

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

ORDER

Dated: 30 April, 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 Renewable Energy (**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 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, 2015 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) Through a Public Notice published in the daily newspapers Times of India and Indian Express (English), and Maharashtra Times and Loksatta (Marathi) on 2 March, 2019, the Commission invited comments and suggestions by 22 March, 2019 on its Draft RE Tariff Order for FY 2019-20, which was also made available on its websites, and intimated that a Public Hearing will be held on 25 March, 2019 and accordingly, the Public Hearing was held at the Office of the Commission at 13th Floor, World Trade Centre, Cuffe Parade, Mumbai. The list of persons who filed their written comments, suggestions and objections and/or made oral submissions during the Public Hearing is at Appendix-1, and the list of those present at the Public Hearing is at Appendix-2.
- 5) After considering the responses received on the Draft Order and in discharge of its mandate under Regulation 9.1 of the RE Tariff Regulations, 2015, the Commission hereby determines the Generic Tariff for RE Projects for FY 2019-20 (from 01 April, 2019 to 31 March, 2020). The Generic Tariff determined through this Order is based on the financial principles and technology specific parameters stipulated in RE Tariff Regulations, 2015 for the RE Technologies to which competitive discovery of tariff is yet to be undertaken. And for RE Technologies whose tariff has been discovered through Competitive Bidding, the Commission is not determining Generic Tariff under this Order. However, for projects having capacity below the threshold limit of eligibility for participating in competitive bidding process, 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. Detailed rationale for adopting this approach has been explained in the subsequent part of this Order.

The Ministry of New & Renewable Energy (**MNRE**), Government of India has set ambitious target of achieving 175 GW for installed grid connected RE capacity by 2022. Guidelines have been issued for carrying out competitive bidding for various RE projects and Tariffs discovered through 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.

- 6) Though the general trend of tariffs for RE power is showing reduction, some RE sources are still having higher costs. The Commission endeavours to support all the MNRE approved RE technologies.

1. RESPONSE RECEIVED AND COMMISSION RULINGS

The written comments, suggestions and objections received and oral submissions made at the Public Hearing are set out below, issue-wise, along with the Commission's rulings thereon.

1.1. RESPONSE ON GENERIC TARIFF FOR BIOMASS PROJECTS

- a) AA Energy Limited has welcomed the Tariff determined by the Commission for Biomass Projects in the Draft Order. Maharashtra Energy Development Agency (**MEDA**) and Manas Agro Industries & Infrastructure Ltd requested the Commission to align Fixed Cost of Biomass Power Plants by revising the Capital Cost, O&M Expenses and Fixed Charges as per RE Final Tariff Order FY 2019-20 dated 19 March 2019 issued by Central Electricity Regulatory Commission (**CERC**). Maharashtra Biomass Energy Development Association (**MBEDA**) requested to determine the Variable Cost for the Biomass Projects by considering the Fuel Cost as per draft CERC Order dated 11 January 2019. Greta Energy suggested 15% increase on the proposed Variable Charge in the draft Order due to significant increase in fuel prices and O&M cost.

Commission's Ruling

The RE Tariff Regulations, 2015 have been notified after a due process of public consultation. The Commission has calculated required financial and technical parameters in accordance with these Regulations. There is no major technological change due to which Capital Cost and O&M Expense need to be selectively chosen from CERC Order. RE Tariff Regulations offer Return on Equity (RoE) of 16% vis-à-vis 14% by CERC and Rate of Interest on Working Capital (**IoWC**) of 'Base Rate+350 bps' vis-à-vis 'Base Rate+300 bps' by CERC. The Commission has lowered neither the RoE nor the rate of IoWC.

- b) Vayunandana Power Limited requested to increase the Fixed Tariff for Biomass Project mainly on account of various modifications and up-gradations implemented since commissioning which result in capital expenditure. This capital expense is not considered in determination of Tariff. It also highlighted impact of Minimum Wages Act on Employee Expenses which results in higher O&M Expenses and rise in Petroleum, Oil & Lubricants (POL) Costs.

Commission's Ruling

The Commission notes that comments and suggestions by Vayunandana Power Limited in the present matter are in essence the same as those in the RE Generic Tariff Order for FY 2018-19 in Case No. 204 of 2018 dated 18 August, 2018. The Commission has already ruled on this issue in that Order as follows :

“a) The Commission has allowed recovery of capital cost before commissioning of the project through fixed tariff. Additionally, the Commission takes into consideration expenses towards repair & maintenance in O&M expenses. The generators are given tax adjusted

RoE of 20.39% in the first 10 years and 22.57% in the remaining tariff period. Any capital expenditure towards modification & upgradation is to be funded from return on equity.

b) The Commission determines fixed tariff based on year of commissioning of the project only. Fixed tariff does not change throughout tariff period. PPA of Vayunandana Power with MSEDCL is based on assumptions taken in 2008.”

The Commission has escalated annual O&M Expenses as per annual escalation in Wholesale Price Index (WPI) and Consumer Price Index (CPI) as per amendment in MYT Regulations 2015. WPI is as per the Office of Economic Advisor of Government of India and CPI is as per Labour Bureau, Government of India. Therefore, hike in wages is captured in Generic Tariff determined in this Order. Similarly, hike in Fuel Cost is captured as detailed in para 5.13 of this Order.

1.2. DETERMINATION OF VARIABLE CHARGE FOR COGENERATION PROJECTS COMMISSIONED BEFORE 1 AUGUST, 2018

Manas Agro Industries & Infrastructure Ltd, NSL Sugar Limited, Shree Renuka Sugar Energy Limited, Maharashtra State Electricity Distribution Company Limited (**MSEDCL**), Cogeneration Association of India (**CAI**) and Maharashtra Energy Development Agency (**MEDA**) requested the Commission to specify the variable charge component for Non-Fossil Fuel based Cogeneration Projects commissioned prior to 1 August, 2018 in RE Tariff Order.

Commission's Ruling

The Commission notes that in the draft Order, it has proposed tariff of Rs. 4.99/kwh for Non-Fossil Fuel based Co-generation Projects as adopted by the Commission for MSEDCL (Order dated 30 June, 2018 in Case No.165 of 2018). This is tariff discovered through competitive bidding, which does not have separately identifiable Fixed and Variable part of Tariff. As per RE Tariff Regulations, Tariff for Non-fossil Fuel based Cogeneration projects is having Fixed and Variable component. Fixed cost component is as per relevant Generic Tariff Order, whereas Variable component, which is linked to current fuel cost, is as determined under current Generic Tariff Order. Thus, although tariff of Rs. 4.99/kWh would be applicable to projects to be commissioned in FY 2019-20, for existing projects (commissioned prior to 1 April, 2019), the Commission needs to determine Variable component of tariff. The Commission has computed the Variable charge for Non-Fossil based Cogeneration Projects commissioned prior to 1 August, 2018 in Para 6.3 of this Order.

1.3. COMMENTS BY COGENERATION ASSOCIATION OF INDIA (CAI)

- a) In CERC Order dated 19 March, 2019 for Generic Tariff Determination for FY 2019-20, MSEDCL had suggested change in approach for Tariff determination. It was suggested to discontinue Generic Tariff determination for RE technologies and to determine Tariff exclusively by Competitive Bidding. Suggestion of MSEDCL has been expressly disregarded

as it would tantamount to amendment to the Regulations. Therefore, determination of Tariff on the basis of Competitive Bidding would be illegal and invalid unless revised or replaced by fresh Regulations.

Commission's Ruling

The Commission notes that CERC's Generic Tariff Order is governed by its RE Tariff Regulations. Although, this Commission takes guidance from CERC Regulations and Orders, these are not binding on the Commission. Based on factual aspect of the matter and requirement of the State, the Commission takes its decision considering provisions of the Electricity Act, 2003 and its own Regulations. As explained in latter part of this Order, introduction of competitive bidding in RE has shown substantial reduction in RE Tariff, therefore the Commission cannot continue to determine Generic Tariff based on Financial Principles and Operating norms in RE Tariff Regulations, 2015, which are not reflective of true current market conditions. 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 Tariff discovered 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, for not using operating norms and financial principles of RE Tariff Regulations for determining tariff of RE technologies for which tariff has been discovered through competitive bidding. In the opinion of the Commission, suggestions of the CAI to determine the tariff as per existing RE Tariff Regulation would be detrimental to competitive bidding process and would also be against the objective of the Electricity Act, 2003 i.e. to promote competition. Hence, the Commission rejects this objection of CAI.

Considering that small capacity Solar PV and Wind Projects are unable to participate in Competitive Bidding process, the Commission has determined Generic Tariff for such RE Generators based on the latest competitively discovered tariff, for speeding up PPA with the Discoms and reduce offtake risk for such Generators. Further, for Small Hydro Projects (including Mini/Micro), Biomass based Power Projects and Solar Thermal Power Projects, where competitive bidding has not been undertaken, the Commission has determined Generic Tariff based on financial and technical parameters in RE Tariff Regulations, 2015.

Therefore, it is evident that the Commission has not discontinued Generic Tariff determination for RE technologies altogether and has not proposed Tariff determination exclusively by Competitive Bidding.

- b) CAI requested the Commission to determine the Bagasse price in Maharashtra as per the CERC RE Tariff order.

Commission's Ruling

As mentioned in Chapter 6 of this Order, the Commission has determined Generic Tariff for only those RE Projects which are unable to participate in Competitive Bidding depending upon

the latest Tariff discovered in Competitive Bidding. Effect of Fuel Price is implicitly incorporated in the Tariff discovered by way of Competitive Bidding and no separate consideration for Fuel Price is required.

- c) Regulation 5 of RE Tariff Regulations 2015 relates to adoption of Tariff by way of transparent process of Competitive Bidding. However, Tariff by way of Competitive Bidding cannot be adopted if there are allegations and refusal by parties regarding fairness and transparency of the process. Tariff of Rs. 4.9/unit approved by the Commission for Projects commissioned during August 2018 to March 2019 was based on Competitive Bidding held by MSEDCL in FY 2018-19. This Competitive Bidding, in which 17 projects i.e. for installed capacity of 300 MW participated, was forced upon the RE Generators. Coercion was by way of failure and neglect on the part of MSEDCL to execute EPA for 2 years in spite of Guidelines and Government Resolutions.

Commission's Ruling

There are several factual errors in the submission of CAI. The Commission has adopted Tariff of Rs. 4.99/unit, and not Rs. 4.9/unit, for Non-Fossil Fuel based Cogeneration Projects commissioned during August 2018 to March 2019. The Tariff was based on Order in Case No. 165 of 2018 dated 30 June, 2018. This Order was for Competitive Bidding of 200 MW of generation capacity vis-à-vis 300 MW mentioned by CAI. Total number of Bidders who participated in tenders of MSEDCL totalling 300 MW (200 MW in Case No. 165 of 2018 and 100 MW in Case No. 130 of 2018) was 18 instead of 17 as mentioned by CAI.

Further, similar issue was raised by CAI in RE Generic Order for FY 2018-19 in Case No. 204 of 2018 dated 18 August, 2018. The Commission's ruling in relation to this issue in aforementioned Order is quoted below:

“CAI has mentioned in its written submission that members who participated in bidding were those with their projects becoming NPA and the Bidders were unable to pay their liabilities for a period more than 2 years. However, it is seen that some of the Bidders who were successful in e-reverse auction had new plants which had not even commenced recovery of their fixed charge. Question of not being able to pay debt for 2 years does not arise for such new plants which are commissioned in the recent past. Following is the list of such newly commissioned/yet to be commissioned plants:

<i>Under Case No. 130 of 2018</i>	<i>Under Case No. 165 of 2018</i>
<i>Piyush Sagar and Power Pvt. Ltd.</i>	<i>Raosahebada Pawar Godganga SSKL</i>
<i>Shri Dyanenshwar SSKL</i>	<i>Gokul Sugar Industries Ltd.</i>
<i>Shree Siddheshwar SSKL</i>	
<i>Vitthal Refined Sugars Ltd.</i>	

Therefore, claim of CAI that returns from tariff are not sufficient to recover fixed charge is not correct as its members willingly quoted a rate in Competitive Bidding.

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l) CAI has submitted that shortfall of about 625 MW in achieving target of power procurement from cogeneration power projects must be absorbed by MSEDCL under generic tariff. The issue of fulfilment of RPO target has been considered by the Commission in the Order dated 11 January, 2018 in which it allowed Competitive Bidding for procurement of cogeneration power. It is upto Distribution Licensee to procure this power as per its requirement by following laid down process. In addition, it is upto the Distribution Licensees to decide whichever type of non-Solar power it wishes to procure to fulfil its RPO target. The Commission has specifically ruled in this regard in Order in Case No. 33 of 2017 dated 28 April, 2017 for determination of Generic Tariff for RE for FY 2017-18. The Commission's Ruling in para. 1.29 of the said Order

"To the extent that the Distribution Licensee chooses to procure RE power to fulfil its Non-Solar RPO, there is no requirement to do so from one particular type of Non-Solar RE Generator or another. The implementation of the Govt. of Maharashtra Policy in this regard is a matter between the State Govt. and MSEDCL, which is a State Utility, and not the Commission.

The Commission notes that, just as the Distribution Licensee has several options for fulfilment of its RPO, sale of power to Open Access consumers or to Power Exchanges is also open to RE Generators."

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CAI, after about six hearings before the APTEL, withdrew its Appeal. In fact, as mentioned by CAI in its submission, many of its members participated in the Competitive Bidding process of MSEDCL to sell their Bagasse based Co-generation Power. 18 bidders submitted their bids to MSEDCL for tender of long term power procurement for 100 MW and 15 bidders submitted their bids for tender of long term procurement of 200 MW. The Commission has also duly adopted the tariff discovered in those two Bidding process in its two Orders in Case No. 130 and 165 of 2018. Therefore, CAI is now estopped from raising these issues as the Order dated 11 January, 2018 in Case No. 183 of 2017 has attained finality, because the Objector cannot probate and approbate as per its suitability."

CAI is raising the same issues which have been addressed by the Commission in the above Order.

- d) Non- Fossil fuel based Cogeneration Projects cannot be compared with Solar PV and Wind Projects due to agro-climatic variations leading to fluctuation in supply of bagasse and lower interest rates due to foreign investment.

Commission's Ruling

It is naïve to assume that Solar and Wind Projects do not depend upon climatic variations. In fact, their generation is more sensitive to climatic variations. Even though Solar and Wind Projects do not incur Fuel Cost, effect on their profitability due to climatic conditions is more pronounced vis-à-vis Non- Fossil based Cogeneration Projects. Their EPAs have built-in disincentives/penalties for lower generation.

The Government policies incentivise Foreign Direct Investment (FDI) in Renewable Energy which benefits Solar, Wind and Cogeneration projects . Bagasse based Cogeneration Projects receive financial assistance from government in various forms. Excerpt of the Commission's Ruling from RE Order for FY 2018-19 is reproduced below.

“It may also be noted that Bagasse based cogeneration plants receive Central Financial Assistance (CFA) as per MNRE scheme. Private sugar mills receive Rs. 15.00 lakh per MW of CFA, co-operative/public sector sugar mills receive Rs. 40-60 lakh per MW of CFA as per MNRE scheme. Rs. 20-30 lakh per MW of surplus power is available for boiler modification. The Commission has not deducted above CFA in determination of capital cost.

On the other hand, State Government approves reimbursement of capital cost incurred for transmission lines needed for evacuation of generated power upto Rs. 2.00 Crore from Green Fund.”

Even External Commercial Borrowing (ECB), which some Solar PV and Wind Power Projects may avail, need to incur cost related to hedging of foreign exchange risk, because revenue earned by Solar and Wind Power Projects is in Indian Rupees, while ECBs are typically in US Dollars. Therefore, Cogeneration Power Projects need not be given preferential treatment over Solar and Wind Power Projects.

- e) The latest Competitive Bidding with Rs. 4.75/unit ceiling tariff conducted by MSEDCL for bagasse-based co-generation power plant, was not transparent. Generic Tariff based on pre-fabricated Competitive Bidding results into loss for entire system of Co-Generation Power Projects Developers.

Commission's Ruling

The Commission in subsequent Para 2.1 of this Order has mentioned that Tariff discovered in the latest tariff rate discovered through Competitive Bidding has to be adopted by the Commission in order to be considered as Generic Tariff. The aforementioned rate discovered through Competitive Bidding process referred by CAI is yet to be adopted by the Commission. The Commission will decide the issue of transparency and fairness of Competitive Bidding process once MSEDCL approaches the Commission through separate Petition for adoption of Tariff.

1.4. COMMENTS BY MSEDCL

- a) MSEDCL requested the Commission that tariff of Wind energy adopted in this Order of Rs. 2.52/kWh or any other tariff adopted in subsequent order should be applicable for an EPA term of 25 years.

Commission's Ruling

The Commission in its draft RE Tariff Order has clearly stated that Tariff which has been discovered in the latest competitive bidding and so adopted by the Commission shall be used for signing of EPA with project developers having capacity below the threshold limit of eligibility for participating in competitive bidding process. Further, it was also stated in the draft RE Tariff Order that Terms and Conditions of such EPA shall be identical to Terms and Conditions of EPA for such competitive bid. Same approach has been continued in this final Order.

- b) MSEDCL submitted that tariff discovered in its last competitive bidding for procurement 1000 MW Solar PV power is Rs 2.74 /kWh the Commission has also accorded approval for adoption of that Tariff, same may be considered for FY 2019-20 Order.

Commission's Ruling

MSEDCL has requested to adopt the Tariff discovered in the latest Competitive Bidding conducted by MSEDCL for 1000 MW as Generic Tariff for Solar PV Projects. However, the Commission has considered only those cases where Tariff has been adopted by the Commission. As mentioned in proviso to para 2.1 (a), of this Order, the 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. The Tariff which MSEDCL is recommending for consideration is tariff discovered through competitive bidding. Such Tariff may be applicable as Generic Tariff for Solar PV Projects as per approach of the Commission as mentioned in Chapter 7 when the Tariff would be adopted by the Commission.

- c) Purchase of Power from Biomass based Projects may be allowed compulsorily through Competitive Bidding due to variation in fuel cost with location and for benefit of the consumers.

Commission's Ruling

In its draft RE Tariff Order, the Commission has already stated that Distribution Licensee should strive to procure all its RE requirement through competitive bidding. Same approach has been continued in this final RE Tariff Order. Hence, the Commission has already enabled the desired process. Now it is up to Distribution Licensee to procure its RE requirement through competitive bidding process by designing appropriate bidding documents in absence of notified Standard bidding documents and guidelines for the specific RE sources.

- d) MSEDCL has requested the Commission to consider ROE as 14% referring to Regulation 16 (2) of CERC RE Regulations instead of 16% and reduced bank rates.

Commission's Ruling

Financial and technical parameters used by the Commission are in accordance with RE Tariff Regulations, 2015 unless there is any technological advancement due to which RE Tariff

Regulations need to be revisited. RoE as per CERC Tariff Regulations results in lower Generic Tariff. On the other hand, Capital Cost and O&M Expense adopted by CERC RE Tariff Regulations would result in higher Generic Tariff as suggested by Manas Agro. The Commission will not selectively adopt lower RoE as well as higher Capital Cost, O&M Expense.

- e) As per the recommendation of Forum of Regulators (**FoR**), the Clean Development Mechanism (CDM) benefits should be shared on gross basis starting from 100% to developers in the first year and thereafter reducing by 10% every year till the sharing becomes equal (50:50) between the developer and the consumer in the sixth year. Thereafter, sharing of benefits will remain equal till such time the benefits accrue. The Commission may adopt the recommendation of FoR and allow MSEDCL to share the CDM benefits.

Commission's Ruling

Taking into consideration significant delays and upfront cost associated with procurement of CDM benefits, the Commission, vide Regulation 22 of RE Tariff Regulations, 2015 has allowed the RE Generator to retain entire proceeds of carbon credit as well as made them liable to absorb all risks, costs and efforts associated with the availing of carbon credits. CDM benefits entitlement for RE Projects commissioning in FY 2019-20 will be as per Regulation 22 mentioned above.

1.5. COMMENTS BY MAHARASHTRA STATE POWER GENERATION COMPANY LIMITED (MSPGCL)

- a) Pre-condition for adopting Generic Tariff in Solar PV power for projects below threshold limit is that Terms and Conditions of such EPA shall be similar to competitively bided EPA. As per recent trend in Solar PV tenders by MSEDCL, each tender has different deviations in Terms and Conditions which affects the Tariff discovered. It is not possible for small Solar PV projects below threshold level to match all Terms and Conditions of the Competitive Bidding process and as per RE Tariff Regulation, 2015 there is no provision for project specific Tariff determination. Therefore, the RE Generator may be deprived of an opportunity, even if Tariff offered by it is comparable to tariff discovered under Competitive Bidding process.

Commission's Ruling

The Commission notes the suggestions of MSPGCL. Tariff as well as conditions of EPA which are deviating from Standard Bidding Documents are required to get approved from the Commission. Distribution Licensee cannot impose such conditions without approval of the Commission. Under such circumstance, the Commission does not find merits in MSPGCL's submission that small capacity project developers would not be able to comply with the conditions of EPA adopted by the Commission.

- b) MSPGCL requested the Commission to provide clarity regarding component-wise cost factor allowed for the deviations in terms and conditions at injection level, cost of land lease etc.

Commission's Ruling

The Commission notes that tariff discovered through competitive bidding does not have component-wise break up as suggested by MSPGCL. Further, RE Tariff Regulations also does not provide for the same. Hence, request of MSPGCL cannot be granted.

- c) Solar Agricultural Sheds and Floating Solar PV Projects are innovative ways of executing Solar PV Projects. Their Tariff should either be determined on project-specific basis or their Tariff should be determined to be higher than other solar PV projects by Rs. 0.50/kWh.

Commission's Ruling

MSPGCL has not provided any rationale and calculations for Rs. 0.50/kWh higher Tariff for special solar PV projects than that of standard Solar PV Projects. As mentioned in proviso to para 2.1 (a), for Solar Agricultural Sheds and Floating Solar PV Projects, Tariff which has been discovered in the latest Competitive Bidding and adopted by the Commission shall be Generic Tariff for these RE Technologies. 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 those referenced discovered Tariff.

1.6. COMMENTS BY INDIAN WIND TURBINE MANUFACTURERS ASSOCIATION (IWTMA)

IWTMA has requested the Commission to revise the Tariff for wind energy from Rs. 2.52/kWh as approved in Case No. 252 of 2018 to Rs. 2.87/kWh as approved in Case No. 129 of 2018, because the competitive bidding through which tariff was discovered in Case No. 252 of 2018 had participation of only three bidders with bid submission of 87 MW against RfS of 250MW, while in earlier bid by MSEDCL completed on 6 March, 2018 the RfS quantity of 500 MW was allocated to six bidders at the Tariff of Rs. 2.85/kWh to Rs. 2.87/kWh.

Commission's Ruling

The Draft Order has already mentioned that the Tariff for Wind Energy will be updated whenever a new rate is discovered by way of competitive bidding. As on date of this Order, Tariff adopted by this Commission in Case No. 252 of 2018 is the latest Wind Tariff by way of competitive bidding as per guidelines notified by the Central Government. This Tariff will continue until new Tariff by way of competitive bidding is adopted by this Commission.

1.7. COMMENTS ON GENERIC TARIFF OF SOLAR PV PROJECTS

Shri. Ajit Deshmukh requested to increase feed-in Tariff to Rs. 8-9/kWh or provide 25% subsidy to farmers involved in Kisan Urja Suraksha evam Utthaan Mahabhiyan (KUSUM) Scheme, 2019.

Commission's Ruling

Regarding Tariff rate for Solar PV projects, the Commission in this Order has provided detailed rationale for approving such rate. As far as request of providing 25% subsidy is concerned, the Commission does not have any role in providing subsidy. Objector may approach appropriate Government for this purpose.

2. 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.

2.1. 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 RE sources, competition and also the technological advances. Financial Principles of RE Tariff Regulations, 2015 have not been updated to keep pace with the fast changing market conditions. As a result, Generic Tariff based

on these Financial Principles is working out higher than Tariff discovered by way of Competitive Bidding.

The Commission notes that the 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 at, 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 Principles and Operating Norms in RE Tariff Regulations, 2015, which are not reflective of true current market conditions. The Commission cannot 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 dated technology, financial principles and operating norms.

Taking cognizance of the approach taken 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 Tariff discovered 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 gives a ruling 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 those approved 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 2.1 (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 will 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.

2.2. 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.

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

2.3.1. 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.

2.3.2. 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.”

2.3.3. 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 28 April, 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.

Further, the Commission also amended the provisions of MERC (MYT) Regulations, 2015 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 July-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.

2.3.4.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 2.3.3, the SBI Base Rate-linked interest rate for working capital is no longer available for new RE Projects. The Commission has worked out 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 as 11.81% .

2.3.5.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 development 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%

2.3.6.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 $10.41\% = ((11.31\% \times 0.70 \times (1-29.12\%)) + (16.00\% \times 0.30))$.

2.3.7. 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 data for 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).

2.3.8. 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. 0 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.

2.3.9.SHARING OF CDM BENEFITS

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 CDM Project, if any, shall be retained by it.

2.3.10. APPLICABILITY OF TARIFF ORDER

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

3. WIND ENERGY PROJECTS

The Commission notes that Distribution Licensee in Maharashtra i.e. 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 2.1(a) mentioned above, the Commission is not determining Generic Tariff applicable for Wind Energy.

As mentioned in proviso to para 2.1 (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, in case of absence of the competitively discovered tariff for any Distribution Licensee, the 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 bid 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.

4. 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 2.1, 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. 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.

4.2. 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 25 MW.

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.

4.3. 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 given 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

Technology	Variables				
	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

	WPI of Electrical Machinery		WPI of Iron and Steel	
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

4.4. 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.

4.5. 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: $\text{RoE (\%)} / [1 - \text{Tax Rate (\%)}]$

4.6. 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.

4.7. 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.

4.8. 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.

4.9. 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 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 2.3.7 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

4.10. CAPACITY UTILISATION FACTOR

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

4.11. AUXILIARY POWER CONSUMPTION

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

4.12. 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 Rs. 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.”

4.13. 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 the lower of such competitively discovered Tariff or the Commission determined generic tariff shall be Generic Tariff for remaining period of FY 2019-20. Thereafter, conditions mentioned at para 2.1 (a) will become applicable.

5. 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 2.1, Generic Tariff will be computed as per Financial Principles and Technology-specific parameters in RE Tariff Regulations, 2015 as detailed in this Chapter.

5.1. 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:

$$VC_n = VC_1 \times (P_n / P_1)$$

where,

VC₁ represents the Variable Charge based on Biomass Price P₁ for FY 2015-16 as specified under Regulation 49, and shall be determined as under:

$$VC1 = \frac{\text{Station Heat Rate (SHR)}}{\text{Gross Calorific Value (GCV)}} \times \frac{1}{(1 - \text{Auxiliary Consumption Factor})} \times \frac{P_1}{1000}$$

$P_{(n)}$ = 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 $(n-1)^{\text{th}}$ 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 5.14 of this Order. The Fixed Charge component shall continue to be governed by the relevant RE Tariff Orders of the Commission.

5.2. 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. 4.3 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
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
D _n	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

5.3. 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.

5.4. 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: $\text{RoE (\%)} / [1 - \text{Tax Rate (\%)}]$

5.5. 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.

5.6. 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.

5.7. 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.

5.8. 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%.

5.9. AUXILIARY POWER CONSUMPTION

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

5.10. STATION HEAT RATE

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

5.11. 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 2.3.7. Accordingly, the Commission has taken the O&M expense norm for Biomass Projects for FY 2019-20 as Rs. 30.38 lakh per MW.

5.12. 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.

5.13. 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%.

5.14. 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.

5.15. 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 0 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
During FY 2015-16 (10 November, 2015 to 31 March, 2016)	2.35@	5.55	7.90	0.16	7.74

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 (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 2.1(a) will become applicable.

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

The Commission notes that 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 2.1 (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 2.1 (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.

6.1. 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.

6.2. 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. 5.13 of this Order. The corresponding Calorific Value of biomass fuel (3611 kcal/kg) has been taken as set out in para. 5.12. 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.

6.3. VARIABLE CHARGE FOR BAGASSE-BASED CO-GENERATION POWER PROJECTS COMMISSIONED PRIOR TO 1 AUGUST, 2018

As per Regulation 52.2, the fuel-related aspects specified in Regulations 59 to 66 shall be applicable to existing Non-Fossil Fuel-based Co-Generation 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 with respect of Fuel Price of 2506.81/MT. SHR as 3600 kCal/kWh and GCV of 2250 kCal/kg shall be applicable to existing Projects as per Regulations 59, 60 and 61. The Auxiliary Consumption Factor for existing Projects commissioned prior to 1 August, 2018 shall be as stipulated in the respective Tariff Orders (i.e., 8.5%). Based on these parameters, the variable cost of the Projects commissioned prior to 1 August, 2018 works out to Rs. 4.38/kWh

Variable Charge

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

$$4.38 = \frac{3600}{2250} \times \frac{1}{(1 - 8.5\%)} \times \frac{2506.81}{1000}$$

7. SOLAR PHOTO VOLTAIC PROJECTS

The Commission notes that 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 2.1 (a) mentioned above, no Generic Tariff will be determined for Solar PV projects commissioning in FY 2019-20.

As mentioned in proviso to para 2.1 (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.

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.

8. 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 2.1, Generic Tariff will be computed as per Financial Principles and Technology-specific parameters in RE Tariff Regulations, 2015 as detailed in this Chapter.

8.1. 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.

8.2. CONTROL PERIOD

The Control Period for Solar Thermal Power Projects shall be in accordance with the relevant stipulations in para 2.2 of this Order.

8.3. 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.

8.4. 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.

8.5. 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.

8.6. 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	73.42

Particulars	Amount (Rs. lakh/MW)
MAT rate of 21.55%	
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: $\text{RoE (\%)} / [1 - \text{Tax Rate (\%)}]$.

8.7. 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.

8.8. 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.

8.9. 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.

8.10. 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 2.3.7. 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.

8.11. CAPACITY UTILISATION FACTOR

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

8.12. 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 2.1(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

Sd/-
(Mukesh Khullar)
Member

Sd/-
(I. M. Bohari)
Member

Sd/-
(Anand B. Kulkarni)
Chairperson

(Abhijit Deshpande)
Secretary




Appendix-1**List of Organisations, persons who submitted Suggestions and Objections**

Sr. No.	Name
1	AA Energy Ltd, 101, Nikalas Tower, Central Bazar Road, Ramdaspath,Nagpur-10
2	Cogeneration Association of India, First Floor, Sakhar Sankul,Shivajinagar,Pune-411 005
3	Manas Agro & Industries 5 th Floor,Gupta Tower,Civil Lines,Nagpur-440001
4	M/s Vayunandana Power Limited, 953,Sector -31,,Gurugram , Harayana,India-122 001
5	Shri Renuka Sugars LTD 7 th Floor, Devchand House Dr. Annie Besant Road, Worli Mumbai
6	Greta Group No 42A, Bheemanna Mudali Garden Road, 2nd Floor Abhiramapuram,Chennai - 600 018
7	NSL Sugars LTD. NSL Icon,8-2684/2/A Road No 12 Banjara Hill, Hyderabad 500034
8	Maharashtra Biomass Energy Developers Association , 7th Floor, Minerva Complex,94,S.D.Road,Secunderabad-500 003
9	Maharashtra State Electricity Distribution Co. Ltd. (MSEDCL)
10	Maharashtra State Power Distribution Co. LTD.(MSPGCL)
11	Maharashtra Energy Development Agency (MEDA), Pune.
12	Shri. Ajit Sampat Dhore, Baramati, Pune

Appendix-2**List of Persons present for the Public Hearing**

Sr. No.	Name
1	Shri. Pradeep Mittal, Dalmia Bharat Sugar and Industries Ltd.
2	Shri. Pankaj Rastogi Dalmia Bharat Sugar and Industries Ltd
3	Shri S.R. Nargalkar (Adv.) for Cogeneration Association of India
4	Shri. S.C. Natu, Cogeneration Association of India
5	Shri. Jagdish Farsinvis, MBEDA
6	Shri. Sanjay Khatal , M.R.S.S.Sangh Ltd. Mumbai.
7	Shri. Udyia Kamat, Manas Agro and Ltd. Nagpur
8	Shri. Kuldeep Kulkarni, Shree Renuka Sugar, Mumbai.
9	Shri. Kishor Sisaye, Shree Renuka Sugar, Mumbai
10	Shri. Swapnil Agarwal, AA Energy, Nagpur
11	Shri. Kiran More, Dr. Babasaheb Ambedkar SSK Ltd.
12	Shri.S.G.Chaure MSPGCL
13	Shri. S.B.Soni MSPGCL
14	Shri. S.A.Nikalje MSPGCL
15	Smt. Kavita Gharat MSEDCL
16	Shri. Amit Bute, MSEDCL
17	Shri Manoj Pise, MEDA
18	Shri. N.P. Jagaldas, BEST
19	Shri. Ghansham Thakkar, AEML
20	Shri. R.M.Ranade, TPC-D

List of Abbreviations

Abbreviation	Expansion
APPC	Average Power Purchase Cost
BoS	Balance of Systems
Capex	Capital Expenditure
CEA	Central Electricity Authority
CERC	Central Electricity Regulatory Commission
COD	Commercial Operation Date
CPI	Consumer Price Index
CUF	Capacity Utilisation Factor
DSM	Deviation Settlement Mechanism
EA 2003	Electricity Act 2003
EPA	Energy Purchase Agreement
FiT	Feed in Tariff
FY	Financial Year
GCV	Gross Calorific Value
GERC	Gujarat Electricity Regulatory Commission
GSS	Grid Substation
GST	Goods and Services Tax
HVRT	High Voltage Ride-Through
IDC	Interest during Construction
InSTS	Intra State Transmission System
IoWC	Interest on Working Capital
IREDA	Indian Renewable Energy Development Agency Ltd.
JNNSM	Jawaharlal Nehru National Solar Mission
kCal	Kilo-Calorie
KERC	Karnataka Electricity Regulatory Commission
kg	Kilo Gram
kW	Kilo Watt
kWh	Kilo Watt-hour
LVRT	Low-Voltage Ride Through
MAT	Minimum Alternate Tax
MCLR	Marginal Cost based Lending Rates
MEDA	Maharashtra Energy Development Agency
MPERC	Madhya Pradesh Electricity Regulatory Commission
MSEDCL	Maharashtra State Electricity Distribution Co. Ltd
MT	Metric Ton
MU	Million Units
MW	Mega Watt
MYT	Multi Year Tariff
NPA	Non-Performing Asset
NVVNL	NTPC Vidyut Vyapar Nigam Ltd
O&M	Operation and Maintenance
OPEX	Operational Expenditure

Abbreviation	Expansion
PFC	Power Finance Corporation Ltd.
PLF	Plant Load Factor
PPA	Power Purchase Agreement
PV	Photovoltaic
QCA	Qualified Coordinating Agency
RBI	Reserve Bank of India
RE	Renewable Energy
REC	Rural Electrification Corporation
REC	Renewable Energy Certificate
RERC	Rajasthan Electricity Regulatory Commission
RoE	Return on Equity
RoW	Right of Way
RPO	Renewable Purchase Obligation
Rs	Indian Rupees
SBI	State Bank of India
SDF	Sugar Development Fund
SECI	Solar Energy Corporation of India
SERC	State Electricity Regulatory Commission
SHP	Small Hydro Power
SHR	Station Heat Rate
VGF	Viability Gap Funding
WPI	Wholesale Price Index
WTG	Wind Turbine Generator
Y-o-Y	Year-on-Year

Annexure – 1A
(SHP above 1 MW and up to and including 5 MW)

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
		<u>Debt: Equity</u>	Debt	%	70%
			Equity	%	30%
			Total Debt Amount	Rs Lacs	445.20
			Total Equity Amout	Rs Lacs	190.80
		<u>Debt Component</u>	Loan Amount	Rs Lacs	445.20
			Repayment Period(incld Moratorium)	years	12
			Interest Rate	%	11.31%
		<u>Equity Component</u>	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	<u>Fiscal Assumptions</u>	Income Tax	%	29.120%
			MAT Rate (for first 10 years)	%	21.549%
		<u>Depreciation</u>	Depreciation Rate for first 12 years	%	5.83%
			Depreciation Rate 13th year onwards	%	0.87%
			Years for 5.83% rate		12
5	Working Capital	<u>For Fixed Charges</u>			
		O&M Charges		Months	1
		Maintenance Spare	(% of O&M exepenses)		15%
		Receivables for Debtors		Months	2
		<u>For Variable Charges</u>			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
		<u>Total O & M Expenses Escalation</u>		%	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

Levillised 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	0.15	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	1.66	1.66	1.66	1.66	1.66	1.66	1.66	1.66	1.66	1.66	1.66	1.66	1.66	1.66	1.66	1.66	1.66	1.66	1.66	1.66	1.66	1.66	1.66	1.66	1.66
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

Levillised 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
Levillised 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%
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%
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%
Accelerated 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

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
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
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
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
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
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

Levellised benefit	0.32	Rs/Unit
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Annexure – 1B

(SHP above 5 MW and upto and including 25 MW)

Form 1.1 Assumptions Parameters

Form 1.1 Assumptions Parameters					Capacity
S. No.	Assumption Head	Sub-Head	Sub-Head (2)	Unit	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
		<u>Debt: Equity</u>			
			Debt	%	70%
			Equity	%	30%
			Total Debt Amount	Rs Lacs	405.06
			Total Equity Amount	Rs Lacs	173.60
		<u>Debt Component</u>			
			Loan Amount	Rs Lacs	405.06
			Repayment Period(incl Moratorium)	years	12
			Interest Rate	%	11.31%
		<u>Equity Component</u>			
			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	<u>Fiscal Assumptions</u>			
			Income Tax	%	29.120%
			MAT Rate (for first 10 years)	%	21.549%
		<u>Depreciation</u>			
			Depreciation Rate for first 12 years	%	5.83%
5	Working Capital		Depreciation Rate 13th year onwards	%	0.87%
			Years for 5.83% rate		12
		<u>For Fixed Charges</u>			
		O&M Charges		Months	1
		Maintenance Spare	(% of O&M exepenses)		15%
6	Operation & Maintenance	Receivables for Debtors		Months	2
		<u>For Variable Charges</u>			0
		Interest On Working Capital		%	11.81%
		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
		<u>Total O & M Expenses Escalation</u>		%	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	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	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

Levelling 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
Levelling 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%	
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	

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%
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%
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%
Accelerated Depm.	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

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
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
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	
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	
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
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

Levelling benefit	0.29	Rs/Unit
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Annexure –2
(Biomass Power Project)

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 stabilisation	%	10%
			Auxillary Consumption after stabilisation	%	10%
			PLF(Stabilization for 6 months)	%	60%
			PLF(during first year after Stabilization)	%	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 Amount	Rs Lacs	156.57
		Debt Component	Loan Amount	Rs Lacs	365.33
			Moratorium Period	years	0
			Repayment Period(incl'd 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		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 Stabilization 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

Variable 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	Levallised	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

Levallised 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

Levallised Tariff (Variable)	5.55
Levallised Tariff (Fixed)	2.28
Levallised 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%
Accelerated 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

Levelling Benefit	0.15	Rs/ Unit
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Annexure-3
(Solar Thermal Projects)

Form 1.1 Assumptions Parameters

S. No.	Assumption Head	Sub-Head	Sub-Head (2)	Unit	olar thermal
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	Debt: Equity	Tariff Period	Years	25
			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(incl'd 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	182.85	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 Generation	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
Levallised 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%
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%
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%
Accelerated 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

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

Levelling benefit	0.91	Rs/Unit
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