

NAWTEC16-1930

POTENTIAL FOR THE FIRST WTE FACILITY IN MUMBAI (BOMBAY) INDIA

Perinaz Bhada

Department of Earth and Environmental Engineering, and Earth Engineering Center, Columbia University,
New York, NY 10027

Nickolas .J. Themelis,

ABSTRACT

The city of Mumbai (Bombay), India is facing a solid waste management crisis. The infrastructure has been unable to keep pace with economic development and population growth, resulting in insufficient collection of municipal solid waste (MSW) and over-burdened dumps. Improper disposal of solid wastes over several decades and open burning of garbage have led to serious environmental pollution and health problems. This study examined the solid waste management process in Mumbai and the potential for implementation of waste-to-energy facilities.

Mumbai's average per capita waste generation rate is 0.18 tonnes per person. Although the reported collection efficiency of MSW is 90%, almost half of the city's 12 million people live in slums, some of which do not have access to solid waste services. The most pressing problem is the acute shortage of space for landfilling. When the present waste dumps were constructed they were at the outskirts of the city, but now they are surrounded by housing colonies, thus exposing millions of people to daily inconveniences such as odors, traffic congestion, and to more serious problems associated with air, land, and water pollution and the spread of diseases from rodents and mosquitoes.

Mumbai is the financial center of India and has the highest potential for energy generation from the controlled combustion of solid wastes. The lower heating value of MSW is estimated in this study to be 9 MJ/kg, which is slightly lower than the average MSW combusted in the E.U. (10 MJ/kg). The land for the first WTE in Mumbai would be provided by the City and there is a market for the electricity generated by the WTE facility. The main problem to overcome is the source of capital since the present "tipping fees" are very low and inadequate to make the operation profitable and thus attract private

investors. Therefore, the only hope is for the local government and one or more philanthropists in Mumbai to team up in financing the first WTE in India as a beacon that improves living conditions in Mumbai, reduces the City's dependence on the import of fossil fuels, and lights the way for other cities in India to follow.

1. Introduction

India is one of the fastest growing economies in the world today. The rapidly expanding economy is already putting a strain on the environment and on the availability of natural resources. Mumbai, the financial and commercial capital of India, is one of the largest cities in the world with approximately 12 million residents (2001 census).¹ [21, 17]

Mumbai has historically been a driver of economic growth not only for the state of Maharashtra, of which it is the capital, but also for the rest of India. The city contributes to approximately 5% of India's GDP. [2] However, it has been estimated that 48.9% to 54.5% of Mumbai's population lives in slums today. [18, 28] Almost six million people live in some 2,000 slums and do not have access to even the most basic services of running water, electricity, sewage disposal, and adequate housing. [34] Economic growth has slowed considerably in Mumbai, affecting the quality of life, standard of services, and the environment. According to an Economist Intelligence Unit Hardship Survey, conducted in 2002 on infrastructure, health and safety, and environment, Mumbai was ranked 124th out of 130 major cities worldwide. [6]

¹ Tokyo is the largest urban metropolitan area in the world, at over 34 million people, while Mumbai ranks fifth. [32] In terms of actual city population, Mumbai ranks first, while Tokyo comes in eighth at over 8 million. [8]