

**BIHAR ELECTRICITY REGULATORY COMMISSION
PATNA**

NOTIFICATION

2nd August, 2010

No. BERC-Regl/Solar-2/2010-03– In exercise of powers conferred under Section 61 read with Section 181(2)(zd) of the Electricity Act, 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 Solar Energy Sources) Regulations, 2010.
- (2) These regulations shall come into force from the date of notification.

2. Definitions and Interpretation

- (1) In these regulations, unless the context otherwise requires,—
 - (a) **'Act'** means the Electricity Act, 2003 (36 of 2003);
 - (b) **'Auxiliary energy consumption'** or **'AUX'** in relation to a period in case of a generating station means the quantum of energy consumed by auxiliary equipments 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) **'Capital cost'** means the capital cost as defined in regulations 25 and 29;
 - (d) **'Commission'** means the Bihar Electricity Regulatory Commission referred to in sub-section (1) of section 82 of the Act;
 - (e) **'Conduct of Business Regulations'** means the Bihar Electricity Regulatory Commission (Conduct of Business) Regulations, 2005 as amended from time to time;
 - (f) **'Control Period or Review Period'** means the period during which the norms for determination of tariff specified in these regulations shall remain valid;
 - (g) **'Hybrid Solar Thermal Power Plant'** means the solar thermal power plant that uses other forms of energy input sources alongwith solar thermal energy for electricity generation, and wherein not less than 75% of electricity is generated from solar energy component.

- (h) **'Inter-connection Point'** shall mean interface point of solar energy generating facility with the transmission system or distribution system, as the case may be:
 - a) in relation to Solar Photovoltaic Projects, inter-connection point shall be line isolater on outgoing feeder on HV side of the pooling sub-station;
 - (b) in relation to Solar Thermal Power Projects the, inter-connection point shall be line isolator on outgoing feeder on HV side of generator transformer;
- (i) **'MNRE'** means the Ministry of New and Renewable Energy, Government of India.
- (j) **'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.
- (k) **'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;
- (l) **'Renewable Energy'** means the grid quality electricity generated from renewable energy sources.
- (m) **'Renewable Energy Power Plants'** means the power plants other than the conventional power plants generating grid quality electricity from renewable energy sources.
- (n) **'Solar Energy Sources'** means solar PV, rooftop solar PV and other small solar projects, and solar thermal energy sources as approved by the MNRE;
- (o) **'Solar PV power'** means the Solar Photo Voltaic power project that uses sunlight for direct conversion into electricity through Photo Voltaic technology.
- (p) **'Solar Rooftop and other Small Solar Power'** means the solar rooftop or other small solar photovoltaic power projects that uses photovoltaic technology for generation of electricity which are mounted on rooftop of the buildings or ground mounted installation satisfying eligibility criteria as may be specified by MNRE from time to time.
- (q) **'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 as may be approved by the Ministry of New and Renewable Energy.

- (r) **'Tariff period'** means the period for which tariff is to be determined by the Commission on the basis of norms specified under these Regulations;
 - (s) **'Useful Life'** in relation to a unit of solar PV, rooftop solar PV and solar thermal including evacuation system shall mean a duration of twenty five years from the date of commercial operation (COD) of such generation facility.
 - (t) **'Year'** means a financial year.
- (2) 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, MNRE guidelines or the Indian Electricity Grid Code or the Bihar Electricity Grid Code or the Bihar Electricity Regulatory Commission (Terms and Conditions of Tariff) Regulations, 2007 shall have the meanings assigned to them respectively in the Act or the Indian Electricity Grid Code or the Bihar Electricity Grid Code or the Bihar Electricity Regulatory Commission (Terms and conditions of Tariff) Regulations, 2007.

3. Scope and extent of application

These regulations shall apply in all cases of solar energy projects for generation and sale of electricity from such projects to distribution licensee within the State of Bihar from the date of notification of these Regulations and where tariff for a generating station or a unit thereof based on solar energy sources, is to be determined by the Commission under Section 62 read with Section 86 of the Act.

Provided that these regulations shall apply subject to the fulfilment of eligibility criteria specified in regulation 4 of these Regulations.

4. Eligibility Criteria

Both Solar PV and Solar Thermal Projects based on technologies as approved by the MNRE, Govt. of India from time to time shall be eligible.

Chapter 1

General Principles

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 period from the date of notification of these regulations to 31.3.2011.

Provided that the benchmark capital cost for these projects may be reviewed annually by the Commission.

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

Provided notwithstanding anything contained in these Regulations, the generic preferential tariff determined for Solar PV and Solar Thermal Projects based on the capital cost and other norms applicable for the year 2010-11 shall also apply for such projects during the year 2011-12 & 2012-13.

6. Tariff Period

- (1) Tariff Period for Solar PV, and Solar thermal power projects shall be twenty five (25) years.
- (2) Tariff period under these Regulations shall be considered from the date of commercial operation from solar energy generating station.

7. Project Specific tariff

- (1) Project specific tariff, on case to case basis, shall be determined by the Commission for the following types of projects :
 - (a) 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 these Regulations.

- (b) Hybrid Solar Thermal Power Plants.

8. Petition and proceedings for determination of tariff

- (1) The Commission may notify the generic preferential tariff on suo motu basis pursuant to issuance of revised norms by Central Electricity Regulatory Commission or Bihar Electricity Regulatory Commission.
- (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 as appended in Appendix I to 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 Conduct of Business Regulations.

9. Tariff Structure

The tariff for solar 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;

10. Tariff Design

- (1) The generic tariff shall be determined on levelled basis for the Tariff Period.
- (2) For the purpose of levelled tariff computation, the discount factor equivalent to weighted average cost of capital shall be considered.
- (3) Levellisation shall be carried out for the 'useful life' of the Solar PV and Solar Thermal Power Project while Tariff shall be specified for the period equivalent to 'Tariff Period'.

11. Despatch principles for electricity generated from Solar Energy Sources:

All solar energy power plants shall be treated as 'MUST RUN' power plants and shall not be subjected to 'merit order despatch' principles.

Chapter 2

Financial Principles

12. Capital Cost

The norms for the Capital cost as specified in the technology specific chapters hereinafter 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 petition, 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

- (1) **Loan Tenure.** For the purpose of determination of tariff, loan tenure of 10 years shall be considered.
- (2) **Interest Rate**
 - (a) The loans arrived at in the manner indicated above shall be considered as gross normative loan for calculation for interest on loan. The normative loan outstanding as on 1st April of every year shall be worked out by deducting the cumulative repayment up to 31st March 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 long term prime lending rate (LTPLR) of State Bank of India (SBI) prevalent during the previous year plus 150 basis points. In case of change of SBI Policy as regard LTPLR the Commission may Suo Motu amend this rate of basis points over and above the bank interest rate.
 - (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.

15. 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 per annum shall be based on 'Differential Depreciation Approach' over loan tenure and period beyond loan tenure over useful life computed on 'Straight Line Method'. The depreciation rate for the first 10

years of the Tariff Period shall be 7% per annum and the remaining depreciation shall be spread over the remaining useful life of the project from 11th year onwards.

- (3) Depreciation shall be chargeable from the first year of commercial operation.

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

16. Return on Equity

- (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:
- a) Pre-tax 19% per annum for the first 10 years.
 - b) Pre-tax 24% per annum 11th years onwards.

17. 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 :
- (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 Capacity Utilisation Factor (CUF);
 - (c) Maintenance spares @ 15% of operation and maintenance expenses
- (2) Interest on working capital shall be at interest rate equivalent to average State Bank of India short term Prime Lending Rate (STPLR) during the previous year plus 100 basis points. In case of change of SBI Policy as regard STPLR the Commission may Suo Motu amend this rate of basis points over and above the bank interest rate.

18. 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, like insurance and overhead, spares consumable, etc.
- (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 2010-11) under these Regulations shall be escalated at the rate of 5.72% per annum over the Tariff Period.

19. 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.

20. 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.

21. Sharing of Clean Development Management (CDM) Benefits

- (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.

22. 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 solar 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 Solar projects during second half of the fiscal year.
Per unit benefit shall be derived on levellised basis at discount factor equivalent to weighted average cost of capital.

23. 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.

Chapter 3

Technology specific parameters for Solar PV, Power Projects

24. Technology Aspects

- (1) Norms for Solar Photovoltaic (PV), Rooftop Solar PV and other Small Solar Power Projects 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 from time to time.

25. Capital Cost

- (1) The normative capital cost for setting up Solar Photovoltaic (PV), Rooftop Solar PV and other Small Solar Power Projects shall be Rs. 1690 Lakh/MW for FY 2010-11 which may be reviewed from time to time.

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

26. Capacity Utilisation Factor

- (1) The Capacity Utilisation Factor (CUF) for Solar Photovoltaic (PV), Rooftop Solar PV and other Small Solar Power Projects shall be 19%.

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

27. Operation and Maintenance Expenses

- (1) The O&M Expenses shall be Rs. 9.51 Lakhs/MW for the 1st year of operation.

- (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 4

Technology specific parameters for Solar Thermal Power Projects

28. Technology Aspects

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

29. Capital Cost

- (1) The normative capital cost for setting up Solar Thermal Power Project shall be Rs. 1530 Lakh/MW for FY 2010-11.

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. Capacity Utilisation Factor (CUF)

- (1) 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.

31. Operation and Maintenance Expenses

- (1) The O&M Expenses shall be Rs 13.74 Lakhs/MW for 1st year of operation.
- (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.

32. Auxiliary Consumption for Solar Thermal

- (1) The auxiliary consumption factor for Solar Thermal 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.

Chapter 5
Miscellaneous

33. 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 levelled tariff over the useful life of the project on the basis of the norms in deviation does not exceed the levelled 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.

34. Power Purchase Agreement (PPA)

The utility before signing any PPA with solar Power developer shall satisfy the eligibility criteria as decided/modified from time to time by MNRE, under Jawaharlal Nehru National Solar Mission Programme (JNNSM) and also satisfy the technical and financial credibility of the Developers.

35. Renewable Purchase Obligation (RPO)

- (1) Keeping in view generation from existing renewable sources including small/mini hydroelectric power plants in the State, and the projection made by the Distribution Licensee the Commission revises the target for purchase of electricity by the Distribution Licensee from renewable and cogeneration sources or any other source coming under this category as per guidelines of MNRE in the following percentage of its total energy consumption in a year,

<u>Year</u>	<u>Minimum Percentage</u>
2010-11	1.5%
2011-12	2.5%
2012-13	4.0%

Purchase obligations for Distribution Licensee(s) as mentioned above are mandatory minimum percentage of purchase to be maintained by the licensee(s)

- (2) Renewable Purchase Obligation from solar sources for FY 2010-11 shall be 0.25% of overall RPO as specified in (1) above with an annual increase of 0.25%.

36. Guidelines of Competent Authority

Policy / guidelines issued by the Ministry of Power, Govt. of India, MNRE, State Govt. and any other competent authority in this regard from time to time shall prevail.

37. 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.

38. 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.

39. 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.

By Order of the Bihar Electricity Regulatory Commission

Secretary

Form Template for Solar PV / Solar Thermal

S. No.	Assumption Head	Sub-Head	Sub-Head (2)	Unit	Assumptions
1	Power Generation	<u>Capacity</u>	Installed Power Generation Capacity Capacity Utilisation Factor 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 Rs. Lakh	
3	Financial Assumptions	<u>Debt: Equity</u>	Tariff Period Debt Equity Total Debt Amount Total Equity Amount	Years % % Rs Lacs Rs Lacs	
		<u>Debt Component</u>	Loan Amount Moratorium Period Repayment Period (including Moratorium) Interest Rate	Rs Lacs years years %	
		<u>Equity Component</u>	Equity amount Return on Equity for first 10 years RoE 11th year onwards Discount Rate	Rs Lacs % p.a Year %	
		<u>Depreciation</u>	Depreciation Rate for first 12 years Depreciation Rate 13th year onwards Generation based incentives, if any Period for GBI	% % Rs. L p.a. %	
4	Operation & Maintenance	Normative O&M expense O&M expense p.a. Escalation factor for O&M expenses		Rs. Lakh/MW Rs. Lakh %	
5	Working Capital	O&M expenses Maintenance Spare Receivables Interest on Working Capital	(% of O&M expenses)	Months % Months %	

Form Templates for Solar PV / Solar Thermal: Determination of Tariff Components

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

Tariff Components (Fixed Cost)	Unit	Yr-->	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
O&M Expenses	Rs Lakh																										
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	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
O&M expn	Rs/kWh																										
Depreciation	Rs/kWh																										
Int. on term loan	Rs/kWh																										
Int. on working capital	Rs/kWh																										
RoE	Rs/kWh																										
Total Tariff components	Rs/kWh																										

Levellised Tariff	Unit	Yr-->	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Discount Factors																											
Discounted Tariff Components	Rs/kWh																										
Levellised Tariff	Rs/kWh																										