

HIMACHAL PRADESH ELECTRICITY REGULATORY COMMISSION, SHIMLA

Suo-Motu Petition No.: 06/2023

Date of Order: 04.11.2023

**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 2023-24 (for a period w.e.f 01.10.2023 to 31.03.2024) 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 and the 7th amendment 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 2023-24 (for a period w.e.f 01.10.2023 to 31.03.2024).
3. The Commission invited objections/suggestions from the public on its aforesaid proposal, by way of insertions in two News Papers i.e. "Hindustan Times" and "Amar Ujala" on 29th September, 2023. The text of said proposal was also made available on the Commission's website www.hperc.org.
4. The Commission, vide letter dated 03.10.2023, 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 20th March, 2023.
5. In response, the written comments/suggestions were received from the following stakeholders:-
 - (i) Sh. Roop Lal Sankhyan, VPO Dhar Tathoh, Tehsil Sadar, Distt. Bilaspur-174001, HP.
 - (ii) Smt. Neelam Sharma, Jupiter Solar Power, VPO Rajakhasa, Teh. Indora, Distt. Kangra- 176402.

- (iii) M/s Rajakhasa Solar Power, VPO Rajakhasa, Teh. Indora, Distt. Kangra- 176402.
- (iv) Sh S.K. Patial, VPO Dhar Tatoh, Tehsil Sadar, Distt. Bilaspur-174001, HP.
- (v) Aditya Urja – II, Village Baniyala, P.O. Joghon, Tehsil Nalagarh, Distt Solan (H.P.).
- (vi) Evaz Solars, VPO Chalet, Teh. Ghanari, Distt UNA-177204.
- (vii) M/s Surya Solar Power Project, vill Chater Behar, Teh. Amb, Distt Una (HP).
- (viii) Shri. R.P. Suman & Co., VPO Jahu, Teh.-Bhoranj, Distt.- Hamirpur-176048, HP.

6. The public hearing in the matter was held on 19th October, 2023 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) Sh. Roop Lal Sankhyan, the representative of M/s Sankhyan Solar has reiterated their written submissions and further stated that the Commission may consider module cost by taking into account the actual taxes and duties imposed on the modules. He also stated that 21% CUF considered in the proposal needs to be looked into keeping in view the lower annual generation data of installed solar PV project in the State and mentioned that the generation from solar PV projects is about 15 Lacs units compare to net generation of 18.13 Lacs units per MW considered in the proposal.
- (ii) Shri. R.P. Suman, the representative of M/s R.P. Suman & Co stated during the hearing that as per present market scenario, the module cost is about Rs. 20 per watt. i.e. Rs. 2 Crore/MW and as such, the proposed capital cost needs enhancement so that planned capacity addition in the State may take place. He further stated that despite using the latest technology such as robot cleaning and panel tracking, the annual generation is lower as compared to the proposed generation on normative basis.

He also suggested during the hearing that for better regulatory certainty, the Commission may consider to fix the normative benchmark levelled tariff for capacity upto 500 kW irrespective of control period so that developer may approach the HIMURJA/HPSEBL to install the project as per his feasibility accordingly. It was also mentioned that the demand of collateral by the banks to sanction 60% of the total project cost is also one of the hurdles for speedy development of this RE sector in the State.

- (iii) Sh. S.K. Patial, the representative of Solar Power Producers and Developers Trust has stated during the hearing that the capital of Rs. 5 Crore/ MW may have loan interest burden of Rs. 50 Lacs annually during the project life. The tariff recovery to that extent need to be protected and the

overall landed cost of the modules and unit generation may be considered as per the State specific conditions only.

- (iv) Sh. Rajeev Sharma, the representative of Aditya Urja stated that the module cost varies from Rs. 19 per watt. + GST to Rs. 21 per watt.+ GST and suggested that taking this aspect into consideration, the Commission may consider realistic capital cost in tariff determination. It was also mentioned that the funding of the project from the banks is a cumbersome process in the State despite the solar as a priority RE projects.
- (v) The representative of Distribution Licensee i.e. HPSEBL submitted in the hearing that they have no objection on the proposal 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.-

Sh. Roop Lal Sankhyan and Solar Power Producers & Developers Trust have submitted that the normative capital cost proposed in draft, is far away from reality. The cost presently in the market/manufacturer is around Rs 200 Lakh+12% GST which means Rs 224 Lakh per MW. The Commission has proposed Rs 135.05 Lakh per MW. The normative module cost taken in the proposal is based on inputs from the 'pvinsights' on average basis of Poly and Mono technology cells. It means, 50% panels would be Poly and 50% would be Mono. If, Commission has considered gross annual generation as 18.4 Lakh per MW then the higher quality modules would be required and out of Poly and Mono, Mono are better. Since the modules are to be imported, so 40 % import duty would be imposed. The Cost may be as under:

- (i) Cost of Mono PERC Modules as per 'pvinsights on 26.9.23 = 0.152USD X 82.41= Rs 12.53
- (ii) Import duty @ 40% =12.53*1.4 = Rs 17.54
- (iii) Sellers profit @ 10% + GST @ 12%= 17.54x1.1x1.12 = Rs 21.61
- (iv) insurance, Transportation to HP, unloading, stacking etc =Rs 0.80
So, per watt cost would be = 21.61+0.80 = Rs. 22.41 means Rs 224.10 Lakh per MW whereas commission has proposed the same as Rs. 135.05 Lakhs/MW.

So, the stakeholder has suggested that the ground reality should be considered to make the project(s) viable. The Commission may consider appropriate normative capital cost.

- (ii) Jupiter Solar Power & Rajakhasa Solar Power have submitted that the Normative capital cost proposed in draft, is very low. Presently, the modules available in the solar market are around Rs. 22/- per watt.+12%GST. The

Rs. 13.5 per watt cost including GST for PV modules considered by the Commission in the proposal have some gaps and the same may be required to be looked into. The Stakeholders further suggested that exact parameters may please be adopted and if commission feels, the services of some experts may please be taken to determine the tariff.

The policy of HP Govt. to provide green energy to state and to motivate the Himachali people to install solar projects on their barren land will definitely be forfeited with the rates proposed i.e. Rs. 3.36/unit. As such, it is suggested that the correct parameters as listed below may be adopted by the Commission to work out the tariff rate:

- (a) PV Modules cost Rs 220 Lakh
- (b) Gross annual generation 14.50 Lakh units from 1 MW

- (iii) Evaz Solars has submitted that that the order dated 27.09.2023 vide which the Tariff has been proposed by HPERC for the FY 23-24 (for a period w.e.f 1.10.2023) is far away from reality. The assumption on the basis of which Normative capital cost is calculated in the draft is on much lower side and is beyond the actual facts and figures.

At present the modules (A class) which are available in solar market are around Rs. 21/watt+ GST, but in the proposed draft, the normative module cost is considered at Rs.13.5/watt (inclusive GST), further the annual generation from 1MW installation is considered as 18.40 Lakh Units, whereas, the fact is that not even a single unit in the State is achieving more than 15.0 Lakh units, in case they do not violate the overloading conditions.

- (iv) Aditya Urja has submitted that the tariff for solar projects proposed by the HPERC for the financial year 2023-24 (for last six months) is not realistic and discourages the promoters from commissioning the solar projects in the larger interest of the State. The prices of modules calculated are far from the actual prices of A class modules available in the market. At present the Mono PERC p type modules are available @ Rs. 20.50 + 12% GST in the market.

- (v) M/s R.P. Suman & Co has suggested the following:-

- (a) The current domestic market rate of solar module is Rs. 200 Lakhs/ MWp. The applicable GST is 12% on the Modules, so the Commission may consider this cost for tariff determination.
- (b) The Govt. has extended Production Linked Incentive (PLI) to the larger manufacturers and they are not selling the modules to the retail buyer like us i. e. the capacity ranging from 0.50 MW to 1.00 MW. Further, these manufacturers have their own requirements. Hence, the cost of the modules can not be considered as per international market rate.

- (vi) M/s Surya Solar Power Project has submitted that the normative cost of modules is worked out as Rs. 189.33 Lakh/MW by considering the basic

custom duty @40%, surcharge @10% and GST @12%. By considering these taxes and charges, the normative capital cost works out as Rs. 405.63 Lakh per MW and also suggested to consider his plea to retain the tariff as Rs. 3.76 per unit.

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 starting from the date of floating the proposal.

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

All these factors would have overlapping effects and would not only increase the competitiveness but 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. 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 23.2%. The space requirement may also get reduced with more and more innovative methods of installation of such modules.

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.

In view of above, the Commission feels that the proposed rates of solar PV modules are not wholly unrealistic, as contended by some of the stakeholders. However, taking into account the various suggestions given by the stakeholders in relation to the normative capital cost and balancing various concerns and taking into account the fact that the duration of the proposed tariff is of six (6) months only, 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 instead of 15% proposed in the proposal.

Apart from above, the normative cost of the other components of normative capital cost shall also be increased to Rs. 225.00 Lakhs/MW as against Rs. 216.30 Lakhs/MW as per the proposal.

B. NORMATIVE NET SALEABLE ENERGY /CUF.-

- (i) Sh. Roop Lal Sankhyan and Solar Power Producers & Developers Trust have suggested that the assumption of annual gross generation of 18.40 Lakh units in the draft proposal is on higher side. The annual average net saleable energy available is about 15 Lakh units from 1MW plant. So, the gross generation for the purpose of calculation of tariff may be kept 15 Lakh units in place of 18.40 Lakh units.
- (ii) Aditya Urja has submitted that the solar plants which are already existing in the State are not producing more than 16 Lakh units per MW per year. So, before finalizing the generic levelled tariff, actual generation data of solar plants should be taken into consideration.
- (iii) M/s R.P. Suman & Co has suggested that the Commission has considered CUF 21% which is on higher side. In Himachal Pradesh, the CUF of 1.00 MWp is not more than 15%. To achieve 21% CUF, the DC capacity of the solar plant has to be overloaded upto 35%. Hence the cost of 1 MW should be considered accordingly.

Commission's View:-

The Commission has considered the suggestions carefully. Comments/ suggestions of similar nature were received from the stakeholders while finalizing the tariff for Solar PV plants for FY 2022-23 and first six months of FY 2023-24. Therefore, the Commission reiterates its earlier view that as per the CERC RE Regulations, 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 operations of the projects. The Commission also feels that with the technological development, the CUF should normally witness an increasing trend. Efficiency parameters of 23.2% is already being indicated. The Commission, however, decides to retain the same as 21% only.

C. Power Degradation

Sh. Roop Lal Sankhyan and Solar Power Producers & Developers Trust have submitted that the approximate power degradation of solar cells is 2.5% during 1st year and thereafter 0.68% every year upto 25 years. However, in draft proposal the gross generation is considered as 18.40 lakh units in a year. The Stakeholder has suggested to consider this factor separately and Gross generation of 1.5 MUs may be considered in place of

1.84 MUs with Power Degradation of 2.5% during 1st year and thereafter 0.68% w.e.f 2nd to 25 years.

Commission's View:-

As far as de-gradation impact in 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. Miscellaneous:-

- (i) M/s R.P. Suman & Co has suggested that the Banks are demanding 100% collateral or BG to sanction the loan. The banks are providing loan upto 60% of the total project cost. Thus the viability of the project gets affected. The similar concern is also shown by the other stakeholders during the public hearing also.
- (ii) M/s R.P. Suman & Co has also suggested during the public hearing that for better regulatory certainty, the Commission may consider to fix the normative benchmark levelled tariff for capacity upto 500 kW irrespective of control period so that a developer may approach the HIMURJA/HPSEBL to install the project as per his feasibility accordingly. The demand of collateral by the banks to sanctioned 60% of the total project cost is also one of the hurdles for speedy development of this RE sector in the State.

Commission's View:-

- (i) As far as demand of 100% collateral or BG by the banks to sanction the loan, the Commission is of the view that the solar PV power developers may take up this issue with the State Government for issuance of directions to banks including State Co-operative Bank to provide term loans to the solar project by considering the assured return on account of PPA execution with the HPSEBL.
- (ii) The Commission regularly fixes the generic levelled rates for Solar PV Projects upto 5 MW on periodical basis. The rates cannot be fixed for very long periods in advance, keeping in view the dynamic nature of the various tariff components, such as the Cost of Modules, the interest rates, etc. As regards the suggestions to keep the Registrations open ended to the extent of the targeted requirement of Licensee, the Commission observes that the matter pertains to HIMURJA/GoHP. The Commission may not be averse to entertain joint petitions for approval of PPA so long as the total quantum of purchase of power by the licensee does not exceed beyond its requirements from such technology.

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 last six months of the FY 2023-24 (for a period w.e.f 01.10.2023 to 31.03.2024) and also to determine the generic levelled 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 levelled tariff for FY 2023-24 (period 01.10.2023 to 31.03.2024) :-

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 26.09.2023, is as under:-

USD/Watt	
Item	Average
Poly Solar Module	0.133
Mono PERC Module	0.152

The average of these prices works out to 0.1425 USD/Watt. The Commission finds it appropriate to consider the cost of Solar PV Module as Rs. 117.43 Lakhs/MW considering the exchange rate of Rs. 82.41/USD based on the average of six months, ending 26th September, 2023. The Commission, while determining the generic tariff for Solar PV Plants for FY 2021-22 as per its 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 applicability period of safeguard duty however expired on 30.06.2021 and has not been renewed. Moreover, 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. The Commission, while finalising the order for FY 2023-24 for 1st six months, allowed the additional 15% escalation on the basic cost subject to certain adjustment linked with the tax rates, as detailed in the said order.

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 has resulted in increasing the production of solar modules at the competitive rates in the Country. This trend is 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 has considered the normative cost of solar PV module as Rs. 117.43 Lakhs/MW and decides to escalate the same by 40% to account for the various factors as mentioned above. The average normative price of Solar PV Modules on the above basis works out to Rs. 164.41 Lakhs/MW.

- b) As regards, the normative cost of the other components which was considered as Rs. 216.30 per/MW in the tariff order 31.03.2023, the Commission decides to enhance the same to Rs. 225 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. 389.41 Lakhs/MW as detailed in the following table:-

Sr. No.	Particulars	Normative Capital Cost (Rs. Lakh/MW)
1	PV Modules	164.41
2	Preliminary and Pre-operative expenses, Land Cost, Civil & General Works and Mounting Structures. Power Conditioning Units, Evacuation cost up to interconnection point etc.	225.00
	Total Cost	389.41

- 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 fixed the normative capital cost for the Solar PV projects upto 1.00 MW capacity by allowing increase of 1.0% as considered in the tariff order for first six months of FY 2023-24. The same works out as Rs. 393.30 Lakh/MW.

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 proposed 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	393.30
(b)	Above 1.00 MW & upto 5.00 MW	389.41
2	Projects to be set up in urban areas and industrial areas	
(a)	Upto 1.00 MW	400.88
(b)	Above 1.00 MW & upto 5.00 MW	396.91

10.2 OPERATION AND MAINTENANCE EXPENSES.-

The Commission considered the O&M expenses as Rs. 9.79 Lakh/MW with escalation @ 3.84% per annum over the tariff period as per provision of Regulations 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 proposed the technology specific parameters as above, the Commission now proceeds to determine the generic levelled tariff, based on the provisions of RE Tariff Regulations, 2017 for solar PV projects for FY 2023-24(01.10.2023 to 31.03.2024) under Regulation 18 of the (Promotion of Generation from the Renewable Energy Sources and Terms and Conditions for Tariff Determination) Regulations, 2017. 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 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 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.

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.*
- (d) *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 10.52% 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
April, 2023	8.50
May, 2023	8.50
June, 2023	8.50
July, 2023	8.55
August, 2023	8.55
September, 2023	8.55
Avg. for last available 6 months.	8.52

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 12.02% 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 levellised 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 levellised 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 10.52%. 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 9.52%. 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 tariff and the associated terms and conditions for solar PV power project for FY 2023-24(for a period w.e.f 01.10.2023 to 31.03.2024) under the RE Regulations, 2017 have been arrived at and are determined as under:-

- A. The generic levellised tariff for Solar PV power projects for FY 2023-24(for a period w.e.f 01.10.2023 to 31.03.2024)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	3.65
(b)	Above 1.00 MW & upto 5.00 MW	3.62
2	Projects to be set up in industrial areas and urban areas	
(a)	Upto 1.00 MW	3.70
(b)	Above 1.00 MW & upto 5.00 MW	3.67

- 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 there under 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:-
- in cases where the joint petition for approval of PPA is submitted to the Commission on or after 01.10.2023, but not later than 31.03.2024, this tariff shall be applicable for such capacity(ies) as are commissioned on or before 31.03.2025.

(ii) in other cases, not covered under Item (i) above and where the Generic Levellised Tariff for 2023-24 is to be considered in accordance with the provisions of the Power Purchase Agreement, the Generic Levellised Tariff for 2023-24 shall be reckoned as follows, namely.-

- (a) for the capacities which are commissioned during the period 01.04.2023 to 30.09.2023, the Generic Levellised Tariff determined by the Commission for such projects for the period 01.04.2023 to 30.09.2023 shall be reckoned as the Generic Levellised Tariff for 2023-24 for the said purpose; and
- (b) for the capacities which are commissioned during the period 01.10.2023 to 31.03.2024, the Generic Levellised Tariff determined, as per this order, by the Commission for such projects for the period 01.10.2023 to 31.03.2024 shall be reckoned as the Generic Levellised Tariff for 2023-24 for the said purpose:

Provided that the Generic Levellised Tariff for the full capacity of the project shall be considered for the said purposes. To illustrate, if the capacity of a project is 3.00 MW and part capacity of 600 kW is commissioned during the period, the tariff applicable for 3.00 MW capacity shall be considered for such part capacity of 600 kW even though this part capacity is less than 1.00 MW.

- 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 levellised tariff for FY 2023-24 (01.10.2023 to 31.03.2024) 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”.

Sd/-
(Shashi Kant Joshi)
Member

Sd/-
(Yashwant Singh Chogal)
Member (Law)

Sd/-
(Devendra Kumar Sharma)
Chairman

Place: Shimla.

Dated: 4th November, 2023.

Annexure-“A”

List of the stakeholders/participants who attended the public hearing on 19th October, 2023.

Sr. No.	Name
1	Er. Anup Ram, Chief Engineer (Comm.).
2	Sh. Kamlesh Saklani, Law Officer, HPSEBL
3	Er. Suresh Patial , Solar Power Producers & Development Trust.
4	Sh. Roop Lal Sankhyan, Sankhyna Solar.
5	Sh. Abhishek Sankhyan, Sankhyna Solar.
6	Sh. R. P. Suman, R. P. Suman & Co.
7	Sh. Rajeev Sharma, Aditya Urja.

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	393.30
3	Project Financing	Debt Equity	Tariff Period	Year	25
			Debt	%	70
			Equity	%	30
		Debt Component	Loan Amount	Lakh Rs./MW	275.31
			Moratorium Period	Year	0
			Repayment Period	Year	15
			Interst Rate	%	10.52
		Equity Component	Equity Amount	Lakh Rs./MW	117.99
			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
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	9.79
			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	%	12.02
8	Discount Factor		Discount Rate	%	9.52

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		9.79	10.166	10.56	10.96	11.38	11.82	12.27	12.74	13.23	13.74	14.27	14.82	15.39	15.98	16.59	17.23	17.89	18.58	19.29	20.03	20.80	21.60	22.43	23.29	24.18
Depriciation	Rs. lakh		18.37	18.37	18.37	18.37	18.37	18.37	18.37	18.37	18.37	18.37	18.37	18.37	18.37	18.37	18.37	7.85	7.85	7.85	7.85	7.85	7.85	7.85	7.85	7.85	7.85
Interest on Term Loan	Rs. lakh		28.00	26.07	24.14	22.20	20.27	18.34	16.41	14.48	12.55	10.62	8.69	6.76	4.83	2.90	0.97	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		1.44	1.42	1.41	1.40	1.39	1.38	1.37	1.36	1.35	1.35	1.34	1.33	1.33	1.33	1.32	1.18	1.20	1.23	1.27	1.30	1.38	1.41	1.45	1.49	1.53
Return on Equity	Rs. lakh		19.82	19.82	19.82	19.82	19.82	19.82	19.82	19.82	19.82	19.82	19.82	19.82	19.82	19.82	19.82	19.82	19.82	19.82	19.82	19.82	22.88	22.88	22.88	22.88	22.88
Total fixed Cost	Rs. lakh		77.41	75.85	74.29	72.76	71.24	69.73	68.24	66.78	65.33	63.90	62.49	61.10	59.73	58.39	57.07	46.07	46.76	47.48	48.22	49.00	52.90	53.74	54.60	55.50	56.44
Levellised CoG																											
Per unit CoG	Unit	levellised																									
O&M Expences	/kWh	0.74	0.54	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	0.92	0.95	0.99	1.02	1.06	1.10	1.15	1.19	1.24	1.28	1.33
Depriciation	/kWh	0.91	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	0.43	0.43	0.43	0.43	0.43	0.43	0.43	0.43	0.43	0.43
Interest on Term Loan	/kWh	0.81	1.54	1.44	1.33	1.22	1.12	1.01	0.91	0.80	0.69	0.59	0.48	0.37	0.27	0.16	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	/kWh	0.08	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	0.06	0.07	0.07	0.07	0.07	0.08	0.08	0.08	0.08	0.08
Return on Equity	/kWh	1.10	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.26	1.26	1.26	1.26	1.26
Total CoG	/kWh	3.65	4.27	4.1836	4.10	4.01	3.93	3.85	3.76	3.68	3.60	3.52	3.45	3.37	3.29	3.22	3.15	2.54	2.58	2.62	2.66	2.70	2.92	2.96	3.01	3.06	3.11
Discounted factor	%		1	0.91	0.83	0.76	0.70	0.63	0.58	0.53	0.48	0.44	0.40	0.37	0.34	0.31	0.28	0.26	0.23	0.21	0.19	0.18	0.16	0.15	0.14	0.12	0.11
Levellised Tariff	/kWh	3.65	4.27	3.8200	3.42	3.05	2.73	2.44	2.18	1.95	1.74	1.55	1.39	1.24	1.11	0.99	0.88	0.65	0.60	0.56	0.52	0.48	0.47	0.44	0.41	0.38	0.35

Generic Levellised Tariff (without Subsidy) at Capital Cost of Rs393.30 Lakh/MW = Rs.3.65/kWh
Indicative Generic Levellised Tariff by considering Subsidy/Incentive/Grant of Rs 10 Lakh/MW = Rs. 3.57/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 Consumption including Transformation Losses	%	1.45
			Useful Life	Years	25
2	Project Cost	Capital Cost /MW	Project Cost	Lakh Rs./MW	389.41
3	Project Financing	Debt Equity	Tariff Period	Year	25
			Debt	%	70
		Debt Component	Equity	%	30
			Loan Amount	Lakh Rs./MW	272.587
			Moratorium Period	Year	0
			Repayment Period	Year	15
		Equity Component	Interest Rate	%	10.52
			Equity Amount	Lakh Rs./MW	116.823
			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
Annual Rate of Depreciation till completion of Loan Repayment (balance spread in remaining years) 16th year Onward			%	90	
5				%	4.67
6	Operation & Maintenance		Total O&M Expenses	Lakh Rs./MW	9.79
			Annual Escalation	%	3.84
7	Working Capital		O&M Charges	Month	1
			Maintenance Spares	% of O&M expenses of a Year	15
			Receivables	Months	1.5
			Interest on Working capital	%	12.02
8	Discount Factor		Discount Rate	%	9.52

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

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		9.79	10.166	10.56	10.96	11.38	11.82	12.27	12.74	13.23	13.74	14.27	14.82	15.39	15.98	16.59	17.23	17.89	18.58	19.29	20.03	20.80	21.60	22.43	23.29	24.18
Depriciation	Rs. lakh		18.19	18.19	18.19	18.19	18.19	18.19	18.19	18.19	18.19	18.19	18.19	18.19	18.19	18.19	18.19	7.77	7.77	7.77	7.77	7.77	7.77	7.77	7.77	7.77	7.77
Interest on Term Loan	Rs. lakh		27.72	25.81	23.90	21.99	20.07	18.16	16.25	14.34	12.43	10.51	8.60	6.69	4.78	2.87	0.96	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		1.43	1.42	1.40	1.39	1.38	1.37	1.36	1.35	1.35	1.34	1.33	1.33	1.32	1.32	1.32	1.17	1.20	1.23	1.26	1.29	1.37	1.41	1.44	1.48	1.52
Return on Equity	Rs. lakh		19.63	19.63	19.63	19.63	19.63	19.63	19.63	19.63	19.63	19.63	19.63	19.63	19.63	19.63	19.63	19.63	19.63	19.63	19.63	19.63	22.65	22.65	22.65	22.65	22.65
Total fixed Cost	Rs. lakh		76.75	75.20	73.67	72.15	70.65	69.16	67.70	66.25	64.82	63.41	62.02	60.65	59.30	57.98	56.68	45.79	46.49	47.20	47.95	48.72	52.59	53.43	54.29	55.19	56.13
Levellised CoG																											
Per unit CoG	Unit	levellised																									
O&M Expences	/kWh	0.74	0.54	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	0.92	0.95	0.99	1.02	1.06	1.10	1.15	1.19	1.24	1.28	1.33
Depriciation	/kWh	0.91	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.43	0.43	0.43	0.43	0.43	0.43	0.43	0.43	0.43	0.43
Interest on Term Loan	/kWh	0.80	1.53	1.42	1.32	1.21	1.11	1.00	0.90	0.79	0.69	0.58	0.47	0.37	0.26	0.16	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	/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	0.06	0.07	0.07	0.07	0.07	0.08	0.08	0.08	0.08	0.08
Return on Equity	/kWh	1.09	1.08	1.08	1.08	1.08	1.08	1.08	1.08	1.08	1.08	1.08	1.08	1.08	1.08	1.08	1.08	1.08	1.08	1.08	1.08	1.08	1.25	1.25	1.25	1.25	1.25
Total CoG	/kWh	3.62	4.23	4.1481	4.06	3.98	3.90	3.82	3.73	3.65	3.58	3.50	3.42	3.35	3.27	3.20	3.13	2.53	2.56	2.60	2.64	2.69	2.90	2.95	2.99	3.04	3.10
Discounted factor	%		1	0.91	0.83	0.76	0.70	0.63	0.58	0.53	0.48	0.44	0.40	0.37	0.34	0.31	0.28	0.26	0.23	0.21	0.19	0.18	0.16	0.15	0.14	0.12	0.11
Levellised Tariff	/kWh	3.62	4.23	3.7875	3.39	3.03	2.71	2.42	2.16	1.93	1.73	1.54	1.38	1.23	1.10	0.98	0.88	0.65	0.60	0.55	0.51	0.48	0.47	0.44	0.41	0.38	0.35

Generic Levellised Tariff (without Subsidy) at Capital Cost of Rs 389.41 Lakh/MW = Rs. 3.62 /kWh
Indicative Generic Levellised Tariff by considering Subsidy/Incentive/Grant of Rs 10 Lakh/MW = Rs. 3.54 /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 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 Consumption including Transformation Losses	%	1.45
			Useful Life	Years	25
2	Project Cost	Capital Cost /MW	Project Cost	Lakh Rs./MW	400.88
3	Project Financing	Debt Equity	Tariff Period	Year	25
			Debt	%	70
		Debt Component	Equity	%	30
			Loan Amount	Lakh Rs./MW	280.616
			Moratorium Period	Year	0
			Repayment Period	Year	15
		Equity Component	Interest Rate	%	10.52
			Equity Amount	Lakh Rs./MW	120.264
			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
Annual Rate of Depreciation till completion of Loan Repayment (balance spread in remaining years) 16th year Onward			%	90	
5				%	4.67
6	Operation & Maintenance		Total O&M Expenses	Lakh Rs./MW	9.79
			Annual Escalation	%	3.84
7	Working Capital		O&M Charges	Month	1
			Maintenance Spares	% of O&M expenses of a Year	15
			Receivables	Months	1.5
			Interest on Working capital	%	12.02
8	Discount Factor		Discount Rate	%	9.52

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		9.79	10.166	10.56	10.96	11.38	11.82	12.27	12.74	13.23	13.74	14.27	14.82	15.39	15.98	16.59	17.23	17.89	18.58	19.29	20.03	20.80	21.60	22.43	23.29	24.18
Depriciation	Rs. lakh		18.72	18.72	18.72	18.72	18.72	18.72	18.72	18.72	18.72	18.72	18.72	18.72	18.72	18.72	18.72	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00
Interest on Term Loan	Rs. lakh		28.54	26.57	24.60	22.63	20.66	18.70	16.73	14.76	12.79	10.82	8.86	6.89	4.92	2.95	0.98	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		1.46	1.44	1.43	1.42	1.41	1.40	1.39	1.38	1.37	1.36	1.35	1.35	1.34	1.34	1.33	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		20.20	20.20	20.20	20.20	20.20	20.20	20.20	20.20	20.20	20.20	20.20	20.20	20.20	20.20	20.20	20.20	20.20	20.20	20.20	20.20	23.32	23.32	23.32	23.32	23.32
Total fixed Cost	Rs. lakh		78.71	77.10	75.51	73.94	72.38	70.84	69.31	67.81	66.32	64.85	63.40	61.98	60.57	59.19	57.84	46.61	47.30	48.02	48.77	49.54	53.50	54.34	55.20	56.10	57.04
Levellised CoG																											
Per unit CoG	Unit	levellised																									
O&M Expences	/kWh	0.74	0.54	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	0.92	0.95	0.99	1.02	1.06	1.10	1.15	1.19	1.24	1.28	1.33
Depriciation	/kWh	0.93	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	0.44	0.44	0.44	0.44	0.44	0.44	0.44	0.44	0.44	0.44
Interest on Term Loan	/kWh	0.82	1.57	1.47	1.36	1.25	1.14	1.03	0.92	0.81	0.71	0.60	0.49	0.38	0.27	0.16	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	/kWh	0.08	0.08	0.08	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	0.08	0.08	0.08	0.08	0.08
Return on Equity	/kWh	1.13	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.29	1.29	1.29	1.29	1.29
Total CoG	/kWh	3.70	4.34	4.2530	4.17	4.08	3.99	3.91	3.82	3.74	3.66	3.58	3.50	3.42	3.34	3.27	3.19	2.57	2.61	2.65	2.69	2.73	2.95	3.00	3.05	3.09	3.15
Discounted factor	%		1	0.91	0.83	0.76	0.70	0.63	0.58	0.53	0.48	0.44	0.40	0.37	0.34	0.31	0.28	0.26	0.23	0.21	0.19	0.18	0.16	0.15	0.14	0.12	0.11
Levellised Tariff	/kWh	3.70	4.34	3.8833	3.47	3.10	2.77	2.48	2.22	1.98	1.77	1.58	1.41	1.26	1.12	1.00	0.89	0.66	0.61	0.56	0.52	0.49	0.48	0.44	0.41	0.38	0.35

Generic Levellised Tariff (without Subsidy) at Capital Cost of Rs 400.88 Lakh/MW = Rs. 3.70 /kWh
Indicative Generic Levellised Tariff by considering Subsidy/Incentive/Grant of Rs 10 Lakh/MW = Rs. 3.63/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 Consumption including Transformation Losses	%	1.45
			Useful Life	Years	25
2	Project Cost	Capital Cost /MW	Project Cost	Lakh Rs./MW	396.91
3	Project Financing	Debt Equity	Tariff Period	Year	25
			Debt	%	70
		Debt Component	Equity	%	30
			Loan Amount	Lakh Rs./MW	277.837
			Moratorium Period	Year	0
			Repayment Period	Year	15
		Equity Component	Interest Rate	%	10.52
			Equity Amount	Lakh Rs./MW	119.073
			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	9.79
			Annual Escalation	%	3.84
7	Working Capital		O&M Charges	Month	1
			Maintenance Spares	% of O&M expenses of a Year	15
			Receivables	Months	1.5
			Interest on Working capital	%	12.02
8	Discount Factor		Discount Rate	%	9.52

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		9.79	10.166	10.56	10.96	11.38	11.82	12.27	12.74	13.23	13.74	14.27	14.82	15.39	15.98	16.59	17.23	17.89	18.58	19.29	20.03	20.80	21.60	22.43	23.29	24.18
Depriciation	Rs. lakh		18.54	18.54	18.54	18.54	18.54	18.54	18.54	18.54	18.54	18.54	18.54	18.54	18.54	18.54	18.54	7.92	7.92	7.92	7.92	7.92	7.92	7.92	7.92	7.92	7.92
Interest on Term Loan	Rs. lakh		28.25	26.31	24.36	22.41	20.46	18.51	16.56	14.61	12.67	10.72	8.77	6.82	4.87	2.92	0.97	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		1.45	1.43	1.42	1.41	1.40	1.39	1.38	1.37	1.36	1.35	1.35	1.34	1.34	1.33	1.33	1.18	1.21	1.24	1.27	1.30	1.38	1.42	1.45	1.49	1.53
Return on Equity	Rs. lakh		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	23.09	23.09	23.09	23.09	23.09
Total fixed Cost	Rs. lakh		78.03	76.45	74.87	73.32	71.78	70.26	68.75	67.27	65.80	64.35	62.92	61.52	60.13	58.77	57.43	46.33	47.02	47.74	48.48	49.26	53.19	54.02	54.89	55.79	56.72
Levellised CoG																											
Per unit CoG	Unit	levellised																									
O&M Expences	/kWh	0.74	0.54	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	0.92	0.95	0.99	1.02	1.06	1.10	1.15	1.19	1.24	1.28	1.33
Depriciation	/kWh	0.92	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	0.44	0.44	0.44	0.44	0.44	0.44	0.44	0.44	0.44	0.44
Interest on Term Loan	/kWh	0.82	1.56	1.45	1.34	1.24	1.13	1.02	0.91	0.81	0.70	0.59	0.48	0.38	0.27	0.16	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	/kWh	0.08	0.08	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	0.08	0.08	0.08	0.08	0.08
Return on Equity	/kWh	1.11	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.27	1.27	1.27	1.27	1.27
Total CoG	/kWh	3.67	4.30	4.2167	4.13	4.04	3.96	3.88	3.79	3.71	3.63	3.55	3.47	3.39	3.32	3.24	3.17	2.56	2.59	2.63	2.67	2.72	2.93	2.98	3.03	3.08	3.13
Discounted factor	%		1	0.91	0.83	0.76	0.70	0.63	0.58	0.53	0.48	0.44	0.40	0.37	0.34	0.31	0.28	0.26	0.23	0.21	0.19	0.18	0.16	0.15	0.14	0.12	0.11
Levellised Tariff	/kWh	3.67	4.30	3.8501	3.44	3.08	2.75	2.46	2.20	1.96	1.75	1.57	1.40	1.25	1.11	0.99	0.89	0.65	0.61	0.56	0.52	0.48	0.48	0.44	0.41	0.38	0.35

Generic Levellised Tariff (without Subsidy) at Capital Cost of Rs 396.91 Lakh/MW = Rs. 3.67/kWh

Indicative Generic Levellised Tariff by considering Subsidy/Incentive/Grant of Rs 10 Lakh/MW = Rs. 3.60 /kWh

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