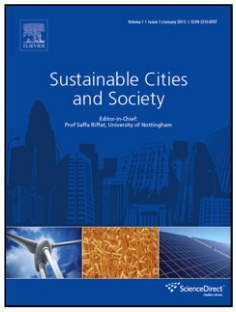

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<AT>Reliability and economic analysis of moving towards wastes to energy recovery based waste less sustainable society in Bangladesh: The case of commercial capital city Chittagong

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<ABS-HEAD>Highlights► Energy recovery from waste has large potential for the waste less sustainable society transition in Bangladesh. ► Bangladesh has discrepancy and shortage of power supply. ► The potential energy that could be produced from Municipal solid wastes in Chittagong Bangladesh range from 110 to 6531 TJ. ► Bangladesh waste management backlog as well as power crisis situation enables introduction of waste to energy (WtE) strategy for the wastes less sustainable urban society transition.

<ABS-HEAD>Abstract

<ABS-P>Rapid increase of waste generation in recent times because of booming economy and rapid urbanization aggravating the environmental and social problems significantly in the developing countries of the world, and is the prime cause of unsustainable society in the developing countries. At the same time, the developed countries are motivating themselves to move towards a sustainable society based on zero wastes strategy, circular economy principles, and waste to energy recovery. Waste to energy (WtE) strategy for MSW management of a city could be a viable option for transition towards sustainable city. WtE not only reduce the land pressure problem in city areas, but also generate electricity and heat. WtE strategy is also in covenant with industrial ecology principle, because waste from urban human living system serve as raw materials for energy generation system. This paper assesses the energy reliability and cost-benefits aspects of utilizing MSW for WtE recovery in the commercial capital city Chittagong of Bangladesh. It also presents a social cost-benefit analysis of selected WtE strategy, and compares with coal-fired power plant. The results indicate that utilizing MSW for electricity generation is socially more cost-effective, and sustainable. The findings show that WtE can be a potential component of transition towards sustainable city area management, and transition towards sustainable urban society in Bangladesh.

<KWD>Keywords: Sustainable waste management; Sustainable city management; Circular economy; and Industrial ecology.

<H1>1. Introduction

Zero waste society represents a society with one hundred percent recycling, and recovery of all possible resources from the waste streams with no harmful wastes disposed to the environment. Zero waste society is a component of the broader concept of eco-city, and a many cities around the world are designed or planned to build eco-city, such as Vauban Freiberg (Germany), Hammarby Sjöstad (Sweden), Masdar City (UAE), Tianjin Eco-City (China) [1]. Rapid population growth and accompanied ongoing booming economy are causing tremendous generation of municipal solid waste (MSW), which is blamed for significant aesthetic and environmental glitches in Bangladesh [2–4]. Bangladesh has enjoyed tremendous growth in its economy over the last few years, resulting into a great influx of village workforce to cities [5–7]. This rapid increase of city area population and affluence causing tremendous increase in MSW generation in the city area of Bangladesh. Moreover, due to low budget of city corporation-the responsible organization for MSW management in Bangladesh; almost 95% of MSW generated