

**Before the**  
**MAHARASHTRA ELECTRICITY REGULATORY COMMISSION**  
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**Case No. 10 of 2012**

**In the matter of**  
**Determination of Generic Tariff for the third year of the first Control Period under**  
**Regulation 8 of the Maharashtra Electricity Regulatory Commission (Terms and**  
**Conditions for Determination of Renewable Energy Tariff) Regulations, 2010**

**Shri V.P. Raja, Chairman**  
**Shri Vijay L. Sonavane, Member**

**ORDER (SUO-MOTU)**

**Dated: March 30, 2012**

In exercise of the powers vested under Section 61 read with Section 181 of the Electricity Act 2003 ("EA 2003"), the Maharashtra Electricity Regulatory Commission ("MERC" or "the Commission") has notified the MERC (Terms and Conditions for determination of Renewable Energy Tariff) Regulations, 2010, ( "the RE Tariff Regulations") on June 7, 2010. The RE Tariff Regulations provide for Terms and Conditions and the Procedure for determination of generic tariff on suo-motu basis in respect of the following Renewable Energy (RE) generating stations:

- (a) Wind Power Projects;
- (b) Small Hydro Projects, Mini and Micro Hydro Projects;
- (c) Biomass Power Projects;
- (d) Qualifying and Non-Qualifying Non-fossil fuel-based co-generation Plants;
- (e) Solar Photo Voltaic (PV) Projects,
- (f) Solar Thermal Power Projects,
- (g) Solar Rooftop PV and other small Solar Power Projects.

2. Regulation 8.1 of the RE Tariff Regulations requires the Commission to determine the Generic Tariff on suo-motu basis for the RE technologies for which norms have been specified in the said Regulations, as reproduced below:

*“8.1 The Commission shall notify the generic preferential tariff on suo-motu basis pursuant to issuance of revised norms by Central Electricity Regulatory Commission at the beginning of each year of the Control Period for renewable energy technologies for which norms have been specified under the Regulations.*

*Provided that for the first year of Control Period, (i.e. FY 2010-11), the generic tariff on suo-motu basis may be determined within a period not exceeding three months from the date of notification of these Regulations.”*

3. Accordingly, the Commission vide its Order dated July 14, 2010, issued the Order for the ‘Determination of Generic Tariff for RE Technologies for the First year of the Control Period, i.e., FY 2010-11’ on suo-motu basis.

4. Further, in accordance with the above Regulations, the Commission, vide its Order dated April 26, 2011, issued the Order for the ‘Determination of Generic Tariff for RE Technologies for the second year of the Control Period, i.e., FY 2011-12’ on suo-motu basis. The same is applicable for Renewable Energy Projects to be commissioned in Maharashtra during the second year of the Control Period, i.e., from April 1, 2011 to March 31, 2012.

5. Furthermore, in due discharge of the mandate under Regulations 8.1 of the RE Regulations, the Commission, vide its public notice dated February 01, 2012, issued a draft Order for the ‘Determination of Generic Tariff for RE Technologies for the third year of the Control Period, i.e., FY 2012-13’ on suo-motu basis, and invited comments from interested stakeholders. The Commission has received written suggestions and objections from various persons.

6. A public hearing was held on **Wednesday, March 7, 2012, at 11.00 hours in Centrum Hall, 1st floor, Centre No.1, World Trade Centre, Cuffe Parade, Mumbai 400 005**. The list of stakeholders who submitted their comments/suggestions in writing or made oral submissions during the public hearing is placed at **Appendix-1** and the list of participants who attended the public hearing is placed at **Appendix-2**.

7. After considering the suggestions and objections received on the draft Order published by the Commission, in due discharge of the mandate under Regulation 8.1 of RE Tariff Regulations, the Commission hereby determines the generic tariff of the RE projects for the third year of the Control Period (i.e., FY 2012-13) through this Order based on the financial principles and technology specific parameters as explained in the subsequent sections of the Order.

# 1. Comments/Objections received and Commission's Ruling

## 1.1. INTEREST ON LOAN AND INTEREST ON WORKING CAPITAL

### *Stakeholder Comments/Suggestions*

The Indian Wind Energy Association (InWEA) and Green Energy Pvt. Ltd (GRPL) in their submission, have listed the sequence of events and contended that even after the effectiveness of guidelines of RBI on Base Rate, the Commission has issued two Tariff Orders for determination of tariff for Renewable Energy sources based on the interest rate linked with State Bank of India (SBI) Prime Lending Rate without considering the Base Rate system. They also submitted that even after the implementation of the Base Rate system, SBI has continued to specify benchmarking the Prime Lending Rate (PLR) as 4.75% above the Base Rate. They further requested that considering the correlation between Bank Advance Rate and Base Rate, the Commission may continue with the existing methodology for computation of interest rate for long-term loan and interest on working capital. GRPL further argued that while issuing the Order in Case No 153 of 2011, in the matter of Petition filed by M/s Gamesa, the Commission has decided to consider the requirement of waiving of 50 m hub height criteria for wind installation only by way of amendment of the Regulations. Hence, GRPL requested that on similar lines, the Commission may consider any change in methodology for determination of normative interest Rate on term loans and working capital only after the amendment of RE Regulations.

The Indian Wind Turbine Manufacturers Association (IWTMA) submitted that the interest rate proposed in the draft Order is much lower than the actual interest rate prevailing in the market. IWTMA requested the Commission to consider interest rate of 13.56% for long-term loan and interest rate of 13.06% for working capital. ReGen Powertech requested to modify the Interest on loan and Interest on Working Capital as SBI Base Rate + 600 basis points and SBI Base Rate + 550 basis points, respectively, to account for the wide difference in rates between SBI PLR and SBI Base Rate.

GAPS Power requested the Commission to consider the interest on working capital as average Base Rate of SBI+450 basis points, since, the interest rate has increased considerably in the last one year.

Bharat Forge requested to consider average interest rate for complete financial year (i.e., from April 1, 2011 to March 31, 2012) by assuming the latest rate for the remaining

period. It also proposed similar revisions in the interest rates for working capital and discount rate.

### *Commission's Ruling*

In view of the significant policy shift from Advance Rate (PLR) to Base Rate for banks as per RBI Guidelines and taking guidance from the draft CERC RE Tariff Regulations 2012, which was in public domain at the time of issuance of the draft Order, the Commission had proposed to revise the computation of normative interest rate from Prime Lending Rate (Advance Rate) to Base Rate. The Regulations provide as follows:-

*"14.2. ....For the purpose of computation of tariff, the normative interest rate shall be considered as average of State Bank Advance Rate (SBAR) prevalent during the previous year plus 150 basis points."*

*"17.3 Interest on Working Capital shall be at interest rate equivalent to average State Bank Advance Rate (SBAR) during the previous year plus 100 basis points."*

Further, in order to factor in the concerns for lending to RE projects, the Commission had proposed to consider a spread of 300 basis points above the average Base Rate of State Bank of India to arrive at normative interest rate of 12.56% for long-term loan financing of the RE projects and a spread of 250 basis points above the average Base Rate of State Bank of India to arrive at normative interest rate of 12.06% for interest on working capital.

However, many objectors have expressed their concerns over such shift in benchmark interest rate and pleaded that the interest rate proposed in the draft Order does not represent the real market conditions in which the projects are being financed, which is in the range of 13% to 15%.

The Commission has noted the comparison of Base Rate and BPLR applicable for the previous Financial Year (i.e., FY 2011-12) issued by the State Bank of India, which is reproduced below for ready reference:

***Table: Comparison of Base Rate and BPLR***

<b>Period</b>	<b>Base Rate</b>	<b>BPLR ( State Bank Advance Rate)</b>
1-April-2011 to 24-April-2011	8.25%	13.00%
25-April-2011 to 11-May-2011	8.50%	13.25%

12-May-2011 to 10-July-2011	9.25%	14.00%
11-July-2011 to 12-August-2011	9.50%	14.25%
13-August-2011 to 31-March-2012	10.00%	14.75%
<b>Weighted Average Advance Rate for 2011 – 12</b>	<b>9.65%</b>	<b>14.40%</b>

It can be observed from the above table that if the BPLR system is used, the interest rate works out to 15.90% (14.40% +150 basis point), while if the interest rate is considered as per the methodology proposed in the draft Order (i.e., Base Rate +300 basis points), which is in line with the notified CERC RE Tariff Regulations, 2012, the interest rate works out to 12.65% (9.56% + 300 basis points). Similarly, the Interest Rate on Working Capital works out to 15.40% (14.40% + 100 basis points) as per BPLR system and 12.15% (9.25% + 250 basis points) as per Base Rate system. While the Commission recognises that modification of the benchmark reference interest rate would require amendment of RE Tariff Regulations, at the same time, the Commission cannot ignore the principles and methodology specified by the Central Commission. Further, while the methodology of switch over to Base Rate regime was announced by RBI about two years ago, its consideration as reference rate for RE Tariff purposes was adopted by Central Commission only recently upon notification of CERC RE Tariff Regulations, 2012. In view of the significant variation in resultant interest rates from 15.90% p.a. (if based on SBAR+150 basis points) or 12.65% p.a. (if based on SBI Base Rate + 300 basis points) depending on assumption of benchmark reference rate, for tariff determination, the Commission is of the considered view that the assumption of interest rate for RE Tariff determination for FY 2012-13 should be viewed taking into consideration the prevalent market considerations rather than adopting a formulation, which is no longer valid.

In this context, the Commission has scrutinised the existing interest rates offered by Indian Renewable Energy Development Agency Ltd (IREDA) and Power Finance Corporation Ltd (PFC). The following table summarises the current interest rates offered by IREDA and PFC for RE Technologies and Generation facilities:

**Table: Interest Rates offered by IREDA w.e.f. August 16, 2011**

<b>Sr.No</b>	<b>Borrower /Sector</b>	<b>Interest Rate</b>
1	Schedule A, AAA rated PSUs	11.00%
2	State Sector Borrowers	11.00% - 11.75%
3	Wind Energy, Co-generation &Hydro	11.75%-12.50%

4	Solar PV and Energy Efficiency/ Energy Conservation	12.25%-13.00%
5	Solar Thermal and Biomass Power	12.50%-13.25%
6	Sectors other than above	13.50%
7	Manufacturing (All Sectors)	Existing units - 13.50% Green Field - 13.75%

(source: www.ireda.gov.in)

**Table: Interest Rates offered by PFC w.e.f. July 27, 2011**

Sr.No	Borrower /Sector	Interest Rate
1	<b>State Sector Borrower</b> of Category A+ and	12.50%
	<b>Identified CPSUs</b> and	
	<b>AAA rated company</b>	
2	<b>State Sector Borrower</b> (of Category A) and	12.75%
	<b>Central Sector Borrower</b> (Other than Identified CPSUs and AAA rated ) and	
	<b>Private Sector Borrower</b> ( with Generation projects with Integrated rating IR-1)	
3	<b>Private Sector Borrowers :</b>	13.25%
	a) Generation projects with Integrated rating IR-2	
	b) Entity Grade E-I & E-II	
4	<b>Private Sector Borrower</b>	13.50%
	a) Generation projects with Integrated rating IR-3	
	b) Entity Grade E-III & E-IV	
	c) Discom of Grade-A	
5	<b>Private Sector Borrower</b>	13.75%
	Generation projects with Integrated rating IR-4	
6	<b>Private Sector Borrower</b>	14.00%
	a) Generation projects with Integrated rating IR-5	
	b) Entity Grade E-V	
	c) Discom of Grade-B	
	d) Non-graded	

(www.pfc.gov.in)

From the above table, it is observed that the interest rate offered by IREDA for different RE technologies and borrowers ranges from 11.75 % to 13.25 % while that for PFC varies from 12.50 % to 14.00%.

Further, as referred by GPRL in its comments, the Commission in its Order dated January 11, 2012 in Case No. 153 of 2011 in the matter of Petition filed by M/s Gamesa Wind Turbines Pvt. Ltd., has decided to modify the minimum criteria of 200 WPD at 50 m hub height based on the MNRE guidelines dated August 1, 2011 by way of amendment in the RE Tariff Regulations.

In view of the concerns raised by the stakeholders, the Commission has decided to revise the computation of normative interest rate from Prime Lending Rate (Advance Rate) to Base Rate after following the due process of suitably amending the Regulations in future.

However, a feasible interest rate requires to be adopted for the purposes of this order. It can be seen clearly from the above analysis that interest rate of 15.90% (14.40% + 150 basis point) and interest rate on working capital of 15.40% (14.40% + 100 basis points) as per the BPLR system does not reflect the real market conditions. Comparisons of prevailing interest rates in the industry have been examined in the foregoing paragraphs. In these circumstances, it will be not be in the interest of consumers if these higher rates are allowed. On the other hand, the Regulations provide as follows:-

*“14.2. ....For the purpose of computation of tariff, the normative interest rate shall be considered as average of State Bank Advance Rate (SBAR) prevalent during the previous year plus 150 basis points.”*

*“17.3 Interest on Working Capital shall be at interest rate equivalent to average State Bank Advance Rate (SBAR) during the previous year plus 100 basis points.”*

{Emphasis added}

The Commission is of the view that the normative interest rate on loan and normative interest rate on working capital for this order should be as determined by the Commission based on the State Bank Advance Rate for second year of the Control Period (i.e., FY 2011-12) i.e., 12.23% and which should be made to continue to be applicable for the third year of the Control Period (i.e., FY 2012-13), since the same are also in line with the market rates of interest being offered by IREDA and PFC. However, the words “*State Bank Advance Rate (SBAR) prevalent during the previous year*” in regulation 14.2 and regulation 17.3, are difficult to be implemented if out of practical necessity the normative interest rate on loan and normative interest rate on working capital for the third year of the

Control Period (i.e., FY 2012-13) is to be as determined by the Commission based on the State Bank Advance Rate for second year of the Control Period (i.e., FY 2011-12). In order to obviate the necessity of removal of this difficulty, instead of going through the time-consuming amendatory process, Regulation 77 has invested the Commission with the power to make minor adaptations and peripheral adjustments in the Regulations, for making its implementation effective, without touching its substance. Regulation 77 provides as follows:-

*“77. Power to remove difficulties*

*77.1 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.”*

For the reasons aforesaid, there exists and arises a difficulty in giving effect to “*State Bank Advance Rate (SBAR) prevalent during the previous year*”, hence the sine qua non is to exercise the power to remove that difficulty. Also, there would be a difficulty to implement the Maharashtra Electricity Regulatory Commission (Terms and Conditions for determination of RE Tariff) Regulations, 2010 for determining Generic Tariff for the third year of the first Control Period under this order if SBAR prevalent during the previous year is followed as it will create friction with Section 61 of the Act which requires the Commission to safeguard the interests of consumers while determining tariffs in accordance with the tariff regulations.

The normative interest rate on loan and on working capital estimated by the Commission in Chapter 3.6 and 3.8 of the Commission’s Order dated April 29, 2011 in the matter of determination of Generic Tariff for the second year of the first Control Period (i.e., FY 2011-12) were 13.73% and 13.23%, respectively. **Thus, the Commission hereby invokes its powers under Regulation 77 to remove difficulties and holds that normative interest rate on long term loan applicable for third year of the first Control Period (i.e., FY 2012-13) shall be 13.73% and normative interest rate on working capital shall be 13.23% based on weighted average of SBAR for FY 2010-11 (12.23%) for the purpose of this Order.**



## **1.2. CAPITAL COST FOR WIND ENERGY PROJECTS**

### *Stakeholder Comments/Suggestions*

ReGen Powertech requested to increase the Capital Cost of the Wind Projects to Rs. 600 Lakh/MW to take into account the additional investment for development of facilities for Forecasting and Scheduling as per IEGC Grid Code Regulations. IWTMA requested to revise the Capital Cost up to Rs. 575 Lakh/MW in line with the Capital Cost considered in the CERC RE Tariff Regulations, 2012. GE Energy-India recommended a review of Capital Cost assumptions for establishing tariffs citing the reason that the average Capital Cost of the current higher efficiency MW class technology is significantly higher than that of kW class machines.

### *Commission's Ruling*

As mentioned in the draft Order, in order to determine the yearly normative Capital Cost for eligible Wind Energy Projects over the Control Period, the RE Tariff Regulations specify an indexed Capital Cost to be notified on a yearly basis pursuant to issuance of such indexed Capital Cost by Central Electricity Regulatory Commission (CERC) for wind energy projects in accordance with indexation mechanism stipulated under CERC RE Tariff Regulations. As the first Control Period for CERC RE Tariff Regulations, 2009 was valid only till March 2012, CERC has notified the CERC RE Tariff Regulations, 2012 for the next Control Period (i.e., FY 2012-13 to FY 2016-17). However, it should be noted that CERC has specified the same indexation mechanism to determine the Capital Cost for each year of the next Control Period as specified in the CERC RE Tariff Regulations, 2009. Since, Regulation 25 of the MERC RE Tariff Regulations specifies that the indexation mechanism as stipulated under CERC RE Tariff Regulations has to be considered for determination of Capital Cost, the Commission has derived the Capital Cost of the wind projects based on the same indexation formula for the wind projects to be commissioned in FY 2012-13 as was considered for earlier Orders, in line with CERC RE Tariff Regulations, 2012. Moreover, the MERC RE Tariff Regulations, 2010 have been notified after undertaking the required regulatory process of prior publication, invitation of comments, etc., and the norms specified in the Regulations cannot be modified through this Suo-Motu Order. In view of the above, the Commission has retained the Capital Cost for wind projects as proposed in the draft Order.

### **1.3. OPERATION AND MAINTENANCE (O&M) EXPENSES FOR WIND ENERGY PROJECTS**

#### *Stakeholder Comments/Suggestions*

ReGen Powertech submitted that the O&M Cost for wind energy projects may be increased to Rs. 12 Lakh/MW to account for the cost of forecasting and scheduling of Wind Energy, which requires continuous service of the Service Provider. IWTMA requested to consider the O &M cost as Rs 9 Lakh/MW for Wind Energy Projects for FY 2012-13 in line with CERC RE Tariff Regulations, 2012.

#### *Commission's Ruling*

The normative O&M expenses for wind energy projects for FY 2012-13 has been estimated in accordance with Regulations 27.1 and 27.2 of the MERC RE Tariff Regulations, which have been notified after undertaking the required regulatory process of prior publication, invitation of comments, etc., and the norms specified in the Regulations cannot be modified through this Suo-Motu Order.

### **1.4. CAPACITY UTILISATION FACTOR FOR WIND ENERGY PROJECTS**

#### *Stakeholder Comments/Suggestions*

MEDA and IWTMA, in their submissions, requested the Commission to clarify the classification of Wind Zones to remove the ambiguity about inclusion of wind sites with intermediate Wind Power Density (WPD), i.e., wind sites with WPD of 250 Watt/m<sup>2</sup>, 300 Watt/m<sup>2</sup>, 350 Watt/m<sup>2</sup> and 400 Watt/m<sup>2</sup> in their respective zone.

KENERSYS requested the Commission to modify the “Procedure for classification of Wind Power Projects in Wind Zone Class” uploaded by MEDA by citing the new guidelines issued by MNRE wherein the minimum criteria of 200 W /m<sup>2</sup> for WPD has been removed, to harness lower wind regime. Torrent Power Limited requested the Commission to continue with specifying the wind tariff based on wind zone criteria at 50 m hub height for at least next 2 years, which would allow the projects conceived under the current Regulations to be commissioned and be commercially viable. InWEA requested the Commission to determine the Wind Energy Tariff at 50 m hub height only and not to consider the 80 m hub height for FY 2012-13. InWEA further submitted that the Commission may start necessary process to amend the MERC RE Tariff Regulations to incorporate the new modifications subsequently.

### *Commission's Ruling*

Regulation 26.1 of the MERC RE Tariff Regulations, 2010 specify the classification of Wind Zones based on Annual Mean Wind Power Density. However, to remove the ambiguity regarding the same and in pursuance of the powers of the Commission under "Removal of Difficulty" as specified in Regulation 77.1 of the RE Tariff Regulations, the Commission modifies the representation of Wind Zone as follows:

<b>Classification of Wind Zones</b>	<b>Annual Mean Wind Power Density (Watt/Sq m) at 50 metre hub-height</b>
Wind Zone- 1	Above 200 and less than/ equal to 250
Wind Zone- 2	Above 250 and less than/ equal to 300
Wind Zone- 3	Above 300 & less than/ equal to 400
Wind Zone- 4	Above 400

In accordance with Regulation 26.2 of the MERC RE Tariff Regulations, the annual mean wind power density is to be measured at 50 metre hub-height. Accordingly, the Commission has determined the Wind Energy Tariff as per the annual wind power density criteria at 50m hub height. Further, the Commission, under its recent Order dated January 11, 2012 (Case No. 153 of 2011) in the matter of Petition filed by M/s Gamesa, has considered the submissions made by MNRE that the provision for consideration of WPD of 200 W/m<sup>2</sup> at 50 m hub height does not hold relevance any longer. However, as stated in the same Order, the Commission has decided that it will be necessary to initiate suitable actions to amend the MERC RE Tariff Regulations appropriately to address the issue and other incidental matters connected therewith. Accordingly, the Commission shall revise the criteria of estimation of wind power density at 50 m hub height and Capacity Utilisation Factor after following the due process of suitably amending the RE Tariff Regulations in future.

### **1.5. RETURN ON EQUITY**

#### *Stakeholder Comments/Suggestions*

IWTMA submitted that the Commission may consider the Pre-tax Return on Equity (RoE) as 20% per annum for the first 10 years on similar lines as the CERC RE Tariff Regulations, 2012.

### *Commission's Ruling*

Regulation 16 of the MERC RE Tariff Regulations, 2010 specifies the normative Return on Equity for RE projects as 19% pre-tax per annum for the first ten years. As the said Regulations have been notified after previous publication and extensive consultation process, the Commission is not inclined to re-open this issue at the time of the present proceedings, the scope of which is limited to determination of Generic Tariff for the third year of the first Control Period under Regulation 8 of the MERC RE Tariff Regulations, 2010.

## **1.6. TARIFF PERIOD FOR WIND ENERGY PROEJCTS**

### *Stakeholder Comments/Suggestions*

IWTMA requested the Commission to modify the expression for tariff period from ‘13 years’ to ‘minimum period of 13 years’ in order to provide flexibility for Power purchase Agreement (PPA) beyond 13 years.

### *Commission’s Ruling*

Regulation 6 of the MERC RE Tariff Regulations, 2010 specifies the Tariff Period for various RE projects. Accordingly, the Tariff Period for wind energy projects is 13 years, considered from the date of commercial operation of the RE project. It is envisaged that the Utilities and Developers shall explore opportunities for purchase/sale beyond the period of debt service, which normally gets over after 13 years of operation. Moreover, the same is not the subject matter of the current regulatory process, which has been initiated for determination of Tariff based on provisions outlined under the notified RE Tariff Regulations.

## **1.7. SHARING OF EVACUATION COST**

### *Stakeholder Comments/Suggestions*

Mahathi Hydro Power Projects Pvt. Ltd. submitted that MSEDCL and MSETCL have not followed the provision regarding sharing of evacuation cost according to which evacuation upto the interconnection point is the responsibility of the developer and after interconnection point, it is the responsibility of the distribution licensee. According to the objector, this has resulted in excessive capital expenditure for such evacuation infrastructure which is not considered in the Tariff. Further, the objector submitted that MSEDCL/MSETCL take seven (7) years to reimburse such extra cost incurred by the developer for evacuation infrastructure. Hence, the objector requested the Commission to

direct MSEDCL or MSETCL to take the responsibility of building evacuation infrastructure beyond interconnection point as specified in the MERC RE Tariff Regulations and reimburse this extra cost spent by the developer to develop evacuation infrastructure beyond interconnection point, immediately.

The Tata Power Company (TPC) sought clarification on whether the cost of 33kV network interconnecting the various windmills and the line, which brings the power to the distribution or transmission network up to the interconnection point, are included in the normative capital cost. TPC further requested the Commission to direct that in case such cost is excluded, the network developed by the developer may be transferred to MSEDCL as per Government of Maharashtra (GOM) Policy dated July 14, 2010 only after reimbursement of cost by the MSEDCL for the same.

#### *Commission's Ruling*

Regulation 17 of MERC (RPO-REC) Regulations, 2010 clearly specifies and demarcates the responsibility for development of evacuation infrastructure. The relevant extract of the said Regulation 17.1 is reproduced hereunder:

*“17.1 The licensees shall be responsible for development of evacuation infrastructure beyond the inter-connection point while developer/generating company will have to develop evacuation infrastructure from generation facility up to the interconnection point at its own expense;*

*Provided that, the evacuation infrastructure cost beyond the Inter-connection Point shall be borne by the licensees and shall be recovered from the consumers as per suitable pricing framework developed by the State Commission;”*

Thus, it is the responsibility of transmission licensee or distribution licensee, as the case may be, to arrange for evacuation of power from generating station beyond the Inter-connection Point. Further, the Commission has defined Inter-connection Point in case of all qualified RE generating facility under Regulation 2.1 (p) of MERC RE Tariff Regulations 2010. However, specifying a timeline for reimbursement of extra cost incurred by the developer for creating evacuation infrastructure beyond the interconnection point is not a subject matter of this regulatory process, which has been initiated for generic tariff determination of RE Technologies based on Regulation 8.1 of MERC RE Tariff Regulations, 2010.

As regards consideration of evacuation cost in the normative capital cost specified for wind projects, ample clarity is provided through Regulation 24 of the MERC RE Tariff Regulations, wherein it is specified that the normative capital cost of wind projects includes evacuation cost up to the interconnection point of the project. The relevant Regulation is reproduced below for ease of reference.

*“24.1 The capital cost for wind energy projects shall include Wind turbine generator including its auxiliaries, land cost, site development charges and other civil works, transportation charges, evacuation cost up to inter-connection point, financing charges and Interest During Construction (IDC).” (Emphasis Added)*

## **1.8. TARIFF PERIOD FOR SHP PROEJCTS**

### *Stakeholder Comments/Suggestions*

Mahathi Hydro Power Projects requested the Commission to revise the tariff period for SHP projects between 1 MW to 5 MW to 13 years instead of 35 years, like the tariff period for SHP Projects above 5 MW to 25 MW.

Bharat Forge requested the Commission to determine the tariff for SHP Projects above 5 MW to 25 MW for the whole life of the project (i.e., 35 years) instead of tariff period of 13 years by citing reason that it is very difficult to find open access consumers and projects are forced to sell power to the Discoms at very low rate. Hence, the Commission may mandate the Discoms to purchase such RE power at a minimum price, which may be declared every year along with the Tariff Order.

Further, Bharat Forge also requested to provide separate tariff for projects availing REC Mechanism and for projects not availing the same.

### *Commission's Ruling*

The Commission observes that the issue of Tariff Period is a settled issue under Regulation 6.2 of the MERC RE Tariff Regulations, 2010 which specifies that the tariff period in case of Small hydro projects up to and including 5 MW and Mini/Micro Hydro projects, shall be thirty five (35) years. Further, the Commission has dealt with the issue of pricing for Renewable Energy Projects under REC Mechanism via its separate Regulations namely Maharashtra Electricity Regulatory Commission (Renewable Purchase Obligation, its Compliance and REC Framework Implementation) Regulations, 2010. As both the said Regulations have been finalised after previous publication and

extensive consultation process, the Commission is not inclined to re-open this issue at the time of the present proceedings, the scope of which is limited to determination of Generic Tariff for the second year of the first Control Period under Regulation 8 of the MERC RE Tariff Regulations, 2010.

### **1.9. USEFUL LIFE OF SHP PROEJCTS**

#### *Stakeholder Comments/Suggestions*

Mahathi Hydro Power Projects requested the Commission to revise the useful life of SHP projects between 1 MW to 5 MW to 30 years instead of 35 years as these projects are built on B.O.O.T policy of State Government, which considers hand over of projects after 30 years.

#### *Commission's Ruling*

The useful life specified for Small Hydro Projects (SHPs) and Mini/Micro Projects under Regulation 2.1 (ff) of the MERC RE Tariff Regulations is 35 years from COD. Review of the Useful life is not a subject matter of this regulatory process, which has been initiated for generic tariff determination of RE Technologies based on Regulation 8.1 of the MERC RE Tariff Regulations, 2010.

### **1.10. TARIFF FOR MINI/MICRO HYDRO PROJECTS**

#### *Stakeholder Comments/Suggestions*

Shri. T.P.Vartak submitted that the Micro hydro Projects have been facing difficulties in evacuation of the power generated from the Projects due to its connectivity at nearby existing 11/22 KV distribution feeders, which are subjected to daily or weekly load shedding. According to Shri T.P.Vartak, this has resulted in further lowering the CUF of such projects affecting the revenue stream for the projects and underutilization of the micro hydro potential in the State. Hence, the Objector requested that the Commission may direct MSEDCL to refrain from performing load shedding on such feeders or increase the tariff to take care of the reduced CUF.

#### *Commission's Ruling*

The Commission is of the view that the scope of the present proceedings is limited to determination of Generic Tariff for the second year of the first Control Period under Regulation 8 of the Maharashtra Electricity Regulatory Commission (Terms and Conditions for Determination of Renewable Energy Tariff) Regulations, 2010.

The objector or any other concerned developer may file separate Petition with case specific details to address its concerns through initiation of appropriate regulatory process.

### **1.11. TARIFF FOR BIOMASS POWER PROJECTS FOR FY 2012-13**

#### *Stakeholder Comments/Suggestions*

MEDA submitted that unlike most co-generation projects, biomass project developers are required to procure biomass mostly from farmers, who are unorganised. High price of Biomass fuel along with additional cost of transportation has been affecting the economic viability and sustainability of these projects. According to MEDA, prices of biomass have increased by 18% to 20% in the last two years. Further, MEDA also submitted that only five (5) projects out of fourteen (14) projects are operational in the State presently, which amounts to 147 MW of installed capacity being hardly utilised. Looking at the difficulties being faced by the biomass power projects and considering their ability to achieve higher PLF, thus, helping the obligated entities to fulfil their RPO obligations, MEDA requested to relax certain clauses of RE Tariff Regulations.

Further, since the indexation mechanism is going to be followed in future for arriving at the fuel cost component of tariff, MEDA requested the Commission to make it mandatory for all concerned biomass developers to provide relevant audited data pertaining to procurement of biomass usage and procurement details to MEDA on monthly basis. This will help to ensure that necessary compliance for use of fossil fuel is being followed by the biomass power producers.

The Maharashtra Biomass Energy Developers Associations (MBEDA) in its detailed submission requested to revise the present tariff for biomass power projects to Rs 5.96 per unit based on the rationale given in their submission. MBEDA submitted that the tariff of Rs 4.98/kWh for the new and existing Biomass Power Projects in the State for FY 2012-13 are based on the fuel prices experienced by the said projects during the period of January to June 2009 equivalent to Rs 2605/MT. The weighted average fuel prices experienced by the same projects were Rs 2921/MT for the period April 2009 to March 2010. MBEDA also proposed that biomass price of Rs 2921 per MT may be considered for FY 2009-10 and then after factoring in 5% escalation per year the revised biomass price of Rs 3381 per MT may be considered in the current tariff Order for FY 2012-13. Further, the parameters such as SHR of 3650 kcal/kWh and auxiliary consumption of 10% were used by the Commission for arriving at the tariff of Rs 4.98/kWh in the Biomass Tariff Order dated August 8, 2005. MBEDA requested the Commission to consider the operating parameters as per the findings of the National Productivity Council (NPC) study



prepared for MEDA, including SHR, GCV and Auxiliary Consumption for biomass power projects. MBEDA submitted that considering the higher fuel price and revised parameters on a pro-rata basis, the tariff for FY 2012-13 works out to Rs 5.96/kWh and the same may be considered by the Commission. Subsequently, MBEDA through its additional affidavit dated March 20, 2012, submitted that Central Commission vide Draft RE Tariff Order dated February 28, 2012 has considered Generic Tariff for Biomass Power Projects in Maharashtra for FY 2012-13 as Rs 5.76 per unit comprising variable tariff component as Rs 3.63 per unit and levelled fixed tariff component as Rs 2.13 per unit. MBEDA, therefore, requested the Commission to take into consideration the observations made by CERC with regards to biomass power projects in Maharashtra and review its Suo-Motu draft RE Tariff Order in light of CERC Order.

The Indian Biomass Power Association (IBPA), in its submission, informed that out of 12 Biomass Power Projects commissioned in the State, only one or two Plants are operating with low PLF due to very high cost of biomass fuel, which is not less than Rs. 3500 per MT anywhere in the State. Hence, IBPA requested to consider fuel cost of Rs 3500 per MT for the year 2012-13 to arrive at the Tariff.

Shalivahana Green Energy Limited (SGEL), Rake Power Limited (RPL), and GAPS Power submitted that biomass prices are much higher than the fuel price considered by the Commission due to transportation cost, rising prices of fossil fuel, use of biomass by competing industries, reduced growth in agriculture productivity, increase in input cost and labour cost, etc. Hence the Objectors requested that a minimum price of Rs. 3200 to 3400 per ton may be taken into account as a realistic price of biomass fuel. SGEL, RPL and GAPS Power also requested to revise the Tariff for Biomass Power Projects for FY 2012-13, as the tariff stipulated in the draft Order is not attractive enough to make biomass power projects in the State viable.

SGEL, RPL and GAPS Power further requested the Commission to consider the average GCV of fuel at 2800 kcal/kg and Station Heat Rate of 4200 kcal/kWh for Biomass Power Projects. GAPS Power requested the Commission to revise the fixed charges considering the O&M expense at Rs. 35 Lakh/MW with annual escalation of 7%, instead of Rs. 21.41 Lakh/MW with annual escalation of 5.72% considered in the RE Tariff Regulations, 2010.

### *Commission's Ruling*

In accordance with Regulation 3.3 of the MERC RE Tariff Regulations, 2010, the applicable Tariff, and terms and conditions of Tariff for new as well as existing Biomass Power Projects as specified under existing RE Tariff Order dated December 14, 2009 shall continue to be applicable for the first three years of the new Control Period (i.e., FY 2010-11, FY 2011-12, and FY 2012-13).

However, based on the number of concerns and objections received on the draft Order, the Commission observes that the revision in variable charge component on account of revision in biomass fuel prices may have to be undertaken in pursuance of the powers of the Commission under "Removal of Difficulty" as specified in Regulation 77.1 of the RE Tariff Regulations, in order to ensure that biomass power projects continue to operate in the State. The Commission has also noted MEDA's submission that it has no objection to the proposed revision in variable charge component for biomass based power projects and that biomass fuel prices have been increased in the last two years. However, the Commission also notes that the present circumstances are exceptional and is of the view that comprehensive review of the Biomass power projects needs to be carried out to assess the ground conditions in future to arrive at realistic tariff.

As regards the issues of Station Heat Rate, auxiliary power consumption, etc., the Commission is of the view that these are performance parameters for which norms have been stipulated. Any modification in the same will amount to a review of the RE Tariff Regulations, which is not the subject matter of this Regulatory Process, which has been initiated for generic tariff determination of RE Technologies based on Regulation 8.1 of the MERC RE Tariff Regulations, 2010. Hence, the Commission has only dealt with revision in variable charge component of the Tariff for Biomass Power Projects for FY 2012-13 based on fuel price variation.

Though many Objectors have pleaded to raise the Biomass Fuel Price to Rs 3500 per MT, it should be noted that no one have provided the audited data related to Biomass procurement. Hence, in order to determine the variable component of the Biomass Power Projects, the Commission has considered Equivalent Heat Value Approach. In this, the biomass price and other relevant parameters considered by the Central Electricity Regulatory Commission in CERC RE Tariff Regulations, 2012 notified on February 02, 2012 have been compared with that considered in the MERC RE Tariff Regulations, 2010.

It is observed that with the Biomass Price of Rs. 2695 per MT and Calorific Value of 3300 kcal/ kg as specified in the CERC RE Tariff Regulations 2012, Heat Value (in Rs/ Million kcal) for biomass projects work out to Rs. 817 per Million kcal (i.e., Fuel Price (Rs. 2695 per MT) / Calorific Value ( 3300 kcal/ kg) x 1000). In order to get this heat value of Rs 817 per Million kcal with State specific norms for Calorific Value of 3611 kcal/ kg as specified by the Commission in MERC RE Tariff Regulations, 2010, the biomass fuel price works out as Rs 2950 per MT [i.e. Heat Value (817 Rs/Million Kcal) x Calorific Value (3611 kcal/ kg) /1000]. Hence, the Commission has considered biomass fuel price as Rs 2950 per MT for the purpose of this Order. Further, the Commission had considered biomass fuel price of Rs 2605/ MT and variable charge component as Rs 3.28 / kWh in its Biomass Tariff Order dated December 14, 2009 in Case No. 83 of 2008. Based on the above calculation, the variable charge component has been calculated on pro rata basis as Rs 3.71/ kWh [Variable charge component determined in Case No. 83 of 2008 (Rs 3.28/kWh) x Revised biomass fuel price derived for this Order (Rs. 2950/ MT) / biomass fuel price determined in Case No. 83 of 2008 (Rs 2605/MT) = Rs 3.28/kWh x Rs 2950/MT / Rs 2605/MT].

The fixed charge component of tariff shall continue to remain the same as Rs 1.70/kWh. In accordance with Regulation 3.3 of the RE Tariff Regulations, and on the basis of the Tariff, Tariff Structure and other conditions as stipulated in the existing Tariff Order, the Tariff for existing and new Biomass Power Projects during FY 2012-13 shall be as under.

***Table: Tariff for Existing and New Biomass Power Projects***

<b>Financial Year</b>	<b>Fixed Charge (Rs/kWh)</b>	<b>Variable Charge (Rs/kWh)</b>	<b>Tariff (Rs/kWh)</b>
2012-13	1.70	3.71	5.41

The Commission observes that as per Regulation 43 of MERC RE Tariff Regulations, 2010, the biomass power project developers are required to furnish monthly fuel usage and monthly fuel procurement statement duly certified by Chartered Accountant regularly on month-to-month basis along with the monthly energy bill to beneficiary as well as to MEDA, which is responsible for compliance monitoring of the biomass power projects and to publish such data on its website as per Regulation 44 of RE Tariff Regulations. Since, from April 1, 2013, fuel cost for biomass power projects will be determined based on indexing formula as specified in Regulations 47 of RE Tariff Regulations, it is mandatory for all biomass power projects to furnish such data to MEDA. **The**

**Commission hereby again directs the biomass power project developers to strictly comply with this requirement of monthly data submission for each calendar month by 15<sup>th</sup> day of subsequent calendar month and also to furnish month-wise data /Statements for all earlier monthly periods, within 30 days from issuance of this Order, if not done until now.**

### **1.12. EXTENDING APPLICABILITY OF CURRENT ORDER TO INCLUDE NON-SUGAR FACTORY BASED CO-GENERATION STATIONS**

#### *Stakeholder Comments/Suggestions*

Kay Power & Paper Mills Ltd. submitted that the current Order is applicable to sugar factory based co-generation stations. However, the Order should also consider non-sugar factory based co-generation stations, wherein fuel is sought to be bought/transported from the sugar factories from the nearby areas.

Further, Kay Power & Paper Mills Ltd. submitted that the index price of the fuel for non-sugar factory based co-generation stations should also consider additional cost involved such as expense on transportation of bagasse, other expenses such as loading-unloading, toll taxes, stacking cost, etc.,. Considering these additional costs, the tariff of Rs 4.79/kWh offered for general co-generation stations needs to be revised for the non-sugar based co-generation stations.

#### *Commission's Ruling*

The Commission observes that it is incorrect to interpret that this Order is applicable only for sugar factory based co-generation projects. This Order covers tariff for all non-fossil fuel based co-generation projects, whether sugar factory based or otherwise, subject to fulfilment of eligibility conditions and qualifying criteria as covered under Regulation 2.9, Chapter-6 and relevant provisions of RE Tariff Regulations. Further, price of non-fossil fuels considered for determination of tariff are based on 'equivalent heat value approach' which accounts for landed cost of such fuels.

### **1.13. ADDITIONAL RELAXATION FOR NON FOSSIL FUEL BASED CO-GENERATION PROJECTS**

#### *Stakeholder Comments/Suggestions*

Kay Power & Paper Mills Ltd. submitted that the co-generators connected to MSEDCL grid are paying higher price for the imported units and get lower price for the exported units. Therefore, they requested that the co-generator should be charged only for the

difference in the units imported and exported to the MSEDCL grid, and MSEDCL should not raise separate bills for export and import units.

Kay Power further submitted that power for Lift Irrigation Schemes (LIS) used for supplying water to the co-generating stations are supplied by MSEDCL through LT connections, which are subjected to load shedding. Kay Power requested to exempt such LT connections from load shedding.

#### *Commission's Ruling*

The export of energy units by RE projects as per applicable metering code are covered under this generic RE tariff Order whereas the import of energy units by concerned co-generation project/consumer from the grid will have to be governed as per relevant supply arrangement with concerned licensee, hence, separate billing for export and import of energy units by MSEDCL is appropriate.

The issue of load shedding for LT level LIS raised by the objector cannot be addressed as part of current regulatory process, which has been initiated for determination of generic RE tariff in pursuance of RE Tariff Regulations and Kay Power may file a separate Petition with case specific details to address its concerns through initiation of appropriate regulatory process.

### **1.14. TARIFF FOR NON-FOSSIL FUEL BASED CO-GENERATION PROJECTS FOR FY 2012-13**

#### *Stakeholder Comments/Suggestions*

MEDA submitted that the tariff for non fossil fuel based cogeneration projects is fixed till FY 2012-13. Since, the indexation mechanism is going to be followed in future for arriving at the fuel cost component of tariff, MEDA requested the Commission to make it mandatory for all concerned co-generators to provide relevant audited data pertaining to bagasse fuel usage and procurement details to MEDA on monthly basis. According to MEDA, none of the co- generators are extending any information in this context. MEDA further submitted that it has undertaken the compliance monitoring studies of all commissioned generation projects in the State and requested the Commission to give necessary directions/ instructions to co-generators to assist the study and to submit the relevant information to MEDA on monthly basis.

#### *Commission's Ruling*

The Commission observes that the Tariff for non-fossil fuel based cogeneration projects for FY 2012-13 will have to be governed as per the relevant provisions under the RE

Tariff Regulations. In accordance with RE Tariff Regulations, 2010, the tariff for new as well as existing non-fossil fuel based co-generation projects as specified under existing RE Tariff Order (dated January 11, 2010 in Case No 123 of 2008) shall continue to be applicable for first three years of the new Control Period (i.e., FY 2010-11, FY 2011-12, and FY 2012-13).

The Commission observes that there has not been any representation from the bagasse co-generation sector to revise the variable charge component for non-fossil fuel based co-generation projects. However, in view of the revision in variable component of biomass based power projects as explained above, the Commission, in pursuance of the powers of the Commission under “Removal of Difficulty” as specified in Regulation 77.1 of the RE Tariff Regulations, has decided to revise the variable charge component considering the same logic of equivalent heat value used for Biomass Power Projects.

In order to determine the variable component of the non-fossil fuel based cogeneration power projects, the Commission has considered equivalent heat value approach. In this, the bagasse price and other relevant parameters considered by the Central Electricity Regulatory Commission in CERC (RE Tariff) Regulations, 2012 notified on February 02, 2012 are compared with that considered in the MERC RE Tariff Regulations, 2010. It is observed that with the bagasse price of Rs. 1832 per MT for State of Maharashtra and Gross Calorific Value of 2250 kcal/ kg as specified in the CERC RE Tariff Regulations 2012, Heat Value (in Rs/ Million kcal) for non-fossil fuel based cogeneration power projects work out to Rs. 814 per Million kcal [i.e., Fuel Price (Rs.1832 per MT) / Calorific Value (2250 kcal/ kg) x 1000 = ( Rs 1832 per MT / 2250 kcal/ kg x 1000 ) ] .

The Commission observes that in order to get the heat value of Rs 814 per Million kcal with State specific norms for Calorific Value of 2250 kcal/ kg as specified by the Commission in MERC RE Tariff Regulations, 2010, the bagasse fuel price works out to Rs 1832 per MT [i.e. Heat Value (814 Rs/Million Kcal) x Calorific Value (2250 kcal/ kg) /1000]. Hence, the Commission has considered bagasse fuel price as Rs 1832 per MT for the purpose of this Order. Further, the Commission, in its bagasse based cogeneration Tariff Order dated January 11, 2010 in Case No 123 of 2008, has already considered the same price of Rs 1832 per MT for bagasse fuel price and variable charge component as Rs 2.53/kWh. Thus, there is no increase in the variable cost component of the non fossil fuel based cogeneration power projects. However, the Commission is of the view that comprehensive review of the Non-fossil fuel based co-generation power projects needs to be carried out to assess the ground conditions in future to arrive at realistic tariff.

The fixed charge component of tariff shall continue to remain the same as Rs 2.26/kWh. In accordance with Regulation 3.3 of the RE Tariff Regulations, and on the basis of the Tariff, Tariff Structure and other conditions as stipulated in the existing Tariff Order, the Tariff for existing and new Non-fossil fuel based Co-generation power projects during FY 2012-13 shall be as under.

***Table: Tariff for Existing and New Non-Fossil Fuel based Cogen Power Projects***

<b>Financial Year</b>	<b>Fixed Charge (Rs/kWh)</b>	<b>Variable Charge (Rs/kWh)</b>	<b>Tariff (Rs/kWh)</b>
2012-13	2.26	2.53	4.79

The Commission observes that as per Regulation 59 of RE Tariff Regulations, the non-fossil fuel based cogeneration project developers are required to furnish monthly fuel usage and monthly fuel procurement statement duly certified by Chartered Accountant regularly on month-to-month basis along with the monthly energy bill to beneficiary as well as to MEDA, which is responsible for compliance monitoring of the co-generation projects and to publish the such data on its website as per Regulation 61 of MERC RE Tariff Regulations. **The Commission hereby again directs the non-fossil fuel based cogeneration project developers to strictly comply with this requirement of monthly data submission for each calendar month by 15<sup>th</sup> day of subsequent calendar month and also to furnish month-wise data /Statements for all earlier monthly periods, within 30 days from issuance of this Order, if not done until now.**

#### **1.15. BIOMASS PROJECTS BASED ON GASIFIER TECHNOLOGY**

GE Energy-India submitted that in addition to the direct combustion based on Rankine Cycle technology, the Gasifier Gas Engine route for power generation may be promoted by preparing guidelines for tariff norms specific to such technologies considering the difference in technology costs and efficiency.

##### *Commission's Ruling*

The Commission has recognised that biomass power projects based on technology other than Rankine Cycle also need to be promoted. Accordingly, the Commission has enabled 'project specific tariff determination' for such projects as per Regulation 7.1(f) of MERC (Terms and Conditions for determination of RE Tariff) Regulations, 2010. The relevant extract of the Regulations is reproduced below:

“ ...

**7. Project Specific Tariff**

7.1 Project specific tariff, on case to case basis, shall be determined by the Commission for the following types of projects:

...

f) Biomass project other than that based on Rankine Cycle technology application with water cooled condenser.

...”

Accordingly, the Commission shall determine the tariff for Biomass power projects based on technologies other than Rankine Cycle on a project specific basis, provided such Petition is filed with requisite supporting information in accordance with the relevant Regulations.

## **1.16. MODEL POWER PURCHASE AGREEMENT (PPA) FOR RE PROEJCTS**

### *Stakeholder Comments/Suggestions*

The Tata Power Company (TPC) submitted that after the issuance of new RE Tariff Regulations, no Model PPA has been approved by the Commission for Renewable Energy Sources. TPC requested the Commission to initiate the process for Model PPA for the procurement of the power from RE sources and in which the role and responsibility of both the parties is brought out clearly in addition to the tenure and the tariff.

### *Commission's Ruling*

The Commission opines that the terms and conditions for Model Power Purchase Agreement (Model PPA) for RE projects will have to be in line with the principles outlined under MERC RE Tariff Regulations, 2010. Moreover, the issue of Model PPA cannot be addressed as part of the present regulatory process, which has been initiated for the purpose of determination of RE Tariff for FY 2012-13, in pursuance of RE Tariff Regulations. Further, separate regulatory process can be initiated in case distribution licensee prepares and submits a draft Model PPA for approval. However, distribution licensee may prepare such draft Model PPA in consultation with RE developers and in conformity with the principles and conditions outlined under MERC RE Tariff Regulations, 2010.



## **1.17. WAIVER OF THE PROVISO TO REGULATION 7.2 OF THE MERC RPO REC REGULATIONS**

### *Stakeholder Comments/Suggestions*

Reliance Infrastructure Limited (RInfra) submitted that Regulation 7.2 of the MERC (RPO-REC) Regulations, 2011, prohibits the Distribution Licensee from procuring renewable energy at rates other than the rate approved by the Commission. RInfra submitted that this provision of the Regulations constrained it to purchase power at “the preferential tariff” as determined by the Commission for commissioning of the project in particular Financial Year. According to RInfra, this exposes the Licensee to the risk of not complying with the proviso of Regulation 7.2 of MERC (RPO-REC) Regulations in case of delay in commissioning by Generators. Hence, RInfra requested the Commission to add the following proviso in the Generic Tariff Order:-

*“In case the distribution licensee has agreed on the preferential tariff as determined by the MERC, for COD achieved during particular financial year under the PPA, and commissioning of the plant is delayed, energy purchased from such power plant at preferential tariff as agreed upon in the PPA ,would be considered as eligible quantum for fulfilment of Renewable purchase obligation of such distribution licensee”*

### *Commission’s Ruling*

The issue raised by the stakeholder and Regulation 7.2 referred by the stakeholder pertains to MERC (RPO-REC) Regulations, 2010. Further, as specified in the Regulation 5 of MERC RE Tariff Regulations, 2010 and Paragraph 2.9 below of this Order, this Tariff Order shall be applicable for New RE Projects to be commissioned during FY 2012-13 (i.e. from April 1, 2012 to March 31, 2013) and shall be applicable for entire duration of tariff period for respective RE technologies as specified in Regulation 6 of MERC RE Tariff Regulations, 2010. Moreover, any tariff risks owing to delay in commissioning of projects should be covered by suitable provisions in the PPA between the Discom and the supplier. Hence, the Commission does not feel any necessity to modify or add any provision as proposed by the objector.

## **1.18. FLEXIBILITY IN REC MECHANISM AND PREFERENTIAL TARIFF**

### *Stakeholder Comments/Suggestions*

Vindhyachal Hydro requested that the projects eligible under REC mechanism may be granted flexibility to change from REC Option to Preferential Tariff and vice versa.

### *Commission's Ruling*

The issue raised by the stakeholder pertains to MERC (RPO-REC) Regulations, 2010 and cannot be addressed as a part of the current regulatory process, which has been initiated for determination of RE Tariff for FY 2012-13 in pursuance of RE Tariff Regulations.

## **1.19. O&M COST FOR RE PROJECTS**

### *Stakeholder Comments/Suggestions*

Bharat Forge requested the Commission to clarify whether the O&M costs approved for RE Projects in various Tariff Orders factor in all possible costs incurred during the lifetime operation of projects like mid life overhaul costs, replacement cost, etc.

### *Commission's Ruling*

Regulation 18 of the MERC RE Tariff Regulations, 2010 specifies the provision related to Operational and Maintenance cost which comprises of repair and maintenance (R&M), establishment including employee expenses, and administrative and general expenses including insurance. The said Regulations have been finalised after previous publication and extensive consultation process. Moreover, the issue raised by the stakeholder is not a subject matter of this regulatory process, scope of which is limited to determination of Generic Tariff for the third year of the first Control Period under Regulation 8 of the Maharashtra Electricity Regulatory Commission (Terms and Conditions for Determination of Renewable Energy Tariff) Regulations, 2010.

## **1.20. COST OF SCADA EQUIPMENT FOR SHP PROJECT**

### *Stakeholder Comments/Suggestions*

Mahathi Hydro Power Projects Pvt. Ltd submitted that MSETCL has been insisting on installation of SCADA equipment by the SHP developer even though the generation from the Project is Must Run. The objector requested to mandate MSETCL not to insist on SCADA equipment to install for real time monitoring requirement of the SLDC, wherever the power is to be sold to the distribution licensee.

### *Commission's Ruling*

The issue raised by the objector is outside the scope of the present proceedings, which is limited to determination of Generic Tariff for the third year of the first Control Period under Regulation 8 of the Maharashtra Electricity Regulatory Commission (Terms and Conditions for Determination of Renewable Energy Tariff) Regulations, 2010.

The objector may file a separate Petition with case specific details to address its concerns through initiation of appropriate regulatory process.

## **1.21. BENEFITS UNDER SECTION 80 IA OF INCOME TAX ACT**

### *Stakeholder Comments/Suggestions*

Bharat Forge submitted that the benefits under Section 80IA of the Income tax Act would not be available for projects commissioned after March 31, 2012 and hence, requested the Commission to modify the calculation of Tariff by not considering the benefits under Section 80 IA.

### *Commission's Ruling*

As per the recent Finance Bill, benefits under Section 80IA of Income Tax Act have been further extended. Thus, the premise of the objection is no longer valid. Moreover, Regulation 22 of MERC RE Tariff Regulations, 2010 specifies the provision related to any subsidy or incentive from Central and State Government while Regulation 23 provides the treatment of Taxes and Duties, according to which the Commission has determined the tariff under this Order. The issue raised by the stakeholder is not a subject matter of this regulatory process the scope of which is limited to determination of Generic Tariff for the third year of the first Control Period under Regulation 8 of the Maharashtra Electricity Regulatory Commission (Terms and Conditions for Determination of Renewable Energy Tariff) Regulations, 2010.

## **1.22. ASSESSMENT OF BENEFITS UNDER ACCELERATED DEPRECIATION**

### *Stakeholder Comments/Suggestions*

GRPL requested to modify the calculation for levelisation of Accelerated Depreciation benefits upto useful life of 25 years instead of 20 years for wind energy projects.

Further, GRPL submitted that under the Income Tax Act, projects not availing accelerated depreciation are allowed to claim depreciation at 7.69% on the actual cost of the project (i.e., on straight line method (SLM)). Hence, according to GRPL, additional benefits while claiming the accelerated depreciation (i.e., 80% under Written Down Value method) will be over and above depreciation at 7.69% on SLM allowed as per Income Tax Act and not over and above the depreciation at 5.28% allowed as per the Companies Act. In view of this, GRPL requested that while working out the net depreciation benefit, the

Commission may consider depreciation at 7.69% on SLM as per Income Tax Act as against depreciation @ 5.28% as per Straight Line Method (Book depreciation as per Companies Act, 1956) which may then be compared with depreciation as per Income Tax Act, i.e., 80% under Written Down Value method.

#### *Commission's Ruling*

The Commission has noted the observation made by the stakeholder regarding calculation of levelisation of accelerated benefits upto useful life of 25 years instead of 20 years for wind energy projects and the same has been incorporated in calculation of levelisation of accelerated depreciation.

Further, as regards the observation on calculation of net depreciation benefits, the Commission notes that the net depreciation benefits have been calculated considering the projects, which are availing benefit of accelerated depreciation. The purpose of calculating the levelised accelerated depreciation benefits as explained in Paragraph 2.7 of this Order is to estimate the absolute value of depreciation benefits any developer is entitled to avail under accelerated depreciation option and hence, the benefits under Income Tax Act (i.e., 80% under Written Down Value method) needs to be compared with book depreciation (i.e., 5.28% as per Straight Line method) under Companies Act, 1956 to calculate absolute value of benefits such projects would avail under Accelerated Depreciation benefits. The methodology suggested by the objector compares the relative benefits for a project developer between availing accelerated depreciation and not availing accelerated depreciation, which is not the purpose for estimating per unit benefit of accelerated depreciation. It may be noted that in both the cases, the depreciation benefit is to be ascertained in terms of accelerated depreciation under I.Tax Act, 1961 vis-a-vis book depreciation claimed under Companies Act 1956. The Commission has correctly estimated the levelised accelerated depreciation in line with Regulation 22.1 of MERC RE Tariff Regulations, which then needs to be deducted to estimate the tariff for RE projects availing accelerated depreciation and hence, the Commission retains the methodology mentioned in the draft Order, which has also been explained in Paragraph 2.7 of this Order.

### **1.23. SHARING OF SUBSIDY AND INCENTIVE BENEFITS AND CDM BENEFITS**

MSEDCL submitted that the subsidies which have not been considered while determining the tariff, if materialized in future, should be shared between the licensee and developer

equally. MSEDCL also submitted that the CDM benefit should be equally shared between the host Licensee and Generator.

#### *Commission's Ruling*

As per Regulation 22.1 of MERC (Terms and Conditions for determination of RE Tariff) Regulations, 2010, the Commission observes that it shall take into consideration the incentive or subsidy offered by the Central or State Government while determining tariff. However, the issue raised by MSEDCL pertains to future subsidies if and when materialised for the RE project, which were not factored in while determining tariff. The Commission is of the view that in the absence of specific information as regards nature of subsidy, its purpose, eligibility, and applicability, etc., the Commission is not inclined to pass generic ruling in the matter in the present proceedings. The issue of sharing of such subsidies can be taken up in accordance with the provisions under Regulations based on application to be filed by concerned party.

As regards sharing of CDM benefits, Regulation 21.1 of MERC Terms and Conditions for determination of RE Tariff) Regulations, 2010 specifies that all risks, costs and efforts associated with the availing of carbon credits shall be borne by the generating company and entire proceeds of carbon credit from approved CDM project, if any, shall be retained by the generating company. The above Regulations have been finalised after previous publication and extensive consultation process. Further, the issue raised by the objector is not subject matter of this regulatory process, the scope of which is limited to determination of Generic Tariff for the third year of the first Control Period under Regulation 8 of the Maharashtra Electricity Regulatory Commission (Terms and Conditions for Determination of Renewable Energy Tariff) Regulations, 2010.

#### **1.24. APPLICABILITY OF REACTIVE POWER PENALTY AND HARMONIC PENALTY ON RE GENERATORS**

MSEDCL submitted that RE generators should be penalized for not maintaining the levels of reactive power and harmonics as permitted in the State Grid Code.

#### *Commission's Ruling*

The Commission observes that the issue of incentive and dis-incentive mechanism for associated harmonic content and reactive power injection/drawal will have to be addressed upon detailed study taking into consideration RE technology specific conditions and compensation requirement of the Grid. Further, performance norms/standards will have to

be developed in conformity with relevant Grid Connectivity Standards for each type of RE system to be formulated by Central Electricity Authority. The Commission opines that technical issues in the matter needs to be deliberated at forum such as Grid Co-ordination Committee and suitable action plan may be proposed within three months from issuance of this Order.

## **1.25. INTERIM RATE OF TARIFF FOR WIND PROJECTS**

### *Stakeholder Comments/Suggestions*

MSEDCL proposed in its submission that the payment for wind energy shall be done at interim rate till submission of certificate from MEDA specifying the wind zone and the debit/ credit may be carried out after submission of final certification. Further, MSEDCL also submitted to reconsider the zone wise tariff for wind projects in the State and proposed that the Commission may incorporate the combination of machine efficiency and the wind velocity to decide tariff in respect of Wind Project.

### *Commission's Ruling*

As elaborated in the Paragraph 3.7 of this Order, MEDA has finalised the procedure for classification of wind power projects into wind zone class and has also published it on its website. Accordingly, in view of the finalisation of the procedure for classification of wind power projects into wind zones class by MEDA, the same shall form the basis for determination of applicable Tariff for wind power projects falling under particular wind zone class and the same shall be applicable for the Wind power projects to be commissioned in FY 2012-13. In view of above, the Commission observes that the interim tariff mechanism is no more required for the wind energy projects in the State.

Further, the Commission observes that the wind power density based approach for determination of Wind Zone specific tariffs, recognises the combination of wind velocity and power curve of machine which takes into account harnessing of available wind power potential in most optimal manner, as outlined under MERC (Terms and Conditions for Determination of RE Tariff) Regulations, 2010. Above Regulations have been finalised after previous publication and extensive consultation process and modification of the same is not subject matter of present regulatory process, which is limited to determination of Generic Tariff for the third year of the first Control Period under Regulation 8 of the Maharashtra Electricity Regulatory Commission (Terms and Conditions for Determination of Renewable Energy Tariff) Regulations, 2010.

## **2. Common Parameters applicable for determination of Generic Tariff**

This Section of the Order details the applicable norms for determination of Generic Levelised Tariff, which are common to all type of renewable technologies as specified in the RE Tariff Regulations.

### **2.1. CONTROL PERIOD**

Regulation 5 of the RE Tariff Regulations specifies that the Control Period for determination of tariff for RE projects shall be five years, starting from the date of notification of the RE Tariff Regulations. The first year of the Control Period was FY 2010-11, the second year of the Control Period was FY 2011-12, and the third year of the Control Period is FY 2012-13. The Proviso to Regulation 5.1 stipulates that the tariff determined for the RE projects commissioned during the Control Period shall continue to be applicable for the entire duration of the Tariff Period (as specified in Regulation 6 of the RE Tariff Regulations).

Further, as stipulated under Regulation 5.2 of the RE Tariff Regulations, the generic tariff determined for Solar PV projects and Rooftop Solar PV and other small solar projects based on the Capital Cost and other norms applicable for FY 2011-12 vide Commission's Order dated April 29, 2011 shall also apply for such projects during FY 2012-13, provided that (i) the Power Purchase Agreements (PPA) in respect of the Solar PV projects as mentioned in this Paragraph are signed on or before March 31, 2012; and (ii) the entire capacity covered by the Power Purchase Agreements is commissioned on or before March 31, 2013 in respect of Solar PV projects.

Further, for those Solar photovoltaic power projects and Rooftop Solar PV and other small solar projects whose PPAs are signed after March 31, 2012, the tariff for such projects for their commissioning during FY 2012-13 would be based on the benchmark capital cost norm for Solar PV power projects for FY 2012-13 as specified under Paragraph 7.4 of this Order.

As specified under Regulation 5.2 of the RE Tariff Regulations, the generic tariff determined for Solar thermal projects based on the Capital Cost and other norms for FY 2010-11 shall also apply for such projects to be commissioned during FY 2011-12 and FY 2012-13, provided that (i) the Power Purchase Agreements (PPA) in respect of Solar

thermal projects as mentioned in this Paragraph are signed on or before March 31, 2011; and (ii) the entire capacity covered by the Power Purchase Agreements is commissioned on or before March 31, 2013 in respect of such Solar thermal projects.

Further, for those Solar thermal power projects whose PPAs are signed after March 31, 2011, the tariff for such projects for their commissioning during FY 2012-13 would be based on the benchmark capital cost norm for Solar thermal power projects for FY 2012-13 as specified under Paragraph 8.4 of this Order.

## **2.2. TARIFF STRUCTURE**

Regulation 9.1 of the RE Tariff Regulations 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 having fuel cost component, like biomass power projects and non-fossil fuel based cogeneration projects, single-part tariff with two components, i.e., fixed cost component and fuel cost component, has been determined under this Order.

The relevant cost components and basis for determination of Generic Tariff in respect of each RE technology have been elaborated under technology specific Sections in detail.

## **2.3. TARIFF DESIGN**

In accordance with Regulation 10 of the RE Tariff Regulations, the Tariff Design for RE generating stations is as under:

*“10.1 The generic tariff shall be determined on levellised basis for the Tariff Period.*

*...*

*10.2 For the purpose of levellised tariff computation, the discount factor equivalent to normative weighted average cost of capital shall be considered.*



10.3 *Levellisation shall be carried out for the ‘useful life’ of the Renewable Energy project while tariff shall be specified for the period equivalent to ‘Tariff Period’.*”

## **2.4. INTEREST ON LOAN**

Regulation 14.1 of the RE Tariff Regulations specifies that the loan tenure of 10 years is to be considered for the purpose of determination of generic tariff for RE projects. Regulation 14.2 provides for consideration of the rate of interest on loan as under:

*“The loans arrived at in the manner indicated above shall be considered as gross normative loan for calculation for interest on loan. The normative loan outstanding as on April 1st of every year shall be worked out by deducting the cumulative repayment up to March 31st of previous year from the gross normative loan.*

*For the purpose of computation of tariff, the normative interest rate shall be considered as average of State Bank Advance Rate (SBAR) prevalent during the previous year plus 150 basis points.*

*Notwithstanding any moratorium period availed by the generating company, the repayment of loan shall be considered from the first year of commercial operation of the project and shall be equal to the annual depreciation allowed.”*

However, as ruled above in Paragraph 1.1 of this Order, the Commission has decided that the normative interest rate on loan determined by the Commission based on the State Bank Advance Rate for the second year of the Control Period (i.e., FY 2011-12) shall continue to be applicable for the third year of the Control Period (i.e., FY 2012-13). Thus, normative interest rate of 13.73% on long-term loan applicable for second year of the first Control Period (i.e., FY 2011-12) has been considered as the normative interest rate on long-term loans for third year of the Control Period (i.e., FY 2012-13) for computation of levelised tariff for RE technologies in this Order.

## **2.5. INTEREST ON WORKING CAPITAL**

Regulation 17.3 of the RE Tariff Regulations provides for computation of the rate of interest on working capital as under:

*“Interest on Working Capital shall be at interest rate equivalent to average State Bank Advance Rate (SBAR) during the previous year plus 100 basis points.”*

However, in view of the ruling outlined under Paragraph 1.1 of this Order, the Commission has decided that the normative interest rate on working capital determined by the Commission based on the State Bank Advance Rate for second year of the first Control Period (i.e., FY 2011-12) shall continue to be applicable for the third year of the Control Period (i.e. FY 2012-13). Thus, normative interest rate of 13.23% on working capital applicable for second year of the first Control Period (i.e., FY 2011-12) has been considered as the normative interest rate on working capital for third year of the Control Period (i.e., FY 2012-13) for computation of levelised tariff for RE technologies in this Order.

## **2.6. LEVELISED TARIFF**

Levelised Tariff is calculated by carrying out levelisation over useful life of each technology considering the discount factor equivalent to weighted average cost of capital, to represent the time value of money.

### *Discount Factor*

The discount factor considered for this purpose is equal to the weighted average cost of capital on the basis of normative debt:equity ratio (70:30) specified in the Regulations, and weighted average rates for debt and equity component.

Interest Rate considered for the loan component (i.e., 70%) of Capital Cost is 13.73% (as explained in Paragraph 2.4 above). For the equity component (i.e., 30%), rate of Return on Equity (ROE) for the first ten (10) years is 19%, and for the 11<sup>th</sup> year onwards till useful life of the RE project, the rate is 24%. Based on these rates, the weighted average ROE has been calculated, which is around 22.3% (ranging from 22% to 22.57% depending on the useful life of RE technologies). The discount factor for each technology derived by this method is detailed in the respective technology specific Sections of this Order.

## **2.7. SUBSIDY OR INCENTIVE PROVIDED BY THE CENTRAL/STATE GOVERNMENT**

Regulation 22 of the RE Tariff Regulations specifies:

*“The Commission shall take into consideration any incentive or subsidy offered by the Central or State Government, including accelerated depreciation benefit if*

*availed by the generating company, for the renewable energy power plants while determining the tariff under these Regulations.*

*Provided that the following principles shall be considered for ascertaining income tax benefit on account of accelerated depreciation, if availed, for the purpose of tariff determination:*

- a) Assessment of benefit shall be based on normative capital cost, accelerated depreciation rate as per relevant provisions under Income Tax Act and corporate income tax rate.*
- b) Capitalisation of RE projects during second half of the fiscal year.*
- c) Per unit benefit shall be derived on levelled basis at discount factor equivalent to weighted average cost of capital.”*

Accordingly, for the projects availing the benefit of accelerated depreciation as per applicable Income Tax rate of 32.445% (30% IT rate + 5% surcharge + 3% Education cess) has been considered. For the purpose of determining the net depreciation benefits, depreciation @ 5.28% as per Straight Line Method (Book depreciation as per Companies Act, 1956) has been compared with depreciation as per Income Tax Act, i.e., 80% under Written Down Value method, and depreciation for the first year has been calculated at the rate of 50% of 80%, i.e., 40%, assuming the project to be capitalized during the second half of the financial year as per proviso (ii) to Regulation 22. The tax benefit has been worked out as per normal tax rate on the net depreciation benefit. The per unit levelled accelerated depreciation benefit has been computed considering the weighted average cost of capital as discounting factor. The detailed computation of benefit of accelerated depreciation in respect of each RE technology has been covered under the technology specific Sections.

Further, as per the second proviso under Regulation 22.1 of the RE Tariff Regulations, in case any Central Government or State Government notification specifically provides for any Generation Based Incentive (GBI) over and above tariff, the same shall not be factored in while determining tariff. Thus, while determining the tariffs for RE projects in this Order, no such incentives have been considered.

## **2.8. SHARING OF CDM BENEFITS**

As per Regulation 21.1 of the RE Tariff Regulations, all risks, costs and efforts associated with the availing of carbon credits shall be borne by the Generating Company. Further, the entire proceeds of carbon credit from approved CDM project, if any, shall be retained by the Generating Company.

## **2.9. APPLICABILITY OF TARIFF ORDER**

This Tariff Order shall be applicable for New RE Projects to be commissioned during FY 2012-13 (i.e. from April 1, 2012 to March 31, 2013).

The applicable Tariff Rate, Tariff Structure and other terms and conditions for RE Projects (commissioned on or before March 31, 2012 will be in accordance with the relevant provisions outlined under the Generic RE Tariff Order for FY 2011-12 (Case No. 39 of 2011 dated April 29, 2011) issued by the Commission.

The following Sections of the Order outline the technology-wise norms and corresponding Generic Tariff for New RE Projects to be commissioned during FY 2012-13 based on various renewable energy technologies.

# **3. WIND ENERGY PROJECTS**

## **3.1. USEFUL LIFE**

Regulation 2.1 (ff) of the RE Tariff Regulations defines 'useful life' in relation to a Unit of a generating station (including evacuation system) to mean the duration from the date of commercial operation (COD) till such time as specified under the RE Tariff Regulations, for such generation facility. Accordingly, the useful life for wind energy projects as specified under Regulation 2.1 (ff) is 25 years from COD.

## **3.2. TARIFF PERIOD**

Regulation 6 of the RE Tariff Regulations specifies the Tariff Period for various RE projects. Accordingly the Tariff Period for wind energy projects is 13 years, considered from the date of commercial operation of the RE project, and the tariff determined under the Regulations shall be applicable only for the duration of the Tariff Period.

### 3.3. CAPITAL COST

Wind energy projects located at the wind sites having minimum annual Wind Power Density (WPD) of 200 Watt/m<sup>2</sup> measured at hub height of 50 metres and using new wind turbine generators are eligible for the preferential tariff as determined under the RE Tariff Regulations. The Commission, under its recent Order dated January 11, 2012 (Case No. 153 of 2011) in the matter of Petition filed by M/s Gamesa, has considered the submissions made by MNRE that the provision for consideration of WPD of 200 W/m<sup>2</sup> at 50 m hub height does not hold relevance any longer. However, the Commission has observed that it will be necessary to initiate suitable actions to amend the RE Tariff Regulations appropriately to address the issue and other incidental matters connected therewith. Hence, pending such amendment of the RE Tariff Regulations, this Order is based on the provisions as outlined under existing RE Tariff Regulations.

In order to determine the yearly normative Capital Cost for such eligible Wind Energy Projects over the Control Period, the RE Tariff Regulations specify an indexed capital cost to be notified on a yearly basis pursuant to issuance of such indexed Capital Cost by Central Electricity Regulatory Commission (CERC) for wind energy projects in accordance with indexation mechanism stipulated under CERC RE Tariff Regulations. As the first Control Period for CERC RE Tariff Regulations 2009 is valid only till March 2012, CERC is in the process of finalisation of RE Regulations for the next Control Period (i.e., FY 2012-13 to FY 2016-17). The CERC has proposed the same indexation mechanism to determine the capital cost for each year of the next Control Period as specified in its existing CERC RE Regulations 2009. Since Regulation 25 of the RE Tariff Regulations specifies that the indexation mechanism as stipulated under CERC RE Tariff Regulations has to be considered for determination of capital cost, the Commission has derived the capital cost of the wind project based on the same indexation formula for the wind projects to be commissioned in FY 2012-13 as was considered for earlier Orders in line with CERC RE Tariff Regulations, 2009.

While arriving at the index for capital cost norm for FY 2012-13 for the wind projects in Maharashtra, the Commission has considered the indices related information for the period of 11 months during calendar year 2011 starting from January 2011 to November 2011. Besides, in accordance with the RE Tariff Regulations, the calendar year 2009 has been considered as the base year. Accordingly, the indexed capital cost for wind energy projects to be commissioned during FY 2012-13 works out to Rs 516.94 Lakh/MW as summarised under the following table:

### Capital Cost Indexation for Wind Power Projects (FY2012-13)

<b>Indexation Formulation</b> $CC(n) = P\&M(n) * [1 + F_1 + F_2 + F_3]$ $dn = (a * (SI_n - 1 / SI_0) + b * (EI_n - 1 / EI_0)) / (a + b)$ $P\&M(n) = P\&M(0) * (1 + dn)$
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Variable	Description	Value
a	Weightage for Steel Index	0.6
b	Weightage for Electrical Machinery Index	0.4
F <sub>1</sub>	Factor for Land and Civil Work	0.08
F <sub>2</sub>	Factor for Erection and Commissioning	0.07
F <sub>3</sub>	Factor for IDC and Financing	0.10

Month/Year	Electrical & Machinery		Iron & Steel	
	2011	2009	2011	2009
January	125.10	124.60	143.70	118.00
February	125.10	124.50	145.50	118.00
March	126.40	123.90	146.10	117.20
April	127.20	123.60	144.20	124.00
May	127.60	123.80	141.80	124.30
June	128.00	123.70	142.50	122.20
July	128.70	123.70	142.50	123.10
August	129.20	123.70	142.10	125.30
September	130.90	120.30	142.80	131.40
October	131.00	120.70	142.60	130.80
November	130.70	120.50	142.80	131.70
December		120.40		131.60
<b>Average</b>	<b>128.17</b>	<b>122.78</b>	<b>143.33</b>	<b>124.80</b>

Parameter	Description	Value
CC <sub>(0)</sub> (RsL/MW)	Capital Cost for the Base Year	467.13
P&M <sub>(0)</sub> (RsL/MW)	Plant & Machinery Cost for the Base Year	373.70
dn	Capital Cost Escalation Factor	10.66%
<b>P&amp;M<sub>(n)</sub> (RsL/MW)</b>	<b>Plant &amp; Machinery Cost for the nth Year (FY 2012-13)</b>	<b>413.55</b>
<b>CC<sub>(n)</sub> (RsL/MW)</b>	<b>Capital Cost for the nth Year (FY2012-13)</b>	<b>516.94</b>

### 3.4. DEBT-EQUITY RATIO

Regulation 13.1 of the RE Tariff Regulations provides that the debt-equity ratio of 70:30 is to be considered for determination of generic tariff. In accordance with the normative debt equity ratio and the above stipulated Capital Cost, the debt and equity component for wind energy projects works out to Rs. 361.86 Lakh / MW and Rs. 155.08 Lakh / MW, respectively, for FY 2012-13.

### 3.5. RETURN ON EQUITY

Regulation 16.2 stipulates the normative Return on Equity (RoE) as under:

- (a) Pre-tax 19% per annum for the first 10 years, and
- (b) Pre-tax 24% per annum from the 11<sup>th</sup> year onwards.

Accordingly, Return on Equity for FY 2012-13 works out as under:

Opening Equity (Rs lakh / MW)	155.08
Return on Equity for the first 10 years @19% (Rs lakh / MW)	29.47
Return on Equity after first 10 years @24% (Rs lakh / MW)	37.22

### 3.6. INTEREST ON LOAN

As explained above in Paragraph 2.4 of this Order, the interest rate of 13.73% p.a. has been considered for Wind Energy Projects for loan amount of Rs. 361.86 Lakh / MW in FY 2012-13.

### 3.7. DEPRECIATION

Regulation 15 of the RE Tariff Regulations specifies that depreciation is to be allowed up to a maximum of 90% of the Capital Cost of the asset and the depreciation rate for the first 10 years of the Tariff Period shall be 7% per annum and the remaining depreciation shall be spread over the remaining useful life of the project from 11<sup>th</sup> year onwards.

Accordingly, for Wind Energy Projects, depreciation rate is 7% for the first 10 years, and works out to 1.33% thereafter, for the remaining useful period of 15 years.

### 3.8. INTEREST ON WORKING CAPITAL

Regulation 17.1 of the RE Tariff Regulations provides for computation of the working capital requirements of the wind projects as under:

- "(a) Operation & Maintenance expenses for one month;*
- (b) Receivables equivalent to 2 (Two) months of energy charges for sale of electricity calculated on the normative CUF;*
- (c) Maintenance Spares @ 15% of operation and maintenance expenses."*

Further, as explained above in Paragraph 2.5 of this Order, interest rate of 13.23% p.a. has been considered on working capital for the Renewable Energy projects in FY 2012-13.

### 3.9. OPERATION AND MAINTENANCE (O&M) EXPENSES

In accordance with Regulation 27 of the RE Tariff Regulations, the normative O&M expenses for wind energy projects for FY 2010-11 is Rs 6.87 Lakh/MW, to be escalated at the rate of 5.72% per annum over the Tariff Period for determination of the levellised tariff. Accordingly, the Commission has considered O&M expense norm for wind energy projects as Rs 7.68 Lakh/MW for FY 2012-13.

### 3.10. CAPACITY UTILISATION FACTOR

In accordance with Regulation 26 of the RE Tariff Regulations and Paragraph 1.4 of this Order, the norms for Capacity Utilization Factor (CUF) specified for wind energy projects are as under:

<b>Wind Energy Projects</b>	<b>CUF</b>
Annual Mean Wind Power Density (W/m <sup>2</sup> )	
Wind zone-1 (Above 200 and <=250)	20%
Wind zone-2 (Above 250 and <=300)	23%
Wind zone-3 (Above 300 and <=400)	27%
Wind zone-4 (Above 400)	30%

In accordance with Regulation 26.2 of the RE Tariff Regulations, the annual mean wind power density is to be measured at 50 metre hub-height and as per Regulation 26.3, for the purpose of classification of wind energy project into particular wind zone class, the State-wise wind power density map prepared by Centre for Wind Energy Technology (C-WET)



annexed as schedule to the RE Tariff Regulations, is to be considered, provided that the said Schedule may be amended based on inputs provided by C-WET/MNRE.

Further, as directed by the Commission in its generic RE Tariff Order for FY 2010-11 (Case No. 20 of 2010 dated July 14, 2010), the State Nodal Agency, MEDA has provided the procedure for classification of wind power projects into wind zone class vide its letter ref: MEDA Letter no. IDD 2011/CR-28/WRA-028/2011-12/2897 dated July 16, 2011 and published it on its website. The same has been approved by the Commission vide its letter no. MERC/MEDA-COR/2011-12/01571 dated September 12, 2011.

Accordingly, in view of the finalisation of the procedure for classification of wind power projects into wind zones class by MEDA, the same shall form the basis for determination of applicable Tariff for wind power projects falling under particular wind zone class and the same shall be applicable for the Wind power projects to be commissioned in FY 2012-13.

### **3.11. LEVELISED TARIFF FOR NEW WIND ENERGY PROJECTS IN FY 2012-13**

Accordingly, the generic tariffs for Wind Energy Projects for FY 2012-13 have been determined as under. The discount factor for carrying out levelisation of Tariff for wind energy projects works out to 16.21%.

#### **Tariff for New RE Projects for FY 2012-13- Wind**

Wind Energy	Tariff Period	Levelling Tariff for	Benefits of Accelerated Depreciation	Net Levellised Tariff upon adjusting for Accelerated Depreciation Benefit)
		FY 2012-13	(if availed)	(if availed)
		Rs/kWh	Rs/kWh	Rs/kWh
<b>WindZone-1</b>	13	5.67	0.81	4.86
<b>WindZone-2</b>	13	4.93	0.70	4.23
<b>WindZone-3</b>	13	4.20	0.60	3.60
<b>WindZone-4</b>	13	3.78	0.54	3.24

Notes:

- The above Tariff shall be valid for Projects Commissioned in FY 2012-13.

- The above Tariff shall be valid for a Tariff Period of 13 years from the Commercial Operation Date (COD).

## **4. SMALL HYDRO POWER PROJECTS AND MINI/MICRO HYDRO PROJECTS**

### **4.1. USEFUL LIFE**

The useful life specified for Small Hydro Projects (SHPs) and Mini/Micro Projects under Regulation 2.1 (ff) of the RE Tariff Regulations is 35 years from COD.

### **4.2. TARIFF PERIOD**

Regulation 6.1 of the RE Tariff Regulations specifies a Tariff Period of 13 years for Small Hydro Projects of capacities above 5 MW and lower than or equal to 25 MW.

Regulation 6.2 of the RE Tariff Regulations specifies a Tariff Period of 35 years for Mini/Micro Hydro projects and Small hydro projects upto and including 5 MW. The Tariff Period matches the useful life in case of these Projects, reflecting a longer preferential treatment for such Projects.

### **4.3. CAPITAL COST OF SMALL HYDRO PROJECTS**

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

The RE Tariff Regulations provide for indexed capital cost to be notified on a yearly basis pursuant to issuance of such indexed Capital Cost by CERC for small hydro projects in accordance with indexation mechanism stipulated under CERC RE Tariff Regulations.

As the first Control Period for CERC RE Tariff Regulations 2009 is valid only till March 2012, CERC is in the process of finalisation of RE Regulations for the next Control Period (i.e., FY 2012-13 to FY 2016-17). The CERC has proposed the same indexation mechanism to determine the capital cost for each year of the next Control Period as specified in its existing CERC RE Regulations 2009. Since, Regulation 29 of the RE Tariff Regulations specifies that the indexation mechanism as stipulated under CERC RE Tariff Regulations 2009 has to be considered for determination of capital cost for SHP projects, the Commission has derived the capital cost based on the indexation formula for the SHP projects to be commissioned in FY 2012-13 as was considered in the earlier Orders in line with CERC RE Tariff Regulations, 2009.

While arriving at the index for capital cost norm for FY 2012-13 for the SHP projects in Maharashtra, the Commission has considered the indices related information for the period of 11 months during calendar year 2011 starting from January 2011 to November 2011. Besides, in accordance with the RE Tariff Regulations, the calendar year 2009 has been considered as the base year. Accordingly, the indexed capital cost for small hydro power projects to be commissioned during FY 2012-13 works out to Rs 552.21 Lakh/MW for small hydro projects with installed capacity (> 1 MW and upto and including 5 MW) and Rs 502.41 Lakh/MW for small hydro projects with installed capacity (> 5 MW to 25 MW) as summarised under the following table:

**Capital Cost Indexation for Small Hydro Power Projects (FY2012-13)**

<b>Indexation Formulation</b> $CC(n)=P\&M(n)*[1+F1+F2+F3]$ $dn = (a*(SI_n-1/SI_0)-1)+b*(EI_n-1/EI_0)-1)/(a+b)$ $P\&M(n)=P\&M(0)*(1+dn)$
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Variable	Description	Value
a	Weightage for Steel Index	0.6
b	Weightage for Electrical Machinery Index	0.4
F <sub>1</sub>	Factor for Land and Civil Work	0.16
F <sub>2</sub>	Factor for Erection and Commissioning	0.10
F <sub>3</sub>	Factor for IDC and Financing	0.14

Month/Year	E&M		Iron & Steel	
	2011	2009	2011	2009
January	125.10	124.60	143.70	118.00
February	125.10	124.50	145.50	118.00
March	126.40	123.90	146.10	117.20
April	127.20	123.60	144.20	124.00
May	127.60	123.80	141.80	124.30
June	128.00	123.70	142.50	122.20
July	128.70	123.70	142.50	123.10
August	129.20	123.70	142.10	125.30
September	130.90	120.30	142.80	131.40
October	131.00	120.70	142.60	130.80
November	130.70	120.50	142.80	131.70
December		120.40		131.60
<b>Average</b>	<b>128.17</b>	<b>122.78</b>	<b>143.33</b>	<b>124.80</b>

Parameter	Description	< 5MW	5MW - 25MW
CC <sub>(0)</sub> (RsL/MW)	Capital Cost for the Base Year	499.00	454.00
P&M <sub>(0)</sub> (RsL/MW)	Plant & Machinery Cost for the Base Year	356.43	324.29
dn	Capital Cost Escalation Factor	10.66%	10.66%
<b>P&amp;M<sub>(n)</sub> (RsL/MW)</b>	<b>Plant &amp; Machinery Cost for the nth Year (FY 2012-13)</b>	<b>394.43</b>	<b>358.86</b>
<b>CC<sub>(n)</sub> (RsL/MW)</b>	<b>Capital Cost for the nth Year (FY2012-13)</b>	<b>552.21</b>	<b>502.41</b>

#### 4.4. DEBT-EQUITY RATIO

In accordance with Regulation 13.1 of the RE Tariff Regulations, the debt and equity component for FY 2012-13 for SHP having capacities above 1MW and up to and including 5MW works out to Rs. 386.55 Lakh and Rs. 165.66 Lakh, respectively, and for projects having capacities above 5 MW and lower than or equal to 25 MW, the debt and

equity component works out to Rs. 351.69 Lakh / MW and Rs. 150.72 Lakh / MW, respectively.

#### **4.5. RETURN ON EQUITY**

In accordance with Regulation 16 of the RE Tariff Regulations, the RoE works out as shown in the Table below:

<b>Particulars</b>	<b>&gt; 1 MW and upto and including 5 MW</b>	<b>&gt; 5 MW to 25 MW</b>
Opening Equity (in Rs lakh / MW)	165.66	150.72
Return on Equity for the first 10 years @19% (Rs lakh / MW)	31.48	28.64
Return on Equity after first 10 years @24% (Rs lakh / MW)	39.76	36.17

#### **4.6. INTEREST ON LOAN**

As explained in Paragraph 2.4 of this Order, the interest rate of 13.73% p.a. has been considered for small hydro projects having capacities above 1MW and up to and including 5MW with a gross opening loan amount of Rs. 386.55 Lakh / MW and for projects having capacities above 5 MW and lower than or equal to 25 MW with a gross opening loan amount of Rs. 351.69 Lakh / MW in FY 2012-13.

#### **4.7. DEPRECIATION**

In accordance with Regulation 15 of the RE Tariff Regulations, the depreciation will be charged at 7% for the first 10 years, and at 0.80% thereafter for the remaining useful period of 25 years for SHPs.

#### **4.8. INTEREST ON WORKING CAPITAL**

Regulation 17 of the RE Tariff Regulations provides for computation of the working capital requirements of the SHPs as under:

- "(a) Operation & Maintenance expenses for one month;*  
*(b) Receivables equivalent to 2 (Two) months of energy charges for sale of electricity calculated on the normative CUF;*  
*(c) Maintenance spares @ 15% of operation and maintenance expenses"*

Further, as explained above in Paragraph 2.5 of this Order, interest rate of 13.23% p.a. has been considered on Working Capital for small hydro projects having capacities above 1 MW and up to and including 5 MW, and small hydro projects having capacities above 5 MW and lower than or equal to 25 MW.

#### **4.9. OPERATION AND MAINTENANCE (O&M) EXPENSES**

Regulation 32 of the RE Tariff Regulations provide for the normative O&M expenses for small hydro projects for FY 2010-11, to be escalated at the rate of 5.72% per annum over the Tariff Period for determination of the levelised tariff. Accordingly, the table below presents the normative O&M expenses considered by the Commission for small hydro power for FY 2012-13:

<b>Project Size</b>	<b>O&amp;M expenses (Rs Lakh/MW)</b>
> 1 MW and up to and including 5 MW	20.08
5 MW to 25 MW	14.18

#### **4.10. CAPACITY UTILISATION FACTOR (CUF)**

In accordance with Regulation 30 of the RE Tariff Regulations, a CUF of 30% has been considered for determination of Tariff for SHPs.

#### **4.11. AUXILIARY POWER CONSUMPTION**

In accordance with Regulation 31 of the RE Tariff Regulations, the Normative Auxiliary Consumption of 1.0% has been considered for determination of tariff of SHPs.

#### **4.12. INCENTIVE FOR MINI/MICRO HYDRO PROJECTS**

The RE Tariff Regulations provide for a higher tariff for Mini/Micro hydro projects over the other SHP projects, as reproduced below:

*“33.1 Tariff for Mini/Micro Hydro Projects shall be higher by Rs 0.50/kWh **or such other higher amount as may be stipulated by Commission from time to time** over and above the tariff applicable for Small Hydro Projects with installed capacity more than 1 MW but upto and including 5 MW.” (Emphasis Added)*

In pursuance of Regulation 33.1 of the RE Tariff Regulations and in order to encourage deployment of Mini/Micro Hydro power projects, while determining the generic tariff for the second year of the Control Period in the Tariff Order dated April 29, 2011 in Case No 39 of 2011, the Commission has further categorised small hydel projects below 1 MW into two sub categories, viz., a) above 500 kW and up to and including 1 MW at single location, and b) 500 kW & below at single location. Further, in view of the lack of economies of scale associated with such small hydel projects, the Commission has provided preferential tariff incentive for Mini/Micro Hydel projects below 500 kW. Accordingly, in line with the principle outlined under earlier Order, the Commission hereby determines the tariff for such sub-categories of Mini/Micro Hydro Projects for FY 2012-13 as under:

- a) Tariff for Mini/Micro Hydro Projects above 500 kW and up to and including 1 MW at single location shall be higher by Rs 0.50/kWh over and above the tariff applicable for Small Hydro Projects with installed capacity more than 1 MW but upto and including 5 MW.
- b) Tariff for Mini/Micro Hydro Projects of capacity 500 kW and below at single location shall be higher by Rs 1.00/kWh over and above the tariff applicable for Small Hydro Projects with installed capacity more than 1 MW but upto and including 5 MW.

#### **4.13. LEVELLISED TARIFF FOR NEW SMALL HYDRO PROJECTS IN FY 2012-13**

In light of the above parameters and the discount factor worked out as 16.38% for levelisation of tariff for SHPs, the generic tariffs for Small Hydro Projects for FY 2012-13 have been determined as under:

## Tariff for New RE Projects-Small Hydro Projects, Mini and Micro Hydro Projects

Small Hydro Power	Tariff Period	Levelised Tariff (FY 2012-13)	Benefit of Accelerated Depreciation (if availed)	Net Levelised Tariff (upon adjusting for accelerated depreciation benefit) (if availed)
		(Rs/kWh)	(Rs/kWh)	(Rs/kWh)
<b>Mini and Micro Hydro</b>				
500 kW and below	35	5.76	0.58	5.18
Above 500 kW and upto and including 1 MW	35	5.26	0.58	4.68
<b>Other SHP</b>				
Above 1 MW and upto and including 5 MW	35	4.76	0.58	4.19
5 MW to 25 MW	13	4.09	0.53	3.56

### Notes:

- The above Tariff shall be valid for Projects commissioned in FY 2012-13.
- The above Tariff shall be valid for a tariff period of 35 years from their Commercial Operation Date (COD) for Projects less than and including 5 MW, and for 13 years for Projects with installed capacity greater than 5 MW and upto and including 25 MW

## 5. BIOMASS POWER PROJECTS

### 5.1. KEY PROVISIONS OF RE TARIFF REGULATIONS

In accordance with the RE Tariff Regulations, the applicable Tariff and terms and conditions of Tariff for new as well as existing Biomass Power Projects as specified under existing RE Tariff Order shall continue to be applicable for the first three years of the new Control Period (i.e., FY 2010-11, FY 2011-12, and FY 2012-13). The relevant extract of Regulation 3.3 of the RE Tariff Regulations is reproduced as under:

*“3.3 For existing and new projects based on renewable energy technologies having fuel cost component, like biomass power projects and non-fossil fuel based co-generation projects, the tariff, tariff structure and other conditions as specified under respective RE Tariff Order shall continue to be applicable for first three years of the Control Period, i.e., FY 2010-11, FY 2011-12 and FY 2012-13”.*



Further, Chapter 5 of the RE Tariff Regulations provides technology specific norms for determination of tariff for Biomass Power Projects and the same shall be applicable to new Biomass Projects only from the fourth year of the Control Period, i.e., from FY 2013-14. The relevant Regulations specifying the applicability of such norms is reproduced as under:

*"35.1 The capital cost and performance norms as specified under Regulation 36 to Regulation 40 shall be applicable only for new biomass power projects with effect from April 1, 2013.*

*35.2 The fuel related aspects specified under Regulation 41 to Regulation 47 shall be applicable for existing and new biomass power projects with effect from April 1, 2013:*

*Provided that norms in respect of Station Heat Rate, Gross Calorific Value and Auxiliary Consumption factor for existing biomass power projects shall be as stipulated under the respective RE tariff Order as referred under Regulation 3.2."*

In addition, the Regulations also specify that the fuel price for each year of operation, of both existing and new Biomass Projects shall be adjusted based on an indexation mechanism with effect from April 1, 2013. The relevant extract of the Regulations is reproduced as under:

*"47.1 In case of (existing and new) biomass power projects, the following indexing mechanism for adjustment of fuel prices for each year of operation, from April 1, 2013, will be applicable for determination of applicable variable charge component of tariff:*

*The indexed Biomass Fuel Price ( $P_n$ ) in case of Biomass Power projects for each year ( $n$ ) of the Control Period shall be notified pursuant to notification of such indexed Biomass Fuel Price norm as applicable for Biomass Power projects within Maharashtra by Central Electricity Regulatory Commission in accordance with indexation mechanism stipulated under CERC RE Tariff Regulations.*

*Where,*

*P (n) = Price per ton of biomass for the nth year to be considered for tariff determination"*

## **5.2. RELEVANT BIOMASS TARIFF ORDERS**

The Commission has issued several Orders for determination of Tariff of Biomass Power Projects as well as for revising the variable component of the Tariffs to factor in the increase in biomass price over the years. The Orders issued by the Commission in respect of Tariff for Biomass Projects and their applicability are as under:

- a) Order dated August 8, 2005 in Case No. 37 of 2003 for determination of tariff and dispensation of related issues in respect of procurement of power from biomass based power projects. This Order was applicable to all biomass based power generation projects in Maharashtra using the Rankine cycle based technology applications and commissioned by March 31, 2010, or until installed plant capacity based on biomass reaches 250 MW, whichever is earlier. This Order was applicable only to those Projects harnessing biomass potential in Maharashtra and commissioned in the State, and intended for sale of electricity to Licensees within Maharashtra.
- b) Subsequently, the Commission issued Orders for revision of Variable Charge component of Tariff on March 25, 2009 and thereafter on December 14, 2009 (Case No. 83 of 2008) upon scrutiny of submissions of few operational biomass power projects. As stipulated in the Order dated December 14, 2009, the revised variable charge component was applicable till March 31, 2010.
- c) The applicability of the tariffs as determined through the above Orders was subsequently extended till the issuance of new Tariff Orders for the next Control Period (FY 2010-11 to FY 2014-15) through an Order dated March 31, 2010 in Case No. 116 of 2009.

However, as explained above in Paragraph 1.12 of this Order, considering the various concerns raised by stakeholders, the Commission has revised the variable charge component while keeping fixed charge component same at Rs 1.70/unit for biomass power projects for FY 2012-13.

In accordance with Regulation 3.3 of the RE Tariff Regulations, on the basis of the Tariff, Tariff Structure and other conditions as stipulated in the existing Tariff Order and the

rationale explained in Paragraph 1.12 of this Order, the Tariff for existing and new Biomass Power Projects during FY 2012-13 shall be as under.

### **5.3. TARIFF FOR EXISTING AND NEW BIOMASS POWER PROJECTS**

#### **Tariff for Existing and New Biomass Power Projects**

<b>Financial Year</b>	<b>Fixed Charge (Rs/kWh)</b>	<b>Variable Charge (Rs/kWh)</b>	<b>Tariff (Rs/kWh)</b>
2012-13	1.70	3.71	5.41

The Tariff Rate comprises two parts, viz., (i) fixed charge component, and (ii) variable charge component and shall be applicable for sale of power by Rankine Cycle based biomass power project to distribution licensees within Maharashtra during FY 2012-13.

## **6. NON-FOSSIL FUEL BASED CO-GENERATION PROJECT**

### **6.1. KEY PROVISIONS OF RE TARIFF REGULATIONS**

In accordance with the RE Tariff Regulations, the applicable Tariff and terms and conditions of Tariff for new as well as existing non-fossil fuel based co-generation projects as specified under existing RE Tariff Order shall continue to be applicable for first three years of the new Control Period (i.e., FY 2010-11, FY 2011-12, and FY 2012-13). The relevant extract of Regulation 3.3 of the RE Tariff Regulations, is reproduced as under:

*“3.3 For existing and new projects based on renewable energy technologies having fuel cost component, like biomass power projects and non-fossil fuel based co-generation projects, the tariff, tariff structure and other conditions as specified under respective RE Tariff Order shall continue to be applicable for first three years of the Control Period, i.e., FY 2010-11, FY 2011-12 and FY 2012-13”.*

Further, Chapter 6 of the RE Tariff Regulations provides technology specific norms for determination of tariff for non-fossil fuel based co-generation projects and the same are applicable to existing and new non-fossil fuel based co-generation projects only from the

fourth year of the Control Period, i.e., from FY 2013-14. The relevant Regulations specifying the applicability of such norms is reproduced as under.

*"49.1 The capital cost and performance norms as specified under Regulation 50 to Regulation 54 and Regulation 62 shall be applicable only for new non-fossil fuel based co-generation projects with effect from April 1, 2013.*

*49.2 The fuel related aspects specified under Regulation 55 to Regulation 61 shall be applicable for existing and new biomass power projects with effect from April 1, 2013:*

*Provided that norms in respect of specific fuel consumption, Gross Calorific Value and Auxiliary Consumption factor for existing non-fossil fuel based co-generation projects shall be as stipulated under the respective RE tariff Order as referred under Regulation 3.2."*

In addition, the Regulations also specify that the fuel price for each year of operation, of both existing and new non-fossil fuel based co-generation projects shall be adjusted based on an indexation mechanism with effect from April 1, 2013. The relevant extract of the Regulations is as reproduced as under:

*"56.1 In case of (existing and new) non-fossil fuel based co-generation projects, the following indexing mechanism for adjustment of fuel prices for each year of operation, from April 1, 2013, will be applicable for determination of applicable variable charge component of tariff:*

*The indexed Bagasse Fuel Price (P<sub>n</sub>) in case of Non-fossil fuel based Co-generation projects for each year (n) of the Control Period shall be notified pursuant to notification of such indexed Bagasse Fuel Price norm as applicable for Non-fossil fuel based Co-generation projects within Maharashtra by Central Electricity Regulatory Commission in accordance with indexation mechanism stipulated under CERC RE Tariff Regulations.*

*Where,*

*P (n) = Price per ton of Bagasse for the nth year to be considered for tariff determination"*

## **6.2. RELEVANT TARIFF ORDERS FOR NON-FOSSIL FUEL BASED CO-GENERATION**

The Commission has issued Orders for determination of Tariff of non-fossil fuel based co-generation projects as well as for revising the variable cost component of Tariffs to factor in the fuel price increase over the years, as under:

- a) Order dated August 16, 2002 in Case No. 8/9/10/15/17/18/19/20/21 of 2001 for purchase of power from non-fossil fuel based co-generation projects and in the matter of aiding the State Government in formulation of the Policy. The Tariff Rate and tariff structure, as approved, were valid till March 31, 2007 or 300 MW of capacity addition, whichever is earlier. Subsequently, through RPS Order (Case No. 6 of 2006), the Commission extended the validity of the Tariff Rate, tariff structure and other conditions of said Order for co-generation projects to be commissioned upto March 31, 2010.
- b) The Commission issued a Clarificatory Order dated November 21, 2003 specifying the qualification criteria for co-generation projects and outlining the measurement and verification protocol for compliance monitoring.
- c) Subsequently, the Commission issued an Interim Order for review of tariff rate and tariff structure for non-fossil fuel based grid connected Cogeneration projects on January 11, 2010 (Case No. 123 of 2008) upon scrutiny of submissions made by Cogeneration Association of India.

As explained in the above Paragraph 1.15 of this Order, in view of the revision in variable charge component of biomass based power projects, the Commission also decided to revise the variable charge component for non-fossil fuel based co-generation power projects considering the same logic of equivalent heat value followed for biomass power projects. The fixed charge component of tariff shall continue to remain the same at Rs 2.26/kWh. However, the Commission observed that there is no change in the variable charge component for non-fossil fuel based co-generation projects.

In accordance with Regulation 3.3 of the RE Tariff Regulations, on the basis of the Tariff, Tariff Structure and other conditions as stipulated in the existing Tariff Order and the

rationale explained in Paragraph 1.15 of this Order, the Tariff for existing and new Non-Fossil fuel based Co-Generation Projects during FY 2012-13 shall be as under.

### **6.3. TARIFF FOR EXISTING AND NEW NON-FOSSIL FUEL BASED CO-GENERATION PROJECTS**

#### **Tariff for Existing and New Non-Fossil fuel based Co-Generation Projects**

<b>Financial Year</b>	<b>Fixed Charge (Rs/kWh)</b>	<b>Variable Charge (Rs/kWh)</b>	<b>Tariff (Rs/kWh)</b>
2012-13	2.26	2.53	4.79

The Tariff Rate comprises of two parts, viz., (i) fixed charge component, and (ii) variable charge component and shall be applicable for sale of power by non-fossil fuel based co-generation project to distribution licensees within Maharashtra during FY 2012-13.

### **6.4. TARIFF FOR NON-QUALIFYING NON-FOSSIL FUEL-BASED CO-GENERATION PLANTS**

In accordance with the RE Tariff Regulations, the applicable Tariff and terms and conditions of Tariff for new as well as existing non-qualifying non-fossil fuel based co-generation projects as specified under existing RE Tariff Order shall continue to be applicable for the first three years of the new Control Period (i.e., FY 2010-11, FY 2011-12, and FY 2012-13). The relevant extract of Regulation 3.3 of the RE Tariff Regulations is reproduced as under:

*“3.3 For existing and new projects based on renewable energy technologies having fuel cost component, like biomass power projects and non-fossil fuel based co-generation projects, the tariff, tariff structure and other conditions as specified under respective RE Tariff Order shall continue to be applicable for first three years of the Control Period, i.e., FY 2010-11, FY 2011-12 and FY 2012-13”.*

In this context, the Commission has determined the Tariff for non-qualifying non-fossil fuel based co-generation (NQNFFC) projects as Rs 1.94/kWh with escalation of 2% per annum on compounded basis under its Order (Case 26 of 2004) dated May 25, 2005.

Accordingly, the Tariff Rate for existing non-qualifying non-fossil fuel based co-generation projects for FY 2012-13 works out to Rs 2.23/kWh.

## **7. SOLAR PHOTOVOLTAIC (PV) PROJECTS**

### **7.1. USEFUL LIFE**

Regulation 2.1 (ff) of the RE Tariff Regulations defines 'useful life' in relation to a Unit of a generating station (including evacuation system) to mean the duration from the date of commercial operation (COD) till such time as specified under the RE Tariff Regulations for such generation facility. Accordingly, as per Regulation 2.1 (ff), the useful life specified for Solar PV Projects is 25 years.

### **7.2. CONTROL PERIOD**

The generic tariff determined for Solar PV projects based on the Capital Cost and other norms applicable for FY 2011-12 the vide Commission's Order dated April 29, 2011 shall also apply for such projects during FY 2012-13, provided that (i) the Power Purchase Agreements (PPA) in respect of the Solar PV projects as mentioned in this Paragraph are signed on or before March 31, 2012; and (ii) the entire capacity covered by the Power Purchase Agreements is commissioned on or before March 31, 2013 in respect of Solar PV projects.

Further, for those Solar photovoltaic power projects whose PPAs to be signed after March 31, 2012, the tariff for such projects for their commissioning during FY 2012-13 would be based on the benchmark capital cost norm for Solar PV power projects for FY 2012-13 as specified under Paragraph 7.4 of this Order.

### **7.3. TARIFF PERIOD**

Regulation 6 of the RE Tariff Regulations, specifies the Tariff Period for Solar PV projects as 25 years. In terms of Regulation 6.4 and 6.5 of the RE Tariff Regulations, the Tariff Period specified shall be reckoned from the date of commercial operation 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**

As stated earlier, as the first Control Period for CERC RE Tariff Regulations 2009 is valid only till March 2012, CERC is in the process of finalisation of RE Regulation for the next Control Period (i.e., FY 2012-13 to FY 2016-17). The Commission, in its draft Order, had proposed to consider the Capital Cost of Rs. 1000 Lakh/MW on similar lines as proposed in the draft CERC RE Tariff Regulations, 2012 which was available in the public domain at that time. The Commission observes that CERC has notified the CERC RE Tariff Regulations, 2012 on February 6, 2012 and has specified the same Capital cost of Rs 1000 Lakh/MW.

The above capital cost norm shall also apply for Solar PV projects in Maharashtra for FY 2012-13, provided PPAs are signed after March 31, 2011 and solar PV project is commissioned during FY 2012-13.

#### **7.5. DEBT-EQUITY RATIO**

In accordance with Regulation 13.1 of the RE Tariff Regulations, the normative debt and equity component for Solar PV Projects shall be Rs. 700 Lakh / MW and Rs. 300 Lakh / MW, respectively.

#### **7.6. RETURN ON EQUITY**

In accordance with Regulation 16.1 of the RE Tariff Regulations, the RoE for Solar PV Projects works out as shown in the Table below:

<b>Particulars</b>	<b>Solar PV</b>
Opening Equity (in Rs lakh / MW)	300
Return on Equity for the first 10 years @ 19% (in Rs lakh / MW)	57
Return on Equity after first 10 years @24% (in Rs lakh / MW)	72



## **7.7. INTEREST ON LOAN**

As explained in Paragraph 2.4 of this Order, the interest rate of 13.73% p.a. has been considered for Solar PV Projects for loan amount of Rs. 700 Lakh / MW in FY 2012-13.

## **7.8. DEPRECIATION**

In accordance with Regulation 15 of the RE Tariff Regulations, the depreciation will be charged at 7% for the first 10 years and at 1.33% thereafter for the remaining useful period of 15 years for Solar PV projects.

## **7.9. INTEREST ON WORKING CAPITAL**

Regulation 17.1 of the RE Tariff Regulations provides for computation of the working capital requirements for Solar PV Projects as under:

- "(a) Operation & Maintenance expenses for one month;*
- (b) Receivables equivalent to 2 (Two) months of energy charges for sale of electricity calculated on the normative CUF;*
- (c) Maintenance Spares @ 15% of operation and maintenance expenses"*

Further, as explained above in Paragraph 2.5 of this Order, the Commission has considered the interest rate of 13.23% p.a. as Interest on Working Capital for the Solar PV Projects to be commissioned in FY 2012-13. ..

## **7.10. OPERATION AND MAINTENANCE (O&M) EXPENSES**

Regulation 68 of the RE Tariff Regulations specifies the normative O&M expenses for Solar PV projects for FY 2010-11 as Rs. 9.51 Lakh/MW, which is to be escalated at the rate of 5.72% per annum over the Tariff Period, for determination of the levelised tariff. Accordingly, the O&M expense norm for Solar PV projects for FY 2012-13 has been considered as Rs. 10.63 Lakh/MW.

## **7.11. CAPACITY UTILISATION FACTOR**

In accordance with Regulation 67 of the RE Tariff Regulations, CUF of 19% has been considered for determination of Tariff for Solar PV power projects.

### 7.12. LEVELISED TARIFF FOR SOLAR PV POWER PROJECTS IN FY 2012-13

In light of the parameters discussed in the preceding paragraphs and with respect to the discount factor of 16.21 % derived based on the methodology stipulated in Paragraph 2.6 of this Order, the generic tariffs for Solar PV Projects for FY 2012-13 have been determined as under:

<b>Tariff for New RE Projects-Solar Power Projects</b>				
[Refer Regulation 3.1 of RE Tariff Regulations]				
Particulars	Tariff Period	Levelised Tariff (FY 2012-13)	Benefit of Accelerated Depreciation (if availed)	Net Levelled Tariff (upon adjusting for Accelerated Depreciation benefit) (if availed)
		(Rs/kWh)	(Rs/kWh)	(Rs/kWh)
Solar PV	25	11.16	1.65	9.51

The above Tariff shall be applicable for Solar PV Projects wherein PPA are signed after March 31, 2012 and projects are commissioned during FY 2012-13, and shall be valid for a tariff period of 25 years from the Commercial Operation Date (COD).

The Tariff for Solar PV Projects to be commissioned during FY 2012-13, wherein PPA are signed on or before March 31, 2012, shall be as stipulated in the Commission's Generic RE Tariff Order (Case No. 39 of 2011) for RE technologies for the second year of the Control Period, issued on April 29, 2011.

### 7.13. LEVELLED TARIFF FOR SOLAR ROOFTOP PV AND OTHER SMALL SOLAR PROJECTS IN FY 2012-13

Regulation 68 of the RE Tariff Regulations specifies that the tariff for Solar Rooftop PV projects and other small solar projects will be Rs 0.50/kWh higher than the Tariff specified for Solar PV projects in the Regulations. Accordingly, the Tariff for such Projects in FY 2012-13 shall be as follows:

## Tariff for New Solar Rooftop PV and other small Solar Power Projects

Particular	Tariff Period	Levelised Total Tariff (FY 2012-13)	Benefit of Accelerated Depreciation (if availed)	Net Levelised Tariff (upon adjusting for Accelerated Depreciation benefit) (if availed)
		(Rs/kWh)	(Rs/kWh)	(Rs/kWh)
<b>Solar Power Projects</b>				
Solar rooftop PV and other small solar power Projects	25	11.66	1.65	10.01

The above Tariff shall be applicable for Solar Rooftop PV and other small solar Projects wherein PPA are signed after March 31, 2012 and projects are commissioned during FY 2012-13, and the same shall be valid for a tariff period of 25 years from the Commercial Operation Date (COD).

The Tariff for Solar Rooftop PV and other small solar Projects to be commissioned during FY 2012-13 wherein PPA are signed on or before March 31, 2012, shall be as specified in the Commission's Generic RE Tariff Order (Case No. 39 of 2011) for RE technologies for the second year of the Control Period, issued on April 29, 2011.

## 8. SOLAR THERMAL PROJECTS

### 8.1. USEFUL LIFE

Regulation 2.1 (ff) of the RE Tariff Regulations 'useful life' in relation to a Unit of a generating station (including evacuation system) to mean the duration from the date of commercial operation (COD) till such time as specified under the RE Tariff Regulations for such generation facility. Accordingly, as per Regulation 2.1 (ff), the useful life specified for Solar thermal projects is 25 years.

### 8.2. CONTROL PERIOD

As specified under Regulation 5.2 of the RE Tariff Regulations, the generic tariff determined for Solar thermal projects based on the Capital Cost and other norms for FY 2010-11 shall also apply for such projects to be commissioned during FY 2011-12 and FY

2012-13, provided that (i) the Power Purchase Agreements (PPA) in respect of Solar thermal projects as mentioned in this Paragraph are signed on or before March 31, 2011; and (ii) the entire capacity covered by the Power Purchase Agreements is commissioned on or before March 31, 2013 in respect of such Solar thermal projects.

Further, for those Solar thermal power projects whose PPAs are signed after March 31, 2011, the tariff for such projects for their commissioning during FY 2012-13 would be based on the benchmark capital cost norm for Solar thermal power projects for FY 2012-13 as specified under Paragraph 8.4 of this Order.

### **8.3. TARIFF PERIOD**

Regulation 6 of the RE Tariff Regulations specifies the Tariff Period for Solar thermal projects as 25 years. In terms of Regulations 6.4 and 6.5 of the RE Tariff Regulations, the Tariff Period specified shall be reckoned from the date of commercial operation of the RE projects and the tariff determined under the Regulations shall be applicable only for the duration of the Tariff Period.

### **8.4. CAPITAL COST OF SOLAR THERMAL PROJECTS**

As stated earlier, as the first Control Period for CERC RE Tariff Regulations 2009 is valid only till March 31, 2012, CERC is in the process of finalisation of RE Regulations for the next Control Period (i.e. FY 2012-13 to FY 2016-17).

The Commission, in its draft Order, had proposed to consider the Capital Cost of Rs. 1300 Lakh/MW on similar lines as proposed in the draft CERC RE Tariff Regulations, 2012, which was available in the public domain at that time. The Commission observes that CERC has notified the CERC RE Tariff Regulations, 2012 on February 6, 2012 and has specified the same Capital cost of Rs 1300 Lakh/MW.

The above capital cost norm shall also apply for Solar thermal projects in Maharashtra for FY 2012-13, provided PPAs are signed after March 31, 2011 and the solar thermal power project is commissioned during FY 2012-13.

### **8.5. DEBT-EQUITY RATIO**

In accordance with Regulation 13.1 of the RE Tariff Regulations, the normative debt and equity component for Solar thermal projects shall be Rs. 910 Lakh / MW and Rs. 390 Lakh / MW, respectively.

## 8.6. RETURN ON EQUITY

In accordance with Regulation 16.1 of the RE Tariff Regulations, the RoE for Solar thermal projects works out as shown in the table below:

Particulars	Solar Thermal
Opening Equity (in Rs lakh / MW)	390
Return on Equity for the first 10 years @19% (in Rs lakh / MW)	74.10
Return on Equity after first 10 years @24% (in Rs lakh / MW)	93.60

## 8.7. INTEREST ON LOAN

As explained in Paragraph 2.4 of this Order, the interest rate of 13.73% p.a. has been considered for determination of Tariff for Solar thermal projects for the normative loan amount of Rs. 910 Lakh / MW in FY 2012-13.

## 8.8. DEPRECIATION

In accordance with Regulation 15 of the RE Tariff Regulations, the depreciation will be charged at 7% for the first 10 years, and at 1.33% thereafter for the remaining useful period of 15 years for Solar thermal projects.

## 8.9. INTEREST ON WORKING CAPITAL

Regulation 17.1 of the RE Tariff Regulations, provides for computation of the working capital requirements of the Solar thermal projects as under:

- "(a) Operation & Maintenance expenses for one month;*
- (b) Receivables equivalent to 2 (Two) months of energy charges for sale of electricity calculated on the normative CUF;*
- (c) Maintenance Spares @ 15% of operation and maintenance expenses"*

Further, as explained above in Paragraph 2.5 of this Order, interest rate of 13.23 % p.a. has been considered on Working Capital for Solar thermal power Projects.

#### **8.10. OPERATION AND MAINTENANCE (O&M) EXPENSES**

Regulation 72 of the RE Tariff Regulations specifies the normative O&M expenses for solar thermal power projects for FY 2010-11 as Rs. 13.74 Lakh/MW, to be escalated at the rate of 5.72% per annum over the Tariff Period for determination of the levelised tariff. Accordingly, O&M expenses norm for Solar thermal power projects for FY 2012-13 has been considered as Rs. 15.37 Lakh/MW.

#### **8.11. CAPACITY UTILISATION FACTOR**

In accordance with Regulation 72 of the RE Tariff Regulations, CUF of 23% is considered for determination of tariff for solar thermal projects.

#### **8.12. AUXILIARY POWER CONSUMPTION**

In accordance with Regulation 74 of the RE Tariff Regulations, the auxiliary power consumption factor for determination of tariff of solar thermal power projects is 10.00%.

#### **8.13. LEVELISED TARIFF FOR SOLAR THERMAL PROJECTS IN FY 2012-13**

In light of the parameters discussed in the preceding paragraphs and with respect to the discount factor of 16.21 % derived based on the methodology stipulated in Paragraph 2.6 of this Order, the generic tariff for Solar Thermal Projects for FY 2012-13 has been determined as under:

##### **Tariff for New Solar Thermal Power Project to be commissioned in FY 2012-13**

Particular	Tariff Period	Levelised Tariff (FY 2012-13)	Benefit of Accelerated Depreciation (if availed)	Net Levelised Tariff (upon adjusting for Accelerated Depreciation benefit) (if availed)
		(Rs/kWh)	(Rs/kWh)	(Rs/kWh)
Solar Thermal	25	13.44	1.97	11.47

The above Tariff shall be applicable for Solar thermal power Projects wherein PPAs are signed after March 31, 2011 and projects are commissioned during FY 2012-13, and shall be valid for a Tariff Period of 25 years from the Commercial Operation Date (COD).

The Tariff for Solar thermal power projects to be commissioned during FY 2012-13 wherein PPA are signed on or before March 31, 2011, shall be as specified in the Commission's Generic RE Tariff Order (Case No. 39 of 2011) for RE technologies for the second year of the Control Period, issued on April 29, 2011.

9. The detailed computations of the generic tariff for various RE technologies have been annexed with this Order, as per the details given hereunder:

<b>S No</b>	<b>Renewable Energy Projects</b>	<b>Annexure</b>
<b>A</b>	<b>Wind Power Projects</b>	
	Wind Zone-I	Annexure 1A
	Wind Zone-II	Annexure 1B
	Wind Zone III	Annexure 1C
	Wind Zone IV	Annexure 1D
<b>B</b>	<b>Small Hydro Power Projects</b>	
	SHP Projects Less than 5 MW	Annexure 2A
	SHP Projects between 5 MW and 25 MW	Annexure 2B
<b>C</b>	<b>Solar Projects</b>	
	Solar PV Projects	Annexure 3
	Solar Thermal Projects	Annexure 4

Sd/-  
(Vijay L. Sonavane)  
Member

Sd/-  
(V. P. Raja)  
Chairman

**Annexure – 1A  
(Wind Zone-1)**

**Form 1.1 Assumptions Parameters**

S. No.	Assumption Head	Sub-Head	Sub-Head (2)	Unit	Wind Zone 1
1	Power Generation	Capacity	Installed Power Generation Capacity	MW	1
			Capacity Utilization Factor	%	20%
			Useful Life	Years	25
2	Project Cost	Capital Cost/MW	Power Plant Cost	Rs Lacs/MW	516.94
3	Sources of Fund		Tariff Period	Years	13
			<u>Debt: Equity</u>		
			Debt	%	70%
			Equity	%	30%
			Total Debt Amount	Rs Lacs	361.86
			Total Equity Amount	Rs Lacs	155.08
			<u>Debt Component</u>		
			Loan Amount	Rs Lacs	361.86
			Repayment Period(inclcd Moratorium)	years	10
			Interest Rate	%	13.73%
			<u>Equity Component</u>		
Equity amount	Rs Lacs	155.08			
Return on Equity for first 10 years	% p.a	19.00%			
RoE Period	Year	10			
Return on Equity 11th year onwards	% p.a	24.00%			
Discount Rate		16.21%			
4	Financial Assumptions	<u>Fiscal Assumptions</u>	Income Tax	%	32.445%
			MAT Rate (for first 10 years)	%	20.008%
			80 IA benefits	Yes/No	Yes
			<u>Depreciation</u>		
			Depreciation Rate for first 10 years	%	7.00%
Depreciation Rate 11th year onwards	%	1.33%			
5	Working Capital	<u>For Fixed Charges</u>	O&M Charges	Months	1
			Maintenance Spare	(% of O&M exepenses)	15%
			Receivables for Debtors	Months	2
			Interest On Working Capital	%	13.23%
6	Operation & Maintenance		power plant (FY12-13)	Rs Lakh	7.68
			Total O & M Expenses Escalation	%	5.72%



Form 1.2 Form Template for (Wind Power Projects under Zone - 1) : 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		1.75	1.75	1.75	1.75	1.75	1.75	1.75	1.75	1.75	1.75	1.75	1.75	1.75	1.75	1.75	1.75	1.75	1.75	1.75	1.75	1.75	1.75	1.75	1.75	1.75

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		7.68	8.12	8.58	9.07	9.59	10.14	10.72	11.34	11.98	12.67	13.39	14.16	14.97	15.83	16.73	17.69	18.70	19.77	20.90	22.10	23.36	24.70	26.11	27.60	29.18
Depreciation	Rs Lakh		36.19	36.19	36.19	36.19	36.19	36.19	36.19	36.19	36.19	36.19	6.89	6.89	6.89	6.89	6.89	6.89	6.89	6.89	6.89	6.89	6.89	6.89	6.89	6.89	6.89
Interest on term loan	Rs Lakh		47.20	42.23	37.26	32.29	27.33	22.36	17.39	12.42	7.45	2.48	0.00	0.00	0.00	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		2.96	2.87	2.78	2.70	2.62	2.53	2.45	2.37	2.30	2.22	1.72	1.76	1.80	1.85	1.90	1.95	2.01	2.06	2.13	2.19	2.26	2.33	2.41	2.49	2.57
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	37.22	37.22	37.22	37.22	37.22	37.22	37.22	37.22	37.22	37.22	37.22	37.22	37.22	37.22	37.22
<b>Total Fixed Cost</b>	<b>Rs Lakh</b>		<b>123.49</b>	<b>118.87</b>	<b>114.28</b>	<b>109.72</b>	<b>105.19</b>	<b>100.68</b>	<b>96.22</b>	<b>91.78</b>	<b>87.39</b>	<b>83.03</b>	<b>59.23</b>	<b>60.03</b>	<b>60.89</b>	<b>61.79</b>	<b>62.74</b>	<b>63.75</b>	<b>64.82</b>	<b>65.95</b>	<b>67.14</b>	<b>68.40</b>	<b>69.73</b>	<b>71.14</b>	<b>72.63</b>	<b>74.20</b>	<b>75.87</b>

Levallised tariff corresponding to Useful life

Per Unit Cost of Generation	Unit	Levelling	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		0.44	0.46	0.49	0.52	0.55	0.58	0.61	0.65	0.68	0.72	0.76	0.81	0.85	0.90	0.96	1.01	1.07	1.13	1.19	1.26	1.33	1.41	1.49	1.58	1.67
Depreciation	Rs/kWh		2.07	2.07	2.07	2.07	2.07	2.07	2.07	2.07	2.07	2.07	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39
Int. on term loan	Rs/kWh		2.69	2.41	2.13	1.84	1.56	1.28	0.99	0.71	0.43	0.14	0.00	0.00	0.00	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		0.17	0.16	0.16	0.15	0.15	0.14	0.14	0.14	0.13	0.13	0.10	0.10	0.10	0.11	0.11	0.11	0.11	0.12	0.12	0.13	0.13	0.13	0.14	0.14	0.15
RoE	Rs/kWh		1.68	1.68	1.68	1.68	1.68	1.68	1.68	1.68	1.68	1.68	2.12	2.12	2.12	2.12	2.12	2.12	2.12	2.12	2.12	2.12	2.12	2.12	2.12	2.12	2.12
<b>Total COG</b>	<b>Rs/kWh</b>	<b>5.67</b>	<b>7.05</b>	<b>6.79</b>	<b>6.52</b>	<b>6.26</b>	<b>6.00</b>	<b>5.75</b>	<b>5.49</b>	<b>5.24</b>	<b>4.99</b>	<b>4.74</b>	<b>3.38</b>	<b>3.43</b>	<b>3.48</b>	<b>3.53</b>	<b>3.58</b>	<b>3.64</b>	<b>3.70</b>	<b>3.76</b>	<b>3.83</b>	<b>3.90</b>	<b>3.98</b>	<b>4.06</b>	<b>4.15</b>	<b>4.24</b>	<b>4.33</b>
Discount Factor			1	0.861	0.740	0.637	0.548	0.472	0.406	0.349	0.301	0.259	0.223	0.192	0.165	0.142	0.122	0.105	0.090	0.078	0.067	0.058	0.050	0.043	0.037	0.032	0.027
<b>Levallised Tariff</b>	<b>5.67</b>	<b>Rs/Unit</b>																									

**Determination of Accelerated Depreciation for Wind Power Projects**

Depreciation amount	90%
Book Depreciation rate	5.28%
Tax Depreciation rate	80%
Income Tax (Normal Rates)	32.445%
Capital Cost	516.94

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	%	2.64%	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%	2.88%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Book Depreciation	Rs Lakh	13.65	27.29	27.29	27.29	27.29	27.29	27.29	27.29	27.29	27.29	27.29	27.29	27.29	27.29	27.29	27.29	27.29	14.89	0.00	0.00	0.00	0.00	0.00	0.00	0.00

**Accelerated Depreciation**

Opening	%	100%	60%	12%	2%	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	%	40%	48%	10%	2%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Closing	%	60%	12%	2%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Accelerated Deprn.	Rs Lakh	206.78	248.13	49.63	9.93	1.99	0.40	0.08	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

Net Depreciation Benefit	Rs Lakh	193.13	220.84	22.33	-17.37	-25.31	-26.90	-27.22	-27.28	-27.29	-27.29	-27.29	-27.29	-27.29	-27.29	-27.29	-27.29	-27.29	-14.89	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tax Benefit	Rs Lakh	62.66	71.65	7.25	-5.64	-8.21	-8.73	-8.83	-8.85	-8.85	-8.86	-8.86	-8.86	-8.86	-8.86	-8.86	-8.86	-8.86	-4.83	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Energy generation	MU	0.88	1.75	1.75	1.75	1.75	1.75	1.75	1.75	1.75	1.75	1.75	1.75	1.75	1.75	1.75	1.75	1.75	1.75	1.75	1.75	1.75	1.75	1.75	1.75	1.75
Discounting Factor		1.00	0.93	0.80	0.69	0.59	0.51	0.44	0.38	0.32	0.28	0.24	0.21	0.18	0.15	0.13	0.11	0.10	0.08	0.07	0.06	0.05	0.05	0.04	0.03	0.03

<b>Levellised benefit</b>	<b>0.81</b>	<b>Rs/Unit</b>
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**Annexure – 1B  
(Wind Zone-2)**

**Form 1.1 Assumptions Parameters**

S. No.	Assumption Head	Sub-Head	Sub-Head (2)	Unit	Wind Zone 2
1	Power Generation	Capacity	Installed Power Generation Capacity	MW	1
			Capacity Utilization Factor	%	23%
			Useful Life	Years	25
2	Project Cost	Capital Cost/MW	Power Plant Cost	Rs Lacs/MW	516.94
3	Sources of Fund		Tariff Period	Years	13
			<u>Debt: Equity</u>		
			Debt	%	70%
			Equity	%	30%
			Total Debt Amount	Rs Lacs	361.86
			Total Equity Amount	Rs Lacs	155.08
			<u>Debt Component</u>		
			Loan Amount	Rs Lacs	361.86
			Repayment Period(inclcd Moratorium)	years	10
			Interest Rate	%	13.73%
			<u>Equity Component</u>		
Equity amount	Rs Lacs	155.08			
Return on Equity for first 10 years	% p.a	19.00%			
RoE Period	Year	10			
Return on Equity 11th year onwards	% p.a	24.00%			
Discount Rate		16.21%			
4	Financial Assumptions	<u>Fiscal Assumptions</u>	Income Tax	%	32.445%
			MAT Rate (for first 10 years)	%	20.008%
			80 IA benefits	Yes/No	Yes
			<u>Depreciation</u>		
			Depreciation Rate for first 10 years	%	7.00%
Depreciation Rate 11th year onwards	%	1.33%			
5	Working Capital	<u>For Fixed Charges</u>	O&M Charges	Months	1
			Maintenance Spare	(% of O&M exepenses)	15%
			Receivables for Debtors	Months	2
			Interest On Working Capital	%	13.23%
6	Operation & Maintenance		power plant (FY12-13)	Rs Lakh	7.68
			Total O & M Expenses Escalation	%	5.72%

Form 1.2 Form Template for (Wind Power Projects under Zone - 2) : 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		2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01

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		7.68	8.12	8.58	9.07	9.59	10.14	10.72	11.34	11.98	12.67	13.39	14.16	14.97	15.83	16.73	17.69	18.70	19.77	20.90	22.10	23.36	24.70	26.11	27.60	29.18
Depreciation	Rs Lakh		36.19	36.19	36.19	36.19	36.19	36.19	36.19	36.19	36.19	36.19	36.19	36.19	36.19	36.19	36.19	36.19	36.19	36.19	36.19	36.19	36.19	36.19	36.19	36.19	36.19
Interest on term loan	Rs Lakh		47.20	42.23	37.26	32.29	27.33	22.36	17.39	12.42	7.45	2.48	0.00	0.00	0.00	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		2.96	2.87	2.78	2.70	2.62	2.53	2.45	2.37	2.30	2.22	1.72	1.76	1.80	1.85	1.90	1.95	2.01	2.06	2.13	2.19	2.26	2.33	2.41	2.49	2.57
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	37.22	37.22	37.22	37.22	37.22	37.22	37.22	37.22	37.22	37.22	37.22	37.22	37.22	37.22	37.22
<b>Total Fixed Cost</b>	<b>Rs Lakh</b>		<b>123.49</b>	<b>118.87</b>	<b>114.28</b>	<b>109.72</b>	<b>105.19</b>	<b>100.68</b>	<b>96.22</b>	<b>91.78</b>	<b>87.39</b>	<b>83.03</b>	<b>59.23</b>	<b>60.03</b>	<b>60.89</b>	<b>61.79</b>	<b>62.74</b>	<b>63.75</b>	<b>64.82</b>	<b>65.95</b>	<b>67.14</b>	<b>68.40</b>	<b>69.73</b>	<b>71.14</b>	<b>72.63</b>	<b>74.20</b>	<b>75.87</b>

Levillised tariff corresponding to Useful life

Per Unit Cost of Generation	Unit	Levillised	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		0.38	0.40	0.43	0.45	0.48	0.50	0.53	0.56	0.59	0.63	0.66	0.70	0.74	0.79	0.83	0.88	0.93	0.98	1.04	1.10	1.16	1.23	1.30	1.37	1.45
Depreciation	Rs/kWh		1.80	1.80	1.80	1.80	1.80	1.80	1.80	1.80	1.80	1.80	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34
Int. on term loan	Rs/kWh		2.34	2.10	1.85	1.60	1.36	1.11	0.86	0.62	0.37	0.12	0.00	0.00	0.00	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		0.15	0.14	0.14	0.13	0.13	0.13	0.12	0.12	0.11	0.11	0.09	0.09	0.09	0.09	0.09	0.10	0.10	0.10	0.11	0.11	0.11	0.11	0.12	0.12	0.13
RoE	Rs/kWh		1.46	1.46	1.46	1.46	1.46	1.46	1.46	1.46	1.46	1.46	1.85	1.85	1.85	1.85	1.85	1.85	1.85	1.85	1.85	1.85	1.85	1.85	1.85	1.85	1.85
<b>Total COG</b>	<b>Rs/kWh</b>	<b>4.93</b>	<b>6.13</b>	<b>5.90</b>	<b>5.67</b>	<b>5.45</b>	<b>5.22</b>	<b>5.00</b>	<b>4.78</b>	<b>4.56</b>	<b>4.34</b>	<b>4.12</b>	<b>2.94</b>	<b>2.98</b>	<b>3.02</b>	<b>3.07</b>	<b>3.11</b>	<b>3.16</b>	<b>3.22</b>	<b>3.27</b>	<b>3.33</b>	<b>3.39</b>	<b>3.46</b>	<b>3.53</b>	<b>3.60</b>	<b>3.68</b>	<b>3.77</b>

Discount Factor			1	0.861	0.740	0.637	0.548	0.472	0.406	0.349	0.301	0.259	0.223	0.192	0.165	0.142	0.122	0.105	0.090	0.078	0.067	0.058	0.050	0.043	0.037	0.032	0.027
<b>Levillised Tariff</b>	<b>4.93</b>	<b>Rs/Unit</b>																									

**Determination of Accelerated Depreciation for Wind Power Projects**

Depreciation amount	90%
Book Depreciation rate	5.28%
Tax Depreciation rate	80%
Income Tax (Normal Rates)	32.445%
Capital Cost	516.94

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	%	2.64%	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%	2.88%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Book Depreciation	Rs Lakh	13.65	27.29	27.29	27.29	27.29	27.29	27.29	27.29	27.29	27.29	27.29	27.29	27.29	27.29	27.29	27.29	27.29	14.89	0.00	0.00	0.00	0.00	0.00	0.00	0.00

**Accelerated Depreciation**

Opening	%	100%	60%	12%	2%	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	%	40%	48%	10%	2%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Closing	%	60%	12%	2%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Accelerated Deprn.	Rs Lakh	206.78	248.13	49.63	9.93	1.99	0.40	0.08	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

Net Depreciation Benefit	Rs Lakh	193.13	220.84	22.33	-17.37	-25.31	-26.90	-27.22	-27.28	-27.29	-27.29	-27.29	-27.29	-27.29	-27.29	-27.29	-27.29	-27.29	-14.89	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tax Benefit	Rs Lakh	62.66	71.65	7.25	-5.64	-8.21	-8.73	-8.83	-8.85	-8.85	-8.86	-8.86	-8.86	-8.86	-8.86	-8.86	-8.86	-8.86	-4.83	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Energy generation	MU	1.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01
Discounting Factor		1.00	0.93	0.80	0.69	0.59	0.51	0.44	0.38	0.32	0.28	0.24	0.21	0.18	0.15	0.13	0.11	0.10	0.08	0.07	0.06	0.05	0.05	0.04	0.03	0.03

<b>Levellised benefit</b>	<b>0.70</b>	<b>Rs/Unit</b>
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**Annexure – 1C  
(Wind Zone-3)**

**Form 1.1 Assumptions Parameters**

S. No.	Assumption Head	Sub-Head	Sub-Head (2)	Unit	Wind Zone 3
1	Power Generation	Capacity	Installed Power Generation Capacity	MW	1
			Capacity Utilization Factor	%	27%
			Useful Life	Years	25
2	Project Cost	Capital Cost/MW	Power Plant Cost	Rs Lacs/MW	516.94
3	Sources of Fund		Tariff Period	Years	13
			<u>Debt: Equity</u>		
			Debt	%	70%
			Equity	%	30%
			Total Debt Amount	Rs Lacs	361.86
			Total Equity Amount	Rs Lacs	155.08
			<u>Debt Component</u>		
			Loan Amount	Rs Lacs	361.86
			Repayment Period(inclcd Moratorium)	years	10
			Interest Rate	%	13.73%
			<u>Equity Component</u>		
			Equity amount	Rs Lacs	155.08
Return on Equity for first 10 years	% p.a	19.00%			
RoE Period	Year	10			
Return on Equity 11th year onwards	% p.a	24.00%			
Discount Rate		16.21%			
4	Financial Assumptions	<u>Fiscal Assumptions</u>	Income Tax	%	32.445%
			MAT Rate (for first 10 years)	%	20.008%
			80 IA benefits	Yes/No	Yes
			<u>Depreciation</u>		
			Depreciation Rate for first 10 years	%	7.00%
Depreciation Rate 11th year onwards	%	1.33%			
5	Working Capital	<u>For Fixed Charges</u>	O&M Charges	Months	1
			Maintenance Spare	(% of O&M exepenses)	15%
			Receivables for Debtors	Months	2
			Interest On Working Capital	%	13.23%
6	Operation & Maintenance		power plant (FY12-13)	Rs Lakh	7.68
			Total O & M Expenses Escalation	%	5.72%

Form 1.2 Form Template for (Wind Power Projects under Zone - 3) : 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		2.37	2.37	2.37	2.37	2.37	2.37	2.37	2.37	2.37	2.37	2.37	2.37	2.37	2.37	2.37	2.37	2.37	2.37	2.37	2.37	2.37	2.37	2.37	2.37	2.37

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		7.68	8.12	8.58	9.07	9.59	10.14	10.72	11.34	11.98	12.67	13.39	14.16	14.97	15.83	16.73	17.69	18.70	19.77	20.90	22.10	23.36	24.70	26.11	27.60	29.18
Depreciation	Rs Lakh		36.19	36.19	36.19	36.19	36.19	36.19	36.19	36.19	36.19	36.19	6.89	6.89	6.89	6.89	6.89	6.89	6.89	6.89	6.89	6.89	6.89	6.89	6.89	6.89	6.89
Interest on term loan	Rs Lakh		47.20	42.23	37.26	32.29	27.33	22.36	17.39	12.42	7.45	2.48	0.00	0.00	0.00	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		2.96	2.87	2.78	2.70	2.62	2.53	2.45	2.37	2.30	2.22	1.72	1.76	1.80	1.85	1.90	1.95	2.01	2.06	2.13	2.19	2.26	2.33	2.41	2.49	2.57
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	37.22	37.22	37.22	37.22	37.22	37.22	37.22	37.22	37.22	37.22	37.22	37.22	37.22	37.22	37.22
<b>Total Fixed Cost</b>	<b>Rs Lakh</b>		<b>123.49</b>	<b>118.87</b>	<b>114.28</b>	<b>109.72</b>	<b>105.19</b>	<b>100.68</b>	<b>96.22</b>	<b>91.78</b>	<b>87.39</b>	<b>83.03</b>	<b>59.23</b>	<b>60.03</b>	<b>60.89</b>	<b>61.79</b>	<b>62.74</b>	<b>63.75</b>	<b>64.82</b>	<b>65.95</b>	<b>67.14</b>	<b>68.40</b>	<b>69.73</b>	<b>71.14</b>	<b>72.63</b>	<b>74.20</b>	<b>75.87</b>

Levillised tariff corresponding to Useful life

Per Unit Cost of Generation	Unit	Levillise	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		0.32	0.34	0.36	0.38	0.41	0.43	0.45	0.48	0.51	0.54	0.57	0.60	0.63	0.67	0.71	0.75	0.79	0.84	0.88	0.93	0.99	1.04	1.10	1.17	1.23	
Depreciation	Rs/kWh		1.53	1.53	1.53	1.53	1.53	1.53	1.53	1.53	1.53	1.53	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29	
Int. on term loan	Rs/kWh		2.00	1.79	1.58	1.37	1.16	0.95	0.74	0.53	0.32	0.11	0.00	0.00	0.00	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	0.11	0.11	0.11	0.10	0.10	0.10	0.09	0.07	0.07	0.07	0.08	0.08	0.08	0.08	0.08	0.09	0.09	0.09	0.10	0.10	0.10	0.11	0.11
RoE	Rs/kWh		1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.57	1.57	1.57	1.57	1.57	1.57	1.57	1.57	1.57	1.57	1.57	1.57	1.57	1.57	1.57	
<b>Total COG</b>	<b>Rs/kWh</b>	<b>4.20</b>	<b>5.22</b>	<b>5.03</b>	<b>4.83</b>	<b>4.64</b>	<b>4.45</b>	<b>4.26</b>	<b>4.07</b>	<b>3.88</b>	<b>3.69</b>	<b>3.51</b>	<b>2.50</b>	<b>2.54</b>	<b>2.57</b>	<b>2.61</b>	<b>2.65</b>	<b>2.70</b>	<b>2.74</b>	<b>2.79</b>	<b>2.84</b>	<b>2.89</b>	<b>2.95</b>	<b>3.01</b>	<b>3.07</b>	<b>3.14</b>	<b>3.21</b>	

Discount Factor			1	0.861	0.740	0.637	0.548	0.472	0.406	0.349	0.301	0.259	0.223	0.192	0.165	0.142	0.122	0.105	0.090	0.078	0.067	0.058	0.050	0.043	0.037	0.032	0.027
<b>Levillised Tariff</b>	<b>4.20</b>	<b>Rs/Unit</b>																									

**Determination of Accelerated Depreciation for Wind Power Projects**

Depreciation amount	90%
Book Depreciation rate	5.28%
Tax Depreciation rate	80%
Income Tax (Normal Rates)	32.445%
Capital Cost	516.94

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	%	2.64%	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%	2.88%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Book Depreciation	Rs Lakh	13.65	27.29	27.29	27.29	27.29	27.29	27.29	27.29	27.29	27.29	27.29	27.29	27.29	27.29	27.29	27.29	27.29	14.89	0.00	0.00	0.00	0.00	0.00	0.00	0.00

**Accelerated Depreciation**

Opening	%	100%	60%	12%	2%	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	%	40%	48%	10%	2%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Closing	%	60%	12%	2%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Accelerated Deprn.	Rs Lakh	206.78	248.13	49.63	9.93	1.99	0.40	0.08	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

Net Depreciation Benefit	Rs Lakh	193.13	220.84	22.33	-17.37	-25.31	-26.90	-27.22	-27.28	-27.29	-27.29	-27.29	-27.29	-27.29	-27.29	-27.29	-27.29	-27.29	-14.89	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tax Benefit	Rs Lakh	62.66	71.65	7.25	-5.64	-8.21	-8.73	-8.83	-8.85	-8.85	-8.86	-8.86	-8.86	-8.86	-8.86	-8.86	-8.86	-8.86	-4.83	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Energy generation	MU	1.18	2.37	2.37	2.37	2.37	2.37	2.37	2.37	2.37	2.37	2.37	2.37	2.37	2.37	2.37	2.37	2.37	2.37	2.37	2.37	2.37	2.37	2.37	2.37	2.37
Discounting Factor		1.00	0.93	0.80	0.69	0.59	0.51	0.44	0.38	0.32	0.28	0.24	0.21	0.18	0.15	0.13	0.11	0.10	0.08	0.07	0.06	0.05	0.05	0.04	0.03	0.03

<b>Levellised benefit</b>	<b>0.60</b>	<b>Rs/Unit</b>
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**Annexure – 1D  
(Wind Zone-4)**

**Form 1.1 Assumptions Parameters**

S. No.	Assumption Head	Sub-Head	Sub-Head (2)	Unit	Wind Zone 4
1	Power Generation	Capacity	Installed Power Generation Capacity	MW	1
			Capacity Utilization Factor	%	30%
			Useful Life	Years	25
2	Project Cost	Capital Cost/MW	Power Plant Cost	Rs Lacs/MW	516.94
3	Sources of Fund		Tariff Period	Years	13
			<u>Debt: Equity</u>		
			Debt	%	70%
			Equity	%	30%
			Total Debt Amount	Rs Lacs	361.86
			Total Equity Amount	Rs Lacs	155.08
			<u>Debt Component</u>		
			Loan Amount	Rs Lacs	361.86
			Repayment Period(inclcd Moratorium)	years	10
			Interest Rate	%	13.73%
			<u>Equity Component</u>		
Equity amount	Rs Lacs	155.08			
Return on Equity for first 10 years	% p.a	19.00%			
RoE Period	Year	10			
Return on Equity 11th year onwards	% p.a	24.00%			
Discount Rate		16.21%			
4	Financial Assumptions	<u>Fiscal Assumptions</u>	Income Tax	%	32.445%
			MAT Rate (for first 10 years)	%	20.008%
			80 IA benefits	Yes/No	Yes
			<u>Depreciation</u>		
			Depreciation Rate for first 10 years	%	7.00%
Depreciation Rate 11th year onwards	%	1.33%			
5	Working Capital	<u>For Fixed Charges</u>	O&M Charges	Months	1
			Maintenance Spare	(% of O&M exepenses)	15%
			Receivables for Debtors	Months	2
			Interest On Working Capital	%	13.23%
6	Operation & Maintenance		power plant (FY12-13)	Rs Lakh	7.68
			Total O & M Expenses Escalation	%	5.72%

Form 1.2 Form Template for (Wind Power Projects under Zone - 4 ) : 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		7.68	8.12	8.58	9.07	9.59	10.14	10.72	11.34	11.98	12.67	13.39	14.16	14.97	15.83	16.73	17.69	18.70	19.77	20.90	22.10	23.36	24.70	26.11	27.60	29.18	
Depreciation	Rs Lakh		36.19	36.19	36.19	36.19	36.19	36.19	36.19	36.19	36.19	36.19	6.89	6.89	6.89	6.89	6.89	6.89	6.89	6.89	6.89	6.89	6.89	6.89	6.89	6.89	6.89	6.89
Interest on term loan	Rs Lakh		47.20	42.23	37.26	32.29	27.33	22.36	17.39	12.42	7.45	2.48	0.00	0.00	0.00	0.00	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		2.96	2.87	2.78	2.70	2.62	2.53	2.45	2.37	2.30	2.22	1.72	1.76	1.80	1.85	1.90	1.95	2.01	2.06	2.13	2.19	2.26	2.33	2.41	2.49	2.57	
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	37.22	37.22	37.22	37.22	37.22	37.22	37.22	37.22	37.22	37.22	37.22	37.22	37.22	37.22	37.22	
<b>Total Fixed Cost</b>	<b>Rs Lakh</b>		<b>123.49</b>	<b>118.87</b>	<b>114.28</b>	<b>109.72</b>	<b>105.19</b>	<b>100.68</b>	<b>96.22</b>	<b>91.78</b>	<b>87.39</b>	<b>83.03</b>	<b>59.23</b>	<b>60.03</b>	<b>60.89</b>	<b>61.79</b>	<b>62.74</b>	<b>63.75</b>	<b>64.82</b>	<b>65.95</b>	<b>67.14</b>	<b>68.40</b>	<b>69.73</b>	<b>71.14</b>	<b>72.63</b>	<b>74.20</b>	<b>75.87</b>	

Levillised tariff corresponding to Useful life

Per Unit Cost of Generation	Unit	Levillise	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		0.29	0.31	0.33	0.35	0.37	0.39	0.41	0.43	0.46	0.48	0.51	0.54	0.57	0.60	0.64	0.67	0.71	0.75	0.80	0.84	0.89	0.94	0.99	1.05	1.11
Depreciation	Rs/kWh		1.38	1.38	1.38	1.38	1.38	1.38	1.38	1.38	1.38	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26
Int. on term loan	Rs/kWh		1.80	1.61	1.42	1.23	1.04	0.85	0.66	0.47	0.28	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	0.00	0.00
Int. on working capital	Rs/kWh		0.11	0.11	0.11	0.10	0.10	0.10	0.09	0.09	0.09	0.08	0.07	0.07	0.07	0.07	0.07	0.07	0.08	0.08	0.08	0.08	0.09	0.09	0.09	0.09	0.10
RoE	Rs/kWh		1.12	1.12	1.12	1.12	1.12	1.12	1.12	1.12	1.12	1.12	1.42	1.42	1.42	1.42	1.42	1.42	1.42	1.42	1.42	1.42	1.42	1.42	1.42	1.42	1.42
<b>Total COG</b>	<b>Rs/kWh</b>	<b>3.78</b>	<b>4.70</b>	<b>4.52</b>	<b>4.35</b>	<b>4.18</b>	<b>4.00</b>	<b>3.83</b>	<b>3.66</b>	<b>3.49</b>	<b>3.33</b>	<b>3.16</b>	<b>2.25</b>	<b>2.28</b>	<b>2.32</b>	<b>2.35</b>	<b>2.39</b>	<b>2.43</b>	<b>2.47</b>	<b>2.51</b>	<b>2.55</b>	<b>2.60</b>	<b>2.65</b>	<b>2.71</b>	<b>2.76</b>	<b>2.82</b>	<b>2.89</b>

Discount Factor			1	0.861	0.740	0.637	0.548	0.472	0.406	0.349	0.301	0.259	0.223	0.192	0.165	0.142	0.122	0.105	0.090	0.078	0.067	0.058	0.050	0.043	0.037	0.032	0.027
<b>Levillised Tariff</b>	<b>3.78</b>	<b>Rs/Unit</b>																									

**Determination of Accelerated Depreciation for Wind Power Projects**

Depreciation amount	90%
Book Depreciation rate	5.28%
Tax Depreciation rate	80%
Income Tax (Normal Rates)	32.445%
Capital Cost	516.94

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	%	2.64%	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%	2.88%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Book Depreciation	Rs Lakh	13.65	27.29	27.29	27.29	27.29	27.29	27.29	27.29	27.29	27.29	27.29	27.29	27.29	27.29	27.29	27.29	27.29	14.89	0.00	0.00	0.00	0.00	0.00	0.00	0.00

**Accelerated Depreciation**

Opening	%	100%	60%	12%	2%	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	%	40%	48%	10%	2%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Closing	%	60%	12%	2%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Accelerated Depm.	Rs Lakh	206.78	248.13	49.63	9.93	1.99	0.40	0.08	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

Net Depreciation Benefit	Rs Lakh	193.13	220.84	22.33	-17.37	-25.31	-26.90	-27.22	-27.28	-27.29	-27.29	-27.29	-27.29	-27.29	-27.29	-27.29	-27.29	-27.29	-14.89	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tax Benefit	Rs Lakh	62.66	71.65	7.25	-5.64	-8.21	-8.73	-8.83	-8.85	-8.85	-8.86	-8.86	-8.86	-8.86	-8.86	-8.86	-8.86	-8.86	-4.83	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Energy generation	MU	1.31	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
Discounting Factor		1.00	0.93	0.80	0.69	0.59	0.51	0.44	0.38	0.32	0.28	0.24	0.21	0.18	0.15	0.13	0.11	0.10	0.08	0.07	0.06	0.05	0.05	0.04	0.03	0.03

<b>Levelling benefit</b>	<b>0.54</b>	<b>Rs/Unit</b>
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**Annexure – 2A**  
**(SHP above 1 MW and upto and including 5 MW)**

**1.1 Form Template for (above 1 MW upto 5 MW) Assumptions Parameters**

S. No.	Assumption Head	Sub-Head	Sub-Head (2)	Unit	Maharashtra
					<b>&gt;1 MW up to and including 5 MW</b>
1	Power Generation	Capacity	Installed Power Generation Capacity Capacity Utilization Factor Auxiliary Consumption Useful Life	MW % % Years	1 30% 1% 35
2	Project Cost	Capital Cost/MW	Power Plant Cost	Rs Lacs/MW	552.21
3	Financial Assumption	<u>Debt: Equity</u>	Tariff Period Debt Equity Total Debt Amount Total Equity Amount	Years % % Rs Lacs Rs Lacs	35 70% 30% 386.55 165.66
		<u>Debt Component</u>	Loan Amount Repayment Period(incl Moratorium) Intrest Rate	Rs Lacs years %	387 10 13.73%
		<u>Equity Component</u>	Equity amount Return on Equity for first 10 years RoE Period Return on Equity 11th year onwards Discount Rate (equiv. to WACC) 11th year onwards	Rs Lacs % p.a Year % p.a %	165.66 19% 10 24.00% 16.38%
4	Financial Assumptions	<u>Fiscal Assumptions</u>	Income Tax MAT Rate (for first 10 years) 80 IA benefits	% % Yes/No	32.445% 20.008% Yes
		<u>Depreciation</u>	Depreciation Rate for first 10 years Depreciation Rate 11th year onwards	% %	7.00% 0.80%
5	Working Capital	<u>For Fixed Charges</u>			
		O&M Charges		Months	1
		Maintenance Spare	(% of O&M exepenses)		15%
		Receivables for Debtors		Months	2
		Intrest On Working Capital		%	13.23%
6	Operation & Maintenance	O&M Expense power plant (FY 12-13)	% of base capital cost		20.08
		Total O & M Expenses	Escalation	%	5.72%

Form 1.2 Form Template for SHP (1 MW to 5 MW) : 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	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	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		20.08	21.23	22.44	23.73	25.08	26.52	28.04	29.64	31.33	33.13	35.02	37.02	39.14	41.38	43.75	46.25	48.90	51.69	54.65	57.78	61.08	64.57	68.27	72.17	76.30	80.67	85.28	90.16	95.32	100.77	106.53	112.63	119.07	125.88	133.08	
Depreciation	Rs Lakh		38.65	38.65	38.65	38.65	38.65	38.65	38.65	38.65	38.65	38.65	4.42	4.42	4.42	4.42	4.42	4.42	4.42	4.42	4.42	4.42	4.42	4.42	4.42	4.42	4.42	4.42	4.42	4.42	4.42	4.42	4.42	4.42	4.42	4.42	4.42	4.42
Interest on term loan	Rs Lakh		50.42	45.11	39.80	34.50	29.19	23.88	18.58	13.27	7.96	2.65	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Interest on working Capital	Rs Lakh		3.80	3.75	3.69	3.64	3.60	3.55	3.52	3.48	3.46	3.43	2.89	3.00	3.11	3.24	3.36	3.50	3.64	3.79	3.95	4.12	4.30	4.49	4.69	4.90	5.12	5.36	5.61	5.87	6.15	6.45	6.76	7.09	7.44	7.81	8.20	
Return on Equity	Rs Lakh		31.48	31.48	31.48	31.48	31.48	31.48	31.48	31.48	31.48	31.48	39.76	39.76	39.76	39.76	39.76	39.76	39.76	39.76	39.76	39.76	39.76	39.76	39.76	39.76	39.76	39.76	39.76	39.76	39.76	39.76	39.76	39.76	39.76	39.76	39.76	39.76
<b>Total Fixed Cost</b>	<b>Rs Lakh</b>		<b>144.43</b>	<b>140.22</b>	<b>136.07</b>	<b>132.00</b>	<b>128.00</b>	<b>124.09</b>	<b>120.26</b>	<b>116.52</b>	<b>112.88</b>	<b>109.34</b>	<b>82.09</b>	<b>84.20</b>	<b>86.43</b>	<b>88.79</b>	<b>91.29</b>	<b>93.93</b>	<b>96.72</b>	<b>99.66</b>	<b>102.78</b>	<b>106.08</b>	<b>109.56</b>	<b>113.24</b>	<b>117.14</b>	<b>121.25</b>	<b>125.60</b>	<b>130.20</b>	<b>135.07</b>	<b>140.21</b>	<b>145.65</b>	<b>151.39</b>	<b>157.47</b>	<b>163.89</b>	<b>170.68</b>	<b>177.86</b>	<b>185.45</b>	

Levillised tariff corresponding to Useful life

Per Unit Cost of Generation	Unit	Levillise	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	
O&M expn	Rs/kWh		0.77	0.82	0.86	0.91	0.96	1.02	1.08	1.14	1.20	1.27	1.35	1.42	1.50	1.59	1.68	1.78	1.88	1.99	2.10	2.22	2.35	2.48	2.62	2.77	2.93	3.10	3.28	3.47	3.66	3.87	4.09	4.33	4.58	4.84	5.12	
Depreciation	Rs/kWh		1.49	1.49	1.49	1.49	1.49	1.49	1.49	1.49	1.49	1.49	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17
Int. on term loan	Rs/kWh		1.94	1.73	1.53	1.33	1.12	0.92	0.71	0.51	0.31	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	0.00	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		0.15	0.14	0.14	0.14	0.14	0.14	0.14	0.13	0.13	0.13	0.11	0.12	0.12	0.12	0.13	0.13	0.14	0.15	0.15	0.16	0.17	0.17	0.18	0.19	0.20	0.21	0.22	0.23	0.24	0.25	0.26	0.27	0.29	0.30	0.32	
RoE	Rs/kWh		1.21	1.21	1.21	1.21	1.21	1.21	1.21	1.21	1.21	1.21	1.53	1.53	1.53	1.53	1.53	1.53	1.53	1.53	1.53	1.53	1.53	1.53	1.53	1.53	1.53	1.53	1.53	1.53	1.53	1.53	1.53	1.53	1.53	1.53	1.53	1.53
<b>Total COG</b>	<b>Rs/kWh</b>	<b>4.76</b>	<b>5.55</b>	<b>5.39</b>	<b>5.23</b>	<b>5.07</b>	<b>4.92</b>	<b>4.77</b>	<b>4.62</b>	<b>4.48</b>	<b>4.34</b>	<b>4.20</b>	<b>3.16</b>	<b>3.24</b>	<b>3.32</b>	<b>3.41</b>	<b>3.51</b>	<b>3.61</b>	<b>3.72</b>	<b>3.83</b>	<b>3.95</b>	<b>4.08</b>	<b>4.21</b>	<b>4.35</b>	<b>4.50</b>	<b>4.66</b>	<b>4.83</b>	<b>5.00</b>	<b>5.19</b>	<b>5.39</b>	<b>5.60</b>	<b>5.82</b>	<b>6.05</b>	<b>6.30</b>	<b>6.56</b>	<b>6.84</b>	<b>7.13</b>	

Discount Factor			1	0.859	0.738	0.634	0.545	0.468	0.402	0.346	0.297	0.255	0.219	0.188	0.162	0.139	0.120	0.103	0.088	0.076	0.065	0.056	0.048	0.041	0.036	0.031	0.026	0.023	0.019	0.017	0.014	0.012	0.011	0.009	0.008	0.007	0.006
<b>Levillised Tariff</b>	<b>4.76</b>	<b>Rs/Unit</b>																																			

**Determination of Accelerated Depreciation**

Depreciation amount	90%
Book Depreciation rate	5.28%
Tax Depreciation rate	80%
Income Tax (Normal Rates)	32.445%
Capital Cost	552.2

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	%	2.64%	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%	2.88%	0.00%	0.00%	0.00%	0.00%	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	14.58	29.16	29.16	29.16	29.16	29.16	29.16	29.16	29.16	29.16	29.16	29.16	29.16	29.16	29.16	29.16	29.16	15.90	0.00	0.00	0.00	0.00	0.00	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%	60%	12%	2%	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%	0%	0%	0%	0%	0%
Allowed during the year	%	40%	48.00%	9.60%	1.92%	0.38%	0.08%	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%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Closing	%	60%	12%	2.40%	0.48%	0.10%	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%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Accelerated Depm.	Rs Lakh	220.88	265.06	53.01	10.60	2.12	0.42	0.08	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	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Net Depreciation Benefit	Rs Lakh	206.31	235.90	23.86	-18.55	-27.04	-28.73	-29.07	-29.14	-29.15	-29.16	-29.16	-29.16	-29.16	-29.16	-29.16	-29.16	-29.16	-15.90	0.00	0.00	0.00	0.00	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	66.94	76.54	7.74	-6.02	-8.77	-9.32	-9.43	-9.45	-9.46	-9.46	-9.46	-9.46	-9.46	-9.46	-9.46	-9.46	-9.46	-5.16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Energy generation	MU	1.30	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60
Discounting Factor		1.00	0.93	0.80	0.68	0.59	0.51	0.43	0.37	0.32	0.28	0.24	0.20	0.17	0.15	0.13	0.11	0.10	0.08	0.07	0.06	0.05	0.04	0.04	0.03	0.03	0.02	0.02	0.02	0.02	0.02	0.01	0.01	0.01	0.01

<b>Levellised benefit</b>	<b>0.58</b>	<b>Rs/Unit</b>
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**Annexure – 2B  
(above 5 MW to 25 MW)**

**1.1 Form Template for (above 5 MW upto 25 MW) Assumptions Parameters**

S. No.	Assumption Head	Sub-Head	Sub-Head (2)	Unit	Maharashtra
					above 5 MW to 25 MW
1	Power Generation	Capacity	Installed Power Generation Capacity Capacity Utilization Factor Auxiliary Consumption Useful Life	MW % % Years	1 30% 1% 35
2	Project Cost	Capital Cost/MW	Power Plant Cost	Rs Lacs/MW	502.41
3	Financial Assumption	<u>Debt: Equity</u>  <u>Debt Component</u>  <u>Equity Component</u>	Tariff Period  Debt Equity Total Debt Amount Total Equity Amount  Loan Amount Repayment Period(incl. Moratorium) Interest Rate  Equity amount Return on Equity for first 10 years RoE Period Return on Equity 11th year onwards Discount Rate (equiv. to WACC) 11th year onwards	Years  % % Rs Lacs Rs Lacs  Rs Lacs years %  Rs Lacs % p.a Year % p.a %	13  70% 30% 351.69 150.72  352 10 13.73%  150.72 19% 10 24.00% 16.38%
4	Financial Assumptions	<u>Fiscal Assumptions</u>  <u>Depreciation</u>	Income Tax MAT Rate (for first 10 years) 80 IA benefits  Depreciation Rate for first 10 years Depreciation Rate 11th year onwards	% % Yes/No  % %	32.445% 20.008% Yes  7.00% 0.80%
5	Working Capital	<u>For Fixed Charges</u> O&M Charges Maintenance Spare Receivables for Debtors Interest On Working Capital	(% of O&M expenses)	Months  Months %	1 15% 2 13.23%
6	Operation & Maintenance	O&M Expense power plant (FY 12-13)  Total O & M Expenses Escalation	% of base capital cost		14.18  5.72%

Form 1.2 Form Template for SHP (5 MW to 25 MW) : 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	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	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		14.18	14.99	15.85	16.76	17.71	18.73	19.80	20.93	22.13	23.39	24.73	26.15	27.64	29.22	30.89	32.66	34.53	36.50	38.59	40.80	43.13	45.60	48.21	50.97	53.88	56.96	60.22	63.67	67.31	71.16	75.23	79.53	84.08	88.89	93.98	
Depreciation	Rs Lakh		35.17	35.17	35.17	35.17	35.17	35.17	35.17	35.17	35.17	35.17	4.02	4.02	4.02	4.02	4.02	4.02	4.02	4.02	4.02	4.02	4.02	4.02	4.02	4.02	4.02	4.02	4.02	4.02	4.02	4.02	4.02	4.02	4.02	4.02	4.02	4.02
Interest on term loan	Rs Lakh		45.87	41.04	36.21	31.39	26.56	21.73	16.90	12.07	7.24	2.41	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Interest on working Capital	Rs Lakh		3.24	3.18	3.11	3.05	3.00	2.94	2.89	2.84	2.80	2.76	2.72	2.68	2.64	2.60	2.56	2.52	2.48	2.44	2.40	2.36	2.32	2.28	2.24	2.20	2.16	2.12	2.08	2.04	2.00	1.96	1.92	1.88	1.84	1.80	1.76	1.72
Return on Equity	Rs Lakh		28.64	28.64	28.64	28.64	28.64	28.64	28.64	28.64	28.64	28.64	36.17	36.17	36.17	36.17	36.17	36.17	36.17	36.17	36.17	36.17	36.17	36.17	36.17	36.17	36.17	36.17	36.17	36.17	36.17	36.17	36.17	36.17	36.17	36.17	36.17	
<b>Total Fixed Cost</b>	<b>Rs Lakh</b>		<b>127.10</b>	<b>123.02</b>	<b>118.98</b>	<b>115.00</b>	<b>111.07</b>	<b>107.20</b>	<b>103.40</b>	<b>99.65</b>	<b>95.98</b>	<b>92.37</b>	<b>88.66</b>	<b>84.70</b>	<b>80.74</b>	<b>76.77</b>	<b>72.79</b>	<b>68.80</b>	<b>64.80</b>	<b>60.79</b>	<b>56.77</b>	<b>52.74</b>	<b>48.70</b>	<b>44.65</b>	<b>40.59</b>	<b>36.52</b>	<b>32.44</b>	<b>28.35</b>	<b>24.25</b>	<b>20.14</b>	<b>16.02</b>	<b>11.89</b>	<b>7.75</b>	<b>3.60</b>	<b>-0.55</b>	<b>-4.70</b>	<b>-9.84</b>	

Levillised tariff corresponding to Useful life

Per Unit Cost of Generation	Unit	Levillise	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	
O&M expn	Rs/kWh		0.55	0.58	0.61	0.64	0.68	0.72	0.76	0.80	0.85	0.90	0.95	1.00	1.06	1.12	1.19	1.26	1.33	1.40	1.48	1.57	1.66	1.75	1.85	1.96	2.07	2.19	2.31	2.45	2.59	2.74	2.89	3.06	3.23	3.42	3.61	
Depreciation	Rs/kWh		1.35	1.35	1.35	1.35	1.35	1.35	1.35	1.35	1.35	1.35	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15
Int. on term loan	Rs/kWh		1.76	1.58	1.39	1.21	1.02	0.84	0.65	0.46	0.28	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	0.00	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	0.12	0.12	0.12	0.12	0.11	0.11	0.11	0.11	0.11	0.09	0.09	0.09	0.10	0.10	0.10	0.11	0.11	0.12	0.12	0.12	0.13	0.14	0.14	0.15	0.15	0.16	0.17	0.17	0.18	0.19	0.20	0.21	0.22	0.23	
RoE	Rs/kWh		1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.39	1.39	1.39	1.39	1.39	1.39	1.39	1.39	1.39	1.39	1.39	1.39	1.39	1.39	1.39	1.39	1.39	1.39	1.39	1.39	1.39	1.39	1.39	1.39	1.39	
<b>Total COG</b>	<b>Rs/kWh</b>	<b>4.09</b>	<b>4.89</b>	<b>4.73</b>	<b>4.57</b>	<b>4.42</b>	<b>4.27</b>	<b>4.12</b>	<b>3.97</b>	<b>3.83</b>	<b>3.69</b>	<b>3.55</b>	<b>2.58</b>	<b>2.64</b>	<b>2.70</b>	<b>2.76</b>	<b>2.83</b>	<b>2.90</b>	<b>2.98</b>	<b>3.06</b>	<b>3.14</b>	<b>3.23</b>	<b>3.33</b>	<b>3.43</b>	<b>3.53</b>	<b>3.64</b>	<b>3.76</b>	<b>3.89</b>	<b>4.02</b>	<b>4.16</b>	<b>4.31</b>	<b>4.46</b>	<b>4.63</b>	<b>4.80</b>	<b>4.99</b>	<b>5.18</b>	<b>5.39</b>	

Discount Factor			1	0.859	0.738	0.634	0.545	0.468	0.402	0.346	0.297	0.255	0.219	0.188	0.162	0.139	0.120	0.103	0.088	0.076	0.065	0.056	0.048	0.041	0.036	0.031	0.026	0.023	0.019	0.017	0.014	0.012	0.011	0.009	0.008	0.007	0.006
<b>Levillised Tariff</b>	<b>4.09</b>	<b>Rs/Unit</b>																																			



**Determination of Accelerated Depreciation**

Depreciation amount	90%
Book Depreciation rate	5.28%
Tax Depreciation rate	80%
Income Tax (Normal Rates)	32.445%
Capital Cost	502.4

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	%	2.64%	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%	2.88%	0.00%	0.00%	0.00%	0.00%	0.00%	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	13.26	26.53	26.53	26.53	26.53	26.53	26.53	26.53	26.53	26.53	26.53	26.53	26.53	26.53	26.53	26.53	26.53	14.47	0.00	0.00	0.00	0.00	0.00	0.00	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%	60%	12%	2%	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%	0%	0%	0%	0%	0%	0%	
Allowed during the year	%	40%	48.00%	9.60%	1.92%	0.38%	0.08%	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%	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	%	60%	12%	2.40%	0.48%	0.10%	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%	0.00%	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 Deprn.	Rs Lakh	200.96	241.16	48.23	9.65	1.93	0.39	0.08	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	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	187.70	214.63	21.70	-16.88	-24.60	-26.14	-26.45	-26.51	-26.52	-26.53	-26.53	-26.53	-26.53	-26.53	-26.53	-26.53	-26.53	-14.47	0.00	0.00	0.00	0.00	0.00	0.00	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	60.90	69.64	7.04	-5.48	-7.98	-8.48	-8.58	-8.60	-8.61	-8.61	-8.61	-8.61	-8.61	-8.61	-8.61	-8.61	-8.61	-4.69	0.00	0.00	0.00	0.00	0.00	0.00	0.00	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	1.30	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60
Discounting Factor		1.00	0.93	0.80	0.68	0.59	0.51	0.43	0.37	0.32	0.28	0.24	0.20	0.17	0.15	0.13	0.11	0.10	0.08	0.07	0.06	0.05	0.04	0.04	0.03	0.03	0.02	0.02	0.02	0.02	0.01	0.01	0.01	0.01	0.01	0.01	0.01	

**Levellised benefit**      **0.53**      **Rs/Unit**

**Annexure – 3  
(Solar PV)**

**Form 1.1 Form Template for (Solar PV Power Projects) Parameters Assumptions**

S. No.	Assumption Head	Sub-Head	Sub-Head (2)	Unit	Asumptions
1	Power Generation	Capacity	Installed Power Generation Capacity	MW	1
			Capacity Utilization Factor	%	19.0%
			Useful Life	Years	25
2	Project Cost	Capital Cost/MW	Power Plant Cost	Rs Lacs/MW	1000
3	Financial Assumptions		Tariff Period	Years	25
			<u>Debt: Equity</u>		
			Debt	%	70%
			Equity	%	30%
			Total Debt Amount	Rs Lacs	700
			Total Equity Amout	Rs Lacs	300
			<u>Debt Component</u>		
			Loan Amount	Rs Lacs	700.00
			Repayment Period(incld Moratorium)	years	10
			Interest Rate	%	13.73%
			<u>Equity Component</u>		
			Equity amount	Rs Lacs	300.00
			Return on Equity for first 10 years	% p.a	19.00%
RoE Period	Year	10			
Return on Equity 11th year onwards	% p.a	24.00%			
Weighted average of ROE		22.00%			
Discount Rate		16.21%			
4	Financial Assumptions	<u>Fiscal Assumptions</u>	Income Tax	%	32.45%
			MAT Rate (for first 10 years)	%	20.01%
			80 IA benefits	Yes/No	Yes
			<u>Depreciation</u>		
			Depreciation Rate for first 10 years	%	7.00%
Depreciation Rate 11th year onwards	%	1.33%			
Years for 7% rate		10			
5	Working Capital		<u>For Fixed Charges</u>		
			O&M Charges	Months	1
			Maintenance Spare	(% of O&M exepenses)	15%
			Receivables for Debtors	Months	2
			<u>For Variable Charges</u>		
Interest On Working Capital	%	13.23%			
7	Operation & Maintenance		power plant (FY 10-11)	Rs Lakh	9.51
			power plant (FY 12-13)	Rs Lacs	10.63
			Total O & M Expenses Escalation	%	5.72%

Form 1.2 Form Template for (Solar PV) - Determination of Tariff Component

Discount Factor			1	0.861	0.740	0.637	0.548	0.472	0.406	0.349	0.301	0.259	0.223	0.192	0.165	0.142	0.122	0.105	0.090	0.078	0.067	0.058	0.050	0.043	0.037	0.032	0.027
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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 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		10.63	11.24	11.88	12.56	13.28	14.04	14.84	15.69	16.59	17.54	18.54	19.60	20.72	21.91	23.16	24.48	25.88	27.37	28.93	30.59	32.34	34.18	36.14	38.21	40.39
Depreciation	Rs Lakh		70.00	70.00	70.00	70.00	70.00	70.00	70.00	70.00	70.00	70.00	13.33	13.33	13.33	13.33	13.33	13.33	13.33	13.33	13.33	13.33	13.33	13.33	13.33	13.33	13.33
Interest on term loan	Rs Lakh		91.30	81.69	72.08	62.47	52.86	43.25	33.64	24.03	14.42	4.81	0.00	0.00	0.00	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 Capit	Rs Lakh		5.50	5.31	5.13	4.95	4.77	4.60	4.43	4.25	4.09	3.92	2.93	2.98	3.05	3.11	3.18	3.25	3.32	3.40	3.49	3.58	3.67	3.77	3.88	3.99	4.11
Return on Equity	Rs Lakh		57.00	57.00	57.00	57.00	57.00	57.00	57.00	57.00	57.00	72.00	72.00	72.00	72.00	72.00	72.00	72.00	72.00	72.00	72.00	72.00	72.00	72.00	72.00	72.00	72.00
<b>Total Fixed Cost</b>	<b>Rs Lakh</b>		<b>234.43</b>	<b>225.25</b>	<b>216.10</b>	<b>206.98</b>	<b>197.91</b>	<b>188.89</b>	<b>179.91</b>	<b>170.97</b>	<b>162.09</b>	<b>153.26</b>	<b>106.80</b>	<b>107.92</b>	<b>109.10</b>	<b>110.35</b>	<b>111.67</b>	<b>113.07</b>	<b>114.54</b>	<b>116.10</b>	<b>117.75</b>	<b>119.50</b>	<b>121.34</b>	<b>123.29</b>	<b>125.35</b>	<b>127.53</b>	<b>129.84</b>

Levillised COG

Per Unit Cost of Generati	Unit	Levillised	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		0.64	0.68	0.71	0.75	0.80	0.84	0.89	0.94	1.00	1.05	1.11	1.18	1.24	1.32	1.39	1.47	1.56	1.64	1.74	1.84	1.94	2.05	2.17	2.30	2.43	
Depreciation	Rs/kWh		4.21	4.21	4.21	4.21	4.21	4.21	4.21	4.21	4.21	4.21	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	
Int. on term loan	Rs/kWh		5.49	4.91	4.33	3.75	3.18	2.60	2.02	1.44	0.87	0.29	0.00	0.00	0.00	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		0.33	0.32	0.31	0.30	0.29	0.28	0.27	0.26	0.25	0.24	0.18	0.18	0.18	0.19	0.19	0.20	0.20	0.20	0.21	0.22	0.22	0.23	0.23	0.24	0.25	
RoE	Rs/kWh		3.42	3.42	3.42	3.42	3.42	3.42	3.42	3.42	3.42	3.42	4.33	4.33	4.33	4.33	4.33	4.33	4.33	4.33	4.33	4.33	4.33	4.33	4.33	4.33	4.33	
<b>Total COG</b>	<b>Rs/kWh</b>		<b>11.16</b>	<b>14.09</b>	<b>13.53</b>	<b>12.98</b>	<b>12.44</b>	<b>11.89</b>	<b>11.35</b>	<b>10.81</b>	<b>10.27</b>	<b>9.74</b>	<b>9.21</b>	<b>6.42</b>	<b>6.48</b>	<b>6.55</b>	<b>6.63</b>	<b>6.71</b>	<b>6.79</b>	<b>6.88</b>	<b>6.98</b>	<b>7.07</b>	<b>7.18</b>	<b>7.29</b>	<b>7.41</b>	<b>7.53</b>	<b>7.66</b>	<b>7.80</b>

Discount Factor			1	0.861	0.740	0.637	0.548	0.472	0.406	0.349	0.301	0.259	0.223	0.192	0.165	0.142	0.122	0.105	0.090	0.078	0.067	0.058	0.050	0.043	0.037	0.032	0.027
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<b>Levillised Tariff</b>	<b>11.16</b>	<b>Rs/Unit</b>
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**Determination of Accelerated Depreciation Benefit for Solar PV Power Projects**

Depreciation amount	90%
Book Depreciation rate	5.28%
Tax Depreciation rate	80%
Income Tax (Normal Rates)	32.445%
Capital Cost	1000.0

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		2.64%	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%	2.88%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Book Depreciation	Rs Lakh	26.40	52.80	52.80	52.80	52.80	52.80	52.80	52.80	52.80	52.80	52.80	52.80	52.80	52.80	52.80	52.80	52.80	28.80	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Accelerated Depreciation																										
Opening	%	100%	60%	12%	2%	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	%	40%	48.00%	9.60%	1.92%	0.38%	0.08%	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%	0.00%
Closing	%	60%	12%	2.40%	0.48%	0.10%	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%	0.00%	0.00%
Accelerated Deprn.	Rs Lakh	400.00	480.00	96.00	19.20	3.84	0.77	0.15	0.03	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

Net Depreciation Benefit	Rs Lakh	373.60	427.20	43.20	-33.60	-48.96	-52.03	-52.65	-52.77	-52.79	-52.80	-52.80	-52.80	-52.80	-52.80	-52.80	-52.80	-52.80	-28.80	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tax Benefit	Rs Lakh	121.21	138.61	14.02	-10.90	-15.89	-16.88	-17.08	-17.12	-17.13	-17.13	-17.13	-17.13	-17.13	-17.13	-17.13	-17.13	-17.13	-9.34	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Energy generation	MU	0.83	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	14.57	8.33	0.84	-0.65	-0.95	-1.01	-1.03	-1.03	-1.03	-1.03	-1.03	-1.03	-1.03	-1.03	-1.03	-1.03	-1.03	-0.56	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Discounting Factor		1.00	0.93	0.80	0.69	0.59	0.51	0.44	0.38	0.32	0.28	0.24	0.21	0.18	0.15	0.13	0.11	0.10	0.08	0.07	0.06	0.05	0.05	0.04	0.03	0.03

Levillised benefit	1.65	Rs/Unit
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**Annexure – 4**  
**(Solar thermal)**

**Form 1.1 Form Template for (Solar Thermal Power Projects) Parameters Assumptions**

S. No.	Assumption Head	Sub-Head	Sub-Head (2)	Unit	Assumptions			
1	Power Generation	Capacity	Installed Power Generation Capacity	MW	1			
			Capacity Utilization Factor	%	23.0%			
			Auxiliary Consumption Factor	%	10.0%			
			Useful Life	Years	25			
2	Project Cost	Capital Cost/MW	Power Plant Cost	Rs Lacs/MW	1300			
3	Sources of Fund	Debt: Equity	Tariff Period	Years	25			
			Debt	%	70%			
			Equity	%	30%			
			Total Debt Amount	Rs Lacs	910			
			Total Equity Amount	Rs Lacs	390			
			Debt Component	Loan Amount	Rs Lacs	910.00		
				Repayment Period(incl Moratorium)	years	10		
				Interest Rate	%	13.73%		
			Equity Component	Equity amount	Rs Lacs	390.00		
				Return on Equity for first 10 years	% p.a	19.00%		
				RoE Period	Year	10		
Return on Equity 11th year onwards	% p.a	24.00%						
Discount Rate		16.21%						
4	Financial Assumptions	Economic Assumptions	Coal Price Escalation	% p.a	0%			
			HSD Price Escalation	% p.a	0%			
			Discount Rate	% p.a	16.21%			
			Fiscal Assumptions	Income Tax	%	32.4450%		
				MAT Rate (for first 10 years)	%	20.008%		
				80 IA benefits	Yes/No	Yes		
			Depreciation	Depreciation Rate for first 10 years	%	7.00%		
				Depreciation Rate 11th year onwards	%	1.33%		
				Years for 7% rate		10		
			5	Working Capital	For Fixed Charges	O&M Charges	Months	1
						Maintenance Spare	(% of O&M expenses)	15%
Receivables for Debtors	Months	2						
For Variable Charges	Interest On Working Capital	%				13.23%		
7	Operation & Maintenance	power plant (FY12-13)		Rs Lacs	15.37			
			Total O & M Expenses Escalation	%	5.72%			

Form 1.2 Form Template for (Solar Thermal) - 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		15.37	16.25	17.18	18.16	19.20	20.30	21.46	22.69	23.98	25.36	26.81	28.34	29.96	31.68	33.49	35.40	37.43	39.57	41.83	44.22	46.75	49.43	52.26	55.24	58.40	
Depreciation	Rs Lakh		91.00	91.00	91.00	91.00	91.00	91.00	91.00	91.00	91.00	91.00	17.33	17.33	17.33	17.33	17.33	17.33	17.33	17.33	17.33	17.33	17.33	17.33	17.33	17.33	17.33	17.33
Interest on term loan	Rs Lakh		118.70	106.20	93.71	81.21	68.72	56.22	43.73	31.24	18.74	6.25	0.00	0.00	0.00	0.00	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		7.23	7.00	6.76	6.54	6.31	6.09	5.87	5.65	5.44	5.24	3.95	4.03	4.12	4.22	4.31	4.42	4.53	4.64	4.76	4.89	5.03	5.18	5.33	5.49	5.66	
Return on Equity	Rs Lakh		74.10	74.10	74.10	74.10	74.10	74.10	74.10	74.10	74.10	74.10	93.60	93.60	93.60	93.60	93.60	93.60	93.60	93.60	93.60	93.60	93.60	93.60	93.60	93.60	93.60	
<b>Total Fixed Cost</b>	<b>Rs Lakh</b>		<b>306.40</b>	<b>294.55</b>	<b>282.75</b>	<b>271.01</b>	<b>259.33</b>	<b>247.71</b>	<b>236.16</b>	<b>224.68</b>	<b>213.27</b>	<b>201.94</b>	<b>141.69</b>	<b>143.31</b>	<b>145.02</b>	<b>146.82</b>	<b>148.73</b>	<b>150.75</b>	<b>152.89</b>	<b>155.14</b>	<b>157.53</b>	<b>160.05</b>	<b>162.72</b>	<b>165.54</b>	<b>168.52</b>	<b>171.67</b>	<b>175.00</b>	

Levellised COG

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		0.85	0.90	0.95	1.00	1.06	1.12	1.18	1.25	1.32	1.40	1.48	1.56	1.65	1.75	1.85	1.95	2.06	2.18	2.31	2.44	2.58	2.73	2.88	3.05	3.22
Depreciation	Rs/kWh		5.02	5.02	5.02	5.02	5.02	5.02	5.02	5.02	5.02	5.02	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Int. on term loan	Rs/kWh		6.55	5.86	5.17	4.48	3.79	3.10	2.41	1.72	1.03	0.34	0.00	0.00	0.00	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		0.40	0.39	0.37	0.36	0.35	0.34	0.32	0.31	0.30	0.29	0.22	0.22	0.23	0.23	0.24	0.24	0.25	0.26	0.26	0.27	0.28	0.29	0.29	0.30	0.31
RoE	Rs/kWh		4.09	4.09	4.09	4.09	4.09	4.09	4.09	4.09	4.09	4.09	5.16	5.16	5.16	5.16	5.16	5.16	5.16	5.16	5.16	5.16	5.16	5.16	5.16	5.16	5.16
<b>Total COG</b>	<b>Rs/kWh</b>	<b>13.44</b>	<b>16.90</b>	<b>16.24</b>	<b>15.59</b>	<b>14.95</b>	<b>14.30</b>	<b>13.66</b>	<b>13.02</b>	<b>12.39</b>	<b>11.76</b>	<b>11.14</b>	<b>7.81</b>	<b>7.90</b>	<b>8.00</b>	<b>8.10</b>	<b>8.20</b>	<b>8.31</b>	<b>8.43</b>	<b>8.56</b>	<b>8.69</b>	<b>8.83</b>	<b>8.97</b>	<b>9.13</b>	<b>9.29</b>	<b>9.47</b>	<b>9.65</b>

Levellised Tariff 13.44 Rs/Unit

Determination of Accelerated Depreciation Benefit for Solar Thermal Power Projects

Depreciation amount	90%
Book Depreciation rate	5.28%
Tax Depreciation rate	80%
Income Tax (Normal Rates)	32.4450%
Capital Cost	1300.0

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	%	2.64%	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%	2.88%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Book Depreciation	Rs Lakh	34.32	68.64	68.64	68.64	68.64	68.64	68.64	68.64	68.64	68.64	68.64	68.64	68.64	68.64	68.64	68.64	68.64	37.44	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Accelerated Depreciation																										
Opening	%	100%	60%	12%	2%	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	%	40%	48.00%	9.60%	1.92%	0.38%	0.08%	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%	0.00%
Closing	%	60%	12%	2.40%	0.48%	0.10%	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%	0.00%	0.00%
Accelerated Deprn.	Rs Lakh	520.00	624.00	124.80	24.96	4.99	1.00	0.20	0.04	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

Net Depreciation Benefit	Rs Lakh	485.68	555.36	56.16	-43.68	-63.65	-67.64	-68.44	-68.60	-68.63	-68.64	-68.64	-68.64	-68.64	-68.64	-68.64	-68.64	-68.64	-37.44	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tax Benefit	Rs Lakh	157.58	180.19	18.22	-14.17	-20.65	-21.95	-22.21	-22.26	-22.27	-22.27	-22.27	-22.27	-22.27	-22.27	-22.27	-22.27	-22.27	-12.15	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Energy generation	MU	0.91	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
Discounting Factor		1.00	0.93	0.80	0.69	0.59	0.51	0.44	0.38	0.32	0.28	0.24	0.21	0.18	0.15	0.13	0.11	0.10	0.08	0.07	0.06	0.05	0.05	0.04	0.03	0.03

Levillised benefit	1.97	Rs/Unit
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**List of Stakeholders who submitted written/oral Comments/Suggestions**

<b>Sl. No</b>	<b>Organisation/ Individual</b>
1	Maharashtra State Electricity Distribution Company Ltd
2	Maharashtra State Power Generation Co. Ltd.
3	Tata Power Company Limited
4	Reliance Infrastructure Limited
5	Maharashtra Energy Development Agency
6	Indian Wind Energy Association
7	Indian Wind Turbine Manufacturing Association
8	Maharashtra Biomass Energy Developers Association
9	Indian Biomass Power Association
10	Torrent Power Limited
11	Greenenergy Renewable Pvt. Ltd.
12	Kenersys India Pvt Ltd
13	Regen Power Tech
14	BF Utilities Limited
15	Mahati Hydro Power Project Ltd.
16	Shri T.P. Vartak
17	Kay Power & Paper Ltd.
18	GAPS Power and Infrastructure Pvt. Ltd.
19	Shalivahana Green Energy Ltd.
20	Vindhyachal Hydro Power Limited
21	GE Energy-India Limited



**List of participants of Public Hearing held on March 07, 2012**

<b>Sr.No.</b>	<b>Name</b>
1	Mr. S.S Dhande
2	Mr. M.S.Kele
3	Mr. T.P.Vartak
4	Mr. Sanjay Joshi
5	Mr. Ankit Chabra
6	Ms. Ruchika Chawala
7	Mr.Prasad G. Narnaware
8	Mr.Rahul Vikram
9	Mr.Neeraj Singh Gautam
10	Mr.Mahesh Vipradas
11	Mr.Rakesh Garg
12	Ms. Shruti Bhatia
13	Mr.A. Gurunathan
14	Mr.S. S. Dhande
15	Mr.Anil V. Kale
16	Mr.Santosh Singh
17	Mr.Abhijit Dhamdhere
18	Mr.V. K. Rokade
19	Mr.Anil Kelkar
20	Mr.Abhishek Moza
21	Mr.Rajiv
22	Mr.R. G. Sonawane
23	Mr.B. K. Soni
24	Mr.R. V. Goenka
25	Mr.Kedar Deshpande
26	Manoj Pise
27	Mr.S.R. Chandhani
28	Mr.S.A. Patil
29	Mr. A. A. Kulag
30	Mr. G.J. Girase
31	Mr. Arvind Patil

<b>Sr.No.</b>	<b>Name</b>
32	Mr. M. N. Ramchandra
33	Mr. Ravindra Kadam
34	Mr. R. R. Kulkarni
35	Mr. Subhash
36	Mr. Ishwar A.
37	Mr. N.J. Dadarkar
38	Mr. Venkatesh Sonti
39	Mr. Varun Mehta
40	Mr.Kishir Shirsat
41	Mr. S.S. Jadhav
42	Mr. C. Nikubh
43	Mr. J. Bagrodia
44	Mr. P. N Tahilramani
45	Mr. P. G. Narnaware
46	Mr. Sriram R
47	Mr. Avinash Sani
48	Mr. Ramesh Sharma
49	Mr. Sameer Mathur
50	Ms. Pankhuri Bhardwaj
51	Ms. Swapnali Mainkar
52	Ms. Bhavana Chaudhary
53	Ms. Asmita Patil
54	Mr. Jagadish F.
55	Mr. Sharan Jagtiani
56	Mr. Abhishek Khare
57	Mr. Girish Rane
58	Mr. Abhinav Sharma
59	Mr. Dayanand Suryavanshi
60	Mr. Chirag Vora
61	Mr. S A Chawala
62	Mr. M G Joshi
63	Mr. M. A. Patil
64	Smt.Deshragu Rekha