CENTRAL ELECTRICITY REGULATORY COMMISSION
(NEW DELHI)

Suo Motu Petition No. 12/SM/2019

Coram:
Shri P.K.Pujari, Chairperson
Shri I.S.Jha, Member

Date of Hearing : 17.12.2019
Date of Order : 18.02.2020

ORDER

In the matter of

Methodology for Estimation of Electricity Generated from Biomass in Biomass Co-fired Thermal Power Plants.

The Central Electricity Regulatory Commission (hereinafter referred to as 'the Commission') has recognized the use of biomass in biomass co-fired coal based thermal power plants under sub-clause (k) of clause (2) of the Regulation 19 and clause (4) of Regulation 43 of the Central Electricity Regulatory Commission (Terms and Conditions of Tariff) Regulations, 2019 (hereinafter referred to as the 2019 Tariff Regulations). These Regulations notified on 7th March, 2019, introduced the regulatory framework for allowing use of biomass in coal based thermal power plants.

2. The Commission initiated the process of specifying methodology for estimation of electricity generated from biomass in biomass co-fired coal based thermal power plants and accordingly, proposed a draft methodology in this regard. While proposing this methodology, the Commission had considered the following references.

a) Reference of Ministry of Power, Government of India, No. 11/86/2017-Th11 dated 17th Nov'2017 with regard to the "Policy for Biomass Utilization for Power Generation through Co-firing in Pulverized Coal Fired Boilers".

b) Advisory dated 24.11.2017 of Central Electricity Authority (CEA) to thermal power plants for utilizing biomass in coal based thermal power plants.

c) Clarification of Ministry of New and Renewable Energy ("the MNRE"), Government of India issued vide reference dated 26.9.2019 stating that the power generated from co-firing of biomass in coal based thermal power plants is renewable energy and is eligible for meeting non-solar Renewable Purchase Obligation (RPO).

3. Salient aspects of the proposed methodology were as under.

a) Proposed methodology can be applied to biomass co-fired coal based thermal plants whose tariff is determined by "Appropriate Commission" under Section 62 as well as thermal plants whose tariff is adopted by the "Appropriate Commission" under section 63 of the Electricity Act, 2003;

b) Energy generated from biomass can 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 can 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 can be worked out based on consumption and quality (GCV) of the coal and biomass;

e) Consumption of coal and biomass can be worked out based on opening balance, receipt and closing balance of coal and biomass.

4. The proposed methodology was put in public domain and comments/suggestions of various stakeholders were invited vide order dated 26.11.2019 in this Suo Motu petition. Subsequently, public hearing on the draft methodology was held on 17.12.2019 for soliciting views of stakeholders.

Submission of the Stakeholders during Public Hearing

5. The Captive Power Producers Association has requested that the proposed methodology should also be made applicable to captive power plants. They have further submitted that for co-generation power plant, there is a need for a methodology factoring in use of steam for purposes other than generation of electricity. The Association has submitted two alternative methods for consideration of the Commission.

6. Representative of NTPC Ltd submitted that in the proposed methodology, electricity generated from biomass has been proposed to be estimated based on electricity generated at the Generator Terminal (GT). The energy meter installed at Generator Terminal is normally not used for billing purpose and hence, estimates based on Generator Terminal may not be acceptable to distribution licensees.

7. The comments/suggestions/objections of the stakeholders on the proposed methodology have been examined by the Commission.

Applicability of the Methodology

8. As per Para 7 of the order dated 26.11.2019 in this Suo-Moto Petition, the applicability of the methodology was proposed as under:

> "7. The suggested methodology to estimate the energy generated from co-firing of biomass has been framed on the actual consumption of biomass and coal rather than on normative operational parameters of Station Heat Rate and Auxiliary Power Consumption. Such a methodology, which does not use normative operational parameters, can be applied both to thermal plants whose tariff is determined by "Appropriate Commission" under Section 62 as well as thermal plants whose tariff is adopted by the "Appropriate Commission" under section 63 of the Electricity Act, 2003."

9. The Commission had proposed to restrict the application of the methodology only to thermal plants under section 62 or section 63 of the Electricity Act, 2003 since the Commission regulates tariff of centrally owned generating stations and the generating stations having composite scheme for sale or purchase of electricity in more than one state under Section 79(1)(a) and 79(1)(b) of the Act. The methodology was not proposed to cover captive or cogeneration plants. The Captive Power Producers Association has submitted that since captive power plants and co-generation power plants are also eligible under MNRE letter dated 26.9.2019 for the purpose of renewable purchase obligation, the methodology should cover captive power plants and co-generation power plants.

10. We have perused the references of MNRE dated 26.9.2019. The MNRE has clarified that the power generated from co-firing of biomass in coal based thermal power plants is renewable energy and is eligible for meeting non-solar Renewable Purchase Obligations (RPOs).

11. We observe that biomass can also be used in thermal captive power plants similar to thermal generation station. We, therefore, are of the view that the methodology shall also be applicable to the captive power plant using co-firing of biomass. The methodology specified in this order will therefore, be applicable to the captive power plant also that co-fires biomass.

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.

Gross Calorific Value (GCV) measurement & Fuel Stock

13. The Captive Power Producers Association has submitted that GCV measurement point and methodology may be indicated so as to avoid any disputes on measurement of values. In this regard, it is observed that the GCV measurement point is already specified under the 2019 Tariff Regulations. The relevant extract is reproduced below, which shall be adopted by the captive power plants and co-generation power plants.

> "(31) '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".

14. The format specified by the Commission in the 2019 Tariff Regulations captures the requirement of data applicable to the thermal power plants. For captive power plants and co-generation power plants, appropriate format may be developed by the respective State Electricity Regulatory Commission or certifying agency of the State.

Special Energy Meter

15. NTPC Ltd has submitted that measurement at the Special Energy Meter (SEM) installed by them at Generator Terminal (GT) may not be acceptable to the system operator and distribution licensees. In this regard, it is observed that the Auxiliary Energy Consumption (AEC) is worked out on the basis of SEM on Generator Terminal and these are similar to SEMs installed by CTU. Therefore, we do not foresee any difficulty in using SEMs installed on Generator Terminal by the generators. However, the Regional Power Committee, in constitution with respective Regional Load Dispatch Centre or State Load Dispatch Centre as the case may be, shall ensure that the SEMs installed by the generator should be got calibrated from time to time for energy accounting. The Captive Power Plant and Co-generation Power Plant shall ensure appropriate metering arrangement at generator terminal.

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 specified in Annexure I and is a part of this order.

Sd/-	***Sd/-***
(I. S. Jha)	**(P. K. Pujari)**
Member	**Chairperson**

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 specified hereunder is to be followed by ISGS, RPCs for estimating electricity generated from biomass in biomass co-firing coal based thermal power plants, including captive and co-generation power plants co-firing bio-mass.

Step-1:

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

$$Eb(G) = [(Qb \times Gb) / ((Qc \times Gc) + (Qb \times Gb))] \times E(GT)$$

Where,

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

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

Gb = 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)

Qc = Quantity of coal burnt during the month (kg)

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

3. The product (Qb x Gb) represents heat (in Kcal) input through bio-mass during the month and shall be estimated on monthly basis by applying following formulae:

Qb x Gb (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 (Qc x Gc) represents heat (in Kcal) input through coal during the month (kcal) and shall be estimated on monthly basis by applying the following formulae:

Qc x Gc (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:

Eb (ex-bus) = Eb(G) {1- [(E(GT)- ESO)/ E(GT)] }

Where,

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

Eb(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 information to the beneficiaries and publish them in the following manner:

a) The generating company shall maintain separate fuel accounts for coal and bio-mass, with 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) These monthly accounts of fuel and GCV, duly signed by the authorised official of the generating company shall be published on its website along with the bills towards purchase of coal and bio-mass.

c) These 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 the GCV testing of bio-mass.

d) Generating company shall keep beneficiaries informed about the co-firing of bio-mass with coal. Authorised representatives of the beneficiaries shall be allowed inspection during the period when bio-mass is being co-fired.

e) The 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.