

## COMPARISON BETWEEN LANDFILL GAS AND WASTE INCINERATION FOR POWER GENERATION IN ASTANA

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### INTRODUCTION.

The population of Astana, Kazakhstan, generates more than 1,100 tons of municipal solid waste daily and they are deposited mostly without preliminary separation or other treatment in open dumps [1]. Rapid growth of Astana population and ineffective waste management leads to the formation of illegal dumping. This leads to deterioration of sanitary and environmental conditions of the city. This project considers the possibility of depositing high organic content waste in engineered landfills or incineration plants for electricity and heat generation purposes. The objective of this research project is to assess and compare the landfill gas (LFG) and waste incineration (WI) solutions in terms of technical, environmental, and economic performance at a pre-feasibility level.

### MATERIALS AND METHODS.

Two technologies, namely LFG and WI are currently being assessed, using RETScreen software, a decision-support tool that allows us to perform comprehensive analysis of the viability of clean energy technologies. The performance of the technologies was compared in terms of technical-economic outcomes and in terms of the net greenhouse gas (GHG) emissions reduction ( $\text{tCO}_2/\text{yr}$ ), Electricity Exported ( $\text{MWh}/\text{yr}$ ), Net Present Value (NPV) and Internal Rate of Return (IRR) [2]. The same amount and quality of feeding municipal waste is used for both technologies in the analysis.

### RESULTS AND DISCUSSION.

Both landfill gas and waste incineration are potentially waste-to-energy solutions which may reduce the GHG emissions and provide income to the municipality. Analyses are currently ongoing and results are expected to provide at a pre-feasibility level, the technology, between the two explored, that is more appropriate and viable to the city of Astana.

A pre-feasibility analysis is currently ongoing and it is expected to provide a good estimate of the potential benefits of these technologies. According these results, further and deeper studies should be conducted at a feasibility level in order to provide an accurate scenario, with minimal risk to the municipality. The inclusion of carbon credits in the project should be evaluated since it would make both options considerably more profitable.

### REFERENCES.

1. EcoIDEA. (2010). Analysis of Solid Waste Management in Astana.
2. S. A. Anaglate, S. Rahmaputro, C. Ruiz, L.R. Rojas-Solórzano. (2012). Comparison between landfill gas and waste incineration for power generation in Accra, Ghana. International Journal of Environmental Science and Engineering Research (IJESER), 3(3): 35-44.