An argument for developing waste-to-energy technologies in Saudi Arabia

ABSTRACT

Municipal Solid Waste (MSW) management is a chronic environmental problem in most of the developing countries, including the Kingdom of Saudi Arabia (KSA). The concept of Waste-to-Energy (WTE) is known as one of the several technologies capable of benefiting a society, which desires to reduce fossil-fuel addiction. Currently, there is no WTE facility existing in the KSA. The MSW is collected and disposed in landfills untreated. A substantial increase in the population by 3.4 %/y over the last 35 y coupled with urbanization and raised living standards have resulted in high generation rate of MSW. In 2014, about 15.3 Mt of MSW was generated in KSA. The food and plastic waste are the two main waste streams, which covers 70 % of the total MSW. The waste is highly organic (up to 72 %) in nature and food waste covers 50.6 % of it. An estimated electricity potential of 2.99 TWh can be generated annually, if all of the food waste is utilized in anaerobic digestion (AD) facilities. Similarly, 1.03 and 1.55 TWh electricity can be produced annually if all of the plastics and other mixed waste are processed in the pyrolysis and refuse derived fuel (RDF) technologies respectively. The aim of this paper is to review the prospective WTE technologies in Saudi Arabia. However, the real selection of the conversion technologies will be done in conjunction with the fieldwork on waste characterization and laboratory examination of selected technologies and further socio-economic and environmental evaluations.