

HIMACHAL PRADESH ELECTRICITY REGULATORY COMMISSION, SHIMLA

Suo-Motu Petition No. 26 /2018

CORAM

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

Sh. Bhanu Pratap Singh
Member

Date of Order: 14.06.2018

IN THE MATTER OF:-

Determination of generic levellised tariffs for Solar PV Projects for FY 2018-19 under Himachal Pradesh Electricity Regulatory Commission (Promotion of Generation from the Renewable Energy Sources and Terms and Conditions for Tariff Determination) Regulations, 2017.

ORDER

1. The Commission notified the Himachal Pradesh Electricity Regulatory Commission (Promotion of Generation from the Renewable Energy Sources and Terms and Conditions for Tariff Determination) Regulations, 2017, on 23rd November, 2017 in the Rajpatra, Himachal Pradesh (hereinafter referred to as "RE Tariff Regulations, 2017"), which have come into force from 1st October, 2017;
2. The Commission, in due discharge of the mandate under regulation 18 of RE Tariff Regulations, 2017 proposes to determine the generic levellised tariff of solar PV projects and associated terms and conditions as per Annexure-"I";
3. Comments and suggestions of the stakeholders on the above proposals are invited by **29th June, 2018**. A public hearing on the above proposals will be held on **7th July, 2018** at **11.30 AM** onwards in the Commission's court room.

Sd/-
(Bhanu Pratap Singh)
Member

Sd/-
(S.K.B.S. Negi)
Chairman

Generic levellised tariffs for Solar PV Projects for FY 2018-19 under RE Tariff Regulations, 2017.-

The proposed generic levellised tariffs and associated terms and conditions for various categories of solar PV projects in respect of period 01.04.2018 to 31.03.2019 have been computed in accordance with the RE Tariff Regulations, 2017 as discussed in the following paragraphs:-

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

“18 (1).....xxxxxxxxxx.....

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

Provided that.....xxxxxxxx.....

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

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

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

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

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

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

(4)xxxxxxxxxx..... .

(5)xxxxxxxxxx..... .

2. Categorization.-

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

3. 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 feels that in view of the geographical and topographical conditions in the State and in order to promote smaller capacities of solar PV plants at different locations across the State, it may be appropriate to create a separate category of solar PV projects upto 1.00 MW capacity. The capacity of such projects in the second category is proposed to be limited to 5.00 MW as 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. The Commission after taking into account various related factors, categorized these projects vide its order 06.07.2016. The Commission proposes to retain similar categorization for the solar PV generation capacity for the purposes of normative capital cost and determination of levelled tariffs for the period under consideration as well under the RE Tariff Regulation, 2017. Accordingly, the solar PV projects are to be categorized as under:-

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

4. Technology Specific Parameters.-

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

The Central Commission has notified their RE Regulations, 2017 i.e. Central Electricity Regulatory Commission (Terms and Conditions for Tariff

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

The CERC has not made any provision for determination of normative (benchmark) capital cost for solar PV projects and its RE Tariff Regulations, 2017 do not envisage such a generic tariff determination. Accordingly, the Commission proposes to evolve its own technology specific parameters after taking into account the various available inputs, including those notified by CERC for FY 2016-17 and considered by the HPERC in its solar PV tariff order dated 12.02.2018.

4.1 CAPITAL COST.-

The website pvinsights reports the latest solar PV Module Weekly Spot Price accessed on 23.05.2018 as under:

							USD/ Watt
Item			High	Low	Average	Avg. change	Avg. change%
Poly Silicon Module	Solar		0.41	0.27	0.295	↓ 001	↓ 0.34%
Thin Film Module	Solar		0.42	0.29	0.315	↓ 0.001	↓ 0.32%

The Commission proposes the cost of Solar PV Module as Rs. 195.21 Lakh/ MW considering the exchange rate of Rs. 65.07/USD based on the average of six months, i.e. December, 2017 to May, 2018 and module cost of 0.30 USD/Watt. The Commission proposes to adopt an all inclusive solar PV module rate of Rs. 215.00 Lakhs/MW after escalating the above rate by about 10% to cover various miscellaneous cost/taxes etc. etc.

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

Sr. No.	Particulars	Capital Cost norm (Rs. Lakh/MW)
1	PV Modules	215.00
2	Preliminary and Pre-operative expenses, Land Cost, Civil & General Works and Mounting Structures	126.00
3	Power Conditioning Units	35.00
4	Evacuation cost upto interconnection point	50.00
	Total Capital Cost	426.00

The normative capital cost for the solar PV projects upto 1.00 MW is proposed to be fixed by allowing an increase of about 1.5% on the normative cost for the projects above 1.00 MW and upto 5.00 MW as proposed above. Accordingly

the normative capital cost for the solar PV projects upto 1.00 MW is proposed to be fixed as Rs. 432.40 Lakhs per MW.

4.2 OPERATION AND MAINTENANCE EXPENSES.-

The Commission considered the O&M expenses as Rs. 7.40 Lakhs/MW with escalation @ 5.72% for FY 2017-18 in its solar PV tariff order dated 12.02.2018.

The O&M expenses of Rs. 7.82 Lakh/MW are proposed to be considered for FY 2018-19. These normative O&M charges shall also be escalated at the rate 5.72% per annum over the tariff period as per the RE Tariff Regulations, 2017.

4.3 NORMATIVE NET SALEABLE ENERGY.-

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

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

5. After having fixed the technological specific parameters as above, the Commission now proceeds to determine the generic levellised tariffs, based on the provisions of RE Tariff Regulations, 2017 for solar PV projects for FY 2018-19 under regulation 18 of the RE Tariff Regulations, 2017. The main details of the proposed tariffs are as follows:-

5.1 TARIFF STRUCTURE.-

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

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

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

5.2 **TECHNOLOGICAL SPECIFIC PARAMETERS.-**

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

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

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

5.4 **DEBT EQUITY RATIO.-**

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

5.5 **RETURN ON EQUITY.-**

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

5.6 **INTEREST ON LOAN.-**

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

“(2) Interest Rate.-

(a) The loans arrived at in the manner indicated in the regulation 23 shall be considered as gross normative loan for calculation for interest on loan. The normative loan outstanding as on 1st April of every year shall be worked out by deducting the cumulative repayment upto 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), or the respective generic levellised tariffs are to be made applicable, shall be considered:

Provided that in case where 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.”

- (ii) In view of above, interest rate of 9.99% per annum has been worked out by the adding 200 basis points above the average of Marginal Cost of Funds based Lending Rate (MCLR) (one year tenor) of State Bank of India (SBI) prevalent during the last available six months preceding the date of

commencement of the RE Tariff Regulations, 2017, as shown in the table below:-

Month	Tenor-wise MCLR of SBI
October, 2017	8.00
November, 2017	7.95
December, 2017	7.95
January, 2018	7.95
February, 2018	7.95
March, 2018	8.15
Avg. for last available 6 months.	7.99

5.7 DEPRECIATION.-

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

- “(a) the value base for the purpose of depreciation shall be the normative capital cost (for generic tariff) or the capital cost of the project as admitted by the Commission (for project specific tariff), as the case may be;
- (b) the salvage value of the asset shall be considered as 10% and depreciation shall be allowed up to maximum of 90% of the capital cost of the asset;
- (c) depreciation per annum shall be based on ‘Differential Depreciation Approach’. For tariff purposes, the depreciation shall be allowed @ 5.28% per annum till such time the requirement for repayment of loan component of the capital cost as per regulations 21, 23 and 24 after adjusting the amount of subsidy as per regulation 22, is fully provided and the remaining depreciation shall be spread over the residual useful life of the project on straight line method;
- (d) depreciation shall be chargeable from the first year of commencement of operation of the project.”

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

5.8 No adjustment has been made on account of subsidy in the tariff calculations and as such the rate of depreciation for the first 13 years has been considered as 5.28% and the rate of depreciation from the 14th year onwards has been spread over the balance useful life as under:-

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

5.9 INTEREST ON WORKING CAPITAL.-

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

- “(a) operation and maintenance expenses for one month;

- (b) receivables equivalent to 2 (two) months of energy charges for sale of electricity calculated on the net saleable energy corresponding to the CUF considered for tariff determination on normative basis;
 - (c) maintenance spare @ 15% of operation and maintenance expenses.”
- (ii) Interest rate on working capital as 10.99% per annum has been worked out by the adding 300 basis points above the average of Marginal Cost of Funds based Lending Rate (MCLR) (one year tenor) of State Bank of India (SBI) prevalent during the last available six months preceding the date of commencement of the RE Tariff Regulations, 2017.

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

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

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

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

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

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

.....xxxxxx.....”

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

5.11 No capital subsidy or incentive or grant/budgetary support have been considered in the proposed calculations. In case, a solar PV project is entitled to any incentive and/or subsidy and/or grant available, subsidy/budgetary support/grant/generation based incentive (GBI)/ viability gap funding (VGF), under the schemes of the Central or State Government or their agencies, the same shall be adjusted by the distribution licensee, at the time of signing the PPA, as per regulation 22 of RE tariff Regulations, 2017. The benefit,

if any, on account of AD is however not to be considered as provided with RE Regulations, 2017.

5.12 DISCOUNT FACTOR.-

In accordance with sub-regulation (4) of regulation 12 of the RE Tariff Regulations, 2017, the discount factor equivalent to the post tax weighted average cost of capital considered for the purpose of levelled tariff computation. The discount factor has been calculated on this basis by following the normative debt equity ratio (70:30). For this purpose, the interest rate for the loan component (i.e. 70%) of capital cost has been considered as 9.99% which has been adjusted for the corporate tax. For equity component (i.e. 30% of the capital cost) the post tax RoE has been computed as 13.56% by adjusting the normative RoE of 17.00% per annum with average of MAT rate considered by CERC in its RE Tariff Order for FY 2018-19 i.e. 20.26% per annum. The discounted factor has been calculated as 9.02%. The Corporate tax has been taken as 29.12% (25% IT rate+ 12% Surcharge+ 4% Education cess).

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

In light of the discussions made in the preceding paragraphs, the generic levelled tariffs and the associated terms and conditions for solar PV power plant for FY 2018-19 under the RE Regulations, 2017 have been arrived at and are proposed as under:-

A. The generic levelled tariffs for Solar PV power plants in respect of FY 2018-19 shall be as under:

Capacity	Generic levelled tariff (Rs. Per kWh)
Upto 1.00 MW	4.20
Above to 1.00 MW to 5.00 MW	4.15

B. These tariffs shall be subject to the RE Tariff Regulations, 2017 and the orders as may be issued by the Commission thereunder from time to time.

C. These tariffs are applicable to solar photovoltaic (PV) power projects which directly convert Solar Energy into Electricity, using the crystalline silicon or thin film technology or any other technology as approved by the Ministry of New and Renewable Energy and are connected to the Grid.

D. These tariffs shall be applicable in cases where the following conditions are met:-

(i) the joint petition for approval of PPA has been submitted to the Commission on or after 01.04.2018, but not later than 31.03.2019 or on the date on which new Renewable Energy Regulations come into force as per the provisions of Himachal Pradesh Electricity Regulatory Commission (Promotion of Generation from the Renewable Energy Sources and Terms and Conditions for Tariff Determination) (First Amendment) Regulations, 2018, whichever is earlier; and

(ii) such project is commissioned on or before 31.03.2020.

- E. These tariffs shall not be applicable in cases where the distribution licensee procures power through Solar Energy Corporation of India or through competitive bidding at its level in accordance with Section 63 of the Electricity Act, 2003.
 - F. These tariffs shall not be applicable in case of the solar PV plants which are installed by the consumers within their premises (rooftop or ground mounted) under net metering scheme.
8. The detailed computations for generic levelled tariffs for categories of solar PV power plants for FY 2018-19 as well as illustrations thereof are attached as per Appendix – “I & II”.

Assumption Parameters for Solar PV Power Projects upto 1 MW

Sr. No	Assumption Head	Sub Head	Sub Head(2)	Unit	Value
1	Power Generation	Capacity	Installed Generation Capacity	KW	1000
			Capacity Utilisation Factor	%	0.19
			Auxiliary Consumption	%	0
			Transmission losses	%	0.7
			Useful Life	%	25
2	Project Cost	Capital Cost /MW	Project Cost	Rs. Lacs/MW	432.4
3	Project Financing	Debt Equity	Tariff Period	Year	25
			Debt	%	70
		Debt Component	Equity	%	30
			Loan Amount	Rs. Lacs/MW	302.68
			Moratorium Period	Year	0
			Repayment Period	Year	13
			Interest Rate	%	9.99
		Equity Component	Equity Amount	Rs. Lacs/MW	129.72
			Return of equity for first 10 Years	%	17
			Return of equity from 11th Years onwards	%	17
4	Subsidy	Subsidy			0
5	Depreciation	Depreciation	Recovery of Depreciation	%	90
			Annual Rate of Depreciation till completion of Loan Repayment (balance spread in remaining years)	%	5.28
			14th year Onward	%	1.78
6	Operation & Maintenance		Total O&M Expenses	Rs. Lacs/MW	7.82
			Annual Escalation	%	5.72
7	Working Capital		O&M Charges	Months	1
			Maintenance Spares	% of O&M expenses of a Year	15
			Receivables	Months	2
			Interest on Working capital	%	10.99
9	Discount Factor		Discount Rate	%	9.02

		Determination of Tariff for Solar PV Power Projects up to 1 MW																					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		1.664	1.66	1.66	1.66	1.66	1.66	1.66	1.66	1.66	1.66	1.66	1.66	1.66	1.66	1.66	1.66	1.66	1.66	1.66	1.66	1.66	1.66	1.66	1.66	1.66
Losses	MU		0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7
Net Generation	MU		1.653	1.65	1.65	1.65	1.65	1.65	1.65	1.65	1.65	1.65	1.65	1.65	1.65	1.65	1.65	1.65	1.65	1.65	1.65	1.65	1.65	1.65	1.65	1.65	1.65
Fixed Cost		year																									
O&M Expences	Rs lacs		7.82	8.267	8.74	9.24	9.77	10.33	10.92	11.54	12.20	12.90	13.64	14.42	15.24	16.12	17.04	18.01	19.04	20.13	21.28	22.50	23.79	25.15	26.59	28.11	29.72
Depriciation	Rs lacs		22.83	22.83	22.83	22.83	22.83	22.83	22.83	22.83	22.83	22.83	22.83	22.83	7.70	7.70	7.70	7.70	7.70	7.70	7.70	7.70	7.70	7.70	7.70	7.70	7.70
Interest on Term Loan	Rs lacs		29.07	26.75	24.42	22.10	19.77	17.44	15.12	12.79	10.47	8.14	5.81	3.49	1.16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Interest on Working Capital	Rs lacs		1.73	1.71	1.68	1.66	1.64	1.63	1.61	1.59	1.58	1.57	1.56	1.55	1.54	1.28	1.32	1.36	1.41	1.46	1.51	1.56	1.62	1.68	1.75	1.81	1.89
Return on Equity	Rs lacs		22.05	22.05	22.05	22.05	22.05	22.05	22.05	22.05	22.05	22.05	22.05	22.05	22.05	22.05	22.05	22.05	22.05	22.05	22.05	22.05	22.05	22.05	22.05	22.05	22.05
Total fixed Cost	Rs lacs		83.51	81.61	79.73	77.88	76.07	74.28	72.53	70.81	69.13	67.49	65.89	64.34	62.83	47.14	48.10	49.12	50.20	51.34	52.54	53.81	55.16	56.58	58.08	59.67	61.35
Levellised CoG																											
Per unit CoG	Unit	levellised																									
O&M Expences	Rs/kWh	0.78	0.47	0.50	0.53	0.56	0.59	0.62	0.66	0.70	0.74	0.78	0.83	0.87	0.92	0.98	1.03	1.09	1.15	1.22	1.29	1.36	1.44	1.52	1.61	1.70	1.80
Depriciation	Rs/kWh	1.16	1.38	1.38	1.38	1.38	1.38	1.38	1.38	1.38	1.38	1.38	1.38	1.38	1.38	0.47	0.47	0.47	0.47	0.47	0.47	0.47	0.47	0.47	0.47	0.47	0.47
Interest on Term Loan	Rs/kWh	0.82	1.76	1.62	1.48	1.34	1.20	1.06	0.91	0.77	0.63	0.49	0.35	0.21	0.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Interest on Working Capital	Rs/kWh	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.09	0.09	0.09	0.09	0.08	0.08	0.08	0.09	0.09	0.09	0.09	0.10	0.10	0.11	0.11	0.11
Return on Equity	Rs/kWh	1.33	1.33	1.33	1.33	1.33	1.33	1.33	1.33	1.33	1.33	1.33	1.33	1.33	1.33	1.33	1.33	1.33	1.33	1.33	1.33	1.33	1.33	1.33	1.33	1.33	1.33
Total CoG	Rs/kWh	4.20	5.05	4.9376	4.82	4.71	4.60	4.49	4.39	4.28	4.18	4.08	3.99	3.89	3.80	2.85	2.91	2.97	3.04	3.11	3.18	3.26	3.34	3.42	3.51	3.61	3.71
Discounted factor	%		1	0.92	0.84	0.77	0.71	0.65	0.60	0.55	0.50	0.46	0.42	0.39	0.35	0.33	0.30	0.27	0.25	0.23	0.21	0.19	0.18	0.16	0.15	0.14	0.13
levellised Tariff	Rs/kWh	4.20	5.05	4.5291	4.06	3.64	3.26	2.92	2.61	2.34	2.10	1.88	1.68	1.51	1.35	0.93	0.87	0.81	0.76	0.72	0.67	0.63	0.59	0.56	0.53	0.50	0.47

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

Sr. No	Assumption Head	Sub Head	Sub Head(2)	Unit	Value
1	Power Generation	Capacity	Installed Generation Capacity	KW	1000
			Capacity Utilisation Factor	%	0.19
			Auxiliary Consumption	%	0
			Transmission losses	%	0.7
			Useful Life	%	25
2	Project Cost	Capital Cost /MW	Project Cost	Rs. Lacs/MW	426
3	Project Financing	Debt Equity	Tariff Period	Year	25
			Debt	%	70
			Equity	%	30
		Debt Component	Loan Amount	Rs. Lacs/MW	298.2
			Moratorium Period	Year	0
			Repayment Period	Year	13
			Interest Rate	%	9.99
		Equity Component	Equity Amount	Rs. Lacs/MW	127.8
			Return of equity for first 10 Years	%	17
			Return of equity from 11th Years onwards	%	17
4	Subsidy	Subsidy			0
5	Depreciation	Depreciation	Recovery of Depreciation	%	90
			Annual Rate of Depreciation till completion of Loan Repayment (balance spread in remaining years)	%	5.28
			14th year Onward	%	1.78
6	Operation & Maintenance		Total O&M Expenses	Rs. Lacs/MW	7.82
			Annual Escalation	%	5.72
7	Working Capital		O&M Charges	Months	1
			Maintenance Spares	% of O&M expenses of a Year	15
			Receivables	Months	2
			Interest on Working capital	%	10.99
9	Discount Factor		Discount Rate	%	9.02

		Determination of Tariff for Solar PV Power Projects above 1 MW upto 5 MW																				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		1.664	1.66	1.66	1.66	1.66	1.66	1.66	1.66	1.66	1.66	1.66	1.66	1.66	1.66	1.66	1.66	1.66	1.66	1.66	1.66	1.66	1.66	1.66	1.66	1.66
Losses	MU		0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7
Net Generation	MU		1.653	1.65	1.65	1.65	1.65	1.65	1.65	1.65	1.65	1.65	1.65	1.65	1.65	1.65	1.65	1.65	1.65	1.65	1.65	1.65	1.65	1.65	1.65	1.65	1.65
Fixed Cost		year																									
O&M Expences	Rs lacs		7.82	8.267	8.74	9.24	9.77	10.33	10.92	11.54	12.20	12.90	13.64	14.42	15.24	16.12	17.04	18.01	19.04	20.13	21.28	22.50	23.79	25.15	26.59	28.11	29.72
Depriciation	Rs lacs		22.49	22.49	22.49	22.49	22.49	22.49	22.49	22.49	22.49	22.49	22.49	22.49	7.58	7.58	7.58	7.58	7.58	7.58	7.58	7.58	7.58	7.58	7.58	7.58	7.58
Interest on Term Loan	Rs lacs		28.64	26.35	24.06	21.77	19.48	17.19	14.90	12.60	10.31	8.02	5.73	3.44	1.15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Interest on Working Capital	Rs lacs		1.71	1.69	1.67	1.65	1.63	1.61	1.59	1.58	1.56	1.55	1.54	1.53	1.53	1.27	1.31	1.35	1.40	1.45	1.50	1.55	1.61	1.67	1.74	1.81	1.88
Return on Equity	Rs lacs		21.73	21.73	21.73	21.73	21.73	21.73	21.73	21.73	21.73	21.73	21.73	21.73	21.73	21.73	21.73	21.73	21.73	21.73	21.73	21.73	21.73	21.73	21.73	21.73	21.73
Total fixed Cost	Rs lacs		82.39	80.53	78.69	76.87	75.09	73.34	71.62	69.94	68.30	66.69	65.13	63.61	62.14	46.69	47.66	48.67	49.75	50.89	52.09	53.36	54.71	56.13	57.63	59.22	60.90
Levellised CoG																											
Per unit CoG	Unit	levellised																									
O&M Expences	Rs/kWh	0.78	0.47	0.50	0.53	0.56	0.59	0.62	0.66	0.70	0.74	0.78	0.83	0.87	0.92	0.98	1.03	1.09	1.15	1.22	1.29	1.36	1.44	1.52	1.61	1.70	1.80
Depriciation	Rs/kWh	1.15	1.36	1.36	1.36	1.36	1.36	1.36	1.36	1.36	1.36	1.36	1.36	1.36	1.36	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46
Interest on Term Loan	Rs/kWh	0.81	1.73	1.59	1.46	1.32	1.18	1.04	0.90	0.76	0.62	0.49	0.35	0.21	0.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Interest on Working Capital	Rs/kWh	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.09	0.09	0.09	0.09	0.09	0.08	0.08	0.08	0.08	0.09	0.09	0.09	0.10	0.10	0.11	0.11	0.11
Return on Equity	Rs/kWh	1.31	1.31	1.31	1.31	1.31	1.31	1.31	1.31	1.31	1.31	1.31	1.31	1.31	1.31	1.31	1.31	1.31	1.31	1.31	1.31	1.31	1.31	1.31	1.31	1.31	1.31
Total CoG	Rs/kWh	4.15	4.99	4.8722	4.76	4.65	4.54	4.44	4.33	4.23	4.13	4.04	3.94	3.85	3.76	2.83	2.88	2.95	3.01	3.08	3.15	3.23	3.31	3.40	3.49	3.58	3.68
Discounted factor	%		1	0.92	0.84	0.77	0.71	0.65	0.60	0.55	0.50	0.46	0.42	0.39	0.35	0.33	0.30	0.27	0.25	0.23	0.21	0.19	0.18	0.16	0.15	0.14	0.13
levellised Tariff	Rs/kWh	4.15	4.99	4.4691	4.01	3.59	3.22	2.88	2.58	2.31	2.07	1.85	1.66	1.49	1.33	0.92	0.86	0.81	0.76	0.71	0.67	0.63	0.59	0.55	0.52	0.49	0.46