

FORUM OF REGULATORS



REPORT OF THE SUB-GROUP ON CHALLENGES FOR BIOMASS AND WTE POWER PROJECTS

October 2018

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1 Executive Summary

Representatives from Biomass as well as Waste-to-Energy (WtE) Sectors raised issues highlighting that the projects based on biomass and WtE are under stress due to various factors such as seasonality of biomass, high cost of biomass, off take uncertainty etc., threatening financial viability of existing biomass and WTE power projects. While fundamental Policy and Regulatory framework have been in place for some time, both the sectors have not shown significant new investment in Greenfield Projects. In order to understand the challenges before Biomass and Waste-to-Energy Projects and explore opportunity of synergizing both sectors, Technical Committee of Forum of Regulators (FOR), constituted a Sub- Group under Shri R.N Sen, Chairperson WBERC in its 20th Meeting held on 17th July, 2018 at CERC, New Delhi.

Two meetings of the Sub-Group were held on 17th Aug. 2018 at CERC, New Delhi and 24th September 2018 at Kolkata West Bengal to examine the issue in detail and the following three issues emerged during the meeting on which the Sub-Group deliberated.

- Issue-1: Allowance for use of limited quantity of RDF/MSW in Biomass Power plant and treatment thereof
- Issue-2: Allowance for use of limited quantity of Biomass in Waste to Energy (MSW/RDF) Projects and treatment thereof
- Issue-3: Mandate for procurement of biomass power and mode of procurement

1.1 Issue-1: Allowance for use of limited quantity of RDF/MSW in Biomass Power plant

Some project developers proposed before the Sub- Group to allow blending of Refused Derive Fuel (RDF) in biomass power plants upto 30% on annual basis subject to adherence of environmental norms. It was argued that such synergy between biomass and MSW Fuels will help to revive non-operational biomass based power projects and will also help in making cities clean & green. It was also argued that this will mitigate the seasonality issue in biomass projects and would facilitate in achieving higher PLF for the projects.

The Sub –Group considered various implications of providing such flexibility in biomass based power projects such as impact in terms of Station Heat Rate (SHR), Auxiliary consumption and deration thereof, over longer period. Along with this operational impact, the Sub-Group also discussed additional capex and opex required for emission control, pre-processing and fuel blending. Such incremental costs would depend on project case specific parameters.

After comparing various operational, financial and technical parameters approved by various State Electricity Regulatory Commissions (SERCs) in RE Tariff Regulations for biomass and WTE power projects, the Sub Group was of the view that allowing such flexibility for use of

limited quantity of RDF in Biomass power plant in Fuel consumption mix would provide some savings on variable cost for biomass power projects (ranging upto Rs 1 per Unit) but these savings would be partly offset due to incremental capex and opex cost associated with this modifications. However, any incremental cost (capex and opex) incurred in the Biomass Power Plant to accommodate above changes will have to be borne by the developer itself as allowing flexibility is choice of such biomass power plant developer and not mandatory requirement as such.

Further, the Sub-Group also took note of the fact that there had been a practice of allowing use of 15% of fossil fuels in biomass power projects. Accordingly, the Sub-Group recommended that on the similar line use of RDF/MSW fuels to the extent of 15% quantity on annual basis in the Biomass Power Plant could be allowed with strict adherence and compliance of environmental norms and subject to monitoring mechanism for use of such fuel in biomass power plants.

The Biomass power plant developer shall furnish monthly fuel usage statement and monthly fuel procurement statement duly certified by Chartered Accountant to the beneficiary (with a copy to appropriate agency appointed by the Commission for the purpose of monitoring the RDF/biomass/ other non-fossil fuel consumption and fossil fuel (if any) for each month, along with the monthly energy bill. In no case, collectively the use of RDF and fossil fuel (if any) shall exceed 15% of total fuel consumption in such biomass power plants on annual basis.

The Sub Group also agreed that as this is a voluntary measure and no additional cost/benefit or revision in the existing tariff shall be permitted for such usage. Thus, biomass power projects using flexibility of using RDF upto 15% shall continue to have the same tariff as approved for such biomass based power projects. The Sub-Group also reiterated that importance of adherence to environmental norms along with monitoring/reporting mechanism for fuel usage even though not getting into details of other performance parameters of such projects.

1.2 Issue-2: Allowance for use of limited quantity of Biomass in Waste to Energy Projects

The sub group followed similar approach while examining the possibility of blending biomass upto 15% in RDF based WtE projects. It was argued by some project developers that this would address the issue of daily/seasonal variation in quality/quantity of MSW/RDF fuel in the vicinity of WtE plant and would help in mitigating the issue of mass burning of surplus biomass in fields near Tier-2/Tier-3 cities.

The Sub- Group observed that the use of biomass would improve homogeneity in fuel mix and facilitate combustion. However, it was highlighted that effect of continued use of biomass in WtE plant and its influence on performance parameters /O&M over longer period needs to be studied separately. It was also argued that need for additional capex and opex (if necessary) would change from case to case basis and it is difficult to ascertain the same in generic manner.

Hence, the Sub-Group recommended allowing use of Biomass in RDF based WtE plants to the extent of 15% in terms of annual quantity MT of total fuel consumption. However, strict adherence to environmental norms as per SWM Rules, 2016 or any relevant norms would be required while allowing such flexibility. Hence, it was recommended to devise appropriate monitoring/reporting mechanism for the same. The Project developer shall furnish a monthly fuel usage statement and monthly fuel procurement statement duly certified by Chartered Accountant to the beneficiary (with a copy to appropriate agency appointed by the Commission for the purpose of monitoring the RDF/biomass/ other non-fossil fuel consumption and fossil fuel (if any) for each month, along with the monthly energy bill. Further, it was also reiterated that no revision in tariff on this account shall be permitted.

1.3 Issue-3: Mandate for procurement of biomass power and mode of procurement

Third issue examined by the sub group was to mandatory procurement of power from Biomass Power Projects similar to the provision provided for MSW Projects in the Tariff Policy 2016 for mandatory procurement of electricity from MSW projects by Discoms. It was agreed that biomass power projects also require policy support for off-take of its power.

The Sub-Group deliberated on issues such as centralized procurement of electricity from biomass power projects and concluded that Competitive Bidding guidelines for RE do not mandate centralized procurement or bundled procurement as mandatory route.

However, the Sub-Group proposed that FOR may consider recommending mandatory procurement of biomass/biogas based power projects by the Discoms within the States.

2 Introduction

During the 20th Meeting of FOR Technical Committee meeting held on 17th Jul 2018 at Delhi, representatives for Abellon Clean Energy, presented on the issues pertaining to Biomass and MSW based Projects.

The potential and benefits of Biomass and WTE projects underscoring the Environmental, Health and Social benefits of such projects, were highlighted alongwith challenges of processing Waste as a fuel as it is a heterogeneous mixture and is difficult to segregate. Further, it was pointed out that lot of biomass/WTE plants are under stress pertaining to various factors like unorganized fuel supply, low PLF, tariff and offtake uncertainty, lacking support from financial institutions.

To overcome these challenges, following requests were before the Technical Committee:

- Allow existing biomass plants to use up to 30% RDF
- Allow existing/planned MSW/ RDF plants to be allowed use of up to 30% fuel as biomass
- All biomass/MSW/RDF plants to be classified as waste to energy
- DISCOMS to be obligated to buy 100% electricity from the Bio-MSW plants at tariff determined by SERC
- New hybrid tariff structure / policy
- Preferential treatment to bio-MSW Power Plants

2.1 Constitution of Sub-Group for Biomass/WtE Project

The Technical Committee noted the issues raised and suggestions made in respect of Biomass and Waste-to-Energy (WtE) Sectors. The Committee also noted that the projects based on biomass and WtE are under stress due to various factors such as seasonality of biomass, high cost of biomass, off take uncertainty etc., threatening financial viability of existing biomass and WTE power projects. While fundamental Policy and Regulatory framework have been in place for some time, both the sectors have not shown significant new investment in Greenfield Projects.

In order to understand the challenges before Biomass and Waste-to-Energy Projects and explore opportunity of synergizing both sectors, Technical Committee of Forum of Regulators (FOR), constituted a Sub- Group under Shri R.N Sen, Chairperson WBERC in its 20th Meeting held on 17th July, 2018 at CERC, New Delhi. Other members of the Sub-Group included Kerala Chairperson of Kerala ERC, Chairperson of Punjab, Chairperson of Haryana ERC and FOR Secretariat.

2.2 Meetings of the Sub-Group on Biomass/WtE

First meeting of the Sub-Group was held in Delhi on 17th August 2018 where in representatives of Biomass and WtE project developers were invited to make their submissions and presentations. Representatives from M/s Abellon Clean Energy, NTPC, M/s Rajashree Royal Green Energy Ltd, M/s IL&FS Waste Management Company Ltd, M/s A2Z Group participated in the deliberations.

Subsequently, second meeting of the Sub-Group was held at Kolkata on 24th September 2018 wherein representatives from M/s Globe Solutions Team, Poland were invited. Further, Mr. Ajit Pandit, Idam Infra, Consultant to FOR Technical Committee was invited to present analysis of key issues and suggest potential options to address the same for further deliberations.

3 Submissions of the Biomass and WtE Developers

3.1 Submissions of M/s Rajashree Royal Green Energy Ltd

Representative from Rajashree Royal Green Energy Ltd (Biomass Project Developer) briefed the Sub-Group about various types' biomass projects and the different types of fuel used in the biomass power projects. It was highlighted that significant costs involved in the processing of fuel like, converting it into pellets/brickets or gasification.

Further, it was mentioned that with decrease in prices of power of wind and solar projects, discoms are not willingly procuring power from other RE projects such as biomass and delaying payments by 3-4 month which is pushing biomass projects to shut down. The representative requested committee to consider option of bundling the biomass power with NTPC power.

It was further highlighted that most of the biomass projects are old and would complete their PPA in next two or three years. Hence, it was proposed that the PPA of such projects should be extended further along with some financial assistance so make some technological improvements in such projects.

3.2 Submissions of M/s Abellon Clean Energy

Representative from Abellon Clean Energy made a presentation on synergy between Biomass and WTE projects. They recommended to blend RDF from WTE projects with biomass projects to take care of the seasonality of fuel associated with biomass. They proposed Tier-2 and Tier-3 Cities can set up RDF based WTE projects which can have fuel supply agreement with biomass power plants in nearby areas.

Further, they requested the following to the Sub-Group for reviving the industry:

- a) Allow existing biomass plants to use up to 30% RDF (respecting all environmental norms within limits)
- b) Allow existing/planned MSW/ RDF plants to be allowed use of up to 30% fuel as biomass (respecting all environmental norms within limits)
- c) All biomass/MSW/RDF plants to be classified as waste to energy
- d) DISCOMS to be obligated to buy 100% electricity from the Bio-MSW plants at tariff determined by SERC
- e) Gross calorific value may determine in range of 3100kCal/kg - 3300kCal/kg by all state regulators
- f) Station Heat Rate may be standardized to 4400kCal/kWh for Biomass power plants and 4800 kcal/kg for MSW power plants
- g) The PLF may be revised to 75% from second year onwards

3.3 Submissions of M/s A2Z Infra Engineering Ltd

Representatives from A2Z Infra Engineering Ltd. shared their experience with WTE projects in Ludhiana. They highlighted the complexity of processing of RDF because of various reasons like high moisture content, contains construction debris, silt, metals etc. Further, they expressed concerns in blending of Biomass and WTE projects. They emphasized assurance of timely payment to biomass projects and also proposed to allow same tariff for biomass and WTE projects.

In their submission, A2Z group requested:

- a) Both biomass power plant and waste to energy plants should allow using RDF & biomass to produce renewable energy. Tariff of biomass of respective state should be applicable for RDF/Biomass based power projects. In these RDF/Biomass project tariff, variable component of tariff should change each year based on normative escalation factor of 5% or on basis of price indexation mechanism and developer can opt any of the above escalation mechanism.
- b) All biomass/RDF Power plants should be classified as waste to energy and tariff of biomass should be applicable for these power projects. This way we may help to revive nonoperational biomass power projects and also helps in making cities clean & green.
- c) Use of fossil fuel up to 15% of total Fuel Consumption on annual basis should be allowed in these biomass/RDF based power plants

3.4 Submissions of M/s IL&FS Waste Management Company Ltd

Representative of IL&FS shared their experience of running a pure RDF based plant. The variability in composition of waste recovered from different parts of the country was highlighted. The processing of waste to make RDF, which increases the Calorific Value (CV) was underscored and the impact of seasonality on the waste was also highlighted.

It was suggested to segregate the waste at source level to reduce the costing required to process the waste. It was also suggested to keep out the regime of competitive bidding for Biomass/WTE projects and tariff determination should be on Generic Tariff or Project Specific basis.

4 Analysis and Key Findings

Based on deliberations during the Sub-Group meeting and upon perusal of the submissions made by biomass/WtE developers, the following three issues emerged during the meeting on which the Sub-Group deliberated.

- **Issue-1:** Allowance for use of limited quantity of RDF/MSW in Biomass Power plant and treatment thereof
- **Issue-2:** Allowance for use of limited quantity of Biomass in Waste to Energy (MSW/RDF) Projects and treatment thereof
- **Issue-3:** Mandate for procurement of biomass power and mode of procurement

4.1 Issue-1: Allowance for use of limited quantity of RDF/MSW in Biomass power plant

In case use of RDF/MSW in biomass fuel power plant is to be allowed then, this issue needs to be evaluated considering following aspects:

- a. Definitions of 'Biomass', 'RDF' and other conditions for fuel usage
- b. Technical aspects and impact on operational performance
- c. Commercial aspects and impact on tariff
- d. Environmental aspects and monitoring conditions

Definitions and Conditions for fuel usage:

As regards definition of '**Biomass**' and '**Refused Derived Fuel**' as covered under CERC RE Tariff Regulations and MNRE circular is summarized below:

- **'Biomass'** means wastes produced during agricultural and forestry operations (for example straws and stalks) or produced as a by-product of processing operations of agricultural produce (e.g., husks, shells, deoiled cakes, etc); wood produced in dedicated energy plantations or recovered from wild bushes/weeds; and the wood waste produced in some industrial operations (**Ref. Cl. 2(1)(c) of CERC RE Tariff Regulations, 2017**)
- **Types of Biomass Resources:** Biomass will include Agro-based Industrial Residue, wood produced in Energy Plantations or recovered from wild bushes / weeds, wood waste produced in industrial operations; Crop / Agro Residues.
- *Maximum of upto 15% use of fossil fuel of total energy consumption in kcals or as per DPR, whichever is less. Concerned SNA to monitor the project and ensure that the said*

power plant does not utilize more than 15% of fossil fuel of total energy consumption in killo calories. (Ref. MNRE Circular dt 20-Jun-2014)

- *'Refused derived fuel'(RDF) means fuel derived from combustible waste fraction of solid waste like plastic, wood, pulp or organic waste, other than chlorinated materials, in the form of pellets or fluff produced by drying, shredding, dehydrating and compacting of solid waste; (Ref. Cl. 2(1)(u) of CERC RE Tariff Regulations, 2017)*
- *Use of fossil fuels shall not be allowed, except for the biomass power projects commissioned on or before 31.03.2017, the use of fossil fuels to the extent of 15% in terms of calorific value on annual basis shall be allowed for the tariff period from the date of commissioning. (Ref. Cl. 39 of CERC RE Tariff Regulations, 2017)*

Thus, at present use of RDF does not qualify to be considered as fuel source eligible for use in 'biomass' power plants. Besides, RDF includes fractions of solid waste from plastics (fossil fuel) apart from other combustible organic fractions (non-fossil). Further, use of fossil fuel upto 15% in biomass power plant was permissible for projects commissioned on or before 31.03.2017. However, the same was not considered to be eligible as per prevalent CERC RE Tariff Regulations, 2017. However, it is reckoned that flexibility for such usage in limited quantity would mitigate the seasonality issue in biomass power projects and would facilitate in achieving higher PLF for the projects.

Suggestion: Hence, it was suggested that in case use of RDF in limited quantify is to be allowed in biomass power, amendment to above clauses alongwith restriction on such RDF usage alongwith monitoring mechanism should be formulated.

Technical and Commercial Parameters and effect on performance

A comparison of technical parameters, performance norms (SHR, Auxiliary consumption, calorific value, plant load factor), cost norms (capital cost and operating cost) and commercial aspects tariff norms for biomass power projects with different configurations (water cooled condenser/air cooled condenser) as approved by various SERCs and CERC was undertaken. Based on such comparison, it was observed that:

- Approved Station Heat Rate for biomass power plant ranges from 3800-4200 kCal/kWh depending on vintage, boiler type (travelling grate or AFBC)
- Calorific value and fuel price varies for biomass fuel type across states (designed to use range/type of non-fossil fuel usage)
- Aux. power consumption varies, 10% (water-cooled condenser) or 12% (air-cooled condenser).

- Continued use of RDF in biomass power is likely to affect performance in terms of SHR, Auxiliary consumption and deration thereof, over longer period.
- Additional capex and opex would be required for emission control, pre-processing and fuel blending. However, extent of such incremental costs would depend on project case specific parameters.
- Generic tariff has been determined for biomass power projects, as per norms specified under RE Tariff Regulations.
- **Use of RDF** (GCV ~2500 kCal/kg @ Rs 1800/MT) as against Biomass (GCV~ 3100 kCal/kg @ Rs 2800-3300/MT) would provide **savings in VC by ~ Rs 1.00 pu**; but same would be **partly offset due to incremental** capex cost and impact on operational performance.
- In case, such RDF fuel usage in biomass power plant is to be allowed, it needs to be ensured that Compliance to Environmental Norms and NOC sanction conditions are adhered to.
- It needs to be verified & ascertained for **revision in conditions (if necessary)** as outlined under original **NoC from State Pollution Control Board** for air/water pollution control or **modifications required** to conditions in **Consent to Establish**.
- Allowing the use of RDF in biomass power plant would address to some extent issue of **seasonal variation in availability of biomass fuel** in the vicinity of biomass power plant.
- It is expected to **mitigate the issue of safe disposal of RDF/MSW** in Tier-2/Tier-3 cities.

Key Observations and Suggestions:

- Hence, permitting usage of RDF in biomass power plants (**to limited extent upto 15% in terms of annual quantity MT of total fuel consumption**) may be considered.
- However, **strict adherence to environmental norms** is necessary. Hence, **monitoring/reporting mechanism** needs to be devised.
- **Incremental cost** (capex and opex) and **impact on operational performance** would depend on **case to case basis**. Hence, its **impact (savings or cost)** cannot be ascertained in **generic manner**.
- As this is **voluntary measure** and no mandatory **usage of such RDF in biomass power** is contemplated at this stage, **no revision in tariff** on this account shall be permitted.

M&V and Reporting Framework

- The Project developer shall furnish a **monthly fuel usage statement** and **monthly fuel procurement statement** duly **certified by Chartered Accountant** to the beneficiary (with a copy to appropriate agency appointed by the Commission for the purpose of monitoring the RDF/biomass/ other non-fossil fuel consumption and fossil fuel (if any) for each month, along with the monthly energy bill. (*Ref. Cl. 40 of CERC RE Tariff Regulations, 2017*)

Suggestion:

Biomass power project developers may be permitted flexibility to use RDF in limited quantity upto 15% of total fuel consumption on annual basis; subject to adherence to environmental norms and without allowance of any revision in Tariff on this count.

The Biomass power plant developer shall furnish monthly fuel usage statement and monthly fuel procurement statement duly certified by Chartered Accountant to the beneficiary (with a copy to appropriate agency appointed by the Commission for the purpose of monitoring the RDF/biomass/ other non-fossil fuel consumption and fossil fuel (if any) for each month, along with the monthly energy bill.

In no case, collectively the use of RDF and fossil fuel (if any) shall exceed 15% of total fuel consumption in such biomass power plants on annual basis.

4.2 Issue-2: Allowance for use of limited quantity of Biomass in Waste to Energy (WtE) plant

In case use of biomass in waste to energy (WtE) power plant is to be allowed then, this issue needs to be evaluated considering following aspects:

- a. Definitions of ‘Solid Waste’ ‘MSW’ ‘RDF’ ‘Biomass’ and other conditions for fuel usage
- b. Technical aspects and impact on operational performance
- c. Commercial aspects and impact on tariff
- d. Environmental aspects and monitoring conditions

Definitions and Conditions for fuel usage:

As regards definition of ‘**Municipal Solid Waste**’, ‘**Refused Derived Fuel**’ and ‘**Biomass**’ as covered under CERC RE Tariff Regulations, 2017 and SWM Rules, 2016 is summarized below:

- *"solid waste" means and includes solid or semi-solid domestic waste, sanitary waste, commercial waste, institutional waste, catering and market waste and other non residential wastes, street sweepings, silt removed or collected from the surface drains, horticulture waste, agriculture and dairy waste, treated bio-medical waste excluding industrial waste, bio-medical waste and e-waste, battery waste, radio-active waste*

generated in the area under the local authorities and other entities mentioned in rule 2; (Ref. SWM Rules, 2016)

- **‘Municipal solid waste’ or ‘MSW’** means and includes **commercial and residential wastes generated in a municipal or notified areas in either solid or semi-solid form excluding industrial hazardous wastes but including treated bio-medical wastes (Ref. Cl. 2(1)(p) of CERC RE Tariff Regulations, 2017)**
- **‘Refused derived fuel’(RDF)** means fuel derived from combustible waste fraction of solid waste like plastic, wood, pulp or organic waste, other than chlorinated materials, in the form of pellets or fluff produced by drying, shredding, dehydrating and compacting of solid waste; (Ref. Cl. 2(1)(u) of CERC RE Tariff Regulations, 2017 and SMW Rules, 2016)
- **‘Biomass’** means wastes produced during agricultural and forestry operations (for example straws and stalks) or produced as a by-product of processing operations of agricultural produce (e.g., husks, shells, deoiled cakes, etc); wood produced in dedicated energy plantations or recovered from wild bushes/weeds; and the wood waste produced in some industrial operations (Ref. Cl. 2(1)(c) of CERC RE Tariff Regulations, 2017)
- **Eligibility Criteria for Fuel Usage:** The project shall qualify to be termed as a **Municipal solid waste (MSW) or Refuse Derived Fuel (RDF) based power project if it is using new plant and machinery based on Rankine cycle technology and using Municipal solid waste (MSW) or Refuse Derived Fuel (RDF) as fuel sources, as the case may be.** (Ref. Cl. 4 (h) and Cl. 4(l) of CERC RE Tariff Regulations, 2017)

Thus, at present use of biomass/agro-industrial residue or agro-waste does not qualify to be considered as fuel source eligible for use in ‘MSW/Waste to Energy’ power plants. However, it is reckoned that flexibility for such usage in limited quantity would mitigate the seasonality issue, variation on calorific value of heterogeneous fuel source such as MSW in MSW/RDF/Waste to Energy power projects and would facilitate in achieving higher PLF for the projects.

Suggestion: Hence, it was suggested that in case use of biomass in limited quantify is to be allowed in Waste to Energy Plants, amendment to above clauses alongwith restriction on such RDF usage alongwith monitoring mechanism should be formulated.

Technical and Commercial Parameters and effect on performance

A comparison of technical parameters, performance norms (SHR, Auxiliary consumption, calorific value, plant load factor), cost norms (capital cost and operating cost) and commercial aspects tariff norms for MSW/RDF/Waste to Energy projects with different configurations as

approved by various SERCs and CERC was undertaken. Based on such comparison, it was observed that:

- Approved Station Heat Rate ranges from 4100-4200 kCal/kWh and sought to be revised to 4800 kCal/kWh. Auxiliary Consumption factors for MSW/RDF based projects are very high (around 15%)
- Calorific value of MSW varies 1100-1800 kCal/kg but for RDF GCV of 2500 kCal/kg is assumed. Composition and physical/bio-chemical characteristic of RDF would vary across seasons and across regions depending on local factors.
- Use of biomass would improve homogeneity in fuel mix and facilitate combustion. But, effect of continued use of biomass in WtE plant and its influence on performance parameters /O&M over longer period is unknown.
- No significant additional capex and opex is envisaged; except for fuel supply management and optimisation in controlling fuel feed-stock.
- **Generic tariff** was determined for MSW/RDF based WtE projects in 2015-16. However, **CERC RE Tariff Regulations, 2017 and SERCs have preferred Project Specific Tariff determination for MSW/RDF power plants.**
- **Use of Biomass** (GCV~ 3100 kCal/kg @ Rs 2800-3300/MT) as against **RDF** (GCV ~2500 kCal/kg @ Rs 1800/MT) would in fact **increase VC by ~ Rs 0.70-0.80 pu**; but same would improve operational performance/PLF of WtE.
- In case, such biomass fuel usage in Waste to Energy power plant is to be allowed, it needs to be ensured that Compliance to Environmental Norms and NOC sanction conditions are adhered to.
- It needs to be verified & ascertained for **revision in conditions (if necessary)** as outlined under original **NoC from State Pollution Control Board** for air/water pollution control or **modifications required** to conditions in **Consent to Establish.**
- Allowing the use of biomass in RDF based WtE plant would address to some extent issue of **daily/seasonal variation in quality/quantity of MSW/RDF fuel** in the vicinity of WtE plant.

Key Observations and Suggestions:

- Hence, permitting usage of biomass in RDF based WtE plants (**to limited extent upto 15% in terms of annual quantity MT of total fuel consumption**) may be considered.
- It is expected to **mitigate the issue of mass burning of surplus biomass in fields** near Tier-2/Tier-3 cities.

- However, **strict adherence to environmental norms** is necessary. Hence, **monitoring/reporting mechanism** needs to be devised.
- **Incremental cost** (opex/fuel cost) and **impact on operational performance** would depend on **case to case basis**. Hence, its **impact (savings or cost)** cannot be ascertained in **generic manner**.
- As this is **voluntary measure** and no mandatory **usage of such biomass in RDF based WtE** is contemplated, **no revision in tariff** on this account shall be permitted.

M&V and Reporting Framework

- The Project developer shall furnish a **monthly fuel usage statement** and **monthly fuel procurement statement** duly **certified by Chartered Accountant** to the beneficiary (with a copy to appropriate agency appointed by the Commission for the purpose of monitoring the RDF/biomass/ other non-fossil fuel consumption and fossil fuel (if any) for each month, along with the monthly energy bill. (*Ref. Cl. 40 of CERC RE Tariff Regulations, 2017*)

Suggestion:

RDF based Waste to Energy project developers may be permitted flexibility to use biomass in limited quantity upto 15% of total fuel consumption on annual basis; subject to adherence to environmental norms and without allowance of any revision in Tariff on this count.

The RDF based Waste to Energy plant developer shall furnish monthly fuel usage statement and monthly fuel procurement statement duly certified by Chartered Accountant to the beneficiary (with a copy to appropriate agency appointed by the Commission for the purpose of monitoring the RDF/biomass/ other non-fossil fuel consumption and fossil fuel (if any) for each month, along with the monthly energy bill.

4.3 Issue-3: Mandate for use of biomass power and mode of procurement

Third issue examined by the Sub-group was to mandatory procurement of power from Biomass Power Projects similar to the provision provided for MSW Projects in the Tariff Policy 2016 for mandatory procurement of electricity from MSW projects by Discoms.

Sub-group noted the requests made by Biomass power developers in this respect are as under:

- a) Centralised procurement of biomass power may be permitted.
- b) Bundling of biomass power with NTPC power for sale to DISCOM may be considered.
- c) All biomass/MSW/RDF plants to be classified as waste to energy.

- d) DISCOMS to be obligated to buy 100% electricity from the Bio-MSW plants at tariff determined by SERC.

Key Observations and Findings:

The Sub-group noted that the key question to be addressed in this context is whether Biomass Power and Bio-WtE plants to be treated as (or on par with) ‘Waste to Energy (WtE) Plants using MSW/RDF as main fuel source?’

In this context, the Sub-group as noted the provisions of Tariff Policy and SMW Rules 2016, recommending mandate for power procurement from MSW/Waste to Energy power projects as under:

Provisions of Tariff Policy, 2016 (Ref. Cl. 6.4)

6.4 Renewable sources of energy generation including Co-generation from renewable energy sources:

- *1 (ii) Distribution Licensee(s) shall compulsorily procure 100% power produced from all the Waste-to-Energy plants in the State, in the ratio of their procurement of power from all sources including their own, at the tariff determined by the Appropriate Commission under Section 62 of the Act.*
- *“6.4 (2) States shall endeavor to procure power from renewable energy sources through competitive bidding to keep the tariff low, except from the waste to energy plants” (Ref. Cl. 6.4 of Tariff Policy, 2016)*

Mandate for WtE as per SWM Rules, 2016 (Ref. Cl. 9 and 10)

- **9. Duties of the Ministry of Power.**-The Ministry of Power through appropriate mechanisms shall,-
 - a. decide tariff or charges for the power generated from the waste to energy plants based on solid waste.*
 - b. compulsory purchase power generated from such waste to energy plants by distribution company.*
- **10. Duties of Ministry of New and Renewable Energy Sources-** The Ministry of New and Renewable Energy Sources through appropriate mechanisms shall,-
 - (a) facilitate infrastructure creation for waste to energy plants; and*
 - (b) provide appropriate subsidy or incentives for such waste to energy plants.*

Thus, Subgroup noted that the issues and questions to be addressed in this context are as under:

- **Whether the Commission should mandate procurement model for specific RE source for DISCOMs?**

It is noted that Competitive Bidding guidelines for RE do not mandate centralised procurement or bundled procurement as mandatory route. Besides, appointment of Authorised Representative or selection of Procurement Agency is choice to be exercised by DISCOMs. Further, bundling of power is prerogative of concerned PSU or to be formulated as part of Scheme by Central Govt

- **Mandate for RE procurement can be stipulated in terms of RPO target? Whether such technology/RE resource specific mandate is desirable?**

It is observed that separate RPO target (Solar and Non-Solar) has been specified in the past. However, no further distinction is made amongst all other Non-Solar RE sources *except* mini/micro hydel in some states. In case, mandate for specific RE technology/resource is to be provided, the same can be done u/s 86 by stipulating separate target for such RE resource/technology. However, with falling solar prices, need for separate Solar/Non-Solar RPO targets would require wider deliberations.

- **Tariff policy has stipulated mandate for procurement, only for WtE plant at Tariff determined by SERC.**

It is noted that allowance for use of multiple fuels (RDF in Biomass and Biomass in WtE in limited quantity) does not change inherent character or classification of Waste to Energy (WtE) plant. Flexibility in fuel usage/mix (in limited quantity) may be allowed only to provide operational flexibility without any impact on tariff and subject to other conditions, adherence to environmental norms etc.

- **Treatment for Existing Biomass Power plants for Extension of PPA beyond initial term**

Extension to be evaluated in terms of balance Useful Life. MERC has recently allowed (Case 84 of 2015) such extension subject to competitive bidding with ceiling rate for operating cost recovery and VC at annually determined Tariff Rate.

Suggestion:

In case, mandate or support for power procurement for MSW/RDF and biomass power is to be promoted, following alternatives can be explored further:

- a. Alt-1: Separate RPO target for MSW/RDF based WtE project may be considered upon evaluation.

b. Alt-2: REC multiplier with different multipliers for Multiple fuel usage (Biomass, Bio-WtE and WtE) may be considered for RPO.

Upon deliberations the Sub-group was of the considered view that the biomass power projects would require policy support for offtake of its power. However, specifying separate technology specific RPO target would not be desirable at this stage. Similarly, providing REC multipliers for different RE technology would only cater to biomass power projects that are registered for REC. Further, it was deliberated that certification and monitoring of the generation and strict adherence to biomass fuel usage norms/conditions thereof is critical. It is important that such offtake from biomass power be promoted but states could mandate for such procurement for biomass power generated within state for consumption within state.

Suggestion:

The Subgroup noted the request that biomass power projects also require policy support for off-take of its power. The Sub-Group deliberated on issues such as centralized procurement of electricity from biomass power projects and concluded that Competitive Bidding guidelines for RE do not mandate centralized procurement or bundled procurement as mandatory route.

However, the Sub-Group proposed that FOR may consider recommending mandatory procurement of biomass/biogas based power projects by the Discoms within the States.

5 Recommendations

In view of the foregoing deliberations Sub-Group hereby recommends as under:

Issue-1: Allowance use RDF in limited quantity in biomass power plant and treatment thereof

- Biomass power project developers may be permitted flexibility to use RDF in limited quantity upto 15% of total fuel consumption on annual basis; subject to adherence to environmental norms and without allowance of any revision in Tariff on this count.
- The Biomass power plant developer shall furnish monthly fuel usage statement and monthly fuel procurement statement duly certified by Chartered Accountant to the beneficiary (with a copy to appropriate agency appointed by the Commission for the purpose of monitoring the RDF/biomass/ other non-fossil fuel consumption and fossil fuel (if any) for each month, along with the monthly energy bill.
- In no case, collectively the use of RDF and fossil fuel (if any) shall exceed 15% of total fuel consumption in such biomass power plants on annual basis.

Issue-2: Allowance use biomass in limited quantity in RDF based Waste to Energy Plant and treatment thereof

- RDF based Waste to Energy project developers may be permitted flexibility to use biomass in limited quantity upto 15% of total fuel consumption on annual basis; subject to adherence to environmental norms and without allowance of any revision in Tariff on this count.
- The RDF based Waste to Energy plant developer shall furnish monthly fuel usage statement and monthly fuel procurement statement duly certified by Chartered Accountant to the beneficiary (with a copy to appropriate agency appointed by the Commission for the purpose of monitoring the RDF/biomass/ other non-fossil fuel consumption and fossil fuel (if any) for each month, along with the monthly energy bill.

Issue-3: Mandate for biomass power procurement and mode of procurement

- The Subgroup noted the request that biomass power projects also require policy support for off-take of its power. The Sub-Group deliberated on issues such as centralized procurement of electricity from biomass power projects and concluded that Competitive Bidding guidelines for RE do not mandate centralized procurement or bundled procurement as mandatory route.
- However, the Sub-Group proposes that FOR may consider recommending mandatory procurement of biomass/biogas based power projects by the Discoms within the States.