

TO BURN OR NOT TO BURN

FEASIBILITY OF WASTE-TO-ENERGY
PLANTS IN INDIA



Feasibility of Waste to Energy plants in India

Centre for Science
and Environment

Solid Waste in India

- Urban India produces around 55 million tonnes of MSW every year.
- Of this, only about 25 per cent is processed, i.e. recycled or converted into energy, remaining finds its way into dumpsites or is burned openly.

In such a situation, how should the country manage its waste?



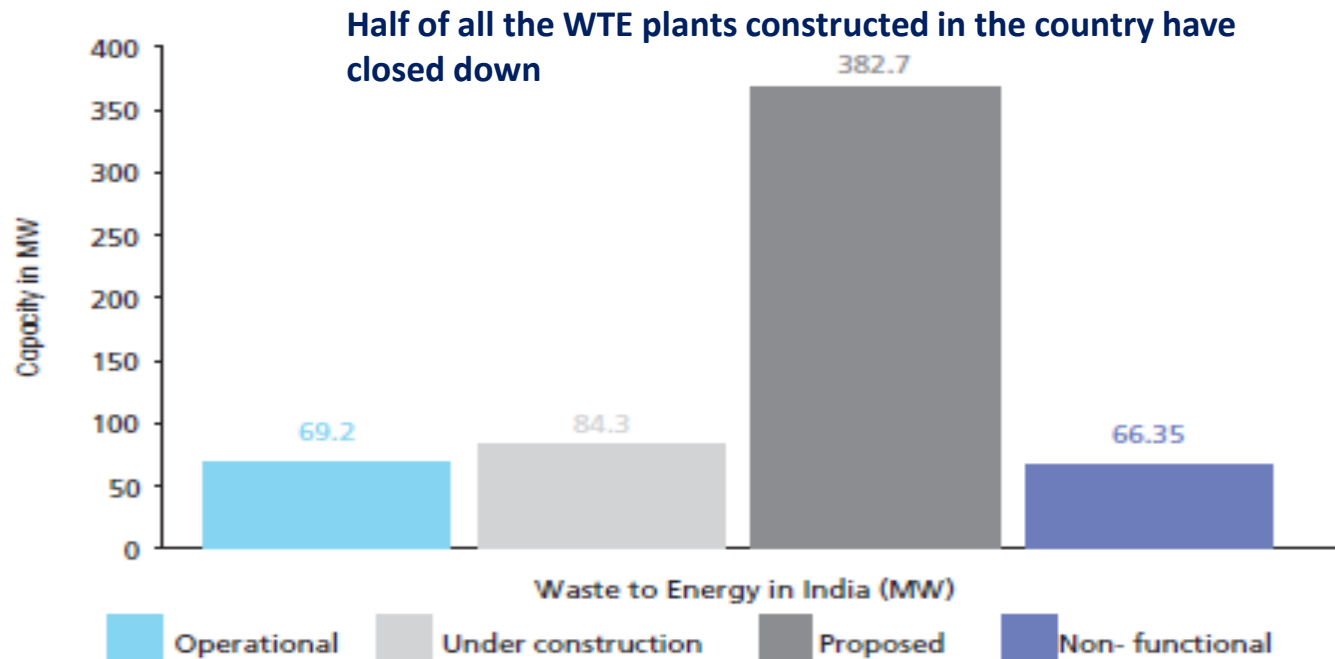


'Sold' quick fix

- For urban policymakers, **best way to deal with waste is to burn it and produce electricity.**
- Silver-bullet of burning waste to make energy will not work unless waste is segregated
- W-T-E plants closing; asking for higher rates for tipping fee or energy; unviable; or people are protesting against pollution by plants
- Reason is quality of waste received by plants
- Reason is contracts for waste are based on how much waste is 'tipped' at plant
- No incentive to segregate
- '**Sorting**' at plant does not work if waste is mixed – everything from plastic to inert debris

Status of waste to energy in India

- First WTE plant —Timarpur in Delhi in 1987 - designed to incinerate 300 TPD of waste and produce 3.75 MW of electricity. It failed and was shut down soon after.
- Since then, 14 more WTE plants of 130 MW capacity have been installed. Of these, 7 plants with capacity of 66 MW are closed and the remaining 7 plants are operational.



Sources: CSE, 2018.



Yet policies promote WTE

- Government has big plans to set up WTE plants across the country.
- For instance, Niti Aayog has set a target of constructing 511 MW of WTE plants by for 2018–19 under the Swachh Bharat Mission (SBM).
- It has also proposed the formation of the Waste to Energy Corporation of India, which would set up incineration plants through PPP models.
- In September 2017, the National Thermal Power Corporation (NTPC) invited developers and investors to set up 100 WTE plants in the country.

But the big questions for the country is:

How feasible are these plants? Is WTE the first choice to manage MSW in India?

Economic feasibility for WTE in India

CHARACTERISTICS OF WASTE

- As per the NGT order of January 2017, only non-recyclable non-biodegradable high-calorific-value waste should be used as waste feed for WTE.
- As most of the waste sent to WTE plants is unsegregated, it has high inert content. Not suitable for burning in WTE plants. To burn it, additional fuel is required.
- Main reason why WTE plants in Kanpur, Bengaluru, Hyderabad, Lucknow, Vijayawada, Karimnagar etc. had to be closed down.



(A) COMPOSITION OF WASTE

- Fundamental determinant
- Biodegradable fraction—40–70 per cent of the total—is the highest in Indian waste.

City	State	Biodegradable (%)	Non-biodegradable (%)	Inert (%)	Domestic hazardous (%)
Cities with population of 1 million-plus					
Bengaluru	Karnataka	64	28	5	3
Hyderabad	Telangana	55	40	5	-
Delhi	Delhi	50	35	15	-
Indore	Madhya Pradesh	50	35	15	-
Patna	Bihar	51	27	15	-
Bhopal	Madhya Pradesh	57	30	11	-
Mysuru	Karnataka	50	35	15	-
Cities with population of 0.1-1 million					
Thiruvananthapuram	Kerala	60	35	4	1
Gaya	Bihar	55	34	11	-
Muzaffarpur	Bihar	55	25	18	2
Imphal	Manipur	55	35	5	-
Alappuzha	Kerala	75	20	5	-
Gangtok	Sikkim	51	28	21	-
Cities with population below 0.1 million					
Balaghat	Madhya Pradesh	70	25	5	-
Bobbili	Andhra Pradesh	50	26	20	4
Valjapur	Maharashtra	50	45	5	-
Panchgani	Maharashtra	70	25	5	-
Vengurla	Maharashtra	54	40	5	1

Source: CSE, 2018.



(B) CALORIFIC VALUE

- Indian waste has low calorific value and high moisture content.
- The calorific value of garbage in Sweden, Norway, Germany and USA ranges between 1,900-3800 kcal/kg—in comparison the calorific value of waste in India is 1,411–2,150 kcal/kg- **too low to burn**

	Net calorific value (kcal/kg)			Moisture (%)		
	Min	Max	Mean	Min	Max	Mean
Capitals with population less than 1 lakh	1,234	3,414	2,149	42	65	52
Capitals with population of 1–5 lakh	591	3,766	2,162	24	63	50
Cities with population of 5–10 lakh	591	2,391	1,481	17	64	48
Cities with population of 10–20 lakh	520	2,762	1,411	25	65	41
Cities with population above 20 lakh	834	2,632	1,772	21	63	47

Source: CPCB-NEERI, 2006,



WTE is expensive despite subsidies

- MNRE offers financial incentives by way of interest subsidy in order to reduce the rate of interest to 7.5 per cent.
- In addition, financial incentives are provided to ULBs for supplying garbage free of cost at the project site and providing land at a nominal rent on a long-term lease of 30 years and above.
- Incentives for preparing Techno-economic Feasibility Reports and for promotion, coordination and monitoring of projects.
- Concessional custom duty on imported parts.
- **These subsidies/incentives take care of about 40 per cent of the project cost. Yet, the cost of electricity produced from these plants is the most expensive.**
- Compared to Rs 3–4 per kWh from coal and solar plants, WTE plants sell electricity at about Rs 7/kWh. Discoms are not interested in buying such expensive electricity.
- **If these subsidies are removed, the electricity produced from WTE plants will not be affordable.**



Environmental, social and health costs

- Not able to meet environmental norms due to highly variable and poor quality of waste.
- Housekeeping is extremely challenging, leading to odour and visual pollution.
- WTE plants reject about 30–40 per cent of the waste, which is dumped because it is either inert or too poor in quality to be combustible.





Global experience

- **W-T-E works** if waste is segregated so that fuel generated is of high quality and plants can get paid for energy
- **W-T-E works** if emission standards are stringent; monitoring systems are credible so that plants do not pollute (*more the unmixed waste, more stringent the standards need to be and higher the cost of plant*)

So what do we burn?

- SWM Rules, 2016 — only segregated non-recyclable high calorific waste be sent to WTE plants.
- Of the 55 MT of MSW generated every year, only about 15 per cent can be classified as non-biodegradable, non-recyclable, high-calorific-value waste. This translates into about **30,000 TPD** of waste which can be fed to the WTE plant.
- But the total waste treatment capacity for 48 existing, under-construction and proposed WTE plants is over 37,000 TPD.
- Choice of technology—whether waste will be burned or recycled or composted—depends on the quality of waste.
- WTE can only be the option for fraction of waste that cannot be managed by other technologies.





CSE RECOMMENDS

- **SUSTAINABLE WASTE MANAGEMENT**
- **IMPLEMENT EPR AND CIRCULAR ECONOMY**
- **CO-PROCESSING BEFORE WTE**
- **WTE IS THE LAST OPTION, NOT THE FIRST SOLUTION**



Thank You

Swati Singh Sambyal
Programme Manager
Centre for Science and Environment
Email: swati@cseindia.org