



Chhattisgarh State Electricity Regulatory Commission

Irrigation Colony, Shanti Nagar, Raipur – 492001

Tel: 0771-73555, Fax-4073553

Website: www.cserc.gov.in, E-mail: cserc.sec.cg@nic.in

Suo-Motu Petition No. 43 of 2021

In the matter of-

Determination of generic preferential tariff for FY 2021-22 for Renewable Energy Sources based plants under Regulation 8.6 of the Chhattisgarh State Electricity Regulatory Commission (Terms and conditions for determination of generation tariff and related matters for electricity generated by plants based on renewable energy sources) Regulations, 2019

and

Energy charges for FY 2021-22 for existing biomass power plants

Present	:	Hemant Verma, Chairman
	:	Vinod Deshmukh, Judicial Member
	:	Pramod Kumar Gupta, Member

DRAFT ORDER

(September 08, 2021)

1. Regulation 8.6 of Chhattisgarh State Electricity Regulatory Commission (Terms and conditions for

determination of generation tariff and related matters for electricity generated by plants based renewable energy sources) Regulations, 2019, (hereinafter referred to as “the RE Tariff Regulations 2019”) mandates the Commission to determine the generic tariff on the basis of the suo-motu petition, for the following renewable energy technologies (RE technologies) for which norms have been specified in the RE Tariff Regulations 2019;

- (a) Small Hydro Projects;
- (b) Non-fossil fuel-based co-generation Plants; and

2. Regulation 53 of the RE Tariff Regulations 2019 specify tariff for grid connected solar PV systems with installed capacity of more than 0.5 MW that directly convert solar energy into electricity and are based on the technologies such as crystalline silicon or thin film etc. as may be approved by MNRE. Regulations 54 of the RE Tariff Regulations, 2019 specify for normative capital cost for setting up Solar Photovoltaic Power Project for FY 2019-20. Though provision for generic tariff for FY 2021-22 for Solar PV plants has been made in RE Tariff Regulations 2019, the Commission is of view that generic preferential tariff for Solar PV plants should not be specified for FY 2021-22 because of the following reasons;

- I. There is continuous improvement in the Renewable Energy Technologies specially in solar PV technologies and the cost has considerably reduced over the past few

years due to multiple factors including economies of scale, technological advancement, efficiency improvement and several other factors, hence it is difficult to consider the latest capital cost for FY 2021-22.

- II. Hon'ble Central Commission and State Commissions are now not specifying capital cost for determination of preferential tariff. However, some of the State Commissions has determined Feed-in-Tariff for sale of power from decentralized solar power plants having capacity of 500kW to 2MW to be set up under Component-A of the Pradhan Mantri Kisan Urja Surakhsha Evam Utthan Mahabhiyan (PM KUSUM) Scheme introduced by GoI, wherein capital cost for Solar PV plants without considering cost of land has been specified.
 - III. Further, it is learnt that, in the past licensees have adopted bidding route for procurement of solar power and have not entered into an agreement, under section 62 of the Act, on generic tariff determined by the Commission.
3. Generic tariff of the RE projects achieving COD during the third year of control period (i.e. FY 2021-22) has been determined through this order. Tariff proposals are enclosed herewith this Order.

4. Comments /suggestions of the stakeholders on the above proposal are invited by October 05, 2021 and hearing will be held on October 05, 2021 at 3:30 PM at the Commission's courtroom.

Suo-motu P No 43 of 2021

The generic Levellised generation tariff for various renewable energy technologies, for FY 2021-22

1. The generic generation tariff for various renewable energy technologies are discussed below:

1.1 **Useful Life:** Regulation 2.1(ii) of the RE Tariff Regulations 2012 defines 'useful life' in relation to a unit of a generating station as per following from the date of commercial operation (COD) of such generation facility:

Renewable Energy Projects	Years
Small Hydro	35
Non-fossil fuel co-generation	20

1.2 **Tariff Period:** As Regulation 6 of RE Tariff Regulations 2019, the tariff period, in respect of the RE projects, shall be considered from the COD of the renewable energy generating stations and shall be considered as useful life of the RE Projects.

1.3 **Tariff Structure:** As per Regulation 9.1 of the RE Tariff Regulations 2019, the tariff for RE projects 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;

For renewable energy technologies having fuel cost component, like non-fossil fuel based cogeneration, single part tariff with two components, fixed cost component and fuel cost component, is to be determined keeping in view the year of COD of the project for fixed cost component. For fuel cost component the tariff will be decided for each/every financial year.

1.4 Tariff Design: As per para 10.1 in RE Tariff Regulations 2019, the generic tariff shall be determined on levlised basis for the Tariff Period from COD and levlisation of tariff is considered for useful life of the project.

2. Parameters for tariff determination

2.1 Capital Cost: Regulation 12 of the RE Tariff Regulations 2019 stipulates that the norms for the capital cost as specified in the technology specific chapter shall be inclusive of all capital works like plant and machinery, civil works, erection and commissioning, financing and interest during construction, and evacuation infrastructure up to inter-connection point.

The Commission has specified the normative capital cost, applicable for the first year of control period i.e. FY 2021-22, for various RE technologies viz Small Hydro Power and Non-Fossil Fuel based Cogeneration. Technology specific capital cost of RE projects is discussed herein under:

A. Capital cost of Small Hydro Projects:

Regulation 28.1 of the RE Tariff Regulation 2019, specify normative capital cost for small hydro projects for FY 2019-20.

Regulation 12.2 specifies that for subsequent years, escalation of 5% shall be applicable. Accordingly capital cost for FY 2021-22 shall be as follows:

Project Size	FY 2021-22 (Rs. Lakh/MW)
Up to 5 MW	970.20
Above 5 MW to 25 MW	882.00

B. Capital Cost of Non-fossil fuel based Co-generation Projects:

Regulation 46.1 of the RE Tariff Regulation 2019, specify normative capital cost for non-fossil fuel based co-generations for FY 2019-20.

Regulation 12.2 specifies that for subsequent years, escalation of 5% shall be applicable. Accordingly capital cost for FY 2021-22 shall be 542.98 Lakh/MW.

2.2 Debt-Equity Ratio: Regulation 13.1 of the RE Tariff Regulations 2012 provides that the debt equity ratio of 70:30 is to be considered for determination of generic tariff based on suo-motu petition.

2.3 Loan and Finance Charges: As per regulation 14 of the RE tariff Regulations 2019, for the purpose of determination of tariff, loan tenure of 13 years shall be considered. The normative interest rate shall be considered as two hundred (200) basis points above the average State Bank of India Marginal Cost of Funds based Lending Rate (MCLR) (one year tenor) prevalent during the last available six months shall be considered. Since, tariff will be applicable from 1st April of the respective years, State Bank of India MCLR, for period prior to six month from the 1st April has been considered.

State Bank of India MCLR and average MCLR is shown below.

Month	One year tenor MCLR Rate (SBI)
10 th Oct 20	7.00%
10 th Nov 20	7.00%
10 th Dec 20	7.00%

Month	One year tenor MCLR Rate (SBI)
10 th Jan 21	7.00%
10 th Feb 21	7.00%
10 th Mar 21	7.00%
Average	7.00%

In terms of the above, the computations of interest on loan comes out as 9% for FY 2021-22.

2.4 Depreciation: As specified in regulation 15 of the RE tariff Regulations 2019, 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. The depreciation rate for the first 13 years of the Tariff Period shall be 5.28% per annum and the remaining depreciation shall be spread over the remaining useful life of the project from 14th year onwards on 'Straight Line Method'.

2.5 Return on Equity: Regulation 16.1 of the RE Tariff Regulations 2019 provides that the value base for the equity shall be 30% of the capital cost for generic tariff determination. Further regulation 16.2 stipulates the normative return on equity 16%, to be grossed up by prevailing MAT rate as on 1st April of the previous year.

Average of MAT rate, as on 1st April 2020, (for companies having profit above Rs. 10 Cr) is 17.47%.

Accordingly, RoE for entire useful life of the project comes out to be 19.39% for FY 2021-22.

2.6 Interest on Working Capital: As per regulation 17 of the RE tariff Regulations 2019, working capital requirement in respect of small hydro power, solar PV power projects shall be computed as per following:

- I. Operation & Maintenance expenses for one month;
 - II. Receivables equivalent to 2 (Two) months of energy charges for sale of electricity calculated on the normative CUF;
 - III. Maintenance spare @ 15% of operation and maintenance expenses
- The Working Capital requirement in respect of non-fossil fuel based co-generation projects shall be computed as per following:

- I. Fuel costs for four months equivalent to normative PLF;
 - II. Operation & Maintenance expense for one month;
 - III. Receivables equivalent to 2 (Two) months of fixed and variable charges for sale of electricity calculated on the target PLF;
 - IV. Maintenance spare @ 15% of operation and maintenance expenses
- Interest on Working Capital shall be at interest rate equivalent to 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. Accordingly interest rate comes out as 10% FY 2021-22.

2.7 Operation & Maintenance Expenses:

As per provisions in RE Tariff Regulations 2019, O&M expenses shall be determined for the Tariff Period based on normative O&M expenses specified by the Commission for first year of the Control Period and shall be escalated at the rate of 5.72% per annum over the Tariff Period”

A.O& M Expenses for Small Hydro Projects:

As per regulation 32.1 of the RE Tariff Regulation, O & M expenses for small hydro projects for the year 2021-22 shall be as follows;

Project Size	O& M Expenses (Rs. Lakh/MW)
Up to 5 MW	36.22
Above 5 MW to 10 MW	31.76
Above 10 MW to 25 MW	26.23

B. O & M Expenses for Non-fossil fuel based Cogeneration Projects:

As per regulations 52.1 of the RE Tariff Regulations 2019, normative O & M expenses for the Non-fossil fuel based Cogeneration Projects for the year 2021-22 shall be Rs. 26.38 Lakh/MW.

2.8 Capacity Utilisation Factor (CUF): Regulations 29 of the RE Tariff Regulations 2019 specify the norms for Capacity Utilization Factor (CUF) in respect of the Small Hydro generating stations as 30%, which has been considered for determination of tariff.

2.9 Plant Load Factor (PLF): Regulations 47 of the RE Tariff Regulations 2019 specify the plant load factor for Non fossil Fuel based Co-generation projects as given in the table below which has been considered for determination of fixed charges.

RE Projects	PLF
Non fossil Fuel based Co-generation projects	38%

2.10 Auxiliary Power Consumption: Regulations 30, 36, and 48 of the RE Tariff Regulations 2019 stipulate the auxiliary power consumption as under which has been considered for determination of tariff of the RE projects.

RE Projects	Aux Cons
Small Hydro projects	1.5%
Biomass based Power projects	10%
Non-fossil Fuel Co-generation projects	8.5%

2.11 Station Heat Rate: The Station Heat Rates (SHR) specified under Regulations 37 and 49 of the RE Tariff Regulations 2019 for biomass and non-fossil fuel based co-generation projects are as under:

RE Projects	SHR, Kcal/kWh
Biomass based Power projects	4000
Non fossil Fuel based Co-generation projects	3600

2.12 Calorific Value: In terms of Regulation 43 and 50 of the RE Tariff Regulations 2019 the calorific value of biomass and bagasse for determination of tariff is 3100 and 2250 Kcal/kg respectively.

2.13 Fuel Cost: The Commission, in terms of Regulation 44 and 51 of the RE Regulations 2019, has specified the biomass and bagasse price applicable during the period 2019-20 as Rs. 3388 and Rs. 2166 per MT respectively. Further, as per regulations 44.2 and 51.3, these costs shall be escalated by 5% to arrive at price for subsequent years. Therefore, for FY 2021-22, biomass and bagasse price shall be Rs. 3735 and Rs. 2388 per MT respectively.

2.14 Discount Factor: The discount factor considered for the purpose of tariff levellisation is equal to the Post Tax weighted average cost of the capital on the basis of normative debt: equity ratio (70:30) specified in the RE Tariff Regulations 2019. Considering the normative debt equity ratio and weighted average of the post tax rates for interest and equity component, the discount factor for FY 2021-22 is calculated.

FY 2021-22

Interest Rate considered for the loan component (i.e.70%) of Capital Cost is 9.00%. For equity component (i.e. 30%) rate of Return on Equity (ROE) considered at Post Tax ROE of 16% considering the IT rate of 29.12%. The discount rate derived by this method for all RE technologies is 9.27%.

3. Generic Levellised Tariff FY 2021-22

In the light of the discussion made in the preceding paragraphs, the generic levellised tariffs of the following RE projects achieving COD during the financial year 2021-22 have been determined as under.

RE Projects	FY 2021-22: Levelling Total Tariff, Rs/kWh
Small Hydro projects below 5 MW	7.48
Small Hydro projects 5 MW to 10 MW	6.74
Small Hydro projects 10 MW to 25 MW	6.33
Mini/Micro Hydro projects (upto2 MW)	7.98
Biomass based projects – Energy Charges	5.35
Non fossil Fuel based Co-generation projects– Fixed Cost	4.18
Non fossil Fuel based Co-generation projects– Variable Cost	4.18

The detailed computations for the generic tariff for various RE technologies have been enclosed to this Order as per the details given hereunder;

RE Projects	FY 2021-22
Small Hydro projects below 5 MW	Annexure: 1A
Small Hydro projects 5 MW to 10 MW	Annexure: 1B

RE Projects	FY 2021-22
Small Hydro projects 10 MW to 25 MW	Annexure: 1C
Mini/Micro Hydro projects (upto2 MW)	Annexure: 1D
Biomass based projects – energy charges	Annexure: 2
Non fossil Fuel based Co-generation projects	Annexure: 3

Above generic levellised tariff has been determined for the RE power projects (considering entire useful life and levellisation of tariff for the entire useful life), which are achieving COD during the FY 2021-22 having long term PPA for useful life with distribution companies in the State. Tariff period shall be considered as useful life of the project and shall be considered from the COD of the renewable energy generating stations.

Energy charges as determined in this Order shall be applicable for existing biomass based plants for FY 2021-22.

We order accordingly.

Member

Member (Judicial)

Chairman