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Investigating waste to energy potential in the eastern region, Saudi Arabia

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Abstract

The Eastern Province of the Kingdom Saudi Arabia is the most important region economically and has a total population of about 6 million. The region witnessed massive socio-economic development over the last four decades which has produced substantial increase in municipal solid waste (MSW) generation and electricity demand. This research assesses the potential value of Waste-to-Energy (WTE) in alleviating the MSW and electricity demand challenges in the region. Two scenarios for WTE deployment were developed and projected up to the year 2035: The first scenario is Mass Burn and the second is Mass Burn with Recycling. The Mass Burn scenario implies complete incineration of the waste stream while Mass Burn with Recycling considers segregation of reusable materials and incinerates the leftover of the waste stream. The annual MSW generation was about 3 million ton/year. The MSW consists of organic food, agriculture and garden waste (48.21%), paper and cardboard (1.03%), plastics (5.8%), glass (6.8%), wood (9.63%) textiles (5.77%) and others (22.31%). The study shows that the Mass Burn scenario has the potential to generate about 272 MW of electricity in 2035, while Mass Burn with Recycling has the potential to generate about 81 MW. The potential electrical generation coupled with the environmental values of the WTE, shows the substantial benefits of WTE facilities to eastern region. The results shall assist the decision makers in the region to deploy WTE facility in the region. Further investigations are recommended to evaluate the two scenarios based on socio-economic, technical, and environmental criteria. © 2014 IEEE.

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