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অসম ৰাজপত্ৰ

सत्यमेव जयते

THE ASSAM GAZETTE

অসাধাৰণ

EXTRAORDINARY

প্ৰাপ্ত কৰ্ত্তৃত্বৰ দ্বাৰা প্ৰকাশিত

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ASSAM ELECTRICITY REGULATORY COMMISSION

NOTIFICATION

The 10th September, 2012

Assam Electricity Regulatory Commission (Terms and Conditions for Tariff Determination from Renewable Energy Sources) Regulations, 2012

No. AERC.25/2012/ In exercise of the powers conferred under section 61 read with Section 181(2)(zd) of the Electricity Act, 2003 (36 of 2003) and all the powers enabling it in this behalf, and after previous publication, the Assam Electricity Regulatory Commission hereby makes the following Regulations:-

REGULATIONS

1. Short Title, extent and Commencement

1.1 These Regulations may be called the "Assam Electricity Regulatory Commission (Terms and Conditions for Tariff determination from Renewable Energy Sources) Regulations, 2012".

1.2 These Regulations shall extend to the whole of State of Assam.

1.3 These Regulations shall come into force from the date of their publication in the official Gazette of the Government of Assam.

2. Introduction

According to Section 61 (h) of the Electricity Act 2003, the Commission shall specify the terms and conditions for determination of tariff for promotion of co-generation and generation of electricity from renewable sources of energy. The Central Electricity Regulatory Commission (CERC) vide L-1/94/CERC/2011 dated 06.02.2012 notified the CERC (Terms and Conditions for Tariff determination from Renewable Energy Sources) Regulations, 2012 under which different aspects of tariff determination for various renewable energy technologies has been incorporated. These Regulations are made in line with that of the CERC regulations mentioned above.

3. Definitions

3.1 In these Regulations, unless the context otherwise requires

i. **'Act'** means the Electricity Act, 2003 (36 of 2003);

ii. **'Auxiliary energy consumption'** or 'AUX' in relation to a period in case of a generating station means the quantum of energy consumed by auxiliary equipment of the generating station, and transformer losses within the generating station, expressed as a percentage of the sum of gross energy generated at the generator terminals of all the units of the generating station;

iii. **'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;

iv. **'Biomass gasification'** means a process of incomplete combustion of biomass resulting in production of combustible gases consisting of a mixture of Carbon monoxide (CO), Hydrogen (H_2) and traces of Methane (CH_4), which is called producer gas.

v. **'Biogas'** means a gas created when organic matter like crop residues, sewage and manure breaks down in an oxygen-free environment (ferments).

vi. **'CUF'** means Capacity Utilization Factor.

vii. **'Capital cost'** means the capital cost as defined in relevant regulations 13, 25, 29, 35, 48, 58, 62, 67 and 77;

viii. **'CERC'** means the Central Electricity Regulatory Commission.

ix. **'Commission'** means the Assam Electricity Regulatory Commission;

x. **'Conduct of Business Regulations'** means the Assam Electricity Regulatory Commission (Conduct of Business) Regulations, 2004 as amended from time to time;

xi. **'Control Period or Review Period'** means the period during which the norms for determination of tariff specified in these regulations shall remain valid;

xii. **'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 litre of liquid fuel or one standard cubic meter of gaseous fuel, as the case may be;

xiii. **'Gross station heat rate'** or 'GHR' means the heat energy input in Kcal required to generate one kWh of electrical energy at generator terminals of a thermal generating station;

xiv. **'Hybrid Solar Thermal Power Plant'** means the solar thermal power plant that uses other forms of energy input sources along with solar thermal energy for electricity generation, and wherein not less than 75% of electricity is generated from solar energy component.

xv. **'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 at the generator terminals).

xvi. **'Inter-connection Point'** shall mean interface point of renewable energy generating facility with the transmission system or distribution system, as the case may be:

a) 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 pooling sub-station;

b) 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;

xvii. **'MNRE'** means the Ministry of New and Renewable Energy of the Government of India.

xviii. **'Non-firm power'** means the power generated from renewable sources, the hourly variation of which is dependent upon nature's phenomenon like sun, cloud, wind etc., that cannot be accurately predicted.

xix. **'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 clause 5.4 of Regulation 5.

xx. **'Operation and maintenance expenses'** or 'O&M expenses' means the expenditure incurred on operation and maintenance of the project, or part thereof, and includes the expenditure on manpower, repairs, spares, consumables, insurance and overheads;

xxi. **'Project'** 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;

xxii.'Renewable Energy' means the grid quality electricity generated from renewable energy sources.

xxiii. **'Renewable Energy Power Plants'** means the power plants other than the conventional power plants generating grid quality electricity from renewable energy sources.

xxiv. '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;

xxv. 'Small Hydro' means Hydro Power projects with a station capacity upto and including 25 MW.

xxvi. 'Solar PV power' means the Solar Photo Voltaic power project that uses sunlight for direct conversion into electricity through Photo Voltaic technology.

xxvii. '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.

xxviii. 'Tariff period' means the period for which tariff is to be determined by the Commission on the basis of norms specified under these Regulations;

xxix. '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 (COD) of such generation facility, namely:-

(a) Wind energy power project	25 years
(b) Biomass power project, non-fossil fuel cogeneration	20 years
(c) Small Hydro Plant	35 years
(d) Solar PV/Solar thermal power plants	25 years
(e) Biomass Gasifier based power project	20 years
(f) Biogas based power project	20 years

xxx. 'Year' means a financial year.

3.2 All other expressions used herein but not specifically defined herein but defined in the Act shall have the meaning assigned to them in the Act. The other expressions used herein but not specifically defined in the regulations or in the Act but defined in the Indian Electricity Grid Code or the AERC (Assam Electricity Grid Code) Regulations or the Assam Electricity Regulatory Commission(Terms and Conditions for determination of Tariff) Regulations, 2006 shall have the meanings assigned to them respectively in the Indian Electricity Grid Code or the AERC (Assam Electricity Grid Code) Regulations or the Assam Electricity Regulatory Commission (Terms and Conditions for determination of Tariff) Regulations, 2006.

4. Scope and extent application

These regulations shall apply for new Renewable Energy projects to be commissioned within the state for generation and sale of electricity to the distribution licensees (within the State) subsequent to date of notification of these regulations and where tariff, for a generating station 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 cases of wind, small hydro projects, biomass power, non-fossil fuel based cogeneration projects, solar PV and Solar Thermal power projects, these regulations shall apply subject to the fulfillment of eligibility criteria specified in regulation 5 of these Regulations.

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.

5. Eligibility Criteria

For the purpose of these regulations a project shall be treated as renewable energy power project only if it meets the following criteria:

5.1 **Wind power project** – using new wind power generators.

5.2 **Small hydro project** – 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.

5.3 **Biomass power project**"– Biomass power projects 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

5.4 **Non-fossil fuel based co-generation project**: The project 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:

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 clause,

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).

(d) 'Topping cycle' means a cogeneration process in which thermal energy produces electricity followed by useful heat application in industrial activities.

5.5 Solar PV and Solar Thermal Power Projects:

Based on Technologies approved by MNRE.

5.6 Biomass Gasifier based Power Project – The project shall qualify to be termed as a biomass gasifier based power project, if it is using new plant and machinery and having a grid connected system that uses 100% producer gas engine, coupled with gasifier technologies approved by MNRE.

5.7 Biogas based Power Project – The project shall qualify to be termed as a biogas based power project, if it is using new plant and machinery and having grid connected system that uses 100% Biogas fired engine, coupled with Biogas technology for co-digesting agriculture residues, manure and otyher bio waste as may be approved by MNRE.

Chapter I

General Principles

6. Control Period or Review Period

The Control Period or Review Period under these Regulations shall be of five years, of which the first year shall be the period from the date of notification of these regulations to 31.3.2013.

Provided that the benchmark capital cost for Solar PV and Solar thermal projects may be reviewed annually by the Commission.

Provided further that the biomass price may be reviewed at the end of the third year of the control period.

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 entire duration of the Tariff Period as specified in Regulation 7 below.

Provided also that the revision in Regulations for next Control Period shall be undertaken at least six months prior to the end of the first Control Period 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.

7. Tariff Period

7.1 The Tariff Period for Renewable Energy power projects except in case of Small hydro projects below 5 MW, Solar PV, Solar thermal, Biomass gaifier and Biogas based power projects shall be thirteen (13) years.

7.2 In case of Small hydro projects below 5 MW, the tariff period shall be thirty five (35) years.

7.3 In case of Solar PV and Solar thermal power projects the Tariff Period shall be twenty five years (25) years.

7.4 In case of biomass gasifier and biogas power projects the tariff period shall be twenty years (20) years.

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

7.6. 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 7.1, 7.2, 7.3,7.4 and 7.5 above.

8. Project Specific tariff

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

(i) Municipal Solid Waste Projects

(ii) 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 shall be guided by the provisions of Chapters VII & VII of these Regulations.

(iii) Hybrid Solar Thermal Power plants

(iv) Other hybrid projects include renewable-renewable or renewable -conventional sources, for which renewable technology is approved by MNRE;

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

(vi) Any other new renewable energy technologies approved by MNRE.

However, the Commission may consider any Renewable Energy projects for determination of project specific tariff as it may deem it appropriate.

b) 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-II of these Regulations, except for capital cost, shall be ceiling norms while determining the project specific tariff.

9. Petition and proceedings for determination of tariff

9.1 The Commission shall determine the generic tariff on the basis of suo-motu petition at least six months 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.

9.2 Notwithstanding anything contained in these regulations,

a) the generic tariff determined for Solar PV projects based on the capital cost and other norms applicable for any year of the control period shall also apply for such projects during the next year; and

b) the generic tariff determined for Solar thermal projects based on the capital cost and other norms for the any year of the control period shall also apply for such projects during the next two years, provided that

(i) the Power Purchase Agreements in respect of the Solar PV projects and Solar thermal projects as mentioned in this clause are signed on or before last day of the year for which generic tariff is determined and

(ii) the entire capacity covered by the Power Purchase Agreements is commissioned on or before 31st March of the next year in respect of Solar PV projects and on or before 31st March of subsequent two years in respect of Solar thermal projects.

9.3 A petition for determination of project specific tariff shall be accompanied by such fee as may be determined by regulations and shall be accompanied by

a) information in forms 1.1, 1.2, 2.1 and 2.2 as the case may be, and as appended in these regulations;

b) Detailed project report outlining technical and operational details, site specific aspects, premise for capital cost and financing plan etc.

c) A Statement of all applicable terms and conditions and expected expenditure for the period for which tariff is to be determined.

d) 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.

e) Any other information that the Commission requires the petitioner to submit. The proceedings for determination of tariff shall be in accordance with the AERC (Conduct of Business) Regulations, 2004.

10. Tariff Structure

10.1 The tariff for renewable energy technologies shall be 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;

Provided that for renewable energy technologies having fuel cost component, like biomass power projects and non-fossil fuel based cogeneration, single part tariff with two components, fixed cost component and fuel cost component, shall be determined. The fuel cost component may be subjected to escalation factor.

11. Tariff Design

11.1 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.

11.2 For the purpose of levellised tariff computation, the discount factor equivalent to Post Tax Weighted average cost of capital shall be considered.

11.3 Levellised tariff shall be specified for the period equivalent to the tariff period.

12. Despatch principles for electricity generated from Renewable Energy Sources

12.1 All renewable energy power plants except for biomass power plants with installed capacity of 10 MW and above, and non-fossil fuel based cogeneration plants shall be treated as 'MUST RUN' power plants and shall not be subjected to 'merit order dispatch principles.

12.2 The biomass power generating station with an installed capacity of 10 MW and above and non-fossil fuel based co-generation projects shall be subjected to scheduling and despatch code as specified under AERC Grid Code and other relevant regulations including amendments thereto.

12.3 Solar generating plants with capacity of 5 MW and above and connected at the connection point of 33 KV level and above shall be subjected to scheduling and despatch code as specified under AERC Grid Code, as amended from time to time.

Chapter II

Financial Principles

13. Capital cost

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, initial spares, civil work, erection and commissioning, financing and 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 9.

14. Debt Equity Ratio

14.1 For generic tariff to be determined based on suo motu petition, the debt equity ratio shall be 70 : 30.

14.2 For Project specific tariff, the following provisions shall apply :-

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 designated in Indian rupees on the date of each investment.

15. Loan and Finance Charges

15.1 **Loan Tenure.** For the purpose of determination of tariff, loan tenure of 12 years shall be considered.

15.2 **Interest Rate**

a) The loans arrived at in the manner indicated in the Regulation 14 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.

b) For the purpose of computation of tariff, the normative interest rate shall be considered as average State Bank of India (SBI) base rate prevalent during first six months of the previous year plus 300 basis points.

c) 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.

16. Depreciation

16.1 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.

16.2 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 12 years of the Tariff Period shall be 5.83% per annum and the remaining depreciation shall be spread over the remaining useful life of the project from 13th year onwards.

16.3 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.

17. Return on Equity

17.1 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 14.

17.2 The normative Return on Equity shall be:

a) Pre-tax 20% per annum for the first 10 years.

b) Pre-tax 24% per annum 11th years onwards.

18. Interest on Working Capital

18.1 The Working Capital requirement in respect of wind energy projects, small hydro power, solar PV and Solar thermal power projects shall be computed in accordance with the following :

Wind Energy / Small Hydro Power / Solar PV / Solar thermal

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 spare @ 15% of operation and maintenance expenses

18.2 The Working Capital requirement in respect of biomass power projects and non-fossil fuel based co-generation projects shall be computed in accordance with the following clause :

Biomass, Biogas Power and Non-fossil fuel Co-generation

a) Fuel costs for four months equivalent to normative PLF;

b) Operation & Maintenance expense for one month;

c) Receivables equivalent to 2 (Two) months of fixed and variable charges for sale of electricity calculated on the target PLF;

d) Maintenance spare @ 15% of operation and maintenance expenses

18.3 Interest on Working Capital shall be at interest rate equivalent to average State Bank of India Base rate during the first six months of the previous year plus 350 basis points.

19. Operation and Maintenance Expenses

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

19.2 Operation and maintenance 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.

19.3 Normative O&M expenses allowed during first year of the Control Period (i.e. FY 2012-13) under these Regulations shall be escalated at the rate of 5.72% per annum over the Tariff Period.

20. Rebate

20.1 For payment of bills of the generating company through letter of credit, a rebate of 2% shall be allowed.

20.2 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.

21. Late payment surcharge

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.

22. Sharing of CDM Benefits

22.1 The proceeds of carbon credit from approved CDM project shall be shared between generating company and concerned beneficiaries in the following manner, namely

a) 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 ;

b) 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.

23. Subsidy or incentive by the Central/State Government

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. Per unit benefit shall be derived on levellised basis at discount factor equivalent to Post Tax weighted average cost of capital.

24. Taxes and Duties

Tariff determined under these regulations shall be exclusive of taxes and duties as may be levied by the appropriate Government:

Provided that the taxes and duties levied by the appropriate Government shall be allowed as pass through on actual incurred basis subject to production of documentary evidence by the generating company.

Chapter III

Technology specific parameters for Wind Energy

25. Capital Cost

25.1 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.

25.2 The capital cost for wind energy projects shall be ₹575 Lakh/MW during first year of Control Period (FY 2012-13) and shall be linked to indexation formula as outlined under Regulation 26.

26. Capital Cost Indexation Mechanism

The following indexation mechanism shall be applicable in case of wind energy projects for adjustments in capital cost over the Control Period with the changes in Wholesale Price Index for Steel and Electrical Machinery.

$CC_{(n)} = P\&M_{(n)} * (1+F_1+F_2+F_3)/P\&M_{(n)} = P\&M_{(0)} * (1+d_{(n)})$

$d_{(n)} = [a*\{(SI_{(n-1)}/SI_{(0)}) - 1\} + b*\{(EI_{(n-1)}/EI_{(0)}) - 1\}]/(a+b),$

Where, $CC_{(n)}$ = Capital Cost for n^{th} year

$P\&M_{(n)}$ = Plant and Machinery Cost for n^{th} year

$P\&M_{(0)}$ = Plant and Machinery Cost for the base year

Note. $P\&M_{(0)}$ is to be computed by dividing the base capital cost (for the first year of the control period) by $(1+F_1+F_2+F_3)$

$d_{(n)}$ = Capital Cost escalation factor for year (n) of Control Period

$SI_{(n-1)}$ = Average WPI Steel Index prevalent for calendar year (n-1) of the Control Period

$SI_{(0)}$ = Average WPI Steel Index prevalent for calendar year (0) at the beginning of the Control Period i.e. April 2011 to March 2012

$EI_{(n-1)}$ = Average WPI Electrical Machinery Index prevalent for calendar year (n-1) of the Control Period

$EI_{(0)}$ = Average WPI Electrical and Machinery Index prevalent for calendar year (0) at the beginning of the Control Period i.e. April 2011 to March 2012

a = Constant to be determined by Commission from time to time, (In default it is 0.6), for weightage to Steel Index

b = Constant to be determined by Commission from time to time, (In default it is 0.4), for weightage to Electrical Machinery Index

F_1 = Factor for Land and Civil Works (0.08)

F_2 = Factor for Erection and Commissioning (0.07)

F_3 = Factor for IDC and Financing Cost (0.10)

27. Capacity Utilisation Factor

27.1 CUF norms for this control period shall be as follows:

Annual Mean Wind Power Density (W/m^2)	CUF
Upto 200	20%
201-250	22%
251-300	25%
301-400	30%
> 400	32%

27.2 The annual mean wind power density specified in Regulation 27.1 above shall be measured at 80 meter hub-height.

27.3 For the purpose of classification of wind energy project into particular wind zone class, as per MNRE guidelines for wind measurement, wind mast either put-up by C-WET or a private developer and validated by C-WET would be normally extended 10 km from the mast-point to all directions for uniform terrain and limited to appropriate distant in complex terrain with regard to complexity of the site. Based on such validation by C-WET, State Nodal Agency should certify zoning of the proposed wind farm complex.

28. Operation and Maintenance Expenses

28.1 Normative O&M expenses for the first year of the Control Period (i.e. FY 2012-13) shall be Rs 9.00 Lakh per MW.

28.2 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 IV

Technology specific parameters for Small Hydro Project

29. Capital Cost

29.1 The normative capital cost for small hydro projects during first year of Control Period (FY 2012-13) shall be as follows:

Size of Project	Capital cost(₹ in Lakh/MW)
Below 5 MW	770
5 MW to 25 MW	700

29.2 The capital cost for subsequent years shall be determined on the basis of indexation formula as outlined under Regulation 30.

30. Capital Cost Indexation Mechanism

The following indexation mechanism shall be applicable in case of small hydro power projects for adjustments in capital cost over the Control Period with the changes in Wholesale Price Index for Steel and Electrical Machinery.

$CC_{(n)} = P\&M_{(n)} * (1+F_1+F_2+F_3)/P\&M_{(n)} = P\&M_{(0)} * (1+d_{(n)})$

$d_{(n)} = [a*\{(SI_{(n-1)}/SI_{(0)}) - 1\} + b*\{(EI_{(n-1)}/EI_{(0)}) - 1\}]/(a+b)$

Where, $CC_{(n)}$ = Capital Cost for n^{th} year

$P\&M_{(n)}$ = Plant and Machinery Cost for n^{th} year

$P\&M_{(0)}$ = Plant and Machinery Cost for the base year

Note. $P\&M_{(0)}$ is to be computed by dividing the base capital cost (for the first year of the control period) by $(1+F_1+F_2+F_3)$

Size of Project	Base Capital Cost (₹ Lakh/MW)	Factor$(1+F_1+F_2+F_3)$	$P\&M_{(0)}$ (₹ Lakh/MW)
Below 5 MW	770	1.40	550
5 MW to 25 MW	700	1.40	500

$d_{(n)}$ = Capital Cost escalation factor for year (n) of Control Period

$SI_{(n-1)}$ = Average WPI Steel Index prevalent for calendar year (n-1) of the Control Period

$SI_{(0)}$ = Average WPI Steel Index prevalent for calendar year (0) at the beginning of the Control Period i.e. April 2011 to March 2012

$EI_{(n-1)}$ = Average WPI Electrical Machinery Index prevalent for calendar year (n-1) of the Control Period

$EI_{(0)}$ = Average WPI Electrical and Machinery Index prevalent for calendar year (0) at the beginning of the Control Period i.e. April 2011 to March 2012

a = Constant to be determined by Commission from time to time. (In default it is 0.6). for weightage to Steel Index

b = Constant to be determined by Commission from time to time. (In default it is 0.4). for weightage to Electrical Machinery Index

F_1 = Factor for Land and Civil Work (0.16)

F_2 = Factor for Erection and Commissioning (0.10)

F_3 = Factor for IDC and Financing Cost (0.14)

31. Capacity Utilisation Factor

Capacity Utilisation factor for the small hydro projects shall be 45%. The normative CUF shall be net of free power to the home State, if any, and any quantum of free power if committed by the developer over and above the normative CUF shall not be factored into the tariff.

32. Auxiliary Consumption

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

33. Operation and Maintenance Expenses

33.1. The normative O&M cost for the first year of Control Period (FY 2012-13) shall be as follows:

Size of Project	O&M expenses (₹ in lakh/MW)
Below 5 MW	25
5 MW to 25 MW	18

33.2. 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.

Chapter V

Technology specific parameters for Biomass based Power Projects Based on Rankine Cycle technology.

34. Technology Aspect

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

35. Capital Cost

The normative capital cost for the biomass power projects shall be ₹445 Lakh/MW during first year of Control Period (FY 2012-13) and shall be linked to indexation formula as outlined under Regulation 36.

36. Capital Cost Indexation Mechanism

The following indexation mechanism shall be applicable in case of biomass power projects for adjustment in capital cost over the Control Period with the changes in Wholesale Price Index for Steel and Electrical Machinery,

$CC_{(n)} = P\&M_{(n)} * (1+F_1+F_2+F_3) / P\&M_{(n)} = P\&M_{(0)} * (1+d_{(n)})$

$d_{(n)} = [a*\{(SI_{(n-1)}/SI_{(0)}) - 1\} + b*\{(EI_{(n-1)}/EI_{(0)}) - 1\}]/(a+b)$

Where, $CC_{(n)}$ = Capital Cost for n^{th} year

$P\&M_{(n)}$ = Plant and Machinery Cost for n^{th} year

$P\&M_{(0)}$ = Plant and Machinery Cost for the base year

Note. $P\&M_{(0)}$ is to be computed by dividing the base capital cost (for the first year of the control period) by $(1+ F_1+F_2+F_3)$

$d_{(n)}$ = Capital Cost escalation factor for year (n) of Control Period

$SI_{(n-1)}$ = Average WPI Steel Index prevalent for calendar year (n-1) of the Control Period

$SI_{(0)}$ = Average WPI Steel Index prevalent for calendar year (0) at the beginning of the Control Period i.e. April 2011 to March 2012

$EI_{(n-1)}$ = Average WPI Electrical Machinery Index prevalent for calendar year (n-1) of the Control Period

$EI_{(0)}$ = Average WPI Electrical and Machinery Index prevalent for calendar year (0) at the beginning of the Control Period i.e. April 2011 to March 2012

a = Constant to be determined by Commission from time to time. (In default it is 0.7), for weightages to Steel Index

b = Constant to be determined by Commission from time to time. (In default it is 0.3), for weightages to Electrical Machinery Index

F_1 = Factor for Land and Civil Works (0.10)

F_2 = Factor for Erection and Commissioning (0.09)

F_3 = Factor for IDC and Financing Cost (0.14)

37. Plant Load Factor

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

a) During Stabilisation: 60%

b) During the remaining period of the first year (after stabilization) : 70%

c) From 2nd Year onwards: 80 %

37.2 The stabilisation period shall not be more than 6 months from the date of commissioning of the project.

38. Auxiliary Consumption

The auxiliary power consumption factor shall be 10% for the determination of tariff.

39. Station Heat Rate

The Station Heat Rate for biomass power projects shall be 4000 kCal / kWh.

40. Operation and Maintenance Expenses

40.1 Normative O&M expenses for the first year of the Control period (i.e. FY 2012-13) shall be ₹24 Lakh per MW.

40.2 Normative O&M expenses allowed at the commencement of the Control Period (i.e. FY 2012-13) under these Regulations shall be escalated at the rate of 5.72% per annum.

41. Fuel Mix

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

The use of fossil fuels shall be limited to the extent of 15% of total fuel consumption on annual basis.

43. Monitoring Mechanism for the use of fossil fuel

43.1 The Project developer shall furnish a monthly fuel usage statement and monthly fuel procurement statement duly certified by Chartered Accountant to the beneficiary (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 -

a) Quantity of fuel (in tonnes) for each fuel type (biomass fuels and fossil fuels) consumed and procured during the month for power generation purposes,

b) Cumulative quantity (in tonnes) of each fuel type consumed and procured till the end of that month during the year,

c) Actual (gross and net) energy generation (denominated in units) during the month,

d) Cumulative actual (gross and net) energy generation (denominated in units) until the end of that month during the year,

e) Opening fuel stock quantity (in tonnes),

f) Receipt of fuel quantity (in tonnes) at the power plant site and

g) Closing fuel stock quantity (in tonnes) for each fuel type (biomass fuels and fossil fuels) available at the power plant site.

43.2 Non-compliance with the condition of fossil fuel usage by the project developer, during any financial year, shall result in withdrawal of applicability of tariff as per these Regulations for such biomass based power project.

44. Calorific Value

The Calorific Value of the biomass fuel used for the purpose of determination of tariff shall be 3300 (Kcal/kg)

45. Fuel cost

Biomass fuel price during first year of the Control Period (i.e. FY 2012-13) shall be 2476 ₹/MT) and shall be linked to indexation formulae as specified under Regulation 46. Alternatively, for each subsequent year of the Tariff Period, the normative escalation factor of 5% per annum shall be applicable at the option of the biomass project developer

46. Fuel Price Indexation Mechanism

46.1 In case of biomass power projects, the following indexing mechanism for adjustment of fuel prices for each year of operation will be applicable for determination of applicable variable charge component of tariff, in case developer wishes to opt for indexing mechanism:

$P_{(n)} = P_{(n-1)} * \{a * (WPI_{(n)}/WPI_{(n-1)}) + b * (1+IRC)_{(n-1)} + c *(Pd_{(n)}/Pd_{(n-1)})\}$

Where,

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

$P_{(n-1)}$ = Price per tonne of biomass for the $(n-1)^{th}$ year to be considered for tariff determination. P_1 shall be Biomass price for FY 2012-13 as specified under Regulation 45.

a = Factor representing fuel handling cost

b =Factor representing fuel cost

c = Factor representing transportation cost

$IRC_{(n-1)}$ = Average Annual Inflation Rate for indexed energy charge component in case of captive coal mine source (in %) to be applicable for $(n-1)^{th}$ year, as may be specified by CERC for 'Payment purpose' as per Competitive Bidding Guidelines

Pd_n = Weighted average price of HSD for n^{th} year.

Pd_{n-1} = Weighted average price of HSD for $(n-1)^{th}$ year.

WPI_n = Whole sale price index for the month of April of n^{th} year

WPI_{n-1} = Wholesale price index for month of April of $(n-1)^{th}$ year.

Where a, b & c will be specified by the Commission from time to time. In default, these factors shall be 0.2, 0.6 & 0.2 respectively.

46.2 Variable Charge for the n^{th} year shall be determined as under:

i.e. $VC_n = VC_1 x (P_n / P_1)$ or $VC_n = VC_1 x (1.05)^{(n-1)}$ (optional)

Where,

VC_1 represents the Variable Charge based on Biomass Price P_1 for FY 2012-13 as specified under Regulation 45 and shall be determined as under:

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

46.3 The biomass base price shall be revised at the end of third year of the control period and same shall also be applicable to project commissioned under this Control Period.

Chapter VI

Technology specific parameters for Non-fossil fuel based Cogeneration Projects

47. Technology Aspect

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 5.4.

48. Capital Cost

The normative capital cost for the non-fossil fuel based cogeneration projects shall be ₹420 Lakh/MW for the first year of Control Period i.e. (FY 2012-13), and shall be linked to indexation formula as outlined under Regulation 49.

49. Capital Cost Indexation Mechanism

The following indexation mechanism shall be applicable in case of nonfossil fuel based cogeneration projects for adjustments in capital cost with the changes in Wholesale Price Index for Steel and Electrical Machinery,

$CC_{(n)} = P\&M_{(n)} * (1+F_1+F_2+F_3) / P\&M_{(n)} = P\&M_{(0)} * (1+d_{(n)})$

$d_{(n)} = [a*\{(SI_{(n-1)}/SI_{(0)}) - 1\} + b*\{(EI_{(n-1)}/EI_{(0)}) - 1\}]/(a+b)$

Where,

$CC_{(n)}$ = Capital Cost for n^{th} year

$P\&M_{(n)}$ = Plant and Machinery Cost for n^{th} year

$P\&M_{(0)}$ = Plant and Machinery Cost for the base year

Note: $P\&M_{(0)}$ is to be computed by dividing the base capital cost (for the first year of the control period) by $(1+ F_1+F_2+F_3)$

$d_{(n)}$ = Capital Cost escalation factor for year (n) of Control Period

$SI_{(n-1)}$ = Average WPI Steel Index prevalent for fiscal year (n-1) of the Control Period

$SI_{(0)}$ = Average WPI Steel Index prevalent for calendar year (0) at the beginning of the Control Period i.e. April 2011 to March 2012

$EI_{(n-1)}$ = Average WPI Electrical Machinery Index prevalent for calendar year (n-1) of the Control Period

$EI_{(0)}$ = Average WPI Electrical and Machinery Index prevalent for calendar year (0) at the beginning of the Control Period i.e. April 2011 to March 2012

a = Constant to be determined by Commission from time to time, (In default it is 0.7), for weightages to Steel Index

b = Constant to be determined by Commission from time to time, (In default it is 0.3), for weightages to Electrical Machinery Index

F_1 = Factor for Land and Civil Work (0.10)

F_2 = Factor for Erection and Commissioning (0.09)

F_3 = Factor for IDC and Financing Cost (0.14)

50. Plant Load Factor

50.1 For the purpose of determining fixed charge, the plant load factor for non-fossil fuel based cogeneration 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 clause 50.2 below and load factor of 92%.

50.2 The number of operating days for the State of Assam shall be 150 days (crushing) + 60 days (off-season) = 210 days operating days and the Plant Load Factor shall be 53%

51. Auxiliary Consumption

The auxiliary power consumption factor shall be 8.5% for the computation of tariff.

52. Station Heat Rate

The Station Heat Rate of 3600 kCal / kWh for power generation component alone shall be considered for computation of tariff for non-fossil fuel based Cogeneration projects.

53. Calorific Value

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 44 shall be applicable.

54. Fuel Cost

54.1 The price of Bagasse shall be 1583 (₹/MT) and shall be linked to indexation formulae as outlined under Regulation 55. Alternatively, for each subsequent year of the Control Period, the normative escalation factor of 5% per annum shall be applicable at the option of the project developer.

54.2 For use of biomass other than bagasse in co-generation projects, the biomass prices as specified under Regulation 45 shall be applicable.

55. Fuel Price Indexation Mechanism

55.1 In case of non-fossil fuel based cogeneration projects, the following indexing mechanism for adjustment of fuel prices for each year of operation will be applicable for determination of applicable variable charge component of tariff, in case developer wishes to opt for indexing mechanism:

$$P_{(n)} = P_{(n-1)} * \{a * (WPI_{(n)}/WPI_{(n-1)}) + b * (1+IRC)_{(n-1)} + c * (Pd_{(n)}/Pd_{(n-1)})\}$$

Where,

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

$P_{(n-1)}$ = Price per tonne of Bagasse for the $(n-1)^{th}$ year to be considered for tariff determination. P_1 shall be Bagasse price for FY 2012-13 as specified under Regulation 54.

a = Factor representing fuel handling cost

b = Factor representing fuel cost

c = Factor representing transportation cost

$IRC_{(n-1)}$ = Average Annual Inflation Rate for indexed energy charge component in case of captive coal mine source (in %) to be applicable for $(n-1)^{th}$ year, as may be specified by CERC for 'Payment purpose' as per Competitive Bidding Guidelines

Pd_n = Weighted average price of HSD for n^{th} year.

Pd_{n-1} = Weighted average price of HSD for $(n-1)^{th}$ year.

WPI_n = Whole sale price index for the month of April of n^{th} year

WPI_{n-1} = Wholesale price index for month of April of $(n-1)^{th}$ year.

Where a, b & c will be specified by the Commission from time to time. In default, these factors shall be 0.2, 0.6 & 0.2 respectively.

55.2 Variable Charge for the n^{th} year shall be determined as under:

i.e. $VC_n = VC_1 x (P_n / P_1)$ or $VC_n = VC_1 x (1.05)^{(n-1)}$ (optional)

Where,

VC_1 represents the Variable Charge based on Bagasse Price P_1 for FY 2012-13 as specified under Regulation 54 and shall be determined as under:

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

56. Operation and Maintenance Expenses

56.1 Normative O&M expenses during first year of the Control period (i.e. FY 2012-13) shall be ₹ 16 Lakh per MW.

56.2 Normative O&M expenses allowed at the commencement of the Control Period (i.e. FY 2012-13) under these Regulations shall be escalated at the rate of 5.72% per annum.

Chapter VII

Technology specific parameters for Solar PV Power Project

57. Technology Aspects

Norms for Solar Photovoltaic (PV) power under these Regulations shall be applicable for grid connected PV systems 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.

58. Capital Cost

The normative capital cost for setting up Solar Photovoltaic Power Project shall be ₹1000 Lakh/MW for FY 2012-13. Provided that the Commission may deviate from above norm in case of project specific tariff determination in pursuance of Regulation 8 and Regulation 9.

59. Capacity Utilisation Factor (CUF)

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 8 and Regulation 9.

60. Operation and Maintenance Expenses

60.1 The O&M Expenses shall be ₹11 Lakhs/MW for the 1st year of operation.

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

Chapter VIII

Technology specific parameters for Solar Thermal Power Project

61. Technology Aspects

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.

62. Capital cost

The normative capital cost for setting up Solar Thermal Power Project shall be ₹ 1300 Lakh/ MW for FY 2012-13.

Provided that the Commission may deviate from the above norm in case of project specific tariff determination in pursuance of Regulation 8 and Regulation 9.

63. Capacity Utilisation Factor (CUF)

The Capacity utilisation factor shall be 23%.

Provided that the Commission may deviate from the above norm in case of project specific tariff determination in pursuance of Regulation 8 and Regulation 9.

64. Operation and Maintenance Expenses

64.1 The O&M Expenses shall be ₹ 15 Lakhs/MW for 1st year operation.

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

65. Auxiliary Consumption

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 8 and Regulation 9.

Chapter IX

Technology specific parameters for Biomass Gasifier Power Projects

66. Technology Aspect:

The norms for tariff determination specified hereunder are for biomass gasifier power projects based.

67. Capital Cost

The normative capital cost for the biomass gasifier power projects based on Rankine cycle shall be ₹550 Lakh/MW (FY 2012-13) during first year of Control Period and shall be linked to indexation formula as outlined under Regulation 68. After taking into account of capital subsidy net project cost shall be ₹400 Lakh/MW for FY 2012-13.

68. Capital Cost Indexation Mechanism

The following indexation mechanism shall be applicable in case of biomass gasifier power projects for adjustment in capital cost over the Control Period with the changes in Wholesale Price Index for Steel and Electrical Machinery,

$$CC_{(n)} = P\&M_{(n)} * (1+ F_1+F_2+F_3) / P\&M_{(n)} = P\&M_{(0)} * (1+d_{(n)})$$

$$d_{(n)} = [a*\{(SI_{(n-1)}/SI_{(0)})- 1\} + b*\{(EI_{(n-1)}/EI_{(0)}) - 1\}]/(a+b)$$

Where,

$CC_{(n)}$ = Capital Cost for n^{th} year

$P\&M_{(n)}$ = Plant and Machinery Cost for n^{th} year

$P\&M_{(0)}$ = Plant and Machinery Cost for the base year

Note: $P\&M_{(0)}$ is to be computed by dividing the base capital cost (for the first year of the control period) by $(1+F_1+F_2+F_3)$

$d_{(n)}$ = Capital Cost escalation factor for year (n) of Control Period

$SI_{(n-1)}$ = Average WPI Steel Index prevalent for calendar year (n-1) of the Control Period

$SI_{(0)}$ = Average WPI Steel Index prevalent for calendar year (0) at the beginning of the Control Period i.e. April 2011 to March 2012

$EI_{(n-1)}$ = Average WPI Electrical Machinery Index prevalent for calendar year (n-1) of the Control Period

$EI_{(0)}$ = Average WPI Electrical and Machinery Index prevalent for calendar year (0) at the beginning of the Control Period i.e. April 2011 to March 2012.

a = Constant to be determined by Commission from time to time, (In default it is 0.7). for weightages to Steel Index

b = Constant to be determined by Commission from time to time, (In default it is 0.3), for weightages to Electrical Machinery Index

F_1 = Factor for Land and Civil Works (0.10)

F_2 = Factor for Erection and Commissioning (0.09)

F_3 = Factor for IDC and Financing Cost (0.14)

69. Plant Load Factor

Threshold Plant Load Factor for determining fixed charge component of Tariff shall be 85%.

70. Auxiliary Consumption

The auxiliary power consumption factor shall be 10% for the determination of tariff.

71. Specific fuel consumption

Normative specific fuel consumption shall be 1.25 kg per kWh.

72. Operation and Maintenance Expenses

72.1 Normative O&M expenses for the first year of the Control period (i.e. FY 2012-13) shall be ₹40 Lakh per MW.

72.2 Normative O&M expenses allowed at the commencement of the Control Period (i.e. FY 2012-13) under these Regulations shall be escalated at the rate of 5.72% per annum.

73. Fuel Mix

73.1 The Biomass Gasifier based 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, agroindustrial residues, forest residues etc. and other biomass fuels as may be approved by MNRE.

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

74. Fuel Cost

Biomass fuel price during first year of the Control Period (i.e. FY 2012-13) shall be as per Regulation 45 and shall be linked to indexation formula as specified under Regulation 75. Alternatively, for each subsequent year of the Tariff Period, the normative escalation factor of 5% per annum shall be applicable at the option of the Biomass Gasifier project developer.

75. Fuel Price Indexation Mechanism

75.1 In case of Biomass Gasifier power projects, the following indexing mechanism for adjustment of fuel prices for each year of operation will be applicable for determination of applicable variable charge component of tariff, in case developer wishes to opt for indexing mechanism:

$$P_{(n)} = P_{(n-1)} * \{a * (WPI_{(n)}/WPI_{(n-1)}) + b * (1+IRC)_{(n-1)} + c *(Pd_{(n)}/Pd_{(n-1)})\}$$

Where,

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

$P_{(n-1)}$ = Price per tonne of biomass for the $(n-1)^{th}$ year to be considered for tariff determination. P_1 shall be Biomass price for FY 2012-13 as specified under Regulation 45.

a = Factor representing fuel handling cost

b = Factor representing fuel cost

c = Factor representing transportation cost

$IRC_{(n-1)}$ = Average Annual Inflation Rate for indexed energy charge component in case of captive coal mine source (in %) to be applicable for $(n-1)^{th}$ year, as may be specified by CERC for 'Payment purpose' as per competitive Bidding Guidelines

Pd_n = Weighted average price of HSD for n^{th} year.

Pd_{n-1} = Weighted average price of HSD for $(n-1)^{th}$ year.

WPI_n = Whole sale price index for the month of April of n^{th} year

WPI_{n-1} = Wholesale price index for month of April of $(n-1)^{th}$ year.

Where a, b & c will be specified by the Commission from time to time. In default, these factors shall be 0.2, 0.6 & 0.2 respectively.

75.2 Variable Charge for the n^{th} year shall be determined as under:

i.e. $VC_n = VC_1 x (P_n / P_1)$ or $VC_n = VC_1 x (1.05)^{(n-1)}$ (optional)

Where,

VC_1 represents the Variable Charge based on Biomass Price P_1 for FY 2012-13 as specified under Regulation 45 and shall be determined as under:

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

75.3 The biomass base price shall be revised at the end of the control period for the next Control Period and same shall also be applicable to project commissioned under this Control Period.

Chapter X

Technology specific parameters for Biogas based Power Projects

76. Technology Aspect

The norms for tariff determination specified hereunder are for grid connected biogas based power projects that uses 100% Biogas fired engine, coupled with Biogas technology for co-digesting agriculture residues, manure and other bio waste as may be approved by MNRE.

77. Capital Cost

The normative capital cost for the biogas based power shall be ₹1100 Lakh/MW during first year of Control Period (FY 2012-13) and shall be linked to indexation formula as outlined under Regulation 77. After taking into account of capital subsidy net project cost shall be ₹ 800Lakh/MW for FY 2012-13.

78. Capital Cost Indexation Mechanism

The following indexation mechanism shall be applicable in case of biogas based power projects for adjustment in capital cost over the Control Period with the changes in Wholesale Price Index for Steel and Electrical Machinery,

$$CC_{(n)} = P\&M_{(n)} * (1+F_1+F_2+F_3) / P\&M_{(n)} = P\&M_{(0)} * (1+d_{(n)})$$

$$d_{(n)} = [a*\{(SI_{(n-1)}/SI_{(0)}) - 1\} + b*\{(EI_{(n-1)}/EI_{(0)}) - 1\}]/(a+b)$$

Where,

$CC_{(n)}$ = Capital Cost for n^{th} year

$P\&M_{(n)}$ = Plant and Machinery Cost for n^{th} year

$P\&M_{(0)}$ = Plant and Machinery Cost for the base year

Note: $P\&M_{(0)}$ is to be computed by dividing the base capital cost (for the first year of the control period) by $(1+F_1+F_2+F_3)$

$d_{(n)}$ = Capital Cost escalation factor for year (n) of Control Period

$SI_{(n-1)}$ = Average WPI Steel Index prevalent for calendar year (n-1) of the Control Period

$SI_{(0)}$ = Average WPI Steel Index prevalent for calendar year (0) at the beginning of the Control Period i.e. April 2011 to March 2012

$EI_{(n-1)}$ = Average WPI Electrical Machinery Index prevalent for calendar year (n-1) of the Control Period

$EI_{(0)}$ = Average WPI Electrical and Machinery Index prevalent for calendar year (0) at the beginning of the Control Period i.e. April 2011 to March 2012

a = Constant to be determined by Commission from time to time, (In default it is 0.7), for weightages to Steel Index

b = Constant to be determined by Commission from time to time, (In default it is 0.3), for weightages to Electrical Machinery Index

F_1 = Factor for Land and Civil Works (0.10)

F_2 = Factor for Erection and Commissioning (0.09)

F_3 = Factor for IDC and Financing Cost (0.14)

79. Plant Load Factor

Threshold Plant Load Factor for determining fixed charge component of Tariff shall be 90%.

80. Auxiliary Consumption

The auxiliary power consumption factor shall be 12% for the determination of tariff.

81. Operation and Maintenance Expenses

81.1 Normative O&M expenses for the first year of the Control period (i.e. FY 2012-13) shall be ₹ 40 Lakh per MW.

81.2 Normative O&M expenses allowed at the commencement of the Control Period (i.e. FY 2012-13) under these Regulations shall be escalated at the rate of 5.72% per annum.

82. Specific Fuel Consumption

Normative specific fuel consumption shall be 3 kg of substrate mix per kWh.

83. Fuel Cost (Feed stock Price)

Feed stock price during first year of the Control Period (i.e. FY 2012-13) shall be ₹990/MT for FY 2012-13 (net of any cost recovery from digester effluent).

84. Fuel Price Indexation Mechanism

84.1 In case of biomass power projects, the following indexing mechanism for adjustment of fuel prices for each year of operation will be applicable for determination of applicable variable charge component of tariff, in case developer wishes to opt for indexing mechanism:

$$P_{(n)} = P_{(n-1)} * \{a * (WPI_{(n)}/WPI_{(n-1)}) + b * (1+IRC)_{(n-1)} + c *(Pd_{(n)}/Pd_{(n-1)})\}$$

Where,

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

$P_{(n-1)}$ = Price per tonne of biomass for the $(n-1)^{th}$ year to be considered for tariff determination.

P_1 shall be Feed stock price for FY 2012-13 as specified under Regulation 83

a = Factor representing fuel handling cost

b = Factor representing fuel cost

c = Factor representing transportation cost

$IRC_{(n-1)}$ = Average Annual Inflation Rate for indexed energy charge component in case of captive coal mine source (in %) to be applicable for $(n-1)^{th}$ year, as may be specified by CERC for 'Payment purpose' as per Competitive Bidding Guidelines

Pd_n = Weighted average price of HSD for n^{th} year.

Pd_{n-1} = Weighted average price of HSD for $(n-1)^{th}$ year.

WPI_n = Whole sale price index for the month of April of n^{th} year

WPI_{n-1} = Wholesale price index for month of April of $(n-1)^{th}$ year

Where a, b & c will be specified by the Commission from time to time. In default, these factors shall be 0.2, 0.6 & 0.2 respectively.

84.2 Variable Charge for the n^{th} year shall be determined as under:

i.e. $VC_n = VC_1 \times (P_n / P_1)$ or $VC_n = VC_1 \times (1.05)^{(n-1)}$ (optional) where,

VC_1 represents the Variable Charge based on Biomass Price P_1 for FY 2012-13 as specified under Regulation 45 and shall be determined as under:

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

84.3 The biomass base price shall be revised at the end of third year of the control period and same shall also be applicable to project commissioned under this Control Period.

Chapter XI

Miscellaneous

85. Deviation from norms

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 tariff period 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.

86. Power to Relax

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.

87. Power to Amend

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

88. Power to remove difficulties

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

89. Overriding Effect

Notwithstanding anything contained contrary -

- In the AERC (Terms and Conditions for Determination of Tariff) Regulations, 2006; these regulations shall have overriding effect.

90. Repeals

With the coming into force of these Regulations, the following provisions of the Assam Electricity Regulatory Commission (Co-generation and Generation of Electricity from Renewable Sources of Energy) Regulations, 2009 shall stand repealed :

a) Regulation 6: Determination of Tariff for electricity from Renewable sources and Cogeneration, shall stand repealed.

b) Regulation 7: Price Capping for Energy from Cogeneration and various Renewable Sources like (1) Biomass, (2) Small Hydro, (3) Co-generation (4) Municipal Solid Waste (MSW), and (5)(a) Solar PV, shall stand repealed.

91. Savings

(a) Notwithstanding such repeal anything done or any action taken or purported to have been done or taken including any order or notice made or issued or any instrument executed or direction given under the repealed Regulations shall be valid and shall be deemed to have been done or taken under the corresponding provisions of these Regulations.

(b) Nothing in these Regulations shall be deemed to limit or otherwise affect the inherent powers of the Commission to make such orders as may be necessary for meeting the ends of justice or to prevent the abuse of power of the Commission.

(By order of the Commission)

Secretary,
Assam Electricity Regulatory Commission

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

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 Lacs	
			Total Equity Amout	Rs Lacs	
		Debt component			
			Loan Amount	Rs Lacs	
			Moratorium Period	years	
			Repayment Period(incld Moratodium)	years	
			Intrest Rate	%	
		Equity component			
			Equity amount	Rs Lacs	
			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 L p.a.	
			Period for GBI	Years	
4	Operation & Maintenance				
		Normative O&M expense		Rs Lakh/MW	
		O&M expense per annum		Rs Lakh	
		Escalation factor for O&M expense		%	
5	Working Capital	Loan Expense		Months	
		Maintenance Spare	(% of O&M exepenses)	%	
		Receivables		Months	
		Interest on Working Capital		% p.a.	

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

Units Generation	Unit	Yr-1	Yr-2	Yr-3	Yr-4	Yr-5	Yr-6	Yr-7	Yr-8	Yr-9	Yr-10	Yr-11	Yr-12	Yr-13	Yr-14	Yr-15	Yr-16	Yr-17	Yr-18	Yr-19	Yr-20	Yr-21	Yr-22	Yr-23	Yr-24
Installed Capacity	MW																								
Net Generation	MU																								

Tariff Components (Fixed charge)	Unit	Yr-1	Yr-2	Yr-3	Yr-4	Yr-5	Yr-6	Yr-7	Yr-8	Yr-9	Yr-10	Yr-11	Yr-12	Yr-13	Yr-14	Yr-15	Yr-16	Yr-17	Yr-18	Yr-19	Yr-20	Yr-21	Yr-22	Yr-23	Yr-24
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	Yr-1	Yr-2	Yr-3	Yr-4	Yr-5	Yr-6	Yr-7	Yr-8	Yr-9	Yr-10	Yr-11	Yr-12	Yr-13	Yr-14	Yr-15	Yr-16	Yr-17	Yr-18	Yr-19	Yr-20	Yr-21	Yr-22	Yr-23	Yr-24
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																								

Levellised Tariff	Unit	Yr-1	Yr-2	Yr-3	Yr-4	Yr-5	Yr-6	Yr-7	Yr-8	Yr-9	Yr-10	Yr-11	Yr-12	Yr-13	Yr-14	Yr-15	Yr-16	Yr-17	Yr-18	Yr-19	Yr-20	Yr-21	Yr-22	Yr-23	Yr-24
Discount Factors																									
Discounted Tariff components	Rs/kWh																								
Levellised Tariff	Rs/kWh																								

Form-2.1: Form Template for (Biomass Power or Non-fossil fuel based Cogen) : Parameter Assumptions

S. No.	Assumption Head	Sub-Head	Sub-Head (2)	Unit	Parameter values
1	Power Generation				
		Capacity	Installed Power Generation Capacity	MW	
			Auxiliary Consumption factor	%	
			PLF (during stabilisation upto 6 months)	%	
			PLF (during 1st yr after stabilisation)	%	
			PLF (2nd yr onwards)	%	
			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 Lacs	
			Total Equity Amount	Rs Lacs	
		Debt component			
			Loan Amount	Rs Lacs	
			Moratorium Period	years	
			Repayment Period (post Moratorium)	years	
			Intrest Rate	%	
		Equity component			
			Equity amount	Rs Lacs	
			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 L p.a.	
			Period for GBI	Years	
4	Operation & Maintenance				
		Normative O&M expense		Rs Lakh/MW	
		O&M expense per annum		Rs Lakh	
		Escalation factor for O&M expense		%	
5	Working Capital				
		O&M expense		Months	
		Maintenance Spare	(% of O&M expenses)	%	
		Receivables		Months	
		Biomass stock		Months	
		Interest on Working Capital		% p.a.	
6	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.	

Form-2.2: Form Template for (Biomass Power or Non-fossil fuel based Cogen) : Determination of Tariff Components

Under Consideration	Unit	Yr-1	Yr-2	Yr-3	Yr-4	Yr-5	Yr-6	Yr-7	Yr-8	Yr-9	Yr-10	Yr-11	Yr-12	Yr-13	Yr-14	Yr-15	Yr-16	Yr-17	Yr-18	Yr-19	Yr-20	Yr-21	Yr-22	Yr-23	Yr-24	Yr-25
Installed Capacity	MW																									
Net Generation	MU																									

Tariff Components (Fixed charge)	Unit	Yr-1	Yr-2	Yr-3	Yr-4	Yr-5	Yr-6	Yr-7	Yr-8	Yr-9	Yr-10	Yr-11	Yr-12	Yr-13	Yr-14	Yr-15	Yr-16	Yr-17	Yr-18	Yr-19	Yr-20	Yr-21	Yr-22	Yr-23	Yr-24	Yr-25
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	Yr-1	Yr-2	Yr-3	Yr-4	Yr-5	Yr-6	Yr-7	Yr-8	Yr-9	Yr-10	Yr-11	Yr-12	Yr-13	Yr-14	Yr-15	Yr-16	Yr-17	Yr-18	Yr-19	Yr-20	Yr-21	Yr-22	Yr-23	Yr-24	Yr-25
Biomass fuel cost-1	Rs Lakh																									
Biomass fuel cost-2	Rs Lakh																									
Fossil fuel cost	Rs Lakh																									
Sub-total Fuel Costs	Rs Lakh																									
Fuel cost allowance in cover	%																									
Total Fuel Costs	Rs Lakh																									

Per Unit Tariff components (fixed)	Unit	Yr-1	Yr-2	Yr-3	Yr-4	Yr-5	Yr-6	Yr-7	Yr-8	Yr-9	Yr-10	Yr-11	Yr-12	Yr-13	Yr-14	Yr-15	Yr-16	Yr-17	Yr-18	Yr-19	Yr-20	Yr-21	Yr-22	Yr-23	Yr-24	Yr-25
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																									

Levellised Tariff	Unit	Yr-1	Yr-2	Yr-3	Yr-4	Yr-5	Yr-6	Yr-7	Yr-8	Yr-9	Yr-10	Yr-11	Yr-12	Yr-13	Yr-14	Yr-15	Yr-16	Yr-17	Yr-18	Yr-19	Yr-20	Yr-21	Yr-22	Yr-23	Yr-24	Yr-25
Discount Factor																										
Discounted Tariff components (Fixed)	Rs/kWh																									
Discounted Tariff components (Variable)	Rs/kWh																									
Discounted Tariff components (Total)	Rs/kWh																									
Levellised Tariff (fixed)	Rs/kWh																									
Levellised Tariff (variable)	Rs/kWh																									
Levellised Tariff (total)	Rs/kWh																									

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