buy purchase regime, the Power Procurement by the Licensee should be reasonable & competitive, so that the State Consumers may not be unduly burdened.

Taking into account the various suggestions given by the stakeholders in relation to the normative capital cost and balancing various concerns, the Commission, in order to promote setting up of the Solar PV projects of smaller capacities in the State, decides to allow an all inclusive escalation of 40% on the basic cost resulting in enhancement of basis cost from Rs. 127.83 Lakhs/MW considered in the proposal to Rs. 132.56 Lakhs/MW.

Apart from above, the normative cost of the other components of normative capital cost shall also be increased from Rs. 220.00 Lakhs/ MW considered in the proposal to Rs. 231.55 Lakhs/MW.

B. NORMATIVE NET SALEABLE ENERGY /CUF.-

- (i) Sh. Roop Lal Sankhyan has submitted that the assumption of annual gross generation of 1.84 MUs/MWp in the draft proposal is far from actual generation. As per the generation data of his projects, the annual gross generation is not more than 1.45 MUs/MWp. The stakeholder has made submissions that the annual gross generation may be considered as 1.45 MUs/MW.
- (ii) The Solar Power Producers & Developers Trust has submitted that the Commission has considered normative Capacity Utilization Factor (CUF) for

Solar PV projects as 21% which is unrealistic. Any Solar PV project having installed capacity of 1.00 MW_{ac} will generate about 750 kW_{ac} during its peak generation period and its Capacity Utilization Factor (CUF) will come down to about 16%. In such projects, to achieve 1.00 MW_{ac} about 33% more modules require to be added which will further escalate the normative capital cost. In fact, the actual CUF of all the existing projects having installed capacity in kW_{ac} is coming out about 16%.

- (iii) Sh. Kuldeep Singh has submitted that the assumption of annual gross generation of 1.84 MUs /MW_p in the draft proposal is on higher side and the same may be considered as 1.45 MUs/MW_p.
- (iv) M/s Barot Valley Hydro Power (P) Ltd. has submitted that the CUF of 21% i.e. 1.84 MUs/MW per annum is on higher side and practically it is around 1.65 MUs/MW.

Commission's View:-

The comments/suggestions of similar nature were received from the stakeholders while finalizing the tariff for Solar PV plants for FY 2022-23 and FY 2023-24 on six months basis. The Commission reiterates its earlier view that as per the CERC RE Regulations, 2020 the CUF is required to be kept at least at 21%. The auxiliary consumption has, however, been considered separately as 0.75% as per the CERC RE Regulations. The CUF less than 21% may encourage installation of lower efficiency modules which would result in inefficient operation of the projects. The Commission also feels that with the technological development, the CUF should normally witness an increasing trend. Efficiency parameters of 23% and above is already being indicated. The Commission, accordingly, decides to retain the same as 21% only.

C. Power Degradation

Sh. Roop Lal Sankhyan and the Solar Power Producers & Developers Trust have submitted that for degradation of cell, it is mentioned that normative capital cost is inclusive of power degradation but it is not correct. The approximate power degradation of solar cells is 2.5% during 1st year and thereafter 0.50%-0.68% every year upto 25 years. The stakeholder has suggested to consider this factor separately.

Commission's View:-

As far as the impact of de-gradation on the useful project life span is concerned, the same is envisaged to be met through O&M expenses. However, the normative capital cost takes into account, the initial spares to be procured for the purpose. The Commission also feels that with the advancement of technology, in future, the requirement of such running maintenance spares shall also get reduced considerably.

D. Interest Rate:-

Sh. Roop Lal Sankhyan and the Solar Power Producers & Developers Trust have submitted that the RBI has increased interest rates thrice in last year and in view of the uncertain interest rate hikes, the interest rate may be considered 12% instead of the rate considered in the proposal.

Commission's View:-

The financial parameters for determination of generic levelled tariff of RE projects, on normative basis, has already been specified in the RE Tariff Regulations, 2017 for the 4th control period.

The present regulatory process is limited to determination of tariff of Solar PV plants for FY 2024-25. As per the Regulations, the interest rate has been worked out as 10.60% per annum by adding 200 basis points above the average of Marginal Cost of Funds Based Lending Rate (MCLR) (one year tenor) of the SBI i.e. 8.60% (average of last available six months).

E. Miscellaneous:-

Sh. Roop Lal Sankhyan and the Solar Power Producers & Developers Trust have submitted the following additional suggestions:-

- (i) Telemetry/RTU should not be mandatory in smaller capacity Solar PV project i.e. upto 1.00MW as it increases the cost by Rs. 4 Lakhs and also annual renewal charges to the tune of Rs 12000/- per year. At present, there is data logger where the SLDC can monitor the generation of the project.
- (ii) Some Solar PV power developers has deposited Rs. 2,00,000/- for connectivity fee with the HPSEBL but could not get loan for installation of their projects. In such cases, the amount taken for connectivity may be refunded.
- (iii) Joint meter reading should be signed by the JEs/AEs of the HPSEBL as the division office are on an average of 30-40 kms away from Solar PV projects.
- (iv) In PPA, the inspection and COD of solar projects should be carried out by the HPSEBL only.
- (v) The applicability of tariff due to slippage of COD due to COVID for Solar PV projects may require to be addressed by the HPSEBL.

Commission's View:-

- (i) The Commission is of the view that the HPSEBL, Solar PV Power Developers and HPSLDC may sort out these issues in the ambit of applicable CEA/CERC Regulations/Guidelines.
- (ii) These issues are not related to the current regulatory process. However, the concerned party may take-up the matter with the HPSEBL.
- (iii) The Commission is of the view that Joint Meter Reading can easily be carried out at the level of concerned AEs and the HPSEBL need to

authorize the concerned AEs for joint meter reading for smaller capacity upto 500 kW Solar PV plants with a provision of quarterly/ six monthly on site reading verification by the concerned XENs.

- (iv) The Commission is of the view that only two agencies i.e. HPSEBL and Chief Electrical Inspectorate (except in cases where STU systems involved) may carry out the synchronization of the Solar PV project. The Solar PV Developer can declare his COD accordingly.
- (v) The affected Solar PV Developer may approach the HPSEBL for good faith negotiation under the terms and conditions of executed PPA.

8. After having addressed the comments/suggestions of the stakeholders, the Commission now proceeds further to categorize the Solar PV plants, fix the technology specific norms for FY 2024-25 and also to determine the generic levellised tariff for procurement of power by the Distribution Licensee from Solar PV plants as detailed in the succeeding paragraphs.

9. **Categorization.-**

The 2nd 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. The Commission, after taking into account various factors like geographical and topographical conditions in the State and in order to promote smaller capacities of Solar PV plants at different locations across the State, categorized Solar PV projects vide its previous orders of Solar PV tariff determination. The Commission retained similar categorization, as mentioned in the table below, for the Solar PV generation capacity for the purposes of normative capital cost and determination of levellised tariff for FY 2024-25:-

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

Since the capacity in the second category is considered to be limited to 5.00 MW, so the Commission expects 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.

10. **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 CERC has not made any provision for determination of normative (benchmark) capital cost for Solar PV projects in its existing RE Tariff Regulations and does not envisage such a generic tariff determination. Accordingly, the Commission evolved its own technology specific parameters after taking into account the various available inputs, including those notified by the CERC and considered by the HPERC in its previous Solar PV tariff determination orders.

10.1 Capital Cost.-

- a) The capital cost of Solar PV module is not only the single largest component of the capital cost of the project but is also highly sensitive to the market conditions and the impact of the rapid technological development. The Commission accordingly feels that the cost of this component should be considered after taking all relevant factors into account.

As per the website of www.pvinsights.com, the latest Solar PV Module Weekly support Price, as accessed on **16.01.2024**, is as under:-

USD/Watt	
Item	Average
Poly Solar Module	0.108
Mono PERC Module	0.119

The average of these prices works out to 0.114 USD/Watt. The Commission finds it appropriate to consider the cost of Solar PV Module as Rs. 94.689 Lakhs/MW considering the exchange rate of Rs. 83.060/USD based on the average of six months, ending 16th January, 2024. The Commission, while determining the generic tariff for Solar PV Plants for FY 2021-22 and vide Order dated 22nd July, 2021, had escalated the average price, based on the data for the relevant period, by 15% to account for the various factors such as DC/AC ratio, degradation factor, taxes etc. etc. Subsequently, the Government of India has announced levy of import duty, w.e.f. 01.04.2022, on the import of Solar PV Cells and Solar PV Modules @ 25% and 40% respectively. The GST rate for the goods component has also been increased from 5% to 12%. Apart from the above, the Government of India has provided for the production linked incentive (PLI) of Rs. 4500 Crores, in addition to the PLI of Rs. 19500 Crore provided for in the budget proposals for FY 2022-23.

All these factors would have overlapping and diverse effects and may also increase the competitiveness. Such factors shall definitely impact the

market rates at which the Solar PV Cells and Solar PV Modules shall be available from various sources.

The Commission feels that all such developments in the recent years have resulted in increasing the production of solar module at the competitive rates in the Country. This trend is further likely to continue which may make the rates more and more competitive. Moreover, the difference in the cost of Solar PV Cells and Solar PV modules as well as taxes thereon, if availed optimally, can also facilitate marginal reduction in the overall cost of the panels. After taking all related factors into account, the Commission considered the normative cost of Solar PV module as Rs. 94.689 Lakhs/MW and has also considered escalation of the same as 40% on account of various factors as mentioned above. Thus, average normative price of Solar PV Modules on the above basis works out to Rs. 132.56 Lakhs/MW.

- b) As regards, the normative cost of the other components which was considered as Rs. 220.00 Lakhs/MW in the proposal dated 03.02.2024, the Commission decides to enhance the same to Rs. 231.55 Lakhs/MW in order to take care of various suggestions received in this regard.
- c) On the above basis, the per/MW normative capital cost of the project works out to Rs. 364.11 Lakhs/MW as detailed in the following table:-

Sr. No.	Particulars	Normative Capital Cost (Rs. Lakh/MW)
1	PV Modules	132.56
2	Preliminary and Pre-operative expenses, Land Cost, Civil & General Works and Mounting Structures. Power Conditioning Units, Evacuation cost up to interconnection point etc.	231.55
	Total Cost	364.11

- d) As regards, the normative capital cost for the Solar PV projects upto 1.00 MW, the Commission feels that the normative per MW capital cost for a category-I projects may now not be much different from the same for category-II projects. On one hand, the cost for the smaller projects may be slightly higher due to economy of scale consideration, but on the other hand there could be some saving in the smaller capacity Solar PV projects.

As such, the Commission considers to fix the normative capital cost for the Solar PV projects upto 1.00 MW capacity by allowing increase of 1.0% considered in the tariff order of FY 2023-24. The same works out as Rs. 367.75 Lakh/MW.

In line with the proposal, the Commission also decides 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. The additional capital cost for these area specific Solar PV project(s) is considered as Rs. 7.50 Lakh per MW (for capacity above 1.00 MW and upto 5.00 MW) over and above the normative capital cost considered for the project(s) to be set up in the areas other than Urban and Industrial areas. This additional cost of Rs. 7.50 Lakh per MW shall, however, be further increased by 1.0% 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.
- e) Accordingly, the Normative Capital Cost for respective categories of Solar PV plant is tabulated as under:-

Sr. No.	Category	Normative Capital Cost (Lakh Rs./MW)
1	Projects to be set up in areas other than urban areas and industrial areas	
(a)	Upto 1.00 MW	367.75
(b)	Above 1.00 MW & upto 5.00 MW	364.11
2	Projects to be set up in urban areas and industrial areas	
(a)	Upto 1.00 MW	375.33
(b)	Above 1.00 MW & upto 5.00 MW	371.61

10.2 Operation and Maintenance Expenses.-

The Commission considered the O&M expenses as Rs.10.16 Lakhs/MW with escalation @3.84% per annum over the tariff period as per the provision of Regulation 28-C of the RE Tariff Regulations, 2017.

10.3 Normative Net Saleable Energy.-

The CUF shall be considered as 21%. The gross generation based on the same shall be reduced by 1.45% on auxiliary consumption, transformation losses and project line losses upto interconnection point on normative basis.

10.4 The other technology specific parameters viz. useful life of the project and tariff period, have already been specified in the RE Tariff Regulations, 2017 and the same shall be followed accordingly.

11. After having considered the technology specific parameters as above, the Commission now proceeds to determine the generic levelled tariff, based on the provisions of Regulation 18 of the RE Tariff Regulations, 2017 for Solar PV projects for FY 2024-25. The main details of the tariff are as follows:-

11.1 Tariff Structure.-

Regulation 12 of the RE Tariff Regulations, 2017 stipulates that single part levelled 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 levelled tariff has been worked out for the respective categories of Solar PV projects by adopting the methodology, discussed in succeeding paragraphs.

11.2 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.

11.3 Debt Equity Ratio.-

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

11.4 Return on Equity.-

Regulation 26-C of the RE Tariff Regulations, 2017 provides that the value base for the equity (on which return on equity shall be calculated) shall be equal to the equity component computed in accordance with the provisions of Regulation 23-C of the RE Tariff Regulations, 2017.

It has also been specified that the normative Return on Equity shall be 14%. The normative Return on Equity shall be grossed up by the latest available notified Minimum Alternate Tax (MAT) rate for the first 20 years of the Tariff Period and by the latest available notified Corporate Tax rate for the remaining Tariff Period.

Accordingly, the normative return on equity taken as 14% in accordance with the provisions of RE Tariff Regulations, 2017. The grossed-up RoE for

the first 20 years of the useful life of the project worked out as 16.80% by considering MAT @ 16.70% (15% MAT rate+7% Surcharge+ 4% Health and Education cess) and for the remaining 5 years, the same grossed-up as 19.39% by considering corporate tax @ 27.82% (25% tax rate+7% Surcharge+ 4% Health and Education cess).

11.5 Interest on Loan.-

The Sub-regulation (1) of Regulation 24-C of the RE Tariff Regulation, 2017 provides that the loan tenure of 15 years shall 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 loan amount (i.e. the debt component) arrived at in the manner indicated in the regulation 23-C shall be considered as gross normative loan for calculation of interest on loan. The normative loan outstanding as on 1st April of every year shall be worked out by deducting the cumulative repayment up to 31st 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) the respective generic levellised tariffs are to be made applicable, shall be considered:*
Provided that in case where the project specific tariff
- (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.*
- (a) *The loan repayment for a financial year or the relevant part period thereof shall be considered to have been done in the middle of that financial year or the relevant part period thereof, as the case may be.”*

In view of above, the interest rate has been worked out as 10.60% per annum by 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) prevailing during the last available six months as shown in the table below:-

Month	Tenor-wise MCLR of SBI
September, 2023	8.55
October, 2023	8.55
November, 2023	8.55
December, 2023	8.65
January, 2024	8.65
February, 2024	8.65
Avg. for last available 6 months.	8.60

11.6 Depreciation.-

- (i) Regulation 25-C 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 equal to sum total of the debt and equity components as per the provisions of regulation 23-C;*

(b) the salvage value shall be considered as 10% and depreciation shall be allowed up to maximum of 90% of the value base as per clause (a) of this regulation:

Provided that no depreciation shall be allowed to the extent of incentive, grant and capital subsidy available for the project.

(c) depreciation per annum shall be based on 'Differential Depreciation Approach'. For tariff purposes, the depreciation shall be allowed @ 4.67% per annum of the value base as per clause (a) of this regulation till such time the requirement for repayment of loan component of the capital cost as per regulations 21-C, 23-C and 24-C 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:

Provided that purposes of project specific determination of tariff."

Accordingly, the rate of depreciation for the first 15 years has been considered as 4.67% and the rate of depreciation from the 16th 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 15 years (%)	4.67
Rate of depreciation after first 15 years (%)	1.995

11.7 Interest on working capital.-

(i) In accordance with the Regulation 27-C of the RE Tariff Regulations, 2017, the working capital requirement of the Solar PV project has been considered by including the following:-

"(a) operation and maintenance expenses for one month;

(b) receivables equivalent to 45 days 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 has been worked out as 12.10% per annum by the adding 350 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 prior to the respective date(s) from which the generic tariff(s) are to be made applicable.

11.8 Incentive and/or subsidy and/or grant/budgetary support by the Central/ State Government.-

The Sub-regulation (1) of Regulation 22-C 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 and/or budgetary support available, irrespective

of whether the same is actually availed or not, under the schemes of the Central or State Government or their agencies, but excluding accelerated depreciation benefit under the Income Tax Act:

Provided that the capital subsidy under the schemes of the Central or State Government or their agencies shall be adjusted in the normative capital cost and the cost so arrived, after such adjustment, shall be considered for computing Debt-Equity Components for the purposes of determination of generic levelled tariffs:

Provided further that where the Central Government or the State Government notifies, or has notified, any generation based incentive (GBI) scheme for a particular kind of renewable technology, such technology based generating station shall be assumed to have availed the benefit of such a scheme and their tariffs shall be reduced by the amount of generation based incentive (GBI) per unit for the period during which such incentive remains applicable.

(2) Where any additional project specific grant or budgetary support is available to any project, apart from the incentive and/or subsidy and/or grant available under Sub-regulation (1) of this regulation, the Commission shall account for such budgetary support also, while determining project specific levelled tariff.

(3) The amount of subsidy shall be considered for each renewable source as per the applicable policy of the MNRE/State Government/Central Government and if the amount and/or mechanism of subsidy is changed by the MNRE/State Government/Central Government, consequent corrections in tariffs may be carried out by the Commission in accordance with Regulation 20.”

11.9 No adjustment of incentive and/or subsidy and/or grant is being made in the tariff calculations. However, adjustment to be made in the rate on the basis of per million (rupees) of subsidy for each MW capacity has been worked out and mentioned in the attached calculation sheet of the project and adjustment, if any, on account of the same shall be made at appropriate stage while applying the tariff after taking into account the eligibility conditions in each case. Similarly, adjustment on account of any other subsidy Scheme(s) available under the Government (Central/State) shall also be made at appropriate stage(s) after taking into account the extent of subsidy(ies) available under such Scheme(s). The adjustments on account of subsidies, where available, are to be made at the rates indicated in the calculation sheet on normative basis by considering the provisions of Regulations 20-C, 23-C, 24-C, 25-C and 26-C. For this purpose the total amount (in million rupees) of incentive and/or subsidy and/or grant etc., shall be divided by the installed capacity of the projects and the per MW amount (in million rupees) so arrived at, shall be multiplied by the rate indicated in the calculation sheet.

11.10 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 has been considered for the purpose of

levellised tariff computation. The discount factor has been calculated on this basis of the normative debt equity ratio (70:30) and weighed average of the post tax rates for debt and equity component. For this purpose, the interest rate on the loan component (i.e. 70%) of capital cost is 10.60%. For equity component (i.e. 30%), rate of Return of Equity (RoE) is considered as post tax rate of 14%. The discount factor has been calculated as 9.55%. The Corporate tax has been taken as 27.82% (25% IT rate+7% Surcharge+4% Health and Education cess).

11.11 Rounding.-

The tariff so worked out for Solar PV projects has been rounded to nearest paise/kWh. The fraction of 0.5 paise/kWh or above has been rounded to next higher and fraction of less than 0.5 has been ignored.

12. Generic Levellised Tariff and Associated Terms & Conditions.-

In light of the discussions made in the preceding paragraphs, the generic levellised tariffs and the associated terms and conditions for Solar PV power project for FY 2024-25 under the RE Regulations, 2017 have been arrived at and are determine as under:-

- A. The generic levellised tariff for Solar PV power projects for FY 2024-25 shall be:-

Sr. No.	Capacity	Generic levellised tariff (Rs. Per kWh)
1	Projects to be set up in other than industrial areas and urban areas	
(a)	Upto 1.00 MW	3.50
(b)	Above 1.00 MW & upto 5.00 MW	3.47
2	Projects to be set up in industrial areas and urban areas	
(a)	Upto 1.00 MW	3.55
(b)	Above 1.00 MW & upto 5.00 MW	3.52

- B. This tariff as per item A 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. This tariff is applicable to solar photovoltaic (PV) power projects which directly convert Solar Energy into Electricity, using the poly crystalline silicon or Mono PERC technology or any other technology as approved by the Ministry of New and Renewable Energy and are connected to the Grid.
- D. This tariff does not take into account 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, 2017. The adjustments, if any, to be made at the rate per kWh by considering Rs. 10.00 Lacs/MW subsidy have however been indicated in the tariff calculation sheets.

E. The applicability of this tariff shall be governed as per the following provisions:-

- (i) in cases where the joint petition for approval of PPA is submitted to the Commission on or after 01.04.2024, but not later than 31.03.2025, this tariff shall be applicable for such capacity(ies) as are commissioned on or before 31.03.2026.
- (ii) in other cases, not covered in item (i) above, this tariff shall be applicable for such capacity(ies) for which the generic levelled tariff for FY 2024-25 is applicable in accordance with the provisions of the PPAs read with the applicable tariff Order(s) of previous years.

F. This tariff 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. This tariff shall not be applicable in case of the Solar PV projects which are installed by the consumers within their premises (rooftop or ground mounted) under net metering scheme.

13. The detailed computations for generic levelled tariff for FY 2024-25 for the categories of Solar PV power projects, without considering any subsidies/ incentives/ grants as well as illustrations thereof are attached as per Appendix – “I & II” and “III & IV”.

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(Shashi Kant Joshi) (Yashwant Singh Chogal)

(Devendra Kumar Sharma)

Member

Member (Law)

Chairman

Place: Shimla.

Dated: 14 March, 2024.

Annexure-“A”

List of the stakeholders/participants who attended the public hearing on 11th March, 2024.

Sr. No.	Name
1	Er. Lokesh Thakur, Chief Engineer (SP), HPSEBL.
2	Er. Mandeep Singh, Chief Engineer (SO), HPSEBL.
3	Sh. Suresh Patial, Solar Power Producers & Development Trust, Bilaspur (HP).
4	Sh. Pawan Kohli, Barot Valley Hydro Power (P) Ltd.

Assumption Parameters for Solar PV Power Projects upto 1 MW
(for project(s) to be setup in area 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	%	0.21
			Transmission losses, Auxillary Consumption including Transformation Losses	%	1.45
			Useful Life	Years	25
2	Project Cost	Capital Cost /MW	Project Cost	Lakh Rs./MW	367.75
3	Project Financing	Debt Equity	Tariff Period	Year	25
			Debt	%	70
		Debt Component	Equity	%	30
			Loan Amount	Lakh Rs./MW	257.425
			Moratorium Period	Year	0
			Repayment Period	Year	15
			Interst Rate	%	10.60
		Equity Component	Equity Amount	Lakh Rs./MW	110.325
			Return of equity for first 20 Years	%	16.80
			Return of equity from 21st Years onwards	%	19.39
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)	%	4.67
			16th year Onward	%	1.995
6	Operation & Maintenance		Total O&M Expenses	Lakh Rs./MW	10.16
			Annual Escalation	%	3.84
7	Working Capital		O&M Charges	Month	1
			Maintenance Spares	% of O&M expenses of a Year	15
			Recievables	Months	1.5
			Interest on Working capital	%	12.10
8	Discount Factor		Discount Rate	%	9.55

Determination of Tariff for Solar PV Power Projects up to 1 MW (for project(s) to be setup in area other than Industrial areas and Urban areas)

Sheet of Appendix I

Unit Generation	unit	year	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
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		1.840	1.84	1.84	1.84	1.84	1.84	1.84	1.84	1.84	1.84	1.84	1.84	1.84	1.84	1.84	1.84	1.84	1.84	1.84	1.84	1.84	1.84	1.84	1.84	1.84
Losses	MU		1.45	1.45	1.45	1.45	1.45	1.45	1.45	1.45	1.45	1.45	1.45	1.45	1.45	1.45	1.45	1.45	1.45	1.45	1.45	1.45	1.45	1.45	1.45	1.45	1.45
Net Generation	MU		1.813	1.81	1.81	1.81	1.81	1.81	1.81	1.81	1.81	1.81	1.81	1.81	1.81	1.81	1.81	1.81	1.81	1.81	1.81	1.81	1.81	1.81	1.81	1.81	1.81
Fixed Cost		year																									
O&M Expences	Rs. lakh		10.16	10.550	10.96	11.38	11.81	12.27	12.74	13.23	13.73	14.26	14.81	15.38	15.97	16.58	17.22	17.88	18.57	19.28	20.02	20.79	21.59	22.42	23.28	24.17	25.10
Depriciation	Rs. lakh		17.17	17.17	17.17	17.17	17.17	17.17	17.17	17.17	17.17	17.17	17.17	17.17	17.17	17.17	17.17	7.34	7.34	7.34	7.34	7.34	7.34	7.34	7.34	7.34	7.34
Interest on Term Loan	Rs. lakh		26.38	24.56	22.74	20.92	19.10	17.28	15.46	13.64	11.82	10.01	8.19	6.37	4.55	2.73	0.91	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. lakh		1.40	1.39	1.38	1.37	1.36	1.35	1.35	1.34	1.33	1.33	1.33	1.32	1.32	1.32	1.32	1.18	1.21	1.25	1.28	1.31	1.39	1.43	1.47	1.51	1.55
Return on Equity	Rs. lakh		18.53	18.53	18.53	18.53	18.53	18.53	18.53	18.53	18.53	18.53	18.53	18.53	18.53	18.53	18.53	18.53	18.53	18.53	18.53	21.39	21.39	21.39	21.39	21.39	21.39
Total fixed Cost	Rs. lakh		73.65	72.21	70.78	69.38	67.98	66.61	65.26	63.92	62.60	61.31	60.03	58.78	57.55	56.34	55.16	44.94	45.65	46.40	47.17	47.97	51.71	52.57	53.47	54.40	55.37
Levellised CoG																											
Per unit CoG	Unit	levellised																									
O&M Expences	Rs/kWh	0.75	0.56	0.58	0.60	0.63	0.65	0.68	0.70	0.73	0.76	0.79	0.82	0.85	0.88	0.91	0.95	0.99	1.02	1.06	1.10	1.15	1.19	1.24	1.28	1.33	1.38
Depriciation	Rs/kWh	0.86	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40
Interest on Term Loan	Rs/kWh	0.76	1.45	1.35	1.25	1.15	1.05	0.95	0.85	0.75	0.65	0.55	0.45	0.35	0.25	0.15	0.05	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	0.07	0.08	0.08	0.08	0.08	0.08	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.08	0.08	0.08	0.08	0.09
Return on Equity	Rs/kWh	1.03	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.18	1.18	1.18	1.18	1.18
Total CoG	Rs/kWh	3.48	4.06	3.9829	3.90	3.83	3.75	3.67	3.60	3.53	3.45	3.38	3.31	3.24	3.17	3.11	3.04	2.48	2.52	2.56	2.60	2.65	2.85	2.90	2.95	3.00	3.05
Discounted factor	%		1	0.91	0.83	0.76	0.69	0.63	0.58	0.53	0.48	0.44	0.40	0.37	0.33	0.31	0.28	0.25	0.23	0.21	0.19	0.18	0.16	0.15	0.13	0.12	0.11
Levellised Tariff	Rs/kWh	3.50	4.06	3.6357	3.25	2.91	2.60	2.33	2.08	1.86	1.66	1.49	1.33	1.19	1.06	0.95	0.85	0.63	0.59	0.54	0.50	0.47	0.46	0.43	0.40	0.37	0.34

Generic Levellised Tariff (without Subsidy) at Capital Cost of Rs367.75 Lakh/MW = Rs.3.50/kWh

Indicative Generic Levellised Tariff by considering Subsidy/Incentive/Grant of Rs 10 Lakh/MW = Rs. 3.42/kWh

Adjustment to be made per 10 Lakh of Subsidy/Incentive/Grant per MW= Rs. 0.08/kWh

Assumption Parameters for Solar PV Power Projects above 1 MW upto 5 MW

(for project(s) to be setup in area 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	%	0.21
			Transmission losses, Auxillary	%	1.45
			Consumption including Transformation Losses		
			Useful Life	Years	25
2	Project Cost	Capital Cost /MW	Project Cost	Lakh Rs./MW	364.11
3	Project Financing	Debt Equity	Tariff Period	Year	25
			Debt	%	70
		Debt Component	Equity	%	30
			Loan Amount	Lakh Rs./MW	254.877
			Moratorium Period	Year	0
			Repayment Period	Year	15
			Interst Rate	%	10.60
		Equity Component	Equity Amount	Lakh Rs./MW	109.233
			Return of equity for first 20 Years	%	16.80
			Return of equity from 21st Years onwards	%	19.39
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)	%	4.67
			16th year Onward	%	1.995
6	Operation & Maintenance		Total O&M Expenses	Lakh Rs./MW	10.16
			Annual Escalation	%	3.84
7	Working Capital		O&M Charges	Month	1
			Maintenance Spares	% of O&M expenses of a Year	15
			Recievables	Months	1.5
			Interest on Working capital	%	12.10
8	Discount Factor		Discount Rate	%	9.55

Determination of Tariff for Solar PV Power Projects above 1 MW upto 5 MW (Other than Urban/Industrial Area) -Last 6 Months

Sheet of Appendix II

Unit Generation	unit	year	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
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		1.840	1.84	1.84	1.84	1.84	1.84	1.84	1.84	1.84	1.84	1.84	1.84	1.84	1.84	1.84	1.84	1.84	1.84	1.84	1.84	1.84	1.84	1.84	1.84	1.84
Losses	MU		1.45	1.45	1.45	1.45	1.45	1.45	1.45	1.45	1.45	1.45	1.45	1.45	1.45	1.45	1.45	1.45	1.45	1.45	1.45	1.45	1.45	1.45	1.45	1.45	1.45
Net Generation	MU		1.813	1.81	1.81	1.81	1.81	1.81	1.81	1.81	1.81	1.81	1.81	1.81	1.81	1.81	1.81	1.81	1.81	1.81	1.81	1.81	1.81	1.81	1.81	1.81	1.81
Fixed Cost		year																									
O&M Expences	Rs. lakh		10.16	10.550	10.96	11.38	11.81	12.27	12.74	13.23	13.73	14.26	14.81	15.38	15.97	16.58	17.22	17.88	18.57	19.28	20.02	20.79	21.59	22.42	23.28	24.17	25.10
Depriciation	Rs. lakh		17.00	17.00	17.00	17.00	17.00	17.00	17.00	17.00	17.00	17.00	17.00	17.00	17.00	17.00	17.00	7.26	7.26	7.26	7.26	7.26	7.26	7.26	7.26	7.26	7.26
Interest on Term Loan	Rs. lakh		26.12	24.32	22.51	20.71	18.91	17.11	15.31	13.51	11.71	9.91	8.11	6.30	4.50	2.70	0.90	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. lakh		1.39	1.38	1.37	1.36	1.35	1.35	1.34	1.33	1.33	1.32	1.32	1.32	1.32	1.31	1.31	1.18	1.21	1.24	1.27	1.31	1.39	1.42	1.46	1.50	1.54
Return on Equity	Rs. lakh		18.35	18.35	18.35	18.35	18.35	18.35	18.35	18.35	18.35	18.35	18.35	18.35	18.35	18.35	18.35	18.35	18.35	18.35	18.35	18.35	21.18	21.18	21.18	21.18	21.18
Total fixed Cost	Rs. lakh		73.02	71.60	70.20	68.81	67.43	66.08	64.74	63.42	62.12	60.85	59.59	58.35	57.14	55.95	54.79	44.68	45.39	46.14	46.91	47.71	51.42	52.28	53.18	54.12	55.08
Levellised CoG																											
Per unit CoG	Unit	levellised																									
O&M Expences	Rs/kWh	0.77	0.56	0.58	0.60	0.63	0.65	0.68	0.70	0.73	0.76	0.79	0.82	0.85	0.88	0.91	0.95	0.99	1.02	1.06	1.10	1.15	1.19	1.24	1.28	1.33	1.38
Depreciation	Rs/kWh	0.85	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40
Interest on Term Loan	Rs/kWh	0.75	1.44	1.34	1.24	1.14	1.04	0.94	0.84	0.75	0.65	0.55	0.45	0.35	0.25	0.15	0.05	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	0.07	0.08	0.08	0.08	0.08	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.08	0.08	0.08	0.08	0.09
Return on Equity	Rs/kWh	1.02	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.17	1.17	1.17	1.17	1.17
Total CoG	Rs/kWh	3.47	4.03	3.9495	3.87	3.80	3.72	3.64	3.57	3.50	3.43	3.36	3.29	3.22	3.15	3.09	3.02	2.46	2.50	2.54	2.59	2.63	2.84	2.88	2.93	2.98	3.04
Discounted factor	%		1	0.91	0.83	0.76	0.69	0.63	0.58	0.53	0.48	0.44	0.40	0.37	0.33	0.31	0.28	0.25	0.23	0.21	0.19	0.18	0.16	0.15	0.13	0.12	0.11
Levellised Tariff	Rs/kWh	3.47	4.03	3.6052	3.23	2.89	2.58	2.31	2.07	1.85	1.65	1.48	1.32	1.18	1.05	0.94	0.84	0.63	0.58	0.54	0.50	0.47	0.46	0.42	0.39	0.37	0.34

Generic Levellised Tariff (without Subsidy) at Capital Cost of Rs 364.11 Lakh/MW = Rs. 3.47 /kWh
Indicative Generic Levellised Tariff by considering Subsidy/Incentive/Grant of Rs 10 Lakh/MW = Rs. 340 /kWh
Adjustment to be made per 10 Lakh of Subsidy/Incentive/Grant per MW= Rs. 0.07/kWh

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	%	0.21
			Transmission losses, Auxillary	%	1.45
			Consumption including Transformation Losses		
			Useful Life	Years	25
2	Project Cost	Capital Cost /MW	Project Cost	Lakh Rs./MW	375.33
3	Project Financing	Debt Equity	Tariff Period	Year	25
			Debt	%	70
		Debt Component	Equity	%	30
			Loan Amount	Lakh Rs./MW	262.731
			Moratorium Period	Year	0
			Repayment Period	Year	15
			Interst Rate	%	10.60
		Equity Component	Equity Amount	Lakh Rs./MW	112.599
			Return of equity for first 20 Years	%	16.80
			Return of equity from 21st Years onwards	%	19.39
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)	%	4.67
			16th year Onward	%	1.995
6	Operation & Maintenance		Total O&M Expenses	Lakh Rs./MW	10.16
			Annual Escalation	%	3.84
7	Working Capital		O&M Charges	Month	1
			Maintenance Spares	% of O&M expenses of a Year	15
			Recievables	Months	1.5
			Interest on Working capital	%	12.10
8	Discount Factor		Discount Rate	%	9.55

Determination of Tariff for Solar PV Power Projects up to 1 MW (for project(s) to be setup in Industrial areas and Urban areas)

Sheet of Appendix III

Unit Generation	unit	year	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
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		1.840	1.84	1.84	1.84	1.84	1.84	1.84	1.84	1.84	1.84	1.84	1.84	1.84	1.84	1.84	1.84	1.84	1.84	1.84	1.84	1.84	1.84	1.84	1.84	1.84
Losses	MU		1.45	1.45	1.45	1.45	1.45	1.45	1.45	1.45	1.45	1.45	1.45	1.45	1.45	1.45	1.45	1.45	1.45	1.45	1.45	1.45	1.45	1.45	1.45	1.45	1.45
Net Generation	MU		1.813	1.81	1.81	1.81	1.81	1.81	1.81	1.81	1.81	1.81	1.81	1.81	1.81	1.81	1.81	1.81	1.81	1.81	1.81	1.81	1.81	1.81	1.81	1.81	1.81
Fixed Cost		year																									
O&M Expences	Rs. lakh		10.16	10.550	10.96	11.38	11.81	12.27	12.74	13.23	13.73	14.26	14.81	15.38	15.97	16.58	17.22	17.88	18.57	19.28	20.02	20.79	21.59	22.42	23.28	24.17	25.10
Depreciation	Rs. lakh		17.53	17.53	17.53	17.53	17.53	17.53	17.53	17.53	17.53	17.53	17.53	17.53	17.53	17.53	17.53	7.49	7.49	7.49	7.49	7.49	7.49	7.49	7.49	7.49	7.49
Interest on Term Loan	Rs. lakh		26.92	25.06	23.21	21.35	19.49	17.64	15.78	13.92	12.07	10.21	8.35	6.50	4.64	2.78	0.93	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. lakh		1.42	1.41	1.40	1.39	1.38	1.37	1.36	1.36	1.35	1.34	1.34	1.34	1.33	1.33	1.33	1.19	1.22	1.25	1.29	1.32	1.40	1.44	1.48	1.51	1.56
Return on Equity	Rs. lakh		18.92	18.92	18.92	18.92	18.92	18.92	18.92	18.92	18.92	18.92	18.92	18.92	18.92	18.92	18.92	18.92	18.92	18.92	18.92	18.92	21.83	21.83	21.83	21.83	21.83
Total fixed Cost	Rs. lakh		74.95	73.47	72.01	70.56	69.13	67.72	66.33	64.95	63.60	62.26	60.95	59.66	58.39	57.14	55.92	45.48	46.19	46.94	47.71	48.51	52.31	53.17	54.07	55.01	55.97
Levellised CoG																											
Per unit CoG	Unit	levellised																									
O&M Expences	Rs/kWh	0.77	0.56	0.58	0.60	0.63	0.65	0.68	0.70	0.73	0.76	0.79	0.82	0.85	0.88	0.91	0.95	0.99	1.02	1.06	1.10	1.15	1.19	1.24	1.28	1.33	1.38
Depreciation	Rs/kWh	0.87	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.41	0.41	0.41	0.41	0.41	0.41	0.41	0.41	0.41	0.41
Interest on Term Loan	Rs/kWh	0.78	1.48	1.38	1.28	1.18	1.08	0.97	0.87	0.77	0.67	0.56	0.46	0.36	0.26	0.15	0.05	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	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.08	0.08	0.08	0.08	0.09
Return on Equity	Rs/kWh	1.05	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.20	1.20	1.20	1.20	1.20
Total CoG	Rs/kWh	3.55	4.13	4.0525	3.97	3.89	3.81	3.74	3.66	3.58	3.51	3.43	3.36	3.29	3.22	3.15	3.08	2.51	2.55	2.59	2.63	2.68	2.89	2.93	2.98	3.03	3.09
Discounted factor	%		1	0.91	0.83	0.76	0.69	0.63	0.58	0.53	0.48	0.44	0.40	0.37	0.33	0.31	0.28	0.25	0.23	0.21	0.19	0.18	0.16	0.15	0.13	0.12	0.11
Levellised Tariff	Rs/kWh	3.55	4.13	3.6992	3.31	2.96	2.65	2.37	2.12	1.89	1.69	1.51	1.35	1.21	1.08	0.96	0.86	0.64	0.59	0.55	0.51	0.47	0.47	0.43	0.40	0.37	0.35

Generic Levellised Tariff (without Subsidy) at Capital Cost of Rs 375.33 Lakh/MW = Rs. 3.55 /kWh
Indicative Generic Levellised Tariff by considering Subsidy/Incentive/Grant of Rs 10 Lakh/MW = Rs. 3.48/kWh
Adjustment to be made per 10 Lakh of Subsidy/Incentive/Grant per MW= Rs. 0.07/kWh

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	%	0.21
			Transmission losses, Auxillary	%	1.45
			Consumption including Transformation Losses		
			Useful Life	Years	25
2	Project Cost	Capital Cost /MW	Project Cost	Lakh Rs./MW	371.61
3	Project Financing	Debt Equity	Tariff Period	Year	25
			Debt	%	70
		Debt Component	Equity	%	30
			Loan Amount	Lakh Rs./MW	260.127
			Moratorium Period	Year	0
			Repayment Period	Year	15
			Interst Rate	%	10.60
		Equity Component	Equity Amount	Lakh Rs./MW	111.483
			Return of equity for first 20 Years	%	16.80
			Return of equity from 21st Years onwards	%	19.39
4	Subsidy Depreciation	Subsidy Depreciation	Recovery of Depreciation	%	0
5			Annual Rate of Depreciation till completion of Loan Repayment (balance spread in remaining years)	%	90
			16th year Onward	%	4.67
6	Operation & Maintenance		Total O&M Expenses	Lakh Rs./MW	10.16
			Annual Escalation	%	3.84
7	Working Capital		O&M Charges	Month	1
			Maintenance Spares	% of O&M expenses of a Year	15
			Recievables	Months	1.5
			Interest on Working capital	%	12.10
8	Discount Factor		Discount Rate	%	9.55

Determination of Tariff for Solar PV Power Projects above 1 MW upto 5 MW
(for project(s) to be setup in Industrial areas and Urban areas)

Unit Generation	unit	year	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
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		1.840	1.84	1.84	1.84	1.84	1.84	1.84	1.84	1.84	1.84	1.84	1.84	1.84	1.84	1.84	1.84	1.84	1.84	1.84	1.84	1.84	1.84	1.84	1.84	1.84
Losses	MU		1.45	1.45	1.45	1.45	1.45	1.45	1.45	1.45	1.45	1.45	1.45	1.45	1.45	1.45	1.45	1.45	1.45	1.45	1.45	1.45	1.45	1.45	1.45	1.45	1.45
Net Generation	MU		1.813	1.81	1.81	1.81	1.81	1.81	1.81	1.81	1.81	1.81	1.81	1.81	1.81	1.81	1.81	1.81	1.81	1.81	1.81	1.81	1.81	1.81	1.81	1.81	1.81
Fixed Cost		year																									
O&M Expences	Rs. lakh		10.16	10.550	10.96	11.38	11.81	12.27	12.74	13.23	13.73	14.26	14.81	15.38	15.97	16.58	17.22	17.88	18.57	19.28	20.02	20.79	21.59	22.42	23.28	24.17	25.10
Depreciation	Rs. lakh		17.35	17.35	17.35	17.35	17.35	17.35	17.35	17.35	17.35	17.35	17.35	17.35	17.35	17.35	17.35	7.41	7.41	7.41	7.41	7.41	7.41	7.41	7.41	7.41	7.41
Interest on Term Loan	Rs. lakh		26.65	24.82	22.98	21.14	19.30	17.46	15.62	13.79	11.95	10.11	8.27	6.43	4.60	2.76	0.92	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. lakh		1.41	1.40	1.39	1.38	1.37	1.36	1.35	1.35	1.34	1.34	1.33	1.33	1.33	1.33	1.33	1.19	1.22	1.25	1.28	1.32	1.40	1.43	1.47	1.51	1.55
Return on Equity	Rs. lakh		18.73	18.73	18.73	18.73	18.73	18.73	18.73	18.73	18.73	18.73	18.73	18.73	18.73	18.73	18.73	18.73	18.73	18.73	18.73	18.73	21.62	21.62	21.62	21.62	21.62
Total fixed Cost	Rs. lakh		74.31	72.85	71.41	69.98	68.57	67.18	65.80	64.44	63.11	61.79	60.50	59.23	57.98	56.75	55.55	45.21	45.93	46.67	47.45	48.25	52.01	52.88	53.78	54.71	55.68
Levellised CoG																											
Per unit CoG	Unit	levellised																									
O&M Expences	Rs/kWh	0.77	0.56	0.58	0.60	0.63	0.65	0.68	0.70	0.73	0.76	0.79	0.82	0.85	0.88	0.91	0.95	0.99	1.02	1.06	1.10	1.15	1.19	1.24	1.28	1.33	1.38
Depreciation	Rs/kWh	0.86	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.41	0.41	0.41	0.41	0.41	0.41	0.41	0.41	0.41	0.41
Interest on Term Loan	Rs/kWh	0.77	1.47	1.37	1.27	1.17	1.06	0.96	0.86	0.76	0.66	0.56	0.46	0.35	0.25	0.15	0.05	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	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.08	0.08	0.08	0.08	0.09
Return on Equity	Rs/kWh	1.04	1.03	1.03	1.03	1.03	1.03	1.03	1.03	1.03	1.03	1.03	1.03	1.03	1.03	1.03	1.03	1.03	1.03	1.03	1.03	1.03	1.19	1.19	1.19	1.19	1.19
Total CoG	Rs/kWh	3.52	4.10	4.0183	3.94	3.86	3.78	3.71	3.63	3.55	3.48	3.41	3.34	3.27	3.20	3.13	3.06	2.49	2.53	2.57	2.62	2.66	2.87	2.92	2.97	3.02	3.07
Discounted factor	%		1	0.91	0.83	0.76	0.69	0.63	0.58	0.53	0.48	0.44	0.40	0.37	0.33	0.31	0.28	0.25	0.23	0.21	0.19	0.18	0.16	0.15	0.13	0.12	0.11
Levellised Tariff	Rs/kWh	3.52	4.10	3.6680	3.28	2.94	2.63	2.35	2.10	1.88	1.68	1.50	1.34	1.20	1.07	0.96	0.85	0.63	0.59	0.55	0.51	0.47	0.46	0.43	0.40	0.37	0.34

Generic Levellised Tariff (without Subsidy) at Capital Cost of Rs 371.61 Lakh/MW = Rs. 3.52/kWh

Indicative Generic Levellised Tariff by considering Subsidy/Incentive/Grant of Rs 10 Lakh/MW = Rs. 3.45 /kWh

Adjustment to be made per 10 Lakh of Subsidy/Incentive/Grant per MW= Rs. 0.07/kWh