

MSW to energy in India: the scenario and expectations

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FP6 Technology at Work Project
Facilitation Workshop
New Delhi, February 21-22, 2008

Waste to energy technologies in practice

Prevalent MSW to energy technologies are:

- Landfill gas – trapping and utilization of the gas or conversion to electrical power
- Anaerobic digestion - utilization of the gas or conversion to electrical power
- RDF (refuse derived fuel)
- Incineration (mass burn)

Indian scenario

- As per MSW Rule 2000, biodegradable material should not be deposited in the sanitary landfill
- Therefore there is almost no scope of generation of biogas in the form of landfill gas from new sanitary landfills
- However, there is a huge potential of trapping the landfill gas generated in the old dump-sites across the country, particularly the large ones with more than 5 meter thickness (height plus depth)

Harnessing methane from old dumpsites: Issues

- Reliable records of waste deposition is rarely available
- The deposited waste is often put on fire, so the organic waste gets burnt, losing its potential of generating methane
- Since these dumpsites are without a bottom liner or an impervious top cover, the gas escapes through convenient routs (apart from issues of water and air pollution)
- A properly designed system would not only trap maximum gas but also contain pollution

Waste to energy technologies in India

The following technologies appear to be more relevant at present in India for harnessing energy from municipal solid waste:

- RDF
- Anaerobic digestion
- Trapping landfill gas from existing landfills (dump-sites)

Experience in India so far

- Initially RDF plants were installed in India in the mid-nineties followed by larger ones later:
- 5 TPD plant in Bangalore (private entrepreneur) – MSW to pellets
- 80 TPD plant in Mumbai (1994, DST) – MSW to pellets
- 200 TPD plant in Hyderabad – MSW to pellets (1999, DST Technology), private company (SELCO)
- Hyderabad plant upgraded to 1000 TPD with power generation



MSW pelletisation plant at Hyderabad (courtesy MNRE)

Experience in India so far

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- RDF plant in Vijaywada (fluff) along with pelletization plant at Guntur, pellets transported to Vijaywada followed by combined power generation – 5 MW power generation capacity, BOT operator (DST technology)
- RDF plant in Jaipur (fluff), BOT operator, baled fluff sent to cement plant for CDM benefits (500 TPD capacity)
- RDF plant in Chandigarh (fluff) – under construction, BOT operator, baled fluff sent to cement plant for CDM benefits (500 TPD capacity)

Experience in India so far

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Biomethanation plants:

- Biomethanation plant in Pune (pilot plant) using technology from Paques (5 TPD capacity) – mid nineties (closed)
- Biomethanation plant in Vijaywada using segregated MSW (16 TPD) and slaughterhouse waste (4 TPD), technology from Mailhem, Pune
- Biomethanation plant in Chennai (Koyembedu flower market) of 30 TPD capacity, BIMA technology, Austria
- Biomethanation plant in Lucknow BIMA technology, Austria, 5 MW designed capacity, 500 TPD MSW input (closed)



0.15 MW Power Project Utilizing Vegetable Market and Slaughterhouse Wastes at Vijayawada, A.P. (courtesy MNRE)



Project for generation of 5 MW power from Municipal Solid Waste at Lucknow (courtesy MNRE)

Experience in India so far

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Harnessing of biogas (landfill gas) from landfills (dumpsites)

- Attempted in Delhi by DEDA in a small scale
- Large scale closure and harnessing of landfill gas under construction at Gorai in Mumbai
- Similar closure and landfill gas harnessing plans for two other sites in Mumbai (Deonar and Mulund)
- Plans under way for Delhi
- A number of Municipal Corporations have floated bids for such projects in the recent past

Issues of WTE technologies

- Competing technologies, particularly composting
- The bids from the ULBs (Urban Local Bodies) for processing of municipal solid waste through BOT route are often open regarding choice of technology but the bids are highly competitive from the financial angle
- Therefore the bidder looks for a technology which not only satisfies the applicable laws of the land but also gives them the competitive edge in the financial bid
- The emphasis is on 'royalty' rather than 'tipping fee'
- The technology with lower capital outlay and higher overall revenue accrual is preferred under the circumstances

Issues of WTE technologies

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- The waste scenario in a given situation is an important determinant
- For example, waste characteristics, quantity generated, site characteristics (particularly, proximity of habitation), availability of land etc.
- Local preferences – whether energy or power has felt need or demand
- Financial and fiscal support available, e.g., subsidy (capital / interest), tax and duty exemptions, CDM etc
- While selecting a technology, a bidder would keep these under consideration

Need of the sector

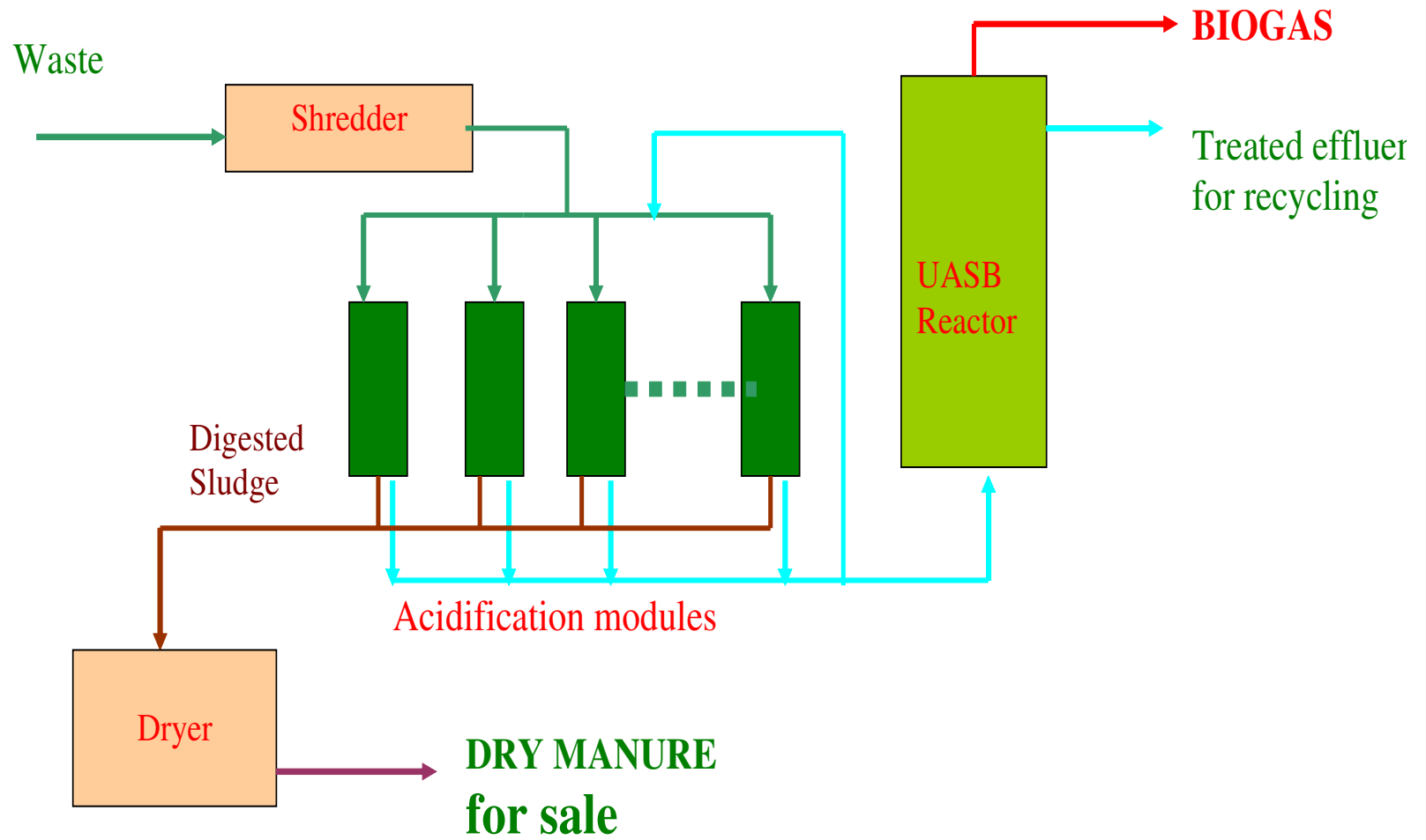
- Deep deliberation is required keeping in view the need of the ULB and the BOT operator
- The need of different site situations have to be thoroughly analyzed and solutions have to be accordingly designed
- For example, in case of close proximity of habitation, open windrow composting would not be the preferred option inspite of cost advantage
- WTE and in-vessel composting would then be the competing technologies

Need of the sector

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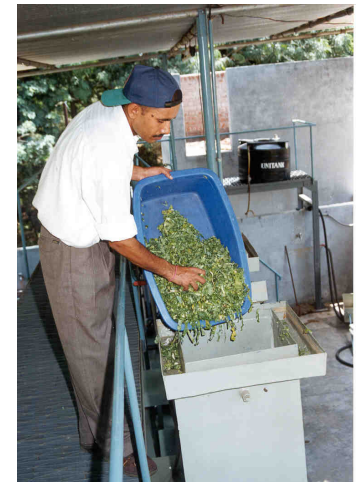
- Integrated facilities are gradually coming into consideration
- For example a combination of aerobic windrow composting and RDF may provide a better solution depending upon the quantum of waste available so that the load on the landfill also reduces
- Such attempts have been done at Rajkot and is on the anvil in Delhi
- Decentralized facilities based on dedicated waste stream (Vijaywada, Chennai, TEAM process of TERI)

Schematic diagram of TEAM



TEAM Process (acidification)

**Startup of
acidification
process**



**Drying of
digested
sludge for
manure
production**

Thank You