

# Opportunities and challenges for MBT technologies and policy decisions on the ground in India

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# Municipal Solid Waste Management in India

- ▶ The quantum of waste generation in India is 147,613 MTPD as per November 2020 data from the Ministry of Housing and Urban Affairs (Swachhata Sandesh Newsletter)
- ▶ Fortunately the per capita generation is low compared to many other developing countries
- ▶ As per our Constitution, waste management is a State subject
- ▶ In spite of a number of steps from the Central Government as well as many State Governments, the status of waste management needs a lot of improvement in most of the municipalities



# What are the drivers of MBT in India ?

- ▶ In the context of this webinar, the status of application of MBT in India is to be discussed
- ▶ There has been a trend to move from centralized to de-centralized processing and disposal facilities as evidenced from policy changes and recent tenders floated by the ULBs (urban local body)
- ▶ The most important driver of MBT in India – saving land for waste disposal (especially, sanitary landfill / dumping)
- ▶ The next important issue is coping with segregation at source (uncertainty regarding extent of segregation, issue of design and capacity)
- ▶ saving the environment (GHG, vectors and diseases, air and water pollution), aesthetic issues etc



# Indore city: 5 times topper for Cleanliness Survey by Government of India (2016-2020)

- ▶ A shining example of best practice
- ▶ A city of 2.5 million population and 1115 TPD MSW generation (wet waste – 58.25%, dry waste – 41.75% and household hazardous waste and sanitary waste – 0.5%)
- ▶ Since 2016, Indore Municipal Corporation (IMC) has been able to rapidly implement segregation of waste at source and has achieved 100%
- ▶ The clue to success appears to be in meticulous doorstep collection of segregated waste in 'tippers' having 3 compartments – 2 in the main collection container and a drum with hinged cover, tucked at the back side



# Indore city ..... contd.





## Indore city ..... contd.

- ▶ 8 garbage transfer stations (GTS) of three types: Ramp based static, portable Compactors based and semi portable Compactors based GTS (Hyva and TPS)
- ▶ The bulk generators (marriage halls, hotels) have to install their own system for wet waste
- ▶ Households have been encouraged for home composting
- ▶ This way IMC has been able to divert almost 100 TPD wet waste from the central processing facility (composting plant)
- ▶ Biodegradable waste based 3 biogas plants have been set up and the product CBG is used for public transport
- ▶ Centralized dry waste processing facility for segregation – saleable items
- ▶ Centralized domestic hazardous waste treatment facility - incineration



# Policy and Regulatory Issues

- ▶ Different types of waste are generated – particularly in urban areas, but their management is inter-related
- ▶ Hence the Government of India had notified 6 rules in 2016:
  1. Solid Waste Management Rules, 2016
  2. Construction and Demolition Waste Management Rules, 2016
  3. Bio-Medical Waste Management Rules, 2016
  4. Plastic Waste Management Rules, 2016
  5. E-Waste Waste Management Rules, 2016
  6. Hazardous and other Waste (Management and Transboundary Movement) Rules, 2016



# Policy and Regulatory Issues

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- ▶ Apart from the above, the Batteries (Management and Handling) Rules 2001, Amended in 2010 was also notified
- ▶ **FCO 2009** for standard of organic manure derived from MSW and **FCO 2013** for PROM (Phosphate Rich Organic Manure) – these are mandatory standards for any compost which is sold to be applied for food crops
- ▶ A number of State Governments have notified certain guidelines and regulations, such as,
- ▶ Draft Guidelines for Regulation of Tyre Re-treading Activities in the State of Maharashtra
- ▶ Guidelines on co-processing in Cement, Power and Steel Industries
- ▶ Formulation of Andhra Pradesh Integrated Municipal Solid Waste Management Strategy, 2014



# Guidelines from the Government of India

- ▶ To assist implementation of the rules, the Government of India has published elaborate Guidelines from to time, some important ones relating to MSWM are:
- ▶ Municipal Solid Waste Management Manual (3 parts), Ministry of Urban Development, 2016
- ▶ Guidelines on Usage of Refuse Derived Fuel in Various Industries, Ministry of Housing and Urban Affairs, 2018 (3 grades / qualities of RDF have been suggested in this report)
- ▶ Report of the Inter-Ministerial Task Force on Integrated Plant Nutrient Management, 2005 (dealt with composting of city MSW in detail)
- ▶ Report of the Task Force on Waste to Energy, Planning Commission, 2014



# Type of plant and machinery used for MBT

- ▶ Sorting – electrically operated sorting belts, usually manned by 4-8 persons, who are fairly skilled at their job, with keen eyes and deft hands
- ▶ Segregation is done mostly by trommels (slightly tilted rotating drums), these have been significantly improved over the last 4 decades. The ratio of length to diameter is important for good cascading activity leading to efficient size based separation
- ▶ For large composting plants (300-500 TPD waste intake) using collected mixed waste, 4 trommels are used: pore size 80-100 mm large size trommel followed by 35 mm and 16 mm pore size post windrow composting in tandem and finally 4 mm pore size after post-screening stabilization for 3 weeks
- ▶ After 4 mm screen the material is passed through density separator to remove inert material, so that the final compost has density less than 1



# Type of plant and machinery used for MBT

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- ▶ Magnets (either permanent or moving belt type) are fitted to remove small iron pieces, especially, nails of different sizes
- ▶ Eddy current is not popular in India because non-ferrous items are either sold by the waste generators or picked up by the informal sector because of their higher price
- ▶ Shredders – primary and secondary – especially used for RDF making
- ▶ The most challenging issue is designing shredders for plastics and fabric material, there is need for indigenous development of this item with reasonable pricing
- ▶ Bio-drying is not popular in India so far



# Endeavour for making a difference

- ▶ A number of organisations and companies including Start-up companies are trying to make a difference by focussing from different perspectives
- ▶ National Physical Laboratory, Delhi has developed a technology for preparing inert and strong boards from plastic waste, which can be used for light and temporary structures
- ▶ One such company – Trashcon has fabricated automated equipment to segregate mixed waste, which is claimed to be very useful during the pandemic COVID-19
- ▶ One of their equipment can make boards from different dry waste including multilayer covers
- ▶ One facility for segregation has been set up at Dhapa in Kolkata (to be commissioned) and another in Bangalore for segregation



# Market for the products from waste processing

- ▶ High organic carbon fraction such as compost or stabilized sludge manure from a biogas digester. **Issues – the yield of FCO 2009 compliant compost from mixed waste is around 10% only. Bad quality manure does not sell. Issue of warehousing for 6 months, cost of distribution to the farmers. Lack of awareness regarding benefits of organic manure amongst farmers**
- ▶ Renewable fuel such as biogas (cleaned compressed biogas). **No standard pricing mechanism so far**
- ▶ Recovered recyclable material, such as, paper, plastic, glass, metal etc. **Clean recyclables – big challenge**
- ▶ High calorific fraction, such as, RDF (used in cement plants). **Quality and price uncertainty between waste and cement industries, other industries not interested**
- ▶ Sale of carbon credits (CERs). **Price has crashed, political and market uncertainty**



# Financial implications – can MSWM be financially self-sufficient with MBT?

- ▶ As per the Constitution of India, urban waste management is mandated for the urban local bodies (Municipal bodies)
- ▶ The 74<sup>th</sup> Amendment Act of the constitution has devolved significant powers to the ULBs, including financial powers
- ▶ It is well known that waste management can not be financially self-sufficient with the limited avenues of revenue accrual
- ▶ It has to be funded from taxes and duties on the principle of 'polluters pay'
- ▶ In places where segregation at source has not been established, MBT can provide lot of advantage as mentioned in the 3<sup>rd</sup> slide





# *Thank You*

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