

part thereof, and includes the expenditure on manpower, repairs, spares, consumables, insurances, and overheads.

The Commission in the approach paper has proposed to fix O&M cost for Biomass based Power projects as 6% of the capital cost during first year of operation with an annual escalation factor of 3.84% over the useful life of the plant in line with CERC approach.

Comments/ Suggestions

The Commission has not received any suggestions/comments from the stakeholders in this regard.

Commission's View

The Commission in its earlier order dated 30th November 2016 had considered O&M expenses at the rate of 4% of the Capital Cost with annual escalation of 5.72 %. It has been observed that in CERC RE Regulations, 2020, the annual escalation rate is revised to 3.84% with respect to change in WPI and CPI during last 5 years and O & M expenses were considered at the rate of 6 % of the capital Cost. The O&M expenses considered by the other SERCs ranges between 4% to 9% of the capital cost. In view of this, the Commission decides to fix normative O&M cost as 6% of the capital cost during first year of operation with an annual escalation at the rate of 3.84% over the useful life of the plant for the projects commissioned during the control period of this order.

3.15 Plant Load Factor

Proposed in Approach Paper

The Commission in the Approach Paper has proposed to consider plant load factor as 80% for tariff determination purpose.

Comments/ Suggestions

The Commission has not received any Comments/ suggestions from the stakeholders.

Commission's View

For Biomass based power plants, MPERC RE Tariff Regulations, 2017 provides a normative Plant Load Factor equal to 65% during 1st year of operation and 80% from 2nd year onward for tariff determination purpose. CERC RE Tariff Regulations, 2020 provides for a normative Plant Load Factor of 80% for Biomass power plants. Other SERC's has also followed the CERC approach while specifying PLF for the Biomass based power projects. In view of above, the Commission decides to consider the normative Plant Load Factor of 80 % for the Biomass based power project for tariff determination purpose in this order.

3.16 Auxiliary Consumption

Proposed in Approach Paper

The Commission in the Approach Paper has proposed normative auxiliary consumption at 10 % of gross generation for tariff determination purpose, according to MPERC RE Tariff Regulations, 2017.

The Commission in its earlier tariff order dated 30th November 2016 had considered the same normative value for the auxiliary consumption.

Comments/ Suggestions

The Commission has not received any Comments/ suggestions from the stakeholders.

Commission's View

The Commission decides to fix the normative value of auxiliary consumption as 10% of the gross generation for tariff determination purpose for the control period of this order, which is also in line with the MPERC RE Tariff Regulations, 2017 and earlier tariff order dated 30th November 2016.

3.17 Cost of Fuel

Proposed in Approach Paper

The Commission in the Approach paper has proposed that the feedstock suitable for Biomass based power plants may comprise of rice husk, Soyabean or any other crop/forest residue available in the state. The Commission had proposed the fuel cost for determination of tariff during control period of this order by escalating the cost of biomass fuel in previous tariff order dated (30th November 2016) by an escalation factor of 5 % per annum.

Accordingly, biomass fuel cost of Rs 3365 /MT was proposed for FY 2022-23. An escalation factor of 5 % was proposed for determination of fuel cost from 2nd year onwards for determination of levelized tariff for the biomass-based projects during the control period.

Comments/Suggestions

One of the stakeholders has submitted that the actual landed cost of biomass fuel at one of the operational biomass power projects in the state is about of Rs 3800/per MT. Some recent bills in support of its contention for biomass fuel cost were submitted by the stakeholder. The stakeholder submitted that the Biomass fuel price should be considered

as Rs 3800/ MT for FY 2022-23 and it shall be escalated at the rate of 5% per annum during subsequent years of the control period.

Commission's View

The Commission has noted that the biomass plant for which data is referred by the above stakeholder was not in operation for past few years. In such situation, the data with regard to biomass fuel submitted by the stakeholder cannot be considered as representative data for determination of generic tariff in the State.

The Commission is of the view that biomass fuel cost in the state depends on availability of biomass (agro waste) for power generation, which is mostly dependent on production of underlying crop based on cropping pattern and climatic conditions during the year.

In view of above, the Commission decides to fix the biomass fuel cost of Rs 3365 / MT for FY 2022-23 as proposed in approach paper with an escalation rate of 5% per annum from 2nd year onward for determination of tariff for the biomass-based power projects to be commissioned in this control period. Escalation rate of 5% per annum is considered for the following reasons:

- i. MPERC RE Tariff Regulations 2017 specifies annual escalation rate of 5% p.a. for biomass fuel cost from 2nd year onwards.
- ii. CERC has also recommended same escalation rate of 5% p.a. for revision of biomass fuel cost from 2nd year onwards in its RE tariff Regulations since year 2012.
- iii. Most of the SERCs have considered this escalation rate of 5% p.a. for levelized tariff computation.
- iv. The stakeholder also suggested the same escalation rate for tariff determination purpose.

3.18 Gross Calorific Value (GCV)

Proposed in Approach Paper

The Commission in the Approach paper has proposed GCV of Biomass as 3100 kCal/kg. The Commission in its earlier tariff order dated 30th November 2016 had considered the same value of GCV of bagasse for tariff determination purpose. The CERC and most of SERCs have considered GCV of Biomass as 3100 kCal/kg.

Comments/Suggestions

The Commission has not received any Comments/ suggestions from the stakeholders.

Commission's View

The Commission in its earlier tariff order considered Gross Calorific Value of Biomass as 3100 kCal/kg. The Commission has observed that the CERC and other SERCs in their recent tariff orders have considered the same value of GCV for tariff determination.

In view of above, the Commission decides to consider the Gross Calorific Value of Biomass as 3100 kCal/kg for tariff determination purpose for control period of this order.

3.19 Station Heat Rate

Proposed in Approach Paper

The Commission in the approach paper has proposed Station Heat Rate as 4200 kCal/kWh for tariff determination purpose, which is same as considered by CERC in its Regulations 2020 and other SERCs.

The Commission in its earlier tariff order dated 30th November 2016 had considered the same normative values for the Station Heat Rate.

Comments/Suggestions

The Commission has not received any Comments/ suggestions from the stakeholders.

Commission's View

Station Heat Rate depends on the plant design and operating conditions; it has been noted that the CERC and most of the SERCs have considered the normative value of Station Heat Rate as 4200 kcal/kWh.

In view of above, the Commission decides to fix the normative value of Station Heat Rate as 4200 kcal /kWh for tariff determination purpose for the control period of this order.

3.20 Specific Fuel Consumption

Proposed in Approach Paper

The Commission in the approach paper has proposed that Specific Fuel consumption as 1.35 kg/kWh.

Comments/Suggestions

The Commission has not received any Comments/ suggestions from the stakeholders.

Commission's View

Specific fuel consumption is the resultant of Station Heat Rate and Gross Calorific Value of the fuel. With the above considered, Station Heat Rate at 4200 kCal/kWh and GCV at

3100 kCal/kg, the resultant specific fuel consumption works out to 1.35 kg/kWh. The Commission decides to consider specific fuel consumption of 1.35 kg/kWh for tariff determination purpose in this control period.

4 Treatment for Subsidy or Incentive received from Central / State Government

Proposed in Approach Paper

The MPERC RE Tariff Regulations, 2017 provides that the Commission shall indicate in the tariff order whether any subsidy or incentive offered by the Central or State Government is taken into consideration or not.

It has been noted that presently, no Financial Assistance in the form of back-ended subsidy is provided by the Central or State Government for installation of biomass-based energy projects. The Commission has not factored-in such subsidy / grant while determining the tariff for this control period. In case, the biomass project developer receives subsidy / grant from government in future during the control period of this order, the State Nodal Agency/ Project proponent/ generator shall inform the same to the MPPMCL / distribution Licensee on quarterly basis.

It was proposed that such subsidy / grant / incentive received by project proponent shall be adjusted in subsequent bills payable by the MPPMCL / distribution utility in suitable instalments or within such period as may be specified by the Commission.

To factor in the benefit of Accelerated Depreciation available from central government, the Commission proposed to specify separate tariff by taking into account the accelerated depreciation (AD) benefit as well as without considering the AD benefit.

Following principles was proposed to determine the per-unit AD benefit:

As per the current provisions under Income Tax Act, RE project owners can avail accelerated depreciation at the rate of 40% in the first year on a **written-down value (WDV)** basis. In addition to this 40% depreciation, an additional depreciation of 20% in the initial year is extended to new assets acquired by power generation companies vide amendment in the section 32, sub-section (1) clause (iia) of the Income Tax Act, 1961. With this, the projects can avail 60% depreciation in the first year of commissioning. From the second year onwards, depreciation at the rate of 40% on written-down-value (WDV) is available. The Commission has considered the above depreciation rate while calculating per unit AD benefit in this order.

Following principles have been considered for ascertaining Income Tax benefit on account of accelerated or additional depreciation for the purpose of tariff determination:

- a. The assessment of benefit shall be based on normative Capital Cost, book depreciation rate of 5.28% per annum, accelerated/ additional depreciation rate (i.e., 60% in the first year and 40% from Second year onwards) as per the relevant provisions of the Income Tax Act and the Corporate Income Tax rate.
- b. The Capitalisation of RE Projects for the full financial year;
- c. The Per-unit benefit shall be derived on levelled basis at a discounting factor equivalent to the post-tax weighted average cost of capital.

Comments/Suggestions

The Commission has not received any comments/ suggestions from the stakeholders in this regard.

Commission's View

The Commission decides to determine tariff without considering the subsidy /incentive. In case the project proponent / generator receives subsidy or incentive from Central/State government, which is not considered in tariff determination, same shall be adjusted in subsequent bills payable by the MPPMCL / distribution utility in equated monthly installment of Rs 5 lakh/per MW / per month till the subsidy received by generator is fully recovered.

The State Nodal Agency/ Project proponent/ generator shall inform the MPPMCL / distribution Licensee regarding any such grant, subsidy or incentives received by a Project proponent / generator on a quarterly basis. The MPPMCL shall confirm the receipt of such subsidy / incentive to Biomass based project proponent from the State Nodal Agency and accordingly execute the Power Purchase Agreement as per applicable Tariff specified in this order.

To factor-in the benefit of Accelerated depreciation available from central government, the Commission decides to specify separate tariff by taking into account the accelerated depreciation (AD) benefit as well as without considering the AD benefit.

Following principles shall be adopted to determine the per-unit AD benefit:

As per the current provisions under Income Tax Act, RE project owners can avail accelerated depreciation at the rate of 40% in the first year on a written-down value (WDV) basis. In addition to this 40% depreciation, an additional depreciation of 20% in the initial year is extended to new assets acquired by power generation companies vide amendment in the section 32, sub-section (1) clause (ia) of the Income Tax Act, 1961.

With this, the projects can avail 60% depreciation in the first year of commissioning. From the second year onwards, depreciation at the rate of 40% on WDV is available.

Following principles shall be adopted for ascertaining the Income Tax benefit on account of accelerated or additional depreciation for the purpose of tariff determination:

- a. The assessment of benefit shall be based on normative Capital Cost, book depreciation rate of 5.28% per annum, accelerated/ additional depreciation rate (i.e., 60% in the first year and 40% from Second year onwards) as per the relevant provisions of the Income Tax Act and the Corporate Income Tax rate.
- b. The Capitalisation of RE Projects for the full financial year;
- c. The Per-unit benefit shall be derived for each year and considered appropriately in tariff.

It is further clarified that in case the generating company is not claiming accelerated depreciation benefit, the Power Purchase Agreement entered into with the generating company shall include an undertaking by the generating company with certificate from the Chartered Accountant indicating that accelerated benefit would not be availed for the project.

Provided also that if accelerated or higher depreciation benefit has been claimed despite submission of the undertaking, then the MPPMCL / distribution licensee shall be entitled to recover amount wrongly claimed along with penal charges at the rate of 1.50% per month calculated on daily basis.

5 Computation of Tariff for Biomass based Power Projects

The operating and financial parameters considered by the Commission for tariff determination for the control period in this order are as given below:

Parameters for tariff determination of Biomass based Power projects

| Parameters | Biomass Based Power Projects |
|---|------------------------------|
| | Project Cost and O&M |
| Total Project Cost:- Water Cooled (Rs. Lakh/MW) Without Subsidy | 592 |
| Total Project Cost:- Air Cooled (Rs. Lakh/MW) Without Subsidy | 604 |
| Normative O&M Cost for First Year (Rs. Lakh/MW) | 6% of the Project Cost |
| Escalation in O&M (per annum from 2nd year) | 3.84% |
| Performance Parameters | |
| PLF (%) | 80% |
| Auxiliary Consumption (%) | 10% |

Determination of Tariff for Biomass based Power Projects

| Parameters | Biomass Based Power Projects |
|--------------------------------------|---|
| Project Life in Years | 25 |
| Gross caloric value (kCal/kg) | 3100 kCal/kg |
| Station Heat Rate (kCal/kWh) | 4200 kCal/ kWh |
| Specific fuel consumption (Kg/kWh) | 1.35 (Kg/kWh) |
| Financial Parameters | |
| Debt-Equity Ratio | 70:30 |
| Term of Loan in Years | 15 |
| Interest on Term Loan (%) | 9 % |
| Interest on Working Capital Loan (%) | 10.5 % |
| Depreciation (%) | 4.67% (up to 15 years) 2% (16 to 25 years) |
| Base rate of Return on Equity * (%) | 14 % |
| Biomass price (Rs/ MT) | Rs 3365/ MT |
| Fuel cost escalation (%) | 5% per annum |

*Base rate grossed up by the applicable Minimum Alternate Tax (MAT) rate for the first 20 years of the Tariff Period and by the applicable Corporate Tax rate for the remaining 5 years of Tariff Period.

Approved Tariffs are given below:

Tariff for Biomass based power projects with water cooled condenser

| Year | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 |
|------------------------------|------|------|------|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Fixed Charges (Rs/kWh) | 2.37 | 2.37 | 2.36 | 2.36 | 2.36 | 2.37 | 2.37 | 2.38 | 2.39 | 2.40 | 2.41 | 2.42 | 2.44 | 2.46 | 2.48 | 2.27 | 2.34 | 2.41 | 2.48 | 2.56 |
| Less: AD benefit (Rs / kWh)* | 1.79 | 0.35 | 0.14 | 0.02 | -0.06 | -0.11 | -0.13 | -0.15 | -0.16 | -0.16 | -0.17 | -0.17 | -0.17 | -0.17 | -0.17 | -0.17 | -0.17 | -0.01 | 0.00 | 0.00 |
| Variable Charges (Rs/ kwh) | 5.07 | 5.32 | 5.58 | 5.86 | 6.16 | 6.47 | 6.79 | 7.13 | 7.48 | 7.86 | 8.25 | 8.66 | 9.10 | 9.55 | 10.03 | 10.53 | 11.06 | 11.61 | 12.19 | 12.80 |

| Year | 21 | 22 | 23 | 24 | 25 |
|------------------------------|-------|-------|-------|-------|-------|
| Fixed Charges (Rs/kWh) | 2.77 | 2.86 | 2.94 | 3.03 | 3.13 |
| Less: AD benefit (Rs / kWh)* | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Variable Charges (Rs/ kwh) | 13.44 | 14.11 | 14.82 | 15.56 | 16.34 |

Tariff for Biomass based power projects with air cooled condenser

| Year | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 |
|------------------------------|------|------|------|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Fixed Charges (Rs/kWh) | 2.41 | 2.41 | 2.41 | 2.40 | 2.40 | 2.41 | 2.41 | 2.42 | 2.43 | 2.44 | 2.45 | 2.46 | 2.48 | 2.50 | 2.52 | 2.31 | 2.38 | 2.45 | 2.52 | 2.60 |
| Less: AD benefit (Rs / kWh)* | 1.83 | 0.36 | 0.14 | 0.02 | -0.06 | -0.11 | -0.13 | -0.15 | -0.16 | -0.17 | -0.17 | -0.17 | -0.17 | -0.18 | -0.18 | -0.18 | -0.18 | -0.01 | 0.00 | 0.00 |
| Variable Charges (Rs/ kwh) | 5.07 | 5.32 | 5.58 | 5.86 | 6.16 | 6.47 | 6.79 | 7.13 | 7.48 | 7.86 | 8.25 | 8.66 | 9.10 | 9.55 | 10.03 | 10.53 | 11.06 | 11.61 | 12.19 | 12.80 |

| Year | 21 | 22 | 23 | 24 | 25 |
|------------------------------|-------|-------|-------|-------|-------|
| Fixed Charges (Rs/kWh) | 2.81 | 2.90 | 2.99 | 3.08 | 3.18 |
| Less: AD benefit (Rs / kWh)* | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Variable Charges (Rs/ kwh) | 13.44 | 14.11 | 14.82 | 15.56 | 16.34 |

* Positive means to be deducted, and negative means to be added to tariff

6 Other Issues

Proposed in Approach Paper

In the Approach Paper, the Commission has proposed arrangement for power purchase agreement between the Biomass based power project owner and MPPMCL, reactive energy charges applicable to Biomass based power project as per provisions under relevant regulations / code notified by MPERC/CEA / CERC depending on the case. The Commission in the Approach paper also proposed the mechanism of sharing of CDM benefits as per the provisions under the MPERC RE Regulations, 2017.

Comments/ Suggestions

The Commission has not received any comments/ suggestions from the stakeholders in this regard.

Commission's View

The Commission decides to deal with the power purchase arrangement, Reactive energy charges and sharing of CDM benefit sharing issues as provided below:

6.1 Power Purchase Agreement

The energy generated from Biomass based power projects will be procured centrally by the M.P. Power Management Co. Ltd. (MPPMCL) at the applicable tariff determined by the Commission in this order. The Power Purchase Agreement shall be signed between developer and MPPMCL. The agreement will be for sale of electricity for a period of 25 years from the date of commissioning of the plant. The energy so procured will be allocated by MPPMCL to three distribution licensees on the basis of actual energy input in the previous financial year. MPPMCL will have a back-to-back power supply agreement with the Distribution Licensees. The developer may execute the agreement with MPPMCL before commissioning of the plant. The developer shall file Commissioning Certificate with all relevant documents to the Procurer separately.

The Biomass based power developers are required to get all the required statutory clearances/approvals/consents from the government before entering into agreement with M.P. Power Management Company Limited.

6.2 Reactive Power Supply

The Biomass based power projects are deemed to be generating stations of a generating company and all functions, obligations, and duties assigned to such stations under the Electricity Act 2003 would be applicable to these power stations. These stations would be required to abide by all applicable codes notified by MPERC / CERC /CEA as the case may be.

The Commission determines the charges for KVARh consumption from grid from time to time and the same would be applicable to Biomass based power projects. Present applicable reactive energy charges are 27 paise per unit which would be payable by the developer till the revision in the rates, to the Distribution Licensees in whose territorial area the Biomass based power project is located.

6.3 Sharing of Clean Development Mechanism (CDM) Benefits

Regulations 18 of MPERC RE Tariff Regulations, 2017 provides mechanism for sharing of CDM benefit by the generator with the power procurer.

18. Sharing of 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 power generating company and the beneficiaries."*

The Commission decides to retain the above provisions for sharing of CDM benefits for this control period. However, Biomass based power projects availing CDM benefit shall share the CDM proceeds annually as per above, by 31st March of every year with an affidavit stating the annual energy generation (date of commissioning as starting point of the first year), carbon credits generated, and receipts in this regard.

7 Any Other Provisions

Proposed in Approach Paper

The Commission in the Approach Paper proposed that all other provisions which are not mentioned in the approach paper explicitly for Biomass based power projects like Renewable purchase obligation (RPO), scheduling, Wheeling charges for Third-Party sale/captive consumption, Metering & Billing, payment mechanism, Default Provisions for Third-Party Sale or sale to utility, etc. shall be guided by the relevant provisions of Madhya Pradesh Electricity Regulatory Commission (Co-generation and Generation from Renewable sources of Energy), Regulations as applicable.

Comments/Suggestions

One of the stakeholders requested to specify separate Renewable purchase obligation (RPO) of 2% for biomass-based power projects within the notified non-solar Renewable purchase obligation (RPO) in line with practice followed by RERC.

Commission's View

Fixing Renewable Purchase Obligation is not subject matter of the present proceedings. The Commission shall deal with the same appropriately in future.

8 Applicability of the Order

The tariff determined in this order shall be applicable to all Biomass based power project commissioned during the control period of this order for sale of electricity to the distribution licensees in the state. The control period of this tariff order shall commence from the date of issue of this order till 31st March 2024 unless reviewed earlier or extended.

The tariff determined by the Commission under this order shall be the ceiling tariff, the distribution licensee may procure electricity from the Biomass based power project proponent / generator at a tariff lower than the tariff determined by the Commission. The Biomass based Power projects commissioned during the control period of previous Tariff order shall be governed by the terms and conditions given in the said tariff order.

(Gopal Srivastava)

Member (Law)

(Mukul Dhariwal)

Member

(S.P.S Parihar)

Chairman

Place: Bhopal

Date: 13th September' 2022

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