

# Waste-to-energy plants add to Delhi's pollution woes

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Public protest demanding the closure of the Okhla plant.  
Credit: Ranjit Devraj

An official report admitting to toxic emissions being generated by three waste-to-energy (WtE) plants operating in the Indian capital has thrown a question mark on the future of WtE incinerators as a way to deal with the municipal solid waste generated by the country's 1.3 billion people.

The report by the Central Pollution Control Board (CPCB), the government's pollution watchdog, submitted to the National Green Tribunal and the Supreme Court in the last week of September, showed dioxins, furans and PM<sub>2.5</sub> (particulate matter at 2.5 microns) among chief pollutants being released at levels beyond permissible limits by [waste](#)-to-energy plants located in the Okhla, Bawana and Ghazipur areas of Delhi.

Inhaling PM<sub>2.5</sub> particles can lead to cardiovascular diseases, lung cancer, chronic obstructive pulmonary diseases and respiratory disorders. WHO estimates that it causes upwards of four million premature deaths globally each year.

Dioxins and furans, generated by incineration at low temperatures, are among the most toxic substances known.

Waste-to-energy plants were introduced to Delhi 10 years ago as answer to garbage dumps that had grown into mountains reaching over 60 meters tall and dominating the capital's skyline. During monsoons, the waste would slide down the slopes, and at other times, smolder and catch fire, endangering nearby residential areas.

As originally envisaged, the plan was to convert the waste into [fuel pellets](#), also referred to as refuse-derived fuel or RDF, which could be transported to cement or power plants located outside the city. But transport costs were high and the fuel pellets produced did not have sufficient calorific value as more than half of Delhi's waste was wet household garbage with large fractions of silt and construction waste. This mixed waste cut the calorific value to far below the 1,800 kilocalories per kilogram needed for self-sustaining combustion.

Also, power produced by these plants was twice as costly as that generated by regular coal or gas-fired units and has to be supported by government subsidies.

Attempts to sustain the burning in the boilers with auxiliary diesel fuel did not help and people living around the three plants began to complain of choking and breathlessness from plumes of acrid smoke produced by burning unsegregated waste as the city is yet to enforce segregation as mandated by law in 2016.

Of the roughly 150,000 tons of solid waste generated daily across India, 40 percent is disposed of in open dumpsites which are hazardous to public health and environment. In 2017, the government announced plans to build 100 waste-to-energy plants through public-private partnerships across the country as a solution to the

waste problem.

So far, only four Waste-to-Energy plants, including three in Delhi and another in Jabalpur, have become functional, according to a report by Swati Singh Sambyal, an independent expert formerly with the Center for Science and Environment. A fifth plant in Surat, Gujarat state was ordered relocated by the National Green Tribunal in September 2019 following complaints of excessive pollution.

Several other projects are mired in litigation. Residents living around the biggest and oldest of the plants in the Okhla area took the matter to the National Green Tribunal and the Supreme Court, complaining about the use of toxic, mass-burning technology to burn 2,000 tons of unsegregated [municipal solid waste](#) in a thickly populated area.

"Both the Delhi and Central governments have made a lot of tall claims about environmental protection these last few years, but the WtE plant at Okhla is located where it should not be," says Manju Menon, senior fellow at the Center for Policy Research, New Delhi. "The Okhla WtE plant does not have key components that it is legally mandated to have to prevent air pollution and has been emitting toxic gasses as per CPCB's reports."

The plants at Okhla, Bawana and Ghazipur were licensed to convert wastes into fuel pellets by heating and drying so that they reach a calorific value of 2,600 kilocalories per kilogram before being fed into boilers to drive steam turbines and generate power. Instead, they just directly burn a combined total of 5,000 tons of solid waste to roughly generate 40 megawatts of electricity.

"What is being fed into the boilers at Okhla is mixed waste at 900—1,000 kilocalories per kilogram," says Navin Chandra, chairman of thermal projects at the Central Electricity Authority, who is among several experts to have officially inspected the plant and found it wanting.

With fears that air quality levels will rise during the winter season and aggravate respiratory ailments, including COVID-19, Delhi Chief Minister Arvind Kejriwal launched this month a "War on Pollution"

campaign complete with a 'war room' to rapidly deal with complaints.

"We know that every year, the level of pollution rises in the months of October, November and December," Kejriwal said. "One of the biggest reasons for this is the burning of crop stubble in nearby areas," he said, reiterating his government's position that farmers burning crop residues in neighboring Haryana, Punjab and Uttar Pradesh states were to blame.

Last week (15 October), Delhi's power minister Satyendra Jain, addressing a press conference, called for the closure of 11 thermal [power plants](#) functioning within a radius of 300 kilometers from the city. Pointing to CPCB warnings notices issued to these coal-fired plants, Jain said their functioning was "adversely affecting the lives of Delhi citizens."

Curiously, neither Kejriwal nor Jain saw fit to mention the CPCB report on toxic emissions from the three waste-to-energy [plants](#) functioning within the capital. "The Okhla plant's closure should have been at the top of the government's list of clean air initiatives," Menon commented.

SciDev.Net asked officials to comment on the CPCB report but did not receive a reply by the time of publication.

IQ Air rates Delhi and at its suburbs as among the most polluted in the world. A study published September in *Chemosphere* calculates that Delhi—known for high exposure to PM2.5—loses 227.47 years of life per 1,000 population annually.

As part of measures to counter PM2.5, Kejriwal has announced the construction of more smog towers with giant filters and water misting arrangements at pollution hotspots—a practice begun last year following orders by the Supreme Court. But this has invited skepticism from the public and environmental scientists as unworkable.

"It is unscientific to assume that one can trap air, clean it and release it into the same atmosphere, which has no boundaries," says Sarat Guttikonda, director of Urban Emissions, an independent research organization based in New Delhi.

But lockdowns (24 March—3 May) to prevent spread of COVID-19 resulted in a 50 percent reduction in pollutants as compared to corresponding periods in the previous years, according to a study published August in *Science of the Total Environment*.

"COVID-19 lockdowns proved that [air pollution](#) can be reduced by controlling emissions at the source," comments Guttikonda.

**More information:** Susanta Mahato et al. Effect of lockdown amid COVID-19 pandemic on air quality of the megacity Delhi, India, *Science of The Total Environment* (2020). DOI: [10.1016/j.scitotenv.2020.139086](https://doi.org/10.1016/j.scitotenv.2020.139086)

Shovan Kumar Sahu et al. Estimating ground level PM<sub>2.5</sub> concentrations and associated health risk in India using satellite based AOD and WRF predicted meteorological parameters, *Chemosphere* (2020). DOI: [10.1016/j.chemosphere.2020.126969](https://doi.org/10.1016/j.chemosphere.2020.126969)

Compliance Report of Waste to Energy Plants in Delhi: [greentribunal.gov.in/sites/default/files/updates/Compliance%20Report%20in%20O.A.%20No.%20640%20of%202018%20Earlier%20O.A.%20No.%2022%20of%202013%20\(Sukhdev%20Vihar%20Resident's%20Welfare%20Association.%20Vs.%20State%20of%20Delhi%20&%20Ors.\).pdf](https://greentribunal.gov.in/sites/default/files/updates/Compliance%20Report%20in%20O.A.%20No.%20640%20of%202018%20Earlier%20O.A.%20No.%2022%20of%202013%20(Sukhdev%20Vihar%20Resident's%20Welfare%20Association.%20Vs.%20State%20of%20Delhi%20&%20Ors.).pdf)

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