



भारत सरकार/ Government of India  
विद्युत मंत्रालय/ Ministry of Power  
केन्द्रीय विद्युत प्राधिकरण/ Central Electricity Authority  
ई टी एंड आई प्रभाग/ ET&I Division

सं. के.वि.प्रा./पी.सी.ई.-॥/ई.टी. एवं आई./MII/2024/३५-५१

दिनांक: 06-03-2024

The Secretary,  
Central Electricity Regulatory Commission,  
Chanderlok Building, 36, Janpath, New Delhi- 110001.

Subject: Suggestions related to MSW/RDF Plants for inclusion in the draft Regulations of CERC on Tariff Determination for Electricity from Renewable Energy Sources.

Sir,

This is with reference to Draft Notification No.: RA-14026(11)/1/2023-CER dated 17.02.2024 of Central Electricity Regulatory Commission (Terms and Conditions for Tariff determination from Renewable Energy Sources) Regulations, 2024. For these regulations, CERC have sought comments /suggestion from the stakeholders/public by 14<sup>th</sup> March 2024.

2. In relation to these draft regulations, CEA has received representation(s) from the developer(s) of power plants based on Municipal Solid Waste (MSW) and Refused Derived Fuel (RDF) raising their concerns about the omission of requirement of auxiliary fuel in the said draft regulations and its impact in the tariff to be determined by CERC for electricity generated from such plants.

3. On perusal of the representation and the provisions laid down in the "Standard Operating Procedure (SOP) for Utilization of Non- recyclable Solid Wastes (NRSW) (including Plastic Waste), Effluent Treatment Plant (ETP) Sludge, Deinking Sludge from Waste Paper based Paper Mills and Refused Derived Fuel (RDF) in Industrial Boiler / Waste to Energy Plant" issued by Gujarat Pollution Control Board (GPCB) in the month of November 2023 (copy of relevant excerpt i.e. para 5.1 of the SOP enclosed at **Annexure-I**), it transpires that a provision for auxiliary fuel to maintain sustained appropriate temperature of above 850 degree Celsius in the combustion of the MSW/RDF during startup, operation and shutdown is a technical requirement for the preclusion of the formation of environmentally detrimental gases of Dioxin and Furans, for safe and scientifically proper combustion of waste, for optimal efficiency,

and for ensuring efficiency, the health and longevity of the plant among other things merits its inclusion under Chapter 10 of the said draft Regulations of CERC and allied tables (form 2.1) for parameters for determination of the tariff for electricity generated from the power plants based on MSW/RDF.

4. The requirement of inclusion of provisions for auxiliary fuel is further buttressed by the provisions viz paras 2.3.1.7 *Auxiliary burners*, 1.3.2 *regarding rotary kilns*, 2.4.3.1 *Energy inputs to waste incinerators (copy enclosed at Annexure-II) as laid down in the European Commission's Report on "Best available Techniques (BAT) reference document for Waste Incineration"* prepared by European Integrated Pollution Prevention and Control Bureau (EIPPCB) in the year 2019.

5. As it becomes mandatory for the developers to use auxiliary fuel for the reasons mentioned above, the omission of both the provisions of auxiliary fuel and the variable component in tariff due to technically and environmentally necessary auxiliary fuel requirement in the methodology and parameters proposed in the draft Regulations will economically adversely affect the developers.

Thus, keeping in view the environmental aspects, the efficiency, health and longevity of the MSW/RDF based power plants, in our considered opinion it will be justifiable that the provision of the auxiliary fuel and corresponding parameters (viz. fuel component in tariff) for tariff determination be included in the draft Regulations to address the germane concerns of the developers of the MSW/RDF power plants.

Further, it is suggested that the proportion of the auxiliary fuel may be kept limited to the extent of 5% and it may be mandated that only renewable based fuel say biomass be used as an auxiliary fuel.

Encl: As above,

Yours faithfully,



(सुरता राम /Surata Ram)

मुख्य अभियन्ता/ Chief Engineer (ET&I)

Copy to:

1. Secretary, Ministry of New and Renewable Energy, New Delhi
2. Chief (Regulatory Affairs), CERC, New Delhi
3. Principal Economic Adviser, NITI Aayog, New Delhi
4. Adviser (Energy), NITI Aayog, New Delhi
5. Director (PHE-SBM-2), Ministry of Housing and Urban Affairs, New Delhi
6. Senior Adviser-Renewable Energy, CERC.



The relevant para of the Gujarat Pollution Control Board's **Standard Operating Procedure (SOP) for Utilization of Non- recyclable Solid Wastes (NRSW) (including Plastic Waste), ETP Sludge, Deinking Sludge from Waste Paper based Paper Mills and Refused Derived Fuel (RDF) in Industrial Boiler / Waste to Energy Plant** in the month of November 2023, is reproduced below:

**“5.1 Design and Operational Aspects of Boiler:**

- a) *A well designed waste to energy/ steam boiler having capacity not less than 10 TPH is to be provided for the purpose. It should be suitably designed for feeding and combustion of different type of wastes mentioned in this SOP.*
- b) *Combustion system of boiler must be designed to maintain combustion temperature above 850 degree centigrade with a flue gas residence time at least 2 seconds during combustion to avoid formation of dioxin & Furans.*
- c) *The auxiliary fuel is to be used to reach required temperature of 850 degree centigrade before starting waste feeding.*
- d) *Automatic startup of auxiliary fuel system is to be provided for maintaining the temperature at 850 degree centigrade, in case temperature starts going down. However, characteristics of the waste feed should be preferably such that it will not require auxiliary fuel more than 20% of total fuel requirement.*
- e) *Startup/ shutdown procedure following above requirement is to be derived and strictly followed to maintain combustion temperature above 850 degree centigrade with gas residence time of 2 seconds all the times.*
- f) *Fuel firing system of Waste to Energy shall consist of Silo / Fuel Feed Hopper, Ram Feeder, Combustion Grate with hydraulic drive.*
- g) *The combustion chamber to be scientifically designed and sized for the complete combustion of carryovers and controlling the super heater inlet gas temperature and also to ensure providing proper residence time for the complete combustion of non-recyclable solid waste.*
- h) *Air system should have a facility to supply primary (combustion) and secondary air to the boiler.*
- i) *The combustion chamber should be provided with an adequate special refractory to counter the erosion and corrosion as well as to ensure that heat is contained within the combustor. Refractory with higher percentage of silicon carbide is preferred.*
- j) *Flue gas shall pass through super heaters, evaporators, economizer, flue gas cleaning systems, ID fans before final exhaust into the atmosphere through chimney of adequate height.*
- k) *The combustor must be designed in line with the best available technologies to ensure stable and continuous operation and complete burnout of the waste and flue gases.”*

Relevant paras from the European Commission report on "Best available Techniques (BAT) reference document for Waste Incineration" prepared by European Integrated Pollution Prevention and Control Bureau (EIPPCB) year 2019:

**"2.3.1.7 Auxiliary burners**

*At start-up, auxiliary burners are used to heat up the furnace to a specified temperature before any waste is added. During operation, the burners are switched on automatically if the temperature falls below the specified value. During shutdown, the burners are used until there is no more unburnt waste in the furnace to keep the furnace temperature at the desired level*

**1.3.2 Rotary kilns**

*Rotary kilns are very robust and almost any waste, regardless of type and composition, can be incinerated. Rotary kilns are, in particular, very widely applied for the incineration of hazardous wastes and most hazardous clinical waste is incinerated in high-temperature rotary kiln incinerators. [ 64, TWG 2003 ]*

*Operating temperatures of rotary kilns range from around 500 °C (as a gasifier) to 1450 °C (as a high-temperature ash melting kiln). **Higher temperatures are sometimes encountered, but usually in non-waste incineration applications. When used for conventional oxidative combustion, the kiln temperature is generally above 850 °C. Kiln temperatures in the range of 900–1 200 °C are typical when incinerating hazardous wastes.***

*Generally, and depending on the waste input, the higher the operating temperature, the greater the risk of fouling and thermal stress damage to the refractory kiln lining. Some kilns have a cooling jacket (using air or water) that helps to extend refractory life, and therefore the time between maintenance shutdowns.*

**2.4.3.1 Energy inputs to waste incinerators**

*In addition to the energy in the waste, there are other inputs to the incinerator that need to be recognised when considering the energy efficiency of the plant as a whole.*

*Electricity inputs*

*Electricity is needed to run the process. The source can be external or circulated.*

*Steam/heat/hot water inputs*

Steam (or hot water or other heat carrier) can be used in the process. The source can be external or circulated.

*Non-waste fuels*

***Non-waste fuels are used to:***

- i. Preheat the combustion air;*
- ii. Increase the temperature in the combustion chamber to the required level during start-up before the plant is fed with waste;*
- iii. Ensure that the required combustion chamber temperatures are maintained during plant operation;*
- iv. Maintain the temperature in the combustion chamber at the required level during shutdown, while there is still unburned waste in the plant;*
- v. Heat up the flue-gas for treatment in specific devices, such as selective catalytic reduction SCR or bag filters;*
- vi. Heat up the flue-gas (e.g. after wet scrubbers) in order to avoid bag filter and stack corrosion, and to suppress plume visibility.”*

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