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Analysis of influence factors of municipal solid waste generation in Glasgow: Current status and prospects

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ABSTRACT

The rapid development of the economy and urbanization leads to sharp increases in the generation of municipal solid waste (MSW). MSW can threaten urban ecosystems if not properly managed. The understanding of the influential factors of waste gene generation is essential to developing sustainable waste management plans. It can also provide useful information for the formulation of pollution control policies.

In this work, the autoregressive distributed lag (ARDL) model is used to analyze the impact of economic development (per capita GDP), consumer price index (CPI), and population growth on MSW output (e.g. waste arising per capita) during the period 2004-2020 monthly from Scottish government's statistics data. Furthermore, the study predicts the next decade's potential output based on the 2004-2020 MSW's data in Glasgow, Scotland. Based on the prediction of MSW generation in the coming decades and three types of advanced technologies, i.e. pyrolysis, gasification, and concentrated solar thermal gasification, the waste-to-energy potential is evaluated for Glasgow. The results will help governmental agencies to design measures to address the increasing waste generation effectively.

Keywords: municipal solid waste (MSW); waste management; ARDL model; MSW gasification

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