Before the
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CASE No. 52 of 2019

In the matter of

Determination of Generic Tariffs for Renewable Energy for FY 2019-20

Coram

Shri. Anand B. Kulkarni, Chairperson
Shri. I.M. Bohari, Member
Shri. Mukesh Khullar, Member

DRAFT ORDER

Dated: 1 March, 2019

BACKGROUND

1) The Commission notified the MERC (Terms and Conditions for Determination of Renewable Energy Tariff) Regulations, 2015, ('RE Tariff Regulations') on 10 November, 2015 for determination of Generic Tariff of eligible RE Projects selling electricity to Distribution Licensee in Maharashtra. The Regulations specify the terms and conditions and the procedure for determination of Generic Tariff in respect of the following types of Renewable Energy (RE) Generation Projects:

   (a) Wind Power Projects;
   (b) Biomass-based Power Projects;
   (c) Non-Fossil Fuel-based Co-Generation Projects;
   (d) Mini/Micro and other Small Hydro Power Projects;
   (e) Solar Photo Voltaic (PV) and Solar Thermal Power Projects;
   (f) Solar Roof-top PV Systems Power Projects.

2) Regulation 9.1 of the RE Tariff Regulations requires the Commission to determine the Generic Tariffs for RE Technologies for which the norms have been specified in the Regulations:

   "9.1 The Commission shall notify the Generic Tariff at the beginning of each year of the Review Period considering the norms specified by the Central Commission from time to time with regard to the respective RE technologies:

   Provided that, for the first year (FY 2015-16) of the Review Period, the Generic Tariff may be determined by the Commission within three months from the date of notification of these Regulations."

3) The Commission, vide its Orders in Case Nos 135 of 2015 dated 25 January 2016, 45 of 2016 dated 29 April 2016, and 33 of 2017 dated 28 April 2017 for the Financial Years 2015-16, 2016-17 and 2017-18 respectively determined the Generic Tariff for RE Technologies. Later, the Commission determined the Generic RE Tariff for period 1 August, 2018 to 31 March, 2019 vide its Order dated 18 August, 2018 in Case No 204 of 2018.

4) In discharge of its mandate under Regulation 9.1 and through this draft Order, the Commission proposes to determine the Generic Tariff for RE Technologies for FY 2019-20 to be applicable for the RE Projects which would be commissioned during that year. The Commission invites public comments, objections and suggestions on the draft Order.

5) The Ministry of New & Renewable Energy (MNRE), Government of India has set ambitious target of achieving 175 GW target for installed grid connected RE capacity by 2022. Guidelines have been issued for carrying out competitive bidding for various RE projects and Tariffs discovered by competitive bidding are considerably lower than the RE Generic Tariffs. Over the years, maturing RE Technologies achieving higher CUF at lower costs and innovative financial engineering in project costing have reduced gap between Tariffs of conventional power projects and RE projects.

It has been observed that since the rates discovered by competitive bidding process are considerably lower than the Generic Tariffs determined in the earlier years, many of the distribution companies have been procuring RE power by way of competitive bidding rather than power purchase at RE Generic Tariff.

1. COMMON PARAMETERS FOR GENERIC TARIFF DETERMINATION

This Section sets out the norms for determination of the Generic levelised Tariff which are applicable to all types of RE Technologies as specified in the RE Tariff Regulations.

1.1. TARIFF PHILOSOPHY

The Commission notified RE Tariff Regulations on 10 November, 2015. RE Tariff Regulations have set up Financial Principles and Technology-specific parameters for each eligible RE technology.

National Tariff Policy, 2016 was notified by the Ministry of Power (MoP) on 28 January 2016 i.e. after RE Tariff Regulations were notified in November, 2015. As per Para 6.4 (2) of the Tariff Policy 2016, States are encouraged to procure power from RE sources above the notified capacity through competitive bidding to keep the Tariff low. The portion of Tariff policy is quoted below:

> *(2) States shall endeavour to procure power from renewable energy sources through competitive bidding to keep the Tariff low, except from the waste to energy plants. Procurement of power by Distribution Licensee from renewable energy sources from projects above the notified capacity, shall be done through competitive bidding process, from the date to be notified by the Central Government.*
>
> *However, till such notification, any such procurement of power from renewable energy sources projects, may be done under Section 62 of the Electricity Act, 2003. While determining the Tariff from such sources, the Appropriate Commission shall take into account the solar radiation and wind intensity which may differ from area to area to ensure that the benefits are passed on to the consumers.*

In accordance with National Tariff Policy, the Central Government has notified competitive bidding guidelines for solar & wind power projects on August 2017 and December 2017, respectively. As per bidding guidelines, intra-state wind projects below 25 MW and solar projects below 5 MW are excluded from applicability of Tariff based competitive bidding for procurement of power from grid connected solar and wind power projects.

However, this Commission has received requests for deviation in bidding guidelines to allow participation of RE developers below notified capacity in competitive bidding. The Commission has allowed such deviations.

With introduction of competitive bidding in RE, the country has witnessed significant reduction in Tariff of RE power. The same is the combined effect of maturing technology, competition and also the technological advances. Financial Principles of RE Tariff Regulations, 2015 have not been updated to account for these factors. As a result, Generic Tariff based on these Financial Principles is higher than Tariff discovered by way of Competitive Bidding.

The Commission notes that the Central Electricity Regulatory Commission (CERC) had been determining Generic Tariff for solar PV and wind RE Projects till FY 2016-17. However, considering competitive bidding guidelines notified by the Central Government for Solar PV and Wind Energy, from FY 2017-18, CERC has stopped determining Generic Tariff for Solar PV and

Wind Energy. As per CERC RE Tariff Regulations 2017, only project specific Tariff shall be determined for solar PV and wind energy instead of Generic Tariff.

As per Regulation 9.1 of MERC RE Tariff Regulations, 2015, the Commission has to notify Tariff for each year of Review Period after considering norms specified by the CERC for respective RE Technology. As CERC has stopped determining Generic Tariff for Solar PV and Wind Energy, there are no norms specified by CERC for these RE Technologies. This has created difficulty in giving effect to the provisions of RE Tariff Regulations, 2015 with respect to Solar PV and Wind Energy. In previous RE Tariff Orders, in absence of norms specified by CERC, the Commission has used norms arrived by analysing RE Tariff Orders of other State Commissions.

The Commission also notes that purpose of RE Generic Tariff Order is to determine Tariff at which Distribution Licensee can procure energy from RE sources to fulfil its RPO. When, introduction of competitive bidding in RE has shown substantial reduction in RE Tariff, the Commission cannot continue determining Generic Tariff based of Financial Principals and operating norms in RE Tariff Regulations, 2015, which are not reflective of true current market conditions. Commission can not in the process burden the Distribution Licensees and in turn the consumers with increased cost of meeting its RPO by fixing Generic Tariff based on obsolete financial principles and operating norms.

Taking cognizance of anomaly approach adopted by CERC and the provisions relating to RE Generic Tariff Regulations, the Commission is separately taking up the revision of the Regulations to reflect these developments appropriately so as to bridge the significant gap in the Generic Tariff fixed in the past and the discovered Tariff through competitive bidding in recent times. Until amendments come into effect, in the interim, the Commission is invoking its power to remove difficulty under Regulation 82 of RE Tariff Regulations, 2015, and rules as under:

a. For FY 2019-20, no Generic Tariff will be determined for RE Technologies for which competitive bidding has been enabled and the Commission has adopted such competitively discovered Tariff.

   Provided that in case of projects having capacity below the threshold limit of eligibility for participating in competitive bidding process as approved by the Commission, Distribution Licensee may sign EPA with such RE Projects at a Tariff which has been discovered in the latest competitive bidding and so adopted by the Commission. In absence of competitively discovered Tariff of concerned Distribution Licensee, Tariff discovered by other Distribution Licensee in the State shall be used for signing of EPA. Terms and Conditions of such EPA shall be identical to Terms and Conditions of EPA for such competitive bid.

b. For other RE Technologies for which competitive bidding has not been undertaken, the Commission will determine Generic Tariff as per principles stipulated in RE Tariff Regulations, 2015.

   Provided that during FY 2019-20, if Distribution Licensee conducts competitive bidding for such RE Technology and Tariff is adopted by the Commission, then such competitively discovered Tariff shall be Generic Tariff for remaining period of FY 2019-20. Thereafter, conditions mentioned at 1.1 (a) above will become applicable.

The Commission hopes that for other RE Technologies also as has been done for bagasse based cogeneration project by MSEDCL, Competitive bidding needs to be undertaken by the licensees.

The Commission notes that above Ruling of the Commission is also consistent with the mandate of the Electricity Act, 2003 i.e. encouraging competition, efficiency and economical use of resources. In any case, most of the Distribution Licensees in the State, whose RE procurement is regulated at Generic Tariff, are showing increasing inclination for exercising the option for procurement of RE through competitive bidding so as to obtain market price of the RE in a transparent manner. Hence, for promoting competition and at the same time for enabling small RE projects (which cannot participate in competitive bidding due to qualification criteria like minimum capacity requirement) to sell its energy to Distribution Licensees at competitively discovered Tariff, the Commission is adopting above approach.

1.2. REVIEW PERIOD

Regulation 6.1 of the RE Tariff Regulations specifies that the Review Period for determination of the Tariff for RE Projects shall be five financial years, starting from the date of publication of the Regulations (i.e. 10 November, 2015). Thus, FY 2015-16 was the first year of the Review Period and FY 2019-20 is the fifth and final year of this Review Period.

1.3. GENERAL & FINANCIAL PRINCIPLES (RE TARIFF REGULATIONS 2015)

1.3.1. TARIFF STRUCTURE

Regulation 10 specifies that the Tariff for RE Projects shall be a single-part Tariff consisting of the following fixed cost components:

(a) Return on Equity;
(b) Interest on loan capital;
(c) Depreciation;
(d) Interest on working capital;
(e) Operation and maintenance expenses.

For RE Technologies with a fuel cost component, like Biomass-based Projects, a single-part Tariff with two components, viz., fixed cost and fuel cost, has been determined in this Order. The relevant cost components and basis for determination of the Generic Tariff for each RE technology have been elaborated in the technology-specific Sections of this Order.

1.3.2. TARIFF DESIGN

As per Regulation 11, the Tariff Design for RE Generating Stations is as under**:**

"11.1 The Tariff shall be determined on a levelised basis for the Tariff Period:

Provided that, for RE Projects having a single-part Tariff with two components, the Tariff shall be determined on a levelised basis considering the year of commissioning of the Project for the fixed cost component, while the fuel cost component shall be specified

on the basis of the year of operation.

11.2 For the purpose of computation of levelised Tariff, a discount factor equivalent to the normative post-tax weighted average cost of capital shall be considered.

11.3 Levelisation shall be carried out for the 'useful life' of the RE Project, while Tariff shall be determined for the period equivalent to the Tariff Period."

1.3.3. INTEREST ON LOAN

Regulation 15.1 specifies loan tenure of 12 years for determination of the Generic Tariff for RE Projects. Regulation 15.2 provides for consideration of the rate of interest on loan as follows:

"For the purpose of computation of Tariff, the Base Rate of the State Bank of India prevailing during the previous year plus 300 basis points shall be considered as the normative interest rate.

Notwithstanding any moratorium period availed, the repayment of loan shall be considered from the first year of commercial operation of the Project and shall be equal to the annual depreciation allowed."

However, the Commission observes that, the reference rate for sanction of new loan has been shifted to MCLR instead of SBI Base Rate. Accordingly, the Commission while determining Generic RE Tariff for FY 2017-18 vide its Order dated 28April,2017 in Case 33 of 2017 considered as below:

However, as per the RBI guidelines dated 3 March, 2016 (updated on 29 March, 2016),

"All rupee loans sanctioned and credit limits renewed w.e.f. April 1, 2016 shall be priced with reference to the Marginal Cost of Funds based Lending Rate (MCLR) which will be the internal benchmark for such purposes."

SBI will continue to declare its Base Rate for existing loans, but new loans will be sanctioned on the basis of MCLR.

Considering this difficulty of unavailability of new loan with reference of SBI Base Rate, the Commission invoked the provision of Regulation 82 of MERC RE Tariff Regulations, 2015 as below:

Regulation 82 of the RE Tariff Regulations empower the Commission as follows:

"82. Power to remove difficulties

If any difficulty arises in giving effect to the provisions of these Regulations, the Commission may, by general or specific order, make such provisions not inconsistent with the provisions of the Act, as may appear to be necessary for removing the difficulty."

The Commission has invoked the provisions of Regulation 82 in view of the change in the circumstances and dispensation concerning interest rates and the consequent issues in persisting with consideration based on the SBI Base Rate.

Further, the Commission also amended the provisions of MERC (MYT) Regulations, 2016 vide amendment dated 29 November, 2017, wherein the Commission has amended the definition of Base Rate as below:

> *2. Amendment to Regulation 2.1 (10)*
> *Regulation 2.1 (10) of the principal Regulations shall be substituted by the following:*
>
> *"**Base Rate"** shall mean the one-year Marginal Cost of Funds-based Lending Rate ('MCLR') as declared by the State Bank of India from time to time;"*

Considering the above discussed difficulties in implementing provisions of RE Tariff Regulations related to Interest Rate, the Commission has invoked the provisions of Regulation 82 of MERC RE Tariff Regulations, 2015, *Power to remove difficulties* in view of the change in the circumstances and dispensation concerning interest rates and the consequent issues in pursuing rate to be linked to MCLR instead of SBI Base Rate.

Accordingly, the Commission has determined the Interest on loan considering 1-year average from February, 2018 to February 2019 of 1 year MCLR of SBI as shown in the Table below:

Date of Revision of 1 Year MCLR by SBI	**MCLR by SBI**
01 February, 2018	7.95%
01 March, 2018	8.15%
01 April, 2018	8.15%
01 May, 2018	8.15%
01 June, 2018	8.25%
01 1 July-2018July, 2018	8.25%
01 August, 2018	8.25%
01 September, 2018	8.45%
01 October, 2018	8.50%
01 November, 2018	8.50%
10 December, 2018	8.55%
10 January, 2019	8.55%
01 February, 2019	8.55%
Average 1 year MCLR	**8.31%**
1 Year MCLR + 300 Basis points	**8.31% + 3.00% =11.31%**

Hence, the Commission has considered the Interest on term Loan as 8.31% + 3.00% = 11.31% for the purpose of determination of Tariff.

1.3.4. INTEREST ON WORKING CAPITAL

Regulation 18.3 provides for computation of the rate of IoWC as follows:

> *"Interest on Working Capital shall be the average of the Base Rate of State Bank of India prevalent during the previous year, plus 350 basis points."*

As discussed earlier in Para 1.3.3, the SBI Base Rate-linked interest rate for working capital is no longer available for new RE Projects. The Commission has worked our Average of 1 year MCLR as 8.31%. Hence the Commission considers the Interest on Working Capital as 8.31% + 3.50% =

11.81%. In view of the above, as in the case of interest on long term loan, the Commission invokes its powers under Regulation 82 to remove difficulties and to apply, for the purposes of this Order, interest rate on working capital loan of 11.81% is considered for FY 2019-20.

1.3.5. REVISION IN INCOME TAX RATE

In Union Budget 2018-19, it was proposed to extend benefit of reduced income tax rate of 25% to companies who have reported turnover upto Rs. 250 crore in FY 2016-17. This benefit is expected to benefit almost 99% of companies filing their tax returns. Moreover, the existing three per cent education cess is proposed to be replaced by a four per cent "Health and Education Cess". As a result of these proposed changes, income tax rates are changed as follows:

Particulars		Income tax	MAT
Corporate Tax		25%	18.50%
Surcharge	12%	3.00%	2.22%
Corporate Tax + surcharge		28.00%	20.72%
Health & Education Cess	4%	1.12%	0.83%
Total Tax Rate		29.12%	21.55%

1.3.6. LEVELISED TARIFF

The Levelised Tariff is computed by undertaking levelisation over the Useful Life of each RE technology considering a discount factor equivalent to the normative post-tax weighted average cost of capital, to represent the time value of money.

Discount Factor

The discount factor considered for this purpose is 10.41%, which is equal to the normative post-tax weighted average cost of capital on the basis of the normative debt-equity ratio of 70:30 specified in the Regulations, and the weighted average rates for the debt and equity components.

The Interest Rate considered for the loan component (i.e., 70%) of Capital Cost is 11.31%. For the equity component (i.e., 30%), the rate of RoE is computed at the base rate of 16%, grossed up as per the applicable tax rate. The rate of RoE is to be computed by grossing up the base rate with the tax rate equivalent to MAT for the first 10 years from the Commercial Operation Date (COD), and the normal tax rate for the remaining years of Project life. The discount factor for each technology derived by this method is detailed in the respective technology-specific Sections of this Order.

The Discount Factor is computed as 10.41% = ((11.31% x 0.70 x (1-29.12%)) + (16.00% x 0.30)).

1.3.7. ESCALATION RATE FOR O&M EXPENSE AND FOR CAPITAL COST COMPUTATION

In May 2017, the base year of All-India WPI has been revised from 2004-05 to 2011-12 by the Office of Economic Advisor (OEA), Department of Industrial Policy and Promotion, Ministry of Commerce and Industry to align it with the base year of other macroeconomic indicators to capture structural changes in the economy. However, as per amendment in MERC (MYT) Regulations, 2016; five year monthly average WPI escalation rate is required in calculation of annual escalation

rate for O&M expenses. As 5 years was not available at that time in 2011-12 WPI series which started from January 2014, 2004-05 WPI series was used for determination of escalation rate for O&M expenses in previous RE Generic Tariff Orders. As on date of this Order, 5 years data is available for calculation of average monthly indices. Therefore, 2011-12 WPI series is used for computation of annual escalation rate for O&M expense as well as for undertaking the capital cost indexation for the RE Technologies, i.e., biomass, small hydro power (SHP).

1.3.8. GRANT, SUBSIDY OR INCENTIVE FROM CENTRAL/ STATE GOVERNMENTS

Regulation 24 of the RE Tariff Regulations specifies that:

"The Commission shall take into consideration any grant, subsidy or incentive offered by the Central or State Government or their agencies, including accelerated/additional depreciation benefit, if availed, while determining the Tariff under these Regulations:

Provided that the State Nodal Agency shall inform the Distribution Licensee regarding any such grant, subsidy or incentives received by a Project Entity on a quarterly basis;

Provided further that any such grant, subsidy or incentives availed by a Project Entity shall be deducted by the Distribution Licensee in subsequent bills raised by the particular Project Entity towards sale of electricity in suitable instalments or within such period as may be stipulated by the Commission;

Provided also that the following principles shall be considered for ascertaining the Income Tax benefit on account of accelerated or additional depreciation, if availed, for the purpose of Tariff determination:

a. The assessment of benefit shall be based on normative Capital Cost, accelerated/additional depreciation rate as per the relevant provisions of the Income Tax Act and the Corporate Income Tax rate;

b. Capitalisation of RE Projects for the full financial year;

c. Per-unit benefit shall be derived on levelised basis at a discounting factor equivalent to the post-tax weighted average cost of capital;

Provided also that, in case the Central or State Government or their agencies provide any generation-based incentive which is specifically over and above the Tariff, such incentive shall not be taken into account while determining the Tariff."

Accordingly, for Projects availing the benefit of accelerated depreciation, the applicable Corporate Income Tax rate of 29.12% (25% Income Tax rate + 12% surcharge + 4% Health & Education Cess) has been considered. As per the Circular dated 7 November, 2016 of the Income Tax Department, the accelerated depreciation rates have been revised to 40% from FY 2017-18.

For determining the net depreciation benefits, depreciation @ 5.28% as per the Straight Line Method (book depreciation as per the Companies Act, 2013) has been compared with depreciation as per the Income Tax Act, i.e., 40% under the Written Down Value method. Moreover, additional 20% depreciation in the initial year is proposed to be extended to new assets acquired by Generation Companies vide the amendment to Section 32 (1) (ii a) of the Income Tax Act.

Depreciation for the first year has been computed at the rate of 40% and the accelerated depreciation at 20%, assuming the Project to be capitalized for the full financial year as per the

second proviso to Regulation 24 of the RE Tariff Regulations. The tax benefit has been worked out as per the Corporate Income Tax rate on the net depreciation benefit. The 'per unit levelised accelerated depreciation benefit' has been computed considering the weighted average cost of capital as the discounting factor of 10.41%, as detailed in para. 1.3.6 of this Order. The detailed computation of benefit of accelerated depreciation in respect of each RE technology is set out in the technology-specific Sections.

As per the second proviso to Regulation 24, in case the Central or State Government or their agencies provide any generation-based incentive which is specifically intended to be over and above the Tariff, such incentive shall not be taken into account while determining the Tariff. Thus, while determining the Tariffs for RE Projects in this Order, no such incentives have been considered.

1.3.9. SHARING OF CDM BENFITS

As per Regulation 22, all risks, costs and efforts associated with the availing of carbon credits shall be borne by the Project Entity. The entire proceeds of carbon credit from an approved Clean Development Mechanism (CDM) Project, if any, shall be retained by it.

1.3.10. APPLICABILITY OF TARIFF ORDER

This Order shall be applicable from 1 April, 2019 to 31st March, 2020.

The Variable Charge component determined for Biomass-based Power Projects commissioned in FY 2019-20 shall also be applicable to such existing Projects commissioned prior to FY2019-20.

The Fixed Charge component of the Tariff of such Projects shall continue to be governed by the other relevant Orders of the Commission.

The applicable Tariff Rate, Tariff Structure and other terms and conditions for other RE Projects commissioned on or before 31 March, 2019 will be in accordance with the provisions of the relevant Generic RE Tariff Orders.

The following Sections of this Order outline the technology-wise norms and corresponding Generic Tariffs for RE Projects to be commissioned in FY 2019-20 based on various RE Technologies.

2. WIND ENERGY PROJECTS

The Commission notes that Distribution Licensee in Maharashtra i.e. Maharashtra State Electricity Distribution Co. Ltd. (MSEDCL) has successfully conducted competitive bidding for procurement of Wind Energy and the Commission vide its Order in Case No. 252 of 2018 dated 25 September, 2018 has adopted rate discovered through competitive bidding. Hence, as per para 1.1(a) mentioned above, the Commission is not determining Generic Tariff applicable for Wind Energy.

As mentioned in proviso to para 1.1 (a), for Wind Projects having capacity below the threshold limit for participating in competitive bidding process, Tariff which has been discovered in the latest competitive bidding and adopted by the Commission shall be used for signing of EPA irrespective of wind zone of the Project. In absence of competitively discovered Tariff of concerned Distribution Licensee, Tariff discovered by other Distribution Licensee in the State shall

be used for signing of EPA. Terms and Conditions of such EPA shall be identical to Terms and Conditions of such competitively bade EPA.

As of now the latest competitive bidding Tariff for Wind Energy adopted by the Commission is Rs 2.52 /kWh for MSEDCL (Order dated 25 September, 2018 in Case No. 252 of 2018). Any subsequent Order of adoption of Tariff shall be considered at the time of signing of EPA.

3. SMALL (INCLUDING MINI/MICRO) HYDRO POWER PROJECTS

No competitive bidding is carried out in the State of Maharashtra for power procurement from small hydro power generation projects. Therefore, as mentioned in Para 1.1, Generic Tariff will be computed as per Financial Principles and Technology-specific parameters in RE Tariff Regulations, 2015 as detailed in this Chapter.

3.1. USEFUL LIFE

The Useful Life specified for SHPs, including Mini/Micro Hydro Projects, under Regulation 2.1 (mm) of the RE Tariff Regulations is 35 years from COD.

3.2. TARIFF PERIOD

Regulation 7.2 specifies a Tariff Period of 13 years for SHPs of a capacity higher than 5 MW and upto and including 25MW.

Regulation 7.3 specifies a Tariff Period of 35 years for Mini/Micro Hydro Projects and for other SHPs upto and including 5 MW. The Tariff Period matches the Useful Life in case of these Projects, reflecting a longer preferential treatment for them.

3.3. CAPITAL COST OF SMALL HYDRO PROJECTS

For the purpose of the RE Tariff Regulations, SHPs are those Projects located at sites approved by the State Government/ State Nodal Agency using new plant and machinery and with installed power plant capacity lower than or equal to 25 MW. For Capital Cost, SHPs have been classified into two categories based on their installed capacities, viz., a) SHPs above 1 MW and upto and including 5 MW, and b) SHPs above 5 MW and lower than or equal to 25 MW.

Under Regulation 30.1, the Commission has considered the normative Capital Cost for SHPs for the first year of the Review Period (Base Year) as below:

Project Size	Capital Cost (Rs. lakh/MW)
> 1 MW and upto and including 5 MW	605.28
> 5 MW and upto and including 25 MW	550.70

This Capital Cost has been escalated by applying the indexation mechanism of the CERC RE Tariff Regulations, as stipulated in Regulation 31 of the Commission's Regulations. The computation steps are shown in table below. For FY 2019-20, that base Capital Cost has been revised applying the indexation specified in the CERC RE Tariff Regulations, as stipulated in Regulation 27 of this Commission's Regulations. The computation is shown below.

Indexation Formula

$CC(n) = P \& M(n)*[1 + F1 + F2 + F3]$

$dn = (a*(SIn-1/SI_0)-1) + b*(EIn-1/EI_0)-1))/(a+b)$

$P\&M(n) = P\&M(0)*(1 + dn)$

Where: a=Weightage for Steel Index and b= Weightage for Electrical Machinery Index

Capital Cost Indexation for FY 2019-20

	Variables				
Technology	**a**	**b**	**F1**	**F2**	**F3**
Small Hydro	0.60	0.40	0.16	0.10	0.14
Biomass	0.70	0.30	0.10	0.09	0.14

As per CERC RE Tariff Regulations 2012:
a= Weightage to Steel Index
b= Weightage to Electrical Machinery Index
F1= Factor for Land and Civil Work
F2= Factor for Erection and Commissioning
F3= Factor for IDC and Financing Cost

Wholesale Price Index (WPI)

	WPI of Electrical Machinery		WPI of Iron and Steel	
	2018	**2014**	**2018**	**2014**
January	110.10	106.90	104.00	102.40
February	109.40	106.20	105.90	103.60
March	110.10	107.20	108.90	103.60
April	110.90	108.00	110.50	106.30
May	110.80	108.60	111.70	107.70
June	110.80	108.00	111.30	107.00
July	111.50	109.10	110.50	105.40
August	111.80	110.90	112.80	102.80
September	111.50	110.70	114.60	102.30
October	111.70	111.30	114.30	102.00
November	112.10	110.40	113.80	99.10
December	112.00	109.60	110.30	98.40
Average	**111.14**	**108.91**	**110.72**	**103.38**

Variable	Year	Value
SI_0	2014	103.38
SI_{n-1}	2018	110.72
EI_0	2014	108.91
EI_{n-1}	2018	111.14
Dn		**5.08%**

The normative Capital Cost for FY 2019-20 computed as per the mechanism specified in the CERC RE Tariff Regulations is shown in the Table below.

Parameter	Particulars	SHP of > 1 MW and upto and including 5 MW	SHP of > 5 MW and upto and including 25 MW
1+F1+F2+F3		1.40	1.40
CC_0 (Rs. lakh/MW)	Capital Cost for the Base Year	605.28	550.70
$P\&M_0$ (Rs. lakh/MW)	Plant and Machinery Cost for the Base Year Capital Cost	432.34	393.36
$P\&M_n$ (Rs. lakh/MW)	Plant & Machinery Cost for the nth Year (FY 2019-20)	454.29	413.23
CC_n(Rs. lakh/MW)	**Capital Cost for the nth Year (FY 2019-20)**	**636.01**	**578.66**

3.4. DEBT-EQUITY RATIO

In accordance with Regulation 14.1, the debt and equity components for SHPs with capacities above 1 MW and up to and including 5 MW work out to Rs. 445.20 lakh per MW and Rs. 190.80 lakh per MW (i.e., 70% and 30% of the Capital Cost), respectively. For Projects of capacities above 5 MW and lower than or equal to 25 MW, the debt and equity components work out to Rs. 405.06 lakh per MW and Rs. 173.60 lakh per MW, respectively.

3.5. RETURN ON EQUITY

In accordance with Regulation 17.2, the RoE works out as shown in the Table below:

Particulars	> 1 MW and up to and including 5 MW	> 5 MW and up to and including 25 MW
Opening Equity (in Rs lakh per MW)	190.80	173.60
Return on Equity for the first 10 years @16% grossing up with MAT rate of 21.55% (Rs lakh per MW)	38.91	35.40
Return on Equity after first 10 years @16% grossing up with Income Tax rate of 29.12% (Rs lakh per MW)	43.07	39.19

Grossing up of the RoE is done as per the Formula: RoE (%) / [1- Tax Rate (%)]

3.6. INTEREST ON LOAN

The interest rate of 11.31% has been taken for SHPs with capacities above 1 MW and up to and including 5 MW, with a gross opening loan amount of Rs. 445.20 lakh per MW; and for SHPs above 5 MW and lower than or equal to 25 MW, with a gross opening loan amount of Rs. 405.06 lakh per MW in the applicable period of this Order.

3.7. DEPRECIATION

In accordance with Regulation 16.2, the depreciation for SHPs will be charged at 5.83% for the first 12 years and at 0.87% thereafter for the remaining Useful Life of 23 years.

3.8. INTEREST ON WORKING CAPITAL

Regulation 18.1 of the RE Tariff Regulations provides for computation of the working capital requirements of SHPs as follows:

> *"(a) O & M expenses for one month;*
>
> *(b) Receivables equivalent to two months of Tariff for sale of electricity calculated on the normative CUF;*
>
> *(c) Maintenance spares @ 15% of O & M expenses."*

The IoWC is taken as 11.81 % for computation of the Tariff for SHPs for FY 2019-20.

3.9. OPERATION AND MAINTENANCE EXPENSES

Regulation 34.1 provides for the normative O&M Expenses for SHPs for FY 2015-16 (Base Year), in accordance with which the following normative O&M expenses have been considered for the Base Year:

Project Size	O&M Expense Norm	O&M Expenses (Rs. lakh/MW)
> 1 MW and upto and including 5 MW	3.60% of the Capital Cost	21.79
> 5 MW and upto and including 25 MW	2.80% of the Capital Cost.	15.42

These O&M Expenses are escalated by 2.96% for FY 2016-17 and further escalated at of 4.85% for FY 2017-18. For FY 2018-19, O&M expense was escalated at 4.26% per annum. From FY 2019-20 onwards, O&M expense is escalated at 2.63% per annum as explained in section 1.3.7 and the Commission has applied the O&M expense norm for SHPs for FY 2019-20 as shown in the Table below:

Project Size	O&M Expenses (Rs. lakh/MW) for FY 2019-20
> 1 MW and upto and including 5 MW	25.17
> 5 MW and upto and including 25 MW	17.81

3.10. CAPACITY UTILISATION FACTOR

In accordance with Regulation 32, a CUF of 30% has been applied for determination of Tariff for SHPs.

3.11. AUXILIARY POWER CONSUMPTION

In accordance with Regulation 33, a Normative Auxiliary Consumption of 1.0% has been considered for determination of Tariff.

3.12. TARIFF MARK-UP FOR MINI/MICRO HYDRO PROJECTS

The RE Tariff Regulations provide for a higher Tariff for Mini/Micro Hydro Projects than for other SHPs, as below:

> *"35.1 The Tariff for Mini Hydro Power Projects of capacity of 1 MW and less but more than 500 kW, shall be higher by Rs 0.50 per kWh than that applicable to Small Hydro Power Projects with installed capacity of 5 MW or less, but more than 1 MW.*
>
> *35.2 The Tariff for Micro Hydro Power Projects of a capacity of 500 kW and below shall be higher by Rs. 1.00 per kWh than that Tariff applicable to Small Hydro Power Projects with installed capacity of 5 MW or less but more than 1 MW."*

Accordingly, the Commission has determined a higher Tariff for Mini/Micro Hydro Projects which is higher by 50 paise and Re. 1 per kWh, respectively, than for other SHPs. However, Tariff for mini and micro hydro projects can also be determined by way of project specific Tariff as mentioned in RE Order for FY 2018-19 in Case No. 204 of 2018. The Commission has given following Ruling regarding Tariff determination of mini & micro hydro projects:

"However the Commission notes that the issue of Tariff for Mini/Micro power plants based on the actual capital cost is still remains unaddressed. This is more so important in light of the submission of Shri Vartak that he has identified 5 Mini/Micro HEPs in Maharashtra for application of technologies designed by him which may reduce capital costs. In view of foregoing (that too after eight years) the Commission notes that the latest technological development in the Mini and Micro Hydro power plants has to be taken into account and it is appropriate now that a benchmark capital cost and corresponding Tariff has to be fixed for Mini and Micro hydro projects in Maharashtra. Therefore the Commission in exercise of its powers under Regulation 82 "Power to remove difficulties" of RE Tariff Regulations rules that the existing and future developers of Mini and Micro Hydro Power plants in the State of Maharashtra may approach the Commission through a separate Petition for determination of its capital cost and corresponding project specific Tariff for their Mini and Micro Hydro power plants. The Commission may take an appropriate view on such Petitions which may require a due process of public consultation."

3.13. GENERIC TARIFF FOR SMALL HYDRO PROJECTS

Considering the above parameters and the discount factor of 10.41% for levelisation of Tariff for SHPs, Tariffs during the applicable period of this Order for SHPs commissioned from 1 April, 2019 to 31 March, 2020 have been determined as under:

Tariff for Mini/Micro Hydro Projects and other SHPs

Type of SHP	Tariff Period (Years)	Levelised Tariff from 1 April, 2019 to 31 March, 2020	Benefit of Accelerated Depreciation (if availed)	Net Levelised Tariff (upon adjusting for accelerated depreciation benefit, if availed)
		(Rs/kWh)	(Rs/kWh)	(Rs/kWh)
Mini and Micro Hydro Projects				
500 kW and below	35	5.82	0.32	5.50
Above 500 kW and up to and including 1 MW	35	5.32	0.32	5.00
Other SHPs				
Above 1 MW and up to and including 5 MW	35	4.82	0.32	4.50
Above 5 MW and upto and including 25 MW	13	4.13	0.29	3.84

Notes:

- Detailed computations of Tariffs for SHPs of 1 MW to 5 MW and for SHPs of 5 MW to 25 MW are provided in Annexures 1A and 1B of this Order, respectively.

No Tariff is adopted for hydro power projects (including mini/micro) through competitive bidding. If, during FY 2019-20, Distribution Licensee conducts competitive bidding for such RE Technology and Tariff is adopted by the Commission, then such competitively discovered Tariff shall be Generic Tariff for remaining period of FY 2019-20. Thereafter, conditions mentioned at para 1.1(a) will become applicable.

4. BIOMASS-BASED POWER PROJECTS

No competitive bidding is carried out in the State of Maharashtra for power procurement from biomass power projects. Therefore, as mentioned in Para 1.1, Generic Tariff will be computed as per Financial Principles and Technology-specific parameters in RE Tariff Regulations, 2015 as detailed in this Chapter.

4.1. KEY PROVISIONS OF RE TARIFF REGULATIONS

Chapter 5 of the RE Tariff Regulations specifies the technology-specific norms for determination of Tariff for Biomass-based Power Projects based on Rankine Cycle technology applications using water-cooled condensers, as below:

> *"37.1 The Capital Cost and performance norms as specified in this Chapter shall be applicable only to new Biomass-based Power Projects commissioned after notification of these Regulations.*
>
> *37.2 The fuel-related aspects specified in Regulations 44 to 50 shall be applicable to both existing and new Biomass-based Power Projects;*

Provided that the norms in respect of SHR and Auxiliary Consumption factor for existing Biomass-based Power Projects shall be as stipulated in the respective RE Tariff Orders referred to in Regulation 3.2."

Regulation 49 specifies the Biomass fuel price as Rs. 3987 /MT during the first year of the Review Period, i.e., FY 2015-16, escalated for each subsequent year as per the indexation mechanism specified in Regulation 50. Regulation 50.1 reads as follows:

"50.1 In the case of both existing and new Biomass-based Power Projects, the following indexing mechanism for adjustment of fuel prices for each year of operation will be applicable for determination of the variable charge component of Tariff:

The Variable Charge for the nth year shall be computed as under:

$VC_n = VC_1 x (P_n / P_1)$

where,

VC_1 represents the Variable Charge based on Biomass Price P1 for FY 2015-16 as specified under Regulation 49, and shall be determined as under:

$$VC1 = \frac{Station\ Heat\ Rate\ (SHR)}{Gross\ Calorific\ Value\ (GCV)}\ x \frac{1}{(1 - Auxiliary\ Consumption\ Factor)} x \frac{P1}{1000}$$

$P_{(n)}$ = Price per tonne of biomass for the n^{th} year to be considered for Tariff determination

$P_{(n-1)}$ = Price per tonne of biomass for the $(n-1)^{th}$ year to be considered for Tariff determination. P_1 shall be the Biomass price for FY 2015-16 as specified under Regulation 49."

The Biomass fuel price shall be revised by the Commission taking into consideration the Biomass fuel price determined by the Central Commission or a normative escalation factor of 5% per annum, as it may consider appropriate."

Accordingly, in case of Biomass-based Power Projects commissioned on or before 31 March, 2020, the Variable Charge component of the Tariff for FY 2019-20 shall be determined as outlined in para 4.14 of this Order. The Fixed Charge component shall continue to be governed by the relevant RE Tariff Orders of the Commission.

4.2. CAPITAL COST OF BIOMASS-BASED POWER PROJECTS

Regulation 38 specifies the normative Capital Cost for Biomass-based Power Projects based on Rankine Cycle technology as Rs. 494.32 lakh per MW for FY 2015-16 (Base Year). This Base Year Cost has been revised as per the indexation mechanism of the CERC RE Tariff Regulations, as stipulated in Regulation 39 of the Commission's Regulations. The computation steps are as shown in para. 3.3 of this Order. The normative Capital Cost for FY 2019-20 computed accordingly is shown in the Table below.

Parameter	Description	Cost
1+F1+F2+F3		1.33

Parameter	Description	Cost
CC_0	Capital Cost for the Base Year (Rs. lakh/MW)	494.32
$P\&M_0$	Plant & Machinery Cost for the Base Year Capital Cost (Rs. lakh/MW)	371.67
Dn	Capital Cost Escalation Factor	5.58%
$P\&M_n$	Plant & Machinery Cost for the nth Year (FY 2019-20) (Rs. lakh/MW)	392.41
CC_n	**Capital Cost for the nth Year (FY2019-20) (Rs. lakh/MW)**	**521.91**

4.3. DEBT-EQUITY RATIO

In accordance with Regulation 14.1, the debt and equity components for Biomass-based Power Projects to be commissioned in FY 2019-20 work out to Rs. 365.33 lakh per MW and Rs. 156.57 lakh per MW respectively.

4.4. RETURN ON EQUITY

In accordance with Regulation 17.2, the RoE is as shown in the Table below:

Particulars	Amount (Rs. lakh/MW)
Opening Equity	156.57
Return on Equity for the first 10 years @16% grossing up with MAT rate of 21.55%	31.93
Return on Equity after first 10 years @16% grossing up with Income Tax rate of 29.12%	35.34

Grossing up of the RoE is done as per the Formula: RoE (%) / [1- Tax Rate (%)]

4.5. INTEREST ON LOAN

The interest rate of 11.31% has been considered for Biomass-based Power Projects commissioned in FY 2019-20, with a gross opening loan amount of Rs. 365.33 lakh per MW.

4.6. DEPRECIATION

In accordance with Regulation 16.2, depreciation will be charged at 5.83% for the first 12 years, and at 2.50% thereafter for the remaining Useful Life of 8 years.

4.7. INTEREST ON WORKING CAPITAL

Regulation 18.2 provides for computation of the working capital requirements of Biomass-based Power Projects as under:

"(a) Fuel costs for four months equivalent to normative Plant Load Factor(PLF);

(b) O & M expenses for one month;

(c) Receivables equivalent to two months of fixed and variable charges for sale of electricity calculated on the target PLF;

(d) Maintenance spares @ 15% of O & M expenses"

IoWC is taken as 11.81 % for computation of the Tariff of Biomass Power Projects for FY 2019-20.

4.8. PLANT LOAD FACTOR

In accordance with Regulation 40.1 of the RE Tariff Regulations, the Plant Load Factor (PLF) for determining the Fixed Charge component of the Tariff for Biomass-based Power Projects will be as follows:

a) During stabilisation: 60%
b) During the remaining period of the first year (after stabilisation): 70%
c) From 2nd Year onwards: 80%.

4.9. AUXILIARY POWER CONSUMPTION

In accordance with Regulation 41, a Normative Auxiliary Consumption of 10.0% has been considered.

4.10. STATION HEAT RATE

In accordance with Regulation 42, the Normative SHR of 4200 kcal/kWh has been considered for determination of Tariff.

4.11. OPERATION AND MAINTENANCE EXPENSES

Regulation 43.1 specifies the normative O&M Expenses for Biomass-based Power Projects for FY 2015-16 (Base Year) as 5.32% of the Capital Cost. This works out to Rs. 26.30 lakh per MW, which is to be escalated at 2.96% for the second year FY 2016-17, and further escalated by 4.85% for FY 2017-18 as per the RE Tariff Orders for FY 2016-17 and FY 2017-18 respectively. For FY 2018-19, O&M expense was escalated at 4.27% per annum as per the RE Tariff Order for FY 2018-19. From FY 2019-20 onwards, O&M expense is escalated at 2.63% per annum as explained in section 1.3.7. Accordingly, the Commission has taken the O&M expense norm for Biomass Projects for FY 2019-20 as Rs. 30.38 lakh per MW.

4.12. CALORIFIC VALUE

In accordance with Regulation 48, the average Calorific Value of the Biomass Fuel (s) of 3,611 kcal/kg has been considered for determination of Tariff.

4.13. FUEL COST

Regulation 50.1 provides for revision of Biomass fuel price as below:

"the Biomass fuel price shall be revised by the Commission taking into consideration the Biomass fuel price determined by the Central Commission or a normative escalation factor of 5% per annum, as it may consider appropriate."

The Commission had escalated fuel price of FY 2018-19 of Rs. 4,091.02/MT by 5% per annum to arrive at fuel price of Rs. 4,295.57/MT for FY 2019-20.
Considering this Fuel Cost, the Commission has computed the Variable Charge as Rs. 5.55/kWh in accordance with Regulation 50.1, considering GCV as 3,611 kCal/kg, SHR as 4200 kCal/kWh and Auxiliary Consumption as 10%.

4.14. VARIABLE CHARGE FOR BIOMASS-BASED POWER PROJECTS COMMISSIONED PRIOR TO 1 APRIL, 2019

As per Regulation 37.2, the fuel-related aspects specified in Regulations 44 to 50 shall be applicable to both existing and new Biomass-based Power Projects, except for the SHR and Auxiliary Consumption norms which shall be as stipulated in the respective RE Tariff Orders referred to in Regulation 3.2. Accordingly, the norms in respect of Fuel Price and GCV shall be applicable to existing Projects as per Regulations 48, 49 and 50. Further, as detailed in para. 1.18 of the Generic RE Tariff Order in Case No. 135 of 2015, the SHR for existing Projects has been considered the same as that for new Projects, i.e. 4200 kcal/kWh. The Auxiliary Consumption Factor for existing Projects commissioned prior to 1 April, 2019 shall be as stipulated in the respective Tariff Orders (i.e., 10%). Based on these parameters, the variable cost of the Projects commissioned before 1 April, 2019 works out to Rs 5.55/kWh.

The Fixed Charge component for Biomass-based Power Projects commissioned prior to 1 April, 2019 shall be the levelised Fixed Charge approved under the respective RE Tariff Orders.

4.15. GENERIC TARIFF FOR BIOMASS-BASED POWER PROJECTS FOR FY 2019-20

Considering the above parameters and the discount factor of 10.41% (as computed at para 1.3.6 of this Order) for levelisation of Tariff, the 'Generic Tariffs' for Biomass-based Power Projects for FY 2019-20 have been determined as in the Table below:

Tariff for Biomass based Projects

Date of Commissioning of Project	Fixed Charge (Rs/kWh)	Variable Charge (Rs/kWh)	Tariff from 1 April, 2019 to 31 March, 2020 (Rs/kWh)	Benefit of Accelerated Depreciation (if availed) (Rs/kWh)	Net Levelised Tariff (upon adjusting for accelerated depreciation benefit, if availed) (Rs/kWh)
During FY 2019-20	2.28	5.55	7.83	0.15	7.68
During FY 2018-19	2.15^^	5.55	7.70	0.14	7.56
During FY 2017-18	2.20^	5.55	7.75	0.16	7.59
During FY 2016-17	2.25***	5.55	7.80	0.17	7.63

Date of Commissioning of Project	Fixed Charge (Rs/kWh)	Variable Charge (Rs/kWh)	Tariff from 1 April, 2019 to 31 March, 2020 (Rs/kWh)	Benefit of Accelerated Depreciation (if availed) (Rs/kWh)	Net Levelised Tariff (upon adjusting for accelerated depreciation benefit, if availed) (Rs/kWh)
During FY 2015-16 (10 November, 2015 to 31 March, 2016)	2.35@	5.55	7.90	0.16	7.74
During FY 2015-16 (1 April to 9 November, 2015)	2.27*	5.55	7.82	0.22	7.60
During FY 2014-15	2.27*	5.55	7.82	0.22	7.60
During FY 2013-14	2.17#	5.55	7.72	0.21	7.51
Prior to FY 2013-14	1.70**	5.55	7.25	0	7.25

^^ As per Order Dt 18 August 2018,, 2017 in Case No.208 of 2018 (from 1st August, 2018 to 31st March, 2019)

^ As per Order Dt 28 April, 2017 in Case No. 33 of 2017 (from 1st April, 2017 to 31st March, 2018)

**** As per Order Dt 29 April, 2016 in Case No. 45 of 2016 (from 1st April, 2016 to 31st March, 2017)*

@ As per Order dt 25 January, 2016 in Case No 135 of 2015 (from 10 November, 2015 to 31 March, 2016)

** As per Order dt 7 July, 2014 in Case No. 100 of 2014(extended till 31 Dec 2015)*

 # As per Order dt 22 March, 2013 in Case No. 6 of 2013

***Considering first year of operation as per Order dt 8 August, 2005 in Case Nos. 37 of 2003 and 83 of 2008.*

The detailed computations of Tariff for FY 2019-20 for Biomass-based Power Projects are provided in Annexure 2 of this Order.

The Tariff Rate comprises (i) Fixed Charge component, and (ii) Variable Charge component, and shall be applicable for sale of power by Rankine Cycle-based Projects to Distribution Licensees in Maharashtra in FY 2019-20.

No Tariff is adopted for Biomass power projects through competitive bidding. If, during FY 2019-20, Distribution Licensee conducts competitive bidding for such RE Technology and Tariff is adopted by the Commission, then such competitively discovered Tariff shall be Generic Tariff for remaining period of FY 2019-20. Thereafter, conditions mentioned at para 1.1(a) will become applicable.

5. NON-FOSSIL FUEL-BASED CO-GENERATION PROJECTS

The Commission notes that Distribution Licensee in Maharashtra i.e. Maharashtra State Electricity Distribution Co. Ltd. (MSEDCL) has successfully conducted competitive bidding for procurement of power from Non-Fossil Fuel based Co-generation Projects and the Commission vide its Order in Case No. 165 of 2018 dated 30 June, 2018 has adopted rate discovered through competitive bidding. Hence, as per para 1.1 (a) mentioned above, the Commission is not determining Generic Tariff applicable for Non-Fossil Fuel based Co-generation Projects commissioning in FY 2019-20.

As mentioned in proviso to para 1.1 (a), for Non-Fossil Fuel based Co-generation Projects which cannot participate in competitive bidding due to qualification criteria, Tariff which has been discovered in the latest competitive bidding and adopted by the Commission shall be used for signing of EPA. In absence of competitively discovered Tariff of concerned Distribution Licensee, Tariff discovered by other Distribution Licensee in the State shall be used for signing of EPA. Terms and Conditions of such EPA shall be identical to Terms and Conditions of such competitively bade EPA.

As of now, latest competitive bidding Tariff for Non-Fossil Fuel based Co-generation Projects adopted by the Commission is Rs 4.99/kWh for MSEDCL (Order dated 30 June, 2018 in Case No. 165 of 2018). Any subsequent Order of adoption of Tariff shall be considered at the time of signing of EPA.

5.1. TARIFF FOR NON-QUALIFYING NON-FOSSIL FUEL-BASED CO-GENERATION PLANTS

The Tariff of Non-Qualifying Non-Fossil Fuel-based Co-Generation Projects will be equivalent to the Average Power Purchase Cost (APPC) of the respective Distribution Licensees for FY 2019-20, in accordance with Regulation 67.

5.2. TARIFF FOR NON-FOSSIL FUEL-BASED CO-GENERATION PLANTS USING BIOMASS

Regulation 60.2 specifies that the fuel price for Non-Fossil Fuel-based Co-Generation Projects using biomass other than Bagasse will be the biomass prices specified under Regulation 49. Accordingly, the fuel cost for such Projects is considered as Rs. 4,295.57/MT as set out in para. 4.13 of this Order. The corresponding Calorific Value of biomass fuel (3611 kcal/kg) has been taken as set out in para. 4.12. Considering the Auxiliary Consumption and SHR applicable to Non-Fossil Fuel-based Co-Generation Projects set out in Regulation 56 and 57 of RE Tariff Regulations respectively, the Commission has computed the Variable Charge as Rs. 4.68/kWh for Non-Fossil Fuel-based Co-Generation Projects using biomass for FY 2019-20 (for the period for which such Projects are using biomass) as follows:

$$Variable\ Charge = \frac{\text{Station Heat Rate(SHR)}}{\text{Gross Calorific Value (GCV)}} \times \frac{1}{(1 - \text{Auxillary Consumption Factor})} \times \frac{\text{Price per tonne of Fuel}}{1000}$$

$$4.68 = \frac{3600}{3611} \times \frac{1}{(1 - 8.5\%)} \times \frac{4295.57}{1000}$$

The Project Entity shall, along with its monthly energy bill, furnish a monthly fuel procurement and fuel usage statement certified by a Chartered Accountant to the Distribution Licensee with whom an EPA has been entered into and to the State Nodal Agency (presently, MEDA) for monitoring the fossil and Non-Fossil fuel consumption as per Regulation 46. The State Nodal Agency shall verify the use of biomass other than Bagasse for applicability of the biomass fuel Tariff for Non-Fossil Fuel-based Co-Generation Projects using biomass. Before making payment of the monthly energy bills, the Distribution Licensees shall satisfy themselves about the monthly fuel procurement and fuel usage as per the statement certified by a Chartered Accountant and verified by the State Nodal Agency. The Distribution Licensees shall also submit an annual

consolidated report to the Commission, giving details of monthly fuel bills and fuel use statement for such Projects having EPAs with them.
Above Variable Charge is for existing Co-Generation Projects using Biomass as fuel. Fixed Charge for such Projects will be as per RE Generic Order for the year in which these plants have commissioned. For RE Projects commissioning in FY 2019-20, no such separate Variable Charge is determined by the Commission. Generic Tariff for Co-Generation Plants commissioning in FY 2019-20 will be as adopted by the Commission in this Chapter irrespective of fuel used.

6. SOLAR PHOTO VOLTAIC PROJECTS

The Commission notes that Distribution Licensee in Maharashtra i.e. Maharashtra State Electricity Distribution Co. Ltd. (MSEDCL) has successfully conducted competitive bidding for procurement of power from Solar PV Projects and the Commission vide its Order in Case No. 7 of 2019 dated 15 February, 2019 has adopted rate discovered through competitive bidding. Hence, as per para 1.1 (a) mentioned above, no Generic Tariff will be determined for Solar PV projects commissioning in FY 2019-20.

As mentioned in proviso to para 1.1 (a), for Solar PV Projects having capacity below the threshold limit for participating in competitive bidding process, Tariff which has been discovered in the latest competitive bidding and adopted by the Commission shall be used for signing of EPA. In absence of competitively discovered Tariff of concerned Distribution Licensee, Tariff discovered by other Distribution Licensee in the State shall be used for signing of EPA. Terms and Conditions of such EPA shall be identical to Terms and Conditions of such competitively bade EPA.

As of now latest competitive bidding Tariff for Solar PV Projects adopted by the Commission is Rs 3.29/kWh for MSEDCL (Order dated 15 February, 2019 in Case No. 7 of 2019). Any subsequent Order of adoption of Tariff shall be considered at the time of signing of EPA.

Note:

1) This Tariff is applicable for projects where cost of land & evacuation infrastructure is included in Capital Cost of RE Project and not provided free of cost by the power purchaser.
2) If no safeguard duty is paid by solar PV Project in spite of import from China & Malaysia, then Rs. 0.18/unit will be deducted from Generic Tariff towards impact of safeguard duty.

GENERIC TARIFF FOR SOLAR ROOF-TOP PV PROJECTS

The Solar Roof-top PV Projects covered in this Order under the RE Tariff Regulations, 2015 are distinct and separate from and do not include those covered under the MERC (Net Metering for Roof-top Solar PV Systems) Regulations, 2015.

Regulation 72 of the RE Tariff Regulations specifies that the Tariff for Solar Roof-top PV Projects shall be Rs 0.50 per kWh higher than that of other Solar PV Projects. Accordingly, the Tariff for such Projects commissioning during FY 2019-20 shall be Rs. 3.79/kWh.

Note:

- If no safeguard duty is paid by solar PV Project in spite of import from China & Malaysia, then Rs. 0.18/unit will be deducted from Generic Tariff towards impact of safeguard duty.

7. SOLAR THERMAL POWER PROJECTS

No competitive bidding is carried out in the State of Maharashtra for power procurement from solar thermal generation projects. Therefore, as mentioned in Para 1.1, Generic Tariff will be computed as per Financial Principles and Technology-specific parameters in RE Tariff Regulations, 2015 as detailed in this Chapter.

7.1. USEFUL LIFE

Regulation 2.1 (mm) defines the 'Useful Life' of a Unit of a Generating Station (including evacuation system) to mean the duration from the COD till such time as specified under the Regulations for such generation facility. The Useful Life specified for Solar Thermal Power Projects is 25 years.

7.2. CONTROL PERIOD

The Control Period for Solar Thermal Power Projects shall be in accordance with the relevant stipulations in para 1.2 of this Order.

7.3. TARIFF PERIOD

Regulation 7 specifies the Tariff Period for Solar PV Projects as 25 years. In terms of Regulation 7.5, the Tariff Period is reckoned from the COD of the RE Project, and the Tariff determined under the Regulations is applicable only for the duration of the Tariff Period.

7.4. CAPITAL COST OF SOLAR THERMAL POWER PROJECTS

Regulation 74 specifies the normative Capital Cost of a Solar Thermal Power Project for FY 2015-16 (Base Year) as Rs. 1200 lakh/MW. The CERC in its RE Tariff Regulations, 2017 has considered Solar Thermal Power Projects for Project-specific Tariff determination.

This Commission's RE Tariff Regulations do not specify the indexation mechanism for Solar Thermal Power Projects. No recent benchmark Capital Cost is available for consideration, and no specific suggestions have been received from Solar Thermal Power Project Developers in these proceedings. The Commission has taken the normative benchmark Capital Cost of Rs. 1,200 Lakhs/MW as specified in the RE Tariff Regulations for the base year for the Projects to be commissioned in FY 2019-20 also. However, Developers may also approach the Commission for Project-specific Tariff determination as provided in the RE Tariff Regulations.

7.5. DEBT-EQUITY RATIO

In accordance with Regulation 14.1, the normative debt and equity components for Solar Thermal Projects shall be Rs. 840 lakh per MW and Rs. 360 lakh per MW, respectively.

7.6. RETURN ON EQUITY

In accordance with Regulation 17.1, the RoE for such Projects works out as shown in the Table below:

Particulars	Amount (Rs. lakh/MW)
Opening Equity	360.00
Return on Equity for the first 10 years @16% grossing up with MAT rate of 21.55%	73.42
Return on Equity after first 10 years @16% grossing up with Income Tax rate of 29.12%	81.26

Grossing up of the RoE is done as per the Formula: RoE (%) / [1- Tax Rate (%)].

7.7. INTEREST ON LOAN

The interest rate of 11.31% has been considered for Solar Thermal Power Projects for a loan amount of Rs. 840.00 lakh per MW for FY 2019-20.

7.8. DEPRECIATION

In accordance with Regulation 16, Depreciation will be charged at 5.83% for the first 12 years, and at 1.54% thereafter for the remaining Useful Life of 13 years.

7.9. INTEREST ON WORKING CAPITAL

Regulation 18.1 provides for computation of the working capital requirements for Solar Thermal Power Projects as follows:

"a) O&M expenses for one month;

b) Receivables equivalent to two months of Tariff for sale of electricity calculated on the normative CUF;

c) Maintenance spares @ 15% of O&M expenses."

The IoWC is considered as 11.81% for computation of Tariff for FY 2019-20.

7.10. OPERATION AND MAINTENANCE EXPENSES

Regulation 76.1 specifies the normative O&M Expenses for Solar Thermal Power Projects for FY 2015-16 (Base Year) as Rs. 15 lakh per MW. These are to be escalated at 2.96% for the second year FY 2016-17 and further escalated at 4.85% for FY 2017-18. For FY 2018-19, O&M expense was escalated at 4.26% per annum. These escalation rates are as given in Tariff Orders for respective years. For FY 2019-20 onwards, O&M expense is escalated at 2.63% per annum as explained in section 1.3.7. Accordingly, the Commission has considered the O&M expenses for Solar Thermal Power Projects for FY 2019-20 as Rs. 17.33 lakh per MW.

7.11. CAPACITY UTILISATION FACTOR

In accordance with Regulation 75, CUF of 23% has been considered for determination of the Tariff for such Projects.

7.12. GENERIC TARIFF FOR SOLAR THERMAL POWER PROJECTS COMMISSIONED IN FY 2019-20

Considering the parameters discussed in the preceding paragraphs, the Generic Tariff for Solar Thermal Power Projects commissioned in FY 2019-20 has been determined as under:

Particulars	Tariff Period (Years)	Levelised Tariff	Benefit of Accelerated Depreciation (if availed)	Net Levelised Tariff (adjusting for Accelerated Depreciation benefit, if availed)
		(Rs/kWh)	(Rs/kWh)	(Rs/kWh)
Solar Thermal Power Projects	25	11.15	0.91	10.24

Note:

- This Tariff is applicable for projects where cost of land & evacuation infrastructure is included in Capital Cost of RE Project and not provided free of cost by the power purchaser.

The Tariff computations for FY 2019-20 are provided in Annexure 3 of this Order.

No Tariff is adopted for Solar Thermal power projects through competitive bidding. If, during FY 2019-20, Distribution Licensee conducts competitive bidding for such RE Technology and Tariff is adopted by the Commission, then such competitively discovered Tariff shall be Generic Tariff for remaining period of FY 2019-20. Thereafter, conditions mentioned at para 1.1(a) will become applicable.

The detailed computations of the Generic Tariff for various RE Technologies are set out in the following Annexures to this Order:

S.No.	RE Projects	Remark
1	**Small Hydro Power Projects**	
	SHP above 1MW and upto and including 5 MW	Annexure-1A
	SHP above 5 MW and upto and including 25 MW	Annexure-1B
2	**Biomass Power Projects**	Annexure-2
3	**Solar Projects**	
	Solar Thermal Power Projects	Annexure-3

(Mukesh Khullar)
Member

(I. M. Bohari)
Member

(Anand B. Kulkarni)
Chairperson

Form 1.1 Assumptions Parameters

Form 1.1 Assumptions Parameters Capacity

S. No.	Assumption Head	Sub-Head	Sub-Head (2)	Unit	<=5 MW
1	**Power Generation**				
		Capacity			
			Installed Power Generation Capacity	MW	1
			Capacity Utilization Factor	%	30%
			Auxilliary Consumption		1%
			Useful Life	Years	35
2	**Project Cost**				
		Capital Cost/MW	Power Plant Cost	Rs Lacs/MW	636.01
3	**Sources of Fund**				
			Tariff Period	Years	35
		Debt: Equity			
			Debt	%	70%
			Equity	%	30%
			Total Debt Amount	Rs Lacs	445.20
			Total Equity Amout	Rs Lacs	190.80
		Debt Component			
			Loan Amount	Rs Lacs	445.20
			Repayment Period(incld Moratorium)	years	12
			Interest Rate	%	11.31%
		Equity Component			
			Equity amount	Rs Lacs	190.80
			Return on Equity for first 10 years	% p.a	20.39%
			RoE Period	Year	10
			Return on Equity 11th year onwards	% p.a	22.57%
			Weighted average of ROE		21.95%
			Discount Rate		10.41%
4	**Financial Assumptions**				
		Fiscal Assumptions			
			Income Tax	%	29.120%
			MAT Rate (for first 10 years)	%	21.549%
		Depreciation			
			Depreciation Rate for first 12 years	%	5.83%
			Depreciation Rate 13th year onwards	%	0.87%
			Years for 5.83% rate		12
5	**Working Capital**				
		For Fixed Charges			
		O&M Charges		Months	1
		Maintenance Spare	(% of O&M exepenses)		15%
		Receivables for Debtors		Months	2
		For Variable Charges			0
		Interest On Working Capital		%	11.81%
6	**Operation & Maintenance**				
		power plant (FY16-17)		Rs Lakh	22.43
		power plant (FY17-18)			23.52
		power plant (FY18-19)			24.53
		power plant (FY19-20)		Rs Lakh	25.17
		Total O & M Expenses Escalation		%	2.63%

Form 1.2 Form Template for (Small Hydro Projects) : Determination of Tariff Component

Units 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	26	27	28	29	30	31	32	33	34	35
Installed Capacity	MW		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Net Generation	MU		2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60

Fixed Cost	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	26	27	28	29	30	31	32	33	34	35
O&M Expenses	Rs Lakh		25.17	25.83	26.51	27.21	27.92	28.66	29.41	30.18	30.97	31.79	32.62	33.48	34.36	35.26	36.19	37.14	38.12	39.12	40.14	41.20	42.28	43.39	44.53	45.70	46.90	48.13	49.40	50.70	52.03	53.39	54.80	56.24	57.71	59.23	60.79
Depreciation	Rs Lakh		37.08	37.08	37.08	37.08	37.08	37.08	37.08	37.08	37.08	37.08	37.08	37.08	5.54	5.54	5.54	5.54	5.54	5.54	5.54	5.54	5.54	5.54	5.54	5.54	5.54	5.54	5.54	5.54	5.54	5.54	5.54	5.54	5.54	5.54	5.54
Interest on term loan	Rs Lakh		48.26	44.06	39.86	35.67	31.47	27.28	23.08	18.88	14.69	10.49	6.29	2.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	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		3.16	3.18	3.20	3.22	3.24	3.26	3.28	3.30	3.32	3.35	3.37	3.39	3.42	3.44	3.47	3.49	3.52	3.55	3.58	3.61	3.64	3.67	3.70	3.73	3.76	3.80	3.83	3.87	3.90	3.94	3.98	4.02	4.06	4.10	4.15
Return on Equity	Rs Lakh		38.91	38.91	38.91	38.91	38.91	38.91	38.91	38.91	38.91	38.91	43.07	43.07	43.07	43.07	43.07	43.07	43.07	43.07	43.07	43.07	43.07	43.07	43.07	43.07	43.07	43.07	43.07	43.07	43.07	43.07	43.07	43.07	43.07	43.07	43.07
Total Fixed Cost	**Rs Lakh**		**152.58**	**149.07**	**145.57**	**142.09**	**138.63**	**135.18**	**131.76**	**128.36**	**124.98**	**121.62**	**122.44**	**119.12**	**86.39**	**87.32**	**88.27**	**89.25**	**90.25**	**91.28**	**92.33**	**93.42**	**94.53**	**95.67**	**96.84**	**98.04**	**99.28**	**100.54**	**101.84**	**103.18**	**104.54**	**105.95**	**107.39**	**108.87**	**110.39**	**111.94**	**113.54**
Per unit Fixed Cost	**Rs/kWh**		**5.86**	**5.73**	**5.60**	**5.46**	**5.33**	**5.20**	**5.06**	**4.93**	**4.80**	**4.67**	**4.71**	**4.58**	**3.32**	**3.36**	**3.39**	**3.43**	**3.47**	**3.51**	**3.55**	**3.59**	**3.63**	**3.68**	**3.72**	**3.77**	**3.82**	**3.86**	**3.91**	**3.97**	**4.02**	**4.07**	**4.13**	**4.18**	**4.24**	**4.30**	**4.36**

Levallised tariff corresponding to Useful life

Per Unit Cost of Generation	Unit	Levelise	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	26	27	28	29	30	31	32	33	34	35
O&M expn	Rs/kWh	**1.23**	0.97	0.99	1.02	1.05	1.07	1.10	1.13	1.16	1.19	1.22	1.25	1.29	1.32	1.36	1.39	1.43	1.47	1.50	1.54	1.58	1.63	1.67	1.71	1.76	1.80	1.85	1.90	1.95	2.00	2.05	2.11	2.16	2.22	2.28	2.34
Depreciation	Rs/kWh	**1.08**	1.43	1.43	1.43	1.43	1.43	1.43	1.43	1.43	1.43	1.43	1.43	1.43	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21
Int. on term loan	Rs/kWh	**0.83**	1.85	1.69	1.53	1.37	1.21	1.05	0.89	0.73	0.56	0.40	0.24	0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Int. on working capital	Rs/kWh	**0.13**	0.12	0.12	0.12	0.12	0.12	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.16	0.16	0.16
RoE	Rs/kWh	**1.55**	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	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
Total COG	**Rs/kWh**	**4.82**	**5.86**	**5.73**	**5.60**	**5.46**	**5.33**	**5.20**	**5.06**	**4.93**	**4.80**	**4.67**	**4.71**	**4.58**	**3.32**	**3.36**	**3.39**	**3.43**	**3.47**	**3.51**	**3.55**	**3.59**	**3.63**	**3.68**	**3.72**	**3.77**	**3.82**	**3.86**	**3.91**	**3.97**	**4.02**	**4.07**	**4.13**	**4.18**	**4.24**	**4.30**	**4.36**

Levellised Tariff	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	26	27	28	29	30	31	32	33	34	35
Discount Factor			1	0.91	0.82	0.74	0.67	0.61	0.55	0.50	0.45	0.41	0.37	0.34	0.30	0.28	0.25	0.23	0.21	0.19	0.17	0.15	0.14	0.12	0.11	0.10	0.09	0.08	0.08	0.07	0.06	0.06	0.05	0.05	0.04	0.04	0.03
Fixed Cost			125.51	125.51	125.51	125.51	125.51	125.51	125.51	125.51	125.51	125.51	125.51	125.51	125.51	125.51	125.51	125.51	125.51	125.51	125.51	125.51	125.51	125.51	125.51	125.51	125.51	125.51	125.51	125.51	125.51	125.51	125.51	125.51	125.51	125.51	125.51
Levellised Tariff	**4.82**	Rs/Unit																																			

Determination of Additional Depreciation for Small Hydro Power Projects

Depreciation amount	90%
Book Depreciation rate	5.28%
Tax Depreciation rate	40%
Additional Depreciation	20%
Income Tax (MAT)	21.549%
Income Tax (Normal Rates)	29.12%
Capital Cost	636.01

Years ---------->	Unit	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	26	27	28	29	30	31	32	33	34	35
Book Depreciation	%	5.28%	5.28%	5.28%	5.28%	5.28%	5.28%	5.28%	5.28%	5.28%	5.28%	5.28%	5.28%	5.28%	5.28%	5.28%	5.28%	5.28%	0.24%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Book Depreciation	Rs Lakh	33.58	33.58	33.58	33.58	33.58	33.58	33.58	33.58	33.58	33.58	33.58	33.58	33.58	33.58	33.58	33.58	33.58	1.53	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Accelerated Depreciation																																				
Opening	%	100%	40%	24%	14%	9%	5%	3%	2%	1%	1%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Allowed during the year	%	60.00%	16.00%	9.60%	5.76%	3.46%	2.07%	1.24%	0.75%	0.45%	0.27%	0.16%	0.10%	0.06%	0.03%	0.02%	0.01%	0.01%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Closing	%	40.0%	24.0%	14.4%	8.64%	5.18%	3.11%	1.87%	1.12%	0.67%	0.40%	0.24%	0.15%	0.09%	0.05%	0.03%	0.02%	0.01%	0.01%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Accelrated Depm.	Rs Lakh	381.60	101.76	61.06	36.63	21.98	13.19	7.91	4.75	2.85	1.71	1.03	0.62	0.37	0.22	0.13	0.08	0.05	0.03	0.02	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Net Depreciation Benefit	Rs Lakh	348.02	68.18	27.48	3.05	-11.60	-20.39	-25.67	-28.83	-30.73	-31.87	-32.56	-32.97	-33.21	-33.36	-33.45	-33.50	-33.53	-1.50	0.02	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tax Benefit	Rs Lakh	101.34	19.85	8.00	0.89	-3.38	-5.94	-7.47	-8.40	-8.95	-9.28	-9.48	-9.60	-9.67	-9.71	-9.74	-9.76	-9.76	-0.44	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Energy generation	MU	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60
Per unit benefit	Rs/Unit	3.90	0.76	0.31	0.03	-0.13	-0.23	-0.29	-0.32	-0.34	-0.36	-0.36	-0.37	-0.37	-0.37	-0.37	-0.37	-0.38	-0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Discounting Factor		1.00	0.91	0.82	0.74	0.67	0.61	0.55	0.50	0.45	0.41	0.37	0.34	0.30	0.28	0.25	0.23	0.21	0.19	0.17	0.15	0.14	0.12	0.11	0.10	0.09	0.08	0.08	0.07	0.06	0.06	0.05	0.05	0.04	0.04	0.03
Applicable Discounting Factor		1.00	0.95	0.86	0.78	0.71	0.64	0.58	0.53	0.48	0.43	0.39	0.35	0.32	0.29	0.26	0.24	0.22	0.20	0.18	0.16	0.14	0.13	0.12	0.11	0.10	0.09	0.08	0.07	0.07	0.06	0.05	0.05	0.04	0.04	0.04

Levellised benefit	**0.32**	**Rs/Unit**

Annexure – 1B
(SHP above 5 MW and upto and including 25 MW)

Form 1.1 Assumptions Parameters

Form 1.1 Assumptions Parameters

S. No.	Assumption Head	Sub-Head	Sub-Head (2)	Unit	Capacity up to 25 M
1	**Power Generation**				
		Capacity			
			Installed Power Generation Capacity	MW	1
			Capacity Utilization Factor	%	30%
			Auxilliary Consumption		1%
			Useful Life	Years	35
2	**Project Cost**				
		Capital Cost/MW	Power Plant Cost	Rs Lacs/MW	578.66
3	**Sources of Fund**				
			Tariff Period	Years	13
		Debt: Equity			
			Debt	%	70%
			Equity	%	30%
			Total Debt Amount	Rs Lacs	405.06
			Total Equity Amout	Rs Lacs	173.60
		Debt Component			
			Loan Amount	Rs Lacs	405.06
			Repayment Period(incld Moratorium)	years	12
			Interest Rate	%	11.31%
		Equity Component			
			Equity amount	Rs Lacs	173.60
			Return on Equity for first 10 years	% p.a	20.39%
			RoE Period	Year	10
			Return on Equity 11th year onwards	% p.a	22.57%
			Weighted average of ROE		21.95%
			Discount Rate		10.41%
4	**Financial Assumptions**				
		Fiscal Assumptions			
			Income Tax	%	29.120%
			MAT Rate (for first 10 years)	%	21.549%
		Depreciation			
			Depreciation Rate for first 12 years	%	5.83%
			Depreciation Rate 13th year onwards	%	0.87%
			Years for 5.83% rate		12
5	**Working Capital**				
		For Fixed Charges			
		O&M Charges		Months	1
		Maintenance Spare	(% of O&M exepenses)		15%
		Receivables for Debtors		Months	2
		For Variable Charges			0
		Interest On Working Capital		%	11.81%
6	**Operation & Maintenance**				
		power plant (FY16-17)		Rs Lakh	15.88
		power plant (FY17-18)			16.65
		power plant (FY18-19)			17.36
		power plant (FY19-20)		Rs Lakh	17.81
		Total O & M Expenses Escalation		%	2.63%

Form 1.2 Form Template for (Small Hydro Projects) : Determination of Tariff Component

Units 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	26	27	28	29	30	31	32	33	34	35
Installed Capacity	MW		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Net Generation	MU		2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60

Fixed Cost	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	26	27	28	29	30	31	32	33	34	35
O&M Expenses	Rs Lakh		17.81	18.28	18.76	19.25	19.76	20.28	20.81	21.36	21.92	22.50	23.09	23.69	24.32	24.95	25.61	26.28	26.97	27.68	28.41	29.15	29.92	30.71	31.51	32.34	33.19	34.06	34.96	35.88	36.82	37.79	38.78	39.80	40.84	41.92	43.02
Depreciation	Rs Lakh		33.74	33.74	33.74	33.74	33.74	33.74	33.74	33.74	33.74	33.74	33.74	33.74	5.04	5.04	5.04	5.04	5.04	5.04	5.04	5.04	5.04	5.04	5.04	5.04	5.04	5.04	5.04	5.04	5.04	5.04	5.04	5.04	5.04	5.04	5.04
Interest on term loan	Rs Lakh		43.90	40.09	36.27	32.45	28.63	24.82	21.00	17.18	13.36	9.54	5.73	1.91	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Interest on working Capital	Rs Lakh		2.60	2.62	2.63	2.64	2.66	2.67	2.69	2.70	2.72	2.73	2.75	2.77	2.78	2.80	2.82	2.84	2.86	2.88	2.90	2.92	2.94	2.96	2.98	3.01	3.03	3.05	3.08	3.10	3.13	3.16	3.18	3.21	3.24	3.27	3.30
Return on Equity	Rs Lakh		35.40	35.40	35.40	35.40	35.40	35.40	35.40	35.40	35.40	35.40	39.19	39.19	39.19	39.19	39.19	39.19	39.19	39.19	39.19	39.19	39.19	39.19	39.19	39.19	39.19	39.19	39.19	39.19	39.19	39.19	39.19	39.19	39.19	39.19	39.19
Total Fixed Cost	**Rs Lakh**		**133.46**	**130.13**	**126.80**	**123.49**	**120.19**	**116.91**	**113.64**	**110.38**	**107.14**	**103.91**	**104.49**	**101.29**	**71.33**	**71.98**	**72.66**	**73.35**	**74.06**	**74.79**	**75.53**	**76.30**	**77.09**	**77.90**	**78.72**	**79.57**	**80.45**	**81.34**	**82.26**	**83.21**	**84.18**	**85.17**	**86.19**	**87.24**	**88.31**	**89.41**	**90.54**
Per unit Fixed Cost	**Rs/kWh**		**5.13**	**5.00**	**4.87**	**4.75**	**4.62**	**4.49**	**4.37**	**4.24**	**4.12**	**3.99**	**4.02**	**3.89**	**2.74**	**2.77**	**2.79**	**2.82**	**2.85**	**2.87**	**2.90**	**2.93**	**2.96**	**2.99**	**3.03**	**3.06**	**3.09**	**3.13**	**3.16**	**3.20**	**3.24**	**3.27**	**3.31**	**3.35**	**3.39**	**3.44**	**3.48**

Levallised tariff corresponding to Useful life

Per Unit Cost of Generation	Unit	Levelise	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	26	27	28	29	30	31	32	33	34	35
O&M expn	Rs/kWh	**0.87**	0.68	0.70	0.72	0.74	0.76	0.78	0.80	0.82	0.84	0.86	0.89	0.91	0.93	0.96	0.98	1.01	1.04	1.06	1.09	1.12	1.15	1.18	1.21	1.24	1.28	1.31	1.34	1.38	1.42	1.45	1.49	1.53	1.57	1.61	1.65
Depreciation	Rs/kWh	**0.99**	1.30	1.30	1.30	1.30	1.30	1.30	1.30	1.30	1.30	1.30	1.30	1.30	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19
Int. on term loan	Rs/kWh	**0.75**	1.69	1.54	1.39	1.25	1.10	0.95	0.81	0.66	0.51	0.37	0.22	0.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Int. on working capital	Rs/kWh	**0.11**	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.13	0.13
RoE	Rs/kWh	**1.41**	1.36	1.36	1.36	1.36	1.36	1.36	1.36	1.36	1.36	1.36	1.51	1.51	1.51	1.51	1.51	1.51	1.51	1.51	1.51	1.51	1.51	1.51	1.51	1.51	1.51	1.51	1.51	1.51	1.51	1.51	1.51	1.51	1.51	1.51	1.51
Total COG	**Rs/kWh**	**4.13**	**5.13**	**5.00**	**4.87**	**4.75**	**4.62**	**4.49**	**4.37**	**4.24**	**4.12**	**3.99**	**4.02**	**3.89**	**2.74**	**2.77**	**2.79**	**2.82**	**2.85**	**2.87**	**2.90**	**2.93**	**2.96**	**2.99**	**3.03**	**3.06**	**3.09**	**3.13**	**3.16**	**3.20**	**3.24**	**3.27**	**3.31**	**3.35**	**3.39**	**3.44**	**3.48**

Levellised Tariff	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	26	27	28	29	30	31	32	33	34	35
Discount Factor			1	0.91	0.82	0.74	0.67	0.61	0.55	0.50	0.45	0.41	0.37	0.34	0.30	0.28	0.25	0.23	0.21	0.19	0.17	0.15	0.14	0.12	0.11	0.10	0.09	0.08	0.08	0.07	0.06	0.06	0.05	0.05	0.04	0.04	0.03
Fixed Cost			107.40	107.40	107.40	107.40	107.40	107.40	107.40	107.40	107.40	107.40	107.40	107.40	107.40	107.40	107.40	107.40	107.40	107.40	107.40	107.40	107.40	107.40	107.40	107.40	107.40	107.40	107.40	107.40	107.40	107.40	107.40	107.40	107.40	107.40	107.40
Levellised Tariff	**4.13**	Rs/Unit																																			

Determination of Additional Depreciation for Small Hydro Power Projects

Depreciation amount	90%
Book Depreciation rate	5.28%
Tax Depreciation rate	40%
Additional Depreciation	20%
Income Tax (MAT)	21.549%
Income Tax (Normal Rates)	29.12%
Capital Cost	578.66

Years ---------->	Unit	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	26	27	28	29	30	31	32	33	34	35
Book Depreciation	%	5.28%	5.28%	5.28%	5.28%	5.28%	5.28%	5.28%	5.28%	5.28%	5.28%	5.28%	5.28%	5.28%	5.28%	5.28%	5.28%	5.28%	0.24%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Book Depreciation	Rs Lakh	30.55	30.55	30.55	30.55	30.55	30.55	30.55	30.55	30.55	30.55	30.55	30.55	30.55	30.55	30.55	30.55	30.55	1.39	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Accelerated Depreciation																																				
Opening	%	100%	40%	24%	14%	9%	5%	3%	2%	1%	1%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Allowed during the year	%	60.00%	16.00%	9.60%	5.76%	3.46%	2.07%	1.24%	0.75%	0.45%	0.27%	0.16%	0.10%	0.06%	0.03%	0.02%	0.01%	0.01%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Closing	%	40.0%	24.0%	14.4%	8.64%	5.18%	3.11%	1.87%	1.12%	0.67%	0.40%	0.24%	0.15%	0.09%	0.05%	0.03%	0.02%	0.01%	0.01%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Accelrated Deprn.	Rs Lakh	347.19	92.58	55.55	33.33	20.00	12.00	7.20	4.32	2.59	1.56	0.93	0.56	0.34	0.20	0.12	0.07	0.04	0.03	0.02	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Net Depreciation Benefit	Rs Lakh	316.64	62.03	25.00	2.78	-10.55	-18.55	-23.35	-26.23	-27.96	-29.00	-29.62	-29.99	-30.22	-30.35	-30.43	-30.48	-30.51	-1.36	0.02	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tax Benefit	Rs Lakh	92.21	18.06	7.28	0.81	-3.07	-5.40	-6.80	-7.64	-8.14	-8.44	-8.63	-8.73	-8.80	-8.84	-8.86	-8.88	-8.88	-0.40	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Energy generation	MU	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60
Per unit benefit	Rs/Unit	3.54	0.69	0.28	0.03	-0.12	-0.21	-0.26	-0.29	-0.31	-0.32	-0.33	-0.34	-0.34	-0.34	-0.34	-0.34	-0.34	-0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Discounting Factor		1.00	0.91	0.82	0.74	0.67	0.61	0.55	0.50	0.45	0.41	0.37	0.34	0.30	0.28	0.25	0.23	0.21	0.19	0.17	0.15	0.14	0.12	0.11	0.10	0.09	0.08	0.08	0.07	0.06	0.06	0.05	0.05	0.04	0.04	0.03
Applicable Discounting Factor		1.00	0.95	0.86	0.78	0.71	0.64	0.58	0.53	0.48	0.43	0.39	0.35	0.32	0.29	0.26	0.24	0.22	0.20	0.18	0.16	0.14	0.13	0.12	0.11	0.10	0.09	0.08	0.07	0.07	0.06	0.05	0.05	0.04	0.04	0.04

Levellised benefit	**0.29**	**Rs/Unit**

Form 1.1 Assumptions Parameters

2.1 Form Template for Biomass Power Projects- Other

S. No.	Assumption Head	Sub-Head	Sub-Head (2)	Unit	MERC
1	**Power Generation**				
		Capacity			
			Installed Power Generation Capacity	MW	1
			Auxillary Consumption during stablisation	%	10%
			Auxillary Consumption after stabilisation	%	10%
			PLF(Stablization for 6 months)	%	60%
			PLF(during first year after Stablization)	%	70%
			PLF(second year onwards)	%	80%
			Useful Life	Years	20.00
			Tariff Period	Years	13
2	**Project Cost**				
		Capital Cost/MW	Power Plant Cost	Rs Lacs/MW	521.91
3	**Financial Assumptions**				
		Debt: Equity			
			Debt	%	70%
			Equity	%	30%
			Total Debt Amount	Rs Lacs	365.33
			Total Equity Amout	Rs Lacs	156.57
		Debt Component			
			Loan Amount	Rs Lacs	365.33
			Moratorium Period	years	0
			Repayment Period(incld Moratorium)	years	12
			Interest Rate	%	11.31%
		Equity Component			
			Equity amount	Rs Lacs	156.57
			Return on Equity for first 10 years	% p.a	20.39%
			RoE Period	Year	10
			Return on Equity after 10 years		22.57%
			Weighted average of ROE		21.48%
			Discount Rate (equiv. to WACC)		10.41%
4	**Financial Assumptions**				
		Fiscal Assumptions			
			Income Tax	%	29.12%
			MAT Rate (for first 10 years)	%	21.55%
		Depreciation			
			Depreciation Rate(power plant)	%	5.83%
			Depreciation Rate 13th year onwards	%	2.505%
			Years for 5.83% depreciation rate		12
5	**Working Capital**				
		For Fixed Charges			
		O&M Charges		Months	1
		Maintenance Spare	(% of O&M exepenses)		15%
		Receivables for Debtors		Months	2
		For Variable Charges			
		Biomass Stock		Months	4
		Interest On Working Capital		%	11.81%
6	**Fuel Related Assumptions**				
		Heat Rate	During/After Stabilisation period	Kcal/kwh	4200
			During Stablization Period	Kcal/kwh	4200
		Biomass			
			Base Price(FY15-16)	Rs/T	3987
			GCV - Biomass	Kcal/kg	3611
			Biomass Price Escalation Factor		5%
			Price (FY 19-20)	Rs/T	4295.57
7	**O & M**	power plant (FY15-16)		Rs Lakh	26.30
		power plant (FY16-17)		Rs Lakh	27.08
		power plant (FY17-18)		Rs Lakh	28.39
		power plant (FY18-19)		Rs Lakh	29.60
		power plant (FY 2019-20)		Rs Lakh	30.38
		Total O & M Expenses Escalation		%	2.63%
8	**Generation and Sale Of Energy**				
		Working Hours/Day		Hrs	24
		No. of Days		Days	365
		Total No. of Hours		Hrs	8760

2.2 Form Template for (Biomass Power Projects) : Determination of Tariff Component

Units Generation	Unit	Year--->	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Installed Capacity	MW		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Gross Generation	MU		5.69	7.01	7.01	7.01	7.01	7.01	7.01	7.01	7.01	7.01	7.01	7.01	7.01	7.01	7.01	7.01	7.01	7.01	7.01	7.01
Auxiliary Consumption	MU		0.57	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70
Net Generation	MU		5.12	6.31	6.31	6.31	6.31	6.31	6.31	6.31	6.31	6.31	6.31	6.31	6.31	6.31	6.31	6.31	6.31	6.31	6.31	6.31

Vaiable Cost	Unit	Year--->	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Biomass Cost	Rs Lakh		284.49	350.14	350.14	350.14	350.14	350.14	350.14	350.14	350.14	350.14	350.14	350.14	350.14	350.14	350.14	350.14	350.14	350.14	350.14	350.14
Per unit Var Cost	**Rs/kWh**		**5.55**	**5.55**	**5.55**	**5.55**	**5.55**	**5.55**	**5.55**	**5.55**	**5.55**	**5.55**	**5.55**	**5.55**	**5.55**	**5.55**	**5.55**	**5.55**	**5.55**	**5.55**	**5.55**	**5.55**

Fixed Cost	Unit	Year--->	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
O&M Expenses	Rs Lakh		30.38	31.18	32.00	32.84	33.70	34.59	35.50	36.43	37.39	38.37	39.38	40.41	41.47	42.56	43.68	44.83	46.00	47.21	48.45	49.73
Depreciation	Rs Lakh		30.43	30.43	30.43	30.43	30.43	30.43	30.43	30.43	30.43	30.43	30.43	30.43	13.07	13.07	13.07	13.07	13.07	13.07	13.07	13.07
Interest on term loan	Rs Lakh		39.60	36.16	32.71	29.27	25.83	22.38	18.94	15.50	12.05	8.61	5.17	1.72	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Interest on working Capital	Rs Lakh		19.94	24.36	24.39	24.41	24.43	24.46	24.48	24.51	24.54	24.56	24.59	24.62	24.65	24.68	24.71	24.74	24.77	24.81	24.84	24.88
Return on Equity	Rs Lakh		31.93	31.93	31.93	31.93	31.93	31.93	31.93	31.93	31.93	31.93	35.34	35.34	35.34	35.34	35.34	35.34	35.34	35.34	35.34	35.34
Total Fixed Cost	**Rs Lakh**		**152.28**	**154.06**	**151.46**	**148.88**	**146.32**	**143.79**	**141.28**	**138.79**	**136.33**	**133.90**	**134.90**	**132.52**	**114.54**	**115.66**	**116.81**	**117.98**	**119.19**	**120.44**	**121.71**	**123.02**
Per unit Fixed Cost	**Rs/kWh**		**2.97**	**2.44**	**2.40**	**2.36**	**2.32**	**2.28**	**2.24**	**2.20**	**2.16**	**2.12**	**2.14**	**2.10**	**1.82**	**1.83**	**1.85**	**1.87**	**1.89**	**1.91**	**1.93**	**1.95**

Levallised tariff corresponding to Useful life

Per Unit Cost of Generation	Unit	Levellised	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Variable COG	Rs/kWh	**5.55**	5.55	5.55	5.55	5.55	5.55	5.55	5.55	5.55	5.55	5.55	5.55	5.55	5.55	5.55	5.55	5.55	5.55	5.55	5.55	5.55
O&M expn	Rs/kWh	**0.59**	0.59	0.49	0.51	0.52	0.53	0.55	0.56	0.58	0.59	0.61	0.62	0.64	0.66	0.67	0.69	0.71	0.73	0.75	0.77	0.79
Depreciation	Rs/kWh	**0.44**	0.59	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21
Int. on term loan	Rs/kWh	**0.33**	0.77	0.57	0.52	0.46	0.41	0.35	0.30	0.25	0.19	0.14	0.08	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Int. on working capital	Rs/kWh	**0.39**	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39
RoE	Rs/kWh	**0.53**	0.62	0.51	0.51	0.51	0.51	0.51	0.51	0.51	0.51	0.51	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56
Total COG	**Rs/kWh**	**7.83**	**8.52**	**7.99**	**7.95**	**7.91**	**7.87**	**7.83**	**7.79**	**7.75**	**7.71**	**7.67**	**7.69**	**7.65**	**7.37**	**7.39**	**7.40**	**7.42**	**7.44**	**7.46**	**7.48**	**7.50**

Levellised Tariff	Unit	Year -->	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Discount Factor			1	0.91	0.82	0.74	0.67	0.61	0.55	0.50	0.45	0.41	0.37	0.34	0.30	0.28	0.25	0.23	0.21	0.19	0.17	0.15
Variable Cost			284.4	350.0	350.0	350.0	350.0	350.0	350.0	350.0	350.0	350.0	350.0	350.0	350.0	350.0	350.0	350.0	350.0	350.0	350.0	350.0
Fixed Cost			116.8	143.8	143.8	143.8	143.8	143.8	143.8	143.8	143.8	143.8	143.8	143.8	143.8	143.8	143.8	143.8	143.8	143.8	143.8	143.8

Levellised Tariff (Variable)	5.55
Levellised Tariff (Fixed)	2.28
Levellised Tariff (Rs/Unit)	**7.83**

Determination of Accelerated Depreciation for Biomass Power Project

Depreciation amount	90%
Book Depreciation rate	5.28%
Tax Depreciation rate	40%
Additional Depreciation	20%
Income Tax (MAT)	21.549%
Income Tax (Normal Rates)	29.12%
Capital Cost	521.9

Years ---------->	Unit	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Book Depreciation	%	5.28%	5.28%	5.28%	5.28%	5.28%	5.28%	5.28%	5.28%	5.28%	5.28%	5.28%	5.28%	5.28%	5.28%	5.28%	5.28%	5.28%	0.24%	0.00%	0.00%
Book Depreciation	Rs Lakh	27.56	27.56	27.56	27.56	27.56	27.56	27.56	27.56	27.56	27.56	27.56	27.56	27.56	27.56	27.56	27.56	27.56	1.25	0.00	0.00
Accelerated Depreciation																					
Opening	%	100%	40%	24%	14%	9%	5%	3%	2%	1%	1%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Allowed during the year	%	60%	16.00%	9.60%	5.76%	3.46%	2.07%	1.24%	0.75%	0.45%	0.27%	0.16%	0.10%	0.06%	0.03%	0.02%	0.01%	0.01%	0.00%	0.00%	0.00%
Closing	%	40%	24%	14.40%	8.64%	5.18%	3.11%	1.87%	1.12%	0.67%	0.40%	0.24%	0.15%	0.09%	0.05%	0.03%	0.02%	0.01%	0.01%	0.00%	0.00%
Accelrated Deprn.	Rs Lakh	313.14	83.50	50.10	30.06	18.04	10.82	6.49	3.90	2.34	1.40	0.84	0.50	0.30	0.18	0.11	0.07	0.04	0.02	0.01	0.01
Net Depreciation Benefit	Rs Lakh	285.59	55.95	22.55	2.51	-9.52	-16.73	-21.06	-23.66	-25.22	-26.15	-26.72	-27.05	-27.25	-27.37	-27.45	-27.49	-27.52	-1.23	0.01	0.01
Tax Benefit	Rs Lakh	83.16	16.29	6.57	0.73	-2.77	-4.87	-6.13	-6.89	-7.34	-7.62	-7.78	-7.88	-7.94	-7.97	-7.99	-8.01	-8.01	-0.36	0.00	0.00
Net Energy generation	MU	5.12	6.31	6.31	6.31	6.31	6.31	6.31	6.31	6.31	6.31	6.31	6.31	6.31	6.31	6.31	6.31	6.31	6.31	6.31	6.31
Per unit benefit	Rs/Unit	1.62	0.26	0.10	0.01	-0.04	-0.08	-0.10	-0.11	-0.12	-0.12	-0.12	-0.12	-0.13	-0.13	-0.13	-0.13	-0.13	-0.01	0.00	0.00
Discounting Factor		1.00	0.906	0.82	0.74	0.67	0.61	0.55	0.50	0.45	0.41	0.37	0.34	0.30	0.28	0.25	0.23	0.21	0.19	0.17	0.15

Levellised Benefit	**0.15**	**Rs/ Unit**

Form 1.1 Assumptions Parameters

S. No.	Assumption Head	Sub-Head	Sub-Head (2)	Unit	olar therma
1	**Power Generation**				
		Capacity			
			Installed Power Generation Capacity	MW	1
			Capacity Utilization Factor	%	23%
			Auxilliary Consumption		10%
			Useful Life	Years	25
2	**Project Cost**				
		Capital Cost/MW	Power Plant Cost	Rs Lacs/MW	1,200.00
3	**Sources of Fund**				
			Tariff Period	Years	25
		Debt: Equity			
			Debt	%	70%
			Equity	%	30%
			Total Debt Amount	Rs Lacs	840.00
			Total Equity Amout	Rs Lacs	360.00
		Debt Component			
			Loan Amount	Rs Lacs	840.00
			Moratorium Period	years	0
			Repayment Period(incld Moratorium)	years	12
			Interest Rate	%	10.98%
		Equity Component			
			Equity amount	Rs Lacs	360.00
			Return on Equity for first 10 years	% p.a	20.39%
			RoE Period	Year	10
			Return on Equity 11th year onwards	% p.a	22.57%
			Weighted average of ROE		21.70%
			Discount Rate		10.25%
4	**Financial Assumptions**				
		Fiscal Assumptions			
			Income Tax	%	29.120%
			MAT Rate (for first 10 years)	%	21.549%
		Depreciation			
			Depreciation Rate for first 12 years	%	5.83%
			Depreciation Rate 13th year onwards	%	1.54%
			Years for 5.83% rate		12
5	**Working Capital**				
		For Fixed Charges			
		O&M Charges		Months	1
		Maintenance Spare	(% of O&M exepenses)		15%
		Receivables for Debtors		Months	2
		For Variable Charges			
		Interest On Working Capital		%	11.48%
6	**Operation & Maintenance**				
		Operation & Maintenance (2015-16)			
		%ge escalation (FY16-17)		%	2.96%
		%ge escalation (FY17-18)		%	4.85%
		Operation & Maintenance (2018-19)		Rs Lakh	16.88
		Total O & M Expenses Escalation		%	4.26%

Form 1.2 Form Template for (Solar Thermal Projects of Capacity -) : Determination of Tariff Component

Units 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	MW		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Net Generation	MU		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	1.81

Fixed Cost	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
O&M Expenses	Rs Lakh		17.33	17.78	18.25	18.73	19.22	19.73	20.25	20.78	21.32	21.88	22.46	23.05	23.65	24.27	24.91	25.57	26.24	26.93	27.63	28.36	29.11	29.87	30.66	31.46	32.29
Depreciation	Rs Lakh		69.96	69.96	69.96	69.96	69.96	69.96	69.96	69.96	69.96	69.96	69.96	69.96	18.50	18.50	18.50	18.50	18.50	18.50	18.50	18.50	18.50	18.50	18.50	18.50	18.50
Interest on term loan	Rs Lakh		91.04	83.13	75.21	67.29	59.38	51.46	43.54	35.63	27.71	19.79	11.88	3.96	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Interest on working Capital	Rs Lakh		4.46	4.47	4.48	4.50	4.51	4.52	4.54	4.55	4.57	4.58	4.60	4.62	4.63	4.65	4.67	4.69	4.70	4.72	4.74	4.76	4.78	4.80	4.83	4.85	4.87
Return on Equity	Rs Lakh		73.42	73.42	73.42	73.42	73.42	73.42	73.42	73.42	73.42	73.42	81.26	81.26	81.26	81.26	81.26	81.26	81.26	81.26	81.26	81.26	81.26	81.26	81.26	81.26	81.26
Total Fixed Cost	**Rs Lakh**		**256.21**	**248.76**	**241.33**	**233.90**	**226.49**	**219.09**	**211.71**	**204.34**	**196.98**	**189.64**	**190.16**	**182.85**	**128.05**	**128.69**	**129.34**	**130.01**	**130.70**	**131.41**	**132.14**	**132.89**	**133.65**	**134.44**	**135.24**	**136.07**	**136.92**
Per unit Fixed Cost	**Rs/kWh**		**14.13**	**13.72**	**13.31**	**12.90**	**12.49**	**12.08**	**11.68**	**11.27**	**10.86**	**10.46**	**10.49**	**10.08**	**7.06**	**7.10**	**7.13**	**7.17**	**7.21**	**7.25**	**7.29**	**7.33**	**7.37**	**7.41**	**7.46**	**7.50**	**7.55**

Levallised tariff corresponding to Useful life

Per Unit Cost of Generatio	Unit	Levelised	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
O&M expn	Rs/kWh	**1.17**	0.96	0.98	1.01	1.03	1.06	1.09	1.12	1.15	1.18	1.21	1.24	1.27	1.30	1.34	1.37	1.41	1.45	1.48	1.52	1.56	1.61	1.65	1.69	1.73	1.78
Depreciation	Rs/kWh	**3.17**	3.86	3.86	3.86	3.86	3.86	3.86	3.86	3.86	3.86	3.86	3.86	3.86	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
Int. on term loan	Rs/kWh	**2.37**	5.02	4.58	4.15	3.71	3.27	2.84	2.40	1.96	1.53	1.09	0.65	0.22	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Int. on working capital	Rs/kWh	**0.25**	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.27	0.27	0.27
RoE	Rs/kWh	**4.18**	4.05	4.05	4.05	4.05	4.05	4.05	4.05	4.05	4.05	4.05	4.48	4.48	4.48	4.48	4.48	4.48	4.48	4.48	4.48	4.48	4.48	4.48	4.48	4.48	4.48
Total COG	**Rs/kWh**	**11.15**	**14.13**	**13.72**	**13.31**	**12.90**	**12.49**	**12.08**	**11.68**	**11.27**	**10.86**	**10.46**	**10.49**	**10.08**	**7.06**	**7.10**	**7.13**	**7.17**	**7.21**	**7.25**	**7.29**	**7.33**	**7.37**	**7.41**	**7.46**	**7.50**	**7.55**

Discount Factor			1	0.91	0.82	0.74	0.67	0.61	0.55	0.50	0.45	0.41	0.37	0.34	0.30	0.28	0.25	0.23	0.21	0.19	0.17	0.15	0.14	0.12	0.11	0.10	0.09
Fixed Cost			202.24	202.24	202.24	202.24	202.24	202.24	202.24	202.24	202.24	202.24	202.24	202.24	202.24	202.24	202.24	202.24	202.24	202.24	202.24	202.24	202.24	202.24	202.24	202.24	202.24
Levellised Tariff	**11.15**	Rs/Unit																									

Determination of Additional Depreciation for Solar Thermal Projects

Depreciation amount	90%
Book Depreciation rate	5.28%
Tax Depreciation rate	40%
Additional Depreciation	20%
Income Tax (MAT)	21.549%
Income Tax (Normal Rates)	29.120%
Capital Cost	1200.00

Years ---------->	Unit	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Book Depreciation	%	5.28%	5.28%	5.28%	5.28%	5.28%	5.28%	5.28%	5.28%	5.28%	5.28%	5.28%	5.28%	5.28%	5.28%	5.28%	5.28%	5.28%	0.24%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Book Depreciation	Rs Lakh	63.36	63.36	63.36	63.36	63.36	63.36	63.36	63.36	63.36	63.36	63.36	63.36	63.36	63.36	63.36	63.36	63.36	2.88	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Accelerated Depreciation																										
Opening	%	100%	40%	24%	14%	9%	5%	3%	2%	1%	1%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Allowed during the year	%	60.00%	16.00%	9.60%	5.76%	3.46%	2.07%	1.24%	0.75%	0.45%	0.27%	0.16%	0.10%	0.06%	0.03%	0.02%	0.01%	0.01%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Closing	%	40.0%	24.0%	14.4%	8.64%	5.18%	3.11%	1.87%	1.12%	0.67%	0.40%	0.24%	0.15%	0.09%	0.05%	0.03%	0.02%	0.01%	0.01%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Accelrated Deprn.	Rs Lakh	720.00	192.00	115.20	69.12	41.47	24.88	14.93	8.96	5.37	3.22	1.93	1.16	0.70	0.42	0.25	0.15	0.09	0.05	0.03	0.02	0.01	0.01	0.00	0.00	0.00

Net Depreciation Benefit	Rs Lakh	656.64	128.64	51.84	5.76	-21.89	-38.48	-48.43	-54.40	-57.99	-60.14	-61.43	-62.20	-62.66	-62.94	-63.11	-63.21	-63.27	-2.83	0.03	0.02	0.01	0.01	0.00	0.00	0.00
Tax Benefit	Rs Lakh	191.21	37.46	15.10	1.68	-6.37	-11.20	-14.10	-15.84	-16.89	-17.51	-17.89	-18.11	-18.25	-18.33	-18.38	-18.41	-18.42	-0.82	0.01	0.01	0.00	0.00	0.00	0.00	0.00
Energy generation	MU	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	1.81
Per unit benefit	Rs/Unit	10.54	2.07	0.83	0.09	-0.35	-0.62	-0.78	-0.87	-0.93	-0.97	-0.99	-1.00	-1.01	-1.01	-1.01	-1.02	-1.02	-0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Discounting Factor		1.00	0.91	0.82	0.74	0.67	0.61	0.55	0.50	0.45	0.41	0.37	0.34	0.30	0.28	0.25	0.23	0.21	0.19	0.17	0.15	0.14	0.12	0.11	0.10	0.09

Levellised benefit	**0.91**	**Rs/Unit**