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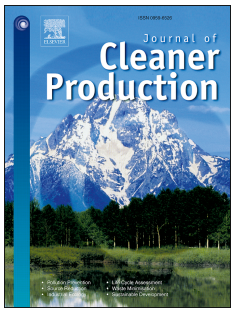

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Potential for energy recovery and greenhouse gas reduction through waste-to-energy technologies

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Abstract

This paper provides a comprehensive analysis of the energy recovery and greenhouse gas (GHG) reduction potentials from solid waste. Based on the current and proposed solid waste management scenarios of Daejeon Metropolitan City in Korea, this study evaluates the energy recovery and GHG reduction potentials of landfill gas recovery, steam heat recovery by incineration, biogas or solid fuel production from organic waste, and solid refuse fuel from solid waste. The results indicate that the energy recovery potential per one ton of waste was largest for solid recovered fuel (SRF) production from municipal solid waste at 2.94 GJ/ton, followed by steam heat generation (2.34 GJ/ton), solid fuel production from sewage sludge (0.77 GJ/ton), biogas production from food waste (0.443 GJ/ton), and landfill gas recovery (0.177 GJ/ton). The energy recovery potentials of all solid waste materials are expected to increase from 252,130 GJ/year in 2012 to 525,540 GJ/ton in 2021. In 2012, GHG reduction by waste-to-energy was 16,061 ton CO_2 eq. /year; it is predicted to be 33,477 ton CO_2 eq. /year in 2021.

Keywords: waste management, renewable energy, municipal solid waste, food waste to energy, sludge to energy