



Confederation of Indian Industry

Inputs/suggestions from stakeholders on the Draft Notification No RA -14026/(11)/1/2023-CERC vide public notice dated 17.2.024

Background:

The determination of a cost-reflective tariff for WTE projects is vital for the operation and viability of such projects and, particularly WTE projects which directly result in the reduction in harmful impact of waste and improvement in the quality of public life. CII Members has analyzed the provisions of the Draft Regulations and have provided certain comments and suggestions for consideration of this Hon'ble Commission in order to assist this Hon'ble Commission in determining the applicable tariff for WTE projects. Further, Members would like to provide additional or supplementary submissions for the consideration. The clause wise comments and suggestions are as follows for your kind consideration:

Clause wise comments

Sr. No	Reference	Existing Description	Comments / Suggestions						
1.	Regulation 62 <u>"Capital Cost"</u> Page 28 of Draft Regulations	62. Capital Cost Normative Capital Costs for first year of the Control Period shall be as under: <table border="1" data-bbox="430 1161 958 1334"> <thead> <tr> <th data-bbox="430 1161 694 1246">Technology</th> <th data-bbox="694 1161 958 1246">Capital Cost (Rs. Lakhs/MW)</th> </tr> </thead> <tbody> <tr> <td data-bbox="430 1246 694 1289">MSW</td> <td data-bbox="694 1246 958 1289">1800</td> </tr> <tr> <td data-bbox="430 1289 694 1334">RDF</td> <td data-bbox="694 1289 958 1334">2100</td> </tr> </tbody> </table>	Technology	Capital Cost (Rs. Lakhs/MW)	MSW	1800	RDF	2100	<ul style="list-style-type: none"> - Regulation 12 under Chapter 2 of the Draft Regulations specify that the <i>"norms for capital cost, as specified in relevant chapters of these regulations, <u>shall be inclusive of land cost, pre-development expenses, all capital work including plant & machinery, civil work, erection, commissioning, financing cost, interest during construction and evacuation infrastructure up to an inter-connection point.</u>"</i> - ACEL submits that in the process of determination of applicable capital cost for MSW and RDF-based WTE projects, this Hon'ble Commission ought to be cognizant of the fact that owing to the poor segregation of MSW at source, the WTE generators are
Technology	Capital Cost (Rs. Lakhs/MW)								
MSW	1800								
RDF	2100								

			<p>forced to incur additional expenditure in pre-processing the MSW to ensure that the inert content is adequately segregated before incineration.</p> <ul style="list-style-type: none">- WTE generators are further obligated to manage the subsequent issues created by the incineration of poor quality MSW <i>vis-à-vis</i> incurring a higher cost for maintaining an adequate Flue Gas Cleaning System (FGCS) to ensure adequate treatment of harmful effluents discharged from the incineration of such poor quality MSW.- ACEL submits that this Hon'ble Commission ought to consider evaluating real-time empirical data from operational and functioning WTE projects instead of basing its determination on any assumptions.- ACEL further seeks to highlight that the construction and commissioning of its Jamnagar WTE project of group entity of ACEL entailed capital cost of INR 19.33 Crores / MW. However, such costs were incurred in the period between 2019-2021 and there has been a considerable hike in effect of inflationary forces upon various costs. Further, the capital cost requirement fluctuates considerably due to the geographical factors. ACEL's other pipeline projects cost have also gone up and approximately is around INR 22.33 Crores/MW for which cost commitments were made during 2020-2022. Accounting for the aforesaid and other prevalent factors, ACEL submits that the capital cost ought to be determined in the range of INR 23 Crores/MW to INR 28 Crores / MW for the next control period.- Considering the aforesaid issues and taking into account the prevailing market rates, the capital cost of MSW-based WTE projects using RDF ought to be provided as INR 23 Crores/MW to INR 28 Crores / MW for the next control period which is inclusive of pre-processing infrastructure.
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			<ul style="list-style-type: none">- ACEL is submitting the aforesaid figures on the basis of the operational data procured from its 7.5 MW WTE plant in Jamnagar, where the total capital cost is around INR 145 Crores, thereby translating to INR 19.33 Crores / MW. It is worth highlighting that the entire economics behind the Jamnagar plant has been corroborated by appropriate authorities such as Indian Renewable Energy Development Agency (“IREDA”) and Power Finance Corporation (“PFC”). However, it is pertinent to note that construction of the aforesaid project had begun back in 2019, and the costs incurred were in line with the market rates at the time. - Notably, the Ministry of Housing and Urban Affairs (“MoHUA”) ‘Guidelines on Usage of RDF in Various Industries, October-2018’ also states that cost of setting up Pre-processing facility is around Rs 12 Crores Per100 ton which translates to Project cost of Rs 120 Crores for 14.9 MW waste to energy Plant.
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Table 18. Tentative Capital Cost for setting up to 100 TPD plant

S.No.	Items	Cost (Rs. Lakhs)
1	Air Shifter (1 nos.)	25
2*	Shredder Metso (1.4tph @ 50mm X1 nos.)	390
3*	Screen, Ecostar make for segregation & recycling 1 no. @12 tph	145
4*	Baling Machine (1 X 15tph)	102
5	Magnetic band (1 no.)	3
6	Conveyors (50 mtrs length approx)	13
7	Weigh Bridge-60T	11
8	Electricals	
a	600 KVA transformer	10
b	1 nos. of 365 KVA DG	22
c	Panel & cables	10
d	VCB	4
e	Earthings	5
f	Lighting of shed & boundary wall	15
9	Civil (Covers Boundary wall, office block, rain water harvesting, bore well, soaking pit, road, toilet etc.)	172
10	Covered Shed (2000 sqm)	200
11	Office furniture & computer	2.5
12	Lab equipment	10
13	Fire fighting	30
14	Reject collection Bins- 6 nos.	3
15	Electrical Connection charges (govt. department)	10
16	Vehicle (JCB 1 nos. & Tractor 1 no.)	35
	Total	1217.5
	Contingency @3%	36.5
	Grand Total	1254.0
	Rounded Off	12.55 Cr

(Cost Source: M/s IL&FS Environmental Infrastructure & Services Ltd.)

			<p>A table containing a detailed breakdown of the component-wise Capital Cost incurred by the developer has been annexed hereto and marked as <u>Annexure – A1</u></p> <p>A descriptive analysis of the individual components for Capital Cost in case of RDF based WTE Projects has been annexed hereto and marked as <u>Annexure – A2</u>.</p>
2	<p>Regulation 66</p> <p>“Fuel Cost”</p> <p><i>Page 29 of the Draft Regulations</i></p>	<p>This Hon’ble Commission has disallowed fuel costs for determination of tariff of MSW and RDF based power projects.</p> <p>Further, this Hon’ble Commission has not included blending and co-firing of the supplementary</p>	<ul style="list-style-type: none"> - This Hon’ble Commission has not allowed fuel cost to the WTE projects and also not considered co-firing of supplementary fuel by such projects in order to maintain the necessary statutory threshold of furnace temperature for optimum incineration of waste and production of electricity. - Further, in relation to the usage of the supplementary fuel, following is noteworthy: <ul style="list-style-type: none"> A. It may also be noted that low calorific value of MSW/RDF poses issue in start-up / shutdown activity requirement where the boiler required to maintain a temperature of minimum 850 °C which is possible with help of co-firing of Biomass. If MSW/RDF is incinerated at below temperature of 850°C, the harmful gases such as Dioxin and Furans will be released, which is threat for the environment. Further, moisture content in MSW/RDF is increased during the monsoon season which further has an impact on maintaining the desired Boiler temperature of minimum 850°C, thereby necessitating that allow Biomass as an auxiliary fuel to the extent of 15%. B. It is further noteworthy that the MNRE Guidelines provide for usage of industrial waste as supplementary fuel:

- **MNRE guidelines dated November 2022 for implementation of Waste to Energy Programme “Programme on Energy from Urban, Industrial and Agricultural Wastes/Residues”**

1.2. Objective: The objective of the programme is to support the setting up of Waste to Energy projects for generation of Biogas/ BioCNG/ Power/ producer or syngas from urban, industrial and agricultural wastes/residues.

- **MNRE REVISED GUIDELINES OF WASTE-TO-ENERGY PROGRAMME – 28.02.2020**

*3.1 Type of Waste – Municipal Solid Waste
viii). In MSW to Power projects, mixing of any waste of renewable nature or biomass may be mixed to the extent of 25% of the total waste used or as per SERC/CERC regulations.*

C. The Gujarat Pollution Control Board (“GPCB”) has issued Standard Operating procedures (“SOP”) for utilisation 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. The relevant para of the GPCB SOP are 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."*

it is therefore inferred that in order to use MSW/RDF into the combustion chamber of Boiler, the minimum temperature of boiler should be 850 °C or above. If MSW/RDF are inserted in the Boiler before temperature of 850 °C, the harmful gases such as Dioxin and Furans will be released, which is threat for the environment. Similarly, during the Shut-down Activity the waste(MSW/RDF) left in the Boiler are required to be burn completely, which is only possible with the help of auxiliary fuel. Thus, WTE plants are required to use auxiliary fuel to maintain a temperature of 850°C during start-up, operations and shut-down activity of the MSW/RDF based WTE Plants.

- D. It is also important to note that the European Commission published a report on "Best available Techniques (BAT) reference document for Waste Incineration" prepared by European Integrated Pollution Prevention and Control Bureau (EIPPCB) in year 2019. This BAT reference document for Waste Incineration forms part of a series presenting the results of an exchange of information between EU Member States, the industries concerned, non-governmental organizations promoting environmental protection and the Commission, to draw up, review and, where necessary, update BAT reference documents. The said report suggests that during the start-up activity of the plant, the best practice is to insert waste in the combustion temperature after a temperature of 850 °C is achieved. It is not advisable to insert waste before the temperature of 850 °C. During shutdown, it is necessary to keep the furnace temperature at the desired level until there is no more unburnt waste in the furnace. The use of Auxiliary fuel which is of non-waste (coal

or coke) type has been described which will help in enhancing the temperature of combustion chamber to required level during start-up, Shut down and plant operation. The relevant para of the European Commission BAT report is reproduced below:

“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

*...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....*

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; Heat up the flue-gas (e.g. after wet scrubbers) in order to avoid bag filter and stack corrosion, and to suppress plume visibility.”*

Although Europe has allowed fossil fuel (coal or coke) as auxiliary fuel, however, in the interest of environment and robust compliance to objectives we are suggesting Biomass to be used as supplementary fuel, which is renewable in nature.

- ACEL vide its letter dated 05.03.2024 has made a representation to the Central Electricity Authority (“CEA”) highlighting the need to allow usage of supplementary fuel for MSW projects in order to maintain the requisite furnace temperature as specified above and accordingly sought its indulgence in placing a recommendation to this Hon’ble Commission expanding upon the same.
- Recently, the CEA while appreciating the suggestion of the ACEL vide its email dated 13.03.2024 notified ACEL that appropriate suggestions have been furnished to this

			<p>Hon'ble Commission upon perusal of ACEL's representation. A copy of the email communication between ACEL and CEA has been annexed hereto and marked as <u>Annexure – A3.</u></p> <p>-</p>
			<p>- This Hon'ble Commission has not allowed fuel cost to the WTE projects and also not considered co-firing of supplementary fuel by such projects in order to maintain the necessary statutory threshold of furnace temperature for optimum incineration of waste and production of electricity.</p> <p>- Further, in relation to the usage of the supplementary fuel, following is noteworthy:</p> <p>E. It may also be noted that low calorific value of MSW/RDF poses issue in start-up / shutdown activity requirement where the boiler required to maintain a temperature of minimum 850 °C which is possible with help of co-firing of Biomass. If MSW/RDF is incinerated at below temperature of 850°C, the harmful gases such as Dioxin and Furans will be released, which is threat for the environment. Further, moisture content in MSW/RDF is increased during the monsoon season which further has an impact on maintaining the desired Boiler temperature of minimum 850°C, thereby necessitating that allow Biomass as an auxiliary fuel to the extent of 15%.</p> <p>F. It is further noteworthy that the MNRE Guidelines provide for usage of industrial waste as supplementary fuel:</p> <p>- MNRE guidelines dated November 2022 for implementation of Waste to Energy Programme "Programme on Energy from Urban, Industrial and Agricultural Wastes/Residues"</p>

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- ix. Maintain the temperature in the combustion chamber at the required level during shutdown, while there is still unburned waste in the plant;***
- x. Heat up the flue-gas for treatment in specific devices, such as selective catalytic reduction SCR or bag filters; Heat up the flue-gas (e.g. after wet scrubbers) in order to avoid bag filter and stack corrosion, and to suppress plume visibility.”*

Although Europe has allowed fossil fuel (coal or coke) as auxiliary fuel, however, in the interest of environment and robust compliance to objectives we are suggesting Biomass to be used as supplementary fuel, which is renewable in nature.

- ACEL vide its letter dated 05.03.2024 has made a representation to the Central Electricity Authority (“**CEA**”) highlighting the need to allow usage of supplementary fuel for MSW projects in order to maintain the requisite furnace temperature as specified above and accordingly sought its indulgence in placing a recommendation to this Hon’ble Commission expanding upon the same.
- Recently, the CEA while appreciating the suggestion of the ACEL vide its email dated 13.03.2024 notified ACEL that appropriate suggestions have been furnished to this Hon’ble Commission upon perusal of ACEL’s representation. A copy of the email communication between ACEL and CEA has been annexed hereto and marked as **Annexure – A3.**

			<ul style="list-style-type: none">- It may be noted that CEA is recognized under the Electricity Act as apex body for the technical issue. The recommendation made by the CEA in terms of Section 73 (n) of the Electricity Act has statutory weightage and ought to be acted upon by the Hon'ble Commission. Section 73 (n) of the Electricity Act provides:<p style="margin-left: 40px;">“73. Functions and duties of Authority.—The Authority shall perform such functions and duties as the Central Government may prescribe or direct, and in particular to—</p><p style="margin-left: 40px;">“....</p><p style="margin-left: 40px;"><u>(n) advise the Appropriate Government and the Appropriate Commission on all technical matters relating to generation, transmission and distribution of electricity</u></p>- It is understood that the CEA vide its letter dated 06.03.2024 to this Hon'ble Commission highlighted the various extraneous factors that are associated with the incineration of MSW for generation of electricity and the hardships being faced by the developers in the absence of sufficient provisions allowing usage of auxiliary fuel. Reference was placed on the provisions of the <i>“Standard Operating Procedure 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”</i> issued by the Gujarat Pollution Control Board (GPCB) and the European Commission's report on <i>“Best available Techniques (BAT) reference document for Waste Incineration”</i> to further highlight the general trend of acceptance in usage of auxiliary fuel in MSW based WTE projects, the same being reproduced and relied upon hereinabove. Accordingly, the CEA suggested that it is justifiable that a suitable provision for usage of auxiliary fuel and corresponding parameters be considered for the tariff determination process in the Draft Regulations and suggested that usage of supplementary fuel to the extent of 5% be allowed. A copy
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			<p>of the letter dated 06.03.2024 of the CEA has been annexed hereto and marked as <u>Annexure – A4.</u></p> <ul style="list-style-type: none"> - Considering the above, particularly binding technical advisory being provided by the CEA which is statutory in nature in terms of Section 73 (n) of the Electricity Act and the applicable legal regime which permits usage of supplementary fuel usage, ACEL suggests that this Hon’ble Commission should allow the supplementary fuel cost for co-firing of <u>supplementary fuel Biomass in the range of 10%-15%.</u>
3.	<p>Regulation 65</p> <p>“Operation and Maintenance Expenses”</p> <p><i>Page 29 of Draft Regulations</i></p>	<p>The Hon’ble Commission has proposed the O&M Cost as 6.5% of the capital cost for MSW-based projects and 8.5% of the capital cost for RDF-based projects with an escalation rate of 5.89%.</p>	<ul style="list-style-type: none"> - Regulation 19 of the Draft Regulations specifies that the O&M expenses for the entire tariff period shall be determined on the normative O&M expenses specified therein for the first year of the control period and the escalation shall be based on such normative expenses for the first year. - As evident from the Explanatory Memorandum furnished along with the Draft Regulations, this Hon’ble Commission has arrived at the proposed O&M expenses by a simple comparative analysis of the findings of other State Commissions and without addressing any of the individual and pertinent issues that are unique to WTE developers. - ACEL submits that similar to the determination of capital cost of the projects, the O&M expenses ought to be determined by analyzing the actual operational data and experiences offered by WTE developers in order to provide a cost-reflective tariff. Accordingly, it is submitted that the O&M expenses for WTE projects ought to be determined by taking into account the following costs: <ul style="list-style-type: none"> (i) O&M of power plant (ii) O&M of pre-processing plant (iii) O&M of ash & inert material disposal

(iv) O&M of FGCS

A detailed breakdown of the O&M expenses in each category has been annexed hereto and marked as **Annexure – A5**.

- It is submitted that WTE developers have to compensate for the lack of reliable technology and scientific methods for disposal and segregation of waste at source. They also have to account for certain variables that affect the smooth functioning and efficient operation of the plants, thereby affecting the actual O&M expenditure incurred by such developers.

- It is also noteworthy that costs associated to O&M expenditure for a WTE plant are not fixed and

fluctuate over time. The slow pace of scientific development coupled with the severe impact on supply chain due to various extraneous circumstances such as the COVID-19 pandemic, Russia-Ukraine and Israel-Palestine wars have further put inflationary pressure on the overall economics of the project and the same needs to be adequately accommodated in the tariff determination for cost-reflective recovery of expenses.

- In addition to the aforesaid issues highlighted, it is also relevant to point out that the O&M expenses are also exacerbated by the costs incurred towards use of consumables such as lime and activated carbon for treatment of flue gas, specialized equipment like extractor crane, corrosive nature of fuel and need for refurbishment and replacement, requirement of skilled labour and various other factors that are considerably higher than other generators. Such factors ought to be adequately provided for at the time of determination of applicable O&M expense.

			<ul style="list-style-type: none"> - It is also worth highlighting that there is a significant uncertainty in the O&M costs applicable to WTE projects due to various factors such as heterogenous quality of waste and unstable market conditions. Furthermore, this Hon'ble Commission is obligated to determine a tariff which allows the generator to recover the actual costs incurred in a reasonable manner, by virtue of Section 61 of the Electricity Act, 2003. <p>The suitability of the proposed O&M percentage threshold is contingent upon the approval of the revised capital expenditure per MW, as proposed in our recommendation above, which is essential for enabling the adoption of a cost-reflective tariff.</p> <ul style="list-style-type: none"> - Considering the above, ACEL humbly prays for a hybrid tariff model wherein the O&M component is treated independently and periodically re-determined without according a levelized treatment to the same.
4.	<p>Regulation 64</p> <p>“Auxiliary Consumption”</p> <p><i>Page 28 of the Draft Regulations</i></p>	<p>This Hon'ble Commission has proposed the auxiliary consumption as 15%.</p>	<ul style="list-style-type: none"> - ACEL submits that the basic design of a WTE project can be segregated into two major components: (a) the Generating Plant and (ii) the Pre-Processing Plant. It must be noted that from an operational perspective, the WTE plant requires increased volume of air for adequate combustion of heterogenous waste having high moisture content and low calorific value. Therefore, it requires appropriate side-wall cooling, flue gas recirculation and cylinder cooling, all of which entails a much higher load on such individual fans. As such, it significantly increases the quantum of auxiliary consumption of such power plants. - In addition to the above, WTE plants also require additional systems such as FGCS (lime activation and injection of activated carbon), bag filters and boiler cleaning systems which further add to the burden of auxiliary consumption. A detailed breakdown of the component-wise auxiliary consumption is reproduced hereinbelow:

Sr. No.	Components	Connected Load (kWh)	Running kW / Day
1.	Boiler	826	13,076
2.	Turbine	107	620
3.	Pre-Processing Plant	615	4,884
4.	Mist Cooling Tower & Water Treatment	673	7,103
5.	Fuel Handling System	187	474
6.	Other Equipment	446	2718
	Aux. Power Consumption	2854	28,875
	Gross generation / day	-	1,53,000
	% of Aux. Power in Power Plant	-	18.87%

- Thus, as per the actual data provided hereinabove, our auxiliary power consumption is 18.87% which may be considered by this Hon'ble Commission as basis for our proposal. However, we are requesting a minimum of 16% if 18.87% is not considered by this Hon'ble Commission.
- It is further worth pointing out that the Hon'ble MERC vide Order dated 22.03.2021 in Case No. 162 of 2019 has determined the auxiliary consumption as 18.67%.
- As such, we submit that the auxiliary consumption for RDF-based WTE projects may be considered as **at least 16% and if not 18.67%** as considered by the Hon'ble MERC.

5.	Regulation 14	This Hon'ble Commission has proposed the interest rate on loan to be normative interest	- ACEL submits that consideration of 200 basis points above average MCLR is incorrect and not an accurate reflection of the true nature of market practices. Further, as per the
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	<p>“Loan Tenure and Interest on Loan”</p> <p><i>Page 14 of the Draft Regulations</i></p>	<p>rate of 200 basis points above the average MCLR prevalent during the last available 6 months.</p>	<p>documents available with ACEL from construction / commissioning of its WTE projects, the fundings that were received operate with an interest rate @ 11.95%.</p> <ul style="list-style-type: none"> - It may also be noted that IREDA has granted financial assistance @ 11.95% to the existing pipeline WTE Projects. - The current market regime and applicable rates indicate that interest rate ought to be @ 11.95% - Hence, we suggest that the applicable interest on term loan may be determined as <u>11.95%</u>
6.	<p>Regulation 15</p> <p>“Depreciation”</p> <p><i>Page 14 of the</i></p>	<p>This Hon’ble Commission has proposed the depreciation rate at 4.67% p.a. for the first 15 years and remaining depreciation to be evenly spread during the remaining useful life of the project.</p>	<ul style="list-style-type: none"> - As evident from the Explanatory Memorandum, this Hon’ble Commission has adopted the ‘Differential Depreciation Approach’ involving the utilization of the straight-line method to compute depreciation over the loan tenure and beyond and while considering the project’s salvage value to be 10% of the project cost. -

Draft Regulations

- As evident from the Explanatory Memorandum, this Hon'ble Commission has adopted the 'Differential Depreciation Approach' involving the utilization of the straight-line method to compute depreciation over the loan tenure and beyond and while considering the project's salvage value to be 10% of the project cost.
- Keeping in line with the provisions under CERC RE Tariff Regulations 2020, we have considered the salvage value of the project to be 10% and allotted 90% of the Capital Cost of the Project eligible for depreciation.
- It is appropriate to consider the findings of the other Ld. SERCs regarding applicable depreciation rate:

State	Tariff Order Particulars	Depreciation (%)
Rajasthan	Order in Petition Nos. 1195 and 1221 of 2017 <i>Dated: 18.05.2018</i>	5.83% - First 12 years 2.51% - Remaining 8 years
Himachal Pradesh	<i>Order Dated: 07.05.2016</i>	5.83% - First 12 years 2.51% - Remaining 8 years
Telangana	Order in OP No. 14 of 2020 <i>Dated: 18.04.2020</i>	5.83% - First 12 years 2.50% - Remaining 8 years
Gujarat	2016 Tariff Order	7% - First 10 years

	Dated: 10.11.2016	2% - Remaining 10 years
Bihar	Case No. 22 of 2015 Order dated 24.09.2015	7% - For 10 Years 1.33% For (15 yrs)
Bihar	Suo-motu Proceedings No.19/2016 dated 01.08.2016	7% - First 10 years 2% - Remaining 8 years

- In light of the above, ACEL submits that repayment of the loan undertaken by a project developer would be better facilitated if this Hon'ble Commission considered the depreciation rate of 7% for the first 10 years of the project life. Thereafter, this Hon'ble Commission ought to adopt the Straight-Line Method of depreciation and accordingly determine it @ 2% for the remaining useful life of the Project.
- Therefore, ACEL submits that the depreciation ought to be **7% for the first 10 years and 2% for the remaining useful life of the project.**

	<p>Regulation 16</p> <p>“Return on Equity”</p> <p><i>Page 15 of the Draft Regulations</i></p>	<p>This Hon’ble Commission has proposed the Return on Equity (“RoE”) is 14%. Further, it has provided for grossing up of ROE by latest available MAT rate for first 20 years and by latest available Corporate Tax rate for the remaining period.</p>	<ul style="list-style-type: none"> - This Hon’ble Commission has considered the historical trends of various benchmark rates, including bank rate, SBI PLR, deposit rates and government securities rate for the purpose of determining the risk-free rate and market risk premium. However, it has erred in not considering the exigent circumstances that are prevalent with WTE projects which necessitates a differential view and treatment of the ROE component for such projects. - Due to the nascent stage of development of technology associated with WTE projects, the developers are constrained to import a major bulk of the plant and machinery from abroad and integrate them into the indigenous balance of plant equipment. It is not out of place to mention that operating a plant in a relatively new environment and with foreign technology is associated with an element of risk which ought to be adequately provided for. - It is further submitted that due to the nascent stage of technology development in India and associated risk of operating equipment / technology integrated from foreign imports, there is an element of high risk and low returns which dissuades the nationalized banks from financing such projects. Further, it is difficult for the developers to obtain financing from private equity / venture capital funds / DFIs since they are unable to match their expectation of 25-30% returns on their investment. As such, it is imperative that this Hon’ble Commission determine an applicable ROE which is competitive and would result in better returns so as to make it a lucrative opportunity for investors / financiers to fund such projects with the prospect of better returns. This would ensure better investment opportunities for WTE projects which would ultimately satisfy one of the basic tenets of the Electricity Act, 2003, i.e., the promotion of generation and co-generation of renewable energy. - It is also noted that the ROE for WTE projects have been calculated on the basis of MAT @ 17.47%. However, ACEL submits that such an assumption is erroneous and is not
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reflective of the market practice and regulatory regimes. It is a matter of fact that as per the applicable tax on equity in the current scenario is considered to be 27.82%. It is submitted that considering an assumption which is lower than the prevailing market trends would *inter alia* hamper the investors by not accurately accommodating for their actual tax liability.

- ACEL also wishes to highlight that for the purpose of calculation of ROE, this Hon'ble Commission has erred in considering the MAT for the first 20 years, which is the entire useful life of WTE projects. It is submitted that Hon'ble Commission ought to have allowed consideration of MAT for the first 10 years and Corporate Tax Rate of 27.82% for the period thereafter until expiry of the useful life of the project.

- The following comparative analysis may be relevant:

State	Tariff Order Particulars	Return on Equity (%)
Rajasthan	Order in Petition Nos. 1195 and 1221 of 2017 <i>Dated: 18.05.2018</i>	First 10 years: 20% Remaining 10 years: 24% Normative ROE: 22%
Himachal Pradesh	<i>Order dated: 07.05.2016</i>	First 10 years: 20% Remaining 10 years: 24% Normative ROE: 22%

Jharkhand	Order dated 21.06.2017 in Case No 12 of 2016	First 10 years: 20% Remaining 10 years: 24%
<i>Bihar</i>	Order dated 01.08.2016 in Suo-motu Proceedings No.19/2016	First 10year - 20% from 11th - 24%
	Order dated 24.09.2015 in Case No. 22/2015	First 10year - 20% from 11th - 24%
Tamil Nadu	Order dated 28.03.2019	17.60%

- As such, we suggest that the applicable tax rate on ROE ought to be considered as **27.82%** and the resultant ROE post tax ought to be determined as **18%**.

8.	Regulation 10 Tariff Design	Levelized Tariff	- We propose that instead of fixing the Levelized Tariff for entire project list, please consider the Hybrid Tariff for WTE Projects wherein Fixed Cost without Operation and Maintenance cost to be considered on levelized basis and Fuel cost and O&M cost to be fixed for first 3 years considering escalation and then to revisit in next control period so as to cover for market uncertainty, price fluctuation, change in tax rates etc.
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Other inputs:

➤ Category : Municipal Solid Waste based power project /Refuse derived fuel based project

At the outset, the differentiation in the description /definition of MSW/RDF based projects by CERC vide its earliest order 2015 and now in 2024 should be brought on record, because there is a fundamental shift in these definitions/descriptions.

CERC Regulations Explanatory Memorandum 2015	CERC Draft Regulations Explanatory Memorandum 2024	Remarks
<p>MSW Project is defined as a Project inclusive of Processing facility of MSW Cost of Processing plant is considered 35-40% of the project cost of Rs 15 Cr /MW Thus , the Processing plant for manufacturing RDF is Rs 6 Cr/MW &</p>	<p>The draft explanatory memorandum makes a monumental change in the definition. Now CERC considers MSW based WTE as mass incineration without involving any pre processing of the MSW and at a cost of Rs 18 Cr/MW</p>	<p>CERC reckoning that MSW Waste to Energy as direct mass incineration being permissible is to be re-examined in the light of SWM rules 2016 which makes it mandatory for segregation of MSW into RDF and Wet waste. Secondly, the Hon'ble NGT has laid down clearly in its order</p>

<p>Waste to Energy Plant is Rs 9 Cr/MW</p> <p>Totalling Rs 15 cr/MW</p> <p>The RDF based Power project is Rs 9 Cr/MW as it will not have any Processing plant and in stead RDF is procured at a certain price by generator of RDF based WTE Plant</p>	<p>RDF based WTE plant comprising of Pre processing plant of Rs 3 Cr/MW and Rs 18 Cr/MW of Waste to Energy totalling Rs 21 Cr/MW</p>	<p>Dec 2016 in matter of OP 199/2014 , that segregation of MSW is absolutely necessary for incineration /waste to energy .(Para 6 /Page 82 and Para 9/Page 83 and most importantly Para 10/Page 84)</p>
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Remarks

1. The definition given by CERC for MSW projects to be direct mass incineration runs counter to the stipulations of SWM 2016 and Directions by Hon'ble NGT vide order in OP 199/2014. It can be even said that CERC is transgressing into the domain of Solid Waste Management arena , governed by SWM Rules 2016 and interpreted by Hon'ble NGT from time to time as required.
2. Secondly, it is to be noted that SWM Rules 2016 have laid out an elaborate framework for treatment & disposal of Municipal waste making it mandatory to segregate, deploy processes for treatment of RDF and wet waste , dispose the residues to Sanitary landfill , post closure of the Sanitary landfill, treatment and disposal of leachate (effluent from Municipal Solid Waste). All these functions are performed by Urban Local Body or by its selected operator usually for a fee called gate fee/tipping fee which is not an incentive but a consideration for contract with ULB. Such contracts are called Concession Agreements.
3. It is to be noted that Waste to energy is one of the approved processes for utilizing the Refuse derived fuel (RDF/combustible fraction /dry waste) after mandatory segregation of Mixed MSW , while wet waste is treated through aerobic composting or anaerobic digestion. The residues from both Waste to Energy and Aerobic composting/Anaerobic digestion goes to a mandatory sanitary landfill which is not a dump but a scientific operation with a specific construction standard given in the SWM rules 2016 including a mandatory post closure maintenance for 15 years of such SLF after the expiry of concession agreement usually 25 to 30 years.
4. The standards for treatment of leachate (effluent from Municipal waste) are laid down in the SWM rules 2016. The cost of Leachate treatment varies from Rs 2000 to Rs 2500 per KL to meet the laid down standards.

In the light of the above , it is requested that CERC may limit the definition to that the of waste to energy plant encompassing the following

- (i) Storage and handling cranes of RDF in CC Bunker with PEB cover usually called Waste storage Bunker with overhung cranes for managing receipt of Waste and its storage . The waste bunker provides for 7 to 10 days storage , whereby the overhung cranes loosen the stored Waste prior to feeding to the waste fired boilers. The free moisture is released at the bottom of the bunker and such leachate is to be treated by the operator of the facility or dispose as per the Consent orders of the local state PCB
- (ii) The waste fired boilers deploy a reciprocating grate with a drying, combustion and inertization sections with provision for under fire and over fire air , refractory and Inconel lined furnace, followed by three more passes of flue path where evaporators, superheaters and economisers are placed for conversion to superheated steam. The SWM rules prescribe a min temp of 950 Deg C with 2 sec residence time in the furnace for destruction of organic pollutants as a global engineering practice.
- (iii) The design basis /firing principle for these waste fired boilers entail a range of heat value usually ranging from 1100 Kcal/kg to 1900 Kcal/kg. The design point is the upper value of heat value , and the corresponding capacity sizing of the electricity generation, though the installed capacity of electricity is often is not realized for at least half life of the project. A sample firing diagram is as under

- (iv) It is mandatory for treating the flue gas emanating from boiler through a wet or semi dry or a dry system , using chemicals such as lime as powder or slurry and activated carbon for neutralizing the acidic nature of the emissions , followed by bag filter
- (v) The major cost of the waste to energy plant lies in the waste bunker, cranes, reciprocating grate , refractory lining /Inconel weld overlay , flue gas treatment and incremental cost because of air cooled condenser.
- (vi) The evacuation is generally site specific and a conventional cost does not normally work because of the location of the site usually allotted by ULBs with complex ROW issues.

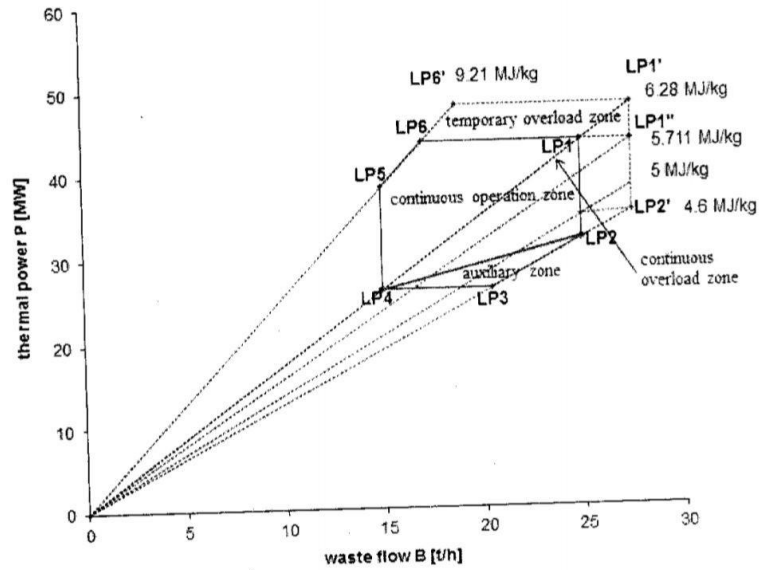


Fig. 4-1 Stoker Capacity Diagram

Table 4-1 Grate Capacity Table For Each Load Point

Point		P		B		LHV	
No.	Load rate	MW	t/h	kJ/kg	kcal/kg		
LP1	100.0%	43.61	25.00	6280	1500		
LP2	73.2%	31.94	25.00	4600	1099		
LP3	60.0%	26.17	20.48	4600	1099		
LP4	60.0%	26.17	15.00	6280	1500		
LP5	88.0%	38.38	15.00	9210	2200		
LP6	100.0%	43.61	17.05	9210	2200		
LP6'	110.0%	47.97	18.75	9210	2200		
LP1'	110.0%	47.97	27.50	6280	1500		
LP1''	100.0%	43.61	27.50	5709	1364		
LP2'	80.6%	35.14	27.50	4600	1099		
LP2''	80.6%	35.14	27.50	4600	1099		

A few photos of the waste to energy plant are enclosed for general appreciation.

In the light of aforementioned, it is reiterated that CERC to reconsider & refrain from defining of Mass incineration of MSW which is not legally aligned with SWM Rules and NGT order . It is also submitted that the costs of RDF processing plant can not be included /clubbed with that of the waste to energy plant , ignoring the other aspects of wet waste processing , residue disposal and leachate treatment etc which pertain to the realm of Solid waste management framework , not falling under the domain of CERC.

The definition of Waste to Energy is thus only one which is RDF Waste to Energy plant and the capital cost of such project should be considered without the processing plant because the elaborate processing of segregation of dry /RDF and wet waste & its further processing , residue disposal to SLF and leachate treatment are laid down separately Swatch Bharat Manual under SWM framework .

These bench marks are followed by ULBs and it is not possible to rate/assess the capital costs of these facilities in terms of MW , because these processing units are defined in terms of processing capacities of MSW namely in Tons per Day (TPD). These aspects do not come under purview of CERC as well.

➤ Capital Cost

It is submitted that capital costs are generally mentioned as cost per annual capacity of waste disposal of the waste fired boilers , than in terms of MW (e) output for the waste to energy industry.

For example, there are five plants in India with same waste disposal capacity but with different electricity output in terms of MW (E) as stated below.

Name of the Unit	Capacity of Waste fired boilers	Capacity of Electricity /Power Generation
Delhi MSW Energy Solutions Ltd	2 X 600 TPD Equalling 1200 Tons per day of Processed waste	24 MW Cost Rs 490 Cr
Hyderabad MSW Energy Solutions P Ltd	2 X 600 TPD Equalling 1200 Tons per day of Processed waste	19.8 MW initial Assessed and approved to be 24 MW by MOEF&CC , TSPCB . However, TSERC declines to accept the revised capacity

		Cost Rs 500 Cr
Waste to Energy Plant at Vizag	2 X 600 TPD Equalling 1200 Tons per day of Processed waste	20 MW installed. However, the present approved capacity is 15 MW only and APERC has approved the capacity to be 20 MW Cost mentioned in CERC paper as Rs 17 Cr/MW
Waste to Energy plant at Guntur	2 X 600 TPD Equalling 1200 Tons per day of Processed waste	15 MW installed. CERC paper has mentioned that the cost is Rs 23 Cr/MW
Waste to Energy plant at Tekhand, Delhi	2 X 600 TPD Equalling 1200 Tons per day of Processed waste	30 MW installed. However, the PPA is reportedly for 25 MW Minimum. Presently operational over 25 MW capacity

Thus, in all above cases, the output of power is rated differently , while the capacity of waste combustion is same namely 1200 TPD. The difference lies in heat value of waste and the resultant heat energy converted to electrical energy.

It is noteworthy that three waste to energy plants in India have been approved for capacity augmentation over the initial capacity

Name of the unit	Initial Capacity MW	Approved revised capacity MW
Okhla Waste to Energy plant 1350 TPD Capacity	16 MW in 2012	23 MW in 2020 Without any change in waste combustion capacity and generator change
Jawahar Nagar , Hyderabad 1200 TPD Capacity	19.8 MW in Year 2000`	Revised to 24 MW in 2022 . However, state ERC declines the capacity augmentation

Waste to Energy plant Guntur` 1200 TPD Capacity	15 MW in 2022 but with prior installed capacity of 20 MW	Approved to be 20 MW
Waste to Energy plant in Vizag 1200 TPD Capacity	15 MW in 2023	

Hence, there is lot of diversity in the capital costs vis-à-vis power capacity with same waste combustion capacity. Given such diversity and configuration, the methodology of tariff determination assumes lot of uncertainty and imponderables.

➤ Project life period

CERC until now considered 25 years as project life period ; however, in current draft regulations, it is changed to 20 years as most SERCs have adopted such bench mark. Plant abroad have worked for 30-35 years with a major retrofit after 20 years and finally de-commissioned after 35 years.

An important aspect of refurbishment is the asset replacement unique for waste to energy industry starting from 6th year which is a very popular input considered by authorities in countries where Waste to energy as industry has matured such as China, Korea, Japan, Europe etc in contrast to India, with about 12 operational plants as on date.

Plants at Okhla, Guntur, Vizag, Tekhand have got 25 years of PPA, while the rest of the projects have only 20 years. A provision for 25 years for the other plants should be considered.

➤ Incentives /subsidies

An important aspect of digression and aberration caused by TSERC is regarding the tipping fee. Tipping fee is a bid parameter followed by ULBs for selection of MSW Operator for SWM activities with a right of revenue to the operator including risks , on the derivatives such as compost, power, energy , biogas , recyclables etc .

The SERCs have to perform within the realm of Electricity Act and to determine the costs associated with power generation. The provisions of Concession Agreement are beyond the jurisdiction of the SERCs or for that matter even CERC. The generic order of TSERC dated 18.4.2020 stipulating the reimbursement of an unquantified amount of tipping fee has led to a lot imbroglio which continues today with avoidable litigation and costs.

It is submitted that the CERC regulations may make it abundantly clear that the regime of tipping fee is beyond the jurisdiction of SERCs and such orders involving tipping fee as revenue out of power generation should be avoided.

➤ O&M expenses

O&M expenses should include that of asset replacement starting from 6th Year after COD .

It is suggested that 50% of the capital cost of waste fired boilers should be considered as asset replacement fund in 15 years of life after first 5 years after COD.

➤ Plant Load factor

The NTP provisions are clear that 100% power to be procured by DISCOMs at a rate determined under s/62 of Act by SERCs.

Thus, the plant load factor is only a normative for purpose of tariff determination , and the special dispensation given to Waste to Energy sector by NTP should continue without any linkage to any normatives of PLF either under Generic order route or under project specific route.

Our submission for a National Tariff for Waste to Energy for a fixed period of 10 years from COD and review by CERCs there after.

Given the nascent nature of the industry and its emerging trend *qua* the need for capacity development for disposal of the waste , it is suggested to prescribe a National Tariff like that of PR China , which is 0.65 RMB/kwh all across the provinces in China , with tipping fee being the sole bid variable.

A national tariff for waste to energy say Rs 7.50/kwh levellized to be prescribed applicable all over India in all states without SERCs determining the tariff and without any provision for sharing of revenue nor tipping fee in any manner. The ULBs can carryout a transparent bidding process to select operator for SWM for whom the National Tariff , say Rs 7.5 Kwh for a period of 10 years is prescribed for bidding competitively the tipping fee.

1. Project cost @ INR 18 cr/MW for MSW based is not realistic at all. Preprocessing is an integral part of even an MSW based WtE to achieve specific GCV level before incineration/combustion. Besides the overall cost of BTG +BOP package is much higher than mentioned is draft policy. There needs to be some basis to it and line-item wise cost feedback should be taken from all developers. Otherwise, the consultant has to advise the basis of project cost of Rs.18 crores/MW.
2. All exclusions like SLF etc should be mentioned. If evacuation system plus transmission line is a part of Project cost, then it may vary depending on the vicinity of the substation.
3. WtEs are normally provided treated water through local STP. STP pipeline laying is often in the scope of concessionaire. The distance of pipeline laying to the source of water is another major cost which needs to be added for tariff determination, else a clear exclusion should be provided by CERC while determining generic tariff.
4. The Interest rate @ SBI MLCR plus 200 bps is highly unlikely on project financing basis, without recourse to promoters or holding company. All lenders seek credit enhancements for lowering the rates, and mere step in or substitution rights are no financial recourse these days for lenders. Hence Interest rate should be kept at 12% minimum.
5. The ROE @ 14.5% post tax in a developing but highly regulated economy like India is too low to attract investors or developers. Unlike coal, solar, wind, hydro, biomass etc, the WtE sector has other challenges as well and all investors are often not keen to invest. We are living in a high interest rate and high

inflation regime in India. As such the ROE should be reasonable to attract Funds, PE, and Private investors. There are not many corporate developers in WtE sector in India, hence this needs a relook.

- 6. While Interest during construction period (IDCP) is part of project cost, the ROE is calculated post COD, whereas lenders require prorated equity investment during construction period. Hence ROE formulae need some adjustment.
- 7. MAT applicability for entire concession period needs to be examined as it affects ROE.
- 8. The O & M at 6.5% is being pushed since inception of the CERC WtE tariff guidelines. There is a compulsion of preprocessing so as to reach a minimum calorific value requirement for MSW based WtE plants. O & M of SLF or in case out of scope, the transportation of ash and rejects is a cost which will vary, but should be at least specified, so that it doesn't become a debatable point. Major maintenance cost every 5 years should be considered as it requires major shut down.
- 9. Auxiliary consumption of 15% is okay for plants having capacity of 15 MW and above. However, the Aux requirement for lower capacity WtE plants would be higher at 18% or more.
- 10. It is better to provide for at least 10% or more Alternative fuel e.g. Biomass for a WtE Plant. As such fuel cost to that extent should be kept and it is advisable.

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