



All eyes on biogas plants as cities continue to grapple with overflowing landfills

SOLUTION TO WASTE CRISIS IN CITIES

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Pic: Som Narayan

Petroleum and Natural Gas Minister of India, Dharmendra Pradhan has an ambitious new solution to tackle the problem of solid waste in India. Earlier this year in October, Pradhan announced his massive plan to [set up 5000 biogas plants](#) across the country over the next five years that will convert agricultural residue, cattle dung and municipal solid

waste into usable biogas. This biogas will then be compressed and distributed as a replacement for vehicular fuel CNG.

Advertisement Will it make your city any cleaner, then?

India generates 62 million tonnes of waste every year. As citizens it may be hard to put that number in perspective but as urban Indians, we are no stranger to mounds of garbage, overflowing landfills and the associated stench. In September 2017, overflowing landfills captured every Indian's attention when an avalanche of garbage from the Ghazipur landfill, just outside of Delhi, killed two people, injured some, and swept away several vehicles. Experts say that growing population and consumerism will only drive that garbage mound to grow bigger.

It is projected that by 2031, **we'd be producing 125 million tonnes** of garbage annually. Clearly, the problem of garbage is a monumental one and needs some effective solutions. Pradhan's solution to create energy out of this waste, then, needs some serious exploration.

The good and bad of waste to energy technologies

As a concept, waste to energy has been around and experimented with for quite some time in India. In fact, the first large scale waste to energy (WtE) plant was set up in Timarpur in Delhi as early as 1987. This plant relied on the incineration of waste to produce energy. Unfortunately, the plant did not last more than six months. WtE experts have long stated the **unsuitability of incineration-based plants** for India, because our garbage has low calorific value and high moisture content.

The other way to produce energy from waste is via biomethanation. In this method, garbage is degraded in anaerobic conditions to produce a mixture of gases, mainly constituting of methane. The government's new WtE plan is also placing its bets on this technology.

“It is great that the government is finally acknowledging the role of biogas as a form of waste to energy. So far the emphasis has been on thermal solutions, namely incineration (burning) of wet, low-calorie mixed waste which is thermally inefficient, financially unviable, highly polluting and causes ill health around such plants,” said, Almitra Patel, Member, Supreme Court Committee for SWM and National Expert, Swachh Bharat Mission.

“Compressed Biogas (CBG) is a great new idea for several reasons. It creates almost no air or water pollution, promotes collection and use of unmixed biodegradable (wet) waste as mandated, and returns nutrients to our carbon-depleted soils to restore their fertility,” she added.

The catch, however, lies in the type of garbage required to generate the fuel. Only biodegradable waste or what is popularly called wet waste can be used to produce biogas. However, waste in India is often unsegregated. In the past, waste to energy plants in **Lucknow and Kolkata** have failed, precisely because the municipal waste being fed into these plants was not segregated at source.



Waste dump at Sarjapur in Bangalore. Pic: Manupriya

Earlier this year when the Delhi government announced its launch of 10 new biogas plants, Swati Sambyal, a waste

management expert from the Delhi-based NGO Centre for Science and Environment said, “A necessary condition to run the plants would be community-based segregation of waste at source. The civic bodies should focus on **segregation and behaviour change** while setting up infrastructure at this scale.”

Yet, **a study done by CSE** on 20 cities that are a part of its ‘Forum of Cities that Segregate’ found that only four cities have attained a segregation rate higher than 90%. Smaller cities in general were found to have done a good job of complying with the major clauses of key environmental legislation, while larger cities including Bengaluru and New Delhi failed to satisfy the basic mandate of waste management: source segregation.

Another **study** done in neighbouring Malaysia also found that in addition to investment in necessary infrastructure and human resources, government policies should push for waste segregation, without which a continuous supply of good quality raw material for biogas plants cannot be ensured.

Alappuzha in Kerala, on the other hand has been able to segregate its waste quite effectively and is also running numerous small scale/decentralised biogas plants to manage its organic waste. T V Ramachandra, Faculty at Centre for Ecological Sciences, Indian Institute of Science, Bengaluru, too favours the decentralised model. While welcoming the government’s decision, he said that the biogas plants should be set up at the “village or panchayat level as it would bring down the transportation cost (of gas) and would also provide jobs to local youth in management and maintenance of the plants”.

Early success

Some startups however have shown the way to success in managing solid waste via the biogas method. Bengaluru-based Carbon Masters have set up a plant right outside Bengaluru in Malur, where they process pre-segregated wet

waste to produce biogas and organic fertiliser. They bottle the biogas and sell it as a **replacement for kitchen fuel to commercial kitchens** under the brand name Carbonlites.

“Carbonlites burns longer and stronger- the calorific value of Carbonlites Bottled Bio-CNG is 52MJ/kg where as LPG has only 46 MJ/kg. It helps its customers save 15% on their fuel costs”, said, Som Narayan, one of the founders at Carbon Masters. The team at Carbon Masters is also trying a run of their biogas plants in decentralised fashion. One of their plants is being run at Koramangala- a residential locality in Bengaluru and occupies an area of 3000 sqft.

In **Solapur** in Maharashtra, an alternative strategy – segregating waste after collection – has led to success in energy generation from waste. In partnership with a private firm Organic Recycling System (ORS), the Solapur waste to energy plant first segregates the waste and uses degradation technologies that are especially calibrated to decompose Indian municipal solid waste which has more moisture and less calorific value than its western counterparts. The plant has been contributing 3MW power to the grid daily since 2014.

If these early successes can be replicated at a nation-wide scale, then slowly but surely, urban solid waste can be managed better and the pollution associated with burning of agricultural waste brought down. The government's interest in biogas technology has provided a boost for the industry players. However, expansion of the technology footprint across the country will require more than good intention and interest from government.

“Approvals to set up these plants should be provided within 45-50 days. From our past experience, plant approvals have taken close to 9-12 months and this is not sustainable. At present, this is the biggest challenge for entrepreneurs/companies looking to invest in this space,” says Narayan.

Access to capital at a lower interest rate and an ecosystem of suppliers & manufacturers of compressors, cylinder and construction service providers will also be needed to support the expansion of biogas plants.

Despite the challenges, Narayan is hopeful. Success of biogas plants he says will also automatically help in “reducing India’s carbon emissions, helping farmers improve soil health, reducing India’s dependence on oil imports, and creating jobs in rural areas – it is a perfect example of circular economy in action.”