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# MADHYA PRADESH ELECTRICITY REGULATORY COMMISSION BHOPAL

**Subject:- Methodology for Estimation of Electricity Generated from Biomass in Biomass co-fired Thermal Power Plants.**

**SMP No. 08 of 2023**

## **ORDER**

(Date of public hearing: 11.04.2023)

(Date of Order: 26.04.2023)

### **PRESENT:**

**S.P.S Parihar, Chairman**

**Gopal Srivastava, Member (Law)**

**Prashant Chaturvedi, Member**

1. The Madhya Pradesh Electricity Regulatory Commission (hereinafter referred to as 'the Commission or MPERC) has recognized the use of biomass in biomass co-fired coal based thermal power plants and amended MPERC (Terms and Conditions for determination of Generation Tariff) Regulations, 2020 (hereinafter referred to as the Regulations, 2020) by way of second amendment notified on 24<sup>th</sup> February, 2023. The regulatory framework for allowing use of Biomass in coal based thermal power plants was thus introduced through the aforesaid amendment.
2. The Commission released an approach paper and initiated the process of specifying methodology for estimation of electricity generated from Biomass in biomass co-fired coal based thermal power plant. A draft methodology was proposed in the approach paper for this purpose. While proposing this methodology the Commission considered the following:
  - a. A Clarification was issued by the Ministry of New and Renewable Energy ("the MNRE"), Government of India on 26.9.2019, stating that the power generated from co-firing of Biomass in Coal based Thermal Power Plants is Renewable Energy (RE) and is eligible for meeting non-solar Renewable Purchase Obligation (RPO).

- b. CERC issued Suo Motu Order dated 18.02.2020 in Petition No. 12/SM/2019 regarding methodology for estimation of electricity generated from Biomass in Biomass co-fired Thermal Power Plants.
  - c. Ministry of Power, Government of India vide letter No. 11/86/2017- Th11 dated 8<sup>th</sup> October, 2021 issued the "Revised Policy for Biomass Utilization for Power Generation through Co-firing in Coal Based Thermal Power Plants".
  - d. Ministry of Power, Government of India, issued letter No. 23/3/2016-R&R-Pt-I dated 25<sup>th</sup> January, 2022 to Forum of Regulators regarding utilization of Biomass for power generation through co-firing in Coal based Thermal Power Plants.
  - e. Ministry of Power, Government of India vide letter No. 11/86/2017- Th-II Part (II) dated 06<sup>th</sup> January 2023 circulated "Revised Model Contract for use of Biomass in thermal Power Plants (TPPs).
  - f. Ministry of Power, Government of India vide letter No. F. No. 12/07/2021- RCM dated 17<sup>th</sup> January 2023 sought action taken report on "Biomass Utilization for Power generation through co-firing in Coal based Thermal Power Plants" from Forum of Regulators.
3. Salient aspects of the proposed methodology floated by the Commission through its approach paper were as under:
- a) Methodology shall be applied to biomass co-fired coal based thermal plants, whose tariff is determined by the Commission under Section 62 as well as thermal plants whose tariff is adopted by the Commission under section 63 of the Electricity Act, 2003;
  - b) Energy generated from biomass shall be worked out based on the actual consumption of biomass and coal rather than on normative operational parameters of Station Heat Rate and Auxiliary Power Consumption;
  - c) Principle of proportion shall be the basis to work out the energy generated from biomass. The energy output is estimated in proportion to the heat input from biomass out of total heat input from biomass and coal;

- d) Heat input shall be worked out based on consumption and quality (GCV) of the coal and biomass;
  - e) Consumption of coal and biomass shall be worked out based on opening balance, receipt and closing balance of coal and biomass.
4. The proposed methodology was placed in public domain and comments / suggestions /objections of stakeholders were invited on Approach Paper through public notice dated 11.03.2023 in this Suo Moto petition. In response to that the Commission received comments / suggestions form three stakeholders. Subsequently, public hearing on this Suo Moto petition was held on 11.04.2023.

**Submission of Stakeholders:**

- 5. Representative of M/s M B Power (MP) Ltd., requested to clarify, whether the methodology is also applicable to IPPs/ISGS like MB Power (Madhya Pradesh) Limited which has a 1200 MW Coal-based Thermal Power Plant at Anuppur in Madhya Pradesh, wherein the State of Madhya Pradesh is having its share.
- 6. MP Power Generating Company Limited (MPPGCL) has submitted that as per proposed methodology, the landed cost of biomass fuel should be worked out based on the delivered cost of biomass at the unloading point of the generating station, inclusive of applicable taxes. MPPGCL has requested to consider the methodology for calculation of ECR for blending of Biomass with coal in line with the Regulations, 2020 considering landed cost of fuel as well as GCV on “as received basis”.
- 7. Third stakeholder Shri Rajendra Agrawal has submitted that before finalizing the proposed methodology, necessary technical changes in the boiler of the power house, biomass Availability, price, method of storage, safety measures, impact on electricity rate, etc., should be assessed and actual situation should be taken into cognizance.
- 8. The Commission has examined the aforesaid comments/suggestions/objections in light of the provisions under the Regulations, 2020.

**Applicability of the Methodology:**

9. The methodology is applicable to State Sector Thermal Generating Stations and IPPs (including those IPPs in which state of MP has its share) whose tariff is determined by the Commission under section 62 or adopted under section 63 of the Electricity Act, 2003.
10. As per MNRE clarification dated 26.09.2019, the power generated from co-firing of Biomass in Coal based Thermal Power Plants is Renewable Energy (RE) and is eligible for meeting non-solar Renewable Purchase Obligation (RPO).
11. The Commission observed that Biomass can also be used in thermal captive power plants similar to thermal generating stations. Therefore, the Commission extends the applicability of methodology to the captive power plants using co-firing of biomass with coal.
12. While in case of captive power plant, the entire heat generated from coal and biomass is used to generate power, in case of co-generation plant, only part of the heat is used to generate power. But, the underlying principle remains applicable i.e. the proportion of heat input from biomass to total heat input for power generation. Accordingly, the methodology specified in this order shall also be applicable for co-generation power plant.

**Landed cost of Biomass Fuel**

13. Where Biomass fuel is used for blending with coal, the landed cost of biomass fuel shall be worked out based on the delivered cost of biomass at the unloading point of the generating station, inclusive of taxes and duties as applicable. The energy charge rate of the blended fuel shall be worked out considering consumption of biomass based on blending ratio as specified by Authority or actual consumption of biomass, whichever is lower.

**Gross Calorific Value (GCV) measurement & Fuel Stock:**

14. MPPGCL has submitted to consider the methodology for calculation of ECR for blending of Biomass with coal in line with the Regulations, 2020. It further submitted that while calculating the ECR, landed cost of fuel as well as GCV on “as received basis” be considered. In this regard, it is observed that the GCV measurement point is already specified under Regulation 3.1 (30) of the Regulations, 2020. The relevant extract is

reproduced below which shall be adopted for Biomass also in Biomass co-fired thermal power plants:

*‘GCV as received’ means the GCV of coal as measured at the unloading point of the thermal generating station through collection, preparation and testing of samples from the loaded wagons, trucks, ropeways, Merry-Go-Round (MGR), belt conveyors and ships in accordance with the IS 436 (Part-1/ Section 1)- 1964:*

*Provided that the measurement of coal shall be carried out through sampling by third party to be appointed by the generating companies in accordance with the guidelines, if any, issued by Central Government:*

*Provided further that samples of coal shall be collected either manually or through hydraulic augur or through any other method considered suitable keeping in view the safety of personnel and equipment:*

*Provided also that the generating companies may adopt any advance technology for collection, preparation and testing of samples for measurement of GCV in a fair and transparent manner;*

15. The format specified by the Commission in the Regulations, 2020 captures the requirement of data applicable to the thermal power plants.
16. The methodology for estimating the energy generated from bio-mass in biomass co-fired coal based thermal power plants, including captive power plants and co-generation plants has been described in Annexure I and is a part of this order.

**(Prashant Chaturvedi)**  
**Member**

**(Gopal Srivastava)**  
**Member (Law)**

**(S.P.S. Parihar)**  
**Chairman**

**Annexure-I****Methodology for estimation of electricity generated from Biomass in biomass co- fired coal based Thermal Power Plants, including captive and co-generation power plants co-firing bio-mass.**

The methodology described hereunder is to be followed by RPC/SLDC, State Sector Thermal Generating Stations including IPPs and captive power plant using co-firing of Biomass for estimating electricity generated from Biomass in biomass co-firing Coal based Thermal Power Plants.

**Step-1:**

2. The electricity generated from Biomass shall be estimated at Generator Terminal on monthly basis in accordance with the following formulae:

$$E_b(G) = [(Q_b \times G_b) / ((Q_c \times G_c) + (Q_b \times G_b))] \times E(GT)$$

Where,

$E_b(G)$  = Electrical energy generated by bio-mass at Generator terminal during the month (kWh);

$Q_b$  = Quantity of bio-mass consumed during the month (kg)

$G_b$  = Weighted average Gross Calorific Value (GCV) of bio-mass consumed during month (kCal/kg)

$E(GT)$  = Gross electrical energy generated at Generator Terminal during the month (kWh)

$Q_c$  = Quantity of coal burnt during the month (kg)

$G_c$  = Weighted average GCV of coal burnt during the month (kCal/kg)

3. The product ( $Q_b \times G_b$ ) represents heat (in Kcal) input through bio-mass during the month and shall be estimated on monthly basis by applying following formulae:

$Q_b \times G_b$  (kCal) = {opening balance of bio-mass (kg) X weighted average GCV of opening balance of bio-mass (kCal/kg)} + {quantity of bio-mass received during the month (kg) X weighted average GCV of bio-mass received during the month (kcal/kg)} - {closing stock of bio-mass (kg) X weighted average GCV of the closing balance of bio-mass (kCal/kg)}.

4. The product ( $Q_c \times G_c$ ) represents heat (in Kcal) input through coal during the month (kcal) and shall be estimated on monthly basis by applying the following formulae:

$Q_c \times G_c$  (kCal) = {opening balance of coal (kg) X weighed average GCV of opening balance of coal (kCal/kg)} + {quantity of coal received during the month (kg) X weighted average GCV of coal received during the month (kCal/kg)} – {closing stock of coal (kg) X weighted average GCV of the closing balance of coal (kCal/kg)}

**Step-2:**

5. The ex-bus electrical energy generated by using bio-mass shall be estimated on monthly basis by applying following formulae:

$$E_b \text{ (ex-bus)} = E_b(G) \{1 - [(E(GT) - ESO) / E(GT)]\}$$

Where,

$E_b$  (ex-bus) = Electrical energy generated by bio-mass ex-bus during the month (kWh);

$E_b$  (G) = Electrical energy generated by bio-mass at Generator terminal during the month arrived at Step-1(kWh)

$E(GT)$  = Total electrical energy generated at generator terminal during the month (kWh)

$ESO$  = Total Energy Sent Out (ex-bus) during the month (kWh)

6. The generating company shall provide various information to beneficiaries and publish them in the manner given below:
  - a. The generating company shall maintain separate fuel accounts for coal and bio-mass, containing details about opening balance, fuel received during the month and closing balance in kg. The generating company shall also maintain separate GCV (in kCal/kg) accounts for coal and bio-mass, with weighted average GCV of the opening balance, weighted average GCV of the fuel received during the month and weighted average GCV of the closing balance at the end of the month.
  - b. Monthly accounts of fuel and GCV, duly signed by the authorised official of generating company shall be published on its website along with the bills towards purchase of coal and Bio-mass.
  - c. Monthly fuel and GCV accounts shall be made available to authorized representative(s) of beneficiaries and RLDC/SLDC on demand. Any authorised representative of beneficiaries shall be allowed to witness GCV testing of Bio-mass.
  - d. Generating company shall keep beneficiaries informed about co-firing of Bio-mass with coal. Authorised representatives of beneficiaries shall be allowed to inspect during the period when bio-mass is being co-fired.
  - e. Generating company shall publish the quantum of Bio-mass fired and the energy generated from Bio-mass based on the formulae specified above on its website.