Before the

MAHARASHTRA ELECTRICITY REGULATORY COMMISSION

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CASE No. 33 of 2017

In the matter of

Determination of Generic Tariffs for Renewable Energy for FY 2017-18

Coram

Shri. Azeez M. Khan, Member
Shri. Deepak Lad, Member

ORDER

Dated: 28 April, 2017

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

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

2. Regulation 9.1 of the RE Tariff Regulations requires the Commission to determine suo-moto 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 Order dated 25 January, 2016 in Case No 135 of 2015, had determined the Generic Tariff for RE Technologies for FY 2015-16 from the date of publication of the RE Tariff Regulations, i.e., from 10 November, 2015 to 31 March, 2016. The Commission also determined the Generic RE Tariff for FY 2016-17 vide its Order dated 29 April, 2016 in Case No 45 of 2016.

4. Through a Public Notice published in the daily newspapers Times of India and Indian Express (English) and Lokmat and Loksatta (Marathi) on 24 February, 2017, the Commission invited comments by 22 March, 2017 on its Draft RE Tariff Order for FY 2017-18, which was made available on its websites, and intimated that a Public Hearing would also be held on that date. The Public Hearing was held on 22 March, 2017 at Centrum Hall, 1st floor, Centre No.1, 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 2017-18. The Generic Tariff determined through this Order is based on the financial principles and technology specific parameters as explained in the subsequent Sections of this Order.

1. Responses Received, and Commission's 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.

1.1. Revision of Interest on Loan

Comments/Suggestions

AA Energy Ltd. suggested that the Interest Rate of 12.5% be considered as per the present Bank rates, whereas Cogeneration Association of India suggested a rate of 13.50%.

Maharashtra State Electricity Distribution Co. Ltd. (MSEDCL) suggested a clearly defined approach aligned with market dynamics which would reflects prevalent rates, and that the provisions of the Regulations on the rate of Interest on Term Loan be amended to reflect the recent changes in Monetary Policy by Reserve Bank of India (RBI).

Mytrah Energy (India) Pvt. Ltd. suggested that the interest rates on loan be in line with the average normative interest rates prevalent in the top 5 Government and private financial institutions.

Indian Wind Energy Association (InWEA) asked that the methodology in the RE Tariff Regulations, 2015 for computation of Interest on Long Term Loan and Interest on Working Capital (IoWC) be continued. If a departure from the existing methodology is proposed, a public process may be initiated to amend the RE Tariff Regulations instead of resorting to

the provision for 'removal of difficulty' for a change in a major factor in tariff determination. Any change in the methodology for computation of Interest on Long Term Loan and IoWC may be considered only after amendment of the Regulations.

Commission's Ruling

Regulation 15.2 of the RE Tariff Regulations specifies the norms for rate of interest on loans as the State Bank of India (SBI) Base Rate during the year plus 300 basis points. However, as per the RBI guidelines dated 3 March, 2016, new loans will be sanctioned only on the basis of Marginal Cost-based Lending Rates (MCLR). Thus, the benchmark reference rate for new RE Projects to be commissioned during FY 2017-18 has been changed to MCLR instead of the Base Rate.

Different rates of MCLR linked to tenures ranging from 1 day upto 3 years have been notified by SBI from time to time. The loan tenure for RE Projects as per Regulation 15.1 is stipulated as 12 years, and the benchmark reference rate for this tenure is not readily available. Consequently, the Commission proposes to invoke its powers to remove difficulties under Regulation 82 of the RE Tariff Regulations considering this policy change, as discussed at Para 2.4 of this Order.

1.2. Revision of Interest on Working Capital

Comments/Suggestions

AA Energy Ltd. requested the Commission to consider the IoWC as 13.25%, as per the present bank rates, whereas Cogeneration Association of India suggested 14%. MSEDCL stated that IoWC may be at the rate equivalent to the normative interest rate of 200 basis points above the average SBI MCLR (One Year Tenure) prevalent during the last six months or 10%, whichever is lower, for the determination of the tariff for FY 2017-18.

Mytrah Energy suggested that forecasting and scheduling costs be included in the IoWC.

Commission's Ruling

Regulation 29.1 of the RE Tariff Regulations specifies normative Operation and Maintenance (O&M) expenses as 1.47% of the Capital Cost of Wind Power Projects, and the Capital Cost includes the cost of forecasting and scheduling equipment. Regulation 18.1 provides the parameters to be considered for computation of working capital, which also include one month's O&M expenses, receivables for two months, etc. The present proceedings are for determination of the Generic Tariff considering the parameters specified in the RE Tariff Regulations.

As regards the IoWC, the rationale set out at Para 1.1 for revision in the benchmark reference interest rate for long term debt is also applicable in case of the benchmark reference rate for IoWC. Para 2.5 of this Order sets out the detailed view of the Commission on this matter.

1.3. Revision of Loan Tenure

Comments/Suggestions

MSEDCL suggested an increase in the normative loan tenure from 12 years to 13 years, since financial institutions like Power Finance Corporation (PFC), India Renewable Energy Development Agency (IREDA) and Rural Electrification Corporation (REC) extend loans to RE Developers for 10-15 years. Mytrah Energy stated that investors are likely to be given a loan tenure between 13 to 15 years, and the actual cost of debt in the present market is usually higher than the value proposed by the Commission.

Commission's Ruling

As regards loan tenure, the Commission in its first Wind Energy Tariff Order dated 24 November, 2003 in Case Nos. 17(3), 4 and 5 of 2002, had elaborated the rationale for determination of the loan tenure. The development of Wind and other RE Projects and their long-term term financing by Banks and other financial institutions was at a nascent stage at that time. In this background, that Order as well as the subsequent RE Tariff Regulations, 2010 had also specified a loan tenure of 10 years.

While formulating the RE Tariff Regulations, 2015, the Commission had analysed the market conditions and revised the loan tenure from 10 years to 12 years, considering the greater maturity of RE technologies and the availability of loans of a longer tenure.

Thus, Regulation 15.1 of the RE Tariff Regulations specifies the loan tenure of 12 years for the purpose of tariff determination. The Regulations have been notified after due public consultation, and the Commission has considered the tenure of long term loans in line with their provisions.

1.4. Revision of Return on Equity

Comments/Suggestions

MSEDCL stated that the Return on Equity (RoE) norms of other State Electricity Regulatory Commissions (SERCs) have reduced but the RE Developers in Maharashtra are still enjoying a higher RoE. Paying infirm power generation sources such high returns does not make economic and financial sense. Hence, the RoE may be reduced to 14% post tax for the Tariff Period as per the current market expectations, and the RoE may be grossed up by the Minimum Alternate Tax (MAT) as on 1st April of the previous financial year for the entire useful life of the Project.

Mytrah Energy sought that the RoE be kept at 20% for the term loan period and 24% for the post-term loan period of the Project in order to attract investors and promote the RE sector. It also suggested an enabling clause to review the post-tax regulated returns (RoE) because of change in law or change in tax rates in future.

Commission's Ruling

The Central Electricity Regulatory Commission (CERC), in its recent RE Tariff Regulations, 2017, has specified a RoE of 14% (post tax) for the next Control Period (2017-2020) grossed up by the MAT as on 1st April of the previous financial year for the entire Useful Life of the Project. The Commission has also reviewed the RoE specified by other State Electricity Regulatory Commissions (SERCs) for RE. Except for the Gujarat and

Tamil Nadu ERCs, other SERCs have allowed RoE of 16% post tax or 19-20% pre-tax. In its recent Orders for Solar Photo Voltaic (PV) and Municipal Solid Waste Power Projects, the Tamil Nadu ERC has applied RoE of 20% (pre-tax). The Gujarat ERC has considered RoE as 14% plus applicable tax payment in line with its Multi-Year Tariff (MYT) Regulations.

Regulation 17 of the RE Tariff Regulations allows RoE at the rate of 16% by grossing up with the MAT rate for the first 10 years, and grossing up with the Income Tax rate for the remaining Useful Life of the Project. The RE Tariff Regulations have been notified after due public consultation. The Commission has considered the RoE as per the provisions of the RE Tariff Regulations.

1.5. O&M Expenses Escalation Rate

Comments/Suggestions

Tata Power Co. Ltd. (TPC) stated that the CERC had conducted an exercise based on the Wholesale Price Index (WPI) (60% weightage) and Consumer Price Index (CPI) (40% weightage) for the last five years to arrive at a normative rate of escalation for the next Control Period (FY 2017-20). The inflation rate for the 5-year period FY 2011-12 to FY 2015-16 was 5.85%. However, CERC has proposed to maintain the normative normal escalation rate of 5.72% keeping in view the current industry trend for the next Control Period (FY 2017-20). The Commission may accordingly adopt a normative escalation rate of 5.72% as per the CERC RE Tariff Order. Association of Small Hydro Power Projects Developers of Maharashtra also stated that the O&M Expenses for FY 2017-18 may be fixed in line with the CERC Draft RE Tariff Regulations, 2017. The escalation factor for O&M expenses may be specified as 5.72% or 5.84%, which is calculated by considering 5 years' WPI and CPI data.

Mytrah Energy stated that O&M expenses vary with type and location of the Plant, besides its vintage. The O&M escalation rate is inadequate and may be revised.

AA Energy Ltd. stated that the O&M expenses should be considered as Rs. 42 lakh/MW instead of Rs. 27.88 lakh/MW for Biomass Power Plants.

Cogeneration Association of India requested the Commission to consider the actual O&M expenses of Rs. 25 lakh/MW as against Rs. 18.35 lakh/MW for Non-fossil fuel-based Co-Generation Plants.

Commission's Ruling

Regulations 29, 34, 43, 58, 71 and 76 of the RE Tariff Regulations specify the normative O&M Expenses for Wind Energy, Small Hydro, Biomass, Co-Generation, Solar PV and Solar Thermal Projects, respectively, for FY 2015-16 (the Base Year). The Regulations provide that the Base Year O&M expenses be escalated at the rate specified in the Commission's MYT Regulations over the Tariff Period for determination of the levelised Tariff. Regulations 45.1(d), 47.1(c) and 47.2(b) of the MYT Regulations, 2015 specify the norms for escalation of O&M Expense in subsequent years after the Base Year as follows:

"The O&M expenses for each subsequent year shall be determined by escalating the base expenses determined above for FY 2015-16, at the inflation factor considering 60% weightage for the actual point to point inflation over Wholesale Price Index numbers as per Office of Economic Advisor of Government of India in the previous year and 40% weightage for the actual Consumer Price Index for Industrial Workers (all India) as per Labour Bureau, Government of India in the previous year, as reduced by an efficiency factor of 1%, to arrive at permissible O and M expenses for each year of the Control Period."

The Commission considered an O&M expenses escalation rate of 2.97% in the Draft Order, in line with the rate applied in the Commission's latest MYT Tariff Orders issued in FY 2016-17. This was based on the 3-year average variation in WPI and CPI (in relaxation of the MYT Regulations), and retaining the 60% weightage to WPI and 40% weightage to CPI specified in the MYT Regulations.

The Commission notes the comments received on the Draft Order to the effect that the O & M escalation rate of 2.97% is inadequate and needs to be revised. An O&M expenses escalation rate of 5.72% has also been suggested, in line with the Draft RE Tariff Regulations which were published by the CERC on 16 February, 2017.

The escalation rate considered in the Draft Order was based on the last three years' actual WPI and CPI (and an efficiency factor), which is significantly lower than previous years. The Commission has also analysed the approach adopted by the CERC for determining the O&M escalation rate in its RE Tariff Regulations, 2017. The CERC had analysed the last 5 years' Average WPI and CPI Indices from FY 2011-12 to FY 2015-16 considering 60% weightage to WPI and 40% weightage to CPI. However, while finalising its RE Tariff Regulations, 2017, the CERC has retained an O&M expense escalation rate of 5.72%, in line with its earlier RE Tariff Regulations.

Considering the submissions made by various stake-holders on this issue, the Commission has analysed the last 5 years' Average WPI and CPI Indices from FY 2011-12 to FY 2015-16 considering 60% and 40% weightage to WPI and CPI, respectively. This works out to 5.85%.

WPI	
Average 2011-12 to 2015-16	4.36%
Weightage of WPI	60%
Effective Value of WPI	2.61%
CPI	
Average 2011-12 to 2015-16	8.09%
Weightage of CPI	40%
Effective Value of CPI	3.24%
Effective value of inflation rate considering WPI (60%)+CPI(40%) for 2011-12 to 2015-16	5.85%
Less 1% efficiency factor	-1%
O &M escalation rate considered	4.85%

The Commission is of the view that, at this stage, it would be more appropriate to consider the WPI and CPI variation over a longer period so that wide fluctuations in any year are smoothened while arriving at the inflation factor. Hence, the Commission has considered the 5-year average instead of single year variation in WPI and CPI, i.e. from FY 2011-12 to FY 2015-16, to arrive at the inflation factor for projecting the O&M Expenses from FY 2017-18 onwards. Considering 60% weightage to WPI and 40% weightage to CPI, as provided in the Regulations, this works out to 5.85%. After applying the efficiency factor of 1%, the escalation factor to be considered for projecting O & M Expenses works out to 4.85%.

In view of the above, in exercise of its power to remove difficulties under Regulation 82 of the RE Tariff Regulations, the Commission has revised the O&M expenses escalation percentage to be considered for RE Projects. The Commission now stipulates that the O&M expenses for the Base Year shall be escalated considering a yearly escalation factor of 2.96% (as per the RE Tariff Order in Case No. 45 of 2016), and further escalated at the rate of 4.85% for determining the Base O&M expenses for FY 2017-18. These Base O&M expenses shall be escalated throughout the Useful Life of the RE Project at the rate of 4.85%.

1.6. Compliance of RPO through RECs

Comments/Suggestions

TPC stated that the Non-Solar and Solar tariffs proposed in the Draft Order are higher than the proposed Renewable Energy Certificate (REC) prices as proposed to be revised by the CERC from 1st April, 2017 onwards. The Obligated Entities which are non-compliant with the Renewable Purchase Obligation (RPO) may opt for RECs at lower rates, which may result in stranded RE Generation capacities. Hence, the Commission may ensure suitable parity between REC and the Generic Feed-in Tariff (FiT) such that the Obligated Entities can take a balanced view.

Commission's Ruling

The RE Tariff Regulations specify the norms for determination of Generic Tariff for RE technologies, and have been notified after due public consultation. The verification of RPO compliance by Obligated Entities is undertaken by the Commission in separate proceedings under the Commission's RPO Regulations, 2016. The issue raised by TPC is outside the ambit of the present proceedings.

1.7. Revised Wind Zoning for promotion of efficiency in Wind Generation

Comments/Suggestions

MSEDCL stated that, as compared to last financial year, the proposed Generic Tariff rates are slightly lower, but the reduction is not sufficient to make the power procurement viable for supply of electricity to consumers at a reasonable rate. The RE rates in Maharashtra are not only higher than the rates of conventional power purchase by MSEDCL but also among the highest in India. It is not in the interest of MSEDCL's consumers to procure RE power at such high rates. For Wind Energy, it is the highest tariff to lowest efficiency. Efficient use

of the available potential needs to be promoted. There is a need for a more scientific and logical approach to establish the correct Wind Zone to promote only efficient Generators. Hence, the Wind Energy Tariff needs to be determined based on realistic data to avoid profiteering by Developers and to benefit consumers. The high Tariffs given for RE may be reviewed.

Commission's Ruling

The Commission determines the Generic Tariff for RE technologies considering the parameters specified in the RE Tariff Regulations which have been notified after due public consultation. It is not appropriate to compare the RE Tariff rates with the rates of conventional power. The EA, 2003 and Tariff Policy, 2016 enjoin the promotion of RE resources. Moreover, the Generic Tariff specified for RE technologies is a levelised tariff over the entire Tariff period, whereas the rates of fossil-fuel based conventional power are subject to periodic revision as per the MYT Regulations or the adjustments allowed in the Power Purchase Agreements entered into through competitive bidding, as the case may be.

The Commission also notes that the Generic Tariff for Wind Energy in Maharashtra is not the highest in the country. Moreover, the Tariff takes into account the prevalent wind regime and the Commission has determined Zone-wise Tariffs. Wind Tariff for Rajasthan are higher than Maharashtra.

As regards the actual Capacity Utilisation Factor (CUF) for wind power generation in the State, the Commission in its Order dated 12 March, 2014 in Case No. 180 of 2013 had asked the Maharashtra Energy Development Agency (MEDA) for a detailed study to re-assess the realistic CUF of Wind Energy Projects. MEDA has informed the Commission that it is working on the study with the National Institute of Wind Energy (NIWE), and is coordinating with the concerned agencies for the data required by NIWE.

It would not be appropriate to revise the wind zoning in the absence of supporting data. The Commission may review the classification of Wind Zones and CUF norms considering the outcome of the study being undertaken by MEDA with NIWE.

In any event, the present proceedings are for determination of the Generic Tariff for RE technologies considering the parameters specified in the RE Tariff Regulations, which have been notified after due public consultation.

1.8. RE Procurement through Competitive Bidding

Comments/Suggestions

MSEDCL referred to the Gujarat Electricity Regulatory Commission (GERC) letter dated 18 March, 2017 by which it has permitted procurement of RE through competitive bidding. A similar approach may be adopted while determining the Generic Tariff for RE Technologies in Maharashtra for FY 2017-18, and competitive bidding may be allowed to Distribution Licensees for procurement of Wind and Solar power.

Commission's Ruling

The present Order of the Commission is for the determination of Generic Tariff for procurement of RE power in accordance with the RE Tariff Regulations.

As regards competitive bidding for RE procurement by Distribution Licensees, Regulation 5 of the RE Tariff Regulations specifies that the Commission shall adopt the Tariff in respect of RE Projects if it is determined through a transparent process of competitive bidding conducted under Section 63 of the EA, 2003. The 2nd proviso to Regulation 7.2 of the RPO Regulations, 2016 also specifies that procurement of RE power by a Distribution Licensee generated within Maharashtra under a scheme of or approved by the Ministry of New and Renewable Energy (MNRE) may be considered by the State Commission as eligible quantum for fulfilment of the RPO considering the nature of such scheme. Recently, the Commission has also approved the procurement of Solar power by MSEDCL under the Jawaharlal Nehru National Solar Mission (JNNSM) vide Order dated 17 February, 2017 in Case No. 109 of 2016, which involves reverse competitive bidding.

1.9. Policy Options and Financial Incentives for RE Technologies

Comments/Suggestions

MSEDCL stated that there are various policy options and financial incentives available to RE Technologies, especially for Solar and Wind Energy. These enabling policies and incentives result in reducing the capital and operating cost for RE Developers. The objective of promoting RE technologies at FiT tariff should not result in higher tariff for the Developer, prejudicing the interests of the consumers at large. MSEDCL requested to re-determine the tariff as determined in the previous RE Tariff Order dated 29th April, 2016, by exercising regulatory powers in the interest of the consumers at large.

Commission's Ruling

The Commission determines the generic RE Tariff considering the parameters specified in the RE Tariff Regulations. Regulation 24 of the Regulations specify the manner of treatment any subsidies, grants and incentives received under State and Central Government schemes as follows:

> "*24. Grant, Subsidy or Incentive from the Central/State Government*
>
> *...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 installments or within such period as may be stipulated by the Commission;..."*

Thus, the Regulations take into account the impact of any such grant, subsidy or incentive availed by a Project Entity.

The nature and quantum of such subsidies, etc. and their applicability to different Projects varies from time to time. Consequently, the Commission has not considered them for the computation of the Generic Tariff, but has provided in the RE Tariff Regulations for their deduction by Distribution Licensees where applicable.

1.10. Rationalisation of Tariff and review of RE Generic Tariff rates

Comments/Suggestions

In the context of its contention that RE Tariffs in Maharashtra, particularly for Wind Energy, are high and impact consumers adversely, and the need for a better approach to establish the correct Wind Zone so as to promote only efficient Generators, MSEDCL stated that it is necessary to re-consider various parameters based like the maturity of technology, demand supply position, financial incentives, etc. based on the current scenario since the tariffs determined by the other SERCs are lower as compared to the RE FiT rate in Maharashtra, resulting in higher tariff burden on MSEDCL. The FiT rates for RE technologies, especially for Wind and Solar technologies, may be reviewed and the tariffs rationalized in line with the current scenario.

Commission's Ruling

The Commission has determined the Generic Tariff for all RE Technologies based on the norms specified in the RE Tariff Regulations. While those Regulations have attained finality and cannot be at issue in these proceedings, it may be mentioned that, while framing the RE Tariff Regulations, the Commission took into account the norms and parameters considered by CERC and other SERCs, the actual norms and parameters for existing Projects available from MEDA and REC, and indexation/escalation over the existing norms. The norms specified in the Regulations were finalised after a public consultation in which MSEDCL also provided its comments. Moreover, the factual position is that the Tariffs set by the Commission are prudent and comparable with those set by CERC and several other SERCs.

Further, only large Megawatt-scale Solar Projects are moving towards achieving grid parity. Other RE technologies are yet to do so, and hence ordinarily the Tariffs for RE technologies are bound to be higher.

1.11. Revision of RPO Targets

***Comments/*Suggestions**

MSEDCL suggested revision in the RPO targets since they are too aggressive as compared to the capacity availability in the State. In addition, Wind Energy capacity additions are likely to be lower because of reduction in the FiT, expiry of Generation-based Incentive by 31st March, 2017 and reduction in the Accelerated Depreciation from 80% to 40%.

Commission's Ruling

The present proceedings are for the determination of Generic Tariff for RE technologies, considering the parameters specified in the RE Tariff Regulations. The RPO Targets are specified by the Commission in the RPO Regulations, 2016. Reconsideration of these RPO Targets is outside the ambit of these proceedings. The Commission notes MSEDCL's Petition for certain amendments in the RPO Regulations (such as clubbing of Solar and non-Solar RPO targets, etc.) is separately under its consideration. Moreover, those Regulations also provide the option of purchase of RECs for meeting the RPO targets.

1.12. Consideration for Wind-Solar Hybrid Projects under RE Tariff Regulations

Comments/Suggestions

Regen Powertech Pvt. Ltd. suggested that the generic terms and conditions for Generic Tariff for Wind-Solar Hybrid Power Projects be determined instead of providing for determination of Project-specific Tariffs as the latter process is lengthy.

Commission's Ruling

Regulation 2(p) of the RE Tariff Regulations defines a 'Hybrid RE Project' as one that uses a combination of RE technologies approved by the MNRE for electricity generation within the same premises. Hence, Solar-Wind Hybrid RE Projects are also within the purview of these Regulations. The Commission recognises that a Solar-Wind Hybrid Project has benefits arising from complementarities between the two sources of RE. The use of common premises also provides an advantage in terms of saving in Capital Cost, evacuation cost and operational costs. However, the specific parameters, benefits and savings may differ considerably from case to case. For the time being, therefore, and as provided in the Regulations, instead of a Generic Tariff, it would be more appropriate to determine Project-specific Tariffs for such Hybrid Projects. The concerned Developers may approach the Commission for determination of Project-specific Tariffs for their Hybrid RE Projects. The Commission notes that it had taken a similar view when the issue was raised during the previous Generic RE Tariff Order proceedings, but that no such Petition has been received so far.

1.13. Impact of GST

Comments/Suggestions

Mytrah Energy stated that, as per the MNRE report, the forthcoming Goods and Services Tax (GST) will result in an overall increase in tariff of 12-15% in case of Solar and 12-14% in case of Wind Projects. It suggested that the present process be kept on hold until there is clarity on the slab in which different items are categorised is finalised, or build sufficient mechanisms to address concerns, if any, that may arise from GST legislation.

Commission's Ruling

The Commission notes that the GST framework has not been notified till date. Besides, electricity has been proposed to be kept outside the purview of GST so far. Further, as per Regulation 25 of RE Tariff Regulations, taxes and duties levied on the generation and sale of electricity are allowed as a pass-through. The impact of GST on Capital Cost (if any) shall be governed as per the benchmark Capital Cost and indexation mechanism specified in the RE Tariff Regulations.

1.14. Payment Security Mechanism

Comments/Suggestions

Mytrah Energy (India) Pvt Ltd suggested that a payment security mechanism be introduced through a Letter of Credit (LC) backed by a credible escrow account, which will help in the assets not becoming Non-Performing Assets (NPAs) if timely payment is not made by the Distribution Licensees.

Moreover, receivables for 6 months may be considered as Wind Generators have overdue payments of more than 6 months from MSEDCL.

Commission's Ruling

As regards outstanding receivables, Regulation 21 of the RE Tariff Regulations provides for a late payment surcharge at the rate of 1.25% per month for delayed payments beyond 60 days from the date of billing. In its Wind Energy Order dated 24 November, 2003, the Commission had also provided the option of a payment security mechanism through opening of LC which could be incorporated in the Energy Purchase Agreements (EPAs) between the RE Project Entities and Distribution Licensees.

1.15. Energy Conservation and inefficient use of electricity

Comments/Suggestions

Shri. Ulhas Chaudhary stated that the Commission should penalize the inefficient use of electricity, and the use of non-standard equipment and cable joints. Air-conditioning consumes more power and is a luxury, and so a Green Tax of 14% should be levied on such equipment separately and the amount transferred to MEDA. The Housing Societies or Federations and Gram Panchayats may be allowed to collect Rs. 100 per unit as Green Tax from consumers in their areas using air-conditioners. The issue of environmental protection is a sensitive matter. As discussed in the United Nations Climate Change Conference of Parties (COP) 21 Summit, the required measures should be taken to protect the environment and the Commission should initiate suo-moto proceedings on these issues.

Commission's Ruling

The suggestions regarding energy conservation and efficiency are outside the scope of these proceedings, but which MEDA may consider to the extent of its mandate. The imposition of a tax and the utilisation of its proceeds is in the domain of the Government.

RE Technology-wise Comments and Commission's Rulings

WIND ENERGY PROJECTS

1.16. Tariff Period

Comments/Suggestions

Mytrah Energy stated that the Tariff Period be equivalent to the Useful Life of the Project, i.e. 25 years, to eliminate uncertainties arising after the present Tariff Period of 13 years.

Commission's Ruling

Regulation 7.1 of the RE Tariff Regulations specifies the Tariff Period for the determination of Tariff for Wind Energy technologies. The present Order is within the framework of the RE Tariff Regulations, and reconsideration of these basic provisions or their underlying rationale is outside the ambit of these proceedings.

1.17. Revision of Capital Cost

Comments/Suggestions

InWEA sought revision in the Capital Cost of Wind Power Projects to Rs. 625 lakh/MW, considering the additional Capital Cost of Rs. 30 lakh/MW on account of commercial implications of the draft amendments proposed by the Central Electricity Authority (CEA) in technical requirements and standards like HVRT/LVRT, reactive power control and voltage regulation capabilities to be complied with by Wind Energy Generating Stations.

Regen Powertech Pvt. Ltd. suggested that increase in the Capital Cost be considered due to enhancement in technology in terms of increased hub height (+100 m), rotor diameter, blade lengths. The proposed Capital Cost may be aligned with the CERC benchmark Capital Cost for FY 2016-17 (Rs. 619.80 lakh/MW), to which indexation may be applied for determining the Capital Cost for FY 2017-18. It also sought consideration of the increase in capex and recurring operating expenses due to the likely implementation of Forecasting and Scheduling and Deviation Settlement Mechanism (DSM) Regulations in the Intra-State Transmission System (InSTS), for which draft Regulations are already in place in many States, and that these may be factored in determining the O&M expenses for FY 2017-18. Trained and skilled labour is also becoming increasingly expensive, which leads to direct increase in O&M expenses.

The Commission has considered only the capital investment for forecasting and scheduling, which is a one-time cost, whereas the actual cost will be much higher more as the Qualified Coordinating Agency (QCA) will be charging for services monthly.

Mytrah further stated that, as per the CEA technical requirements, Generators are required to install LVRT/HVRT for Wind and Solar energy. Any such cost should be included retrospectively, and the Base Year Capital Cost of Wind Power Projects may be revised to Rs 700 lakh per MW.

TPC stated that the CERC Order dated 5th January, 2016 has directed that all Wind Turbine Generators (WTGs) of capacity of 500 kW or more (except "Stall Type WTGs") comply with LVRT within 2 years. The cost related to installation of LVRTs may be considered, and the time line for meeting this LVRT requirement in Maharashtra may be stipulated.

Commission's Ruling

The Commission notes the contention that advancement in technology and higher hub height (100 M+) would entail additional cost, but it would at the same time yield higher generation which should result in reduction in the economic cost of harnessing of wind energy over the Project's Useful Life.

The Commission also observes that the Objectors have not substantiated their claims of higher Capital Cost with a detailed break-up of component-wise costs or Project-specific information with technical and financial data, and only given their assessment of overall benchmark Capital Cost. In this Order, the Commission has determined the Generic Tariff as per the norms for capital and operating cost and performance parameters stipulated in the RE Tariff Regulations. The detailed rationale for the Capital Cost norm for Wind Power Projects for FY 2017-18 has been elaborated at Para 3.4 of this Order.

As regards the cost relating to installation of LVRT, the Commission notes that statutory requirements for grid stability also provide benefits to the RE generators, and improves the stability of RE generation as well.

1.18. Revision of Capacity Utilisation Factor

Comments/Suggestions

MSEDCL has sought revision in the CUF at relevant speed and increase in hub height to 100 meters, since an increase in CUF of 6-8% has been observed from 80 m hub height to 100 m hub height and, accordingly, CERC has proposed CUF at a different wind speed at 100 m hub height.

Commission's Ruling

Regulation 28.1 of RE Tariff Regulations specifies the Zone-wise wind power density and CUF to be considered for the determination of Tariff for Wind Energy Projects. The Commission has set out the position with regard to Wind Zones and CUF at para. 1.7 above.

1.19 De-rating Factor

Comments/Suggestions

Mytrah Energy stated that Wind Power Projects are subject to wear and tear due to heavy rotating equipment and de-rating of output/performance of the WTGs over time. The Rajasthan ERC RE Tariff Regulations has specified de-rating of 1.25% from the 6th, 10th, 14th and 18th years in the CUF, and a similar de-rating factor may be adopted.

Commission's Ruling

The Rajasthan ERC RE Tariff Regulations, 2014 specify a CUF of 21% for Jaisalmer, Jodhpur and Barmer Districts and 20% for other Districts, and de-ration in CUF of 1.25% of CUF from the 6^{th}, 10^{th} 14^{th} and 18^{th} years. The de-rating factor would have an impact on the operating performance and actual generation of the Plant which is reflected in the norm for CUF. The Commission notes that, except for Rajasthan, neither CERC nor any other SERC have considered the de-rating factor in CUF for Wind Energy generation. Mytrah Energy has also not provided any data in support of its claim for allowing a de-rating factor.

In any event, the present proceedings are for Generic Tariff determination for RE technologies considering the parameters specified in the RE Tariff Regulations, which do not specify any de-rating factor.

SMALL (INCLUDING MINI/MICRO) HYDRO POWER PROJECTS

1.19. Revision of Capital Cost

Comments/Suggestions

Association of Small Hydro Power Projects Developers of Maharashtra (ASHPPDM) suggested that, for promoting the development of Small Hydro Power Projects (SHP) through the private sector, a remunerative tariff representing the actual cost of generation is

a must. The Commission, therefore, should determine the SHP Tariff representative of the cost of generation by applying realistic normative technical and financial parameters. The Capital Cost benchmark for FY 2017-18 for SHP Projects up to 5 MW capacity and between 5 to 25 MW capacity may be revised to Rs. 812 lakh/MW and Rs. 775.8 lakh/MW, respectively, by amending the Regulations. The Commission should not reduce the normative Capital Cost and SHP tariff applicable during FY 2017-18 compared to FY 2016-17, as it does not capture the market realities and ground conditions. It is well known that the cost of plant and equipment raw material, manufacturing cost, etc. is increasing worldwide. Therefore, the normative Capital Cost and other financial parameters may be revisited so as to reflect the market conditions.

TPC stated that the RE Tariff Regulations provide a higher Tariff for Mini/Micro Hydro Projects than for other SHP Projects, and the Commission has determined a higher Tariff accordingly. A comprehensive prudence check of the associated cost for Mini and Micro Hydro Projects should be carried out so that there is no unwarranted burden on consumers while also promoting such Mini/Micro Hydro Projects.

Commission's Ruling

Regulation 30.1 of the RE Tariff Regulations specifies the normative Capital Cost for SHPs for the first year of the Review Period, which is to be revised for each subsequent year as per the indexation mechanism specified in the CERC RE Tariff Regulations. This Capital Cost norm was finalised in the Regulations by considering the CERC norms and other SERCs, the actual Capital Cost of similar Projects collected from REC and MEDA, and Capital Cost indexation over the Base Year Capital Cost of FY 2014-15. Moreover, ASHPPDM has not substantiated its submission with relevant data regarding the increase in the Capital Cost. The Commission has considered the normative parameters provided in the RE Tariff Regulations. The present Order is within the framework of those Regulations, and reconsideration of its basic provisions or their underlying rationale is outside the ambit of these proceedings.

1.20. Distribution network connectivity of Mini/Micro Hydro Projects

Comments/Suggestions

TPC stated that the Mini/Micro Hydro Projects are at remote locations and may not be in the vicinity of a transmission or a distribution network. Hence, the evacuation of power may be a matter of concern and an additional cost burden for the Developer. All Mini/Micro Hydro Projects having inter-connections with any auxiliary network of generating units or connected to a consumer network should also be eligible. The Net Metering arrangement applicable to Roof-top Solar Projects should be extended to such Mini/Micro Hydro Projects to measure any injection into the network.

Commission's Rulings

The evacuation cost beyond the inter-connection point is not the responsibility of the SHP Developer. Regulation 13 of the RE Tariff Regulations specifies that the Capital Cost includes the evacuation infrastructure up to the inter-connection point. The Capital Cost of

Mini/Micro Projects does not include the cost of the distribution or transmission network. Regulation 15 of the RPO Regulations, 2016 also specifies that the grid connectivity network beyond the inter-connection point shall be developed by the Distribution Licensee and the cost recovered through the pricing framework developed by the Commission.

TPC's submission on inter-connection of Mini/Micro Hydro Projects having inter-connection with any auxiliary network of Generating Units or connected to a consumer network would require separate examination with case details. TPC is free to approach the Commission accordingly. The question of extending the applicability of the Solar Roof-top Net Metering arrangement to Mini/Micro Hydro Projects is outside the scope of these proceedings.

1.21. Project-specific Determination of Tariff

Comments/Suggestions

ASHPPDM stated that, as in the case of Solar Thermal Projects, SHPs should be allowed to opt for a Project-specific Tariff and approach the Commission for tariff determination on a case-to-case basis.

Mahati Hydro Power Vidharbha Pvt. Ltd. stated that the Gosikhurd Hydro Power Project was expected to be commissioned in FY 2016-17. However, it is delayed due to no fault of Mahati Hydro and needs to be considered as affected by force majeure condition. Accordingly, the Tariff specified by the Commission for FY 2016-17 needs to be applied to the Project although it may be developed in FY 2017-18. Mahati Hydro proposes to file a separate Petition seeking a Project-specific Tariff for its SHP.

Commission's Ruling

Regulation 8.1 specifies the types of Projects eligible for determination of Project-specific tariff, and does not include SHPs. The present proceedings are for determination of Generic Tariffs for RE technologies considering the parameters specified in the RE Tariff Regulations, and the claims of Mahati Hydro and ASHPPDM are outside the ambit of these proceedings.

BIOMASS-BASED POWER PROJECTS

1.22. Revision of Capital Cost

Comments/Suggestions

AA Energy Ltd. suggested that the Capital Cost be fixed at Rs. 550 lakh/MW, instead of Rs. 482.85 lakh/MW considered in the Draft Order.

Commission's Ruling

Regulation 38 of the RE Tariff Regulations specifies the normative Capital Cost for Biomass Projects for the first year of the Review Period, which is to be revised each subsequent year as per the indexation mechanism specified in the CERC RE Tariff Regulations. This Capital Cost norm was finalised in the Regulations by considering the norms of CERC and other SERCs, the actual Capital Cost of similar Projects collected from

REC and MEDA, and the Capital Cost indexation over the Base Year Capital Cost of FY 2014-15. The present Order is within the framework of the RE Tariff Regulations, and reconsideration of its basic provisions or their underlying rationale is outside the ambit of these proceedings.

1.23. Revision of Fuel Cost, Calorific Value, Variable Cost and Auxiliary Consumption of Biomass Power Plants

Comments/Suggestions

Manas Agro Industries and Infrastructure Ltd. stated that the proposed reduction of variable charges from Rs 5.41/ kWh in FY 2016-17 to Rs 5.14/kWh in FY 2017-18 goes against the market trends. The tariff computation has a minor error: the actual variable charges should be Rs. 5.17/ kWh and the fixed charges Rs. 2.11/kWh.

AA Energy Ltd. suggested that Auxiliary Consumption be considered as 11% as against 10%, and calorific value as between 2900-3100 kCal/kWh.

Maharashtra Biomass Energy Developers Association, Shalivahan Green Energy Ltd. and Vayunandana Power Ltd. suggested that the fuel price be revisited, and that the normative escalation factor of 5% be applied to the prevailing fuel price of Rs. 4286.35/tonne. The appropriate GCV would be 3174 kCal/kg instead of 3611 kCal/kg, considering the fuel cost proposed by the CERC in its Draft RE Tariff Regulations. The consumption of Biomass fuel per unit should be considered as 1.182 kg/kWh. The total cost of power generation would be Rs 7.68/kWh and overhead expenditures would be Rs. 0.43/kWh, which works out to a total cost of Rs. 8.11/kWh. Moreover, as per the EPA dispensation, the monthly generation bills were to be paid within 45 days but this was later increased to 60 days, resulting in increased bank charges and the need for taking overdrafts.

MSEDCL stated that, in accordance with the CERC Regulations, the Commission may adopt the same methodology of fuel price indexation formulae as for CERC.

Commission's Ruling

Regulation 50.1 of RE Tariff Regulations provides that the Biomass fuel price shall be revised considering the Biomass fuel price determined by CERC or a normative escalation factor of 5% per annum, as the Commission may consider appropriate. CERC has recently notified its RE Tariff Regulations, 2017, under which the Biomass fuel price for FY 2017-18 for Maharashtra is specified as Rs. 3344.85/MT. Considering the principle of equivalent heat value, Biomass fuel price for Maharashtra for FY 2017-18 works out to Rs. 3896.21/MT. Considering this Fuel Cost, the Variable Charge of Rs. 5.04/kWh is computed in accordance with Regulation 50.1 by considering the GCV as 3611 kcal/kg, Station Heat Rate (SHR) as 4200 Kcal/kWh and Auxiliary Consumption as 10%.

With regards to Auxiliary consumption, the CERC RE Tariff Regulations, 2017 also specify the Auxiliary consumption for Biomass power plants with water-cooled condenser as 10% from the 2nd year onwards.

The error in the Draft Order pointed out by Manas Agro Industries has been noted and corrected.

1.24. Inter-connection /Delivery Point of Biomass Power Plants

Comments/Suggestions

Manas Agro Industries stated that it is selling power from its 8 MW Biomass Project to BEST Undertaking ('BEST', a Mumbai Distribution Licensee), which is connected to the MSEDCL network at 33 kV. BEST has shifted the delivery point to the "InSTS entry to Transmission", citing disallowance of wheeling charges/ losses by the Commission in its MYT Order dated 28 October, 2016 in Case No. 33 of 2016. As a result, the effective RE Tariff is less than the prescribed Preferential Tariff by Rs. 0.50- 0.55 /kWh. The issue may be clarified and BEST suitably directed.

Commission's Ruling

The present proceedings are initiated by the Commission for determination of Generic Tariff for RE Technologies to be commissioned during FY 2017-18. The issue raised by Manas Agro Industries is outside the ambit of the present proceedings, but it may approach the Commission through a separate Petition to resolve it.

NON-FOSSIL FUEL-BASED CO-GENERATION PROJECTS

1.25. Applicability of Tariff

Comments/Suggestions

Cogeneration Association of India requested that the applicability of the Tariff be extended to the two years FY 2017-18 and 2018-19, instead of only to Projects commissioned in the current year since new Projects which are in the initial stage of implementation during FY 2017-18 would be commissioned only in FY 2018-19 and would have no assurance of the Tariff to which they would be entitled.

Commission's Ruling

Regulation 9.1 of the RE Tariff Regulations specifies that the Commission shall notify the Generic Tariff before or at the beginning of each year of the Review Period. Accordingly, the Commission determines the Generic Tariff applicable for the RE Projects to be commissioned during that financial year. It may be noted that the RE Tariff Regulations specify the various benchmark parameters and indexation mechanism for which provide the trajectory for RE Tariff determination for subsequent years also. Thus, Developers would have some idea of the likely scenario in the following year.

The Commission also notes that the Generic RE Tariff determination on an annual basis in has been undertaken by the Commission in the past as well, in line with the present and the previous RE Tariff Regulations.

1.26. Revision of Capital Cost

Comments/Suggestions

Cogeneration Association of India requested that the Capital Cost computation be reviewed considering the current steel prices and expected increase, and the Capital Cost estimated by

the Sugar Development Fund (SDF). On these considerations, the Capital Cost may be taken as Rs. 525 lakh /MW + Rs. 125 lakh/MW for essential modernisation for optimising power generation and export.

MSEDCL stated that the Commission may consider lowering the Capital Cost to Rs. 452.75 lakh/MW considering the present declining market trends and in line with the CERC Draft RE Tariff Regulations, 2017.

Commission's Ruling

Regulation 53 of the RE Tariff Regulations specifies the normative Capital Cost for Non-Fossil Fuel-based Co-Generation Projects for the first year of the Review Period, which is to be revised in each subsequent year considering the indexation mechanism of the CERC RE Tariff Regulations. This norm was finalised after considering the norms of CERC and other SERCs, the actual Capital Cost of similar Projects collected from REC and MEDA, and the Capital Cost indexation over the Base Year Capital Cost of FY 2014-15.

As regards MSEDCL's suggestion to consider the Capital Cost of Rs. 452.75 lakh/MW in line with the draft CERC Regulations, the Commission notes that CERC has determined the Capital Cost as Rs. 492.50 lakh/MW for FY 2017-18 in its final RE Tariff Regulations, 2017. This Commission has considered a lower normative Capital Cost of Rs 482.85 lakh/MW, as set out in Para 6.2 of this Order.

1.27. Revision of Fuel Cost, Auxiliary Consumption and Station Heat Rate

Comments/Suggestions

Cogeneration Association of India suggested an increase in the Fuel Cost to 2700 Rs/MT as against 2333.03 Rs/MT for FY 2017-18, since the availability of cane is much reduced in this Control Period and its landed cost would increase further.

MSEDCL suggested stated that the Commission may adopt the methodology of Fuel Price Indexation Formulae of CERC for ascertaining the Fuel Cost for FY 2017-18.

Manas Agro Industries stated that the reduction in variable charges from Rs 4.27 / kWh in FY 2016-17 to Rs 4.08/ kWh in FY 2017-18 is contrary to the prevailing market trends. The fixed charges should be at least maintained at the previous year's level, while the Capital Cost, O&M Charges have increased considerably. The Bagasse price may be revised considering normative increase of 5% over the previous year's fuel price instead of the price determined by the CERC.

NSL Sugars Ltd. stated that the Indexation Mechanism formulae should be mentioned in the Order. Bagasse production in Maharashtra and the neighbouring Karnataka and Telangana States has fallen during the current season, resulting in increase in Bagasse price. The CERC Bagasse price for 2016-17 is not relevant for 2017-18 as per the RE Tariff Regulations. The selected option under the Regulations for determination of fuel charges (escalation as against CERC determination) needs to be consistently applied in subsequent years. This will help lakhs of sugarcane farmers and labour in Maharashtra.

Cogeneration Association of India suggested that Auxiliary Consumption be fixed at 10% as against 8.5%, and SHR at 4200 kCal/kWh instead of 3600 kCal/kWh.

Commission's Ruling

Regulation 60.1 of the RE Tariff Regulations specifies the Bagasse price as Rs. 2250/MT during the first year of the Review Period for the purpose of Tariff determination, to be escalated in subsequent years as per the indexation formulae in Regulation 61. Regulation 61.1 specifies that the Bagasse fuel price shall be revised considering the fuel price determined by the CERC or a normative escalation factor of 5% per annum, as it may consider appropriate. Accordingly, the Commission has considered the latest Bagasse fuel price specified by CERC for Maharashtra.

Further, Regulations 56, 57 and 59 specify the norms for Auxiliary Consumption, SHR and Calorific Value, respectively, and these have been applied by the Commission for the determination of Tariff. Reconsideration of these provisions or their underlying rationale is outside the ambit of these proceedings.

1.28. Tariff of Non-Fossil Fuel-Based Cogeneration Projects for renewal of EPA after initial EPA tenure of 13 Years

Comments/Suggestions

Cogeneration Association of India referred to the case of Jawahar Shetkari Sahakari Sarkar Karkhana Ltd. (JSSSKL), Hupri, Dist. Kolhapur. The EPA signed by JSSKL with MSEDCL expired in November, 2014. The Commission may schedule a hearing for determination of tariff for such Projects whose EPAs have expired or are about to expire and determine a Preferential Tariff for them.

Commission's Ruling

The present proceedings are for determination of the Generic Tariff for RE Projects to be commissioned during FY 2017-18. Separate regulatory proceedings are ongoing in Case No. 84 of 2015 initiated by JSSSKL, whose EPA with MSEDCL has expired.

1.29. Non-signing of EPAs by MSEDCL

Comments/Suggestions

Cogeneration Association of India stated that MSEDCL has stopped signing EPAs with Bagasse Co-Generation Plants contending that it has already achieved the target of 2000 MW power procurement from such Plants. However, MSEDCL is considering the installed capacity of Co-Generation Plants and not the actual capacity fed to the MSEDCL grid. As these Co-Generation Plants have to meet the power requirement of the respective sugar factories also, that quantum needs to be reduced from the installed capacity. As on date, out of 2000 MW installed capacity, only 1440 MW power is exported to the grid. Hence, Plants of around 862 MW can be installed with exportable capacity of 560 MW to meet the targets of MSEDCL. Moreover, since MSEDCL is failing in meeting its Non-Solar RPO targets, it must procure the Bagasse Co-Generation power at the Preferential Tariff determined by the Commission. The Commission may direct MSEDCL to honour the policies of the

Government of Maharashtra and the Commission's Tariff Order, and to initiate the process of signing of EPAs immediately. The Commission should also penalise MSEDCL for not meeting its RPO over the last several years.

In view of the non-signing of EPAs by MSEDCL, MEDA is also not issuing infrastructure clearances to these Projects. The Commission may direct MEDA to issue infrastructure clearances to them.

Commission's Ruling

Regulation 19 of the MYT Regulations, 2015 requires the Distribution Licensee to prepare a plan for procurement of power from long-term, medium term and short-term sources to serve the demand for electricity in its area of supply. Regulation 19.4 requires the Licensee to submit its plan for procurement of power from co-generation or renewable sources of energy as per the specified percentage of the total consumption of electricity in the area of a Distribution Licensee. This percentage is specified by the Commission in its RPO Regulations, 2016. Regulation 7.2 of the RPO Regulations require all Obligated Entities to fulfil their RPO targets by procuring RE at the Preferential Tariff (subject to certain exceptions) determined by the Commission by entering into EPAs/PPAs or by purchasing RECs, or both. The RPO compliance of Distribution Licensees is verified by the Commission yearly in suo-moto proceedings.

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.

As regards penalising MSEDCL, the Commission has dealt with MSEDCL's RPO shortfall of FY 2014-15 in its Order dated 14 September, 2016 in Case No. 16 of 2016 as follows:

> *"30. ...the Commission directs MSEDCL as follows with regard to the shortfall against its stand-alone Solar and Non-Solar (excluding Mini/Micro Hydro) RPO targets for FY 2014-15:*
>
> > *1) MSEDCL shall constitute a separate "RPO Regulatory Charges Fund";*
> >
> > *2) The Fund shall be utilised by MSEDCL to purchase Solar and Non-Solar RECs and/or to procure power so as to fully meet the shortfall against its stand-alone Solar and Non-Solar (excluding Mini/Micro Hydro) RPO targets for FY 2014-15, as summarized at para. 19 above, by the end of March, 2017, and the amounts to be deposited into the Fund shall be determined by MSEDCL accordingly from time to time over the remaining period of FY 2016-17;*

3) Considering the circumstances set out in this Order which have led the Commission to invoke Regulation 12, the expenditure expected for purchase of RECs and/or power procurement from the Fund shall not be passed through to consumers to the extent of the shortfall not met by MSEDCL by the end of FY 2016-17.

4) The performance of MSEDCL in this regard shall be reviewed in the RPO compliance verification proceedings for FY 2016-17 and also taken into account in the Mid-Term Review proceedings for the 3rd Multi-Year Tariff Control Period…"

Earlier, a similar dispensation had been directed in the RPO Compliance Verification Order for FY 2013-14 in Case No. 190 of 2014. Considering that Order, the Commission has provisionally disallowed Rs. 260.33 crore, assessed as the cost to the extent of the shortfall in RPO compliance, in its latest MYT Order for MSEDCL dated 3 November, 2016 in Case No. 48 of 2016.

With regard to Cogeneration Association's contention that MEDA is not issuing infrastructure clearances to Co-generation projects, it is free to approach the Commission through a separate Petition.

SOLAR PHOTO VOLTAIC PROJECTS

1.30. Revision of Capital Cost

Comments/Suggestions

TPC stated that the Capital Cost of Rs 424.74 lakh/MW discovered in the recent bidding process carried out by the Solar Energy Corporation of India (SECI) in Maharashtra may not be the most appropriate benchmark because of issues of cost of land and Right of Way (RoW) faced by Solar Projects. Under Option 3 in the draft Order, the Commission has considered a Capital Cost of Rs. 485.67 lakh/MW, which does not include the cost of transmission lines and the bays to be erected by Developers at remote Stations. Hence, the Capital Cost may be considered as Rs. 530 lakh/MW.

Hiranadani Energy Pvt. Ltd. stated that the differences in the structure as well as terms and conditions of contract for sale under the SECI bidding process compared to sale under the EPAs with the State Distribution Licensee at the Preferential Tariff need to be considered. The Commission may revert to its earlier practice of prescribing a normative Capital Cost based on actual market conditions since the tariff discovered under the SECI competitive bidding process and, in effect, the Capital Cost assumption are based on the risk-return assessment for Project development under a given set of tender conditions.

Shri Gajanan Joshi stated that, while considering the Capital Cost, the costs of Transmission Line and Evacuation Cost at the GSS Bay side has not been not considered. This cost is significant and has a substantial impact on the final tariff. This cost may be included in the total Capital Cost before arriving at the Tariff.

Commission's Ruling

The Commission's view on this issue is set out at Para 7.4 of this Order.

1.31. Consideration of Auxiliary Consumption and de-gradation factors

Comments/Suggestions

Shri Gajanan Joshi stated that Auxiliary Power Consumption of 1% needs to be included considering the ground reality of such Projects. In the current competitive low tariff scenario, this consumption of around 1% is very significant and is taking a toll on the financials of such Projects. TPC also stated that, like any other Generating Stations, Solar PV Plants also have Auxiliary Consumption, which is basically towards transformer No-Load Losses (both Inverter and Main Transformers), lighting etc. The Developer has to support it from the Solar generation during the day and import power from the grid at night, which affects the net generation as well as the revenue.

TPC, Shri Gajanan Joshi and Mytrah Energy also proposed that levelised degradation of around 0.5% be factored into the tariff.

Commission's Ruling

The present proceedings are for Generic Tariff determination for RE technologies considering the parameters specified in the RE Tariff Regulations which does not specify any degradation factor or Auxiliary Consumption for Tariff determination. The performance norm in terms of CUF has been specified under the Regulations after public consultation. Reconsideration of those provisions or their underlying rationale is outside the ambit of these proceedings.

1.32. Revision of Capacity Utilisation Factor

Comments/Suggestions

Shri Gajanan Joshi stated that different tariffs should be determined for different CUF levels such as 16%, 17%, 18%, 19% and 20% so that there is Solar RE development across the State. CUF is location-specific and cannot be uniform across Maharashtra. If 19% CUF is considered, Developers would take up Projects only in those parts of Maharashtra where they would have a CUF of 19% or more, resulting in geographically skewed development of Solar RE resources in the State.

Commission's Ruling

Regulation 70 of RE Tariff Regulations specifies the normative CUF to be considered for Tariff determination for each year of the Review Period. The Regulations were finalised after a public and stake-holder consultation. The present proceedings are limited to Generic Tariff determination for RE technologies considering the parameters specified in the RE Tariff Regulations, and reconsideration of the basic provisions of the Regulations is outside its ambit.

The Commission also notes that, for the present, CERC and most other SERCs have considered a single CUF of 19% only for the entire State.

2. COMMON PARAMETERS FOR DETERMINATION OF GENERIC TARIFF

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. 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, the first year of the Review Period was FY 2015-16. FY 2017-18 is the the third year of this Review Period.

2.2. 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 and Non-Fossil Fuel-based Co-Generation 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. 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."

2.4. INTEREST ON LOAN

Regulation 15.1 specifies a 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."*

The Base Rates notified by the SBI from 1 April, 2016 to 31 January 2017 were as follows:

Period		Base Rate (%)	Period (No. of days)
01 April 2016	31 December 2016	9.30	275
01 January 2017	31 January 2017	9.25	31
Weighted Average Base Rate		9.29	

The weighted average of the SBI Base Rate for the period from 1 April, 2016 to 31 January, 2017 as shown in the above Table, plus 300 basis points, works out to an interest rate of 12.29% p.a. (9.29% + 300 basis points).

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.

The MCLR has been effective from 1 May, 2016. The MCLR declared by SBI is shown in the Table below:

MCLR declared by SBI

Date of Revision	Overnight MCLR	1 month MCLR	3 month MCLR	6 month MCLR	1 year MCLR	2 year MCLR	3 year MCLR
01-May-16	8.90%	9.00%	9.05%	9.10%	9.15%	9.25%	9.30%
01-Jun-16	8.90%	9.00%	9.05%	9.10%	9.15%	9.25%	9.30%
01-Jul-16	8.90%	9.00%	9.05%	9 .10%	9.15%	9.25%	9.30%
01-Aug-16	8.85%	8.95%	9.00%	9.05%	9.10%	9.20%	9.25%
01-Sep-16	8.85%	8.95%	9.00%	9.05%	9.10%	9.20%	9.25%
01-Oct-16	8.65%	8.75%	8.80%	8.85%	8.90%	9.00%	9.05%

Date of Revision	Overnight MCLR	1 month MCLR	3 month MCLR	6 month MCLR	1 year MCLR	2 year MCLR	3 year MCLR
01-Nov-16	8.65%	8.75%	8.80%	8.85%	8.90%	9.00%	9.05%
01-Dec-16	8.65%	8.75%	8.80%	8.85%	8.90%	9.00%	9.05%
01-Jan-17	7.75%	7.85%	7.90%	7.95%	8.00%	8.10%	8.15%
01-Feb-17	7.75%	7.85%	7.90%	7.95%	8.00%	8.10%	8.15%
Average	**8.59%**	**8.69%**	**8.74%**	**8.79%**	**8.84%**	**8.94%**	**8.99%**

The RE Tariff Regulations specify a loan period of 12 years, whereas the MCLR has been published for different tenures ranging from overnight to 3 years.

Thus, with the new interest rate regime linked to MCLR, applying the RE Tariff Regulations, 2015 for determining the normative interest rate linked to the SBI Base Rate for new RE Projects to be commissioned during FY 2017-18 would not be appropriate. With the new MCLR regime, which has different tenures, there is a need to revisit the benchmark interest rate along with its spread.

Hence, the Commission has considered the long-term interest rates applied by IREDA, PFC and REC for RE Projects. IREDA's interest rates for different RE technologies and borrower credit profiles range from 10.20% to 11.90% p.a., the average of which works out to 11.05%. The interest rates for long term loans from PFC and REC vary from 9.75% to 12.00% p.a., the average of which is 10.87%. The interest rate considered for Tariff determination purposes ought to reflect the market conditions. The average rate of interest for long term loans offered by the leading lending institutions for various RE technologies and for different borrower credit profiles works out to around 11% p.a. [(11.05% + 10.87) /2]. This rate also amounts to a spread of around 2% p.a. above the Average MCLR (3 year) of 8.99% p.a.

Considering the above discussion, the Commission has applied a normative rate of 11% for the interest on long-term loans for the purposes of this Order, in exercise of its power under the RE Tariff Regulations to remove difficulties.

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

"82. Power to remove difficulties

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

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

2.5. 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, the SBI Base Rate-linked interest rate for working capital is no longer available for new RE Projects. The Commission also notes that the interest rates for short-term loans for RE projects from REC and PFC range from 10.75% p.a. to 11.50% p.a. (REC) and 10.75% to 12.50% p.a. (PFC), the average of which works out to 11.35% p.a. The Commission notes observes that the interest rate for short term borrowings based on SBI MCLR (3 month) plus 200 basis points also works out to 10.74% p.a. (i.e. 8.74% +2%).

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, a normative rate of 11.00% to the IoWC for FY 2017-18.

2.6. 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 9.84 %, 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 11.00%. 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. Based on these rates and the debt-equity ratio, the weighted average RoE ranges from 20.34% to 24.47% depending on the Useful Life of different RE technologies. 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 9.84% = ((11.00% x 0.70 x (1-34.61%)) + (16.00% x 0.30)).

2.7. 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 34.61% (30% Income Tax rate + 12% surcharge + 3% 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% for 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, as detailed in para 2.6 of this Order. The detailed computation of benefit of accelerated depreciation in respect of each RE technology is set out in the technology-specific Sections.

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

2.8. SHARING OF CDM BENFITS

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

2.9. APPLICABILITY OF TARIFF ORDER

This Tariff Order shall be applicable to RE Projects commissioned in FY 2017-18, i.e. from 1 April, 2017 to 31 March, 2018.

As discussed at Paras. 5.14 and 6.14 of this Order, the Variable Charge component determined for Biomass-based Power Projects and Non-Fossil Fuel-based Co-Generation Projects commissioned in FY 2017-18 shall also be applicable to existing such Projects commissioned prior to FY 2017-18.

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, 2017 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 2017-18 based on various RE technologies.

3. WIND ENERGY PROJECTS

3.1. USEFUL LIFE

Regulation 2.1 (mm) of the RE Tariff Regulations defines ‘Useful Life’ in relation to a Unit of a Generating Station (including evacuation system) to mean the period from the COD till such time as specified under the Regulations. The Useful Life of Wind Energy Projects under Regulation 2.1 (mm) is 25 years from COD.

3.2. TARIFF PERIOD

Regulation 7 specifies the Tariff Period for various RE Projects. The Tariff Period for Wind Energy Projects is 13 years, considered from the COD of the Project, and the Tariff determined under the Regulations is applicable only for the duration of the Tariff Period.

3.3. CAPACITY UTILISATION FACTOR

Under Regulation 28 of the RE Tariff Regulations, the CUF norms for Wind Energy Projects are as under:

Wind Zone	*Annual Mean Wind Power Density (W/m^2)*	*CUF*
Zone 1	*<=250*	*22%*
Zone 2	*>250 - <=300*	*25%*
Zone 3	*>300 - <=400*	*30%*
Zone 4	*>400*	*32%*

Provided that these CUF norms may be revised by the Commission through general or specific Order considering data that may become available subsequently."

In accordance with Regulation 28.2, the annual mean wind power density is to be measured at 80 metre hub height.

3.4. CAPITAL COST

The Capital Cost of Wind Energy Projects shall include the cost of the WTG, including its auxiliaries, land cost, site development charges and other civil works, transportation charges, evacuation cost up to the inter-connection point, financing charges and Interest during Construction (IDC), and capital investment for forecasting and scheduling. Accordingly, the Capital Cost of Wind Energy Projects of Rs. 600.74 lakh/MW specified in Regulation 26.2 is the base Capital Cost for the first year of the Review Period. For FY 2017-18, 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 2017-18

	Variables				
Technology	**A**	**b**	**F1**	**F2**	**F3**
Wind	0.6	0.4	0.08	0.07	0.1
Small Hydro	0.6	0.4	0.16	0.1	0.14
Biomass	0.7	0.3	0.1	0.09	0.14
Co-Generation	0.7	0.3	0.1	0.09	0.14

Wholesale Price Index (WPI)

	WPI of Electrical Machinery		WPI of Iron and Steel	
	2016	**2014**	**2016**	**2014**
January	138.30	137.40	153.50	155.10
February	138.00	137.80	153.60	155.40
March	138.00	138.40	153.60	155.90
April	139.40	138.40	154.60	154.60
May	139.20	138.60	154.30	155.20
June	138.90	138.60	153.90	156.10
July	138.80	138.80	153.80	156.10
August	138.70	138.40	155.10	155.70
September	138.60	138.60	155.40	159.10
October	138.70	138.70	154.10	161.10
November	138.80	138.70	154.00	160.70
December	138.90	138.60	154.10	160.60
Average	**138.69**	**138.42**	**154.17**	**157.13**

Variable	Year	Value
SI_0	2014	157.13
SI_{n-1}	2016	154.17
EI_0	2014	138.42
EI_{n-1}	2016	138.69
Dn		**-1.05%**

Parameter	Description	Cost
1+F1+F2+F3		1.25
CC_0 (Rs. lakh/MW)	Capital Cost for the Base Year	600.74
$P\&M_0$(Rs. lakh/MW)	Plant & Machinery Cost for the Base Year Capital Cost Escalation Factor	480.59
$P\&M_n$(Rs. lakh/MW)	Plant & Machinery Cost for the nth Year (FY 2017-18)	475.53
CC_n (Rs. lakh/MW)	**Capital Cost for the nth Year (FY2017-18)**	**594.41**

3.5. DEBT-EQUITY RATIO

Regulation 14.1 of the RE Tariff Regulations provides for a debt-equity ratio of 70:30 for determination of Generic Tariff. Considering this normative ratio and the above Capital

Cost, the debt and equity components for Wind Energy Projects work out to Rs. 416.09 lakh per MW and Rs. 178.32 lakh per MW, respectively**.**

3.6. RETURN ON EQUITY

Regulation 17.2 and 17.3 specifies the normative RoE as under:

> *"The Return on Equity shall be computed at the base rate of 16%, to be grossed up as per the applicable tax rate.*
>
> *The rate of Return on Equity shall be computed by grossing up the base rate with the tax rate equivalent to Minimum Alternate Tax (MAT) during the year for the first 10 years from COD, and the weighted average of normal tax rate during the year for the remaining years of Project life."*

Accordingly, the RoE for the applicable period of this Order is worked out as follows:

Opening Equity (Rs lakh / MW)	178.32
Return on Equity for first 10 years @16% grossing up with MAT rate of 21.34% (Rs lakh per MW)	36.27
Return on Equity after first 10 years @16% grossing up with Income Tax rate of 34.61% (Rs lakh per MW)	43.63

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

3.7. INTEREST ON LOAN

As explained in para. 2.4 of this Order, the interest rate of 11.00% has been considered for Wind Energy Projects for a loan amount of Rs. 416.09 lakh per MW.

3.8. DEPRECIATION

Regulation 16 specifies that depreciation is to be allowed up to 90% of the Capital Cost of the asset. The depreciation rate for the first 12 years of the Tariff Period shall be 5.83% per annum, and the remaining depreciation shall be spread over the remaining Useful Life of the Project from the 13th year onwards.

Accordingly, for Wind Energy Projects, the depreciation rate is 5.83% for the first 12 years, and works out to 1.54% thereafter for the remaining Useful Life of 13 years.

3.9. INTEREST ON WORKING CAPITAL

Regulation 18.1 of the RE Tariff Regulations provides for computation of the Working Capital requirements of Wind Energy Projects as follows:

> *"(a) Operation & Maintenance 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."

As explained earlier at para. 2.4 and 2.5, IoWC is considered as 11.00 % for computation of the Tariff of Wind Energy Projects for the period for FY 2017-18.

3.10. OPERATION AND MAINTENANCE EXPENSES

Regulation 29 of the RE Tariff Regulations specifies the normative O&M Expenses for Wind Energy Projects for FY 2015-16 (Base Year) as 1.47 % of the Capital Cost, which works out to Rs. 8.83 lakh/MW. This is escalated at 2.96% for determining the O&M expenses for FY 2016-17, which is further escalated at 4.85% for the 2nd year of the Review Period. This works out to Rs. 9.53 lakh/MW for FY 2017-18 as the base O&M expenses for Wind Energy Projects. This base O&M for FY 2017-18 is further escalated at the rate of 4.85% for the entire Useful Life of the wind Project, as set out in Para 1.5 of this Order.

3.11. LEVELISED TARIFF FOR WIND ENERGY PROJECTS IN FY 2017-18

Accordingly, the Wind Zone-wise Generic Tariffs for Wind Energy Projects commissioned from 1 April, 2017 to 31 March, 2018 have been determined as follows. The discount factor for levelisation of Tariff for Wind Energy Projects is 9.84%, as computed in para 2.6 of this Order.

Tariff for Wind Energy Projects for FY 2017-18

Wind Energy	Tariff Period	Levelised Tariff from 1 April, 2017 to 31 March, 2018	Benefits of Tax and Additional Depreciation (if availed)	Net Levelised Tariff, adjusting for Tax and Additional Depreciation Benefit) (if availed)
		Rs/kWh	Rs/kWh	Rs/kWh
Wind Zone-1	13	5.40	0.48	4.92
Wind Zone-2	13	4.75	0.42	4.33
Wind Zone-3	13	3.96	0.35	3.61
Wind Zone-4	13	3.71	0.33	3.38

Notes:

- The above Tariff shall be valid for Projects commissioned in FY 2017-18.
- The above Tariff shall be valid for a Tariff Period of 13 years from the COD.
- Detailed computations of Tariffs for Wind Zones 1, 2, 3 and 4 are provided in Annexures 1A, 1B, 1C and 1D of this Order, respectively.

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

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 25MW.

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

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 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 para. 3.4 of this Order. The normative Capital Cost for FY 2017-18 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 2017-18)	427.79	389.21
CC_n(Rs. lakh/MW)	**Capital Cost for the nth Year (FY 2017-18)**	**598.90**	**544.90**

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. 419.23 lakh per MW and Rs. 179.67 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. 381.43 lakh per MW and Rs. 163.47 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)	179.67	163.47
Return on Equity for the first 10 years @16% grossing up with MAT rate of 21.34% (Rs lakh per MW)	36.55	33.25
Return on Equity after first 10 years @16% grossing up with Income Tax rate of 34.61% (Rs lakh per MW)	43.96	40.00

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

4.6. INTEREST ON LOAN

As explained at para. 2.4 above, the interest rate of 11.00% 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. 419.23 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. 381.43 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."

As explained earlier at para. 2.4 and 2.5, the IoWC is taken as 11.00 % for computation of the Tariff for SHPs for FY 2017-18.

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 of 4.85% (as set out at para 1.5 of this Order) for FY 2017-18. Accordingly, the Commission has applied the O&M expense norm for SHPs for FY 2017-18 as shown in the Table below:

Project Size	**O&M Expenses (Rs. lakh/MW) for FY 2017-18**
> 1 MW and upto and including 5 MW	23.52
> 5 MW and upto and including 25 MW	16.65

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 Re. 1 per kWh, respectively, than for other SHPs.

4.13. LEVELISED TARIFF FOR SMALL HYDRO PROJECTS FOR FY 2017-18

Considering the above parameters and the discount factor of 9.84 % (as computed at para. 2.6 of this Order) for levelisation of Tariff for SHPs, the Generic Tariffs during the applicable period of this Order for SHPs commissioned in FY 2017-18 have been determined as under:

Tariff for Mini/Micro Hydro Projects and other SHPs for FY 2017-18

Type of SHP	Tariff Period (Years)	Levelised Tariff from 1 April, 2017 to 31 March, 2018	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	5.86	0.33	5.53
Above 500 kW and up to and including 1 MW	35	5.36	0.33	5.03
Other SHPs				
Above 1 MW and up to and including 5 MW	35	4.86	0.33	4.53
Above 5 MW and upto and including 25	13	4.11	0.30	3.81

Type of SHP	Tariff Period (Years)	Levelised Tariff from 1 April, 2017 to 31 March, 2018	Benefit of Accelerated Depreciation (if availed)	Net Levelised Tariff (upon adjusting for accelerated depreciation benefit, if availed)
		(Rs/kWh)	(Rs/kWh)	(Rs/kWh)
MW				

Notes:

- The above Tariffs shall apply to Projects commissioned during FY 2017-18
- The above Tariffs shall be valid for a Tariff Period of 35 years from COD for SHPs of capacity up to and including 5 MW, and for 13 years for SHPs with installed capacity greater than 5 MW and up to and including 25 MW
- 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 2A and 2B of this Order, respectively.

5. BIOMASS-BASED POWER PROJECTS

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:*

$VC_n = VC_1 x (P_n / P_1)$

where,

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

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

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

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

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

Accordingly, in case of Biomass-based Power Projects commissioned on or before 31 March, 2017, the Variable Charge component of the Tariff for FY 2017-18 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. 3.4 of this Order. The normative Capital Cost for FY 2017-18 computed accordingly is shown in the Table below.

Parameter	Description	Cost
1+F1+F2+F3		1.33
CC_0 (Rs. lakh/MW)	Capital Cost for the Base Year	494.32
$P\&M_0$ (Rs. lakh/MW)	Plant & Machinery Cost for the Base Year Capital Cost	371.67
$P\&M_n$ (Rs. lakh/MW)	Plant & Machinery Cost for the nth Year (FY 2017-18)	366.98
CC_n (Rs. lakh/MW)	**Capital Cost for the nth Year (FY2017-18)**	**488.08**

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 2017-18 work out to Rs. 341.66 lakh per MW and Rs. 146.42 lakh per MWm 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	146.42
Return on Equity for the first 10 years @16% grossing up with MAT rate of 21.34%	29.78
Return on Equity after first 10 years @16% grossing up with Income Tax rate of 34.61%	35.83

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

5.5. INTEREST ON LOAN

As explained in para. 2.4 of this Order, the interest rate of 11.00% has been considered for Biomass-based Power Projects commissioned in FY 2017-18, with a gross opening loan amount of Rs. 341.66 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"*

As explained at para. 2.4 and 2.5 earlier, IoWC is taken as 11.00 % for computation of the Tariff of Biomass Power Projects for FY 2017-18.

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% (as stipulated in Para 1.5 of this Order) for FY 2017-18. Accordingly, the Commission has taken the O&M expense norm for Biomass Projects for FY 2017-18 as Rs. 28.39 lakh per MW.

5.12. CALORIFIC VALUE

In accordance with Regulation 48, the average Calorific Value of the Biomass Fuel (s) of 3611 kcal/kg has been considered for determination of Tariff.

5.13. FUEL COST

Regulation 49 specifies the Biomass fuel price in the first year of the Review Period, i.e., FY 2015-16, as Rs. 3987/MT, to be linked to the indexation mechanism specified under Regulation 50. As per Regulation 50.1, the Biomass fuel price is to be revised taking into consideration the Biomass fuel price determined by the CERC or a normative escalation factor of 5% per annum, as it may consider appropriate.

The CERC has recently notified its RE Tariff Regulations, 2017 for 3 years starting from FY 2017-18. The CERC Regulations specify the Biomass fuel price for Maharashtra for FY 2017-18 as Rs. 3344.85/MT. Considering the equivalent calorific value method, the Biomass fuel price for Maharashtra for FY 2017-18 works out as below:

$$Derived\ Biomass\ fuel\ price\ for\ Maharashtra\ for\ FY\ 2017-18 = Biomass\ fuel\ price\ of\ CERC\ for\ FY\ 2017-18\ for\ Maharashtra\ x\ \frac{Gross\ Calorific\ Value\ (GCV)\ consider\ by\ MERC}{\text{Gross Calorific Value (GCV)}considered\ by\ CERC}$$

$$= 3344.85\ x\ \frac{3611}{3100} = 3896.21\ \text{Rs./MT}$$

Considering the principle of equivalent heat value, the Biomass fuel price for Maharashtra for FY 2017-18 works out to Rs. 3896.21 /MT. Considering this Fuel Cost, the Commission has computed the Variable Charge as Rs. 5.04/kWh in accordance with Regulation 50.1, considering GCV of 3611 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, 2017

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 for new Projects, i.e. 4200 kcal/kWh. The Auxiliary Consumption Factor for existing Projects commissioned prior to 1 April, 2017 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, 2017 works out to Rs 5.04/kWh.

The Fixed Charge component of the FY 2017-18 Tariff for Biomass-based Power Projects commissioned prior to 1 April, 2017 shall be the levelised Fixed Charge approved under the respective RE Tariff Orders.

5.15. LEVELISED TARIFF FOR BIOMASS-BASED POWER PROJECTS FOR FY 2017-18

Considering the above parameters and the discount factor of 9.84 % (as computed at para 2.6 of this Order) for levelisation of Tariff, the Generic Tariffs for Biomass-based Power Projects for FY 2017-18 have been determined as in the Table below.

Date of Commissioning of Project	Fixed Charge (Rs/kWh)	Variable Charge (Rs/kWh)	Tariff from 1 April, 2017 to 31 March, 2018 (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 2017-18	**2.20**	**5.04**	**7.24**	**0.16**	**7.08**
During FY 2016-17	2.25***	**5.04**	7.29	0.17	7.12
During FY 2015-16 (10 November, 2015 to 31 March, 2016)	2.35@	**5.04**	7.39	0.16	7.23
During FY 2015-16 (1 April to 9 November, 2015)	2.27*	**5.04**	7.31	0.22*	7.09
During FY 2014-15	2.27*	**5.04**	7.31	0.22*	7.09
During FY 2013-14	2.17#	**5.04**	7.21	0.21#	7.00
Prior to FY 2013-14	1.70**	**5.04**	6.74	NA	6.74

**** 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 2017-18 for Biomass-based Power Projects are provided in Annexure 3 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 2017-18.

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

6.1. KEY PROVISIONS OF RE TARIFF REGULATIONS

Chapter 6 of the RE Tariff Regulations provides the technology-specific norms for determination of Tariff for Non-Fossil Fuel-based Co-Generation Projects. Regulations 52.1 and 52.2 read as follows:

> *"52.1 The Capital Cost and performance norms specified in this Chapter shall be applicable only to Non-Fossil Fuel-based Co-Generation Projects commissioned after notification of these Regulations.*
>
> *52.2 The fuel-related aspects specified under Regulations 59 to 66 shall be applicable to both existing and new Non-Fossil Fuel-based Co-Generation Projects:*

Provided that the norms in respect of specific fuel consumption and Auxiliary Consumption factor for existing Non-Fossil Fuel-based Co-Generation Projects shall be as stipulated in the respective RE Tariff Orders referred to in Regulation 3.2."

The Regulations also specify that the fuel price for each year of operation, for both existing and new Projects, shall be adjusted according to the following indexation mechanism:

"61.1 In the case of both existing and new Non-Fossil Fuel-based Co-Generation Projects, the following indexing mechanism for adjustment of fuel prices for each year of operation will be applicable for determination of the variable charge component of tariff:

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

$VC_n = VC_1 x (P_n / P_1)$

where,

VC_1 represents the Variable Charge based on Bagasse Price P1 for FY 2015-16 as specified under Regulation 60, and shall be determined as under:

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

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

$P_{(n-1)}$ = Price per tonne of Bagasse for the $(n-1)^{th}$ year to be considered for tariff determination. P_1 shall be the Bagasse price for FY 2015-16 as specified under Regulation 60.

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

Accordingly, in case of Non-Fossil Fuel-based Co-Generation Power Projects commissioned on or before 31 March, 2017, the Variable Charge component of the Tariff for FY 2017-18 shall be determined as per para. 6.14 of this Order. The Fixed Charge component shall continue to be governed by the relevant Orders issued by the Commission.

6.2. CAPITAL COST OF NON-FOSSIL FUEL-BASED CO-GENERATION PROJECTS

The normative Capital Cost of Non-Fossil Fuel-based Co-Generation Projects for the first year of the Review Period (FY 2015-16) has been specified in Regulation 53 as Rs. 489.02 lakh per MW. This Base Year Capital Cost has been escalated considering the CERC RE Tariff Regulations indexation mechanism, as stipulated in Regulation 54 of the Commission's Regulations. The computation steps are as shown in para. 3.4 of this Order.

The normative Capital Cost for FY 2017-18 computed accordingly is as shown in the Table below.

Parameter	Description	Cost
1+F1+F2+F3		1.33
CC_0 (Rs. lakh/MW)	Capital Cost for the Base Year	489.02
$P\&M_0$(Rs. lakh/MW)	Plant & Machinery Cost for the Base Year Capital Cost	367.68
$P\&M_n$(Rs. lakh/MW)	Plant & Machinery Cost for the nth Year (FY 2017-18)	363.04
CC_n(Rs. lakh/MW)	**Capital Cost for the nth Year (FY2017-18)**	**482.85**

6.3. DEBT-EQUITY RATIO

In accordance with Regulation 14.1, the debt and equity components work out to Rs. 337.99 lakh per MW and Rs. 144.85 lakh per MW, respectively.

6.4. RETURN ON EQUITY

In accordance with Regulation 17, the RoE works out as shown in the Table below:

Particulars	Amount (Rs. lakh/MW)
Opening Equity	144.85
Return on Equity for the first 10 years @16% grossing up with MAT rate of 21.34%	29.47
Return on Equity after first 10 years @16% grossing up with Income Tax rate of 34.61%	35.44

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

6.5. INTEREST ON LOAN

As explained in para. 2.4 of this Order, an interest rate of 11.00% has been taken, with a gross opening loan amount of Rs. 337.99 lakh per MW in FY 2017-18.

6.6. DEPRECIATION

In accordance with Regulation 16, the 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.

6.7. INTEREST ON WORKING CAPITAL

Regulation 18 provides for computation of the working capital requirements as follows:

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."*

Further, as explained in para. 2.4 and 2.5, the IoWC is considered as 11.00 % for computation of the Tariff for FY 2017-18.

6.8. OPERATION AND MAINTENANCE EXPENSES

Regulation 58.1 specifies the normative O&M Expenses for Non-Fossil Fuel-based Co-Generation Projects for FY 2015-16 (Base Year) as 3.54% of the Capital Cost, which works out to Rs. 17.31 lakh per MW. This is to be escalated at 2.96% for the second year FY 2016-17, and further at 4.85% (as stipulated in para 1.5 of this Order) for FY 2017-18. Accordingly, the Commission has applied an O&M Expense norm for FY 2017-18 of Rs. 18.69 lakh per MW.

6.9. PLANT LOAD FACTOR

In accordance with Regulation 55.2, PLF of 60% has been considered.

6.10. AUXILIARY POWER CONSUMPTION

In accordance with Regulation 56, the Auxiliary Consumption of 8.5% has been applied.

6.11. STATION HEAT RATE

In accordance with Regulation 57, the Normative SHR is 3600 kcal/kWh.

6.12. CALORIFIC VALUE

Under Regulation 59, the average Calorific Value of Bagasse fuel is considered as 2250 kcal/kg for determination of Tariff.

6.13. FUEL COST

Regulation 60.1 specifies the Bagasse fuel price during the first year, i.e., FY 2015-16, as Rs. 2326.84/MT, which is linked to the indexation mechanism specified under Regulation 61.

As per the indexation mechanism specified in Regulation 61.1, the Bagasse fuel price shall be revised taking into consideration the fuel price determined by the CERC or a normative escalation factor of 5% per annum, as may be considered appropriate. The CERC has recently notified its RE Tariff Regulations, 2017 for 3 years starting from FY 2017-18. The CERC Regulations specify the Bagasse price for Maharashtra for FY 2017-18 as Rs. 2273.75/MT. Considering the equivalent calorific value method, the Bagasse fuel price for Maharashtra for FY 2017-18 works out as below:

$$\text{Derived Bagasse fuel price for Maharashtra for FY } 2017-18$$

$$= \text{Bagasse fuel price of CERC for FY } 2017-18 \text{ for Maharashtra x } \frac{\text{Gross Calorific Value (GCV) consider by MERC}}{\text{Gross Calorific Value (GCV)considered by CERC}}$$

$$= 2273.75\text{x } \frac{2250}{2250} = 2273.75 \text{ Rs./MT}$$

Considering the principle of equivalent heat value, the Bagasse fuel price for Maharashtra for FY 2017-18 works out to Rs. 2273.75 /MT. Considering this Fuel Cost, the Commission has computed the Variable Charge as Rs. 3.98/kWh for Projects to be commissioned in FY 2017-18, in accordance with Regulation 61.1, considering GCV as 2250 kcal/kg, SHR as 3600 Kcal/kWh and Auxiliary Consumption as 8.5%.

6.14. VARIABLE CHARGE FOR BAGASSE-BASED CO-GENERATION POWER PROJECTS COMMISSIONED PRIOR TO 1 APRIL, 2017

As per Regulation 55.2, the fuel-related aspects specified in Regulations 59 to 66 shall be applicable to both existing and new 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 in respect of Fuel Price and GCV shall be applicable to existing Projects as per Regulations 59, 60 and 61. The Auxiliary Consumption Factor for existing Projects commissioned prior to 1 April, 2017 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 April, 2017 works out to Rs 3.98/kWh.

The Fixed Charge component of the Tariff for Projects commissioned prior to 1 April, 2017 shall be the levelised Fixed Charge approved under the respective RE Tariff Orders.

6.15. LEVELISED TARIFF FOR NON-FOSSIL FUEL-BASED CO-GENERATION PROJECTS FOR FY 2017-18

Considering the above parameters and the discount factor as 9.84% (as computed at para 2.6 of this Order) for levelisation of Tariff of Non-Fossil Fuel-based Co-Generation Projects commissioned in FY 2017-18, the Generic Tariffs for such Projects for FY 2017-18 have been determined as under:

TARIFF OF NON-FOSSIL FUEL-BASED CO-GENERATION PROJECTS IN FY 2017-18

Date of Commissioning	Fixed Charge (Rs/kWh)	Variable Charge (Rs/kWh)	Tariff (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 2017-18	**2.35**	**3.98**	**6.33**	**0.16**	**6.17**
During FY 2016-17	2.43***	3.98	6.41	0.21	6.20

Date of Commissioning	Fixed Charge (Rs/kWh)	Variable Charge (Rs/kWh)	Tariff (Rs/kWh)	Benefit of Accelerated Depreciation (if availed) (Rs/kWh)	Net Levelised Tariff (upon adjusting for accelerated depreciation benefit, if availed) (Rs/kWh)
During FY 2015-16 (10 Nov, 2015 to 31 March, 2016)	2.52@	3.98	6.50	0.21	6.29
During FY 2015-16 (1 April to 9 November, 2015)	2.46*	3.98	6.44	0.28	6.16
During FY 2014-15	2.46*	3.98	6.44	0.28	6.16
During FY 2013-14	2.38#	3.98	6.36	0.27	6.09
Prior to FY 2013-14	2.26**	3.98	6.24		6.24

**** 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
*** As per Order dt 11 January, 2010 in Case No. 123 of 2008.*

The computations of Tariff for FY 2017-18 are provided in Annexure 4 of this Order. The Fixed Charge component of the Tariff for Projects commissioned prior to 1 April, 2017 shall be the levelised Fixed Charge approved under the respective RE Tariff Orders. The Tariff Rate comprises (i) Fixed Charge component, and (ii) Variable Charge component, and shall be applicable for sale of power by such Projects to Distribution Licensees in Maharashtra in FY 2017-18.

6.16. 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. 3896.21/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 this Fuel Cost and Calorific Value and the Auxiliary Consumption and SHR applicable to Non-Fossil Fuel-based Co-Generation Projects set out at para 6.10 and 6.11, respectively, the Commission has computed the Variable Charge as Rs. 4.25/kWh for Non-Fossil Fuel-based Co-Generation Projects using biomass for FY 2017-18 (for the period for which such Projects are using biomass) as follows:

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

$$4.25 = \frac{3600}{3611} \times \frac{1}{(1 — 8.5\%)} \times \frac{3896.21}{1000}$$

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.

6.17. 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 2017-18, in accordance with Regulation 67.

7. SOLAR PHOTO VOLTAIC PROJECTS

7.1. USEFUL LIFE

Regulation 2.1 (mm) defines ‘Useful Life’ in relation to 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 Photo Voltaic (PV) Projects is 25 years.

7.2. CONTROL PERIOD

The Control Period for Solar PV Projects shall be in accordance with the relevant stipulations at para 2.1 of this Order.

7.3. TARIFF PERIOD

Regulation 7 specifies the Tariff Period for Solar PV Projects as 13 years. In terms of Regulation 7.5, the Tariff Period specified shall be reckoned from the COD of the RE Projects, and the Tariff determined under the Regulations shall be applicable only for the duration of the Tariff Period.

7.4. CAPITAL COST OF SOLAR PV PROJECTS

Regulation 69 specifies the normative Capital Cost of Solar PV Projects as Rs. 605.85 lakh/MW for the Base Year FY 2015-16. For FY 2016-17, in its previous RE Tariff Order dated 29 April, 2016 in Case No.45, the Commission had taken the Capital Cost of Solar PV Projects as Rs. 530.02 lakh/MW, in line with the CERC's RE tariff Order dated 23 March, 2016.

However, for FY 2017-18, CERC has not determined a benchmark Capital Cost for Solar PV Projects and its RE Tariff Regulations, 2017 do not envisage such a generic determination. The Commission notes that the Capital Cost of Solar PV modules varies significantly, but the declining cost trend is expected to continue in the near future as well. Hence, for deriving the normative Capital Cost for Solar PV Projects for FY 2017-18, the Commission evaluated the following three options:

a) Option 1: Capital Cost determined by other SERCs for FY 2017-18

The Commission considered the Capital Cost specified by other SERCs, primarily Gujarat (GERC), Madhya Pradesh (MPERC), Karnataka (KERC) and Rajasthan (RERC) for FY 2017-18. Except for RERC, all others have considered a Capital Cost in the range of Rs. 530 lakh/MW to Rs. 615 lakh/MW, equal or higher than the Capital Cost considered by this Commission for FY 2016-17.

In its recent Order dated 23 August, 2016, the RERC has taken a Capital Cost of Rs. 518.59 lakh/MW. However, this includes evacuation and transmission costs and connectivity charges of Rs.15 lakh/MW. The RERC Capital Cost excluding evacuation and transmission costs works out to Rs. 503.59 lakh/MW.

b) **Option 2: Derived Capital Cost considering Viability Gap Funding and tariff discovered under reverse bidding process of SECI under JNNSM**

The SECI invited bids under Phase-II, Batch-IV of the Jawaharlal Nehru National Solar Mission (JNNSM) for Maharashtra for 450 MW in the open category on 14 June, 2016 with a benchmark tariff of Rs. 4.43/kWh and Viability Gap Funding (VGF) support. SECI will also charge Rs.0.07 /kWh as trading margin from the Distribution Licensees.

Considering the SECI trading margin, the benchmark tariff for Distribution Licensees will be Rs. 4.50/kWh. The Commission has estimated the proportionate per MW Capital Cost for arriving at the tariff of Rs. 4.50/kWh, considering the market benchmark for cost of capital.

The VGF sought by the bidders ranges from zero to 19.99 lakh/MW. However, as the bids of zero VGF are only for 10 MW out of the total capacity of 450 MW, the Commission has not taken these into account. The VGF sought by other bidders for the remaining 440 MW capacity is between Rs. 19 lakh/MW to Rs.19.99 lakh/MW. The Average VGF sought by bidders is Rs.19.74 lakh/MW. Considering VGF as additional Capital Cost, the total Capital Cost is derived as Rs. 405 + 19.74 = Rs. 424.74 lakh/MW.

The tariff recently discovered through competitive bidding for the 750 MW Solar PV Project at Rewa, Madhya Pradesh is Rs. 2.97/kWh for the 1st year and Rs.3.30/kWh as the levelised Tariff for 25 years. The Commission notes, however, that there are several

provisions in the bid documents and structuring of the Rewa Project that has enabled significant reduction in the price. Some of the important factors include (a) very large Project size enabling economies of scale, (b) Solar Park model which reduces development risk; (c) evacuation arrangement with ISTS connectivity (d) long term off-take assurance with pre-identified credit-worthy customers (e) conducive payment security mechanism supported by suitable fund which minimises risk and facilitates long term capital (f) payment guarantee support, etc. Moreover, the present Generic Tariff determination has to address a range of Project profiles in terms of size, configuration, etc. Hence, relying on the Rewa Project for the present Generic Solar PV Tariff determination would not be appropriate.

c) Option 3: Component-wise cost-plus approach based on market cost for Solar PV modules and Balance of Systems (BoS) of Projects

The Capital Cost of Solar PV Projects broadly comprises the PV module and the non-module components, or the BoS of the Project. The Commission analysed the module and non-module cost separately at market trends and considered the component-wise Capital Cost as below:

Item	Component-wise Capital Cost (Rs. lakh/MW)	Remarks
PV Module	294.04	Based on Market Analysis
Power Conditioning Unit	25	
Land	25	Similar to CERC's Order for FY 2016-17
Civil & general Works	35	
Ground Mounting Structures	35	
Cables and transformers	44	
Preliminary/Pre-operating expenses	27.63	
Total in Rs. lakh/MW	**485.67**	

The Capital Cost set out in **Option-1** above may not be representative of the prevalent Solar PV market scenario trend as most of the SERC Orders were issued several months ago, in August, 2016. As regards **Option-3** for estimating the component-wise Capital Cost, the CERC RE Tariff Regulations, 2017 do not envisage any generic benchmark Capital Cost for Solar PV Projects, and the Capital Cost would be determined on a Project-specific basis. Thus, no benchmark for component-wise Capital Cost for FY 2017-18 is available at this stage, and the component-wise cost benchmark for the previous year, i.e. FY 2016-17, is available from the CERC's earlier RE Tariff Order.

Estimating the component-wise Capital Cost for FY 2017-18 under Option-3 considering the percentage share of different cost components as approved for FY 2016-17 would not be appropriate considering the rapid decline in the PV Module costs. The PV module costs based on current and expected market price trends may be considered for Capital Cost estimation for FY 2017-18, but projection of other non-Module costs (e.g. land, power

evacuation, erection and installation costs) would be a challenge without assessment of ground realities. Estimation of non-Module Costs linked to approved costs for FY 2016-17, as envisaged under Option-3, would not appropriately represent the Projected cost estimates for FY 2017-18.

The Commission notes that, out of 9 GW + Solar PV installed capacity in India (as in February, 2017), over 80% capacity has been set up through the bidding process under Central schemes (SECI/NVVNL) or State-level programmes, and only a relatively small component of Solar capacity addition has taken place under the cost-plus regulated regime. Hence, it may be appropriate to consider cost benchmarks emerging through the bidding process as it reflects prevalent market conditions, emerging trends in technology and costs and corresponding expectations of risks and returns. The process referred to in **Option-2** was undertaken by SECI specifically for Maharashtra State and through open competitive bidding. Moreover, the Projects under this bidding process are expected to be commissioned in FY 2017-18.

Hence, the Commission is of the view that it would be appropriate to consider the Capital Cost derived from SECI's bidding process as set out Option-2 above, which is Rs. 424.74 lakh/MW for Solar PV Power Projects, for the Generic Tariff for such Projects for FY 2017-18.

7.5. DEBT-EQUITY RATIO

In accordance with Regulation 14.1, the normative debt and equity components for Solar PV Projects shall be Rs. 297.32 lakh per MW and Rs. 127.42 lakh per MW, respectively.

7.6. RETURN ON EQUITY

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

Particulars	**Amount (Rs. lakh/MW)**
Opening Equity	127.42
Return on Equity for the first 10 years @16% grossing up with MAT rate of 21.34%	25.92
Return on Equity after first 10 years @16% grossing up with Income Tax rate of 34.61%	31.18

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

7.7. INTEREST ON LOAN

As explained in Para. 2.4 of this Order, an interest rate of 11.00% has been taken for a loan amount of Rs. 297.32 lakh per MW in FY 2017-18.

7.8. DEPRECIATION

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

7.9. INTEREST ON WORKING CAPITAL

Regulation 18.1 provides for computation of the working capital requirements for Solar PV Projects as under:

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."*

As explained in Para. 2.4 and 2.5 of this Order, the IoWC is considered as 11.00% for computation of the Tariff.

7.10. OPERATION AND MAINTENANCE EXPENSES

Regulation 71.1 specifies the normative O&M Expenses for Solar PV Projects for FY 2015-16 (Base Year) as Rs. 13 lakh per MW. This is to be escalated at 2.96% for the second year FY 2016-17, and further escalated at 4.85% (as set out in para 1.5 of this Order) for FY 2017-18. Accordingly, the Commission has taken the O&M Expense norm for Solar PV Projects for FY 2017-18 as Rs. 14.03 lakh per MW.

7.11. CAPACITY UTILISATION FACTOR

In accordance with Regulation 70, a CUF of 19% has been taken.

7.12. LEVELISED TARIFF FOR SOLAR PV POWER PROJECTS COMMISSIONED IN FY 2017-18

Considering the parameters discussed above and the discount factor of 9.84 % derived from the methodology at para. 2.6 of this Order, the Generic Tariff for Solar PV Projects commissioned during FY 2017-18 has been determined as shown below:

Tariff for Solar PV Power Projects commissioned in FY 2017-18				
Particulars	**Tariff Period**	**Levelised Tariff**	**Benefit of Accelerated Depreciation (if availed)**	**Net Levelised Tariff (upon adjusting for Accelerated Depreciation benefit, if availed)**
		(Rs/kWh)	(Rs/kWh)	(Rs/kWh)
Solar PV Projects	13	5.13	0.39	4.74

The Tariff computations for FY 2017-18 are provided in Annexure 5A of this Order.

7.13. LEVELISED TARIFF FOR SOLAR ROOF-TOP PV PROJECTS FOR FY 2017-18

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 during FY 2017-18 shall be as follows:

Tariff for Solar Roof-top PV Projects commissioned in FY 2017-18

Particulars	Tariff Period	Levelised Total Tariff	Benefit of Accelerated Depreciation (if availed)	Net Levelised Tariff (upon adjusting for Accelerated Depreciation benefit, if availed)
		(Rs/kWh)	(Rs/kWh)	(Rs/kWh)
Solar Roof-top PV and other small Solar Power Projects	13	5.63	0.39	5.24

8. SOLAR THERMAL POWER PROJECTS

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 2.1 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. 1200 Lakhs/MW as specified in the RE Tariff Regulations for the base year for the Projects to be commissioned in FY 2017-18 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
Opening Equity	360.00
Return on Equity for the first 10 years @16% grossing up with MAT rate of 21.34%	73.23
Return on Equity after first 10 years @16% grossing up with Income Tax rate of 34.61%	88.08

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

8.7. INTEREST ON LOAN

As explained in para. 2.4 of this Order, the interest rate of 11.00% has been considered for Solar Thermal Power Projects for a loan amount of Rs. 840.00 lakh per MW for FY 2017-18.

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."*

As explained above in para. 2.4 and 2.5, the IoWC is considered as 11.00% for computation of Tariff for FY 2017-18.

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% (as set out in para 1.5 of this Order) for FY 2017-18. Accordingly, the Commission has considered the O&M expenses for Solar Thermal Power Projects for FY 2017-18 as Rs. 16.19 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. LEVELISED TARIFF FOR SOLAR THERMAL POWER PROJECTS COMMISSIONED IN FY 2017-18

Considering the parameters discussed in the preceding paras. and the discount factor of 9.84 % derived by the methodology set out at para. 2.6 of this Order, the Generic Tariff for Solar Thermal Power Projects commissioned in FY 2017-18 has been determined as under:

Tariff for Solar Thermal Power Projects				
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	11.28	1.02	10.26

The Tariff computations for FY 2017-18 are provided in Annexure 5B of this Order.

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

S.No.	Renewable Energy Projects	Annexure
1	**Wind Power Projects**	
	Wind Zone-I	Annexure 1A
	Wind Zone-II	Annexure 1B
	Wind Zone III	Annexure 1C
	Wind Zone IV	Annexure 1D
2	**Small Hydro Power Projects**	
	SHP above 1MW and upto and including 5 MW	Annexure 2A
	SHP above 5 MW and upto and including 25 MW	Annexure 2B
3	**Biomass Power Projects**	Annexure 3
4	**Non-Fossil Fuel-based Co-Generation Projects**	Annexure 4
5	**Solar Projects**	
	Solar PV Projects	Annexure 5A
	Solar Thermal Power Projects	Annexure 5B

Sd/-
(Deepak Lad)
Member

Sd/-
(Azeez M. Khan)
Member

(Ashwani Kumar Sinha)
Secretary

Appendix-1

List of Persons/Organisations submitted Suggestions and Objections

Sr. No.	Name
1	Maharashtra State Electricity Distribution Co. Ltd. (MSEDCL) Plot No. G-9, Prakashgad, Bandra (East), Mumbai 400 051
2	AA Energy Ltd, 101, Nikalas Tower, Central Bazar Road, Ramdaspeth,Nagpur-10
3	Co-Generation Association of India, First Floor, Sakhar Sankul,Shivajinagar,Pune-411 005
4	Maharashtra Biomass Energy Developers Association , 7th Floor, Minerva Complex,94,S.D.Road,Secunderabad-500 003
5	Association of Small Hydro Power Projects Developers of Maharashtra, 32-33,Shankarshet Road,Pune-411 037
6	Manas Agro Industries & Infrastructure Ltd., 5TH Floor,Gupta Tower,Civil Lines,Nagpur-440 001
7	Vayunandana Power Limited, 953,Sector -31,,Gurugram , Harayana,India-122 001
8	Mahati Hydropower Vidharbha Private Ltd., 32-33, Shankarshet Road,Behind S.T.Workshop,Pune-411 037
9	Shri Gajanan Joshi
10	Mytrah Energy (India) Pvt. Ltd. 8001, Q-City,S.No.:109, Gachibowli,Hydrabad-500 032
11	Hiranadani Energy Pvt.Ltd.,12th Floor , Knowledge Park, Hiranandani Business Park,Pawai,Mumbai-400 076
12	NSL Sugars Ltd., NSL ICON, 4th Floor,8-2-684/2/A,Road No.12, Banjara Hills,Hydrabad-500 034
13	ReGen Powertech Pvt. Ltd.,2nd Floor,Gopal Das Bhawan, 28,Barakhamba Road,Connaught Place,New Delhi-110001
14	Indian Wind Energy Association, 2nd Floor, All India Federation of the Deaf (AIFD) Bulding,12-13, Special Industrial Area, Shaheed Jeet Sing Marg,New Delhi-110067
15	The Tata Power Company Ltd. Backbay Receiving Station, 148, Lt Gen J Bhonsale Marg, Nariman Point, Mumbai-400 021
16	Shalivan Green Energy Ltd. Association
17	Ulhas Pandharinath Choudhari ,56/5,Gorai (2), Boriwali (W), Mumbai-400 091

Appendix-2

List of Persons and Organisations present for the Public Hearing

Sr. No.	Name
1	Shri. Sushant Gaikwad, Reliance Infrastructure Ltd.
2	Shri. Pradeep Mittal, Dalmia Sugar and Industries Ltd.
3	Shri. Ishaan Choksi, Eternity Legal
4	Shri. Abhay Kulkarni, Cogeneration Association of India
5	Shri. Yuvraj Dhangar, Mahadik Sugar & Agro products
6	Shri. Ganesh Haware, Mahati Hydro power Vidarbha Private Ltd.
7	Shri. M.N. Mengharajan, DLI Power (India) Private Ltd.
8	Shri. P.V. Salunkhe, Association of Small Hydro power Project Developers of Maharashtra
9	Shri. A.B. Chougule, Jawahar Shetkari Sahakari Sakhar Kharkhana Ltd.
10	Shri. V.P. Charan
11	Shri. Satya Boyine, Chandrapur, Maharashtra
12	Shri. S.A Nikalje, MSPGCL
13	Shri. Dayanand Suryavanshi, Suzlon Energy Ltd.
14	Shri. Anant Sant, Idam Infrastructure Advisory Pvt. Ltd.
15	Shri. Swapnil Kolwadkar, Idam Infrastructure Advisory Pvt. Ltd.
16	Shri. Bhagavatheswaran, Idam Infrastructure Advisory Pvt. Ltd.
17	Shri. Y.K.Prasad, MSEDCL
18	Shri. R.T. Age, MSPGCL
19	Shri. Gajanan Joshi, KCS Services
20	Shri. VVVSN Rao, INU-Barath
21	Shri. Abhijit Dhamdhere, IPPAI
22	Shri. Kavita Gharat, MSEDCL
23	Shri. N.P.Jagaldas, BEST Undertaking
24	Shri. Kishore P Khadke , BEST Undertaking
25	Shri. Vikalp Vats, Indian Wind Energy Association

Sr. No.	Name
26	Shri. Pradeep Kumar, Indian Wind Energy Association
27	Shri. Vineet Jain, Avaada Power
28	Shri. S.A. Chawla, Spark Green Energy Private Ltd.
29	Shri. Anup Goyal, Greta Energy Ltd.
30	Shri. R.G. Tambe, Sahyadri
31	Shri. S.S. Babar, Cogeneration Association of India
32	Shri. K.P Kumbhar, Vayunandana Power Limited
33	Shri. Anil P. Shirole
34	Ch. Ravikant, Vaman

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
PFC	Power Finance Corporation Ltd.

Abbreviation	Expansion
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

(Wind Zone-1)

Form 1.1 Assumptions Parameters — Wind Zone

S. No.	Assumption Head	Sub-Head	Sub-Head (2)	Unit	1
1	**Power Generation**				
		Capacity			
			Installed Power Generation Capacity	MW	1
			Capacity Utilization Factor	%	22.0%
			Useful Life	Years	25
2	**Project Cost**				
		Capital Cost/MW	Power Plant Cost	Rs Lacs/MW	594.41
3	**Sources of Fund**				
			Tariff Period	Years	13
		Debt: Equity			
			Debt	%	70%
			Equity	%	30%
			Total Debt Amount	Rs Lacs	416.09
			Total Equity Amout	Rs Lacs	178.32
		Debt Component			
			Loan Amount	Rs Lacs	416.09
			Repayment Period(incld Moratorium)	years	12
			Interest Rate	%	11.00%
		Equity Component			
			Equity amount	Rs Lacs	178.32
			Return on Equity for first 10 years	% p.a	20.34%
			RoE Period	Year	10
			Return on Equity 11th year onwards	% p.a	24.47%
			Weighted average of ROE		22.82%
			Discount Rate		9.84%
4	**Financial Assumptions**				
		Fiscal Assumptions			
			Income Tax	%	34.608%
			MAT Rate (for first 10 years)	%	21.342%
		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)		15.00%
		Receivables for Debtors		Months	2
		For Variable Charges			
		Interest On Working Capital		%	11.00%
6	**Operation & Maintenance**				
		power plant (FY15-16)		Rs Lakh	8.83
		power plant (FY17-18)		Rs Lakh	9.53
		Total O & M Expenses Escalation		%	4.85%

Form 1.2 Form Template for (Wind 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	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
Gross/Net Generation	MU		1.93	1.93	1.93	1.93	1.93	1.93	1.93	1.93	1.93	1.93	1.93	1.93	1.93	1.93	1.93	1.93	1.93	1.93	1.93	1.93	1.93	1.93	1.93	1.93	1.93

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		9.53	10.00	10.48	10.99	11.52	12.08	12.67	13.28	13.92	14.60	15.31	16.05	16.83	17.64	18.50	19.40	20.34	21.32	22.36	23.44	24.58	25.77	27.02	28.33	29.70
Depreciation	Rs Lakh		34.65	34.65	34.65	34.65	34.65	34.65	34.65	34.65	34.65	34.65	34.65	34.65	9.16	9.16	9.16	9.16	9.16	9.16	9.16	9.16	9.16	9.16	9.16	9.16	9.16
Interest on term loan	Rs Lakh		43.86	40.05	36.23	32.42	28.61	24.79	20.98	17.16	13.35	9.54	5.72	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
Interest on working Capital	Rs Lakh		2.38	2.41	2.43	2.46	2.48	2.51	2.54	2.57	2.60	2.64	2.67	2.71	2.75	2.79	2.83	2.87	2.92	2.97	3.02	3.08	3.13	3.19	3.25	3.32	3.39
Return on Equity	Rs Lakh		36.27	36.27	36.27	36.27	36.27	36.27	36.27	36.27	36.27	36.27	43.63	43.63	43.63	43.63	43.63	43.63	43.63	43.63	43.63	43.63	43.63	43.63	43.63	43.63	43.63
Total Fixed Cost	**Rs Lakh**		**126.71**	**123.38**	**120.07**	**116.79**	**113.54**	**110.31**	**107.11**	**103.94**	**100.80**	**97.70**	**101.98**	**98.95**	**72.37**	**73.22**	**74.12**	**75.06**	**76.05**	**77.09**	**78.17**	**79.31**	**80.50**	**81.76**	**83.07**	**84.44**	**85.88**
Per unit Fixed Cost	**Rs/kWh**		**6.57**	**6.40**	**6.23**	**6.06**	**5.89**	**5.72**	**5.56**	**5.39**	**5.23**	**5.07**	**5.29**	**5.13**	**3.76**	**3.80**	**3.85**	**3.90**	**3.95**	**4.00**	**4.06**	**4.12**	**4.18**	**4.24**	**4.31**	**4.38**	**4.46**

Levallised tariff corresponding to Useful life

Per Unit Cost of Generation	Unit	Levellised	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
O&M expn	Rs/kWh	**0.74**	0.49	0.52	0.54	0.57	0.60	0.63	0.66	0.69	0.72	0.76	0.79	0.83	0.87	0.92	0.96	1.01	1.06	1.11	1.16	1.22	1.28	1.34	1.40	1.47	1.54
Depreciation	Rs/kWh	**1.46**	1.80	1.80	1.80	1.80	1.80	1.80	1.80	1.80	1.80	1.80	1.80	1.80	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48
Int. on term loan	Rs/kWh	**1.05**	2.28	2.08	1.88	1.68	1.48	1.29	1.09	0.89	0.69	0.49	0.30	0.10	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
Int. on working capital	Rs/kWh	**0.14**	0.12	0.12	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.14	0.14	0.14	0.14	0.14	0.15	0.15	0.15	0.15	0.16	0.16	0.16	0.17	0.17	0.17	0.18
RoE	Rs/kWh	**2.01**	1.88	1.88	1.88	1.88	1.88	1.88	1.88	1.88	1.88	1.88	2.26	2.26	2.26	2.26	2.26	2.26	2.26	2.26	2.26	2.26	2.26	2.26	2.26	2.26	2.26
Total COG	**Rs/kWh**	**5.40**	**6.57**	**6.40**	**6.23**	**6.06**	**5.89**	**5.72**	**5.56**	**5.39**	**5.23**	**5.07**	**5.29**	**5.13**	**3.76**	**3.80**	**3.85**	**3.90**	**3.95**	**4.00**	**4.06**	**4.12**	**4.18**	**4.24**	**4.31**	**4.38**	**4.46**

Discount Factor			1	0.91	0.83	0.75	0.69	0.63	0.57	0.52	0.47	0.43	0.39	0.36	0.32	0.30	0.27	0.24	0.22	0.20	0.18	0.17	0.15	0.14	0.13	0.12	0.11
Fixed Cost	5.40		104.01	104.01	104.01	104.01	104.01	104.01	104.01	104.01	104.01	104.01	104.01	104.01	104.01	104.01	104.01	104.01	104.01	104.01	104.01	104.01	104.01	104.01	104.01	104.01	104.01
Levellised Tariff	**5.40**	Rs/Unit																									

Determination of Additional Depreciation for Wind Power Projects

Depreciation amount	90%
Book Depreciation rate	5.28%
Tax Depreciation rate	40%
Additional Depreciation	20%
Income Tax (MAT)	21.342%
Income Tax (Normal Rates)	34.61%
Capital Cost	594.41

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	31.38	31.38	31.38	31.38	31.38	31.38	31.38	31.38	31.38	31.38	31.38	31.38	31.38	31.38	31.38	31.38	31.38	1.43	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Accelerated Depreciation																										
Opening	%	100.0%	40.0%	24.0%	14.4%	8.6%	5.2%	3.1%	1.9%	1.1%	0.7%	0.4%	0.2%	0.1%	0.1%	0.1%	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%
Closing	%	40.0%	24.0%	14.4%	8.64%	5.18%	3.11%	1.87%	1.12%	0.67%	0.40%	0.24%	0.15%	0.09%	0.05%	0.03%	0.02%	0.01%	0.01%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Accelrated Depm.	Rs Lakh	356.65	95.11	57.06	34.24	20.54	12.33	7.40	4.44	2.66	1.60	0.96	0.58	0.35	0.21	0.12	0.07	0.04	0.03	0.02	0.01	0.01	0.00	0.00	0.00	0.00
Net Depreciation Benefit	Rs Lakh	325.26	63.72	25.68	2.85	-10.84	-19.06	-23.99	-26.95	-28.72	-29.79	-30.43	-30.81	-31.04	-31.18	-31.26	-31.31	-31.34	-1.40	0.02	0.01	0.01	0.00	0.00	0.00	0.00
Tax Benefit	Rs Lakh	112.57	22.05	8.89	0.99	-3.75	-6.60	-8.30	-9.33	-9.94	-10.31	-10.53	-10.66	-10.74	-10.79	-10.82	-10.84	-10.85	-0.48	0.01	0.00	0.00	0.00	0.00	0.00	0.00
Energy generation	MU	1.93	1.93	1.93	1.93	1.93	1.93	1.93	1.93	1.93	1.93	1.93	1.93	1.93	1.93	1.93	1.93	1.93	1.93	1.93	1.93	1.93	1.93	1.93	1.93	1.93
Per unit benefit	Rs/Unit	5.84	1.14	0.46	0.05	-0.19	-0.34	-0.43	-0.48	-0.52	-0.53	-0.55	-0.55	-0.56	-0.56	-0.56	-0.56	-0.56	-0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Discounting Factor		1.00	0.91	0.83	0.75	0.69	0.63	0.57	0.52	0.47	0.43	0.39	0.36	0.32	0.30	0.27	0.24	0.22	0.20	0.18	0.17	0.15	0.14	0.13	0.12	0.11
Applicable Discounting Factor		1.00	0.95	0.87	0.79	0.72	0.66	0.60	0.54	0.49	0.45	0.41	0.37	0.34	0.31	0.28	0.26	0.23	0.21	0.19	0.18	0.16	0.15	0.13	0.12	0.11

Levellised benefit	**0.48**	**Rs/Unit**

Annexure – 1B

(Wind Zone-2)

Form 1.1 Assumptions Parameters — Wind Zone

S. No.	Assumption Head	Sub-Head	Sub-Head (2)	Unit	2
1	**Power Generation**				
		Capacity			
			Installed Power Generation Capacity	MW	1
			Capacity Utilization Factor	%	25.0%
			Useful Life	Years	25
2	**Project Cost**				
		Capital Cost/MW	Power Plant Cost	Rs Lacs/MW	594.41
3	**Sources of Fund**				
			Tariff Period	Years	13
		Debt: Equity			
			Debt	%	70%
			Equity	%	30%
			Total Debt Amount	Rs Lacs	416.09
			Total Equity Amout	Rs Lacs	178.32
		Debt Component			
			Loan Amount	Rs Lacs	416.09
			Repayment Period(incld Moratorium)	years	12
			Interest Rate	%	11.00%
		Equity Component			
			Equity amount	Rs Lacs	178.32
			Return on Equity for first 10 years	% p.a	20.34%
			RoE Period	Year	10
			Return on Equity 11th year onwards	% p.a	24.47%
			Weighted average of ROE		22.82%
			Discount Rate		9.84%
4	**Financial Assumptions**				
		Fiscal Assumptions			
			Income Tax	%	34.608%
			MAT Rate (for first 10 years)	%	21.342%
		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)		15.00%
		Receivables for Debtors		Months	2
		For Variable Charges			
		Interest On Working Capital		%	11.00%
6	**Operation & Maintenance**				
		power plant (FY15-16)		Rs Lakh	8.83
		power plant (FY17-18)		Rs Lakh	9.53
		Total O & M Expenses Escalation		%	4.85%

Form 1.2 Form Template for (Wind 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	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
Gross/Net Generation	MU		2.19	2.19	2.19	2.19	2.19	2.19	2.19	2.19	2.19	2.19	2.19	2.19	2.19	2.19	2.19	2.19	2.19	2.19	2.19	2.19	2.19	2.19	2.19	2.19	2.19

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		9.53	10.00	10.48	10.99	11.52	12.08	12.67	13.28	13.92	14.60	15.31	16.05	16.83	17.64	18.50	19.40	20.34	21.32	22.36	23.44	24.58	25.77	27.02	28.33	29.70
Depreciation	Rs Lakh		34.65	34.65	34.65	34.65	34.65	34.65	34.65	34.65	34.65	34.65	34.65	34.65	9.16	9.16	9.16	9.16	9.16	9.16	9.16	9.16	9.16	9.16	9.16	9.16	9.16
Interest on term loan	Rs Lakh		43.86	40.05	36.23	32.42	28.61	24.79	20.98	17.16	13.35	9.54	5.72	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
Interest on working Capital	Rs Lakh		2.38	2.41	2.43	2.46	2.48	2.51	2.54	2.57	2.60	2.64	2.67	2.71	2.75	2.79	2.83	2.87	2.92	2.97	3.02	3.08	3.13	3.19	3.25	3.32	3.39
Return on Equity	Rs Lakh		36.27	36.27	36.27	36.27	36.27	36.27	36.27	36.27	36.27	36.27	43.63	43.63	43.63	43.63	43.63	43.63	43.63	43.63	43.63	43.63	43.63	43.63	43.63	43.63	43.63
Total Fixed Cost	**Rs Lakh**		**126.71**	**123.38**	**120.07**	**116.79**	**113.54**	**110.31**	**107.11**	**103.94**	**100.80**	**97.70**	**101.98**	**98.95**	**72.37**	**73.22**	**74.12**	**75.06**	**76.05**	**77.09**	**78.17**	**79.31**	**80.50**	**81.76**	**83.07**	**84.44**	**85.88**
Per unit Fixed Cost	**Rs/kWh**		**5.79**	**5.63**	**5.48**	**5.33**	**5.18**	**5.04**	**4.89**	**4.75**	**4.60**	**4.46**	**4.66**	**4.52**	**3.30**	**3.34**	**3.38**	**3.43**	**3.47**	**3.52**	**3.57**	**3.62**	**3.68**	**3.73**	**3.79**	**3.86**	**3.92**

Levallised tariff corresponding to Useful life

Per Unit Cost of Generation	Unit	Levellised	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
O&M expn	Rs/kWh	**0.65**	0.44	0.46	0.48	0.50	0.53	0.55	0.58	0.61	0.64	0.67	0.70	0.73	0.77	0.81	0.84	0.89	0.93	0.97	1.02	1.07	1.12	1.18	1.23	1.29	1.36
Depreciation	Rs/kWh	**1.29**	1.58	1.58	1.58	1.58	1.58	1.58	1.58	1.58	1.58	1.58	1.58	1.58	0.42	0.42	0.42	0.42	0.42	0.42	0.42	0.42	0.42	0.42	0.42	0.42	0.42
Int. on term loan	Rs/kWh	**0.92**	2.00	1.83	1.65	1.48	1.31	1.13	0.96	0.78	0.61	0.44	0.26	0.09	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	**0.12**	0.11	0.11	0.11	0.11	0.11	0.11	0.12	0.12	0.12	0.12	0.12	0.12	0.13	0.13	0.13	0.13	0.13	0.14	0.14	0.14	0.14	0.15	0.15	0.15	0.15
RoE	Rs/kWh	**1.77**	1.66	1.66	1.66	1.66	1.66	1.66	1.66	1.66	1.66	1.66	1.99	1.99	1.99	1.99	1.99	1.99	1.99	1.99	1.99	1.99	1.99	1.99	1.99	1.99	1.99
Total COG	**Rs/kWh**	**4.75**	**5.79**	**5.63**	**5.48**	**5.33**	**5.18**	**5.04**	**4.89**	**4.75**	**4.60**	**4.46**	**4.66**	**4.52**	**3.30**	**3.34**	**3.38**	**3.43**	**3.47**	**3.52**	**3.57**	**3.62**	**3.68**	**3.73**	**3.79**	**3.86**	**3.92**

Discount Factor			1	0.91	0.83	0.75	0.69	0.63	0.57	0.52	0.47	0.43	0.39	0.36	0.32	0.30	0.27	0.24	0.22	0.20	0.18	0.17	0.15	0.14	0.13	0.12	0.11
Fixed Cost	4.75		104.01	104.01	104.01	104.01	104.01	104.01	104.01	104.01	104.01	104.01	104.01	104.01	104.01	104.01	104.01	104.01	104.01	104.01	104.01	104.01	104.01	104.01	104.01	104.01	104.01
Levellised Tariff	**4.75**	Rs/Unit																									

Determination of Additional Depreciation for Wind Power Projects

Depreciation amount	90%
Book Depreciation rate	5.28%
Tax Depreciation rate	40%
Additional Depreciation	20%
Income Tax (MAT)	21.342%
Income Tax (Normal Rates)	34.61%
Capital Cost	594.41

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	31.38	31.38	31.38	31.38	31.38	31.38	31.38	31.38	31.38	31.38	31.38	31.38	31.38	31.38	31.38	31.38	31.38	1.43	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Accelerated Depreciation																										
Opening	%	100.0%	40.0%	24.0%	14.4%	8.6%	5.2%	3.1%	1.9%	1.1%	0.7%	0.4%	0.2%	0.1%	0.1%	0.1%	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%
Closing	%	40.0%	24.0%	14.4%	8.64%	5.18%	3.11%	1.87%	1.12%	0.67%	0.40%	0.24%	0.15%	0.09%	0.05%	0.03%	0.02%	0.01%	0.01%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Accelrated Deprn.	Rs Lakh	356.65	95.11	57.06	34.24	20.54	12.33	7.40	4.44	2.66	1.60	0.96	0.58	0.35	0.21	0.12	0.07	0.04	0.03	0.02	0.01	0.01	0.00	0.00	0.00	0.00
Net Depreciation Benefit	Rs Lakh	325.26	63.72	25.68	2.85	-10.84	-19.06	-23.99	-26.95	-28.72	-29.79	-30.43	-30.81	-31.04	-31.18	-31.26	-31.31	-31.34	-1.40	0.02	0.01	0.01	0.00	0.00	0.00	0.00
Tax Benefit	Rs Lakh	112.57	22.05	8.89	0.99	-3.75	-6.60	-8.30	-9.33	-9.94	-10.31	-10.53	-10.66	-10.74	-10.79	-10.82	-10.84	-10.85	-0.48	0.01	0.00	0.00	0.00	0.00	0.00	0.00
Energy generation	MU	2.19	2.19	2.19	2.19	2.19	2.19	2.19	2.19	2.19	2.19	2.19	2.19	2.19	2.19	2.19	2.19	2.19	2.19	2.19	2.19	2.19	2.19	2.19	2.19	2.19
Per unit benefit	Rs/Unit	5.14	1.01	0.41	0.05	-0.17	-0.30	-0.38	-0.43	-0.45	-0.47	-0.48	-0.49	-0.49	-0.49	-0.49	-0.49	-0.50	-0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Discounting Factor		1.00	0.91	0.83	0.75	0.69	0.63	0.57	0.52	0.47	0.43	0.39	0.36	0.32	0.30	0.27	0.24	0.22	0.20	0.18	0.17	0.15	0.14	0.13	0.12	0.11
Applicable Discounting Factor		1.00	0.95	0.87	0.79	0.72	0.66	0.60	0.54	0.49	0.45	0.41	0.37	0.34	0.31	0.28	0.26	0.23	0.21	0.19	0.18	0.16	0.15	0.13	0.12	0.11

Levellised benefit	**0.42**	**Rs/Unit**

Annexure – 1C

(Wind Zone-3)

Form 1.1 Assumptions Parameters — Wind Zone

S. No.	Assumption Head	Sub-Head	Sub-Head (2)	Unit	3
1	**Power Generation**				
		Capacity			
			Installed Power Generation Capacity	MW	1
			Capacity Utilization Factor	%	30.0%
			Useful Life	Years	25
2	**Project Cost**				
		Capital Cost/MW	Power Plant Cost	Rs Lacs/MW	594.41
3	**Sources of Fund**				
			Tariff Period	Years	13
		Debt: Equity			
			Debt	%	70%
			Equity	%	30%
			Total Debt Amount	Rs Lacs	416.09
			Total Equity Amout	Rs Lacs	178.32
		Debt Component			
			Loan Amount	Rs Lacs	416.09
			Repayment Period(incld Moratorium)	years	12
			Interest Rate	%	11.00%
		Equity Component			
			Equity amount	Rs Lacs	178.32
			Return on Equity for first 10 years	% p.a	20.34%
			RoE Period	Year	10
			Return on Equity 11th year onwards	% p.a	24.47%
			Weighted average of ROE		22.82%
			Discount Rate		9.84%
4	**Financial Assumptions**				
		Fiscal Assumptions			
			Income Tax	%	34.608%
			MAT Rate (for first 10 years)	%	21.342%
		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)		15.00%
		Receivables for Debtors		Months	2
		For Variable Charges			
		Interest On Working Capital		%	11.00%
6	**Operation & Maintenance**				
		power plant (FY15-16)		Rs Lakh	8.83
		power plant (FY17-18)		Rs Lakh	9.53
		Total O & M Expenses Escalation		%	4.85%

Form 1.2 Form Template for (Wind 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	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
Gross/Net Generation	MU		2.63	2.63	2.63	2.63	2.63	2.63	2.63	2.63	2.63	2.63	2.63	2.63	2.63	2.63	2.63	2.63	2.63	2.63	2.63	2.63	2.63	2.63	2.63	2.63	2.63

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		9.53	10.00	10.48	10.99	11.52	12.08	12.67	13.28	13.92	14.60	15.31	16.05	16.83	17.64	18.50	19.40	20.34	21.32	22.36	23.44	24.58	25.77	27.02	28.33	29.70
Depreciation	Rs Lakh		34.65	34.65	34.65	34.65	34.65	34.65	34.65	34.65	34.65	34.65	34.65	34.65	9.16	9.16	9.16	9.16	9.16	9.16	9.16	9.16	9.16	9.16	9.16	9.16	9.16
Interest on term loan	Rs Lakh		43.86	40.05	36.23	32.42	28.61	24.79	20.98	17.16	13.35	9.54	5.72	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
Interest on working Capital	Rs Lakh		2.38	2.41	2.43	2.46	2.48	2.51	2.54	2.57	2.60	2.64	2.67	2.71	2.75	2.79	2.83	2.87	2.92	2.97	3.02	3.08	3.13	3.19	3.25	3.32	3.39
Return on Equity	Rs Lakh		36.27	36.27	36.27	36.27	36.27	36.27	36.27	36.27	36.27	36.27	43.63	43.63	43.63	43.63	43.63	43.63	43.63	43.63	43.63	43.63	43.63	43.63	43.63	43.63	43.63
Total Fixed Cost	**Rs Lakh**		**126.71**	**123.38**	**120.07**	**116.79**	**113.54**	**110.31**	**107.11**	**103.94**	**100.80**	**97.70**	**101.98**	**98.95**	**72.37**	**73.22**	**74.12**	**75.06**	**76.05**	**77.09**	**78.17**	**79.31**	**80.50**	**81.76**	**83.07**	**84.44**	**85.88**
Per unit Fixed Cost	**Rs/kWh**		**4.82**	**4.69**	**4.57**	**4.44**	**4.32**	**4.20**	**4.08**	**3.96**	**3.84**	**3.72**	**3.88**	**3.77**	**2.75**	**2.79**	**2.82**	**2.86**	**2.89**	**2.93**	**2.97**	**3.02**	**3.06**	**3.11**	**3.16**	**3.21**	**3.27**

Levallised tariff corresponding to Useful life

Per Unit Cost of Generation	Unit	Levellised	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
O&M expn	Rs/kWh	**0.54**	0.36	0.38	0.40	0.42	0.44	0.46	0.48	0.51	0.53	0.56	0.58	0.61	0.64	0.67	0.70	0.74	0.77	0.81	0.85	0.89	0.94	0.98	1.03	1.08	1.13
Depreciation	Rs/kWh	**1.07**	1.32	1.32	1.32	1.32	1.32	1.32	1.32	1.32	1.32	1.32	1.32	1.32	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35
Int. on term loan	Rs/kWh	**0.77**	1.67	1.52	1.38	1.23	1.09	0.94	0.80	0.65	0.51	0.36	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
Int. on working capital	Rs/kWh	**0.10**	0.09	0.09	0.09	0.09	0.09	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	0.12	0.12	0.12	0.12	0.13	0.13
RoE	Rs/kWh	**1.47**	1.38	1.38	1.38	1.38	1.38	1.38	1.38	1.38	1.38	1.38	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**	**3.96**	**4.82**	**4.69**	**4.57**	**4.44**	**4.32**	**4.20**	**4.08**	**3.96**	**3.84**	**3.72**	**3.88**	**3.77**	**2.75**	**2.79**	**2.82**	**2.86**	**2.89**	**2.93**	**2.97**	**3.02**	**3.06**	**3.11**	**3.16**	**3.21**	**3.27**

Discount Factor			1	0.91	0.83	0.75	0.69	0.63	0.57	0.52	0.47	0.43	0.39	0.36	0.32	0.30	0.27	0.24	0.22	0.20	0.18	0.17	0.15	0.14	0.13	0.12	0.11
Fixed Cost	3.96		104.01	104.01	104.01	104.01	104.01	104.01	104.01	104.01	104.01	104.01	104.01	104.01	104.01	104.01	104.01	104.01	104.01	104.01	104.01	104.01	104.01	104.01	104.01	104.01	104.01
Levellised Tariff	**3.96**	Rs/Unit																									

Determination of Additional Depreciation for Wind Power Projects

Depreciation amount	90%
Book Depreciation rate	5.28%
Tax Depreciation rate	40%
Additional Depreciation	20%
Income Tax (MAT)	21.342%
Income Tax (Normal Rates)	34.61%
Capital Cost	594.41

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	31.38	31.38	31.38	31.38	31.38	31.38	31.38	31.38	31.38	31.38	31.38	31.38	31.38	31.38	31.38	31.38	31.38	1.43	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Accelerated Depreciation																										
Opening	%	100.0%	40.0%	24.0%	14.4%	8.6%	5.2%	3.1%	1.9%	1.1%	0.7%	0.4%	0.2%	0.1%	0.1%	0.1%	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%
Closing	%	40.0%	24.0%	14.4%	8.64%	5.18%	3.11%	1.87%	1.12%	0.67%	0.40%	0.24%	0.15%	0.09%	0.05%	0.03%	0.02%	0.01%	0.01%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Accelrated Deprn.	Rs Lakh	356.65	95.11	57.06	34.24	20.54	12.33	7.40	4.44	2.66	1.60	0.96	0.58	0.35	0.21	0.12	0.07	0.04	0.03	0.02	0.01	0.01	0.00	0.00	0.00	0.00
Net Depreciation Benefit	Rs Lakh	325.26	63.72	25.68	2.85	-10.84	-19.06	-23.99	-26.95	-28.72	-29.79	-30.43	-30.81	-31.04	-31.18	-31.26	-31.31	-31.34	-1.40	0.02	0.01	0.01	0.00	0.00	0.00	0.00
Tax Benefit	Rs Lakh	112.57	22.05	8.89	0.99	-3.75	-6.60	-8.30	-9.33	-9.94	-10.31	-10.53	-10.66	-10.74	-10.79	-10.82	-10.84	-10.85	-0.48	0.01	0.00	0.00	0.00	0.00	0.00	0.00
Energy generation	MU	2.63	2.63	2.63	2.63	2.63	2.63	2.63	2.63	2.63	2.63	2.63	2.63	2.63	2.63	2.63	2.63	2.63	2.63	2.63	2.63	2.63	2.63	2.63	2.63	2.63
Per unit benefit	Rs/Unit	4.28	0.84	0.34	0.04	-0.14	-0.25	-0.32	-0.35	-0.38	-0.39	-0.40	-0.41	-0.41	-0.41	-0.41	-0.41	-0.41	-0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Discounting Factor		1.00	0.91	0.83	0.75	0.69	0.63	0.57	0.52	0.47	0.43	0.39	0.36	0.32	0.30	0.27	0.24	0.22	0.20	0.18	0.17	0.15	0.14	0.13	0.12	0.11
Applicable Discounting Factor		1.00	0.95	0.87	0.79	0.72	0.66	0.60	0.54	0.49	0.45	0.41	0.37	0.34	0.31	0.28	0.26	0.23	0.21	0.19	0.18	0.16	0.15	0.13	0.12	0.11

Levellised benefit	**0.35**	**Rs/Unit**

Annexure – 1D
(Wind Zone-4)

Form 1.1 Assumptions Parameters — **Wind Zone**

S. No.	Assumption Head	Sub-Head	Sub-Head (2)	Unit	4
1	**Power Generation**				
		Capacity			
			Installed Power Generation Capacity	MW	1
			Capacity Utilization Factor	%	32.0%
			Useful Life	Years	25
2	**Project Cost**				
		Capital Cost/MW	Power Plant Cost	Rs Lacs/MW	594.41
3	**Sources of Fund**				
			Tariff Period	Years	13
		Debt: Equity			
			Debt	%	70%
			Equity	%	30%
			Total Debt Amount	Rs Lacs	416.09
			Total Equity Amout	Rs Lacs	178.32
		Debt Component			
			Loan Amount	Rs Lacs	416.09
			Repayment Period(incld Moratorium)	years	12
			Interest Rate	%	11.00%
		Equity Component			
			Equity amount	Rs Lacs	178.32
			Return on Equity for first 10 years	% p.a	20.34%
			RoE Period	Year	10
			Return on Equity 11th year onwards	% p.a	24.47%
			Weighted average of ROE		22.82%
			Discount Rate		9.84%
4	**Financial Assumptions**				
		Fiscal Assumptions			
			Income Tax	%	34.608%
			MAT Rate (for first 10 years)	%	21.342%
		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)		15.00%
		Receivables for Debtors		Months	2
		For Variable Charges			
		Interest On Working Capital		%	11.00%
6	**Operation & Maintenance**				
		power plant (FY15-16)		Rs Lakh	8.83
		power plant (FY17-18)		Rs Lakh	9.53
		Total O & M Expenses Escalation		%	4.85%

Form 1.2 Form Template for (Wind 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	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
Gross/Net Generation	MU		2.80	2.80	2.80	2.80	2.80	2.80	2.80	2.80	2.80	2.80	2.80	2.80	2.80	2.80	2.80	2.80	2.80	2.80	2.80	2.80	2.80	2.80	2.80	2.80	2.80

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		9.53	10.00	10.48	10.99	11.52	12.08	12.67	13.28	13.92	14.60	15.31	16.05	16.83	17.64	18.50	19.40	20.34	21.32	22.36	23.44	24.58	25.77	27.02	28.33	29.70
Depreciation	Rs Lakh		34.65	34.65	34.65	34.65	34.65	34.65	34.65	34.65	34.65	34.65	34.65	34.65	9.16	9.16	9.16	9.16	9.16	9.16	9.16	9.16	9.16	9.16	9.16	9.16	9.16
Interest on term loan	Rs Lakh		43.86	40.05	36.23	32.42	28.61	24.79	20.98	17.16	13.35	9.54	5.72	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
Interest on working Capital	Rs Lakh		2.38	2.41	2.43	2.46	2.48	2.51	2.54	2.57	2.60	2.64	2.67	2.71	2.75	2.79	2.83	2.87	2.92	2.97	3.02	3.08	3.13	3.19	3.25	3.32	3.39
Return on Equity	Rs Lakh		36.27	36.27	36.27	36.27	36.27	36.27	36.27	36.27	36.27	36.27	43.63	43.63	43.63	43.63	43.63	43.63	43.63	43.63	43.63	43.63	43.63	43.63	43.63	43.63	43.63
Total Fixed Cost	**Rs Lakh**		**126.71**	**123.38**	**120.07**	**116.79**	**113.54**	**110.31**	**107.11**	**103.94**	**100.80**	**97.70**	**101.98**	**98.95**	**72.37**	**73.22**	**74.12**	**75.06**	**76.05**	**77.09**	**78.17**	**79.31**	**80.50**	**81.76**	**83.07**	**84.44**	**85.88**
Per unit Fixed Cost	**Rs/kWh**		**4.52**	**4.40**	**4.28**	**4.17**	**4.05**	**3.94**	**3.82**	**3.71**	**3.60**	**3.49**	**3.64**	**3.53**	**2.58**	**2.61**	**2.64**	**2.68**	**2.71**	**2.75**	**2.79**	**2.83**	**2.87**	**2.92**	**2.96**	**3.01**	**3.06**

Levallised tariff corresponding to Useful life

Per Unit Cost of Generation	Unit	Levellised	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
O&M expn	Rs/kWh	**0.51**	0.34	0.36	0.37	0.39	0.41	0.43	0.45	0.47	0.50	0.52	0.55	0.57	0.60	0.63	0.66	0.69	0.73	0.76	0.80	0.84	0.88	0.92	0.96	1.01	1.06
Depreciation	Rs/kWh	**1.01**	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33
Int. on term loan	Rs/kWh	**0.72**	1.56	1.43	1.29	1.16	1.02	0.88	0.75	0.61	0.48	0.34	0.20	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
Int. on working capital	Rs/kWh	**0.09**	0.08	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.11	0.11	0.11	0.11	0.11	0.12	0.12	0.12
RoE	Rs/kWh	**1.38**	1.29	1.29	1.29	1.29	1.29	1.29	1.29	1.29	1.29	1.29	1.56	1.56	1.56	1.56	1.56	1.56	1.56	1.56	1.56	1.56	1.56	1.56	1.56	1.56	1.56
Total COG	**Rs/kWh**	**3.71**	**4.52**	**4.40**	**4.28**	**4.17**	**4.05**	**3.94**	**3.82**	**3.71**	**3.60**	**3.49**	**3.64**	**3.53**	**2.58**	**2.61**	**2.64**	**2.68**	**2.71**	**2.75**	**2.79**	**2.83**	**2.87**	**2.92**	**2.96**	**3.01**	**3.06**

Discount Factor			1	0.91	0.83	0.75	0.69	0.63	0.57	0.52	0.47	0.43	0.39	0.36	0.32	0.30	0.27	0.24	0.22	0.20	0.18	0.17	0.15	0.14	0.13	0.12	0.11
Fixed Cost	3.71		104.01	104.01	104.01	104.01	104.01	104.01	104.01	104.01	104.01	104.01	104.01	104.01	104.01	104.01	104.01	104.01	104.01	104.01	104.01	104.01	104.01	104.01	104.01	104.01	104.01
Levellised Tariff	**3.71**	Rs/Unit																									

Determination of Additional Depreciation for Wind Power Projects

Depreciation amount	90%
Book Depreciation rate	5.28%
Tax Depreciation rate	40%
Additional Depreciation	20%
Income Tax (MAT)	21.342%
Income Tax (Normal Rates)	34.61%
Capital Cost	594.41

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	31.38	31.38	31.38	31.38	31.38	31.38	31.38	31.38	31.38	31.38	31.38	31.38	31.38	31.38	31.38	31.38	31.38	1.43	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Accelerated Depreciation																										
Opening	%	100.0%	40.0%	24.0%	14.4%	8.6%	5.2%	3.1%	1.9%	1.1%	0.7%	0.4%	0.2%	0.1%	0.1%	0.1%	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%
Closing	%	40.0%	24.0%	14.4%	8.64%	5.18%	3.11%	1.87%	1.12%	0.67%	0.40%	0.24%	0.15%	0.09%	0.05%	0.03%	0.02%	0.01%	0.01%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Accelrated Deprn.	Rs Lakh	356.65	95.11	57.06	34.24	20.54	12.33	7.40	4.44	2.66	1.60	0.96	0.58	0.35	0.21	0.12	0.07	0.04	0.03	0.02	0.01	0.01	0.00	0.00	0.00	0.00
Net Depreciation Benefit	Rs Lakh	325.26	63.72	25.68	2.85	-10.84	-19.06	-23.99	-26.95	-28.72	-29.79	-30.43	-30.81	-31.04	-31.18	-31.26	-31.31	-31.34	-1.40	0.02	0.01	0.01	0.00	0.00	0.00	0.00
Tax Benefit	Rs Lakh	112.57	22.05	8.89	0.99	-3.75	-6.60	-8.30	-9.33	-9.94	-10.31	-10.53	-10.66	-10.74	-10.79	-10.82	-10.84	-10.85	-0.48	0.01	0.00	0.00	0.00	0.00	0.00	0.00
Energy generation	MU	2.80	2.80	2.80	2.80	2.80	2.80	2.80	2.80	2.80	2.80	2.80	2.80	2.80	2.80	2.80	2.80	2.80	2.80	2.80	2.80	2.80	2.80	2.80	2.80	2.80
Per unit benefit	Rs/Unit	4.02	0.79	0.32	0.04	-0.13	-0.24	-0.30	-0.33	-0.35	-0.37	-0.38	-0.38	-0.38	-0.38	-0.39	-0.39	-0.39	-0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Discounting Factor		1.00	0.91	0.83	0.75	0.69	0.63	0.57	0.52	0.47	0.43	0.39	0.36	0.32	0.30	0.27	0.24	0.22	0.20	0.18	0.17	0.15	0.14	0.13	0.12	0.11
Applicable Discounting Factor		1.00	0.95	0.87	0.79	0.72	0.66	0.60	0.54	0.49	0.45	0.41	0.37	0.34	0.31	0.28	0.26	0.23	0.21	0.19	0.18	0.16	0.15	0.13	0.12	0.11

Levellised benefit	**0.33**	**Rs/Unit**

Annexure – 2A
(SHP above 1 MW and up to and including 5 MW)

Form 1.1 Assumptions Parameters

S. No.	Assumption Head	Sub-Head	Sub-Head (2)	Unit	Capacity <=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	598.90
3	**Sources of Fund**				
			Tariff Period	Years	35
		Debt: Equity			
			Debt	%	70%
			Equity	%	30%
			Total Debt Amount	Rs Lacs	419.23
			Total Equity Amout	Rs Lacs	179.67
		Debt Component			
			Loan Amount	Rs Lacs	419.23
			Repayment Period(incld Moratorium)	years	12
			Interest Rate	%	11.00%
		Equity Component			
			Equity amount	Rs Lacs	179.67
			Return on Equity for first 10 years	% p.a	20.34%
			RoE Period	Year	10
			Return on Equity 11th year onwards	% p.a	24.47%
			Weighted average of ROE		23.29%
			Discount Rate		9.84%
4	**Financial Assumptions**				
		Fiscal Assumptions			
			Income Tax	%	34.608%
			MAT Rate (for first 10 years)	%	21.342%
		Depreciation			
			Depreciation Rate for first 12 years	%	5.83%
			Depreciation Rate 13th year onwards	%	0.87%
			Years for 5.83% rate		12
5	**Working Capital**				
		For Fixed Charges			
		O&M Charges		Months	1
		Maintenance Spare	(% of O&M exepenses)		15%
		Receivables for Debtors		Months	2
		For Variable Charges			0
		Interest On Working Capital		%	11.00%
6	**Operation & Maintenance**				
		power plant (FY15-16)		Rs Lakh	21.79
		power plant (FY17-18)		Rs Lakh	23.52
		Total O & M Expenses Escalation		%	4.85%

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		23.52	24.66	25.86	27.11	28.43	29.81	31.25	32.77	34.36	36.02	37.77	39.60	41.52	43.53	45.64	47.86	50.18	52.61	55.16	57.84	60.64	63.58	66.67	69.90	73.29	76.84	80.57	84.47	88.57	92.86	97.37	102.09	107.04	112.23	117.67
Depreciation	Rs Lakh		34.92	34.92	34.92	34.92	34.92	34.92	34.92	34.92	34.92	34.92	34.92	34.92	5.22	5.22	5.22	5.22	5.22	5.22	5.22	5.22	5.22	5.22	5.22	5.22	5.22	5.22	5.22	5.22	5.22	5.22	5.22	5.22	5.22	5.22	5.22
Interest on term loan	Rs Lakh		44.19	40.35	36.51	32.67	28.82	24.98	21.14	17.29	13.45	9.61	5.76	1.92	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		2.92	2.95	2.98	3.02	3.05	3.08	3.12	3.16	3.20	3.24	3.29	3.34	3.39	3.44	3.49	3.55	3.61	3.67	3.74	3.80	3.88	3.95	4.03	4.11	4.20	4.29	4.39	4.49	4.59	4.70	4.82	4.94	5.07	5.20	5.34
Return on Equity	Rs Lakh		36.55	36.55	36.55	36.55	36.55	36.55	36.55	36.55	36.55	36.55	43.96	43.96	43.96	43.96	43.96	43.96	43.96	43.96	43.96	43.96	43.96	43.96	43.96	43.96	43.96	43.96	43.96	43.96	43.96	43.96	43.96	43.96	43.96	43.96	43.96
Total Fixed Cost	**Rs Lakh**		**142.10**	**139.43**	**136.81**	**134.26**	**131.76**	**129.33**	**126.97**	**124.68**	**122.47**	**120.34**	**125.70**	**123.74**	**94.09**	**96.15**	**98.32**	**100.59**	**102.97**	**105.46**	**108.08**	**110.82**	**113.70**	**116.71**	**119.88**	**123.19**	**126.67**	**130.31**	**134.13**	**138.14**	**142.34**	**146.75**	**151.36**	**156.21**	**161.28**	**166.61**	**172.19**
Per unit Fixed Cost	**Rs/kWh**		**5.46**	**5.36**	**5.26**	**5.16**	**5.06**	**4.97**	**4.88**	**4.79**	**4.71**	**4.63**	**4.83**	**4.76**	**3.62**	**3.70**	**3.78**	**3.87**	**3.96**	**4.05**	**4.15**	**4.26**	**4.37**	**4.49**	**4.61**	**4.73**	**4.87**	**5.01**	**5.16**	**5.31**	**5.47**	**5.64**	**5.82**	**6.00**	**6.20**	**6.40**	**6.62**

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	26	27	28	29	30	31	32	33	34	35
O&M expn	Rs/kWh	**1.49**	0.90	0.95	0.99	1.04	1.09	1.15	1.20	1.26	1.32	1.38	1.45	1.52	1.60	1.67	1.75	1.84	1.93	2.02	2.12	2.22	2.33	2.44	2.56	2.69	2.82	2.95	3.10	3.25	3.40	3.57	3.74	3.92	4.11	4.31	4.52
Depreciation	Rs/kWh	**1.00**	1.34	1.34	1.34	1.34	1.34	1.34	1.34	1.34	1.34	1.34	1.34	1.34	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
Int. on term loan	Rs/kWh	**0.74**	1.70	1.55	1.40	1.26	1.11	0.96	0.81	0.66	0.52	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	**0.13**	0.11	0.11	0.11	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.13	0.13	0.13	0.13	0.13	0.14	0.14	0.14	0.14	0.15	0.15	0.15	0.15	0.16	0.16	0.16	0.17	0.17	0.18	0.18	0.19	0.19	0.19	0.20	0.21
RoE	Rs/kWh	**1.51**	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.69	1.69	1.69	1.69	1.69	1.69	1.69	1.69	1.69	1.69	1.69	1.69	1.69	1.69	1.69	1.69	1.69	1.69	1.69	1.69	1.69	1.69	1.69	1.69	1.69
Total COG	**Rs/kWh**	**4.86**	**5.46**	**5.36**	**5.26**	**5.16**	**5.06**	**4.97**	**4.88**	**4.79**	**4.71**	**4.63**	**4.83**	**4.76**	**3.62**	**3.70**	**3.78**	**3.87**	**3.96**	**4.05**	**4.15**	**4.26**	**4.37**	**4.49**	**4.61**	**4.73**	**4.87**	**5.01**	**5.16**	**5.31**	**5.47**	**5.64**	**5.82**	**6.00**	**6.20**	**6.40**	**6.62**

Levellised Tariff	Unit	Year--->	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35
Discount Factor			1	0.91	0.83	0.75	0.69	0.63	0.57	0.52	0.47	0.43	0.39	0.36	0.32	0.30	0.27	0.24	0.22	0.20	0.18	0.17	0.15	0.14	0.13	0.12	0.11	0.10	0.09	0.08	0.07	0.07	0.06	0.05	0.05	0.05	0.04
Fixed Cost			126.51	126.51	126.51	126.51	126.51	126.51	126.51	126.51	126.51	126.51	126.51	126.51	126.51	126.51	126.51	126.51	126.51	126.51	126.51	126.51	126.51	126.51	126.51	126.51	126.51	126.51	126.51	126.51	126.51	126.51	126.51	126.51	126.51	126.51	126.51
Levellised Tariff	**4.86**	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)	21.342%
Income Tax (Normal Rates)	34.61%
Capital Cost	598.90

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	31.62	31.62	31.62	31.62	31.62	31.62	31.62	31.62	31.62	31.62	31.62	31.62	31.62	31.62	31.62	31.62	31.62	1.44	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Accelerated Depreciation																																				
Opening	%	100%	40%	24%	14%	9%	5%	3%	2%	1%	1%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Allowed during the year	%	60.00%	16.00%	9.60%	5.76%	3.46%	2.07%	1.24%	0.75%	0.45%	0.27%	0.16%	0.10%	0.06%	0.03%	0.02%	0.01%	0.01%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Closing	%	40.0%	24.0%	14.4%	8.64%	5.18%	3.11%	1.87%	1.12%	0.67%	0.40%	0.24%	0.15%	0.09%	0.05%	0.03%	0.02%	0.01%	0.01%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Accelrated Deprn.	Rs Lakh	359.34	95.82	57.49	34.50	20.70	12.42	7.45	4.47	2.68	1.61	0.97	0.58	0.35	0.21	0.13	0.08	0.05	0.03	0.02	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Net Depreciation Benefit	Rs Lakh	327.72	64.20	25.87	2.87	-10.92	-19.20	-24.17	-27.15	-28.94	-30.01	-30.66	-31.04	-31.27	-31.41	-31.50	-31.55	-31.58	-1.41	0.02	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tax Benefit	Rs Lakh	113.42	22.22	8.95	0.99	-3.78	-6.65	-8.37	-9.40	-10.02	-10.39	-10.61	-10.74	-10.82	-10.87	-10.90	-10.92	-10.93	-0.49	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Energy generation	MU	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60
Per unit benefit	Rs/Unit	4.36	0.85	0.34	0.04	-0.15	-0.26	-0.32	-0.36	-0.38	-0.40	-0.41	-0.41	-0.42	-0.42	-0.42	-0.42	-0.42	-0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Applicable Discounting Factor		1.00	0.95	0.87	0.79	0.72	0.66	0.60	0.54	0.49	0.45	0.41	0.37	0.34	0.31	0.28	0.26	0.23	0.21	0.19	0.18	0.16	0.15	0.13	0.12	0.11	0.10	0.09	0.08	0.08	0.07	0.06	0.06	0.05	0.05	0.04

Levellised benefit	**0.33**	**Rs/Unit**

Annexure – 2B
(SHP above 5 MW and upto and including 25 MW)

Form 1.1 Assumptions Parameters

S. No.	Assumption Head	Sub-Head	Sub-Head (2)	Unit	Capacity >5 up to 25 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	544.90
3	**Sources of Fund**				
			Tariff Period	Years	13
		Debt: Equity			
			Debt	%	70%
			Equity	%	30%
			Total Debt Amount	Rs Lacs	381.43
			Total Equity Amout	Rs Lacs	163.47
		Debt Component			
			Loan Amount	Rs Lacs	381.43
			Repayment Period(incld Moratorium)	years	12
			Interest Rate	%	11.00%
		Equity Component			
			Equity amount	Rs Lacs	163.47
			Return on Equity for first 10 years	% p.a	20.34%
			RoE Period	Year	10
			Return on Equity 11th year onwards	% p.a	24.47%
			Weighted average of ROE		23.29%
			Discount Rate		9.84%
4	**Financial Assumptions**				
		Fiscal Assumptions			
			Income Tax	%	34.608%
			MAT Rate (for first 10 years)	%	21.342%
		Depreciation			
			Depreciation Rate for first 12 years	%	5.83%
			Depreciation Rate 13th year onwards	%	0.87%
			Years for 5.83% rate		12
5	**Working Capital**				
		For Fixed Charges			
		O&M Charges		Months	1
		Maintenance Spare	(% of O&M exepenses)		15%
		Receivables for Debtors		Months	2
		For Variable Charges			0
		Interest On Working Capital		%	11.00%
6	**Operation & Maintenance**				
		power plant (FY15-16)		Rs Lakh	15.42
		power plant (FY17-18)		Rs Lakh	16.65
		Total O & M Expenses Escalation		%	4.85%

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		16.65	17.45	18.30	19.19	20.12	21.09	22.12	23.19	24.31	25.49	26.73	28.02	29.38	30.81	32.30	33.87	35.51	37.23	39.04	40.93	42.91	44.99	47.18	49.46	51.86	54.38	57.01	59.78	62.68	65.71	68.90	72.24	75.74	79.42	83.27
Depreciation	Rs Lakh		31.77	31.77	31.77	31.77	31.77	31.77	31.77	31.77	31.77	31.77	31.77	31.77	4.75	4.75	4.75	4.75	4.75	4.75	4.75	4.75	4.75	4.75	4.75	4.75	4.75	4.75	4.75	4.75	4.75	4.75	4.75	4.75	4.75	4.75	4.75
Interest on term loan	Rs Lakh		40.21	36.71	33.22	29.72	26.22	22.73	19.23	15.73	12.24	8.74	5.24	1.75	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		2.39	2.41	2.43	2.45	2.48	2.50	2.53	2.56	2.58	2.61	2.65	2.68	2.71	2.75	2.79	2.83	2.87	2.92	2.96	3.01	3.06	3.12	3.17	3.23	3.29	3.36	3.42	3.49	3.57	3.65	3.73	3.81	3.90	4.00	4.10
Return on Equity	Rs Lakh		33.25	33.25	33.25	33.25	33.25	33.25	33.25	33.25	33.25	33.25	40.00	40.00	40.00	40.00	40.00	40.00	40.00	40.00	40.00	40.00	40.00	40.00	40.00	40.00	40.00	40.00	40.00	40.00	40.00	40.00	40.00	40.00	40.00	40.00	40.00
Total Fixed Cost	**Rs Lakh**		**124.26**	**121.59**	**118.96**	**116.38**	**113.84**	**111.34**	**108.89**	**106.50**	**104.15**	**101.87**	**106.38**	**104.22**	**76.84**	**78.30**	**79.83**	**81.44**	**83.13**	**84.89**	**86.74**	**88.68**	**90.72**	**92.85**	**95.09**	**97.44**	**99.90**	**102.48**	**105.18**	**108.02**	**110.99**	**114.11**	**117.37**	**120.80**	**124.39**	**128.16**	**132.11**
Per unit Fixed Cost	**Rs/kWh**		**4.78**	**4.67**	**4.57**	**4.47**	**4.38**	**4.28**	**4.19**	**4.09**	**4.00**	**3.92**	**4.09**	**4.01**	**2.95**	**3.01**	**3.07**	**3.13**	**3.20**	**3.26**	**3.33**	**3.41**	**3.49**	**3.57**	**3.65**	**3.75**	**3.84**	**3.94**	**4.04**	**4.15**	**4.27**	**4.39**	**4.51**	**4.64**	**4.78**	**4.93**	**5.08**

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	26	27	28	29	30	31	32	33	34	35
O&M expn	Rs/kWh	**1.05**	0.64	0.67	0.70	0.74	0.77	0.81	0.85	0.89	0.93	0.98	1.03	1.08	1.13	1.18	1.24	1.30	1.36	1.43	1.50	1.57	1.65	1.73	1.81	1.90	1.99	2.09	2.19	2.30	2.41	2.53	2.65	2.78	2.91	3.05	3.20
Depreciation	Rs/kWh	**0.91**	1.22	1.22	1.22	1.22	1.22	1.22	1.22	1.22	1.22	1.22	1.22	1.22	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18
Int. on term loan	Rs/kWh	**0.67**	1.55	1.41	1.28	1.14	1.01	0.87	0.74	0.60	0.47	0.34	0.20	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	**0.10**	0.09	0.09	0.09	0.09	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	0.12	0.12	0.12	0.12	0.12	0.13	0.13	0.13	0.13	0.14	0.14	0.14	0.15	0.15	0.15	0.16
RoE	Rs/kWh	**1.37**	1.28	1.28	1.28	1.28	1.28	1.28	1.28	1.28	1.28	1.28	1.54	1.54	1.54	1.54	1.54	1.54	1.54	1.54	1.54	1.54	1.54	1.54	1.54	1.54	1.54	1.54	1.54	1.54	1.54	1.54	1.54	1.54	1.54	1.54	1.54
Total COG	**Rs/kWh**	**4.11**	**4.78**	**4.67**	**4.57**	**4.47**	**4.38**	**4.28**	**4.19**	**4.09**	**4.00**	**3.92**	**4.09**	**4.01**	**2.95**	**3.01**	**3.07**	**3.13**	**3.20**	**3.26**	**3.33**	**3.41**	**3.49**	**3.57**	**3.65**	**3.75**	**3.84**	**3.94**	**4.04**	**4.15**	**4.27**	**4.39**	**4.51**	**4.64**	**4.78**	**4.93**	**5.08**

Levellised Tariff	Unit	Year--->	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35
Discount Factor			1	0.91	0.83	0.75	0.69	0.63	0.57	0.52	0.47	0.43	0.39	0.36	0.32	0.30	0.27	0.24	0.22	0.20	0.18	0.17	0.15	0.14	0.13	0.12	0.11	0.10	0.09	0.08	0.07	0.07	0.06	0.05	0.05	0.05	0.04
Fixed Cost			106.92	106.92	106.92	106.92	106.92	106.92	106.92	106.92	106.92	106.92	106.92	106.92	106.92	106.92	106.92	106.92	106.92	106.92	106.92	106.92	106.92	106.92	106.92	106.92	106.92	106.92	106.92	106.92	106.92	106.92	106.92	106.92	106.92	106.92	106.92
Levellised Tariff	**4.11**	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)	21.342%
Income Tax (Normal Rates)	34.61%
Capital Cost	544.90

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	28.77	28.77	28.77	28.77	28.77	28.77	28.77	28.77	28.77	28.77	28.77	28.77	28.77	28.77	28.77	28.77	28.77	1.31	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Accelerated Depreciation																																				
Opening	%	100%	40%	24%	14%	9%	5%	3%	2%	1%	1%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Allowed during the year	%	60.00%	16.00%	9.60%	5.76%	3.46%	2.07%	1.24%	0.75%	0.45%	0.27%	0.16%	0.10%	0.06%	0.03%	0.02%	0.01%	0.01%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Closing	%	40.0%	24.0%	14.4%	8.64%	5.18%	3.11%	1.87%	1.12%	0.67%	0.40%	0.24%	0.15%	0.09%	0.05%	0.03%	0.02%	0.01%	0.01%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Accelrated Deprn.	Rs Lakh	326.94	87.18	52.31	31.39	18.83	11.30	6.78	4.07	2.44	1.46	0.88	0.53	0.32	0.19	0.11	0.07	0.04	0.02	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Net Depreciation Benefit	Rs Lakh	298.17	58.41	23.54	2.62	-9.94	-17.47	-21.99	-24.70	-26.33	-27.31	-27.89	-28.24	-28.45	-28.58	-28.66	-28.70	-28.73	-1.28	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tax Benefit	Rs Lakh	103.19	20.22	8.15	0.91	-3.44	-6.05	-7.61	-8.55	-9.11	-9.45	-9.65	-9.77	-9.85	-9.89	-9.92	-9.93	-9.94	-0.44	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Energy generation	MU	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60
Per unit benefit	Rs/Unit	3.97	0.78	0.31	0.03	-0.13	-0.23	-0.29	-0.33	-0.35	-0.36	-0.37	-0.38	-0.38	-0.38	-0.38	-0.38	-0.38	-0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Applicable Discounting Factor		1.00	0.95	0.87	0.79	0.72	0.66	0.60	0.54	0.49	0.45	0.41	0.37	0.34	0.31	0.28	0.26	0.23	0.21	0.19	0.18	0.16	0.15	0.13	0.12	0.11	0.10	0.09	0.08	0.08	0.07	0.06	0.06	0.05	0.05	0.04

Levellised benefit	**0.30**	**Rs/Unit**

Annexure – 3
(Biomass Power Project)

2.1 Form Template for Biomass Power Projects- Other

S. No.	Assumption Head	Sub-Head	Sub-Head (2)	Unit	Assumptions
1	**Power Generation**				
		Capacity			
			Installed Power Generation Capacity	MW	1
			Auxillary Consumption during stablisation	%	10%
			Auxillary Consumption after stabilisation	%	10%
			PLF(Stablization for 6 months)	%	60%
			PLF(during first year after Stablization)	%	70%
			PLF(second year onwards)	%	80%
			Useful Life	Years	20.00
			Tariff Period	Years	13
2	**Project Cost**				
		Capital Cost/MW	Power Plant Cost	Rs Lacs/MW	488.08
3	**Financial Assumptions**				
		Debt: Equity			
			Debt	%	70%
			Equity	%	30%
			Total Debt Amount	Rs Lacs	341.66
			Total Equity Amout	Rs Lacs	146.42
		Debt Component			
			Loan Amount	Rs Lacs	341.66
			Moratorium Period	years	0
			Repayment Period(incld Moratorium)	years	12
			Interest Rate	%	11.00%
		Equity Component			
			Equity amount	Rs Lacs	146.42
			Return on Equity for first 10 years	% p.a	20.34%
			RoE Period	Year	10.00
			Return on Equity after 10 years		24.47%
			Weighted average of ROE		22.40%
			Discount Rate (equiv. to WACC)		9.84%
4	**Financial Assumptions**				
		Fiscal Assumptions			
			Income Tax	%	34.61%
			MAT Rate (for first 10 years)	%	21.34%
		Depreciation			
			Depreciation Rate(power plant)	%	5.83%
			Depreciation Rate 13th year onwards	%	2.505%
			Years for 5.83% depreciation rate		12.00
5	**Working Capital**				
		For Fixed Charges			
		O&M Charges		Months	1
		Maintenance Spare	(% of O&M exepenses)		15%
		Receivables for Debtors		Months	2
		For Variable Charges			
		Biomass Stock		Months	4
		Interest On Working Capital		%	11.00%
6	**Fuel Related Assumptions**				
		Heat Rate	During/After Stabilisation period	Kcal/kwh	4200
			During Stablization Period	Kcal/kwh	4200
		Biomass			
			CERC Biomass Price (FY17-18)	Rs/T	3344.85
			GCV - Biomass	Kcal/kg	3611
			Price (FY 17-18)	Rs/T	3896.21
7	**Operation & Maintenance**				
		power plant (FY15-16)		Rs Lakh	26.30
		power plant (FY 2017-18)		Rs Lakh	28.39
		Total O & M Expenses Escalation		%	4.85%

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

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

Vaiable Cost	Unit	Year--->	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Biomass Cost	Rs Lakh		258.04	317.58	317.58	317.58	317.58	317.58	317.58	317.58	317.58	317.58	317.58	317.58	317.58	317.58	317.58	317.58	317.58	317.58	317.58	317.58
Per unit Var Cost	**Rs/kWh**		**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**

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		28.39	29.77	31.21	32.72	34.31	35.97	37.72	39.55	41.46	43.47	45.58	47.79	50.11	52.54	55.09	57.76	60.56	63.50	66.57	69.80
Depreciation	Rs Lakh		28.46	28.46	28.46	28.46	28.46	28.46	28.46	28.46	28.46	28.46	28.46	28.46	12.23	12.23	12.23	12.23	12.23	12.23	12.23	12.23
Interest on term loan	Rs Lakh		36.02	32.88	29.75	26.62	23.49	20.36	17.23	14.09	10.96	7.83	4.70	1.57	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Interest on working Capital	Rs Lakh		16.99	20.78	20.82	20.86	20.90	20.94	20.98	21.03	21.08	21.13	21.19	21.24	21.30	21.37	21.43	21.50	21.57	21.65	21.73	21.81
Return on Equity	Rs Lakh		29.78	29.78	29.78	29.78	29.78	29.78	29.78	29.78	29.78	29.78	35.83	35.83	35.83	35.83	35.83	35.83	35.83	35.83	35.83	35.83
Total Fixed Cost	**Rs Lakh**		**139.64**	**141.67**	**140.02**	**138.44**	**136.93**	**135.51**	**134.17**	**132.91**	**131.75**	**130.68**	**135.75**	**134.88**	**119.47**	**121.96**	**124.57**	**127.31**	**130.18**	**133.19**	**136.35**	**139.66**
Per unit Fixed Cost	**Rs/kWh**		**2.72**	**2.25**	**2.22**	**2.19**	**2.17**	**2.15**	**2.13**	**2.11**	**2.09**	**2.07**	**2.15**	**2.14**	**1.89**	**1.93**	**1.98**	**2.02**	**2.06**	**2.11**	**2.16**	**2.21**

Levallised tariff corresponding to Useful life

Per Unit Cost of Generation	Unit	Levellised	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Variable COG	Rs/kWh	**5.04**	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
O&M expn	Rs/kWh	**0.65**	0.55	0.47	0.49	0.52	0.54	0.57	0.60	0.63	0.66	0.69	0.72	0.76	0.79	0.83	0.87	0.92	0.96	1.01	1.06	1.11
Depreciation	Rs/kWh	**0.41**	0.56	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19
Int. on term loan	Rs/kWh	**0.29**	0.70	0.52	0.47	0.42	0.37	0.32	0.27	0.22	0.17	0.12	0.07	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Int. on working capital	Rs/kWh	**0.33**	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.35
RoE	Rs/kWh	**0.51**	0.58	0.47	0.47	0.47	0.47	0.47	0.47	0.47	0.47	0.47	0.57	0.57	0.57	0.57	0.57	0.57	0.57	0.57	0.57	0.57
Total COG	**Rs/kWh**	**7.23**	**7.76**	**7.28**	**7.26**	**7.23**	**7.21**	**7.18**	**7.16**	**7.14**	**7.12**	**7.11**	**7.19**	**7.17**	**6.93**	**6.97**	**7.01**	**7.05**	**7.10**	**7.15**	**7.20**	**7.25**

Levellised Tariff	Unit	Year -->	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Discount Factor			1	0.910	0.829	0.755	0.687	0.626	0.570	0.519	0.472	0.430	0.391	0.356	0.324	0.295	0.269	0.245	0.223	0.203	0.185	0.168
Variable Cost			258.3	317.9	317.9	317.9	317.9	317.9	317.9	317.9	317.9	317.9	317.9	317.9	317.9	317.9	317.9	317.9	317.9	317.9	317.9	317.9
Fixed Cost			112.7	138.8	138.8	138.8	138.8	138.8	138.8	138.8	138.8	138.8	138.8	138.8	138.8	138.8	138.8	138.8	138.8	138.8	138.8	138.8

Levellised Tariff (Variable)	5.04
Levellised Tariff (Fixed)	2.20
Levellised Tariff (Rs/Unit)	**7.24**

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)	21.342%
Income Tax (Normal Rates)	34.61%
Capital Cost	488.1

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	25.77	25.77	25.77	25.77	25.77	25.77	25.77	25.77	25.77	25.77	25.77	25.77	25.77	25.77	25.77	25.77	25.77	1.17	0.00	0.00
Accelerated Depreciation																					
Opening	%	100%	40%	24%	14%	9%	5%	3%	2%	1%	1%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Allowed during the year	%	60%	16.00%	9.60%	5.76%	3.46%	2.07%	1.24%	0.75%	0.45%	0.27%	0.16%	0.10%	0.06%	0.03%	0.02%	0.01%	0.01%	0.00%	0.00%	0.00%
Closing	%	40%	24%	14.40%	8.64%	5.18%	3.11%	1.87%	1.12%	0.67%	0.40%	0.24%	0.15%	0.09%	0.05%	0.03%	0.02%	0.01%	0.01%	0.00%	0.00%
Accelrated Deprn.	Rs Lakh	292.85	78.09	46.86	28.11	16.87	10.12	6.07	3.64	2.19	1.31	0.79	0.47	0.28	0.17	0.10	0.06	0.04	0.02	0.01	0.01
Net Depreciation Benefit	Rs Lakh	267.08	52.32	21.09	2.34	-8.90	-15.65	-19.70	-22.13	-23.58	-24.46	-24.98	-25.30	-25.49	-25.60	-25.67	-25.71	-25.73	-1.15	0.01	0.01
Tax Benefit	Rs Lakh	92.43	18.11	7.30	0.81	-3.08	-5.42	-6.82	-7.66	-8.16	-8.46	-8.65	-8.76	-8.82	-8.86	-8.88	-8.90	-8.91	-0.40	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	1.80	0.29	0.12	0.01	-0.05	-0.09	-0.11	-0.12	-0.13	-0.13	-0.14	-0.14	-0.14	-0.14	-0.14	-0.14	-0.14	-0.01	0.00	0.00
Discounting Factor		1.00	0.95	0.87	0.79	0.72	0.66	0.60	0.54	0.49	0.45	0.41	0.37	0.34	0.31	0.28	0.26	0.23	0.21	0.19	0.18

Levellised Benefit	**0.16**	**Rs/ Unit**

Annexure – 4
(Co-gen. Power Projects)

2.1 Form Template for Cogen Power Projects

S. No.	Assumption Head	Sub-Head	Sub-Head (2)	Unit	Assumptions
1	**Power Generation**				
		Capacity			
			Installed Power Generation Capacity	MW	1
			Auxillary Consumption during stablisation	%	8.5%
			Auxillary Consumption after stabilisation	%	8.5%
			PLF(Stablization for 6 months)	%	60%
			PLF(during first year after Stablization)	%	60%
			PLF(second year onwards)	%	60%
			Useful Life	Years	20.00
			Tariff Period	Years	13
2	**Project Cost**				
		Capital Cost/MW	Power Plant Cost	Rs Lacs/MW	482.85
3	**Financial Assumptions**				
		Debt: Equity			
			Debt	%	70%
			Equity	%	30%
			Total Debt Amount	Rs Lacs	337.99
			Total Equity Amout	Rs Lacs	144.85
		Debt Component			
			Loan Amount	Rs Lacs	337.99
			Repayment Period(incld Moratorium)	years	12
			Interest Rate	%	11.0%
		Equity Component			
			Equity amount	Rs Lacs	144.85
			Return on Equity for first 10 years	% p.a	20.34%
			RoE Period	Year	10.00
			Return on Equity after 10 years		24.47%
			Weighted average of ROE		21.29%
			Discount Rate (equiv. to WACC)		9.84%
4	**Financial Assumptions**				
		Fiscal Assumptions			
			Income Tax	%	34.61%
			MAT Rate (for first 10 years)	%	21.342%
		Depreciation			
			Depreciation Rate(power plant)	%	5.83%
			Depreciation Rate 13th year onwards	%	2.51%
			Years for 5.83%% depreciation rate		12.00
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			
		Bagasse Stock		Months	4
		Interest On Working Capital		%	11.00%
6	**Fuel Related Assumptions**				
		Heat Rate	After Stabilisation period	Kcal/kwh	3600
		Bagasse			
			CERC Bagasse price (FY17-18)	Rs/T	2273.75
			GCV - Bagasse	Kcal/kg	2250
			Bagasse (FY 17-18)	Rs/T	2273.75
7	**Operation & Maintenance**				
		power plant (FY15-16)		Rs Lakh	17.31
		power plant (FY 2017-18)			18.69
		Total O & M Expenses Escalation		%	4.85%

2.2 Form Template for (Cogen and Bagasse based 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		5.26	5.26	5.26	5.26	5.26	5.26	5.26	5.26	5.26	5.26	5.26	5.26	5.26	5.26	5.26	5.26	5.26	5.26	5.26	5.26
Auxiliary Consumption	MU		0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45
Net Generation	MU		4.81	4.81	4.81	4.81	4.81	4.81	4.81	4.81	4.81	4.81	4.81	4.81	4.81	4.81	4.81	4.81	4.81	4.81	4.81	4.81

Vaiable Cost	Unit	Year--->	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Bagasse Cost	Rs Lakh		191.21	191.21	191.21	191.21	191.21	191.21	191.21	191.21	191.21	191.21	191.21	191.21	191.21	191.21	191.21	191.21	191.21	191.21	191.21	191.21
Per unit Var Cost	**Rs/kWh**		**3.98**	**3.98**	**3.98**	**3.98**	**3.98**	**3.98**	**3.98**	**3.98**	**3.98**	**3.98**	**3.98**	**3.98**	**3.98**	**3.98**	**3.98**	**3.98**	**3.98**	**3.98**	**3.98**	**3.98**

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		18.69	19.59	20.54	21.54	22.58	23.68	24.83	26.03	27.29	28.62	30.01	31.46	32.99	34.59	36.26	38.02	39.86	41.80	43.82	45.95
Depreciation	Rs Lakh		28.15	28.15	28.15	28.15	28.15	28.15	28.15	28.15	28.15	28.15	28.15	28.15	12.10	12.10	12.10	12.10	12.10	12.10	12.10	12.10
Interest on term loan	Rs Lakh		35.63	32.53	29.43	26.34	23.24	20.14	17.04	13.94	10.84	7.75	4.65	1.55	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Interest on working Capital	Rs Lakh		13.07	13.10	13.12	13.15	13.17	13.20	13.23	13.26	13.29	13.33	13.36	13.40	13.44	13.48	13.52	13.57	13.62	13.67	13.72	13.77
Return on Equity	Rs Lakh		29.47	29.47	29.47	29.47	29.47	29.47	29.47	29.47	29.47	29.47	35.44	35.44	35.44	35.44	35.44	35.44	35.44	35.44	35.44	35.44
Total Fixed Cost	**Rs Lakh**		**125.01**	**122.84**	**120.71**	**118.64**	**116.61**	**114.63**	**112.71**	**110.85**	**109.05**	**107.31**	**111.61**	**110.00**	**93.96**	**95.60**	**97.32**	**99.13**	**101.02**	**103.00**	**105.08**	**107.26**
Per unit Fixed Cost	**Rs/kWh**		**2.60**	**2.55**	**2.51**	**2.47**	**2.42**	**2.38**	**2.34**	**2.30**	**2.27**	**2.23**	**2.32**	**2.29**	**1.95**	**1.99**	**2.02**	**2.06**	**2.10**	**2.14**	**2.18**	**2.23**

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
Variable COG	Rs/kWh	**3.98**	3.98	3.98	3.98	3.98	3.98	3.98	3.98	3.98	3.98	3.98	3.98	3.98	3.98	3.98	3.98	3.98	3.98	3.98	3.98	3.98
O&M expn	Rs/kWh	**0.55**	0.39	0.41	0.43	0.45	0.47	0.49	0.52	0.54	0.57	0.60	0.62	0.65	0.69	0.72	0.75	0.79	0.83	0.87	0.91	0.96
Depreciation	Rs/kWh	**0.52**	0.59	0.59	0.59	0.59	0.59	0.59	0.59	0.59	0.59	0.59	0.59	0.59	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
Int. on term loan	Rs/kWh	**0.36**	0.74	0.68	0.61	0.55	0.48	0.42	0.35	0.29	0.23	0.16	0.10	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Int. on working capital	Rs/kWh	**0.28**	0.27	0.27	0.27	0.27	0.27	0.27	0.28	0.28	0.28	0.28	0.28	0.28	0.28	0.28	0.28	0.28	0.28	0.28	0.29	0.29
RoE	Rs/kWh	**0.65**	0.61	0.61	0.61	0.61	0.61	0.61	0.61	0.61	0.61	0.61	0.74	0.74	0.74	0.74	0.74	0.74	0.74	0.74	0.74	0.74
Total COG	**Rs/kWh**	**6.33**	**6.58**	**6.53**	**6.49**	**6.44**	**6.40**	**6.36**	**6.32**	**6.28**	**6.24**	**6.21**	**6.30**	**6.26**	**5.93**	**5.96**	**6.00**	**6.04**	**6.08**	**6.12**	**6.16**	**6.21**

Levellised Tariff	Unit	Year -->	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Discount Factor			1	0.910	0.829	0.755	0.687	0.626	0.570	0.519	0.472	0.430	0.391	0.356	0.324	0.295	0.269	0.245	0.223	0.203	0.185	0.168
Variable Cost			191.4	191.4	191.4	191.4	191.4	191.4	191.4	191.4	191.4	191.4	191.4	191.4	191.4	191.4	191.4	191.4	191.4	191.4	191.4	191.4
Fixed Cost			113.0	113.0	113.0	113.0	113.0	113.0	113.0	113.0	113.0	113.0	113.0	113.0	113.0	113.0	113.0	113.0	113.0	113.0	113.0	113.0

Levellised Tariff (Variable)	3.98
Levellised Tariff (Fixed)	2.35
Levellised Tariff (Rs/Unit)	**6.33**

Determination of Accelerated Depreciation for Cogen and Bagasse based Power Project

Depreciation amount	90%
Book Depreciation rate	5.28%
Tax Depreciation rate	40%
Additional Depreciation	20%
Income Tax (MAT)	21.342%
Income Tax (Normal Rates)	34.61%
Capital Cost	482.8

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	25.49	25.49	25.49	25.49	25.49	25.49	25.49	25.49	25.49	25.49	25.49	25.49	25.49	25.49	25.49	25.49	25.49	1.16	0.00	0.00
Accelerated Depreciation																					
Opening	%	100%	40%	24%	14%	9%	5%	3%	2%	1%	1%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Allowed during the year	%	60%	16.00%	9.60%	5.76%	3.46%	2.07%	1.24%	0.75%	0.45%	0.27%	0.16%	0.10%	0.06%	0.03%	0.02%	0.01%	0.01%	0.00%	0.00%	0.00%
Closing	%	40%	24%	14.40%	8.64%	5.18%	3.11%	1.87%	1.12%	0.67%	0.40%	0.24%	0.15%	0.09%	0.05%	0.03%	0.02%	0.01%	0.01%	0.00%	0.00%
Accelrated Deprn.	Rs Lakh	289.71	77.26	46.35	27.81	16.69	10.01	6.01	3.60	2.16	1.30	0.78	0.47	0.28	0.17	0.10	0.06	0.04	0.02	0.01	0.01
Net Depreciation Benefit	Rs Lakh	264.21	51.76	20.86	2.32	-8.81	-15.48	-19.49	-21.89	-23.33	-24.20	-24.72	-25.03	-25.21	-25.33	-25.39	-25.43	-25.46	-1.14	0.01	0.01
Tax Benefit	Rs Lakh	91.44	17.91	7.22	0.80	-3.05	-5.36	-6.74	-7.58	-8.07	-8.37	-8.55	-8.66	-8.73	-8.76	-8.79	-8.80	-8.81	-0.39	0.00	0.00
Net Energy generation	MU	4.81	4.81	4.81	4.81	4.81	4.81	4.81	4.81	4.81	4.81	4.81	4.81	4.81	4.81	4.81	4.81	4.81	4.81	4.81	4.81
Per unit benefit	Rs/Unit	1.90	0.37	0.15	0.02	-0.06	-0.11	-0.14	-0.16	-0.17	-0.17	-0.18	-0.18	-0.18	-0.18	-0.18	-0.18	-0.18	-0.01	0.00	0.00
Discounting Factor		1.00	0.95	0.87	0.79	0.72	0.66	0.60	0.54	0.49	0.45	0.41	0.37	0.34	0.31	0.28	0.26	0.23	0.21	0.19	0.18

Levellised benefit	**0.16**	**(Rs/kWh)**

Annexure – 5A
(Solar PV)

Form 1.1 Assumptions Parameters

S. No.	Assumption Head	Sub-Head	Sub-Head (2)	Unit	Capacity <=5 MW
1	**Power Generation**				
		Capacity			
			Installed Power Generation Capacity	MW	1
			Capacity Utilization Factor	%	19%
			Auxilliary Consumption		0%
			Useful Life	Years	25
2	**Project Cost**				
		Capital Cost/MW	Power Plant Cost	Rs Lacs/MW	424.74
3	**Sources of Fund**				
			Tariff Period	Years	13
		Debt: Equity			
			Debt	%	70%
			Equity	%	30%
			Total Debt Amount	Rs Lacs	297.32
			Total Equity Amout	Rs Lacs	127.42
		Debt Component			
			Loan Amount	Rs Lacs	297.32
			Moratorium Period	years	0
			Repayment Period(incld Moratorium)	years	12
			Interest Rate	%	11.00%
		Equity Component			
			Equity amount	Rs Lacs	127.42
			Return on Equity for first 10 years	% p.a	20.34%
			RoE Period	Year	10
			Return on Equity 11th year onwards	% p.a	24.47%
			Weighted average of ROE		22.82%
			Discount Rate		9.84%
4	**Financial Assumptions**				
		Fiscal Assumptions			
			Income Tax	%	34.608%
			MAT Rate (for first 10 years)	%	21.342%
		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		%	11.00%
6	**Operation & Maintenance**				
		Operation & Maintenance (2015-16)			13.00
		Operation & Maintenance (2017-18)		Rs Lakh	14.03
		Total O & M Expenses Escalation		%	4.85%

Form 1.2 Form Template for (Solar PV 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		1.66	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

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		14.03	14.71	15.43	16.18	16.96	17.78	18.64	19.55	20.50	21.49	22.53	23.63	24.77	25.97	27.23	28.55	29.94	31.39	32.91	34.51	36.18	37.93	39.77	41.70	43.72
Depreciation	Rs Lakh		24.76	24.76	24.76	24.76	24.76	24.76	24.76	24.76	24.76	24.76	24.76	24.76	6.55	6.55	6.55	6.55	6.55	6.55	6.55	6.55	6.55	6.55	6.55	6.55	6.55
Interest on term loan	Rs Lakh		31.34	28.62	25.89	23.17	20.44	17.72	14.99	12.26	9.54	6.81	4.09	1.36	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		1.93	1.94	1.96	1.98	2.00	2.02	2.04	2.07	2.09	2.12	2.14	2.17	2.20	2.23	2.26	2.30	2.33	2.37	2.41	2.45	2.49	2.54	2.59	2.64	2.69
Return on Equity	Rs Lakh		25.92	25.92	25.92	25.92	25.92	25.92	25.92	25.92	25.92	25.92	31.18	31.18	31.18	31.18	31.18	31.18	31.18	31.18	31.18	31.18	31.18	31.18	31.18	31.18	31.18
Total Fixed Cost	**Rs Lakh**		**97.98**	**95.96**	**93.96**	**92.00**	**90.08**	**88.20**	**86.36**	**84.56**	**82.81**	**81.10**	**84.70**	**83.10**	**64.70**	**65.93**	**67.22**	**68.57**	**69.99**	**71.48**	**73.04**	**74.68**	**76.40**	**78.20**	**80.08**	**82.06**	**84.14**
Per unit Fixed Cost	**Rs/kWh**		**5.89**	**5.77**	**5.65**	**5.53**	**5.41**	**5.30**	**5.19**	**5.08**	**4.98**	**4.87**	**5.09**	**4.99**	**3.89**	**3.96**	**4.04**	**4.12**	**4.21**	**4.29**	**4.39**	**4.49**	**4.59**	**4.70**	**4.81**	**4.93**	**5.06**

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	**1.26**	0.84	0.88	0.93	0.97	1.02	1.07	1.12	1.17	1.23	1.29	1.35	1.42	1.49	1.56	1.64	1.72	1.80	1.89	1.98	2.07	2.17	2.28	2.39	2.51	2.63
Depreciation	Rs/kWh	**1.21**	1.49	1.49	1.49	1.49	1.49	1.49	1.49	1.49	1.49	1.49	1.49	1.49	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
Int. on term loan	Rs/kWh	**0.87**	1.88	1.72	1.56	1.39	1.23	1.06	0.90	0.74	0.57	0.41	0.25	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
Int. on working capital	Rs/kWh	**0.13**	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.13	0.13	0.13	0.13	0.13	0.13	0.14	0.14	0.14	0.14	0.14	0.15	0.15	0.15	0.16	0.16	0.16
RoE	Rs/kWh	**1.66**	1.56	1.56	1.56	1.56	1.56	1.56	1.56	1.56	1.56	1.56	1.87	1.87	1.87	1.87	1.87	1.87	1.87	1.87	1.87	1.87	1.87	1.87	1.87	1.87	1.87
Total COG	**Rs/kWh**	**5.13**	**5.89**	**5.77**	**5.65**	**5.53**	**5.41**	**5.30**	**5.19**	**5.08**	**4.98**	**4.87**	**5.09**	**4.99**	**3.89**	**3.96**	**4.04**	**4.12**	**4.21**	**4.29**	**4.39**	**4.49**	**4.59**	**4.70**	**4.81**	**4.93**	**5.06**

Levellised Tariff	Unit	Year--->	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Discount Factor			1	0.91	0.83	0.75	0.69	0.63	0.57	0.52	0.47	0.43	0.39	0.36	0.32	0.30	0.27	0.24	0.22	0.20	0.18	0.17	0.15	0.14	0.13	0.12	0.11
Fixed Cost			85.38	85.38	85.38	85.38	85.38	85.38	85.38	85.38	85.38	85.38	85.38	85.38	85.38	85.38	85.38	85.38	85.38	85.38	85.38	85.38	85.38	85.38	85.38	85.38	85.38
Levellised Tariff	**5.13**	**Rs/Unit**																									

Determination of Additional Depreciation for Solar PV Power Projects

Depreciation amount	90%
Book Depreciation rate	5.28%
Tax Depreciation rate	40%
Additional Depreciation	20%
Income Tax (MAT)	21.342%
Income Tax (Normal Rates)	34.608%
Capital Cost	424.74

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	22.43	22.43	22.43	22.43	22.43	22.43	22.43	22.43	22.43	22.43	22.43	22.43	22.43	22.43	22.43	22.43	22.43	1.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Accelerated Depreciation																										
Opening	%	100%	40%	24%	14%	9%	5%	3%	2%	1%	1%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Allowed during the year	%	60.00%	16.00%	9.60%	5.76%	3.46%	2.07%	1.24%	0.75%	0.45%	0.27%	0.16%	0.10%	0.06%	0.03%	0.02%	0.01%	0.01%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Closing	%	40.0%	24.0%	14.4%	8.64%	5.18%	3.11%	1.87%	1.12%	0.67%	0.40%	0.24%	0.15%	0.09%	0.05%	0.03%	0.02%	0.01%	0.01%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Accelrated Deprn.	Rs Lakh	254.84	67.96	40.78	24.47	14.68	8.81	5.28	3.17	1.90	1.14	0.68	0.41	0.25	0.15	0.09	0.05	0.03	0.02	0.01	0.01	0.00	0.00	0.00	0.00	0.00
Net Depreciation Benefit	Rs Lakh	232.42	45.53	18.35	2.04	-7.75	-13.62	-17.14	-19.26	-20.52	-21.28	-21.74	-22.02	-22.18	-22.28	-22.34	-22.37	-22.39	-1.00	0.01	0.01	0.00	0.00	0.00	0.00	0.00
Tax Benefit	Rs Lakh	80.44	15.76	6.35	0.71	-2.68	-4.71	-5.93	-6.66	-7.10	-7.37	-7.52	-7.62	-7.68	-7.71	-7.73	-7.74	-7.75	-0.35	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Energy generation	MU	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
Per unit benefit	Rs/Unit	4.83	0.95	0.38	0.04	-0.16	-0.28	-0.36	-0.40	-0.43	-0.44	-0.45	-0.46	-0.46	-0.46	-0.46	-0.47	-0.47	-0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Applicable Discounting Factor		1.00	0.95	0.87	0.79	0.72	0.66	0.60	0.54	0.49	0.45	0.41	0.37	0.34	0.31	0.28	0.26	0.23	0.21	0.19	0.18	0.16	0.15	0.13	0.12	0.11

Levellised benefit	**0.39**	**Rs/Unit**

Annexure – 5B
(Solar Thermal Projects)

Form 1.1 Assumptions Parameters

S. No.	Assumption Head	Sub-Head	Sub-Head (2)	Unit	Capacity <=5 MW
1	**Power Generation**				
		Capacity			
			Installed Power Generation Capacity	MW	1
			Capacity Utilization Factor	%	23%
			Auxilliary Consumption		10%
			Useful Life	Years	25
2	**Project Cost**				
		Capital Cost/MW	Power Plant Cost	Rs Lacs/MW	1,200.00
3	**Sources of Fund**				
			Tariff Period	Years	25
		Debt: Equity			
			Debt	%	70%
			Equity	%	30%
			Total Debt Amount	Rs Lacs	840.00
			Total Equity Amout	Rs Lacs	360.00
		Debt Component			
			Loan Amount	Rs Lacs	840.00
			Moratorium Period	years	0
			Repayment Period(incld Moratorium)	years	12
			Interest Rate	%	11.00%
		Equity Component			
			Equity amount	Rs Lacs	360.00
			Return on Equity for first 10 years	% p.a	20.34%
			RoE Period	Year	10
			Return on Equity 11th year onwards	% p.a	24.47%
			Weighted average of ROE		22.82%
			Discount Rate		9.84%
4	**Financial Assumptions**				
		Fiscal Assumptions			
			Income Tax	%	34.608%
			MAT Rate (for first 10 years)	%	21.342%
		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		%	11.00%
6	**Operation & Maintenance**				
		Operation & Maintenance (2015-16)			15.00
		Operation & Maintenance (2017-18)		Rs Lakh	16.19
		Total O & M Expenses Escalation		%	4.85%

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		16.19	16.98	17.80	18.66	19.57	20.52	21.51	22.56	23.65	24.80	26.00	27.26	28.58	29.97	31.42	32.94	34.54	36.22	37.97	39.81	41.74	43.77	45.89	48.12	50.45
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		88.55	80.85	73.15	65.45	57.75	50.05	42.35	34.65	26.95	19.25	11.55	3.85	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		4.16	4.18	4.21	4.23	4.25	4.28	4.30	4.33	4.36	4.39	4.42	4.45	4.48	4.52	4.56	4.59	4.64	4.68	4.72	4.77	4.82	4.87	4.93	4.98	5.04
Return on Equity	Rs Lakh		73.23	73.23	73.23	73.23	73.23	73.23	73.23	73.23	73.23	73.23	88.08	88.08	88.08	88.08	88.08	88.08	88.08	88.08	88.08	88.08	88.08	88.08	88.08	88.08	88.08
Total Fixed Cost	**Rs Lakh**		**252.10**	**245.20**	**238.35**	**231.53**	**224.76**	**218.03**	**211.35**	**204.72**	**198.14**	**191.62**	**200.01**	**193.60**	**139.65**	**141.07**	**142.56**	**144.12**	**145.76**	**147.48**	**149.28**	**151.17**	**153.15**	**155.22**	**157.40**	**159.68**	**162.08**
Per unit Fixed Cost	**Rs/kWh**		**13.90**	**13.52**	**13.14**	**12.77**	**12.39**	**12.02**	**11.66**	**11.29**	**10.93**	**10.57**	**11.03**	**10.68**	**7.70**	**7.78**	**7.86**	**7.95**	**8.04**	**8.13**	**8.23**	**8.34**	**8.45**	**8.56**	**8.68**	**8.81**	**8.94**

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	**1.34**	0.89	0.94	0.98	1.03	1.08	1.13	1.19	1.24	1.30	1.37	1.43	1.50	1.58	1.65	1.73	1.82	1.90	2.00	2.09	2.20	2.30	2.41	2.53	2.65	2.78
Depreciation	Rs/kWh	**3.14**	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	**2.25**	4.88	4.46	4.03	3.61	3.18	2.76	2.34	1.91	1.49	1.06	0.64	0.21	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	**0.24**	0.23	0.23	0.23	0.23	0.23	0.24	0.24	0.24	0.24	0.24	0.24	0.25	0.25	0.25	0.25	0.25	0.26	0.26	0.26	0.26	0.27	0.27	0.27	0.27	0.28
RoE	Rs/kWh	**4.31**	4.04	4.04	4.04	4.04	4.04	4.04	4.04	4.04	4.04	4.04	4.86	4.86	4.86	4.86	4.86	4.86	4.86	4.86	4.86	4.86	4.86	4.86	4.86	4.86	4.86
Total COG	**Rs/kWh**	**11.28**	**13.90**	**13.52**	**13.14**	**12.77**	**12.39**	**12.02**	**11.66**	**11.29**	**10.93**	**10.57**	**11.03**	**10.68**	**7.70**	**7.78**	**7.86**	**7.95**	**8.04**	**8.13**	**8.23**	**8.34**	**8.45**	**8.56**	**8.68**	**8.81**	**8.94**

Discount Factor			1	0.91	0.83	0.75	0.69	0.63	0.57	0.52	0.47	0.43	0.39	0.36	0.32	0.30	0.27	0.24	0.22	0.20	0.18	0.17	0.15	0.14	0.13	0.12	0.11
Fixed Cost			204.49	204.49	204.49	204.49	204.49	204.49	204.49	204.49	204.49	204.49	204.49	204.49	204.49	204.49	204.49	204.49	204.49	204.49	204.49	204.49	204.49	204.49	204.49	204.49	204.49
Levellised Tariff	**11.28**	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)	21.342%
Income Tax (Normal Rates)	34.608%
Capital Cost	1200.00

Years ---------->	Unit	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Book Depreciation	%	5.28%	5.28%	5.28%	5.28%	5.28%	5.28%	5.28%	5.28%	5.28%	5.28%	5.28%	5.28%	5.28%	5.28%	5.28%	5.28%	5.28%	0.24%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Book Depreciation	Rs Lakh	63.36	63.36	63.36	63.36	63.36	63.36	63.36	63.36	63.36	63.36	63.36	63.36	63.36	63.36	63.36	63.36	63.36	2.88	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Accelerated Depreciation																										
Opening	%	100%	40%	24%	14%	9%	5%	3%	2%	1%	1%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Allowed during the year	%	60.00%	16.00%	9.60%	5.76%	3.46%	2.07%	1.24%	0.75%	0.45%	0.27%	0.16%	0.10%	0.06%	0.03%	0.02%	0.01%	0.01%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Closing	%	40.0%	24.0%	14.4%	8.64%	5.18%	3.11%	1.87%	1.12%	0.67%	0.40%	0.24%	0.15%	0.09%	0.05%	0.03%	0.02%	0.01%	0.01%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Accelrated Depm.	Rs Lakh	720.00	192.00	115.20	69.12	41.47	24.88	14.93	8.96	5.37	3.22	1.93	1.16	0.70	0.42	0.25	0.15	0.09	0.05	0.03	0.02	0.01	0.01	0.00	0.00	0.00
Net Depreciation Benefit	Rs Lakh	656.64	128.64	51.84	5.76	-21.89	-38.48	-48.43	-54.40	-57.99	-60.14	-61.43	-62.20	-62.66	-62.94	-63.11	-63.21	-63.27	-2.83	0.03	0.02	0.01	0.01	0.00	0.00	0.00
Tax Benefit	Rs Lakh	227.25	44.52	17.94	1.99	-7.57	-13.32	-16.76	-18.83	-20.07	-20.81	-21.26	-21.53	-21.69	-21.78	-21.84	-21.88	-21.90	-0.98	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	12.53	2.46	0.99	0.11	-0.42	-0.73	-0.92	-1.04	-1.11	-1.15	-1.17	-1.19	-1.20	-1.20	-1.20	-1.21	-1.21	-0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Applicable Discounting Factor		1.00	0.95	0.87	0.79	0.72	0.66	0.60	0.54	0.49	0.45	0.41	0.37	0.34	0.31	0.28	0.26	0.23	0.21	0.19	0.18	0.16	0.15	0.13	0.12	0.11

Levellised benefit	**1.02**	**Rs/Unit**