

# Cost Benefit Analysis: Landfill RNG versus SSO Organics Composting

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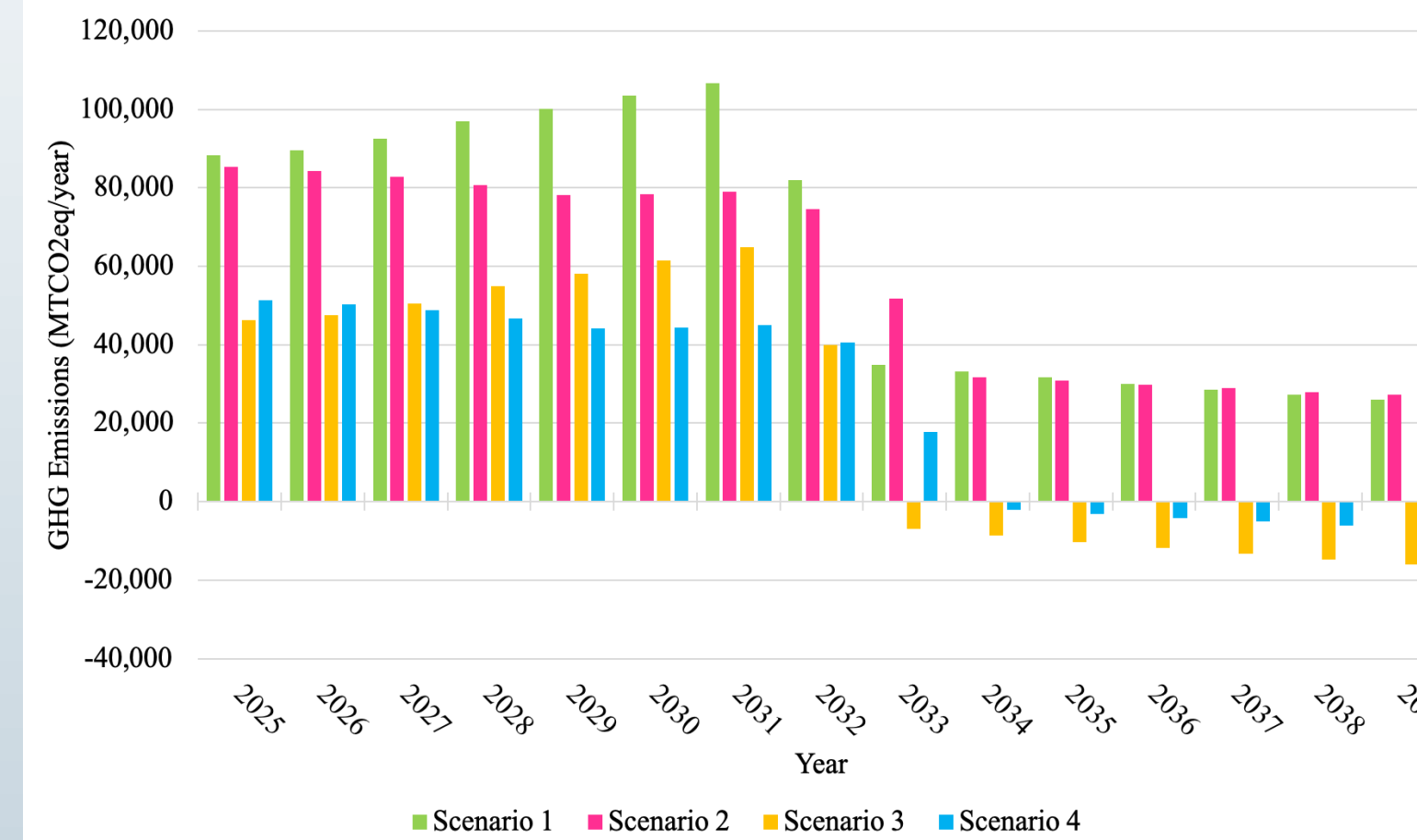
## Project Summary

This project presents the results of a cost-benefit analysis commissioned by a county in the upper Midwest United States (County) to explore new strategies for managing their waste. The County is interested in evaluating the economic, environmental, and social costs of two different waste management strategies: composting source-separated organics (SSO) and/or constructing a facility to produce renewable natural gas (RNG) from landfill gas (LFG). The analysis was conducted for four different scenarios, with each scenario representing a different strategy for organic waste management.



RNG Facility at New River Landfill in Raiford, FL

## Environmental



*Scenario 3* (RNG production) reduces GHG emissions from the County's current waste management operations in *Scenario 1* by 630,000 MTCO<sub>2</sub>eq over the 15-year period of study, the greatest reduction of all scenarios considered. RNG produced from landfill gas is carbon-neutral since the CO<sub>2</sub> was produced from a biogenic source. When used as a vehicle fuel, RNG offsets the use of natural gas, reducing GHG emissions. *Scenario 4* produces slightly more GHG emissions than *Scenario 3*, since the diversion of organics from the landfill generates less LFG for RNG production, and SSO collections and compost facility operations produce additional emissions. *Scenarios 1* and *2* produce the most GHG emissions, and therefore are not favorable from an environmental perspective.



Compost Jax Composting Facility in Jacksonville, FL

## Methods of Analysis

Scenario	Description of Scenario
<i>Scenario 1</i>	No SSO collection; all wastes are disposed of in a landfill equipped with a gas collection and control system (GCCS). This is the baseline.
<i>Scenario 2</i>	SSO Collection and composting of SSO to begin in 2025; residual wastes are disposed of in a landfill equipped with a GCCS
<i>Scenario 3</i>	No SSO collection; the landfill will include an RNG facility in 2025
<i>Scenario 4</i>	SSO collection and composting of SSO to begin in 2025; an RNG facility will also begin operation at the landfill

Four scenarios were developed to evaluate collecting and composting SSO vs converting LFG to RNG. The analysis considers a fifteen-year period from 2025 to 2039, and aims to estimate the economic, environmental, and social impacts of each scenario.

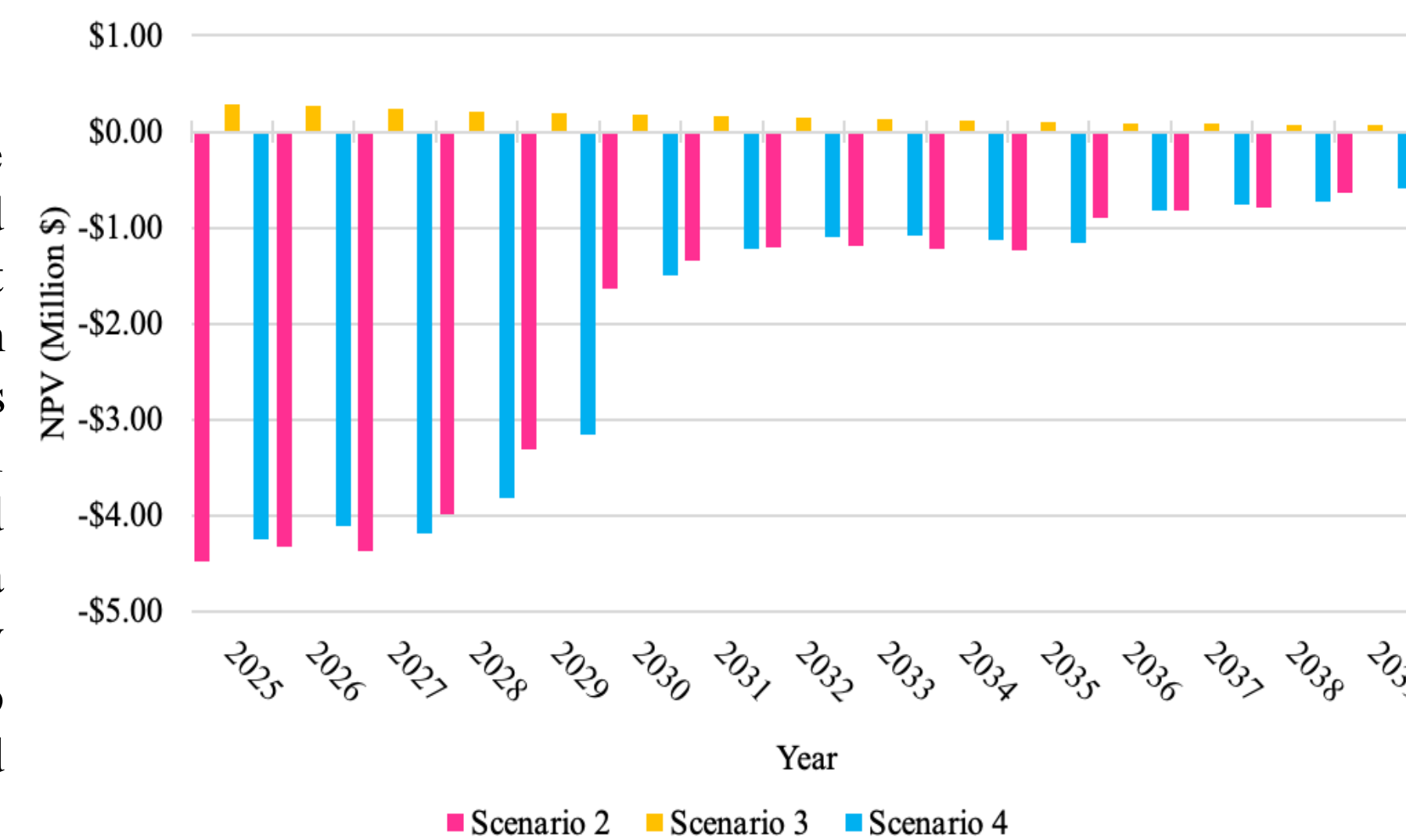
The models LFGcost-Web, OrganEcs, and WARM were used in the analysis, along with an SSO collections model developed by our team. The information included in the models was obtained from data provided by the County, discussions with industry professionals, model documentation, and background research.

## Social

Under current operations, we estimate that 182 jobs are required for waste collection and the operation of the County-owned landfill. Direct and indirect employment opportunities from operating an RNG facility is expected to add approximately 70 new jobs (*Scenarios 3* and *4*). SSO composting is expected to generate 24 jobs through facility operations, and 24 more jobs through SSO collection (*Scenarios 2* and *4*). *Scenario 4* is expected to generate the most jobs compared to all scenarios, since jobs are created through both composting and RNG production.

## Economic

*Scenario 3*, production of RNG, is the only profitable scenario included in the analysis. The County could profit from the sale of LFG to a contractor that produces RNG for vehicle fuel use to benefit from the sale of Renewable Identification Numbers (RINs). Or the County could take on additional economic risk to operate their own RNG facility and recognize greater profits. *Scenarios 2* and *4* have a net cost due to the expenses of implementing a new collection fleet for SSO. If the County were able to reduce the cost of SSO collections, *Scenario 4* could become the most profitable.



## Evaluation and Recommendations

We recommend the County implement an RNG facility at the current landfill (*Scenario 3*). If a contractor were to construct and operate the RNG facility, the County would have limited risk in choosing *Scenario 3*, since the contractor would bear the capital investment and economic risk. However, if the County were to accept more economic risk and operate their own RNG facility, they could recognize greater profits.

Overall, RNG will also result in less disruption to the County's residents compared to the implementation of SSO collections, which would involve a change in waste disposal habits. When considering the economic, environmental, and social impacts of the analyzed scenarios, implementation of an RNG facility is the most attractive option for the County.

## Acknowledgements

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