Assessing the Feasibility of Alternative Waste Management Systems: A Comparative Study

1. Introduction

- Solid waste management is a critical issue worldwide due to the rapid increase in population and urbanization, which leads to an alarming increase in waste generation.
- Poor solid waste management practices can have significant environmental and health impacts, including air, water, and soil pollution.

2. Objectives

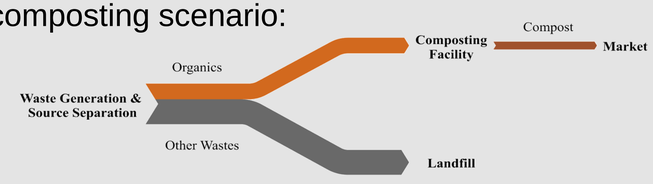
- Assess the economic and environmental viability of two waste management systems, landfilling with RNG and organic composting.
- Provide decision-makers with valuable insights and recommendations that can guide them in selecting the most effective waste management system

3. Waste Management Scenarios

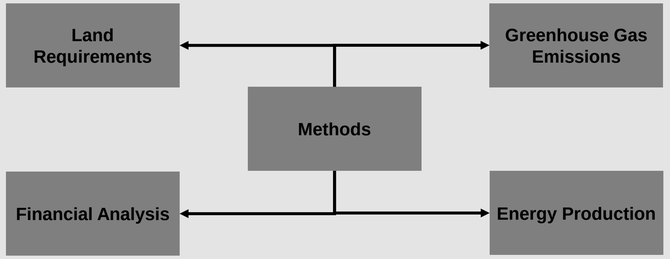
- The county is considering two waste management scenarios:

Landfill with RNG scenario:

Organic composting scenario:



4. Methodology

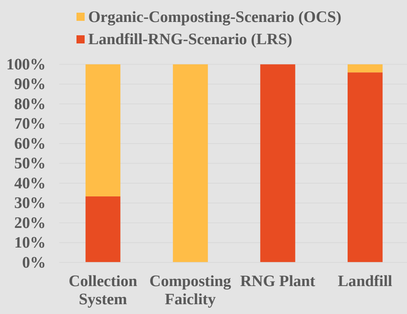


5. Main Results

Parameters	Landfill-RNG Scenario (LRS)	Organic-Composting-Scenario (OCS)
Net Present Value (USD)	1,563,505	269,910,766
Energy Generated (MWh)	87,034,205	-
Land Requirements (m^2)	1,252,072	3,467,569
Greenhouse Gas Emissions (Mg CO2)	864,489	501,263

5. Land Requirement

- The LRS scenario requires considerably less land (1,252,073 m^2) compared to the OCS scenario (3,467,569 m^2) due to the different waste management technologies employed in the scenarios.



8. Conclusions & Recommendations

- The OCS waste management system is recommended for implementation over the LRS due to its higher net present value and lower greenhouse gas emissions.

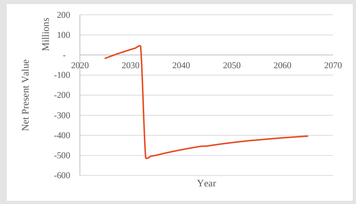
6. Environmental Assessment

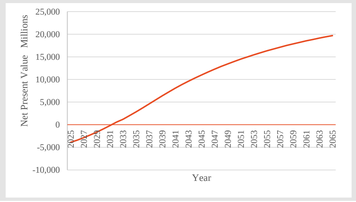
•The GHG emissions of LRS were higher than those of OCS, with 864,489 Mg CO2 for LRS and 501,263 Mg CO2 for OCS.
•The OCS scenario has a lower carbon footprint and is more environmentally friendly compared to the LRS scenario.

7. Financial Analysis

•The LRS scenario is not economically viable in the long term, as it would start losing money by 2032.

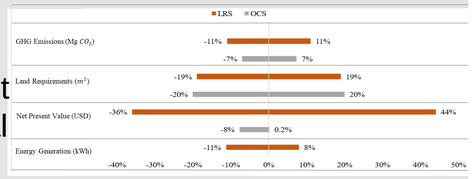
•The OCS scenario is economically feasible in the long term, with a payback period of 2031 and a cumulative NPV of 19 billion USD.





7. Sensitivity Analysis

- The sensitivity analysis indicates that the OCS has more variables to consider but could result in greater environmental benefits.



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