

Chhattisgarh State Electricity Regulatory Commission
Irrigation Colony, Shanti Nagar,
Raipur, Dated March 29, 2011

Chhattisgarh State Electricity Regulatory Commission (Terms and conditions for determination of generation tariff and related matters for electricity generated by plants based on renewable energy sources) Regulations, 2011

Govt. of India is giving thrust to develop renewable source of energy being environment friendly in nature. Also the Electricity Act 2003 provides for policy formulation by the Government of India and mandates State Electricity Regulatory Commissions (SERCs) to take steps to promote renewable sources of energy within their area of jurisdiction.

The Central Electricity Regulatory Commission (CERC) has notified the CERC (Terms and Conditions for Tariff determination from Renewable Energy Sources), Regulations, 2009 under which tariff determination aspects for various renewable energy technologies, has been discussed. Although these Regulations are applicable for central sector and inter-State generation projects, under Section 61 of EA 2003, however these can be considered as guiding factor for SERCs while dealing with matters related to energy generation from RE sources.

Centre of Wind Energy Technology (CWET) has identified few sites in the Chhattisgarh State, wherein wind energy potential can be harnessed for power generation, which needs suitable tariff to attract the investors in this sector.

Keeping the above in view and in exercise of powers vested under section 61, 66, 86 read with Section 181 of the Electricity Act 2003 (36 of 2003) and all other powers enabling it in this behalf, the Chhattisgarh State Electricity Regulatory Commission (the Commission) hereby makes the following Regulations specifying the terms and conditions of tariff for wind based electricity generating stations, small hydro electricity generating stations,

biomass based electricity generating stations and solar based electricity generating stations for the purpose of sale of power to distribution licensees. After notification of these regulations the previous regulations namely Chhattisgarh State Electricity Regulatory Commission (Terms and conditions for determination of generation tariff and related matters for electricity generated by plants based on non-conventional sources of energy) Regulations, 2008 shall stand repealed subject to the provisions in Regulation 77 of these Regulations of 2011.

1. Short title and commencement

- 1.1 These Regulations may be called the Chhattisgarh State Electricity Regulatory Commission (Terms and conditions for determination of generation tariff and related matters for electricity generated by plants based renewable energy sources) Regulations, 2011.
- 1.2 These Regulations shall come into force from April 01, 2011 or the date of their publication in the Chhattisgarh Rajpatra, whichever is earlier.
- 1.3 These Regulations shall extend to the whole of the State of Chhattisgarh and shall be applicable to renewable energy based generating stations established in the state.

2. Definitions and Interpretation

- 2.1 In these Regulations, unless the context otherwise requires:
 - a) "**Act**" means the Electricity Act, 2003 (36 of 2003), as amended from time to time;
 - b) "**Auxiliary Energy Consumption**" or 'AUX' in relation to a period means the quantum of energy consumed by auxiliary equipments of the generating station and transformer losses within the generating station, and shall be expressed as a percentage of the sum of gross energy generated at the generator terminals of all the units, combined or separately of the generating station;
 - c) "**Biomass**" means wastes produced during agricultural and forestry operations (for example straws and stalks) or produced as a by-product of processing operations of agricultural produce (e.g., husks, shells, deoiled cakes, etc); wood produced in dedicated energy plantations or recovered from wild bushes/weeds; and the wood waste produced in some industrial

operations or as specified by Ministry of New and Renewable Energy from time to time;

- d) **"Capacity Utilization Factor"** or **"CUF"** for a given period, means the total electricity sent out corresponding to actual generation during the reference period, expressed as a percentage of sent out electricity corresponding to installed capacity in that reference period and shall be computed in accordance with the following formula;

$$\text{CUF} = \frac{\text{Gross generation over the reference period} \times 100\%}{\text{Installed capacity} \times \text{total hours during the reference period (including outage hours)}}$$

- e) **"Capital Cost"** means as defined in the regulation 12, 24, 28, 35 and 50 for the respective renewable energy source.
- f) **"CERC"** means the Central Electricity Regulatory Commission;
- g) **"Commission"** means the Chhattisgarh State Electricity Regulatory Commission;
- h) **"Commissioning"** means all systems and components of a industrial plant are designed, installed, tested and operated according to the operational requirements of the owner or final client. A commissioning process may be applied not only to new projects but also to existing units and systems subject to expansion, renovation or revamping.
- i) **"Cutoff Date"** means the date of the first financial year closing after one year of the date of commercial operation of the generating station;
- j) **Control Period** or **Review Period** means the period during which the norms for determination of tariff specified in these regulation shall remain valid;
- k) **"Date of Commercial Operation"** or **"COD"** means
- i. in relation to a unit or block of the thermal generating station, the date declared by the generating company after demonstrating the maximum continuous rating (MCR) or the installed capacity (IC) through a successful trial run after notice to the beneficiaries, from 00:00 hour of which scheduling process as per the Indian Electricity Grid Code (IEGC) / CG State Grid Code is fully implemented, and in relation to the generating station as a whole, the date of commercial operation of the last unit or the block of the generating station.
 - ii. in relation to a unit of hydro generating station, the date declared by the

generating company from 00:00 hour of which, after notice to the beneficiaries. Scheduling process in accordance with the CG State Grid Code is fully implemented, and in relation to the generating station as a whole, the date declared by the generating company after demonstrating peaking capability corresponding to installed capacity of the generating station through a successful trial run, after notice to the beneficiaries.

Note

1. In case the hydro generating station with pondage or storage is not able to demonstrate peaking capability corresponding to the installed capacity for the reasons of insufficient reservoir or pond level, the date of commercial operation of the last unit of the generating station shall be considered as the date of commercial operation of the generating station as a whole, provided that it will be mandatory for such hydro generating station to demonstrate peaking capability equivalent to installed capacity of the generating unit or the generating station as and when such reservoir /pond level is achieved.

 2. In case of purely run-of-river hydro generating station if the unit or the generating station is declared under commercial operation during lean inflows period when the water is not sufficient for such demonstration, it shall be mandatory for such hydro generating station or unit to demonstrate peaking capability equivalent to installed capacity as and when sufficient inflow is available
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- l) **"Financial Year"** means a period commencing on 1st day of April of a calendar year and ending on 31st March of the subsequent calendar year;
- m) **"Firm Power"** In relation to **biomass based generating plant** means supply of electricity after COD which is equal or more than the % as decided by the Commission from time to time, however, energy supplied more than 100% of the scheduled energy, on annualized basis, will not be treated as firm power. In relation to **small hydro-generating stations, wind, solar** it means any electricity supplied from and after the COD if the entire generated electricity is supplied to a distribution licensee(s).
- n) **"Gross Calorific Value"** or **'GCV'** in relation to a fuel used in generating station means the heat produced in KCal by complete combustion of one kilogram of solid fuel or one lit of liquid fuel or one standard cubic meter of gaseous fuel, as the case may be;

- o) **"Gross Station Heat Rate" or "GSHR"** means the heat energy input in kCal required to generate one kWh of electrical energy at generator terminals;
- p) **Hybrid Solar Thermal Power Plants** means the solar thermal power plant that uses other forms of energy input sources alongwith solar thermal energy for electricity generation, and wherein not less than 75% of electricity is generated from solar energy component.
- q) **"Infirm Power"** means electricity generated prior to declaration of date of commercial operation of generating station/ unit;
- r) **"Installed Capacity" or "IC"** means the summation of the name plate capacities of all the units of the generating station or the capacity of the generating station (reckoned / tested at the generator terminals), as approved by the Commission from time to time;
- s) **Inter-connection Point** means interface point of renewable energy generating facility with the transmission system or distribution system, as the case may be:
 - I. in relation to wind energy projects and Solar Photovoltaic Projects, inter-connection point shall be line isolator on outgoing feeder on HV side of the DISCOMs sub-station;
 - II. in relation to small hydro power, biomass power and non fossil fuel based cogeneration power projects and Solar Thermal Power Projects the, inter-connection point shall be line isolator on outgoing feeder on HV side of generator transformer;
- t) **"Licensee"** means a distribution licensee operating in the State;
- u) **"MNRE"** means the Ministry of New & Renewable Energy of Government of India;
- v) **"Maximum Continuous Rating" or "MCR"** in relation to a unit of the thermal generating station based on renewable energy source means the maximum continuous output at the generator terminals, guaranteed by the manufacturer at rated parameters;
- w) **'Mini/Micro Hydro'** means Hydro Power projects with a station capacity from 101 kW & up to 1 MW for mini hydro and up to 100 kW for micro hydro power plants;
- x) **"Non-firm power"** means electricity supplied by biomass-based power generating plants after COD, to a distribution licensee which is less than 70% of the scheduled electricity in a given period. Further electricity

supplied by such generating station above 100% plant load factor on annualized basis shall also be treated as non-firm power. However, in case of other renewable energy plants, there is no concept of Non-firm power.

- y) **"Non fossil fuel based co-generation"** means the process in which more than one form of energy (such as steam and electricity) are produced in a sequential manner by use of biomass provided the project may qualify to be a co-generation project if it fulfills the eligibility criteria as specified in Regulation 4.4;
- z) **"Project / Plant"** means a generating station or the evacuation system upto inter-connection point, as the case may be, and in case of a small hydro generating station includes all components of generating facility such as dam, intake water conductor system, power generating station and generating units of the scheme, as apportioned to power generation;
- aa) **"Renewable Energy Power Plants"** means the power plants other than the conventional power plants generating grid quality electricity from renewable energy sources as approved by MNRE;
- bb) **"Renewable Energy Sources"** means renewable sources such as small hydro, wind, solar including its integration with combined cycle, biomass, bio fuel cogeneration, urban or municipal waste and other such sources as approved by the MNRE;
- cc) **"Scheduled Generation"** at any time or for any period or time block means schedule of generation in MW or MU ex-bus as agreed by the generator and licensee;
- dd) **"Small Hydro Electricity generating station" or "SHP"** means the hydro electricity generating station, above 1 MW and up to including installed capacity of 25 MW;
- ee) **"Solar PV power"** means the Solar Photo Voltaic power project that uses sunlight for direct conversion into electricity through Photo Voltaic technology;
- ff) **"Solar Thermal power"** means the Solar Thermal power project that uses sunlight for direct conversion into electricity through Concentrated Solar Power technology based on either line focus or point focus principle;
- gg) **"State"** means the State of Chhattisgarh;
- hh) **"Tariff period"** means the period for which tariff is to be determined by the Commission on the basis of norms specified under these Regulations;
- ii) **'Useful Life'** in relation to a unit of a generating station including

evacuation system shall mean the following duration from the date of commercial operation of such generation facility, namely;

I.	Wind energy power project	25 years
II.	Small Hydro Plant	35 years
III.	Biomass power project, non-fossil fuel cogeneration	20 years
IV.	Solar PV/Solar thermal power plants	25 years

jj) 'Year' means a financial year;

2.2 Words and expressions used in these Regulations and not defined shall have the same meaning as they have in the Act and in the other Regulations made by the Commission.

3. Scope and extent of application

3.1 These Regulations shall apply for all new Renewable Energy (hereinafter referred to as "RE") projects to be commissioned within the State of Chhattisgarh for generation and sale of electricity from such RE projects to distribution licensees within the Chhattisgarh State subsequent to date of notification of these regulations or April 01, 2011 whichever is earlier and where tariff, for a generating station or a unit thereof based on renewable sources of energy, is to be determined by the Commission under Section 62 read with Section 86 of the Act.

Provided that in case of wind, small hydro projects, biomass power, non-fossil fuel based cogeneration projects, solar PV, Solar Thermal and other small solar power projects, these Regulations shall apply subject to the fulfilment of eligibility criteria specified in Regulation 4;

3.2 In case of existing RE projects, applicable tariff and other terms and conditions, shall be governed by respective RE Tariff Orders and amendments thereof as issued from time to time by the Commission. The tariff structure and other conditions as specified under respective RE Tariff Order shall continue to be applicable for such existing RE projects over the duration of the Tariff Period as stipulated under respective RE Tariff Orders.

- 3.3 For existing and new projects based on renewable energy technologies having fuel cost component, like biomass based power generating projects and non-fossil fuel based co-generation projects, tariff structure and other conditions as specified under respective RE Tariff Order shall continue to be applicable for the Control Period, i.e. FY 2011-12, FY 2012-13 and FY 2013-14.

4. Eligibility Criteria

- 4.1 **Wind power project** – New wind power project(s) to be commissioned subsequent to notification of these regulations or April 01, 2011, whichever is earlier and located at the wind sites having minimum annual mean Wind Power Density (WPD) of 200 Watt/m² measured at hub height of 50 meters and using new wind turbine generators.
- 4.2 **Small hydro project** – New small hydro project(s) to be commissioned subsequent to notification of these regulations or April 01, 2011, whichever is earlier and located at the sites approved by State Nodal Agency/ State Government using new plant and machinery, and installed power plant capacity to be lower than or equal to 25 MW at single location.
- 4.3 **Biomass power project** – New biomass power project(s) to be commissioned subsequent to notification of these regulations or April 01, 2011, whichever is earlier and using new plant and machinery based on Rankine cycle technology and using biomass fuel sources, provided use of fossil fuel is restricted only to 15% of total fuel consumption on annual basis in terms of Kcal.
- 4.4 **Non-fossil fuel based co-generation project** - New non-fossil fuel based co-generation project(s) to be commissioned subsequent to notification of these regulations or April 01, 2011, whichever is earlier shall qualify to be termed as a non-fossil fuel based co-generation project, if it is using new plant and machinery and is in accordance with the definition and also meets the qualifying requirement outlined below:
Provided that use of fossil fuel is restricted as stipulated under Regulation 58 of these Regulations.

Topping cycle mode of co-generation – Any facility that uses non-fossil fuel input for the power generation and also utilizes the thermal energy generated for useful heat applications in other industrial activities simultaneously.

Provided that for the co-generation facility to qualify under topping cycle mode, the sum of useful power output and one half the useful thermal output be greater than 45% of the facility's energy consumption, during season.

Explanation - For the purposes of this Regulation

- a. 'Useful power output' is the gross electrical output from the generator. There will be an auxiliary consumption in the cogeneration plant itself (e.g. the boiler feed pump and the FD/ID fans). In order to compute the net power output it would be necessary to subtract the auxiliary consumption from the gross output. For simplicity of calculation, the useful power output is defined as the gross electricity (kWh) output from the generator.
- b. 'Useful Thermal Output' is the useful heat (steam) that is provided to the process by the cogeneration facility.
- c. 'Energy Consumption' of the facility is the useful energy input that is supplied by the fuel (normally bagasse or other such biomass fuel).

4.5 **Solar PV, Solar Thermal Power Projects, Solar rooftop PV systems and small Solar power projects** – Based on Technologies approved by MNRE.

Chapter 1: General Principals

5. Control Period or review Period

5.1 The Control Period or Review Period under these Regulations shall be of three (3) financial years. First year of the Control Period shall commence from the date of notification of these Regulations or April 01, 2011, whichever is earlier and shall cover upto the end of financial year 2013-14.

Provided further that the tariff determined as per these Regulations for the RE projects commissioned during the Control Period, shall continue to be applicable for the RE projects for the entire duration of the Tariff Period as specified in Regulation 6 below.

Provided also that the revision in Regulations for next Control Period shall be notified separately and in case Regulations for the next Control Period are not notified until commencement of next Control Period, the tariff norms as per these Regulations shall continue to remain applicable until notification of the revised Regulations subject to adjustments as per revised Regulations.

6. Tariff Period

6.1 The Tariff Period for Renewable Energy power projects except in case of Mini/micro hydro projects upto and including 1 MW, Solar PV, Solar thermal power projects, Solar rooftop PV and other small Solar power projects shall be thirteen (13) years.

6.2 In case of Mini/micro hydro hydro projects upto and including 1 MW the Tariff Period shall be thirty five (35) years.

6.3 In case of Solar PV, Solar thermal power projects, Solar rooftop PV and other small Solar power projects, the Tariff Period shall be twenty five (25) years.

6.4 Tariff Period under these Regulations shall be considered from the date of commercial operation of the renewable energy generating stations.

6.5 Tariff determined as per these Regulations shall be applicable for Renewable Energy power projects, only for the duration of the Tariff Period as stipulated under Regulation 6.1, 6.2 and 6.3.

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:

- i. Small hydel Projects
- ii. Municipal Waste based Projects
- iii. Any other new renewable energy technologies approved by MNRE apart from those identified in this regulations
- iv. The renewable energy projects which are commissioned before the notification of these Regulations or April 01, 2011, whichever is earlier but for which no power purchase agreement has been signed until the date of notification of these Regulations or April 01, 2011, whichever is earlier.
- v. Solar PV and Solar Thermal Power projects, if a project developer opts for project specific tariff
Provided that the Commission while determining the project specific tariff for Solar PV and Solar Thermal projects shall be guided by the provisions of Chapter 7 and 8 of these Regulations.
- vi. Hybrid Solar Thermal Power plants
- vii. Biomass based power plants of capacity higher than 15 MW capacity.
- viii. Biomass project other than that based on Rankine Cycle technology application with water cooled condenser.
- ix. A new plant installing old used generators, turbine sets, boilers and other important auxiliaries.
- x. Any project, if the licensee/developer desires for the project specific tariff

7.2 Determination of project specific tariff for generation of electricity from such renewable energy sources shall be in accordance with such terms and conditions as stipulated under relevant Orders of the Commission.

Provided that the financial norms as specified under Chapter-2 of these Regulations, except for capital cost and O&M cost, shall be ceiling norms while determining the project specific tariff.

7.3 In case biomass projects rate for power supplied to a licensee prior to declaration of date of commercial operation (infir power) shall be equal to energy (variable) charges and rate for non –firm power shall be equal to energy (variable) charges plus 30 paise per unit. And in case of hydel project power supplied by SHP to a distribution licensee prior to declaration of the date of commercial operation shall be equal to 50% of the tariff for firm power.

8. Petitions and proceedings for determination of tariff

8.1 The Commission may determine the generic preferential tariff on the basis of suo-motu petition in advance at the beginning of each year of the Control period for renewable energy technologies for which norms have been specified under the Regulations. The generic tariff for the year 2011-12 may remain applicable from April 01, 2011 irrespective of date of the Order.

8.2 A petition for determination of project specific tariff shall be accompanied by such fee as may be determined by relevant Regulations and shall be accompanied by

- i. Information in Forms 1.1, 1.2, 2.1 and 2.2 as the case may be, and as appended in these Regulations;
- ii. Detailed project report outlining technical and operational details, site specific aspects, premise for capital cost and financing plan, etc.
- iii. A Statement of all applicable terms and conditions and expected expenditure for the period for which tariff is to be determined.
- iv. A statement containing full details of calculation of any subsidy and incentive received, due or assumed to be due from the Central Government and/or State Government. This statement shall also include the proposed tariff calculated without consideration of the subsidy and incentive.
- v. Any other information that the Commission requires the Petitioner to submit.
- vi. Technical data including data regarding CUF

- 8.3 The proceedings for determination of tariff shall be in accordance with the Conduct of Business Regulations of this Commission.

9. Tariff Structure

- 9.1 The tariff for renewable energy technologies shall be single-part tariff consisting of the following fixed cost components:

- I. Return on equity;
- II. Interest on loan capital;
- III. Depreciation;
- IV. Interest on working capital;
- V. Operation and maintenance expenses;

Provided that for renewable energy technologies having fuel cost component, like biomass power projects and non-fossil fuel based co-generation projects, single-part tariff with two components, viz., fixed cost component and fuel cost component, shall be determined.

10. Tariff Design

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

Provided that for renewable energy technologies having single-part tariff with two components, tariff shall be determined on levellised basis considering the year of commissioning of the project for fixed cost component while the fuel cost component shall be specified on year of operation basis.

- 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'.

11. Dispatch Principles for electricity generation from Renewable Energy Sources

- 11.1 All renewable energy power plants except for biomass power plants and co-generation plants shall be treated as 'MUST RUN' power plants and shall not be subjected to scheduling.
- 11.2 The biomass power generating station and co-generation projects shall be subjected to scheduling agreed between the project developer and licensee.

Chapter 2: Financial Principals

12. Capital Cost

- 12.1 The norms for the Capital Cost as specified in the subsequent technology specific chapters shall be inclusive of all capital work including plant and machinery, civil work, erection and commissioning, financing costs, preliminary and pre-operative expenses, interest during construction, and evacuation infrastructure up to inter-connection point.

Provided that for project specific tariff determination, the generating company shall submit the break-up of capital cost items along with its petition in the manner specified under Regulation 8.

13. Debt Equity Ratio

- 13.1 For suo-motu determination of generic tariff, the debt equity ratio shall be considered as 70:30.
- 13.2 For project specific tariff, If the equity actually deployed is more than 30% of the capital cost, equity in excess of 30% shall be treated as normative loan.

Provided that where equity actually deployed is less than 30% of the capital cost, the actual equity shall be considered for determination of tariff;

Provided further that the equity invested in foreign currency shall be denominated/ designated in Indian rupees on the date of each investment.

14. Loan and Finance Charges

- 14.1 For the purpose of determination of tariff, loan tenure of 10 years shall be considered.
- 14.2 The loans arrived at in the manner indicated above shall be considered as gross normative loan for calculation of 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 base rate (landing rate) of State Bank of India prevalent during the previous year plus 500 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.

15. Depreciation

15.1 The value base for the purpose of depreciation shall be the Capital Cost of the asset admitted by the Commission. The Salvage value of the asset shall be considered as 10% and depreciation shall be allowed up to maximum of 90% of the Capital Cost of the asset.

15.2 Annual Depreciation per annum shall be based on 'Differential Depreciation Approach' over loan tenure and period beyond loan tenure over useful life computed on 'Straight Line Method'. 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 11th year onwards.

15.3 Depreciation shall be chargeable from the first year of commercial operation.

Provided that in case of commercial operation of the asset for part of the year, depreciation shall be charged on *pro rata* basis.

16. Return on Equity

16.1 The value base for the equity shall be 30% of the capital cost or actual equity (in case of project specific tariff determination) as determined under Regulation 13.

16.2 The normative Return on Equity shall be:

- I. Pre-tax 19% per annum for the first 10 years.
- II. Pre-tax 24% per annum 11th year onwards.

17. Interest on Working Capital

17.1 The Working Capital requirement in respect of wind energy projects, small hydro power, solar PV and Solar thermal power projects shall be computed as per following:

- I. Operation & Maintenance expenses for one month;
- II. Receivables equivalent to 2 (Two) months of energy charges for sale of electricity calculated on the normative CUF;
- III. Maintenance spare @ 15% of operation and maintenance expenses

17.2 The Working Capital requirement in respect of biomass power projects and non-fossil fuel based co-generation projects shall be computed as per following:

- I. Fuel costs for four months equivalent to normative PLF;
- II. Operation & Maintenance expense for one month;
- III. Receivables equivalent to 2 (Two) months of fixed and variable charges for sale of electricity calculated on the target PLF;
- IV. Maintenance spare @ 15% of operation and maintenance expenses

17.3 Interest on Working Capital shall be at interest rate equivalent to average of base rate (lending rate) of State Bank of India prevalent during the previous year plus 450 basis points.

18. Operation & Maintenance Expenses

18.1 'Operation and Maintenance or O&M expenses' shall comprise repair and maintenance (R&M), establishment including employee expenses, and administrative and general expenses including insurance.

18.2 O&M expenses shall be determined for the Tariff Period based on normative O&M expenses specified by the Commission subsequently in these Regulations for the first Year of Control Period.

18.3 Normative O&M expenses allowed during first year of the control Period (i.e. FY 2011-12) under these Regulations shall be escalated at the rate of 5.72% per annum over the Tariff Period.

19. Rebate

- 19.1 For payment of bills of the generating company through letter of credit, a rebate of 2% shall be allowed.
- 19.2 Where payments are made other than through letter of credit within a period of one month of presentation of bills by the generating company, a rebate of 1% shall be allowed.

20. Late payment surcharge

- 20.1 In case the payment of any bill for charges payable under these regulations is delayed beyond a period of 60 days from the date of billing, a late payment surcharge at the rate of 1.25% per month shall be levied by the generating company.

21. CDM Benefits

- 21.1 The proceeds of carbon credit from approved CDM project shall be shared between generating company and concerned beneficiaries in the following manner, namely-
- I. 100% of the gross proceeds on account of CDM benefit to be retained by the project developer in the first year after the date of commercial operation of the generating station ;
 - II. In the second year, the share of the beneficiaries shall be 10% which shall be progressively increased by 10% every year till it reaches 50%, where after the proceeds shall be shared in equal proportion, by the generating company and the beneficiaries.

22. Subsidy or incentive by the Central/State Government

- 22.1 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:

- I. 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.
- II. Capitalisation of RE projects during second half of the fiscal year.
- III. Per unit benefit shall be derived on levelled basis at discount factor equivalent to weighted average cost of capital.

Provided further that in case any Central Government or State Government notification specifically provides for any Generation based Incentive over and above tariff, the same shall not be factored in while determining Tariff.

23. Cess, Duties and Water charges

23.1 Tariff determined under these regulations shall be exclusive of cess and duties on generation, auxiliary consumption and sale of electricity as may be levied by the appropriate Government.

Provided that the cess and duties levied by the appropriate Government shall be allowed as pass through on actual incurred basis.

In case of SHP, water charges as levied by the State Government shall not be included in the tariff. It is to be paid separately and shall be pass through on actual incurred basis.

Chapter 3: Technology specific parameters for Wind energy Projects

24. Capital Cost

24.1 The capital cost for wind energy project 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 IDC.

24.2 The capital cost for wind energy projects shall be Rs.492.52 Lakh/MW (FY 2011-12 during first year of Control Period) and shall be revised for the projects to be commissioned in each subsequent year as outlined under Regulation 25.

25. Capital Cost Indexation Mechanism

25.1 The indexed Capital Cost in case of wind energy projects for each year of the tariff period shall be notified pursuant to issuance of such indexed capital cost for wind energy projects by Central Electricity Regulatory Commission in accordance with indexation mechanism stipulated under CERC RE Tariff Regulations.

26. Capacity Utilisation Factor (CUF)

26.1 CUF norms for the tariff period shall be as follows;

Annual Mean Wind Power Density (W/M²)	CUF
200-250	20%
250-300	23%
300-400	27%
>400	30%

26.2 The annual mean wind power density specified in Regulation 26.1 above shall be measured at 50 meter hub-height.

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), shall be considered.

Provided that the Commission may by notification in official gazette, amend the schedule from time to time, based on the input provided by C-WET/ MNRE.

27. Operation and Maintenance Expenses

27.1 Normative O&M expenses for the first year of the control period (i.e. FY 2011- 12) shall be Rs 7.26 Lakh per MW.

27.2 Normative O&M expenses allowed under these Regulations shall be escalated at the rate of 5.72% per annum over the tariff period to compute the levellised tariff.

Chapter 4: Technology specific parameters for Small Hydro Projects

28. Capital Cost

28.1 The normative capital cost for small hydro projects during first year of the control period (i.e. year 2011-12) shall be as follows;

Project Size	Capital Cost (Rs. Lakh/MW)
> 1 MW and up to including 5 MW	550
>5 MW to 25 MW	500

The capital cost will be allowed to a maximum of ceiling of as mentioned in the above table. This may also include the cost of laying of transmission lines for evacuation of power. Considering the topography of the State and the likelihood of many SHPs being located in remote areas, which may require considerable length of transmission lines exceeding 10 Kms and also the geological surprises/constraints which may not have been foreseen and may come to be known at a time of execution of the projects, in such cases the project cost that can be allowed up to a maximum ceiling of Rs. 600 lakh/MW. This would be an exception rather than the rule.

28.2 The capital cost for subsequent years shall be revised for projects to be commissioned in each subsequent year as outlined under Regulation 29.

29. Capital Cost Indexation Mechanism

29.1 The indexed Capital Cost in case of Small Hydro projects for each year of the tariff period shall be notified pursuant to issuance of such indexed capital cost for Small Hydro projects by Central Electricity Regulatory Commission in accordance with indexation mechanism stipulated under CERC RE Tariff Regulations.

30. Capacity Utilisation Factor (CUF)

30.1 Capacity Utilisation factor for small hydro projects shall be min 30% or as per the specific projects, whichever is higher.

31. Auxiliary Consumption

31.1 Normative Auxiliary Consumption for the small hydro projects shall be 1.0%.

32. Operation & Maintenance Expenses

32.1 Normative O&M expenses for the first year of the control period (i.e. FY 2011-12) shall be as follows:

Project Size	O&M Expense (Rs. Lakh/MW)
> 1 MW and up to including 5 MW	19.00
>5 MW to 25 MW	13.41

32.2 Normative O&M expenses allowed under these Regulations shall be escalated at the rate of 5.72% per annum for the Tariff Period for the purpose of determination of levellised tariff.

33. Tariff for Mini/Micro Hydro Projects

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 generic tariff applicable for Small Hydro Projects as decided by the CERC.

Chapter 5: Technology specific parameters for Biomass based Power Projects

34. Technology Aspect

34.1 The norms for tariff determination specified hereunder are for biomass power projects based on Rankine cycle technology application using water cooled condenser.

35. Applicability

35.1 These regulations will not apply in case power purchase agreements (PPAs) have already been entered into by any generating company with distribution licensees, prior to the date of notification of these regulations or April 01, 2011, whichever is earlier. The tariff for such plants shall be as per the provision for tariff made in the respective PPAs in terms of this Commission's order dated 15.01.2008 passed in petition no. 07 of 2005 and dated 15.04.2010 passed in petition no. 25 of 2009(T) in case of biomass-based plants.

35.2 The capital cost and performance norms as specified under Regulation 36 to Regulation 40 shall be applicable only for new biomass power projects commissioned on or after April 1, 2011.

35.3 The fuel related aspects specified under Regulation 41 to Regulation 47 shall be applicable for existing and new biomass power projects; 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.

36. Capital Cost and Capital Cost Indexation Mechanism

36.1 The normative capital cost for the biomass power projects shall be Rs.426 Lakh/MW (FY 2011-12 during first year of Control Period) and shall be linked to indexation formula as outlined under Regulation 36.2.

36.2 The indexed Capital Cost in case of Biomass power projects for each year of the control period shall be notified pursuant to issuance of such indexed capital cost for Biomass power projects by Central Electricity Regulatory Commission in accordance with indexation mechanism stipulated under CERC RE Tariff Regulations.

Provided that for the purpose of the above indexation, the normative capital cost for the Biomass power projects for the first year of the control period (i.e. FY 2011-12) shall be determined by the Commission on the basis of the average cost of various generating capacities.

37. Capacity Utilization Factor

37.1 Threshold Plant Load Factor for determining fixed charge component of Tariff shall be:

- i. First six months of COD: 60%
- ii. Next six months upto one year of COD: 70%
- iii. From 2nd Year of COD onwards: 80 %

38. Auxiliary Consumption

38.1 The auxiliary power consumption shall be considered as 10% of the unit size for the determination of tariff.

39. Station Heat Rate

39.1 The station heat rate for the biomass power projects shall be 3800 kcal/kWh.

40. Operation and Maintenance Expenses

40.1 Normative O&M expenses for the first year of the control period (i.e. FY 2011-12) shall be Rs. 22.63 Lakh per MW.

40.2 Normative O&M expenses allowed at the commencement of the tariff Period under Regulation 40.1 shall be escalated at the rate of 5.72% per annum for the subsequent years of the control period.

41. Fuel

41.1 The biomass power plant shall be designed in such a way that it uses different types of non-fossil fuels available within the vicinity of biomass power project such as crop residues, agro-industrial residues, forest residues etc. and other biomass fuels as may be approved by MNRE.

41.2 The Biomass Power Generating Companies shall ensure fuel management plan to ensure adequate availability of fuel to meet the respective project requirements.

42. Use of Fossil Fuel – Fuel Mix

42.1 The use of fossil fuels shall be on Kcal basis of total fuel consumption on annual basis as per relevant MNRE guideline, which is presently 15%.

43. Monitoring Mechanism for the use of fossil fuel

43.1 The project developer shall furnish a monthly fuel procurement statement and monthly fuel usage statement duly certified by Chartered Accountant to the beneficiary, with whom the power purchase agreement has been made (with a copy to appropriate agency appointed by the Commission for the purpose of monitoring the fossil and non-fossil fuel consumption) for each month, along with the monthly energy bill. The statement shall cover details such as –

- i. Opening fuel stock quantity (in tonnes), for each type of fuel,
- ii. Receipt of fuel quantity (in tonnes) at the power plant site for each type of fuel during the month,
- iii. Quantity of fuel (in tonnes) for each fuel type (biomass fuels and fossil fuels) consumed during the month for power generation purposes,
- iv. Closing fuel stock quantity (in tonnes) for each fuel type (biomass fuels and fossil fuels) available at the power plant site at the end of the month,
- v. Cumulative quantity (in tonnes) of each fuel type (biomass and fossil fuel) procured till the end of that month during the financial year,
- vi. Cumulative quantity (in tonnes) for each fuel type (biomass and fossil fuel) consumed till end of that month during the financial year),
- vii. Actual (gross and net) energy generation (denominated in lakh of units) during the month,
- viii. Cumulative actual (gross and net) energy generation (denominated in lakh of units) until the end of that month during the financial year,

43.2 Non-compliance with the condition of fossil fuel usage by the project developer, during any financial year, shall render such biomass power project to be ineligible to avail preferential tariff determined as per these Regulations in the year of default during such financial year when such default occurs. However, such defaulting Biomass Power Project shall continue to sell power to concern distribution licensee even during the period of default. The rate of supply to distribution licensee will be weighted average pooled price at which the distribution licensee has purchased the electricity including cost of self generation, if any, (in the defaulting year of biomass plant) from all the long-term and short-term energy suppliers, but excluding those based on renewable energy sources, as the case may be, for the entire year of default and additional payment arrived to such power project will be adjusted in future bills in six equal monthly instalments.

44. Compliance Monitoring

- 44.1 The Chhattisgarh Renewable Energy Development Agency (CREDA) shall be responsible for monitoring compliance of biomass projects with these Regulations.
- 44.2 CREDA shall maintain such data, including technical and commercial details of biomass projects in the State and shall make the data available in the public domain by publishing the same on its website with quarterly updation.
- 44.3 The project developer shall submit the information to CREDA as required under Regulation 43 in the format as specified in schedule templates-1.1, 1.2, 2.1 and 2.2.
- 44.4 In addition to the above monitoring mechanism, the developer shall also submit on an annual basis, such necessary financial Statements or documents as stipulated from time to time to the Commission to ascertain that the financial returns to the developers are in accordance with the regulated returns specified under these Regulations.

45. Calorific Value

- 45.1 The average Calorific Value of the biomass fuel(s) used for the purpose of determination of tariff for new biomass power projects shall be 3467 kcal/kg.

46. Fuel Cost

46.1 Biomass fuel price shall be 2017.65 Rs/MT during first year of the control period (i.e., FY 2011-12) and thereafter shall be linked to indexation mechanism as specified under Regulation 47.

47. Fuel Price Indexation Mechanism

47.1 In case of (existing and new) biomass power projects, the indexing mechanism specified in Regulation 47.2 for adjustment of fuel prices for each year of operation, will be applicable for determination of applicable variable charge component of tariff:

47.2 The indexed Biomass Fuel Price in case of Biomass Power projects for each year of the control period shall be notified pursuant to notification of such indexed Biomass Fuel Price norm as applicable for Biomass Power projects within the State by Central Electricity Regulatory Commission in accordance with indexation mechanism stipulated under CERC RE Tariff Regulations.

Chapter 6: Technology specific parameters for Non-fossil fuel based Cogeneration Projects

48. Technology Aspect

- 48.1 A project shall qualify as a non-fossil fuel based co-generation project, if it is in accordance with the eligibility criteria as specified under Regulation 4(4).

49. Applicability

- 49.1 The capital cost and performance norms as specified under Regulations 50 to 54 and 62 shall be applicable only for new non-fossil fuel based co-generation projects with effect from notification of these Regulations or April 1, 2011, whichever is earlier.
- 49.2 The fuel related aspects specified under Regulation 55 to 61 shall be applicable for existing and new biomass power projects with effect from notification of these Regulations or April 1, 2011, whichever is earlier. 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.

50. Capital Cost Indexation Mechanism

- 50.1 The normative capital cost for the non-fossil fuel based co-generation projects shall be considered as Rs.421.3 Lakh/MW for the first year of the Control Period (i.e. FY 2011-12).
- 50.2 The indexed Capital Cost in case of Non-fossil fuel based Co-generation projects for second and third year of the Control Period (i.e. FY 2012-13 and FY 2013-14) shall be notified pursuant to notification of such indexed capital cost for Non-fossil fuel based Co-generation projects by Central Electricity Regulatory Commission in accordance with indexation mechanism stipulated under CERC RE Tariff Regulations.

51. Capacity Utilization Factor

51.1 For the purpose of determining fixed charge, the plant load factor for non-fossil fuel based co-generation projects shall be computed on the basis of plant availability for number of operating days considering operations during crushing season and off-season as specified under Regulation 51.2 below and load factor of 92%.

51.2 The number of operating days shall be as follows:

Operating Days	Plant Load Factor (%)
150 days (crushing)+ 60 days (off-season) = 210 days operating days	53%

52. Auxiliary Consumption

52.1 The auxiliary power consumption shall be 8.5% of the unit size for determination of tariff.

53. Station Heat Rate

53.1 The station heat rate of 3800 kcal/kWh for the power generation component alone shall be considered for computation of tariff for non-fossil fuel based co-generation projects.

54. Calorific Value

54.1 The Gross Calorific Value for bagasse shall be considered as 2250 kcal/kg. For the use of biomass fuels other than bagasse, calorific value as specified under Regulation 45 shall be applicable.

55. Fuel Cost

55.1 The price of bagasse shall be 1305.80 Rs/MT during first year of the tariff Control Period (i.e. FY 2011-12, FY 2012-13 and FY 2013-14) and thereafter shall be linked to indexation formulae as outlined under Regulation 56.

55.2 For use of biomass other than bagasse in co-generation projects, the biomass prices as specified under Regulation 46 shall be applicable.

56. Fuel Price Indexation Mechanism

56.1 In case of (existing and new) non-fossil fuel based cogeneration projects, the following indexing mechanism for adjustment of fuel prices for each year of operation, from April 1, 2011, will be applicable for determination of variable charge component of tariff.

The indexed Bagasse Fuel Price (Pn) 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 Chhattisgarh by Central Electricity Regulatory Commission in accordance with indexation mechanism stipulated under CERC RE Tariff Regulations.

Where,

P(1) is bagasse price for the 1st year of control period i.e. FY 2011-12

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

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

i.e. $VC_n = VC_1 \times (P_n / P_1)$

Where,

P1 is bagasse price for the 1st year of operation i.e. FY 2011-12

VC1 represents the Variable Charge based on bagasse Price P1 for FY 2011-12 as specified under Regulation 55 and shall be determined as under:

$$VC_1 = \frac{\text{Station Heat Rate (SHR)}}{\text{Gross Calorific Value (GCV)}} \times \frac{1}{(1 - \text{Aux Consum. Factor})} \times \frac{P_1}{1000}$$

57. Fuel Mix and Co-generation Plant Capacity

57.1 The co-generation power plant may be designed to use different types of non-fossil fuels available within the vicinity of co-generation power project such as bagasse and crop residues, bio-gas, agro-industrial residues, forest residues, etc., and other biomass fuels as may be approved by MNRE.

57.2 The co-generation projects shall be sized in co-relation to the locally available non-fossil fuel. The co-generation plant developer shall ensure fuel management plan to ensure adequate availability of fuel to meet the respective project requirements.

58. Use of Fossil Fuel

58.1 The use of fossil fuels shall be limited to the extent in Kcal basis of total fuel consumption on annual basis as per relevant MNRE guideline, which is presently 15%.

59. Monitoring Mechanism for the use of fossil fuel

59.1 The project developer shall furnish a monthly fuel procurement statement and monthly fuel usage statement duly certified by Chartered Accountant to the beneficiary, with whom the power purchase agreement has been made (with a copy to appropriate agency appointed by the Commission for the purpose of monitoring the fossil and non-fossil fuel consumption) for each month, along with the monthly energy bill. The statement shall cover details such as –

- i. Opening fuel stock quantity (in tonnes), for each type of fuel,
- ii. Receipt of fuel quantity (in tonnes) at the power plant site for each type of fuel during the month,
- iii. Quantity of fuel (in tonnes) for each fuel type (biomass fuels and fossil fuels) consumed during the month for power generation purposes,
- iv. Closing fuel stock quantity (in tonnes) for each fuel type (biomass fuels and fossil fuels) available at the power plant site at the end of the month,
- v. Cumulative quantity (in tonnes) of each fuel type (biomass and fossil fuel) procured till the end of that month during the financial year,
- vi. Cumulative quantity (in tonnes) for each fuel type (biomass and fossil fuel) consumed till end of that month during the financial year),
- vii. Actual (gross and net) energy generation (denominated in lakh of units) during the month,
- viii. Cumulative actual (gross and net) energy generation (denominated in lakh of units) until the end of that month during the financial year, financial year,

59.2 Non-compliance with the condition of fossil fuel usage by the project developer, during any financial year, shall render such biomass power project to be ineligible to avail preferential tariff determined as per these

Regulations in the year of default during such financial year when such default occurs. However, such defaulting Biomass Power Project shall continue to sell power to concern distribution licensee even during the period of default. The rate of supply to distribution licensee will be weighted average pooled price at which the distribution licensee has purchased the electricity including cost of self generation, if any, (in the defaulting year of biomass plant) from all the long-term and short-term energy suppliers, but excluding those based on renewable energy sources, as the case may be, for the entire year of default and additional payment arrived to such power project will be adjusted in future bills in six equal monthly instalments.

60. Compliance Monitoring

- 60.1 The Chhattisgarh Renewable Energy Development Agency (CREDA) or any other agency as decided by the Commission shall be responsible for monitoring compliance of biomass projects with these Regulations.
- 60.2 CREDA shall maintain such data, including technical and commercial details of biomass projects in the State and shall make the data available in the public domain by publishing the same on its website with quarterly updation.
- 60.3 The project developer shall submit the information to CREDA as required under Regulation 43 in the format as specified in schedule templates-1.1, 1.2, 2.1 and 2.2.
- 60.4 In addition to the above monitoring mechanism, the developer shall also submit on an annual basis, such necessary financial Statements or documents as stipulated from time to time to the Commission to ascertain that the financial returns to the developers are in accordance with the regulated returns specified under these Regulations.

61. Operation and Maintenance Expenses

- 61.1 Normative O&M expenses for the first year of the tariff period (i.e. FY 2011-12) shall be Rs. 14.92 Lakh per MW.
- 61.2 Normative O&M expenses allowed at the commencement of the tariff Period under these Regulations shall be escalated at the rate of 5.72% per annum.

Chapter 7: Technology specific parameters for Solar PV Power Projects

62. Technology Aspects

62.1 Norms for Solar Photovoltaic (PV) power under these Regulations shall be applicable for grid connected PV systems with installed capacity of more than 1 MW that directly convert solar energy into electricity and are based on the technologies such as crystalline silicon or thin film etc. as may be approved by MNRE.

63. Capital Cost

63.1 The normative capital cost for setting up Solar Photovoltaic Power Project shall be Rs. 1500Lakh/MW for FY 2011-12.

Provided that the Commission may deviate from above norm in case of project specific tariff determination in pursuance of Regulation 7 and Regulation 8.

64. Capacity Utilisation Factor

64.1 The Capacity utilisation factor for Solar PV project shall be 19%.

Provided that the Commission may deviate from above norm in case of project specific tariff determination in pursuance of Regulation 7 and Regulation 8.

65. Operation and Maintenance Expenses

65.1 The O&M Expenses shall be Rs.10.06 Lakhs/MW for the 1st year of operation.

65.2 Normative O&M expenses allowed at the commencement of the tariff Period under these Regulations shall be escalated at the rate of 5.72% per annum.

Chapter 8: Technology specific parameters for Solar Thermal Power Projects

66. Technology Aspects

66.1 Norms for Solar thermal power under these Regulations shall be applicable for Concentrated solar power (CSP) technologies viz. line focusing or point focusing, as may be approved by MNRE, and uses direct sunlight, concentrating it several times to reach higher energy densities and thus higher temperatures whereby the heat generated is used to operate a conventional power cycle to generate electricity.

67. Capital Cost

67.1 The normative capital cost for setting up Solar Thermal Power Project shall be Rs. 1530Lakh/MW for FY 2011-12.

Provided that the Commission may deviate from above norm in case of project specific tariff determination in pursuance of Regulation 7 and Regulation 8.

68. Capacity Utilisation Factor

68.1 The Capacity utilisation factor for Solar Thermal project shall be 23%.

Provided that the Commission may deviate from above norm in case of project specific tariff determination in pursuance of Regulation 7 and Regulation 8.

69. Operation and Maintenance Expenses

69.1 The O&M Expenses shall be Rs.14.53 Lakhs/MW for the 1st year of operation.

69.2 Normative O&M expenses allowed at the commencement of the tariff Period under these Regulations shall be escalated at the rate of 5.72% per annum.

70. Auxiliary Consumption

70.1 The auxiliary consumption factor shall be 10%.

Provided that the Commission may deviate from the above norm in case of project specific tariff determination in pursuance of Regulation 7 and Regulation 8.

71. Hybrid Solar Thermal Power Plants

71.1 The capital cost, auxiliary consumption factor, capacity utilization factor, O&M expenses and other relevant parameters for hybrid solar thermal power plants shall be decided by the Commission on case to case basis.

Chapter 9: Miscellaneous

72. Deviation from norms

72.1 Tariff for sale of electricity by the generating company may also be determined in deviation from the norms specified in these Regulations subject to the conditions that the levellised tariff over the useful life of the project on the basis of the norms in deviation does not exceed the levellised tariff calculated on the basis of the norms specified in these Regulations.

Provided that the reasons for deviation from the norms specified under these Regulations shall be recorded in writing.

73. Power to Relax

73.1 The Commission may by general or special order, for reasons to be recorded in writing, and after giving an opportunity of hearing to the parties likely to be affected may relax any of the provisions of these Regulations on its own motion or on an application made before it by an interested person.

74. Power to Review and Amend

74.1 The Commission may, at anytime, vary, alter, modify or amend any provisions of these Regulations.

75. Power to remove difficulties

75.1 If any difficulty arises in giving effect to these Regulations, the Commission may, of its own motion or otherwise, by an order and after giving a reasonable opportunity to those likely to be affected by such order, make such provisions, not inconsistent with these regulations, as may appear to be necessary for removing the difficulty.

76. Repeal

76.1 After issuance of these regulations the previous regulations namely Chhattisgarh State Electricity Regulatory Commission (Terms and conditions for determination of generation tariff and related matters for

electricity generated by plants based on non-conventional sources of energy) Regulations, 2008 shall stand repealed subject to the provision in Regulation 35.1 of these Regulations.

By Order of the Commission

(N.K. Rupwani)
Secretary

Form-1.1. Template for (Wind Power / Small Hydro Project / Solar PV / Solar thermal): Parameter Assumptions

S. No.	Assumption Head	Sub-Head	Sub-Head (2)	Unit	Parameter Values
1	Power Generation				
		Capacity			
			Installed Power Generation Capacity	MW	
			Capacity Utilization Factor	%	
			Commercial Operation Date	mm/yyyy	
			Useful Life	Years	
2	Project Cost				
		Capital Cost / MW			
			Normative Capital Cost	Rs. lakh /MW	
			Capital Cost	Rs. Lakh	
			Capital Subsidy, if any	Rs. Lakh	
			Net Capital cost	Rs. Lakh	
3	Financial Assumptions				
			Tariff period	years	
		Debt Equity			
			Debt	%	
			Equity	%	
			Total Debt Amount	Rs. Lakh	
			Total Equity Amount	Rs. Lakh	
		Debt component			
			Loan amount	Rs. Lakh	
			Moratorium Period	years	
			Repayment period (in cl'd Moratorium)	Years	
			Interest Rate	%	
		Debt component			
			Equity amount	Rs. Lakh	
			Return on Equity for first 10 years	% p.a.	
			Return on Equity 11th year onwards	% p.a.	
			Discount Rate	%	
		Depreciation			
			Depreciation rate for first 12 years	%	
			Depreciation rate 13th year onwards	%	
		Incentives			
			Generation based incentives, if any	Rs. Lakh/annum	
			Period for GBI	years	
4	Operation & Maintenance				
		Normative O&M expense		Rs. Lakh / MW	
		O&M expenses per annum		Rs. Lakh	
		Escalation factor for O&M expenses		%	
5	Working Capital				
		O&M expense		Months	
		Maintenance Spare	(% of O&M expenses)	%	
		Receivables		Months	
		Interest on working capital		% p.a.	

**Form 1.2: Template for (Wind Power / Small Hydro Project / Solar PV / Solar thermal):
Determination of Tariff Components**

Units Generation	Unit	Year-1	Year-2	Year-3	Year-4	Year-5	Year-6	Year-7	Year-8	Year-9	Year-10	Year-11	Year-12	Year-13	Year-14
Installed capacity	MW														
Net Generation	MU														
Tariff Components (Fixed charge)	Unit	Year-1	Year-2	Year-3	Year-4	Year-5	Year-6	Year-7	Year-8	Year-9	Year-10	Year-11	Year-12	Year-13	Year-14
O&M Expenses	Rs. Lakh														
Depreciation	Rs. Lakh														
Interest on term loan	Rs. Lakh														
Interest on working capital	Rs. Lakh														
Return on Equity	Rs. Lakh														
Total Fixed cost	Rs. Lakh														
Per Unit Tariff Components	Unit	Year-1	Year-2	Year-3	Year-4	Year-5	Year-6	Year-7	Year-8	Year-9	Year-10	Year-11	Year-12	Year-13	Year-14
PU O&M Expenses	Rs./kWh														
PU Depreciation	Rs./kWh														
PU Interest on term loan	Rs./kWh														
PU Interest on working capital	Rs./kWh														
PU Return on Equity	Rs./kWh														
PU Tariff Components	Rs./kWh														
Levelling Tariff	Unit	Year-1	Year-2	Year-3	Year-4	Year-5	Year-6	Year-7	Year-8	Year-9	Year-10	Year-11	Year-12	Year-13	Year-14
Discount Factors															
Discounted Tariff components	Rs./kWh														
Levelling Tariff	Rs./kWh														

Form 2.1: Template for Biomass power / non-fossil fuel based Cogen: Parameter Assumptions

Assumption Head	Sub-Head	Sub-Head (2)	Unit	Parameter Values
Power Generation				
	Capacity			
		Installed Power Generation Capacity	MW	
		Auxiliary Consumption factor	%	
		PLF (during stabilisation upto 6 months)	%	
		PLF (during 1st year after stabilisation)	%	
		PLF (2nd year onwards)	%	
		Commercial Operation Date	mm/yyyy	
		Useful Life	Years	
Project Cost				
	Capital Cost / MW			
		Normative Capital Cost	Rs. Lakh / MW	
		Capital Cost	Rs. Lakh	
		Capital Subsidy, if any	Rs. Lakh	
		Net Capital cost	Rs. Lakh	
Financial Assumptions				
		Tariff period	years	
	Debt Equity			
		Debt	%	
		Equity	%	
		Total Debt Amount	Rs. Lakh	
		Total Equity Amount	Rs. Lakh	
	Debt component			
		Loan amount	Rs. Lakh	
		Moratorium Period	years	
		Repayment period (in old Moratorium)	Years	
		Interest Rate	%	
	Equity component			
		Equity amount	Rs. Lakh	
		Return on Equity for first 10 years	% p.a.	
		Return on Equity 11th year onwards	% p.a.	
		Discount Rate	%	
	Depreciation			
		Depreciation rate for first 12 years	%	
		Depreciation rate 13th year onwards	%	
	Incentives			
		Generation based incentives, if any	Rs. Lakh/annum	
		Period for GBI	years	
Operation & Maintenance				
	Normative O&M expense		Rs. Lakh / MW	
	O&M expenses per annum		Rs. Lakh	
	Escalation factor for O&M expenses		%	
Working Capital				
	O&M expense		Months	
	Maintenance Spare	(% of O&M expenses)	%	
	Receivables		Months	
	Biomass stock		Months	
	Interest on working capital		% p.a.	
Fuel related assumptions				
	Station Heat Rate	During stabilisation	kcal/kWh	
		Post stabilisation	kcal/kWh	
	Fuel types & mix	Biomass fuel type-1	%	
		Biomass fuel type-2	%	
		Fossil Fuel (coal)	%	
		GCV of Biomass fuel type-1	kCal/kg	
		GCV of Biomass fuel type-2	kCal/kg	
		GCV of fossil fuel (coal)	kCal/kg	
		Biomass Price (fuel type-1): Yr-1	Rs./MT	
		Biomass Price (fuel type-2):Yr-1	Rs./MT	
		Fossil Fuel price (coal): Yr-1	Rs./MT	
		Fuel price escalation factor	% p.a.	

Form2.2: Template for (Biomass Power or Non-fossil fuel based Cogen): Determination of Tariff Components

		Year-1	Year-2	Year-3	Year-4	Year-5	Year-6	Year-7	Year-8	Year-9	Year-10	Year-11	Year-12
Units Generation	Unit												
Installed capacity	MW												
Net Generation	MU												
Tariff Components (Fixed charge)	Unit	Year-1	Year-2	Year-3	Year-4	Year-5	Year-6	Year-7	Year-8	Year-9	Year-10	Year-11	Year-12
O&M Expenses	Rs. Lakh												
Depreciation	Rs. Lakh												
Interest on term loan	Rs. Lakh												
Interest on working capital	Rs. Lakh												
Return on Equity	Rs. Lakh												
Total Fixed cost	Rs. Lakh												
Tariff Components (Variable charge)	Unit	Year-1	Year-2	Year-3	Year-4	Year-5	Year-6	Year-7	Year-8	Year-9	Year-10	Year-11	Year-12
Biomass fuel type-1	Rs. Lakh												
Biomass fuel type-2	Rs. Lakh												
Fossil fuel (coal)	Rs. Lakh												
Sub total (Fuel costs)	Rs. Lakh												
Fuel cost allocable to power	%												
Total Fuel costs	Rs. Lakh												
Per Unit Tariff Components (Fixed)	Unit	Year-1	Year-2	Year-3	Year-4	Year-5	Year-6	Year-7	Year-8	Year-9	Year-10	Year-11	Year-12
PU O&M Expenses	Rs./kWh												
PU Depreciation	Rs./kWh												
PU Interest on term loan	Rs./kWh												
PU Interest on working capital	Rs./kWh												
PU Return on Equity	Rs./kWh												
PU Tariff Components (Fixed)	Rs./kWh												
PU Tariff Components (Variable)	Rs./kWh												
PU Tariff Components (Total)	Rs./kWh												
Levelling Tariff	Unit	Year-1	Year-2	Year-3	Year-4	Year-5	Year-6	Year-7	Year-8	Year-9	Year-10	Year-11	Year-12
Discount Factors													
Discounted Tariff components (Fixed)	Rs./kWh												
Discounted Tariff components (Variable)	Rs./kWh												
Discounted Tariff components (total)	Rs./kWh												
Levelling Tariff (Fixed)	Rs./kWh												
Levelling Tariff (Variable)	Rs./kWh												
Levelling Tariff (Total)	Rs./kWh												

Schedule- Format of monthly statements to be submitted by Biomass and Cogeneration project developers to CREDA

Monthly Update

Template 1.1 : Monthly Fuel Usage Statement (1/2)

Name of the Project
 (Location, District)
 CREDA / Utility Ref. No.
 Installed Capacity (MW)
 Date of Commissioning

FY:
 Statement Date
 Project Code

Sl. No.	Month	Biomass Fuel-1 Consumptions (in tonnes)			Biomass Fuel-2 Consumptions (in tonnes)			Biomass Fuel-1 Consumptions (in tonnes)			Fossil Fuel (Coal) consumption (in tonnes)			% Fossil Fuel consumption of Total Fuel Consumption (%)	
		Type of Fuel	During current month	Cummulative last 12 months	Type of Fuel	During current month	Cummulative last 12 months	Type of Fuel	During current month	Cummulative last 12 months	Grade of coal used	During current month	Cummulative last 12 months	During current month (13) / (4+7+10+13)	Cummulative last 12 months (14) / (5+8+11+14)
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1	April														
2	May														
3	June														
4	July														
5	August														
6	September														
7	October														
8	November														
9	December														
10	January														
11	February														
12	March														

Template 1.2 : Monthly Fuel Usage Statement (2/2)

Monthly Update

Name of the Project

(Location, District)

CREDA / Utility Ref. No.

Installed Capacity (MW)

Date of Commissioning

FY:

Statement Date

Project Code

Sl. No.	Month	Biomass Fuel-1 Consumptions (in tonnes)			Biomass Fuel-2 Consumptions (in tonnes)			Biomass Fuel-1 Consumptions (in tonnes)			Fossil Fuel (Coal) consumption (in tonnes)			% Fossil Fuel consumption of Total Fuel Consumption (%)	
		Type of Fuel	During current month	Cummulative last 12 months	Type of Fuel	During current month	Cummulative last 12 months	Type of Fuel	During current month	Cummulative last 12 months	Grade of coal used	During current month	Cummulative last 12 months	During current month (13) / (4+7+10+13)	Cummulative last 12 months (14) / (5+8+11+14)
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