

CENTRAL ELECTRICITY REGULATORY COMMISSION

NEW DELHI

Suo Motu Petition No. 12/SM/2019

Coram:

**Shri P.K.Pujari, Chairperson
Dr. M.K.Iyer, Member
Shri I.S.Jha, Member**

Date of Order: 26.11.2019

In the matter of

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

1. Ministry of Power, Government of India, vide letter No. 11/86/2017-Th11 dated 17th Nov'2017 has issued the "Policy for Biomass Utilization for Power Generation through Co-firing in Pulverized Coal Fired Boilers" wherein it is envisaged that fluidized bed and pulverized coal units shall endeavour to use 5-10% blend of biomass pellets made, primarily of agro residue along with coal.
2. Subsequently, Central Electricity Authority (CEA) issued advisory to thermal power plants for utilizing biomass in coal based thermal power plants on 24.11.2017.
3. Regulation 19(2)(k) and Regulation 43(4) of the Central Electricity Regulatory Commission (Terms and Conditions of Tariff) Regulations, 2019 has provided for the regulatory framework for allowing use of biomass in coal based thermal generating station.

4. National Thermal Power Corporation Ltd. (NTPC) undertook a pilot study for firing bio-mass in one of its thermal units with pulverized coal fired boiler. NTPC has successfully co-fired about 10% blend of biomass pellets with coal in trial mode in its 210 MW pulverized coal fired unit at Dadri Plant. This pilot study has demonstrated that the blend of coal and biomass pellets can be safely fired in pulverized coal power plants.

5. Subsequently, in order to promote co-firing of biomass in thermal power plants, Ministry of New and Renewable Energy (MNRE), Government of India, vide its notification dated 26.9.2019 has clarified that the power generated from co-firing of biomass in thermal power plants is renewable energy and is eligible for meeting non-solar Renewable Purchase Obligation (RPO) and has requested this Commission to formulate and notify the procedure/methodology for quantifying the energy produced from biomass in biomass co-fired thermal power plants in a reliable and accurate manner.

6. Accordingly, a draft methodology for quantifying the energy generated from co-firing of bio-mass in thermal power plants with coal has been formulated, which is placed at Annexure-I attached with this order.

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.

8. Comments/suggestions are invited from the stakeholders on the suggested procedure/methodology as given in Annexure-I, attached with this Order. A public hearing on this issue shall be held on 17.12.2019.

Sd/-

(I. S. Jha)
Member

Sd/-

(Dr. M. K. Iyer)
Member

Sd/-

(P. K. Pujari)
Chairperson

Methodology for estimation of electricity generated from biomass in biomass co-fired thermal power plants:

Step-1:

For a month, the electrical energy generated at generator terminal corresponding to biomass fuel input can be estimated as follows:

$$E_b = (Q_b \times G_b \times E_T) / \{(Q_c \times G_c) + (Q_b \times G_b)\}$$

Where

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

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

G_b = weighted average GCV of bio-mass burnt during month (kCal/kg)

E_T = Total 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)

The product ($Q_b \times G_b$) i.e the heat input through bio-mass during the month shall be arrived as follows:

$Q_b \times G_b$ (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)}

And

The product ($Q_c \times G_c$) i.e Heat input through coal during the month (kcal) shall be arrived as follows:

$Q_c \times G_c$ (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:

Electrical energy generated by bio-mass (ex-bus) shall be arrived as follows:

$$E_{b \text{ ex-bus}} = E_b \{1 - [(E_T - E_{T \text{ ex-bus}}) / E_T] \}$$

Where

$E_{b \text{ ex-bus}}$ = Electrical energy generated by bio-mass ex-bus during the month (kWh)

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

E_T = Total electrical energy generated at generator terminal during the month (kWh)

$E_{T \text{ ex-bus}}$ = Total electrical energy generated ex-bus during the month (kWh)

NOTE: Information to be shared by the Generator with Beneficiaries/Public:

The generators shall maintain separate fuel accounts for coal and bio-mass which shall include opening balance of fuel, fuel received during the month and closing balance of fuel, in kg. Similarly, generator shall maintain separate GCV (in kCal/kg) accounts for coal and bio-mass which shall include weighted average GCV of the opening stock, weighted average GCV of the fuel received during the month and weighted average GCV of the closing balance at the end of the month.

These accounts (four nos.) i.e. fuel and GCV accounts shall be signed by the generation head on monthly basis. Generator shall put up these accounts on its website along with the bills towards purchase of coal and bio-mass.

These fuel and GCV accounts shall be made available to authorized representative/s of beneficiaries and RLDC/SLDC on demand. Any representative of beneficiaries, on production of authority letter from the beneficiary, shall be allowed to witness the GCV testing.

Generator shall also inform beneficiaries about the time period during which it intends to co-fire bio-mass with coal by putting this information on its web-site. Representatives of the beneficiaries shall be allowed inspection during the period bio-mass is being co-fired. At the end of the time period during which bio-mass co-firing has been carried out, petitioner shall indicate the quantum of bio-mass fired and the energy generated from bio-mass based on the methodology specified above.