

Dean (Research and Development)

July 23, 2024

IIT Bombay, Powai

Mumbai 400076

Subject : Opinion* sought by Hon. NGT for Waste to Energy article in the media

Dear Sir,

As you are aware, the Director, IIT Bombay had constituted a committee for providing an opinion on the Waste to Energy article in the media. The following faculty colleagues constituted the Committee:

1. Prof. Virendra Sethi, ESED(Convenor)
2. Prof. Sanjay Mahajani, Chemical Engineering
3. Prof. Srinivas Seethamraju, DESE
4. Prof. Munish Chandel, ESED
5. Prof. Sandeep Kumar, DESE

After several meetings and discussions, the Committee has compiled a report attached here as Annexure A.

I request you to kindly forward the same urgently as the next hearing is of the Hon. NGT is on August 1, 2024.

Thank you.

With Regards,

Virendra Sethi
Professor and Committee Convenor

Virendra Sethi
Professor
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IIT Bombay Powai, Mumbai - 400 076.

वीरेंद्र सेठी
प्राध्यापक

* Original Application No.: 536/2024

Order from Date of Hearing: 15.05.2024

ANNEXURE A

Response to Hon. NGT Matter regarding Opinion for Waste to Energy (WtE) Article

Original Application No.: 536/2024

Order from Date of Hearing: 15.05.2024

1. Incineration is a well-established technology for:
 - a. reducing the solid wastes (volume reduction by about 10:1) prior to safe ash disposal
 - b. generation of electricity is an added advantage, but requires a consideration of the scale and quality of the fuel (solid waste of a certain calorific value, moisture and feed rate) for it to be feasible. A relook at the cut-off for scale for decentralised and optimised operations may be considered.
2. Measures for environmental protection
 - a. air pollution controls in an incinerator (or co-firing in other combustion options) requires cognisance of the variety of wastes and the products of complete/incomplete combustion therefrom.
 - b. "ash" left over after incineration requires to be disposed as a hazardous waste if its characteristics meets the requirement of hazardous waste.
 - c. Rigorous, periodic performance evaluation and monitoring of the control devices through credible third-party audits needs to be a part of the operational requirements.
3. Waste segregation is unquestionably required in the Reduce-Reuse-Recycle paradigm, with "Recycle" possible largely through segregation efforts. That which cannot be recycled, may be considered for ultimate treatment through safe incineration (air pollution, water pollution). The ash may be treated (to prevent leaching of heavy metals) and used in paver blocks or in bitumen mix for laying roads. This may generate more revenue, and is a preferred option when compared with disposal in a landfill.
4. The design of the pre-treatment to incinerators may include a requirement to "dry" out the waste to a certain minimum before feed into the incinerator. The additional heating requirement and the pricing of electricity supply may be considered as a necessary cost of waste disposal and not be used to justify the outright rejection of the technology.
5. The post-treatment pollution clean-up installations are extremely important to ensure that the emissions are within the prescribed norms. These systems are capital-intensive and are included into the overall cost of the installation and operations in well-designed units.
6. Training and capacity building with specialised personnel is required in each Urban Local Body to deal with the special control systems for incinerator emissions, and ash disposal, which may be co-ordinated nationally with knowledge partners.
7. Some other suggestions for technology consideration, alternate pathways and policy interventions are as follows:
 - a. In the light of Sustainable Alternative Towards Affordable Transportation (SATAT) [<https://pib.gov.in/PressReleasePage.aspx?PRID=1548031>] scheme, ULBs could be

encouraged to install biogas plants to feed into Compressed Biogas (CBG), and earn revenue by selling the gas. Similarly, the Refuse Derived Fuel (RDF) pellets can go for co-firing. This may increase the motivation towards the level of source segregation. Compared to SWM 2016 rules, significant push is being made in the area of biofuels with SATAT and co-firing schemes. So, aligning these schemes together to make the best use of them is suggested.

- b. Presently, as pointed out in the referred news article, the payment is made for waste collection (and processing) companies on the basis of total of waste handled only (as tipping fee). There could be a mechanism where the payment is in two parts:
 - i. Pay for the amount of waste handled, and
 - ii. Pay for purchase of final products like
 - Biogas (for use in city gas network) or
 - RDF pellets (for use in co-firing) or
 - electricity (for use of street lighting).

This may then encourage such companies to treat the waste to increase their revenues, by also being assured of product uptake agreements.

- c. The success of WtE plants in Europe is partly due to their configuration - they are co-generation plants providing both electricity and steam as outputs. The steam is used for district heating/cooling network. As a result, their operating efficiencies are higher. However, the plants in India only produce electricity. Perhaps, one could consider the option of co-generation in India too, and use the steam for some kind of energy storage or other applications.
- d. In some older plants, the operators were allowed [Nixon et al., 2017] to use alternative feed in the incinerator to match the desired calorific value if the MSW had a low calorific value, or if enough RDF was not available. And, agricultural residues were one of the common feedstock used as the alternative. However, the operators went up to almost 100% agricultural-residues to produce electricity as a profit making alternative. Such lacunae in the contracts and absence of regulatory oversight need to be reviewed with proper consultation with all stake-holders, especially the plant operators and technology licensors.

In general, the general public has concerns about the operational efficiency of the incinerators and whether these incinerators meet the prescribed environmental standards. In absence of proper operation of an incinerator, it could lead to the emission of hazardous pollutants like dioxins and furans. The operation of the existing incinerators should be audited by the credible third-parties. The municipalities and the operators of the incinerators should bring transparency by publishing the data in public domain. Also, the general public should be allowed to visit these facilities as in the developed countries. There is a need of transparency and confidence building.

Reference:

Nixon, J. D., Dey, P. K., and Ghosh, S. K., Energy recovery from waste in India: An evidence-based analysis, Sustainable Energy Technologies and Assessments 21 (2017), 23-32.