

BEFORE THE HON'BLE NATIONAL GREEN TRIBUNAL, PRINCIPAL  
BENCH, NEW DELHI

Original Application No. 536/2024

IN THE MATTER OF:

News item titled "Waste to Energy: Smokescreen or Solution" appearing in the  
Indian Development Review dated 27/03/2024

N.D.O.H.:01.08.2024

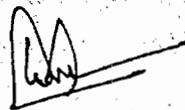
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DELHI

DATED:

THROUGH

  
RESPONDENT No.3  
(CSIR-NEERI)

Malay Swapnil, Adv  
MALAY SWAPNIL  
(ADVOCATE)

CH. NO. 473, LAWYERS CHAMBER  
COMPLEX, PATIALA HOUSE  
COURTS, NEW DELHI-110001  
M. NO. 9289898007

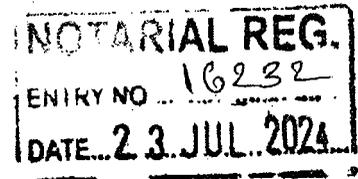
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IN THE MATTER OF:

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MOST RESPECTFULLY SHOWETH:



Response of CSIR-NEERI in Compliance to the Order dated 15/05/2024 and  
Notice dated 12/06/2024 from the Hon'ble National Green Tribunal, New  
Delhi

I, Dr. Mahendra P. Patil, presently designated as Chief Scientist (Employee  
Id: 162) at CSIR-National Environmental Engineering Research Institute,  
Nehru Marg, Nagpur 40020 Maharashtra, India, aged about 56 years, S/o  
Shri Palasram P. Patil, bearing Aadhar No. 222625237049 residing at  
Harmony, Plot No. 104, Hindustan Colony, Wardha Road, Nagpur 440015  
do hereby solemnly affirm, depose and declare on Oath as hereunder:

1. That I am well conversant with the facts and circumstances of the present  
case and as such I am fully competent to swear and sign the Affidavit in  
my Official capacity and on behalf of CSIR-National Environmental  
Engineering Research Institute (NEERI).

That I have read and understood the terms of the Order dated 15.05.2024  
passed by the Hon'ble Principal Bench, The National Green Tribunal, New



Delhi in the above captioned matter and therefore filing the response of CSIR-NEERI in Compliance to the Order dated 15/05/2024 and Notice dated 12/06/2024 from the Hon'ble National Green Tribunal, New Delhi.

3. That the Deponent / CSIR-NEERI carves the leave and liberty of this Hon'ble Tribunal to raise an additional submission and/or file additional Affidavit/Response, whatsoever, before this Hon'ble Tribunal in case need arises during the course of proceedings or at a later stage.
4. That this is my true and correct statement.

**Response of CSIR-NEERI in Compliance to the Order dated 15/05/2024 and Notice dated 12/06/2024 from the Hon'ble National Green Tribunal, New Delhi**

The Hon'ble National Green Tribunal, New Delhi vide its Order dated 15/05/2024 and Notice dated 12/06/2024 had sought response from CSIR-National Environmental Engineering Research Institute (CSIR-NEERI), Nagpur on the two pertinent issues raised by the Author in the above-mentioned news article, regarding feasibility of incineration of mixed municipal solid wastes in India. The two issues on which the response is sought are: i) Suitability of quality of municipal solid waste generated in India for incineration and ii) Health and Environmental implication due to incineration of mixed wastes. The response of CSIR-NEERI on the above-mentioned issues is presented hereunder:

- The Municipal Solid Waste (MSW) generated in India is regulated by Solid Waste Management Rules, 2016 (hereafter referred as SWM Rules, 2016), as notified by Ministry of Environment, Forest and Climate Change, New Delhi. As per the provisions of these rules, it is the responsibility of the waste generators: (individual households, hotels, commercial establishments, educational Institutes, industrial establishments, markets,



airports etc.) to segregate and store the waste generated by them in three separate streams namely bio-degradable (wet waste), non-biodegradable (dry waste) and domestic hazardous wastes, in suitable bins and handover segregated wastes to authorized waste pickers or waste collectors as per the direction or notification by the local authorities. **The purpose of “at source segregation of wastes” is to facilitate efficient collection, transportation, processing and disposal of the MSW.**

- Once the MSW is segregated at source, it is the responsibility of the Local Authorities (Municipal Corporations, Municipal Councils, Village Panchayats etc.) to collect and transport the waste to the waste processing and disposal facility, which is usually managed by a private contractor.
- **The most scientific and sustainable approach for environmentally sound management of segregated MSW involves establishment of an Integrated MSW Management Facility, which comprise of:**
  - Waste receipt & storage in separate areas for wet waste and dry waste.
  - Processing and segregation of dry wastes into various fractions such as paper, plastics, rubber, metals, glass, textiles, inerts and non-recyclables. These segregated fractions are suitable for reuse and recycle for various applications, thus promoting the concept of **Circular Economy**. The people working in informal sectors (waste pickers) may be engaged/employed in processing and segregation of dry wastes at the integrated MSW management facilities.
  - The non-recyclable fraction, generated during processing and segregation of the dry wastes, comprises of unsegregated small pieces of plastics, rubber, wood, papers, textiles and is termed as Refuse Derived



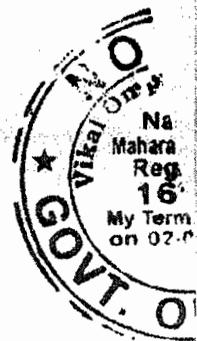
Fuel (RDF). The RDF generated from processing of dry wastes usually has uniform characteristics, low moisture content, high calorific value and is suitable for processing through waste-to-energy plants. As per Rule 21 of SWM Rules 2016, which specifies the "Criteria for waste to energy process", only the Non-recyclable fraction of wastes, having calorific value of 1500 kcal/kg or more shall be utilized for generating energy through co-processing in Cement or thermal power plant. The co-processing of non-recyclables in the existing cement or power plants facilitates utilization of readily available infrastructure, which operates at more than 1000° C temperature and is well equipped with stringent emission monitoring and control systems. This arrangement also avoids setting up of new incineration systems, which requires huge investments as well as various regulatory procedures.

- The inert fraction generated from the processing of dry waste, comprising of stones, pebbles, sand and silt is usually less than 10% of the total MSW. This fraction can either be utilized by construction industry or used for backfilling the low-lying areas.
- The segregated bio-degradable fractions (wet waste) of the MSW, comprising of food and vegetable wastes, can be treated biologically (bio-methanation) for producing biogas, which can be further processed for generating compressed biogas (CBG) as fuel or for generating electricity. The spent digestate from the bio-methanation plant can be utilized for converting it into compost.
- This route of MSW management ensures that, more than 90 % of the waste is utilized through reuse, recycle and energy recovery and less than 10% (inert) is disposed-off on land. Such integrated MSW management plants can be established at the existing MSW dumping sites by clearing the old legacy wastes through bio mining. An Integrated MSW plant with



250 Tons per day capacity, based on this route is successfully operating in the state of Goa for past 7 years. Such plants can be established on a modular basis for various cities where quantum of wastes generation is very high.

- On the other hand, the waste to energy plants, as referred by the author in the afore-mentioned news item, are based on mass burning which utilizes unsegregated MSW. **Promoting waste to energy plants for mixed waste (mass burning), defeats the purpose of waste segregation, which is mandatory, as per the prevailing SWM Rules, 2016. The mass burning of MSW also defeats the opportunity of Circular Economy for waste sector.**
- As pointed out in the news item, the mixed waste generated in India is highly heterogeneous in nature, has high moisture content, and low in calorific value, making it unsuitable for waste-to-energy plants (incineration, co-processing, thermal power plants). The situation is further aggravated during monsoon season, when the calorific value drops significantly due to very high moisture content. The mass burning of mixed waste with high moisture content and low calorific value results in incomplete combustion as the combustion temperature drops to less than 850° C. The mixed wastes are likely to contain chlorinated plastics (polyvinyl chloride) which can lead to emissions of highly toxic dioxins and furans, if the incineration temperatures drop to less than 850° C. The incomplete combustion also results in release of suspended particulate matter, carbon monoxide, nitrogen oxide and sulphur dioxide exceeding the permissible discharge limits, as pointed out in the news item. This altogether can have adverse health and environmental implications. Moreover, presence of non-combustible waste fractions such as metals, glass and inert in the mixed waste results in generation of huge quantities



of ash (30 to 40% of the total waste feed, as pointed out by the Author) which could be hazardous in nature. The disposal of such a huge quantities of ash requires large areas for establishment of secured landfill system, so as to eliminate adverse health and environmental impacts.

In view of the above observations, CSIR-NEERI is of the opinion that, waste to energy plants, based on mass burning of mixed wastes may not be feasible in India, as these are against the prevailing Solid Waste Management Rules, 2016.



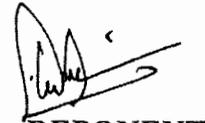
DEPONENT

डॉ. एम. पी. पाटील / Dr. M. P. Patil  
मुख्य वैज्ञानिक तथा प्रमुख / Chief Scientist & Head  
रासायनिक तथा जोखिम अपशिष्ट प्रबंधन प्रभाग  
Chemical & Hazardous Waste Management Division  
सी.एस.आई.आर.-नीरी, नागपुर/CSIR-NEERI, Nagpur-440 020

**VERIFICATION:**

Verified on this Day of July, 2024 that the contents of the response filed by CSIR-NEERI in Compliance to the Order dated 15.05.2024 and Notice dated 12.06.2024 passed by the Principal Bench of the Hon'ble National Green Tribunal, New Delhi are true and correct to the best of knowledge and belief wherein nothing material has been concealed therefrom.

That this is my true and correct statement.

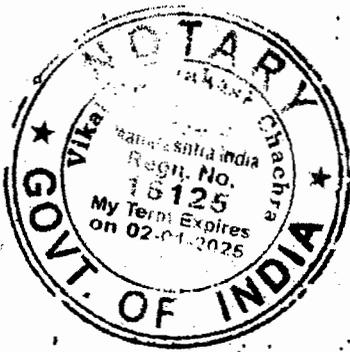


DEPONENT

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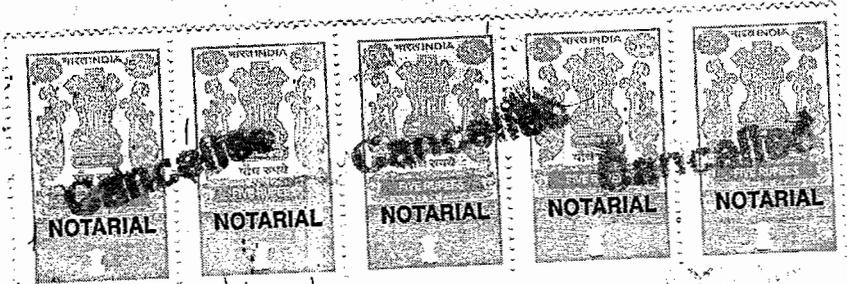
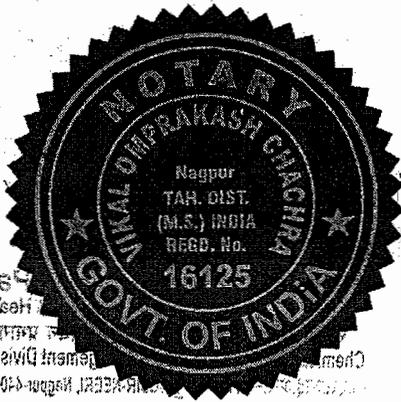


Sworn before me on this 23rd day of July, 2024 at Nagpur by Shri/Smt./Ku. M. P. Patil R/o Nagpur who has been identified by Shri/Smt. M. Swapna Advocate, Nagpur

*M. Swapna*

NOTARY GOVT. OF INDIA Nagpur (M.S.) INDIA

23 JUL 2024



Chemical & Hazardous Waste Management Division, Nagpur-440 030

डॉ. एम. पी. पाटील / Dr. M. P. Patil  
Chief Scientist & Head  
Chemical & Hazardous Waste Management Division  
Nagpur-440 030