Municipal Solid Waste Management

Processing
Energy Recovery
Global Examples



P Jayarama Reddy

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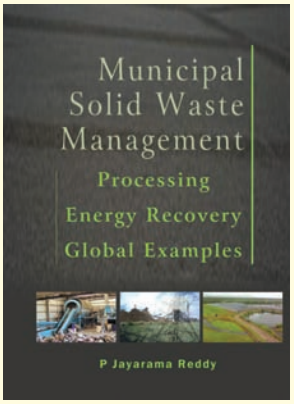

Municipal Solid Waste Management

Processing, Energy Recovery, Global Examples

by

P. Jayarama Reddy

One of the big challenges that today's growing cities are coping with is the delivery of effective and sustainable waste management, together with a good sanitation. This volume provides a comprehensive presentation and overall picture of municipal solid waste management, including waste generation and characterization, waste reduction and recycling, waste collection and transfer and waste disposal. It analyses how these aspects are practiced in developing and developed countries. The traditional method of disposal – composting at different scales – is discussed, including the benefits of compost. 'Energy-from-waste-technologies' are amply discussed, with comparisons between developed and developing countries, and with parameters and conditions for successful operation of these technologies. Moreover, the construction and operational aspects of landfills – to maintain environmental safety and the health of the residents nearby – are described in depth. In addition to a chapter with case studies of several countries and cities in every continent, a special chapter is dedicated to municipal solid waste management in India, including legal provisions, financial resources, private participation and citizens' rights and obligations, and the status in three major cities. By presenting different elements that constitute a sustainable procedure, including the recovery of clean energy, this volume will serve as a guide to students in science and engineering and to key players in waste management services and policies.

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About the Author

Dr. P. Jayarama Reddy is an energy consultant to the solar photovoltaic industry and has made it his mission to promote the application of renewable energy initiatives. He serves as a board member on several international renewable energy companies that work on solar module fabrication, power generation from biomass, and municipal solid waste. Dr. Reddy is retired as a professor of Physic and has devoted a large part of his life to crystal physics and the application of advanced materials in the semi-conductor and thin film industry. He has worked in the various big research laboratories, under which those at Cornell University (US), Imperial College (UK), Charles University (Czech Rep.) and Stuttgart University (Germany). The recipient of several awards and a Fellow of the Institute of Physics (UK), Dr. Reddy has published a number of books on renewable energy, including 'Science and Technology of Photovoltaics' (BS Publications / CRC Press).

Municipal Solid Waste Management: Processing, Energy Recovery, Global Examples

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Currently, they are not considered as a reliable and cost-effective alternative, especially for developing countries.

6.2.1.1.1 Mass-Burn Technology (MBT)

Mass-burn systems are the predominant type of MSW incineration. The *unprocessed* or minimally processed waste is combusted in a mass-burn system. This feature makes mass-burn facility convenient and flexible. However, it is desirable to separate household hazardous wastes such as cleaners and pesticides and also to sort out and recover materials (example, iron scrap etc.,) to make certain that incineration is environmentally-sound. It further helps resource conservation.

In the 20th century, the major advance in waste incineration was the development of moving grates, which allow waste to be fed continuously into a furnace, initially either by gravity or mechanical means. The moving-grate unit has been the heart of the so called mass-burn system, where 'as received' waste is processed at the plant. The grate and furnace technologies of today are ideally suited to the combustion of black bag waste as well as the residual waste stream following extensive source separation for recyclate recovery.

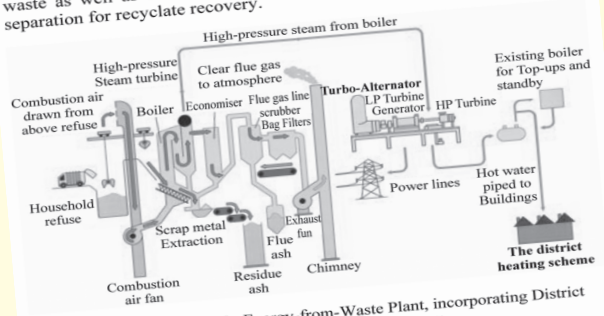

Fig. 6.2 Flow diagram of a Energy-from-Waste Plant, incorporating District Heating System (source: CIWM 2003)

Fig. 6.2 shows the main operating zones and parameters of furnace-boiler assembly. The major components of a mass burn facility are: (a) waste receiving, handling and storage system; (b) the combustion and

In the absence of a facility to collect waste from sources (houses or shops or restaurants etc.), people are prone to dump wastes on streets, drains, open spaces, and near-by water bodies creating insanitary conditions and causing an adverse impact on the environment and public health. The outbreak of plague in Surat in 1994 was the best example of how unsanitary conditions in the cities cause environmental and health hazards.

People generally believe that waste thrown onto the streets would be collected by the municipal street sweepers. The municipalities, probably, have to do much more to educate the citizens on the basics of MSW managemant, and proper storing of the waste in their own bins in the households (Asnani 2006; Rathi 2006; Sharholy et al. 2005; Ray et al. 2005; Jha et al. 2003; Kansal 2002; Kansal et al. 1998; Singh and Singh 1998; Gupta et al. 1998).

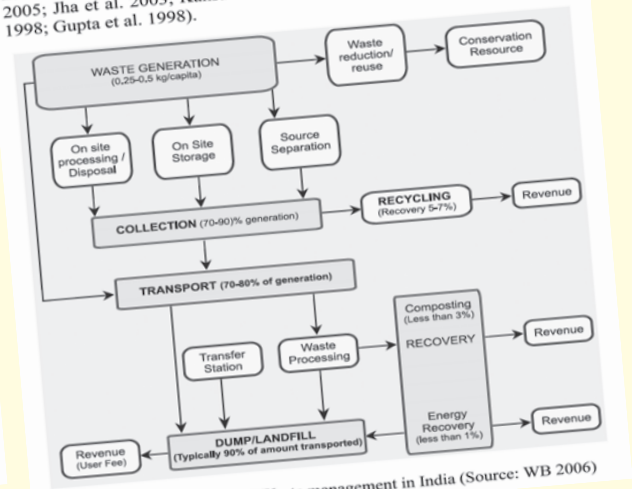

Fig. 8.1 Typical system of Waste management in India (Source: WB 2006)

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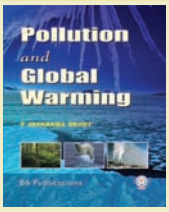

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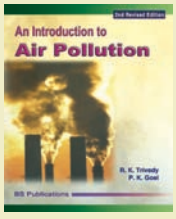

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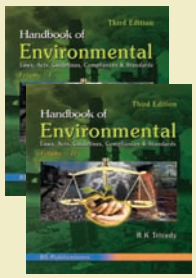

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