
September 2025

# Central Pollution Control Board issues Guidelines on Municipal Solid Waste (MSW) Incineration-Based Waste to Energy Plants

The Central Pollution Control Board ("**CPCB**") has issued the Guidelines on Municipal Solid Waste ("**MSW**") Incineration-Based Waste to Energy ("**WtE**") Plants on August 18, 2025 ("**WtE Guidelines**"). The WtE Guidelines aim to establish a uniform regulatory framework for the development, operation, and monitoring of incineration-based WtE plants across India, addressing environmental, operational, and compliance challenges while enabling energy recovery from non-recyclable MSW.

Incineration-based WtE plants provide a viable solution for managing high-calorific, non-recyclable MSW by reducing landfill dependency and recovering energy in the form of electricity and heat. The WtE Guidelines align with the Solid Waste Management Rules, 2016 ("**SWM Rules**") and promote circular economy practices, including safe utilisation of bottom ash in construction applications.

CPCB notes that several WtE plants in India have faced operational, environmental, and social challenges, including emission breaches, odour control failures, leachate contamination, and public health concerns. Accordingly, the WtE Guidelines prescribe a structured approach covering waste preprocessing, incinerator design, emission monitoring, ash and leachate management, and environmental safeguards. The WtE Guidelines apply to all existing, under-construction, and proposed WtE plants, Urban Local Bodies ("**ULBs**"), and regulators, ensuring that WtE facilities operate in an environmentally sound, technically efficient, and economically viable manner.

## Salient features

1. **Classification as 'Blue Category' projects**: CPCB has classified MSW incineration-based WtE plants under the 'Blue Category' of projects, recognising them as 'Essential Environmental Service' for domestic waste facilities for managing domestic solid waste.
2. **Viable solution for non-recyclable, high-calorific waste**: The Guidelines highlight that WtE plants offer a technically viable solution for treating residual fractions of municipal solid waste that cannot be processed through composting, anaerobic digestion, or material recovery. These fractions typically include plastics, textiles, paper, and other high-calorific combustible components. Through controlled thermal treatment, WtE plants convert these waste streams into usable energy, achieving significant volume reduction while minimising uncontrolled methane emissions, leachate generation, and fire hazards caused by unscientific landfilling practices.
3. **Alignment with the SWM Rules**: The WtE Guidelines are fully aligned with the SWM Rules, and mandate compliance with the following key provisions:
    a) **Rule 15 of the SWM Rules**: Responsibility of local bodies to facilitate construction and operation of solid waste processing facilities.

b) **Rule 16 of the SWM Rules**: The State Pollution Control Board ("**SPCB**")/Pollution Control Committee to authorise, regulate, and monitor the facilities.

c) **Rule 21 of the SWM Rules**: Non-recyclable MSW with calorific value ≥1,500 (one thousand five hundred) kcal/kg cannot be landfilled and must be diverted to generating energy.

d) **Schedule II (Part C) of the SWM Rules**: Prescribes emission standards and mandates installation of advanced pollution control systems.

4. **Hazardous Waste Management Rules, 2016 ("HWM Rules")**: if the toxic metals in incineration ash (i.e. bottom ash and fly ash) exceeds the limits specified in the HWM Rules, then the disposal or beneficial use of bottom ash and fly ash will be governed by the HWM Rules.

5. **WtE process framework**: The WtE Guidelines outline a detailed process flow for energy recovery through incineration:

a) **Step 1 - Waste reception and preprocessing**: MSW delivered to plants undergoes radioactive scanning, weighing, homogenisation, and moisture control to improve calorific value.

b) **Step 2 - Segregation**: Manual and mechanical sorting to recover recyclables, compostables, and Refuse-Derived Fuel ("**RDF**").

c) **Step 3 - Composting**: MSW received at the WtE unit consists of organic fractions (approx. 8–10%) that are unsuitable for incineration and are therefore diverted for controlled composting to prevent boiler corrosion and emission spikes.

d) **Step 4 - Incineration and energy recovery**: RDF fraction after segregation is incinerated in moving-grate furnaces at ≥950°C, producing high-pressure steam for electricity generation while achieving approx. 80% volume reduction.

e) **Step 5 - Ash and residue handling**:

i) Bottom ash (20–30%) is recovered, tested, and potentially reused in construction if non-hazardous.

ii) Fly ash (2–3%), containing toxic metals, is sent to secure landfills or pre-treated for safe secondary use.

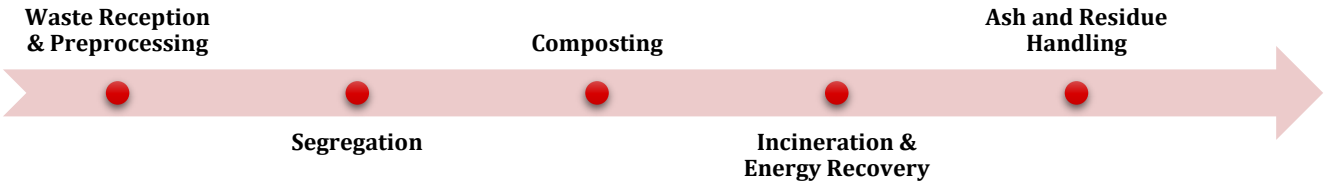


Fig. 1 – MSW incineration-based WtE process

6. **Environmental issues**: The WtE Guidelines identify 4 (four) key environmental risks associated with WtE plants:

a) Stack emissions: Incineration releases oxides of nitrogen (Nox), sulfur dioxide ($SO_2$) and carbon monoxide (CO) particulate matter, heavy metals, dioxins, and furans, which require strict control using advanced emission management systems.

b) Solid residues: Improper disposal of fly ash and bottom ash can lead to soil and groundwater contamination, necessitating safe handling and secure landfilling.

c) Leachate management: Untreated leachate from waste pits and ash handling areas can pollute surface and groundwater, requiring proper collection and treatment systems.

d) Odour control: Persistent odours from waste reception and processing zones cause community discomfort and regulatory challenges, making effective odour management essential.

7. **Environmental management plan**: The WtE Guidelines prescribe a comprehensive plan to ensure effective pollution control and regulatory compliance:

   a) Air pollution control devices: Installation of lime dosing systems, activated carbon injection, and bag filters, along with Online Continuous Emission Monitoring Systems ("**OCEMS**") for real-time emission tracking.

   b) Leachate treatment: Provision of engineered drainage and leachate treatment plants using advanced technologies such as reverse osmosis, multi-effect evaporators, and mechanical vapour recompression evaporators to prevent water contamination.

   c) Ash management: Bottom ash can be reused in construction if found non-hazardous, while fly ash containing toxic components must be securely landfilled or treated before secondary use.

   d) Odour management: Use of negative-pressure systems to direct odorous air to boilers for combustion and herbal-based disinfectants for effective biological odour control.

8. **Monitoring and compliance**: All WtE plants are required to install OCEMS to continuously track emissions, including particulate matter (PM), oxides of nitrogen (Nox), sulfur dioxide ($SO_2$), carbon monoxide (CO), hydrogen chloride (HCl), hydrogen fluoride (HF), dioxins, and furans, and transmit real-time data to CPCB and SPCBs. Facilities must also conduct periodic sampling of treated leachate, bottom ash, and fly ash to ensure compliance with applicable environmental thresholds. Non-compliance may lead to suspension or revocation of authorisations, penalties under the Environment (Protection) Act, 1986, and mandatory corrective actions as directed by regulators.

## Conclusion

The WtE Guidelines mark a significant step towards structured, compliance-driven municipal SWM in India. By introducing design-based safeguards, emission control measures, ash/leachate management standards, and continuous monitoring protocols, CPCB ensures that WtE plants operate sustainably while reducing landfill dependency. For project developers, ULBs, and regulators, the WtE Guidelines provide a clear institutional and technical roadmap to achieve environmentally responsible energy recovery from MSW.

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