



Investigation and Evaluation of Potential Options to Determine the Methane Gas

Ali Kemal Cakir ^{a*}

^a *Department of Mechanical Engineering, Kastamonu University, Kastamonu, Turkey*

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Abstract

Izmir has been one of the cities in our country which firstly began to implement a regular solid waste disposal system with the operation of Harmandali Landfill Facility in 1992. An important part of municipal solid waste produced in contiguous area of Izmir during the period of 25 years was disposed in this facility in order to minimize any possible problems on health and environment caused from that solid waste. The most important factor for deciding on the energy potential of landfill is the amount of landfill methane gas in the landfill area. There are several approaches used to determine the amount of landfill gas. We used one method (When the facility conditions are taken into account (moisture, waste water, landfill leachate etc.) that it is the most appropriate method) and one Literature-Based Approximate Forecast to determine the amount of the landfill gas in Harmandali Landfill. This method is Multi-Phase method. The main objective of this study is to investigate the use of landfill gas as potential energy and electricity provided from municipal solid waste (domestic, industrial, medical waste and sewage sludge) stored regularly in Harmandali Solid Waste Landfill Area, within the boundaries of the contiguous area of Izmir.

Keywords: Landfill; Solid Waste; Landfill Gas; Methane Gas; Energy Production.

1. Introduction

Energy recovery from waste represents an important way to reduce the amount of electric energy to be produced using fossil fuels, i.e. non-renewable sources of energy. Moreover, the energy recovery practice can present interesting economic revenues [1]. Despite efforts to reduce generation and increase recycling of municipal solid waste (MSW), open dumps and sanitary landfills remain the most common solid waste management approach globally. For instance, in the US, 54% of the generated solid waste was landfilled in 2008 [2]. According to the results of the Municipal Waste Statistics Survey of 2014 applied to municipalities in Turkey, it was determined that 1391 of the 1396 municipalities provide waste services. It was determined that 28 million tons of waste was collected from municipalities providing waste services.

Of the 28 million tones collected in the municipalities where waste collection and transportation services were provided, 63.5% were sent to the sanitary landfill facilities, 35.5% to the municipal rubbish tips, 0.5% to the composting plants and 0.5% have been disposed with different methods [3]. This situation reveals the fact that sufficient infrastructure services are still not available for the disposal of solid wastes. In this context, especially under the name of examination of the disposal methods of solid waste of big cities, the example of İzmir has been the starting point. Within the scope of the study, the options for disposal and assessment of the emerging landfill gas and presentation of the existing conditions related to the formation of landfill gas and the gas collection system were investigated in

* Corresponding author: alikelmalcan@hotmail.com

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