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Bihar Electricity Regulatory Commission

NOTIFICATION

The 24th October 2017

No. BERC SMP No-10/2017-06— In exercise of powers conferred under Sections 61,66,86(1)(e) read with Section 181 (2) (zd) of the Electricity Act, 2003 (36 of 2003), and all other powers enabling it in this behalf, and after previous publication, the Bihar Electricity Regulatory Commission hereby makes the following regulations, namely:

1. Short title and commencement

- 1) These Regulations may be called the Bihar Electricity Regulatory Commission (Terms and Conditions for Tariff determination from Renewable Energy Sources) Regulations, 2017.
- 2) These regulations shall come into force on the date of publication in the official Gazette, and unless reviewed earlier or extended by the Commission, shall remain in force for a period of 3 years from the date of commencement.
- 3) These Regulations shall extend to the whole of the State of Bihar.

2. Definitions and Interpretation.—In these regulations, unless the context otherwise requires,

- a) **'Act'** means the Electricity Act, 2003 (36 of 2003);
- b) **'Auxiliary energy consumption'** 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;

- 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, de-oiled cakes, etc); wood produced in dedicated energy plantations or recovered from wild bushes/weeds; and the wood waste produced in some industrial operations;
- d) **'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 (H₂) and traces of Methane (CH₄), which is called producer gas;
- e) **'Biogas'** means a gas created when organic matter like crop residues, sewage and manure breaks down in an oxygen-free environment;
- f) **'Capital cost'** means the capital cost as defined in regulations 12, 26, 27, 28, 29, 30 & 31;
- g) **'Commission'** means the Bihar Electricity Regulatory Commission referred to in sub-section (1) of section 82 of the Act;
- h) **'Conduct of Business Regulations'** means the Bihar Electricity Regulatory Commission (Conduct of Business) Regulations, 2005 as amended from time to time;
- i) **'Control Period or Review Period'** means the period during which the norms for determination of tariff specified in these regulations shall remain valid;
- j) **'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 liter of liquid fuel or one standard cubic meter of gaseous fuel, as the case may be;
- k) **'Gross station heat rate'** or 'GHR' means the heat energy input in k.Cal required to generate one kWh of electrical energy at generator terminals of a thermal generating station;
- l) **'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;
- m) **'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), approved by the Commission from time to time;
- n) **'Inter-connection Point'** shall mean interface point of renewable energy generating facility with the transmission system or distribution system, as the case may be:
 - i. For solar photovoltaic Projects, inter-connection point shall be line isolator on outgoing feeder on HV side of the pooling sub-station;
"Pooling sub-station" means a sub-station developed by the developer/ generator pooling of generation from individual turbine is done for interface with receiving 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;
- o) **'MNRE'** means the Ministry of New and Renewable Energy of the Government of India;
- p) **'Municipal solid waste'** means and includes commercial and residential wastes generated in a municipal or notified areas in either solid or semi-solid form excluding industrial hazardous wastes but including treated bio-medical wastes;
- q) **'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;
- r) **'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;
- s) **'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;
- t) **'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;
- u) **'Refuse derived fuel'** means segregated combustible fraction of solid waste other than chlorinated plastics in the form of pellets or fluff produced by drying, de-stoning, shredding, dehydrating, and compacting combustible components of solid waste that can be used as fuel;
- v) **'Renewable Energy'** means the grid quality electricity generated from renewable energy sources;
- w) **'Renewable Energy Power Plants'** means the power plants other than the conventional power plants generating grid quality electricity from renewable energy sources;
- x) **'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;
- y) **'Small Hydro'** means Hydro Power projects with a station capacity up to and including 25 MW;
- z) **'Solar PV power'** means the Solar Photo Voltaic power project that uses sunlight for direct conversion into electricity through Photo Voltaic technology;
- aa) **'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;

- bb) **'Tariff period'** means the period for which tariff is to be determined by the Commission on the basis of norms specified under these Regulations;
- cc) **'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:-

Sl No	RE Projects	Useful Life (Years)
1	Wind energy power project	25
2	Bio mass power project with Rankine cycle technology	20
3	Non-fossil fuel cogeneration project	20
4	Small Hydro Plant	35
5	Municipal Solid Waste (MSW)/ and Refuse Derived Fuel (RDF) based power project	20
6	Solar PV/Solar thermal power project	25
7	Biomass Gasifier based power project	20
8	Biogas based power project	20

- dd) **'Year'** means a financial year.

Save as aforesaid and unless repugnant to the context or if the subject-matter otherwise requires, words and expressions used in these regulations and not defined, but defined in the Act, or the Indian Electricity Grid Code or Bihar Electricity Grid code or the Central Electricity Regulatory Commission (Terms and conditions of Tariff) Regulations, 2012 shall have the meanings assigned to them respectively in the Act or the Indian Electricity Grid Code or Bihar Electricity Grid Code or the Central Electricity Regulatory Commission (Terms and conditions of Tariff) Regulations, 2012.

3. Scope and extent of application.—These regulations shall apply in all cases 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 cases of Biomass power based on Rankine cycle, non-fossil fuel based cogeneration projects, Solar PV, Solar Thermal power projects, Biomass gasifier, Biogas power project, Municipal solid waste and Refuse derived fuel based power projects, these regulations shall apply subject to the fulfillment of eligibility criteria specified in Regulation 4 of these Regulations.

4. Eligibility Criteria

- a) **Small hydro project** – The project shall qualify to be termed as small hydro project if it is 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.
- b) **Biomass power project based on Rankine cycle technology** – The project shall qualify to be termed as Biomass power projects if it is using new plant and machinery based on Rankine cycle technology and using biomass fuel sources, without use of fossil fuel.

- c) 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,

- (i) **'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.
 - (ii) **'Useful Thermal Output'** is the useful heat (steam) that is provided to the process by the cogeneration facility.
 - (iii) **'Energy Consumption'** of the facility is the useful energy input that is supplied by the fuel (normally bagasse or other such biomass fuel).
 - (iv) **'Topping Cycle'** means a co-generation process in which thermal energy produces electricity followed by useful heat application.
- d) Solar PV and Solar Thermal Power Project** – The project shall qualify to be termed as Solar PV and Solar Thermal Power project, if it is based on technologies as approved by MNRE.
- e) 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.
- f) Municipal solid waste (MSW) based power projects** – The project shall qualify to be termed as a Municipal solid waste (MSW) based power project if it is using new plant and machinery based on Rankine cycle technology and using Municipal solid waste (MSW) as fuel sources
- g) Refuse derived fuel (RDF) based power projects** – The project shall qualify to be termed as a Refuse derived fuel (RDF) based power project, if it is using new plant and machinery based on Rankine cycle technology and using Refuse derived fuel (RDF) as fuel sources
- h) Wind power project** – using new wind turbine generators, located at the sites approved by State Nodal Agency/State Government.
- i) 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 other bio waste as may be approved by MNRE.

5. Control Period or Review Period.— The Control Period or Review Period under these Regulations shall be of three (3) years, of which the first year shall be the financial year 2017-18.

Provided 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 6 below.

Provided further that the revision in Regulations for next Control Period shall be undertaken 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.

6. Tariff Period

- a) The Tariff Period for Renewable Energy power projects will be same as their Useful Life as defined in Regulation 2 (z) (cc) of these Regulations.
- b) Tariff period under these Regulations shall be considered from the date of commercial operation of the renewable energy generating stations.
- c) Tariff determined as per these Regulations shall be applicable for Renewable Energy power projects, for the duration of the Tariff Period as stipulated under Clause (a) and (b).

7. 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) Biogas based projects;
 - (ii) Hybrid Solar Thermal Power Projects;
 - (iii) Small Hydro Projects
 - (iv) Other hybrid projects include renewable–renewable or renewable–conventional sources, for which renewable technology is approved by MNRE;
 - (v) Any other new renewable energy technologies approved by MNRE.
 - (vi) Wind Power projects.
- (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 Regulations/Orders of BERC/CERC.

Provided that the financial norms as specified under these Regulations, except for capital cost, shall be ceiling norms while determining the project specific tariff.

8. Petition and proceedings for determination of tariff

- (1) The Commission shall determine the generic tariff on the basis of suo-motu proceeding at the beginning of each year of the Control period for the following types of projects, for which norms have been specified under the Regulations:
 - (a) Solar PV including Rooftop Solar PV and Solar Thermal.
 - (b) Biomass Power Projects based on Rankine Cycle Technologies.
 - (c) Non-fossil fuel based cogeneration projects.
 - (d) Biomass gasifier projects.

- (e) MSW/RDF project based on Rankine cycle.
- (2) 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.
- (3) The proceedings for determination of tariff shall be in accordance with the BERC (Conduct of Business) Regulations, 2005.

9. Tariff Structure.—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 RDF fuel based Waste to Energy projects, biomass power projects and non-fossil fuel based cogeneration, Biomass gasifier projects, single part tariff with two components, fixed cost component and fuel cost component, shall be determined.

10. Tariff Design

- (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.

- (2) For the purpose of levellised tariff computation, the discount factor equivalent to Post Tax weighted average cost of capital shall be considered.
- (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. Despatch principles for electricity generated from Renewable Energy Sources:

- (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 despatch' principles.

- (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 Indian Electricity Grid Code (IEGC) and Central Electricity Regulatory Commission (Deviation Settlement Mechanism and Related Matters) Regulations, 2014 including amendments thereto.
- (3) Scheduling of wind and solar energy shall be governed as per the aforesaid provisions of Central Electricity Regulatory Commission (Indian Electricity Grid Code) (Third Amendment) Regulations, 2015 and Central Electricity Regulatory Commission (Deviation Settlement Mechanism and related matters) (Second Amendment) Regulations, 2015 as amended from time to time."

12. Capital Cost—The norms for the Capital cost as specified in these Regulations shall be inclusive of all capital work including plant and machinery, 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 8.

13. Debt Equity Ratio

- (1) For generic tariff to be determined based on suo-motu proceeding, the debt equity ratio shall be 70:30.
- (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.

14. Loan and Finance Charges.—For the purpose of determination of tariff, loan tenure of 10 years shall be considered.

15 Interest Rate.—

- (a) The loans arrived at in the manner indicated in the Regulation 13 shall be considered as gross normative loan for calculation for interest on loan. The normative loan outstanding as on 1st April 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, normative interest rate of two hundred (200) basis points above the average State Bank of India MCLR (one year tenor) prevalent during the last available six months shall be considered.
- (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

- (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.
- (2) Depreciation rate of 7.0 % per annum for first 10 years and remaining depreciation to be spread during remaining useful life of the RE projects considering the salvage value of the project as 10% of project cost shall be considered.
- (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

- (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.
- (2) The normative Return on Equity shall be 14 %, to be grossed up by prevailing MAT as on 1st April of previous year for the entire useful life of the project.

18. Interest on Working Capital

- (1) The Working Capital requirement in respect of Solar PV and Solar thermal power projects shall be computed in accordance with the following:

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
- (2) The Working Capital requirement in respect of biomass power projects with Rankine Cycle technology, Biomass Gasifier based power projects, non-fossil fuel based co-generation, Municipal Solid Waste and Refuse Derived Fuel projects shall be computed in accordance with the following clause :
 - a) Fuel costs for four months equivalent to normative PLF; However, in case of non-fossil fuel co-generation, fuel cost for one month will be considered.
 - 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
 - (3) Interest on Working Capital shall be at interest rate equivalent to the normative interest rate of three hundred (300) basis points above the average State Bank of India MCLR (One Year Tenor) prevalent during the last available six months for the determination of tariff.

19. Calculation of CUF/PLF.—The number of hours for calculation of CUF/PLF (wherever applicable) for various RE technologies shall be 8760.

20. Operation and Maintenance Expenses

- (1) 'Operation and Maintenance or O&M expenses' shall comprise repair and maintenance (R&M), establishment including employee expenses, and administrative and general expenses.
- (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.
- (3) Normative O&M expenses allowed during first year of the Control Period (i.e. FY 2017-18) under these Regulations shall be escalated at the rate of 5.72% per annum over the Tariff Period.

21. Rebate.

- (1) For payment of bills of the generating company through letter of credit, a rebate of 2% shall be allowed.
- (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.

22. 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.

23. Sharing of Clean Development Management (CDM) Benefits.—

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.

24. 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) Capitalization of RE projects during second half of the fiscal year. Per unit benefit shall be derived on levlised basis at discount factor equivalent to weighted average cost of capital.

25. 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.

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

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

II. Capital Cost.—The normative capital cost for FY 2017-18 for Biomass Projects shall be as under:

Biomass Rankine Cycle Projects	Capital Cost (FY 2017-18) (Rs. lakhs/MW)
Project [other than rice straw and juliflora (plantation) based project] with water cooled condenser	559.03
Project [other than rice straw and Juliflora(plantation) based project] with air cooled condenser	600.44
For rice straw and juliflora (plantation) based project with water cooled condenser	610.80
For rice straw and juliflora(plantation) based project with air cooled condenser	652.20

III. Capital Cost Indexation Mechanism.—The Capital Cost for Biomass Power Projects based on Rankine Cycle Technology as specified for first year of the control period will remain valid for the entire duration of the control period unless reviewed earlier by the Commission.

IV. Plant Load Factor

- (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 %
- (2) The stabilisation period shall not be more than 6 months from the date of commissioning of the project.

V. Auxiliary Consumption.—The auxiliary power consumption factor shall be as follows:-

- a) For the project using water cooled condenser:
 - i. During first year of operation : 11%
 - ii. From 2nd year onwards : 10%
- b) For the project using air cooled condenser:
 - i. During first year of operation : 13%
 - ii. From 2nd year onwards : 12%

VI. Station Heat Rate.—The Station Heat Rate for biomass power projects shall be :

- a) For projects using travelling grate boilers : 4200 kCal/kWh
- b) For projects using AFBC boilers : 4125 kCal/ kWh

VII. Operation and Maintenance Expenses

- (1) Normative O&M expenses for the first year of the Control period (i.e. FY 2017-18 shall be Rs. 40 Lakh per MW.

- (2) Normative O&M expenses allowed at the commencement of the Control Period (i.e. FY 2017-18) under these Regulations shall be escalated at the rate of 5.72% per annum.

VIII. Fuel Mix

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

IX. Use of Fossil Fuel.—The use of fossil fuels shall not be allowed.

Provided that for the biomass power projects commissioned on or before the date of publication of these Regulations in official Gazette, the use of fossil fuels to the extent of 15% in terms of calorific value on annual basis shall be allowed for the tariff period from the date of commissioning.

X. Monitoring Mechanism for the use of fossil fuel

- (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.
- (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.

XI. Calorific Value.—The Calorific Value of the biomass fuel used for the purpose of determination of tariff shall be at 3174 kCal/kg.

XII. Fuel Cost for FY 2017-18.—Biomass fuel price during first year of the Control Period (i.e. FY 2017-18) shall be **Rs. 3073.05/MT**. 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 or shall be as decided by the Commission.

27. Technology specific parameters for Non-fossil fuel based Cogeneration Projects.

- I. **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 4(c).
- II. **Capital Cost.**—The normative capital cost for the non-fossil fuel based cogeneration projects shall be Rs. 492.5 Lakh/MW for high boiler pressure projects for the first year of Control Period (i.e. FY 2017-18), and will remain valid for the entire duration of the control period unless reviewed earlier by the Commission.
- III. **Plant Load Factor.**—
 - (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 (2) below and load factor of 92%.
 - (2) The number of operating days shall be as follows:

150 days (crushing) + 60 days (off-season)	53%
days operating days = 210	
- IV. **Auxiliary Consumption.**—The auxiliary power consumption factor shall be 8.5% for the computation of tariff.
- V. **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.
- VI. **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 26 shall be applicable.
- VII. **Fuel Cost**
 - (1) The price of Bagasse first year of the Control Period (i.e. FY 2017-18) shall be Rs. 1964.71/MT. 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 or as decided by the Commission.
 - (2) For use of biomass other than bagasse in co-generation projects, the biomass prices as specified under Regulation 26 shall be applicable.
- VIII. **Operation and Maintenance Expenses**
 - (1) Normative O&M expenses during first year of the Control period (i.e. FY 2017-18) shall be Rs. 21.13 Lakh per MW.
 - (2) Normative O&M expenses allowed at the commencement of the Control Period (i.e. FY 2017-18) under these Regulations shall be escalated at the rate of 5.72% per annum.

28. Technology specific parameters for Solar PV Power Project and Rooftop Solar PV Projects.

I. 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.

II. Capital Cost.—*The normative capital cost shall be Rs 442.18 lakhs/MW based on prevailing market trends for Solar PV projects and also Rooftop solar PV projects.*

The above capital cost shall remain valid during the control period unless reviewed earlier by the Commission

III. Capacity Utilisation Factor.—The Capacity utilization 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 8.

IV. Operation and Maintenance Expenses

- (1) *The O&M expenses for Solar PV project shall be Rs. 7.40 Lakh/MW.*
- (2) Normative O&M expenses allowed at the commencement of the Control Period (i.e. FY 2017-18) under these Regulations shall be escalated at the rate of 5.72% per annum over the Tariff Period.

V. Auxiliary Consumption—The auxiliary consumption shall be 0.25% of gross generation.

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.

29. Technology specific parameters for Solar Thermal Power Project.

I. 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.

II. Capital Cost.—*The capital cost for Solar Thermal Projects shall be Rs 1200 Lakh/MW for FY 2017-18.*
The above capital cost shall remain valid during the entire control period unless reviewed earlier by the Commission.

III. 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 7 and Regulation 8.

IV. Operation and Maintenance Expenses

- (1) *The O&M expenses shall be Rs 19.81 Lakhs/MW for Solar Thermal project.*
- (2) Normative O&M expenses allowed at the commencement of the Control Period (i.e. FY 2017-18) under these Regulations shall be escalated at the rate of 5.72% per annum over the Tariff Period.

The above cost shall remain valid during the control period unless reviewed earlier by the Commission.

V. Auxiliary Consumption.— The auxiliary consumption 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.

30. Technology specific parameters for Biomass Gasifier Power Projects.

- I. Technology Aspect.**—The norms for tariff determination are specified hereunder for biomass gasifier based power projects:
- II. Capital Cost.**—The normative capital cost for the biomass gasifier power projects based on Rankine cycle shall be Rs. 592.88 Lakh/MW (FY 2017-18 during first year of Control Period) and shall be same for subsequent years unless specifically ordered by the Commission. After taking into account of capital subsidy of Rs 150.00 lakhs/MW, net project cost shall be Rs. 442.88 Lakh/MW for FY 2017-18.
- III. Plant Load Factor.**—Plant Load Factor for determining fixed charge component of Tariff shall be 85%.
- IV. Auxiliary Consumption.**—The auxiliary consumption shall be 10% for the determination of tariff.
- V. Specific fuel consumption.**—Normative specific fuel consumption shall be 1.25 kg per kWh.
- VI. Operation and Maintenance Expenses**
 - (1) Normative O&M expenses for the first year of the Control period (i.e. FY 2017-18) shall be Rs. 52.83 Lakh per MW Normative O&M expenses allowed at the commencement of the Control Period (i.e. FY 2017-18) under these Regulations shall be escalated at the rate of 5.72% per annum.
- VII. Fuel Mix**
 - (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, agro- industrial residues, forest residues etc. and other biomass fuels as may be approved by MNRE.
 - (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.
- VIII. Fuel Cost.**—Biomass fuel price for the Biomass gasifier based power project applicable for FY 2017-18 shall be the same as for the biomass based power project (Rankine cycle) as mentioned in Regulation 26.

31. Technology specific parameters for power projects using Municipal solid waste/refuse derived fuel and based on Rankine cycle technology.

- I. Technology Aspect.**—Norms for tariff determination specified for power projects which use municipal solid waste (MSW) and refuse derived fuel (RDF) and shall be based on Rankine cycle technology application, combustion or incineration, Bio-methanation, Pyrolysis and High end gasifier technologie
- II. Capital Cost.**—*The capital cost for the power projects which use MSW based on Rankine Cycle Technology shall be Rs. 1500 Lakhs/MW and for refuse derived fuel based Power Plant shall be Rs. 900 Lakhs/MW.*
- III. Plant Load Factor**
 - (1) The Plant Load Factor for determining fixed charge component of tariff for the power projects which use municipal solid waste (MSW) and refuse derived fuel (RDF) shall be as below:

PLF		MSW	RDF
a)	During Stabilisation	65%	65%
b)	During the remaining period of the first year (after stabilization)	65%	65%
c)	From 2nd Year onwards	75%	80%

(2) The stabilisation period shall not be more than 6 months from the date of commissioning of the project

IV. Auxiliary Consumption.—The auxiliary consumption for the power projects which use municipal solid waste and refuse derived fuel shall be 15%.

V. Station Heat Rate.—The Station Heat Rate for power projects which use municipal solid waste and refuse derived fuel shall be 4200 kcal/kWh.

VI. Operation and Maintenance Expenses

1. *The O&M expenses shall be 6% of normative capital cost for the MSW/RDF Projects.*
2. *Normative O&M expenses allowed at the Commencement of the Control period, shall be escalated at the rate of 5.72% per annum.*

VII. Calorific Value.—The Calorific Value of the refuse derived fuel (RDF) fuel used for the purpose of determination of tariff shall be at 2500 kcal/kg.

VIII. Fuel Cost.—Refuse derived fuel (RDF) price during FY 2017-18 shall be Rs 1,800 per MT. For each subsequent year of the Tariff Period, the normative escalation factor of 5% per annum shall be applicable at the option of the refuse derived fuel (RDF) project developer.

No fuel cost shall be considered for determination of tariff for the power projects using municipal solid waste (MSW).

32. Deviation from Norms.—Tariff for sale of electricity generated from a generating station based on renewable energy sources, may also be agreed between a generating company and a licensee, 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.

33. Solar Power Banking

- (i) The facility of banking of solar power will be provided by Bihar State Power Holding Co. Ltd. (BSPHCL)/distribution licensee to solar power generated for captive use, group captive use and for third party sale
- (ii) 2% of the energy fed into the grid for banking by the generator will be paid as banking charge to BSPHCL/distribution licensee.
- (iii) Banking facility will be available for full calendar year. In case energy fed into the grid for banking is not consumed within the same calendar year, it cannot be used by the generator or its user in the subsequent calendar year. However, the BSPHCL/distribution licensee will pay to the generator for the unused energy during the calendar year at the average power

purchase cost of BSPHCL/distribution licensee during that calendar year.

- (iv) Adequate metering facility will be provided by the distribution licensee to enable measurement of input and consumed energy at different points of time including provision of check meters of appropriate accuracy class at consumer's end, calibrated annually.
- (v) In case of third party sale of solar power, the transmission licensee, distribution licensee and/or SLDC, as the case may be, will provide open access within 30 days of application on payment of required open access charges as determined by the Commission and the generator in addition to 2% banking charge, will pay to the BSPHCL/ distribution licensee wheeling and transmission charges and T&D losses as determined by the Commission for the voltage level at which power is fed into the grid. However, no cross-subsidy surcharge will be paid.
- (vi) Drawal of Banked energy shall not be permitted during the peak hours.
- (vii) Solar Power Developer having no PPA for supply of power to DISCOM should draw power during shutdown/maintenance of the plant of the applicable UI rate plus 5% of the maximum UI rate or applicable rate for purchase of power from renewable energy source, whichever is higher.

34. Guidelines of Competent Authority.—Policy/guidelines issued by the Ministry of Power, Government of India, MNRE, State Government and any other competent authority in this regard from time to time shall prevail.

35. 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.

36. Power to remove difficulties.—If any difficulty arises in giving effect to the provisions of these regulations, the commission may, be 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.

37. Power to Amend.—The Commission may from time to time add, vary, alter, modify or amend any provisions of these regulations on its own motion or on any application made before it by an interested person.

38. Repeal and savings.—

Save as otherwise provided in these regulations, Bihar Electricity Regulatory Commission (Terms and Conditions for Tariff Determination from Solar Energy Sources) Regulations, 2010 read with its amendments are hereby repealed.

**By Order of the Commission,
PARMANAND SINGH,
Secretary.**

Form-1.1: Form Template for Solar PV including Rooftop Solar PV/Solar Thermal

S. No	Assumption Head	Sub-Head	Sub-Head(2)	Unit	Parameter
1	Power Generation	Capacity	Installed Power Generation Capacity Capacity Utilization Factor Commercial Operation Date Useful Life	MW % mm/yyyy years	
2	Project Cost	Capital Cost/MW	Normative Capital Cost Capital Subsidy If any Net Capital Cost	Rs. Lakh/MW Rs. Lakh Rs. Lakh Rs. Lakh	
3	Financial Assumptions	Debt Equity Debt Component Equity Component Depreciation Incentives	Tariff Period Debt Equity Total Debt Amount Total Equity Amount Loan Amount Moratorium Period Repayment Period (include Moratorium) Interest Rate Equity amount Return on Equity for first 10 years Return on Equity 11 th year onwards Discount Rate Depreciation Rate for 1 st 10 Yrs. Depreciation Rate 11 th years onward Generation Based Incentives. If any Period for GBI	Years % % % Rs. Lakh Rs. Lacs Years Years % Rs. Lakh %p.a %p.a % % % Rs. L p.a. Years	
4	Operation & Maintenance	Normative O&M expense O&M expense per annum Escalation factor for O&M expense		Rs. Lakh/MW Rs. Lakh %	
5	Working Capital	O&M expense Receivables Interest on Working Capital		Month Month % p.a	

Form-1.2: Form Template for (Biomass Power, Municipal Solid Waste, Refuse Derived Fuel or Non-fossil fuel based Co gen)

S. No	Assumption Head	Sub-Head	Sub-Head(2)	Unit	Parameter
1	Power Generation	Capacity	Installed Power Generation Capacity Auxiliary Consumption factor PLF (during stabilisation upto 6 months) PLF (during 1 st year stabilisation) PLF (2 nd year onwards) Commercial Operation Date Useful Life	MW % % % mm/yyyy years	
2	Project Cost	Capital Cost/MW	Normative Capital Cost Capital Cost Capital Subsidy, If any Net Capital Cost	Rs.Lakh/ MW Rs. Lakh Rs. Lakh	
3	Financial Assumptions	Debt Equity Debt Component Equity Component Depreciation Incentives	Tariff Period Debt Equity Total Debt Amount Total Equity Amount Loan Amount Moratorium Period Repayment Period (include Moratorium) Interest Rate Equity amount Return on Equity for first 10 years Return on Equity 11 th year onwards Discount Rate Depreciation Rate for 1 st 10 Yrs. Depreciation Rate 11 th years onward Generation Based Incentives. If any period for GBI	Years % % % Rs. Lakh Rs. Lacs Years Years % Rs.Lakh %p.a %p.a % % % Rs. L p.a. Years	
4	Operation & Maintenance	Normative O&M expense O&M expanses per annum Escalation factor for O&M expense		Rs. Lakh/MW %	
5	Working Capital	O&M expense Receivables Interest on Working Capital		Rs.Lakh Month % p.a	
6	Fuel related assumptions	Station Heat Rate	During stabilisation post stabilisation Biomass fuel type-1	kCal/Kwh kCal/Kwh %	

S. No	Assumption Head	Sub-Head	Sub-Head(2)	Unit	Parameter
		Fuel Type & mix	Biomass fuel type-2 Municipal Solid Waste fuel Refuse Derived Fuel fossil fuel (coal) GCV of Biomass fuel type-1 GCV of Biomass fuel type-2 GCV of Municipal Solid Waste fuel GCV of Refuse Derived Fuel GCV of fossil fuel (coal) Biomass Price (fuel type-1) yr-1 Biomass Price (fuel type-2) yr-1 Municipal Solid Waste Price/yr-1 Refuse Derived Fuel Price/yr-1 fuel price escalation factor	% % % % kCal/Kwh kCal/Kwh kCal/Kwh kCal/Kwh kCal/Kwh Rs/MT Rs/MT Rs/MT Rs/MT %p.a	

Units Generation	Unit	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-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-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 type-1	Rs Lakh												
Biomass fuel type-2	Rs Lakh												
Fossil fuel (coal)	Rs Lakh												
Municipal Solid Waste	Rs Lakh												
Refuse Derived Fuel	Rs Lakh												
Sub-total (Fuel Costs)	Rs Lakh												
Fuel cost allocable to power	%												
Total Fuel Costs	Rs Lakh												

Per Unit Tariff components (fixed)	Unit	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												

Levellers Tariff	Unit	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 Factors													
Discounted Tariff components (fixed)	Rs/kWh												
Discounted Tariff components (variable)	Rs/kWh												
Discounted Tariff components (total)	Rs/kWh												
Levellers Tariff (fixed)	Rs/kWh												
Levellers Tariff (variable)	Rs/kWh												
Levellers Tariff (total)	Rs/kWh												

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