

Economic feasibility and environmental impact analysis of landfill gas to energy technology of municipal solid waste from African urban areas

Dan Cudjoe

Beijing Institute of Technology, China



Abstract

Despite the tireless efforts of authorities to reduce, recycle, and reuse municipal solid waste in Africa, more and more waste still needs to be disposed of in landfills. There are many waste treatment options available, but local conditions should be taken into consideration when making a choice. Waste management options such as incineration may be a better option for waste treatment, but in developing countries, especially in Africa, technical and economic issues are obstacles to large-scale implementation of waste-to-energy projects. Landfill gas to energy could be a potential source of energy in areas like Africa, where there is low energy accessibility. Therefore, the current study analyzes the economic feasibility and environmental impact of electricity recovery from landfill methane in urban areas of Africa. The study used the best data available in literature, namely methane and electricity generation potential from municipal waste disposed of in landfill in 53 urban areas of Africa in 2012. Economic feasibility analysis using net present value and levelized cost of energy methods was carried out. Besides, the environmental impact of landfill gas to energy was analyzed based on global warming and acidification potential. Key findings showed that landfill gas to energy project has positive net present value in all the countries except Sudan, Uganda, Burundi, Tanzania, the Democratic Republic of the Congo, Chad, Guinea, Malawi, and Ethiopia. It was also realized that levelized cost of energy of the project in urban areas of Africa in 2012 was from \$0.076 kWh to \$0.870 kWh. The environmental impact analysis showed that on the average, landfill gas to electricity project could reduce global warming potential by 72.2%. However, it has been observed that electricity generation from landfill methane could increase acid gas emissions from 8.75% to 9.00%.



Biography:

Dan Cudjoe has completed his PhD in Management Science and Engineering from Beijing University of Technology, China. He is currently a postdoctoral research scientist at the Center for Energy and Environmental Policy Research, Beijing Institute of Technology. His research areas are waste-to-energy, energy consumption behavior, municipal solid waste management, and environmental policy. He has published more than 10 papers in reputed journals.

9th World Conference on Climate Change October 12-13, 2020 Zurich, Switzerland

Abstract Citation:

Dan Cudjoe, Economic feasibility and environmental impact analysis of landfill gas to energy technology of municipal solid waste from African urban areas, Climate Change 2020, 9th World Conference on Climate Change Zurich, Switzerland October 12-13, 2020.

<https://climatechange.insightconferences.com/speaker/2020/dan-cudjoe-center-for-energy-and-environmental-policy-research-china>