1. Background

India's urban centres grapple with a significant waste management challenge. Annually, they generate approximately 55 million tonnes of municipal solid waste (MSW), amounting to roughly 1.6 lakh tonnes per day. This figure is projected to surge dramatically in the coming decades, driven by factors like rising incomes and rapid urbanisation. This growth will not only increase the overall waste volume but also shift the composition towards a higher proportion of non-biodegradable materials. Projections estimate that MSW generation could reach 165 million tonnes by 2030 and a staggering 436 million tonnes by 2050.

Addressing India's escalating waste crisis is imperative for safeguarding public health and environmental sustainability. To mitigate this issue, the development of robust waste processing and recycling infrastructure must be prioritised.

The second phase of the Swachh Bharat Mission (Urban) (SBM U 2.0) recognises the urgency of this issue and focuses on two key objectives:

- Expanding MSW processing capacities: This involves implementing and scaling up technologies for efficient waste management, including waste-to-energy (WtE) solutions.

- Waste to Energy should be considered as advanced waste processing facilities to significantly reduce the disposal of processing rejects and inert in landfills instead of power generation units.

- We have a meagre potential of 1000MW through WtE projects. These projects should be considered as projects for environmental & social improvement and not for power generation.
- Remediating legacy waste: Addressing the environmental and health hazards associated with existing dumpsites through bioremediation and converting them into green spaces.

SBM U 2.0 provides specific guidelines for implementing WtE projects:

- Large Cities: Cities with populations exceeding 1 million and generating over 500 tonnes of MSW per day are encouraged to establish standalone WtE plants.

- Medium-sized Cities: Cities with populations below 1 million, generating below 500 tonnes of MSW per day, are advised to consider a cluster-based approach, where multiple cities collaborate to establish a shared WtE facility, potentially utilising Refuse-Derived Fuel (RDF) from neighbouring urban areas.

WtE technology offers several key advantages:

- Significant waste reduction: WtE technologies can achieve the highest reduction in waste volume compared to other waste management methods.
- Reduced land use: SWM with WtE processing requires much smaller landfills.
- Energy recovery: WtE processes allow for the recovery of energy, such as electricity and heat, which can be utilised to generate revenue and sustainable energy production.

By implementing these strategies and promoting sustainable waste management practices, India can effectively address the growing waste challenge and create cleaner, healthier, and more sustainable urban environments. However, achieving this vision requires a deeper examination of the complex waste management challenges facing urban India.

The escalating generation of municipal solid waste presents significant challenges to urban areas. Landfilling, a traditional waste disposal method, poses environmental risks such as groundwater contamination and methane emissions. To address these challenges, sustainable and innovative waste management solutions are crucial. WtE technologies offer a promising approach by converting waste into valuable energy resources, such as electricity and heat. These technologies, including advanced thermal processes like incineration, gasification, and pyrolysis, can significantly reduce waste volumes and contribute to a more sustainable waste management infrastructure. While framing these guidelines, inputs from the Draft Competitive Bidding Guidelines for Waste to Energy Projects circulated by Ministry of New & Renewable Energy (MNRE) in 2024 have been taken. This revised bidding guidelines document aims to facilitate the development of efficient and environmentally sound WtE projects that align with the evolving needs of modern waste management.

2. Waste to Energy in SWM Rules 2016

Criteria for waste to energy process:

(1) Non-recyclable waste having calorific value of 1500 Kcal/kg or more shall not be disposed of on landfills and shall only be utilised for generating energy either or through refuse derived fuel or by giving away as feed stock for preparing refuse derived fuel.

(2) High calorific wastes shall be used for co-processing in cement or thermal power plants.

(3) The local body or an operator of facility or an agency designated by them proposing to set up waste to energy plant of more than five tonnes per day processing capacity shall submit an application in Form-I to the State Pollution Control Board or Pollution Control Committee, as the case may be, for authorisation.

(4) The State Pollution Control Board or Pollution Control Committee, on receiving such application for setting up waste to energy facility, shall examine the same and grant permission within 60 days.

3. What is Waste to Energy (WtE)

Waste-to-Energy (WtE) is a process of generating energy in the form of electricity, heat, or fuel from waste materials. It involves converting non-recyclable waste into usable forms of energy, thereby reducing waste volume, diverting it from landfills, and contributing to sustainable waste management.

Waste to Electricity and production of Bio CNG are advanced & sustainable energy processes in solid waste management that have definite advantages over plain composting and landfill.

Composting involves aerobic breakdown of biodegradable waste through biochemical transformations. This process produces a stable granular material rich in nutrients, which can be used as an effective soil conditioner. Biogas, another byproduct of waste decomposition, is generated through anaerobic processes like bio-methanation. This renewable energy source, composed primarily of methane and carbon dioxide, can be utilized for thermal energy or electricity generation using gas engines and turbines. These processes emphasise the dual benefits of reducing waste while generating valuable resources.

4. Type of Waste to Energy

(a) Biochemical Conversion

Bio-methanation, also known as anaerobic digestion, is a natural process where microorganisms break down organic waste in the absence of oxygen. This process transforms organic waste, such as food scraps, agricultural residues, and animal manure, into biogas, a mixture primarily composed of methane and carbon dioxide. In a controlled environment, like a bio digester, microorganisms break down complex organic molecules into simpler ones, then into organic acids, and finally into methane gas. Bio-methanation offers several benefits, including waste reduction, renewable energy production, fertiliser creation, and reduced greenhouse gas emissions. The resulting biogas can be further processed into Compressed Biogas (CBG), a high-quality fuel that meets pipeline standards and can be used as a transportation fuel, replacing conventional fossil fuels.

(b) Thermal Conversion

Thermal processing of Municipal Solid Waste (MSW) encompasses several methods, including incineration, pyrolysis, gasification, and mass burning. The feedstock can range from segregated to unsegregated MSW or Refuse-Derived Fuel (RDF). Incineration involves complete combustion of waste to recover heat, generating steam for power turbines. Mass burning directly combusts unprocessed waste. Pyrolysis utilises heat in the absence of oxygen to break down organic materials, yielding a mixture of combustible gases (methane,

hydrocarbons, hydrogen, carbon monoxide, etc.), liquids, and solid residues. Gasification converts carbonaceous materials into carbon monoxide, hydrogen, and carbon dioxide at elevated temperatures (500-1800°C) with limited oxygen, producing syngas at temperatures exceeding 900°C. This syngas can be used as a fuel alongside conventional sources like coal. While effective, thermal treatment systems generally incur higher costs and require specialised expertise for operation.

Essentially, thermal methods harness the power of heat to convert waste into energy through advanced high-temperature processes.

Incineration technology involves the complete combustion of waste to recover heat and generate steam, which subsequently drives turbines to produce electricity. This process typically involves transformation of solid waste into CO2 and water vapor. During the secondary phase, combustible materials react with oxygen, forming CO2 and water vapor. However, due to the heterogeneous nature of waste streams, other compounds are also produced, including unburned carbon particles, incompletely burned compounds (e.g., organic products of incomplete combustion - PICs like carbon monoxide, PAHs, dioxins, and furans), and incombustible elements (e.g., heavy metals, sulfur, nitrogen, chlorine).

Efficient incineration relies on the "three T's": temperature, time, and turbulence. Maintaining a high and uniform temperature within the furnace is crucial to destroy PICs. In mass burn plants, grate systems move waste through drying, burning, and burnout zones, facilitating combustion. RDF and pre-processed MSW/RDF are used as fuels in specially designed boilers. However, RDF's low density leads to higher fly ash production, which can catalyze the formation of dioxins and furans. To minimize this, multiple passes in the boiler's radiative section are necessary, resulting in larger boilers. Flue gases require extensive air pollution control. Incineration ash can be used as construction material after processing, while residues are disposed of in landfills.

Using RDF as fuel in incinerators is advantageous. RDF, typically produced by augmenting combustible waste with high-calorie materials and using binders to form pellets or briquettes, is easier to transport and store. This decentralized approach to RDF production could enhance the success of WtE projects in India by enabling the collection of RDF from smaller facilities and transportation to regional W-to-E plants within a 100 km radius.

Several challenges hinder the widespread application of combustion technologies for waste management. Firstly, meeting stringent emission standards for pollutants like particulates and NOx remains crucial. However, effective technologies are now available to comply with these regulations. Secondly, high water consumption was a concern, but the adoption of air-cooled condensers in India has largely addressed this issue. Thirdly, the ability to utilise multiple fuels is desirable and is being implemented in some cases.

Major research trends in incineration focus on improving the efficiency of low-power capacity steam turbines by achieving higher pressures, addressing issues related to

superheater tubes and material life, promoting co-firing, reducing fossil fuel consumption, developing advanced emission control techniques, and exploring hybridisation options.

Combustion entails the high temperature burning of waste to generate heat, which is then used to produce steam for electricity generation. Although, this method significantly reduces waste volume, it can also generate emissions, necessitating the implementation of robust control mechanisms.

(c) Gasification -

Gasification is a key technology for converting biomass to energy and a promising alternative for thermally treating solid waste. It involves converting dry organic or fossil-based materials into a combustible gas (syngas) – a mixture of carbon monoxide, hydrogen, and carbon dioxide – at elevated temperatures (500-1800°C). This syngas can be utilised as a feedstock for the chemical industry, as fuel for efficient electricity and/or heat production, or for various other applications, demonstrating the versatility of gasification technology. Air gasification produces a low-energy gas, while oxygen gasification yields a medium-energy gas. The primary objectives of waste gasification are to enhance energy generation efficiency at lower power levels (< 2 MW) and minimise emissions.

In this process, MSW is typically segregated to remove non-combustible materials. Biomass, agro-residues, and RDF pellets can be co-gasified to enhance heat generation. The produced gas is typically combusted in a furnace or utilised in internal combustion engines or gas turbines after thorough cleaning. The process generates residual waste and gas cleaning byproducts, which require proper disposal in a controlled landfill. Wastewater treatment is also necessary before discharge.

The resulting ash from gasification is like that produced by incineration. The generated gas can be used for thermal or power generation purposes. Internal combustion engines with heat recovery can be employed for power generation. Gasification systems generally exhibit higher efficiency than incineration, exceeding 25% at capacities below 1 MW. Engine exhaust requires appropriate treatment to meet environmental regulations. Research indicates that gasification produces lower emissions compared to incineration, and the volume of treatment required for gasification byproducts is typically less than one-third that of combustion products.

(d) Pyrolysis-

Pyrolysis is a thermal process that decomposes organic materials in the absence of oxygen at relatively low temperatures (typically around 650°C). This process breaks down waste into three main products:

1. **Gaseous products:** A mixture of combustible gases, primarily including methane, hydrocarbons, hydrogen, and carbon monoxide.
2. **Liquid products:** Bio-oil or tar, which can be further processed into fuels.

3. **Solid products:** Char, a form of charcoal that can be used for soil conditioning or as a carbon black, finding applications as a catalyst, filler material, and CO2 absorbent.

The composition and proportion of these products vary depending on factors such as the type of waste and pyrolysis conditions. Two primary pyrolysis technologies exist: fast pyrolysis, primarily for bio-oil production, and slow pyrolysis for producing charcoal (carbon black). Pyrolysis gas typically exhibits calorific values ranging from 5-15 MJ/Nm^3 for MSW and 15-30 MJ/Nm^3 for RDF.

Low-temperature pyrolysis can also convert waste plastics into synthetic liquid fuels. Notably, pyrolysis differs from gasification, which occurs in the presence of limited oxygen.

The gas generated from pyrolysis can be used as a fuel source in boilers for heat generation or, after appropriate cleaning, in combustion turbine generators. The primary objectives of waste pyrolysis are to minimise emissions, maximize the recovery and quality of recyclable products, reduce the volume of organic waste, and sterilise hazardous components.

(e) Plasma gasification is an advanced form of gasification that utilises plasma torches to achieve extremely high temperatures, converting waste into syngas and inert slag. This technology is particularly effective for handling hazardous and mixed waste streams, with minimal residual waste generation.

5.1 Objective of the Competitive Bidding Guidelines

There are various agencies like MoP, MOHUA, MoEFCC, MoHUA, Pollution Control Boards (PCB), Municipal Corporations/ ULBs, Electricity Regulatory Commissions, utilities etc. are involved in development of WtE projects. There has been lack of uniform guidelines to facilitate selection of entities for development of WtE projects through competitive bidding process, leading to significant process delays in selection of agency and implementation of WtE projects. These guidelines will help to overcome challenges and aimto address the gaps.

The objectives of these guidelines are to ensure the success of WtE projects by addressing issues specific to this sector in a pragmatic manner which would address concerns and requirement of various stakeholders in fair and equitable manner to the extent feasible. This is expected to garner clear and definitive support from the governments and administrative bodies and attract investment from the private sector.

The specific objectives of these guidelines are as follows:

(a) To develop a ready reckoner for setting up WtE in ULBs for understanding of all stakeholders and to establish WtE projects as advance waste processing facilities with power as incidental by product.

(b) To promote competitive procurement of electricity generated from WtE plants by distribution licensees and to facilitate the addition of Waste-to-Energy capacity and support

the fulfilment of Renewable Purchase Obligation (RPO) and Energy Storage Obligations (ESO) requirements of Distribution companies (DISCOMs).

(c) To facilitate Urban Local Bodies (ULB) to undertake a structured approach to the development of WtE projects and undertake competitive bidding process for selection of suitable WtE developer for development of WtE projects.

(d) To provide a transparent, fair, and standardized procurement framework based on open competitive bidding, ensuring appropriate risk-sharing among stakeholders. This framework aims to enable the procurement of energy at competitive prices in the consumer's interest, enhance the bankability of WtE projects, and ensure reasonable returns to investors.

(e) To establish a framework for the inter-state/intra-state, long-term sale and purchase of electricity generated from Waste-to-Energy projects, thereby de-risking the sector and encouraging sustainable energy development.

(f) To provide an overarching framework for distribution licensees to procure power from WtE projects in line with the provisions of the Electricity Act, 2003.

(g) All waste to electricity projects must use RDF as fuel having calorific value of 1500Kcal/kg and above. Mixed waste should not be incinerated in these plants in compliance with SWM Rules 2016

5.2 Applicability of Guidelines

These guidelines shall be applicable for selection of developers for WtE power projects from municipal solid waste. These guidelines may be used in either of the following scenarios of WtE development:

a. Development of green\field WtE projects using new plant and machinery,

b. Renovation and modernisation or rejuvenation of defunct or operational WtE projects already in existence

The guidelines are technology agnostic and may be based on any of the commercially proven technologies approved by the MoHUA and uses MSW as input fuel after suitable pre-processing (where necessary, based on technology employed, sometimes resulting in a derived fuel which is then used in the WtE plant). Some of the probable technologies are incineration, gasification, pyrolysis.

The project owner / proponent shall declare the allowable technologies while initiating the bidding process.

For the purposes of these guidelines, the provisions of the Solid Waste Management Rules, 2016 (SWM Rules) notified by the MoEFCC on 08 April 2016 (with latest amendments and

re-notifications) for meaning of MSW, the process for waste to energy and safety and pollution control shall apply.

5.3 Approaches to WtE Project Development

The important components of value chain of a WtE project for the purposes of these guidelines shall include:

a. Collection of MSW while following suitable segregation and door-to-door collection protocol in the municipal/service area,

b. Transportation of the MSW from the collection areas to the doorstep of the WtE plant,

c. Pre-processing of MSW received at the WtE project premises by the WtE developer for feeding in as fuel to the WtE plant,

d. Processing of the pre-processed MSW resulting in generation of energy, other by-products, if any and waste residue. The offtake of electrical energy by Discom and sale of other by-products in the market,

e. Final disposal of the residual waste, processing rejects and inerts in scientific sanitary landfills compliant with SWM Rules 2016.

Depending on the elements of the value chain proposed to be entrusted to the project developer, WtE projects development models can be classified into two types namely, integrated, and non-integrated models for WtE development for the purpose of these guidelines. Description of these models is further elaborated under following paragraphs.

5.4 Operative Period

The Guidelines shall come into effect on the date of issuance and shall remain in force for a period of five years or till such time, new guidelines are issued. However, amendments may be made by the MoHUA/MoP during the operative period upon following due consultation process.

6. Types of Waste to Energy (WtE) Projects

6.1 Integrated Solid Waste Management (ISWM) Project

Integrated Solid Waste Management (ISWM) projects encompass the entire spectrum of waste management activities, including collection, transportation, and processing, all integrated within a single project to effectively manage a city's solid waste. This approach typically involves a competitive bidding process to select a single operator responsible for undertaking all these activities as per the terms and conditions outlined in the Request for Proposal (RFP) and the subsequent concession agreement. The processing component of ISWM projects can encompass a diverse range of technologies and methods, such as composting, bio-methanation, Material Recovery Facilities (MRfP) with Refuse-Derived Fuel (RDF) production, and WtE plants. Furthermore, these projects typically include the

establishment of a Sanitary Landfill (SLF) for the scientific disposal of processing rejects and inert materials. This integrated approach aims to optimise resource utilisation, minimise environmental impacts, and enhance the overall efficiency and sustainability of urban waste management systems.

While setting up Integrated Solid Waste Management Project with WtE as integral project facility only the costs and revenues directly attributable to the WtE component shall be considered for determining the tariff/grant/tipping fee. Revenues from other ISWM components such as composting, bio-methanation or MRF shall be excluded to ensure a focused and transparent financial assessment of the WtE operations.

6.2 Standalone WtE Project

Standalone WtE Projects focus solely on the processing of municipal solid waste through the utilisation of various WtE technologies. These projects typically involve the establishment of a dedicated WtE facility, such as an incineration plant or a gasification facility, to convert waste into energy, primarily in the form of electricity or heat. Standalone WtE projects may involve pre-processing of the waste stream, such as size reduction and separation of recyclables, to optimize energy recovery and minimise emissions. These projects often require significant capital investment and careful consideration of environmental and social impacts.

6.3 Cluster Based WtE Projects

Cluster-Based WtE Projects, as outlined in the SBM Urban guidelines, advocate for a collaborative approach to waste management. Smaller ULBs in a cluster with combined generation of 500 tonnes per day (TPD) of municipal solid waste may establish such a project at a central location. ULBs (Urban Local Bodies) generating more than 500 tonnes per day (TPD) of municipal solid waste are also encouraged to consider this model by roping in smaller urban areas in their periphery. In a cluster-based approach, several neighbouring ULBs collectively transport their waste to a centralised WtE facility. This regional planning approach allows for the establishment of advanced waste processing infrastructure, which may not be economically feasible for individual ULBs with smaller waste volumes. By pooling their resources and waste streams, ULBs within a cluster can achieve economies of scale, improve operational efficiency, and enhance the overall sustainability of waste management in the region.

7.0 Definitions

7.1 The terms used in these Guidelines will have the following meanings:

a. **"Act"** shall mean the Electricity Act, 2003, including subsequent amendments and clarifications issued thereof.

b. **"Affiliate"** in relation to a Company shall mean a person who controls, is controlled by, or is under the common control with such Company.

c. **"Appropriate Commission"** shall have the same meaning as defined in the Act.

d. **"Authorised Representative"** of the Procurer: In cases, where the Power Purchase Agreement (PPA) signing agency and the agency carrying out the tendering/bidding process are different, the agency carrying out the tendering/bidding process shall be deemed to be the Authorised Representative of the 'Procurer' and will, on behalf of the Procurer be responsible for fulfilling all the obligations imposed on the 'Procurer' during the bidding phase, in accordance with these guidelines.

e. **"Bidding Agency**" shall refer to the organisation issuing tender documents and carrying out the selection process under these guidelines.

f. "**Biodegradable waste**" means any organic waste material that can be degraded by micro-organisms into simpler stable compounds.

g. **"Bio-methanation**" means a process which entails enzymatic decomposition of the organic matter by microbial action to produce methane rich biogas.

h. **"Control"** shall mean the ownership, directly or indirectly, of more than 50% of the voting shares of such Company or right to appoint majority directors.

i. **"Disposal"** means the final and safe disposal of post processed residual solid waste and inert street sweepings and silt from surface drains on land as specified in Schedule I of SWM rules 2016 to prevent contamination of ground water, surface water, ambient air, and attraction of animals or birds.

"Domestic hazardous waste" means discarded paint drums, pesticide cans, CFL bulbs, tube lights, expired medicines, mercury thermometers, used batteries, used needles and syringes and contaminated gauge, etc., generated at the household level.

k. **"Door to door collection**" means collection of solid waste from the doorstep of households, shops, commercial establishments, offices, institutional or any other non-residential premises and includes collection of such waste from entry gate or a designated location on the ground floor in a housing society, multi storied building or apartments, large residential, commercial, or institutional complex or premises.;

l. **"Dry waste"** means waste other than bio-degradable waste and inert street sweepings and includes recyclable and non-recyclable waste, combustible waste and napkin and diapers, etc.

m. **"Dump sites"** means a land utilised by local body for disposal of solid waste without following the principles of sanitary land filling.

n. **"End Procurer**" shall mean the ultimate Procurer of energy from the Intermediary Procurer or the Generator as the case maybe and shall include wherever the context admits the distribution licensee.

"Generator" shall mean the entity owning the WtE Power Generation facility for supply of power under these guidelines.

"Handling" includes all activities relating to sorting, segregation, material recovery, collection, secondary storage, shredding, baling, crushing, loading, unloading, transportation, processing, and disposal of solid wastes.

q. **"Incineration"** means an engineered process involving burning or combustion of solid waste to thermally degraded waste materials at high temperatures.

r. **"Intermediary Procurer**" or **"Implementing Agency"**: In some cases, an intermediary, between the distribution licensee(s) and the WtE power generator(s), or an "Implementing Agency" as notified by the Government of India, may be required to aggregate the RE power purchased from different generators and sell it to the distribution licensee(s). In such cases, the "Procurer" would be a trader or an Implementing Agency, buying power from the generator(s) and selling the same to one or more distribution licensees, such distribution licensees shall be the "End Procurer" and the trader shall be "Intermediary Procurer" for the purpose of these Guidelines. The Intermediary Procurer shall enter into a Power Purchase Agreement (PPA) with the Generator(s) and enter into a Power Sale Agreement (PSA) with the distribution licensee(s)/consumer(s). The PSA shall contain the relevant provisions of the PPA on a back-to-back basis. The Intermediary Procurer shall be entitled to charge trading margin on the Buying entity/Procurer for purchase for the sale of such power as per the provisions of the Regulations.

As long as the Intermediary Procurer follows these Guidelines for procurement of WtE power, the distribution licensee(s) shall be deemed to have followed these Guidelines for procurement of WtE power. The power procurement for Distribution licensees in some States is centralized through a holding company or another government agency. Such companies/ agencies will be considered as Procurer and not as Intermediary Procurer for the purpose of these guidelines.

s. **"Local body or Urban Local body (ULB)"** means and includes the municipal corporation, nagar nigam, municipal council, nagar-palika, nagar-palika parishad, municipal board, nagar-panchayat, town panchayat, census towns, notified areas and notified industrial townships with whatever name they are called in different States and union territories in India.

t. **"Procurer"** shall, as the context may require, shall mean the End Procurer/distribution licensee(s), or an Intermediary Procurer.

u. **"Schedule"** means the Schedule appended to these rules.

v. **"Segregation"** means sorting and separate storage of various components of solid waste namely biodegradable wastes including agriculture and dairy waste, non-biodegradable wastes including recyclable waste, non-recyclable combustible waste, sanitary waste, non-recyclable inert waste, domestic hazardous wastes, and construction and demolition wastes.

w. "**Service provider"** means an authority providing public utility services like water, sewerage, electricity, telephone, roads, drainage, etc.

x. **"Solid waste"** means and includes solid or semi-solid domestic waste, sanitary waste, commercial waste, institutional waste, catering and market waste, other non-residential wastes, the deleted part may be restored -it is as per SWM Rules 2016 horticulture waste, agriculture and dairy waste, treated bio-medical waste excluding industrial waste, bio-medical waste, e-waste, battery waste, radio-active waste generated in the area under the local authorities and other entities.

y. **"Sorting"** means separating various components and categories of recyclables such as paper, plastic, cardboards, metal, glass, etc., from mixed waste as may be appropriate to facilitate recycling.

z. **"Residual solid waste"** means and includes the waste and rejects from the solid waste processing facilities which are not suitable for recycling of further processing;
aa. **"Request for Selection**" or "RFP" or "tender" or "bid" Document shall mean the tender documents issued by the Bid Inviting Agency, including Power Purchase and Power Sale Agreements as applicable, for procurement of power through a competitive bidding process under these Guidelines.

bb. **"Sanitary land filling** " means the final and safe disposal of residual solid waste and inert wastes on land in a facility designed with protective measures against pollution of ground water, surface water and fugitive air dust, wind-blown litter, bad odour, fire hazard, animal menace, bird menace, pests or rodents, greenhouse gas emissions, persistent organic pollutants, slope instability and erosion.

cc. **"Transportation"** means conveyance of solid waste, either treated, partly treated or untreated from a location to another location in an environmentally sound manner through specially designed and covered transport system so as to prevent the foul odour, littering and unsightly conditions.

dd. **"Tipping fee"** means a fee or support price determined by the local authorities or any state agency authorised by the State government to be paid to the concessionaire or operator of waste processing facility or for disposal of residual solid waste at the landfill.

ee. **"Viability Gap Funding"** means a grant, one-time or deferred, provided to support infrastructure projects that are economically justified but fall short of financial viability.

7.2 Words or expressions used and not defined in these guidelines shall have the meaning assigned to them in the Act, or the Rules or other Regulations or Policies framed thereunder.

8. Bid Variable

The "bid variable" in a Request for Proposal (RFP) or tendering process signifies the specific parameter used to evaluate and compare bids from potential contractors. In WtE projects, the bid variable serves as the basis for determining the winning bidder and awarding the contract. In tariff-based bidding, the price per unit of energy supplied, is the bid variable most prevalent in India. Alternative models are also followed. These include capacity payments for guaranteed energy output, availability payments based on plant readiness, and performance-based payments linked to specific operational metrics. The choice of bid variable influences the project's structure, risk allocation between the project developer and the off-taker (the entity purchasing the energy), and ultimately, the overall project economics.

9. Types of Bid Variable

I. Tipping Fee/Processing Fee

In this approach, the tipping fee/Processing fee, quoted in rupees per tonne of waste received for processing at the WtE plant, serves as the bid variable. Developers generate additional revenue through power sales.

II. Tariff-Based Bidding

In this model, the tariff, quoted as Rupees/kilowatt-hour (kWh), represents the price at which power is supplied by the WtE plant. Other terms, such as power generation capacity, waste handling capacity, viability gap funding (VGF), or tipping/processing fees, are predetermined and fixed in advance. The developer offering the lowest tariff for power sales is selected and enters into a Power Purchase Agreement (PPA) with the respective electricity distribution company (DISCOM).

III. Viability Gap Funding (VGF)

Also referred to as grant-based bidding, this model selects the bidder who quotes the lowest viability gap funding required from the authority. The developer also earns revenue from the sale of power.

IV. Output-Based Incentive (OBI)

Under this model, bidders quote a composite OBI payable per kWh generated. The OBI is

typically higher than the tariff approved by the Electricity Regulatory Commission for power sales. The developer's revenue is based on the approved tariff paid by the DISCOM, with the balance (OBI minus tariff) covered by the ULB. This differential is indexed to inflation, ensuring that ULB payouts are linked to actual energy generation.

The selection of the bid variable should be tailored to the project's specific requirements and the operational context of the ULB, ensuring alignment with project objectives and local conditions during preparation.

V. Tariff – Determination of Tariff

a) Section 62 - Determination of Tariff by Appropriate Commission

(1) The Appropriate Commission shall determine the tariff in accordance with the provisions of this Act for –

(a) supply of electricity by a generating company to a distribution licensee: Provided that the Appropriate Commission may, in case of shortage of supply of electricity, fix the minimum and maximum ceiling of tariff for sale or purchase of electricity in pursuance of an agreement, entered into between a generating company and a licensee or between licensees, for a period not exceeding one year to ensure reasonable prices of electricity.

(b) transmission of electricity.

(c) wheeling of electricity.

(d) retail sale of electricity:

Provided that in case of distribution of electricity in the same area by two or more distribution licensees, the Appropriate Commission may, for promoting competition among distribution licensees, fix only maximum ceiling of tariff for retail sale of electricity.

(2) The Appropriate Commission may require a licensee or a generating company to furnish separate details, as may be specified in respect of generation, transmission and distribution for determination of tariff.

(3) The Appropriate Commission shall not, while determining the tariff under this Act, show undue preference to any consumer of electricity but may differentiate according to the consumer's load factor, power factor, voltage, total consumption of electricity during any specified period or the time at which the supply is required or the geographical position of any area, the nature of supply and the purpose for which the supply is required.

(4) No tariff or part of any tariff may ordinarily be amended, more frequently than once in any financial year, except in respect of any changes expressly permitted under the terms of any fuel surcharge formula as may be specified.

(5) The Commission may require a licensee or a generating company to comply with such procedures as may be specified for calculating the expected revenues from the tariff and charges which he or it is permitted to recover.

(6) If any licensee or a generating company recovers a price or charge exceeding the tariff determined under this section, the excess amount shall be recoverable by the person who has paid such price or charge along with interest equivalent to the bank rate without prejudice to any other liability incurred by the licensee.

Under Section 62, the tariff is determined by the concerned Regulatory Commission, i.e., the CERC/SERC based on the terms and conditions of the tariff that are notified by the Regulatory Commission, which inter alia include norms for debt equity ratio, return on equity, interest on loan, depreciation (rate of depreciation), working capital details (billing cycle of 45 days, one-month O&M cost and its escalation factor, primary and secondary fuel cost etc.), norms for auxiliary power consumption and specific oil consumption, station heat rate, etc. Generally, the Commission determines a multi-year tariff based on the petition for tariff that is filed by the generating company before the Regulatory Commission, taking the above factors into account.

b) Section 63 - Determination of Tariff by Bidding Process

Notwithstanding anything contained in section 62, the Appropriate Commission shall adopt the tariff if such tariff has been determined through transparent process of bidding in accordance with the guidelines issued by the Central Government.

Under Section 63 bidding, i.e., tariff based competitive bidding, the procurer (both intermediary and end procurer) invites bids from the generators on power tariff, i.e., power cost per unit. When bids are invited on tariff bidding, the Regulatory Commission can choose to either adopt or reject the tariff. In case the Regulatory Commission agrees with the discovered tariff, the same is adopted by the Regulatory Commission.

10.0 Bidding models for WtE development

Based on the boundary conditions of the bidding process and the bid parameter itself, three types of bidding models have been identified for the purposes of these guidelines. The Procurer may opt for any one of the following models as “Bidding Parameter” for selection of the WtE developer:

a. Tariff Based Bidding
b. VGF Based Bidding
c. Tipping Fee Based Bidding (including OBI)

10.1 MODEL-A: Tariff-based bidding process

10.1.1 Bid Parameters

In this case, the bidding parameter shall be the tariff for the power generated from a WtE plant and the selection of WtE developer will be based on the lowest tariff quoted in INR/kWh of the power generated from the WtE facility. The overview of this model is given in the Figure 1 below.

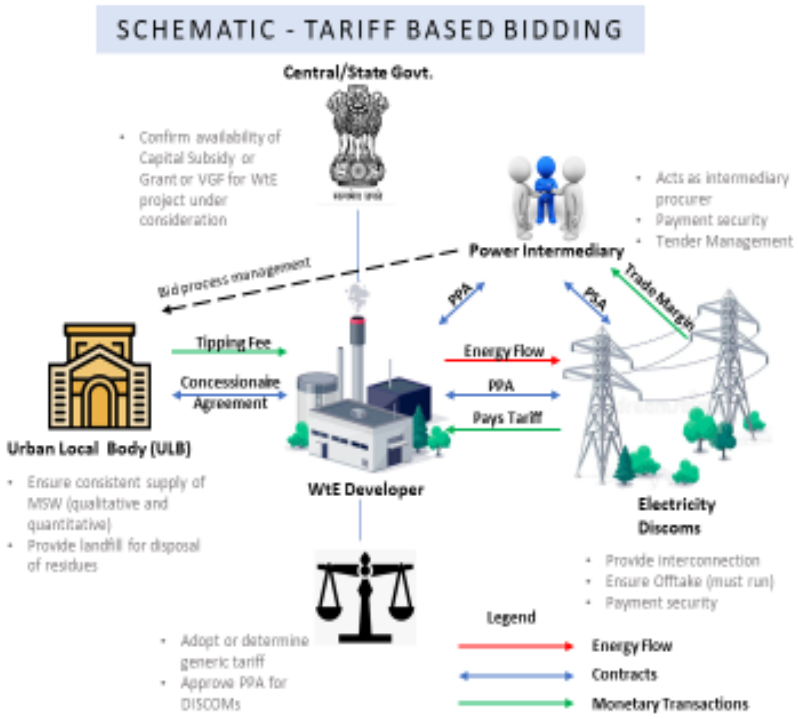

Figure 1: Tariff-based bidding

Above figure briefly outlines the roles and responsibilities of main stakeholders like Central/State Government, ULB, WtE developer, Discom, CERC/SERC. The contractual arrangement between ULB and WtE developer and WtE developer and Discom is also provided appropriately.

The tariff shall cover recovery of various cost components such as:

a. Capital cost of the project including cost of scientific landfilling activities but excluding the cost for leasing the land for land filling and the land for project development. ULBs

are expected to provide land free of cost for this purpose or land lease rental at a nominal value of Re. 1.00 per acre per annum.

b. In case of non-integrated model, operation, and maintenance (O&M) cost to cover O&M of WtE project facilities only. In case of integrated model, this component will be significant since it will cover the cost of waste collection, segregation, and transportation along with all the allied activities culminating in the delivery of the MSW at the WtE plant premises. The cost of waste collection shall be covered by separate ULB funding. It will not be loaded on the electricity tariff. The Tariff to be determined under competitive bidding shall be:

    i. Levelised tariff in INR/kWh for the life of the project which may be 20 years. Or
    ii. Escalating tariff in INR/kWh with pre-defined quantum escalation fixed in terms of percentage of the base year's tariff with a pre-defined computation frequency. Appropriate methods for normalisation shall be specified in the tender to enable ranking of bidders based on the bid value.

10.1.2 Reference Tariff Determination for Bidding Purpose

Tariff based bidding process could be initiated by announcement of Reference tariff as part of bidding documents. A reference tariff shall be specified in the bidding document which would acts as the Ceiling Tariff [in case of Tariff based bidding Model-A] or Base Tariff [in case of VGF (Model-B) or Tipping fee (Model-C) based bidding] for the bidders to peg their bids against. Reference Rate may be determined by any one of the following means:

a. Reference to recent project specific tariff/s determined by the SERC or a variant of the same by suitable modification based on the specific conditions of the project.
b. Tariff discovered anywhere in India in the last one year depending on whether it is a standalone project or an integrated project.
c. Based on capital cost and other parameters by applying the financial and operating cost/performance norms as stipulated in the RE Tariff Regulations of Appropriate Commission.

10.1.3 Conditions Precedent

Under tariff based bidding process, following parameters needs to be pre-determined and stated in the tender document by the Purchaser:

a. Financial assistance from the Central or State Governments in the form of VGF, capital subsidy, performance linked incentives or similar support mechanisms shall be specified in the bidding document with pertinent details like the quantum, eligibility conditions, modalities of disbursement etc. This shall be considered by the WtE developer while bidding the tariff.

b. The ULB shall specify the tipping fee in INR/MT to be offered by ULB to WtE developer for processing the waste. The WtE developer shall consider the revenue from tipping fees as revenue source while proposing the tariff under bidding.

10.2 MODEL-B: VGF/CFA-Based Bidding Process

Viability Gap Funding (VGF) or Central Financial Assistance (CFA) means a grant, one-time or deferred, provided to support infrastructure projects that are economically justified but fall short of financial viability. The Centre and the State Governments may decide to provide financial assistance in the form of VGF or CFA to facilitate setting up WtE projects, subject to fulfilment of eligibility conditions as may be stipulated through administrative approval to be notified by Competent Authority. Such financial assistance is useful to meet the viability gap for WtE projects as such projects are capex intensive.

The VGF/CFA reduces the burden on the electricity tariff of WtE projects without compromising the revenue of the WtE developer. In states where WtE generation cost is significantly higher than the average pooled cost of electricity from all sources to the distribution licensee, VGF/CFA can alleviate the impact to the electricity consumer.

The VGF/CFA based bidding involves a mechanism wherein a pre-determined tariff (base rate) as determined by the SERC/CERC is offered along with INR per MW of VGF/CFA to enable the WtE project to supply power at the pre-determined tariff. The ULB shall declare the upper limit of VGF/CFA that will be offered in the bidding document. Such a VGF rate shall constitute the sole criteria for evaluation of bids. The bidders shall quote his expected INR per MW VGF/CFA which shall be lower than the INR per MW VGF proposed by ULB in the Bid.

The selection of the WtE developer will be based on the lowest bid received in the VGF/CFA bidding parameter. However, it is important that ULB avails consent/in-principle approval for availability of VGF/CFA support for the WtE project prior to initiation of bidding process. Guidelines/Administrative approval process for grant of VGF/CFA may need to be modified to outline eligibility conditions for WtE projects and qualification criteria for potential developers to be selected through bidding process. The overview of this model is given in the Figure 2 below.

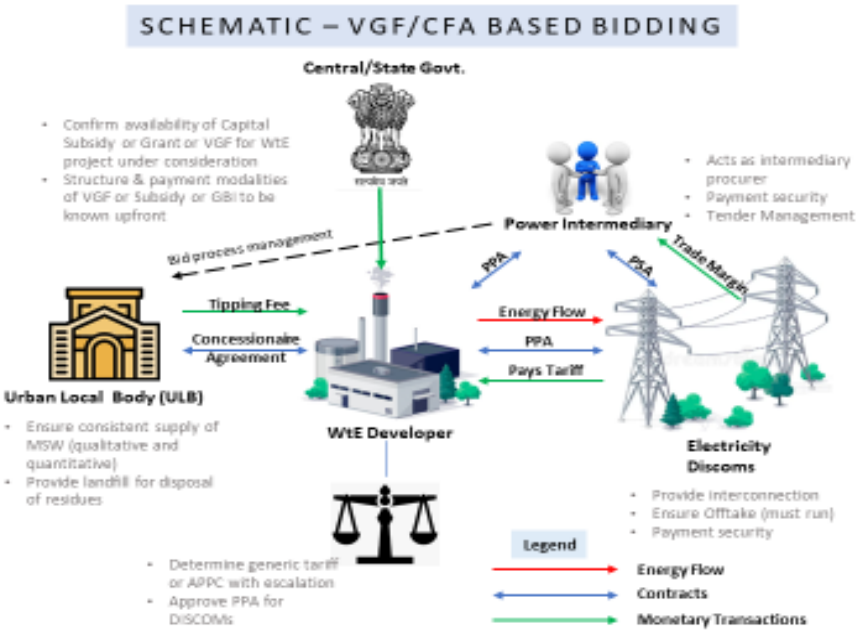

Figure 2: VGF/CFA-based bidding

Above figure briefly outlines the roles of main stakeholders like Central/State Government, ULB, WtE developer, Discom, CERC/SERC. The contractual arrangement between ULB and WTE developer and WtE developer and Discom is also provided appropriately.

10.2.1 Conditions Precedent

Under VGF/CFA based bidding process, the following parameters need to be pre-determined and stated in the tender document by the ULB:

a. The tipping fee (with or without escalation) over the concession period to be paid by the ULB to the WtE developer shall be specified in terms of INR per metric tonne of the waste delivered to the plant site.

b. The tariff for sale of power from the WtE plant to the off taker which shall be applicable for the said WtE project to be pre-determined through one of the following means:

   i. Reference to recent project specific tariff/s determined by the SERC or a variant of the same by suitable modification based on the specific conditions of the project.

   ii. Tariff discovered anywhere in India in the last one year depending whether it is a standalone project or an integrated project.

   iii. Based on capital cost and other parameters by applying the financial and operating cost/performance norms as stipulated in the RE Tariff Regulations of Appropriate Commission.

10.3 MODEL-C: Tipping Fee-Based Bidding Process

In the non-integrated model, MSW is expected to be delivered by the ULB to the WtE project premises. ULBs are also expected to provide INR per MT as tipping fee to the WtE developer for disposal of waste.

Tipping fee means a fee or support price to be paid by the ULB to the WtE developer for processing and disposing waste in scientific manner. Bids are invited for the Project on the basis of the lowest Tipping Fee expressed in terms of INR/MT of the MSW to be paid by the ULB to the WtE developer. The overview of this model is given in the Figure 3 below.

Such a Tipping Fee is anticipated to offset a substantial portion of debt service costs, thereby mitigating project viability risks.

10.3.1 Conditions Precedent

Under tipping fee-based bidding process, the following parameters need to be pre-determined and stated in the tender document by the ULBs:

a. Financial assistance from the Central or State Governments in the form of VGF, capital subsidy, performance linked incentives or similar support mechanisms shall be specified in the bidding document with pertinent details like the quantum, eligibility conditions, modalities of disbursement etc. This shall be considered by the WtE developer while bidding the tariff.

c. The tariff for sale of power from the WtE plant to the off taker which shall be applicable for the said WtE project to be pre-determined through one of the following means:
   i. Reference to recent project specific tariff/s determined by the SERC or a variant of the same by suitable modification based on the specific conditions of the project.
   ii. Tariff discovered anywhere in India in the last one year depending on whether it is a standalone project or an integrated project.
   iii. Based on capital cost and other parameters by applying the financial and operating cost/performance norms as stipulated in the RE Tariff Regulations of Appropriate Commission.

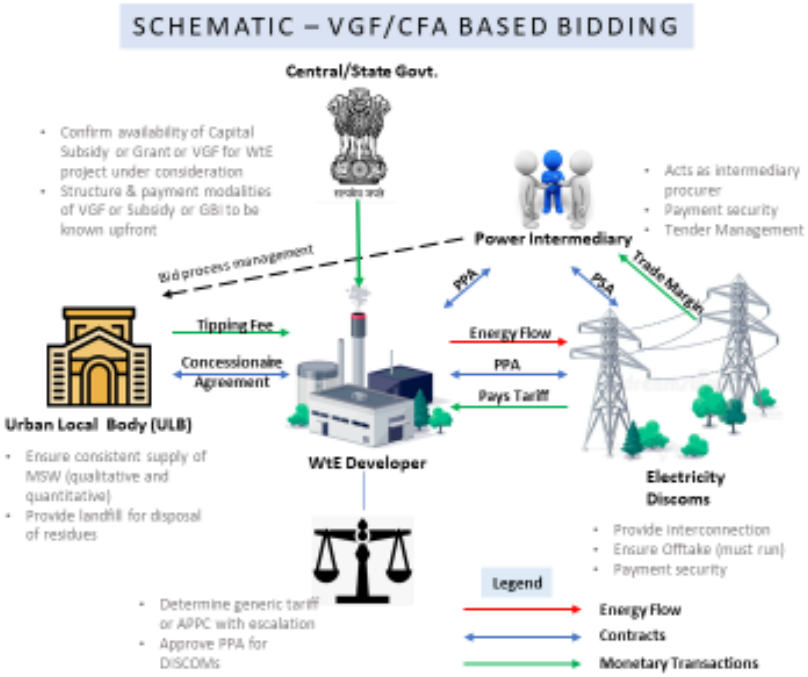

Figure 3: Tipping Fee-Based Bidding

In all the three models mentioned above, Power intermediary shall have same role. It shall manage the tender process as well as act as an intermediary procurer.

11.0 Roles and responsibilities of stakeholders

11.1 Implementing Agency (ULB)

Implementing Agency shall be ULBs like municipal corporation or a group of such ULBs who wish to engage the services of a WtE developer to plan, build, own and operate one or more WtE projects involving the processing of wastes from one or multiple pre-defined areas mapped to each of the WtE projects. The roles and responsibilities of such an Implementing Agency are as under:

11.1.1 Planning

a. Prepare a pre-feasibility report and environmental assessment report for reference to the bidders about expected outcomes from the project.
b. Develop a robust contractual framework pertaining to collection, segregation, and transportation of waste.

c. Identify appropriate, un-encumbered land parcel/s with clear title for the purposes of development of the WtE project and necessary scientific landfills.

d. Secure all necessary permits and clearances required for conduct of the bidding process.

e. Develop bid documents and agreement or modify/adopt model agreement (Model Concession Agreement and Model Power Purchase Agreement (PPA)). ULB may take support of Power Intermediary as specified in these guidelines.

f. ULB may initiate the process of obtaining environmental clearance, if required and assist selected developer to obtain Environmental clearance other Statutory approvals

g. Identify appropriate nearby source of water and energy evacuation facility and arrange right of way

h. Facilitate the execution of Energy Purchase Agreement with respective Discom/off-taker/procurer.

11.1.2 Bid Process

a. Undertake bid process for selection of WtE developer in a transparent and time-bound manner.
b. Maintain continuous engagement with the affected communities to ensure that their interests are not harmed in the process.

11.1.3 Project execution and operation

a. Execute the Concession Agreement to ensure that the terms are abided by both parties.
b. Arrange to provide possession of and access to land free of encumbrances for project site as well as for landfill for disposal of residue.
c. Facilitate the procurement of all necessary permits, approvals, and clearances.
d. Facilitate construction of the WtE project by peaceful transfer of land parcels identified.
e. In case of non-integrated project, ensure efficient delivery of MSW to the WtE project doorstep adhering to the terms of the Concession Agreement.

11.2 WtE Developer

The roles and responsibilities of the WtE Developer are:

a. Abide by the conditions of all the Contracts and Agreements entered into as part of the bidding process and ensure compliance to conditions precedents.
b. Secure all necessary permits, approvals and clearances in coordination with the facilitation being offered by the Purchaser.

c. Ensure that the building plans for the projects facilities at site are duly and expeditiously approved by the concerned authority under relevant Acts/Building by-laws/other relevant bylaws or regulation.
d. Execute the implementation of the WtE project in a timely manner while adhering to all standards and procedures as developed and/or followed in the bidding process.
e. Ensure operation of the WtE project with the desired level of performance as bound by the various contracts, agreements, rules, and protocols being followed.

11.3 Power Intermediary/Intermediary Procurer

a. A Power Intermediary/Intermediary Procurer, between the distribution licensees and the WtE generator, may be required either to aggregate the power purchased from different WtE power generators and sell it to the distribution licensee. In such cases, the "Procurer" would be a trader, buying power from the WtE power generators and selling the same to one or more distribution licensees, such distribution licensees shall be the "End Procurer".

b. The Intermediary Procurer shall enter into a PPA with the WtE power generator and also enter into a Power Sale Agreement (PSA) with the End Procurer. The PSA shall contain the relevant provisions of the PPA on a back-to-back basis. The trading margin, as notified by the Appropriate Commission, shall be payable by the End Procurer to the Intermediary Procurer.

c. In such cases, as long as the Intermediary Procurer has followed these Guidelines for procurement of WtE power, the End Procurer shall be deemed to have followed these Guidelines for procurement of WtE power.

11.4 Distribution Licensee

As per Clause 6.4 (1) second proviso (ii) of Tariff Policy, 2016 notified by Central Government, 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. The roles and responsibilities of distribution licensee are:

a. Enter into an PPA with WtE developer for the electrical energy generated from the WtE project at a tariff determined under competitive bidding process.
b. Facilitate evacuation arrangement in co-ordination with transmission licensee as the case may be to match the project commissioning timelines.
c. Facilitate actual offtake of energy upto 120% of the rated capacity through necessary scheduling and despatch arrangements in coordination with the Load Despatch Centre.
d. Provide payment security arrangements as per terms of PPA.

e. Timely payment of monies against the invoices raised by the WtE developer.

11.5 Central/State governments

The Central and State Governments are expected to devise schemes for incentivizing and supporting WtE projects through mechanisms like Central Financial Assistance (CFA), Viability Gap Funding (VGF), capital subsidies, Performance Linked Incentives (PLI), Generation Based Incentives (GBI) etc.

11.6 Electricity Regulatory Commissions

The Central and the State Electricity Regulatory Commissions (CERC and SERCs) are expected to,

a. Frame suitable Regulations for determination of tariff generated from WtE projects as part of mandatory Renewable Purchase Obligation (RPO)) to facilitate procurement of electricity by Discoms.
b. Determine generic tariff or benchmark tariff as may be required from time to time.
c. Appropriate compensation in the Regulations for the WtE project in case of failure of power offtake.
d. Adjudicate in matters in case of dispute between distribution licensees and WtE developers.

12.0 Pre-Requisite for Bidding

Important pre-requisites to be met by the Procurer in preparation towards inviting bids and ensuring successful implementation of the project are as below:

12.1 Pre-Feasibility Report

A project pre-feasibility report shall be prepared by the Implementing Agency which serves as the guide for the contours of the project. The report shall include the following information/components:

a. Geographical coverage of the waste generation and collection.
b. Estimated rate of waste collection, expressed in terms of metric tonnes per day (TPD), with resolution on daily, monthly and yearly basis over the concession period.
c. Details of the existing door to door waste collection arrangement and waste segregation at source.
d. Estimated nature and calorific value of the waste with expected operating ranges.
e. Develop a list of suitable waste to energy technologies which shall meet the requirements of the proposed project in terms of adherence to policy and regulatory norms for technological, environmental and commercial feasibility.

f. Capacity of the WtE plant expressed in terms of TPD, rate of residual waste generation for scientific landfilling and the expected power generation with resolution on daily, monthly and yearly basis.
g. The area and location of the site/s identified for the WtE plant and scientific landfills.
h. The estimated cost of operation of the waste collection and supply chain management for delivery of the same to the WtE premises.
i. Economic feasibility of the project with indicative cost of electricity generation considering normative regulatory parameters.
j. Details of the supply chain mechanism with details on qualification of the management personnel and their hierarchy.
k. Socio-economic study of the challenges and impacts of the proposed project.
l. Environmental Impact Assessment report for the proposed project.

12.2 Environmental and Social Compliance Requirements for Bidding

WtE is unlike other forms of renewable energy since it provides a critical social service to avoid the negative environmental and health impacts associated with improper MSW management. WtE projects and associated facilities are subject to Environmental and Social Impact Assessment (ESIA) clearance under the provisions of India's EIA Notification of 2006 (subject to amendment under the Draft EIA Notification, 2020). The WtE projects shall strictly adhere to EIA notification guidelines.

Further, as specified under SWM Rule 2016, the operator of the WtE project shall be responsible for the safe and environmentally sound operation of the solid waste processing and or treatment facilities as per the guidelines issued by the Central Pollution Control Board/MoEFCC including amendments thereof and shall also comply with the Manual on Municipal Solid Waste Management published by the MoUD including amendments thereof.

The ULB shall be responsible to monitor environmental standards and adherence to conditions as specified under the Schedule I and Schedule II of SWM Rules 2016 for waste processing and disposal sites. The threshold limits of installed capacity of the WtE projects for applicability of EIA shall be as specified in the EIA Notification of 2006 (subject to amendment under the Draft EIA Notification, 2020).

EIA studies prepared for WtE projects shall comply with the provisions of the EIA Notification, 2006. EIA Report (for the purposes of the pre-feasibility report) should also identify which populations stand to be affected by the project, provide estimates of the number of people affected and reflect on the legal framework for land acquisition and compensation under the Act. In such cases, bidders will ultimately need to demonstrate how they plan to undertake and implement resettlement and compensation activities in line with the Land Acquisition Act, 2013.

Depending on the environmental and social baseline established for individual WtE project EIA Reports, specialist studies or inputs required to identify and evaluate the significance of impacts on the environmental and social receptors which are anticipated to be undertaken.

13.0 Bid Documentation and Bidding Process

13.1 Bid Documentation

a. The Implementing Agency shall prepare the bid documents in accordance with these Guidelines and Standard Bidding Documents (SBDs) [consisting of Model Request for Proposal (RfP) Document, Model Power Purchase Agreement and Model Power Sale Agreement (if applicable)], notified by the Central Government, except as provided in sub clause b below.
b. The Implementing Agency shall seek prior approval of the Appropriate Commission for deviations, if any, in the draft RfP, draft PPA, draft PSA (if applicable) from these Guidelines and/or SBDs, in accordance with the process described in these guidelines.
c. However, till the time the SBDs are notified by the Central Government, for purpose of clarity, if the Implementing Agency while preparing the draft RfP, draft PPA, draft PSA and other Project agreements, provides detailed provisions that are consistent with the Guidelines, such detailing will not be considered as deviations from these Guidelines even though such details are not provided in the guidelines.
d. Further, in case of an ongoing bidding process, if the bids have already been submitted by bidders prior to the notification of these Guidelines and/or SBDs, then if there are any deviations between these guidelines and/or the SBDs and the proposed RfP, Concession agreement, PPA, PSA (if applicable), the RfP, Concession agreement, PPA and the PSA (if applicable), shall prevail.
e. Implementing Agency shall provide the bidders with certain documents which shall be called the "Bidding Documents" these include, the Concession Agreement, the Feasibility Report, and other background documents which might be helpful to the bidders in the process. The Implementing Agency shall encourage the bidders to visit the site and carry out its own investigations on their own cost, which would help them in the bidding process. The Implementing Agency would choose the parameter on their own convenience and ask the bids in the prescribed format.

13.2 Draft Concession Agreement

The Concession Agreement as per format enclosed in the Bidding Documents is envisaged to be signed between the Implementing Agency and the WtE developer with the following key provisions:

a. Definition of the Concession Area and its profile in terms of the geographical area covered, the zoning of areas, sources of waste generation and its mix, segregation method and collection centres;

b. Norms for waste collection and segregation presently being followed;
c. Scope of work for the WtE developer proposed under bidding process. The overall scope will be dependent on the approach to the WtE project development – whether integrated or non-integrated, being followed.
d. Detailed methodology and responsibility matrix based on the selected project approach for transportation of waste; this shall include the existing or proposed means and resources identified for the purpose, namely: human resources, machines and equipment, vehicles, amenities like electricity and water supply, land parcels or demarcated areas on public land for utilization by the waste collection mechanism, waste holding and equipment storage.
e. Designing, financing, developing, constructing, completing and commissioning the Project Facilities by the Scheduled COD, in accordance with Applicable Laws, Applicable Permits, Performance Standards, Technical Specifications, Designs and Drawings, the Construction Plan, the EMP, the OHS Plan and Good Industry Practices; and
f. Operating and maintaining the Project Facilities in accordance with Applicable Laws, Applicable Permits, Performance Standards, Technical Specifications, Designs and Drawings, the O&M Plan, the EMP, the OHS Plan, the Sampling Plan, the Waste Acceptance and Rejection Plan, and Good Industry Practices to ensure compliance with the KPIs; and
g. Clear demarcation of roles and responsibilities between WtE developer and Implementing Agency over the Concession Period to be covered under Concession Agreement.
h. Peaceful hand-over of identified appropriate, land parcel/s on lease and license basis for the purposes of development and operation of the WtE plant, allied machinery and necessary scientific landfilling activities. The land parcel/s shall be handed over to the Concessionaire in a clear, vacant, and unencumbered condition for possession through the agreed Concession Period co-terminus with the life of the plant. The cost of licensing the land shall be clearly defined.
i. In case of non-Integrated approach of project development, information pertaining to the collection, segregation, pre-processing and delivery of the MSW at the premises of the WtE project including specific details of minimum assured quantity of waste and calorific values with suitable ranges of operation.
j. Terms and conditions of payment of tipping fee expressed in terms of INR/MT by the ULBs to the WtE developer for processing the MSW as specified in the Bidding document.
k. Penalties on Concessionaire for deviations from expected quantum of MSW processed.
l. Penalties on Purchaser for deficiencies in minimum supply of MSW, in case of non-Integrated approach of project development.
m. Terms and conditions applicable on income from sale of energy and other by-products (if any); and

n. sale of the electricity generated from the WtE Facility in accordance with the terms of the PPA and delivery of the Residual Inert Matter in accordance with the requirements of this Agreement.

13.3. Concession Period

The Authority grants the Concession to the Concessionaire for a term commencing on the Execution Date and for a period of (20) years from the COD or as defined by CERC/SERC from time to time (the **Concession Period**) during which the Concessionaire is authorised and obligated to implement the Project in accordance with this Agreement, provided that:

(a) If the Concession Period is extended by the Implementing Agency in accordance with the provisions in the Concession Agreement, the Concession Period shall include the period by which the Concession Period is so extended; and

(b) in the event of an early termination of the Agreement by either Party in accordance with the terms of this Agreement, the Concession Period shall mean and be limited to the period commencing on the Execution Date and ending on the date of termination of the Agreement.

13.4 Request for Selection (RfP) document

The standard provisions to be provided by the Procurer in the RfP shall include the following on the basis of which evaluation shall be made for the three different criteria – General Criteria, Technical Criteria and Financial Criteria. Bidding for selection of the successful bidder shall be undertaken considering the models specified in para 10.0 of the guidelines.

13.4.1 General Criteria

General Conditions to be met by Bidder (potential WtE developer)

a. The bidder could be a single entity or a group of entities forming a consortium. No entity shall be part of more than one such consortium or participate simultaneously as a single bidder and as part of such a consortium, for the purposes of this bidding process. The bidder could be a private entity, a government owned entity or a combination of such entities in case of a consortium. The bidder shall disclose any past association with the Purchaser for assessing potential conflict of interest with respect to the whole of the bidding process.

   If a bidder is a consortium, then the consortium and its members shall comply with the following conditions:

i. the number of members in such consortium shall not exceed three.

ii. the bid submitted by the consortium should contain the required information for each member and a brief description of the roles and responsibilities of each member.

iii. the consortium will nominate one of the members as the Lead Member. Such nomination will be supported by a power of attorney from each member of the consortium and will be in the format given in the bidding documents. The Lead Member will have the authority to represent and bind all the members during the bid process and, if the consortium is identified as the selected bidder, execute the agreement on behalf of the consortium, and

iv. the consortium is required to submit a binding and enforceable joint bidding agreement, in the format set given in the bidding documents, and the members will not be permitted to amend or terminate the joint bidding agreement, at any time during the validity of the bid without the prior consent of the Implementing Agency.

b. The bidder shall submit a power of attorney duly authorising the signatory of the bid to commit on behalf of the bidder.

c. The bidder should not have been barred by the Central or any State Government from participating in Public-Private Partnership (PPP) projects.

d. As a general condition, the successful bidder shall ensure a shareholding of at least 51% and in case of a consortium a combined shareholding of 51% in the SPV/project company executing the WtE project till one year from the Commercial Operation Date (COD). In case of change in shareholding pattern in a consortium shall be subject to prior intimation to and concurrence from the ULB.

13.4.2 Technical Specifications and Technical Criteria

13.4.2.1 Technical Specifications

The project shall be based on any of the technologies approved by CPCB/MoP/MoHUA from time to time and ensuring compliance with SWM Rules 2016. The CFA proposed by MoHUA shall be available for the MoHUA approved technologies such as incineration/gasification/pyrolysis or a combination thereof or any new technology as approved by MoHUA. Procurers shall promote commercially established and operational technologies to minimise the technology risk and to achieve the commissioning of the

Projects. The detailed technical parameters, for type of WtE projects covered and to be selected under these Guidelines, shall be specified by MoHUA from time to time. Some of the WtE technologies to recover the energy from the waste in the form of electricity and syngas as specified by the MOHUA are given in para 4.0 above.

13.4.2.2 Technical Criteria

This set of criteria shall serve as the technical competencies of the bidder. These methods revolve around assessment of the past experience of the bidder in successful development and operation of projects of similar size and complexity. The parameters and the qualifying requirements are as follows:

13.4.2.3 Relevant Experience

The Bidder should have proven experience of having successfully designed, built, operated and managed the working of Waste to Energy projects meeting similar requirements as set by the Purchaser in its bidding document such that:

a. The capacity (always expressed in terms of TPD unless stated otherwise) of such reference projects on an aggregate basis shall be –

   (i) [one] waste to electricity facility capable of handling and processing at least [insert the quantity equivalent to 80% of the design capacity] TPD of solid waste; or

   (ii) [two] waste to electricity facilities capable of handling and processing at least [insert the quantity equivalent to 50% of the design capacity] TPD of solid waste each; or

   (iii) [three] waste to electricity facilities capable of handling and processing at least [insert the quantity equivalent to 40% of the design capacity] TPD of solid waste each,

b. At least one such project should have been commissioned and successfully operating for at least two years as on the date of bid opening in last 10 years.

13.4.2.4 Documentary Support Required

The Bidder shall submit the following documents in this regard:

a. Certificate from the past clients/Statutory Auditor regarding the following project details:
   i. Size of the project expressed in terms of TPD of suitable waste processed
   ii. Capacity of the power plant in terms of MW

iii. Generation capacity of the power plant expressed in terms of megawatt-hour per year (MWh/year) accompanied by capacity utilization factor (CUF), auxiliary consumption etc. to demonstrate the energy balance
iv. Rate of residual waste disposal in scientific landfills in terms of TPD
v. Technology Used
vi. Process Flow Chart and Material Balance Statement
vii. Resource Utilisation Statement
viii. Area Allocation Statement
ix. Operations & Maintenance Scheme
x. Project Schedule
xi. Environment, Health & Safety Policy, and Practice

b. Certificate from the past clients as evidence to prove COD of the project and its successful operation.
c. Certificate from the past clients/Statutory Auditor regarding Operation and Maintenance experience for at least one WtE project and at least half the size, in MW, of the project proposed under the current bid.
d. Certificate from the past clients/Statutory Auditor regarding Waste Handling experience
e. Certificate from Statutory Authority regarding the PPP projects.
f. Documents related to technical collaboration/OEM or technology supplier tie-up.

13.4.2.5 Project viability

The bidder shall also submit a Detailed Project Report along with the technical proposal to ascertain feasibility of processing of waste with the following details:

a. Details of the proposed technology including the plant components with technical specifications and bill of quantity, make etc.
b. Maximum range of MSW processing capacity (expressed in TPD) and range of calorific value the project technology can handle.
c. Range of residue generation (TPD) to be committed to scientific landfill.
d. Maximum electricity generation range – in terms of power expressed in mega-watts (MW) with daily, monthly, and yearly profiles with resulting energy in terms of mega-watt-hour MWh.

13.4.3 Financial Criteria

The financial criteria for qualification of Bidders are designed to ensure that they are capable enough of raising the required amount of capital for ensuring time-bound and efficient commissioning, adherence to quality and smooth operation and maintenance of the project

for the envisaged duration of the project. It also ensures the credibility of the bidder when looked at in conjunction with the technical capabilities as described in the previous section. The detailed financial criteria are described hereunder.

13.4.3.1 Net-Worth and Cash Accrual

The average net-worth of the bidder as per audited annual financial statements in the three financial years preceding the bid due date shall have been at least 25% of the estimated project cost as per the pre-feasibility report prepared by the Implementing agency. Net worth shall mean Paid-up Equity Share Capital and Reserves excluding Revaluation reserves and reserves not available for distribution to equity shareholders. In addition, bidder's average cash accruals of last three financial years immediately preceding the bid due date, shall be at least equal to the 25% of estimated project cost.

13.4.3.2 Minimum Turnover

The bidder shall demonstrate Minimum Average Annual Turnover (MAAT) of at least 50% of estimated cost of project over the past three financial years.

13.4.3.3 Documentary Support Required

The bidder should submit the statement of Net worth duly certified by chartered accountant for the last three financial years.

13.4.3.4 Liquidity

The Bidder shall have sufficient funds for meeting the cash flow requirement during the gestation period of the WtE project which includes, among other things – planning, design, procurement of goods and services, construction, cost of capital, statutory fees, and legal expenses of the project and for meeting the operation and maintenance expenses of the project. The sufficiency of such funds must be demonstrated to the extent of meeting the following conditions:

a. The said funds shall be either liquid assets or lines of credit or other such instruments which are non-contestable by commitments of the bidder apart from the bidding proposal being considered and discussed herein if and when it materializes;
b. The said funds shall be free from any encumbrances;
c. The said funds shall be to the extent of the maximum of:
    i. Two (02) months of cash outflow requirements during the project gestation period
    ii. Two (02) months of cash outflow requirements towards operation and maintenance during the project operation period

13.4.3.5 Documentary Support Required

Credit lines/letter of credit/Solvency certificates from nationalised bank equivalent to cash flows for two months during construction period of the proposed WtE project.

13.4.3.6 Other Sources of Finance

The Bidder shall demonstrate availability of adequate sources of finance to meet the cash flow requirements for ongoing works, and for future contract commitments including the proposed WtE project herein.

13.4.3.7 Documentary Support Required

The audited balance sheets for the last three years and statement of above ratios duly certified by chartered accountant.

13.4.3.8 Documentary Support Required

The audited balance sheets for the last three years and turnover certificate duly certified by chartered accountant.

13.5 Bid Package

The bidding process could be initiated to cover one WtE site location or multiple WtE locations as determined by the ULBs. The bids would cater to the total MSW generated in tonnes per day (TPD) and the estimated calorific value of waste available. The bids entertained by the ULB will vary depending on the bidding model selected as specified in these guidelines.

13.6 Bidding process

The ULB shall adopt a single stage, two envelop bid process – one envelope each for the technical proposal and the financial proposal. The steps of the process are as follows:

a. Formation of consortium by bidders shall be permitted, in which case the consortium shall identify a lead member which shall be the contact point for all correspondences during the bidding process.
b. At instances where a Bidder submits a notice for withdrawal of bid to the ULB in specified format, through authorised signatory with Power of Attorney, such bids shall not be opened.
c. The bidding agency will specify suitable technical and financial eligibility criteria for the bidders, in the RfP documents as indicated in these guidelines.
d. Bidders shall submit their bids in two sealed envelopes simultaneously – one containing the technical proposal and the other the financial proposal. Both these envelopes are to be enclosed together in a single outer envelope. The bidders shall also be required to furnish necessary bid-guarantee in the form of an EMD along with the bids.

13.7 Indicative timelines for bid process

A minimum period of eight weeks shall be allowed between the issuance of bid documents and the last date of bid submission ("bid due date"). The ULB may follow the timelines prescribed below or may devise its own timelines on need basis and declare the same at the time of issuing the bid document. Once declared, such timelines shall be adhered to; changes, if at all being made effective, shall only be made while furnishing adequate and relevant reasons in a transparent manner.

#	Event	Time from Zero Date
1.	Issue of Bid Documents	Zero Date
2.	Submission of Queries	2 weeks
3.	Pre-Bid Meeting	4 weeks
4.	Replies from Implementing Agency on Queries	6 weeks
5.	Bid Document Download End Date	8 weeks
6.	Bid Due Date	8 weeks
7.	Opening of Technical Proposal	8 weeks + 1 hr
8.	Evaluation of Technical Proposal	16 weeks
9.	Announcement of Qualified Bidders, opening of Financial Bids	18 weeks
10.	Notification of Successful Bidders	19 weeks
11.	Issue of LoA to Successful Bidders	21 weeks
12.	Signing of Concession Agreement, Power Purchase Agreement	24 weeks

13.8 Tender Fee & Performance Security

The Bidder shall furnish a non-refundable tender fee in form of demand draft issued by a Scheduled Bank in India.

13.9 Earnest Money Deposit (EMD)

Along with the bids, the bidder is supposed to provide the ULB an Earnest Money Deposit towards bid security in the form of bank guarantee or demand draft which shall be issued by a nationalised bank or a scheduled bank. EMD amount should not be more than 2 % (two percent) of estimated project cost as per pre-feasibility study report undertaken by Implementing Agency. The bid security of the unsuccessful bidders would be returned by the ULB as promptly as possible (within 60 days from bid submission due date). The bid security of the selected bidder would be returned after the signing of the concession agreement. The bids would be valid for at least 180 days from the bid due date.

13.10 Performance Security

Performance Security in form of bank guarantee in the favour of the Purchaser for a value of 5 % (five percent) of the contract value to be submitted within 45 days of issuance of LoA and before signing the concession agreement.

Performance Security during operation and maintenance: bank guarantee in the favour of the Purchaser for a value of 5% (five percent) of the contract value, within 45 days of achieving the COD, with a validity of 1 year after the expiry of the Concession period.

The Bidding Agency / Implementing agency shall have the option to specify modes / forms of accepting EMD, taking into due consideration the notifications/Government Resolutions notified by the Appropriate Government, in the form of:

a. Bank Guarantee(s);

   OR

b. "Payment on Order instrument"/Letter of Undertaking to pay in case of default of WtE power generators in terms of Power Purchase Agreement (PPA), from any agency as notified by the Government of India or State Governments from time to time for this purpose.

The Implementing agency may release the Bank Guarantees submitted by WtE Generators as 'Performance Bank Guarantee (PBG)' of any project, if the Generators are able to replace the same with "Payment on Order instrument"/Letter(s) of Undertaking as above, to pay in case of default of the Generators in terms of Power Purchase Agreement (PPA). WtE power generators can seek such letters(s) by offering due security to the notified agencies for seeking replacement of their bank guarantees already pledged with the bidding agency.

14.0 Bid Evaluation

a. The technical bids shall be evaluated to ensure that the bids submitted meet the eligibility criteria set out in the RfP document on all evaluation parameters. Only the bids that meet the evaluation criteria set out in the RfP shall be considered for further evaluation on the price bids.
b. The Procurer shall constitute committee for evaluation of the bids (evaluation committee), with at least three members, including at least one member with expertise in financial matters/bid evaluation.
c. Bid evaluation methodology for evaluating the bids shall depend upon the Bidding Model (as specified in these guidelines) adopted by the Procurer.
d. While evaluating technical bids, the ULBs shall give due consideration to the pre-feasibility studies undertaken by itself prior to initiation of bidding process.
e. The price bid shall be liable to be rejected, if the bid submitted by the Bidder contains any deviation from the tender conditions.

f. Pursuant to completion of the evaluation process based on technical proposals, the envelope of the Financial Proposals of the qualified only are opened - with representatives of technically qualified bidders as witnesses, by the ULB at a date and time indicated in the bidding document.

g. The ULB will evaluate the financial proposals, based on the criteria laid out in these guidelines.

h. The financial proposals are ranked in either descending or ascending order of the bid parameter as applicable to the bidding model adopted as specified in these guidelines and the ULB awards the contract to the bidder with the most competitive bid submitted as per the adopted bidding model.

i. To ensure competitiveness, the minimum number of qualified Bidders should be two. If the number of qualified bidders is less than two, even after two attempts of bidding, and the Procurer still wants to continue with the bidding process, the same may be done with the consent of the appropriate commission.

j. In case of a tie between two or more bidders during the evaluation of financial proposal, such bidders shall be ranked among themselves based on their scores from the evaluation of Technical Proposals.

k. If for some unforeseen reason, the lowest bidder has withdrawn from the process, the Implementing Agency shall annul the process and invite fresh bids.

l. Once the bidder is selected through the bidding process, the ULB shall issue the Letter of Award (LoA) to them, the selected bidder shall sign and return LoA back to the ULB within 7 days. Once it is done, the concession agreement can be signed.

m. In order to invite only serious players there shall be lock in period for WtE developers to operate the plant for at least two years after COD of the WtE plant.

n. The detailed procedure for evaluation of the bid and selection of the successful bidder(s) shall be provided for in the RfP.

14.1 Bid responsiveness

The bid shall be evaluated only if it is responsive and satisfies conditions including inter-alia:

a. It is received in the prescribed format,

b. It is received before the due date,

c. It should be complete in terms of the data and bidding requirements specified in the bid documents in prescribed formats where applicable,

d. The Bidder provides, within the time specified by the ULB, any additional or supplementary information sought by the ULB for evaluation of the bid; all such additional submissions shall be in writing with necessary supporting evidence where applicable,

e. The Bidder, or in case of a consortium – any member of the consortium, shall not have been a wilful defaulter to any lender,

f. The Bidder, or in case of a consortium – any member of the consortium, shall not be facing any major litigation which might hamper their ability to undertake the project.

15. Contract Award and Conclusion

a. After the conclusion of bidding process, the Evaluation Committee constituted for evaluation of RfP bids shall critically evaluate the bids and certify that the bidding process and the evaluation has been conducted in conformity to the provisions of the RfP.

b. The PPA shall be signed with the successful bidder/ project company or an SPV formed by the successful bidder.

c. The PPA shall be executed between WtE Developer and Procurer. In case of involvement of the Intermediary Procurer, PPA shall be executed between the WtE Developer and Intermediary Procurer and the PSA shall be executed between the Intermediary Procurer and the End Procurer. The PPA(s) should preferably be signed immediately after signing of the PSA(s). The provisions of PPA and PSA will be on a back-to-back basis, except for tariff payment.

d. In case of delay in signing of PPA beyond 6 months from the date of issuance of LoAs, or any other extended date as mutually agreed between the bidding agency and the successful bidders, the awarded capacity shall stand cancelled. In certain cases, after the above deadline, if the cumulative capacity eligible for signing of PPAs is lower than the cumulative capacity awarded under the tender, further course of action will be decided by the bidding agency, which will be clearly specified in the tender document.

e. For the purpose of transparency, the Procurer shall, after the execution of the PPA, publicly disclose the name(s) of the successful bidder(s) and the tariff quoted by them together with breakup into components, if any. The public disclosure shall be made by posting the requisite details on the website of the Procurer for at least 30 (thirty) days.

f. Subject to provisions of the Act, distribution licensee, or Intermediary Procurer, as the case may be, shall approach the Appropriate Commission for adoption of tariffs discovered and quantum of electricity to be procured, within 30 days of issuance of Letter(s) of Award to the successful bidder(s).

g. Subsequent to the End Procurer or Intermediary Procurer, as the case may be, approaching the Appropriate Commission for adoption of tariffs, in case, the Appropriate Commission does not decide upon the same within 120 days from the Effective Date of the PPA, the Procurer(s) shall grant appropriate extension of time in scheduled commissioning date to the generators, corresponding to the delay (beyond 120 days of Effective Date of PPA) in adoption/approval by the Appropriate Commission, till the date of adoption/approval by the Appropriate Commission.

16.0 Miscellaneous Provisions

16.1 Deviation from Process Defined in the Guidelines

In case there is any deviation from these Guidelines and/or the SBDs, the same shall be subject to prior approval by the Appropriate Commission/MoHUA.

16.2 Dispute Resolution Mechanism

The Government of India can issue suitable orders providing for a dispute resolution mechanism at the Centre and request the State Government to consider such a mechanism at the State level. These dispute Resolution Mechanisms will be additional forums beyond the provisions of the law and can be used by the relevant parties at their option.

16.3 Applicable Laws and Regulations

All transactions being undertaken under these Guidelines will be subject to applicable laws and regulations of the Government, as amended from time to time.

16.4 Change in Law/Regulation

The provisions for Change in Law shall be in accordance with the Ministry of Environment, Forest and Climate Change (MOEFCC) ensuring comprehensive coverage of regulatory changes impacting the Municipal Solid Waste management sector and Electricity (Timely Recovery of Costs due to Change in Law) Rules, 2021 notified by Ministry of Power vide notification dated 22nd October 2021 including amendments and clarification thereof issued from time to time.

16.5 **Payment Security Mechanism (PSM):** Adequate payment security shall be provided as per Electricity (Late Payment Surcharge and Related Matters) Rules, 2022 including amendments and clarification, if any, thereof, issued from time to time. In addition, the Intermediary Procurer may maintain a payment security fund. To be eligible for coverage from the fund, the developer will undertake to pay PSM charges at the rate of 2 paise per unit.

16.6 Force Majeure

The PPA shall contain provisions with regard to Force Majeure definitions, exclusions, applicability and available relief on account of force majeure as per the Industry Standards. The Generator shall intimate the procurer about the occurrence of force majeure within 15 days of the start of the force majeure and the Procurer shall respond on his claim within 15 days of the receipt of the intimation.

16.7 Commencement of supply of power

The Power Purchase Agreement between the Project Developer and Procurer/Intermediate procurer shall clearly indicate the SCSD and quantum of supply. A stabilization period of 3 months should be provided, during which the project developer can ensure the smooth operation of the power supply before commencement of COD.

ABBREVIATIONS

AD	Anaerobic digestion
APPC	Average power purchase cost
Capex	Capital expenditure
CERC	Central Electricity Regulatory Commission
CFA	Central Financial Assistance
CO	Carbon monoxide
COD	Commercial operation date
CUF	Capacity utilization factor
Discom	Distribution company
DPR	Detailed project report
EIA	Environmental impact assessment
EMD	Earnest money deposit
EMP	Environment management plan
ESIA	Environmental and social impact assessment
GBI	Generation based incentives
H2	Hydrogen
IFC	International Finance Corporation
INR	Indian Rupee
kWh	Kilo Watt-hour
LoA	Letter of award
MAAT	Minimum average annual turnover
MOHUA	Ministry of New and Renewable energy
MoP	Ministry of Power

MoEFCC	Ministry of Environment, Forest and Climate Change
MoHUA	Ministry of Housing and Urban Affairs
MoUD	Ministry of Urban Development
MSW	Municipal solid waste
MT	Metric tonne
MW	Mega Watt
MWh	Mega Watt Hour
O&M	Operation and maintenance
OEM	Original equipment manufacturer
PCB	Pollution Control Board
PLI	Performance linked incentives
PPA	Power purchase agreement
PPP	Public private partnership
PSA	Power sale agreement
RDF	Refuse derived fuel
RE	Renewable energy
RfP	Request for selection
RPO	Renewable purchase obligation
SERC	State Electricity Regulatory Commission
SWM	Solid waste management
TPD	Tonnes per day
ULB	Urban local bodies
VGF	Viability gap funding
WtE	Waste-to-Electricity / Energy as appropriate to the context