

1.INTRODUCTION:

Two decades of economic growth since 1990 has changed the composition of India's urban wastes. The quantity of MSW generated in Bangalore is increasing rapidly due to high growth in population and change in lifestyles.

The continuous dumping of the wastes in the landfill sites is undesirable in the long run as the indiscriminate dumping in the land fill/dump sites has created pressure on land requirements and negative impact on the surroundings.

Land is scarce and public health and environmental resources are precious.

This is to enable the deployment of technology with respect to the 7 landfill sites of the BBMP.

SI No	Name of the landfill site	Quantity in Lakh tons	Area in Acres
1	Mandur North	6.0	95
2	Mandur South	4.0	40
3	Mavallipura	7.0	46
4	Anjanapura	1.0	5
5	Cheemsandra	3.0	10
6	Kannahalli	1.05	25
7	S.Bingipura	1.45	20

Through the data collection process and its assessment, the various dump/waste quantities were compiled along with the geographic locations and distances. The priority site where the bulk waste is accumulated is identified.

The committee recommended speedy implementation of the clearance and processing of the

waste at the existing dump sites by Bio mining technique for the following sites.

1. Mandur North
2. Mandur South
3. Mavallipura
4. Anjanapura
5. Cheemsandra

1.1 GLOSSARY AND DEFINITIONS

Landfill site:

A **landfill site** (also known as **dump**, **rubbish dump** or **dumping ground**) is a site for the disposal of waste materials by burial and is the oldest form of waste treatment. Historically, landfills have been the most common methods of organized waste disposal and remain so in many places around the world. Some landfills are also used for waste management purposes, such as the temporary storage, consolidation and transfer, or processing of waste material (sorting, treatment, or recycling). The design, construction, management of the Landfill should be in accordance with the MSW Act 2000.

Bio-mining:

It refers to clearing landfills by converting waste into compost, methane gas, bio-diesel, Refuse Derived Fuel. It involves the segregation of part of a dumpsite to make a landfill, ideally creating as small a 'footprint' as possible. Compostable waste is removed through sieving, and sold for use as soil enriches or for landscaping.

Bio-mining eliminates leachate and landfill gases by performing such “bioreactor” activities above-ground, in the form of bio-treated aerobic windrows for almost total recovery of waste.

Gasification:

It is a process that converts organic or fossil based carbonaceous materials into carbon monoxide, hydrogen and carbon dioxide. This is achieved by reacting the material at high temperatures ($>700^{\circ}\text{C}$), without combustion, with a controlled amount of oxygen and/or steam. The resulting gas mixture is called *syngas* (from *synthesis gas* or *synthetic gas*) or *produce gas* and is itself a fuel. The power derived from gasification and combustion of the resultant gas is considered to be a source of renewable energy if the gasified compounds were obtained from biomass.

The advantage of gasification is that using the syngas is potentially more efficient than direct combustion of the original fuel because it can be combusted at higher temperatures or even in fuel cells, so that the thermodynamic upper limit to the efficiency defined by Carnot's rule is

higher or not applicable. Syngas may be burned directly in gas engines, used to produce methanol and hydrogen, or converted via the Fischer-Tropsch process into synthetic fuel. Gasification can also begin with material which would otherwise have been disposed of such as biodegradable waste.

In addition, the high-temperature process refines out corrosive ash elements such as chloride and potassium, allowing clean gas production from otherwise problematic fuels. Gasification of fossil fuels is currently widely used on industrial scales to generate electricity.

Pyrolysis:

It is a thermo chemical decomposition of organic material at elevated temperatures without the participation of oxygen. It involves the simultaneous change of chemical composition and physical phase, and is irreversible. The word is coined from the Greek-derived elements *pyro* "fire" and *lysis* "separating".

Incineration:

It is the process of combustion of organic material such as waste with energy recovery is the most common Waste to Energy implementation. The method of using incineration to convert municipal solid waste (MSW) to energy is a relatively old method of waste-to-energy production. Incineration generally entails burning an RDF to boil water which powers steam generators that make electric energy to be used in homes and businesses.

One problem associated with incinerating MSW to make electrical energy, is the potential for pollutants to enter the atmosphere with the flue gases from the boiler. These pollutants can be acidic and in the 1980s were reported to cause environmental damage by turning rain into acid rain. Since then, the industry has removed this problem by the use of lime scrubbers and electro-static precipitators on smokestacks.

The limestone mineral used in these scrubbers has a pH of approximately 8 which means it is a base. By passing the smoke through the lime scrubbers, any acids that may be in the smoke are neutralized which prevents the acid from reaching the atmosphere and hurting the environment.

Biomethanization:

The word methanization means the decomposition of organic matters using micro organisms without oxygen or under anaerobic conditions. This process involves the participation of multiple bacteria who will transform together the organic waste in biogas.

The biogas is composed of 2/3 methane CH₄ and around 1/3 of CO₂ and small amount of other gas. The anaerobic bacteria are organisms from the prehistoric period where they developed when the atmosphere on earth didn't have oxygen. The most important part of the energy coming from the decomposition is included in the methane. The bacteria don't have too much energy for their development and reproduction. The methanization in comparison with the compost process won't generate extra heat energy.