Economic Analysis of Free Waste Collection System in the City of Ouagadougou

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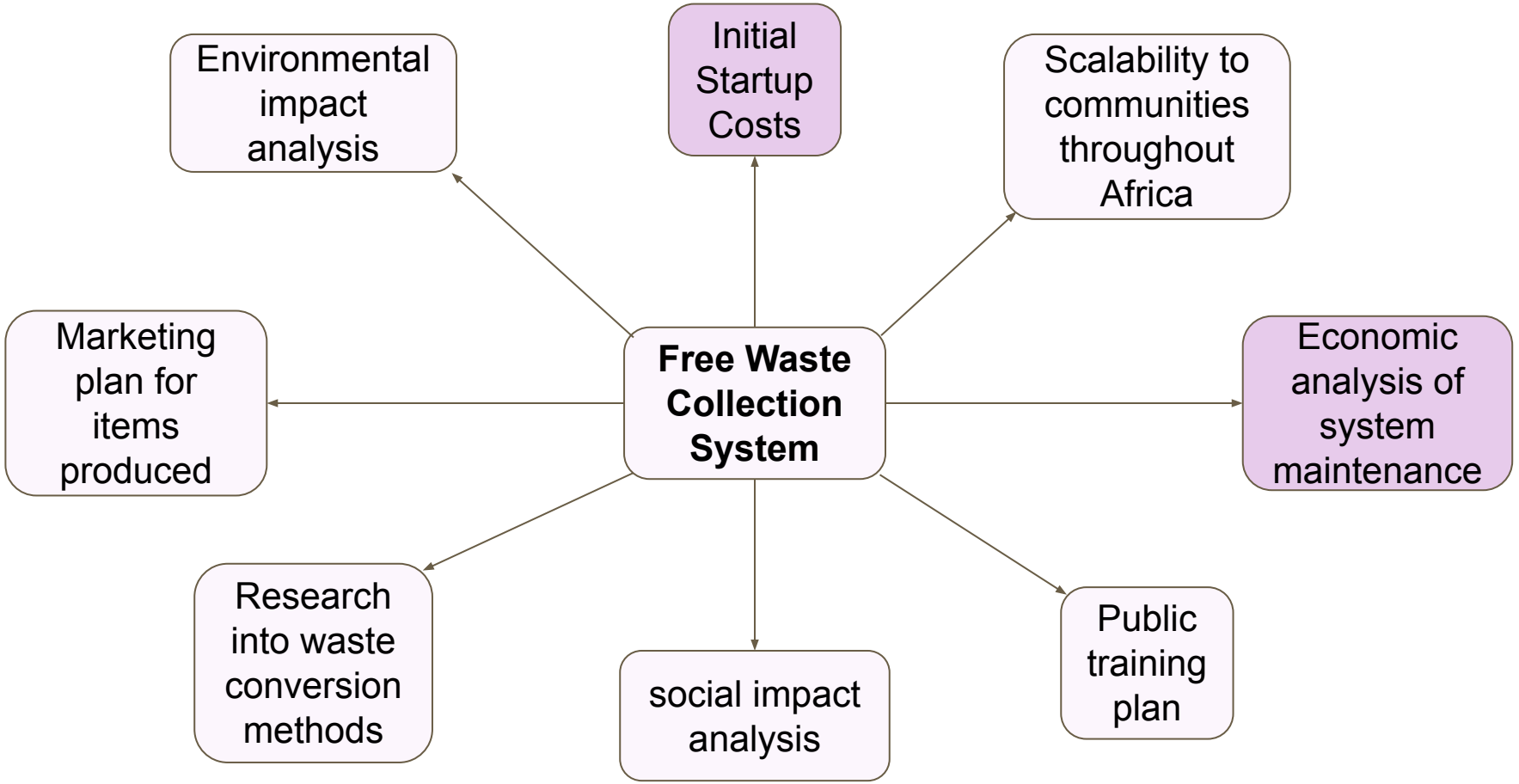
Background

- **Where**: City of Ouagadougou, Burkina Faso
- **Client**: African Network of Engineers for Development (RAID)
- **Problem**: Absence of functional waste management system
    - Damaging environmental, economic and social well being

Project Objectives

- Create a model of startup/maintenance costs
- Identify potential sources of profit from collected waste
- Refine client's business model to be economically feasible
- **GOALS**
  - Reduce waste
  - Improve quality of life
  - Stimulate economy

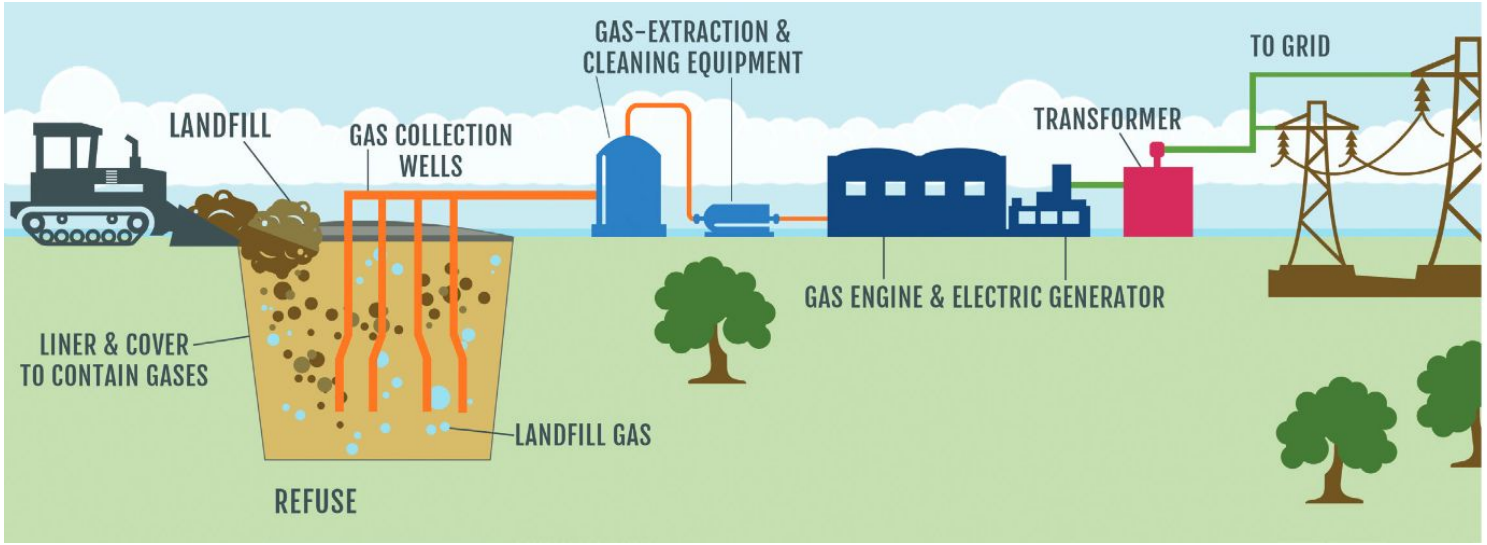

Free Waste Collection System
Initial Startup Costs
Scalability to communities throughout Africa
Economic analysis of system maintenance
Public training plan
social impact analysis
Research into waste conversion methods
Marketing plan for items produced
Environmental impact analysis

Analytical Tools Takeaway:

- Head of environmental department pushing solution to end storm drain pollution
- Government spends thousands to clean waste clogged drain canals
- Current waste collection providers are operating illegally and not always effective

Original client idea: not feasible

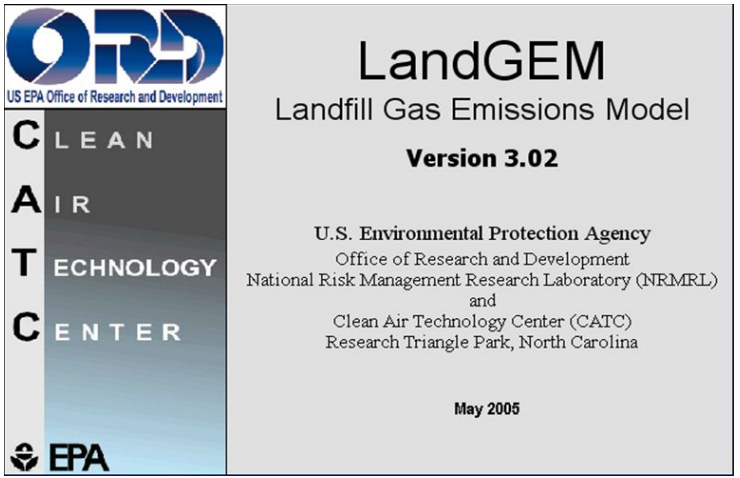
Proposed Energy Recovery Solution:



- Landfill gas collection system requires less expertize than and capital cost versus biodigester system
- Much larger amount of waste can be processed

Key assumptions for economic analysis

- Waste generation rates and waste composition by Client
- The age of a landfill gas-to-energy project is assumed at 10 years
- Landfill gas generation potential estimated by LandGEM model (US EPA)
- 3 kg of recycled plastic to produce one brick



Excluded from economic analysis

- Capital investment of existing waste management facilities
- Country-specific landfill set up operational expenses
- Profit from textiles as difficult to quantify variable

Moving towards “greener” waste collection

Proposed Waste Collection Vehicles

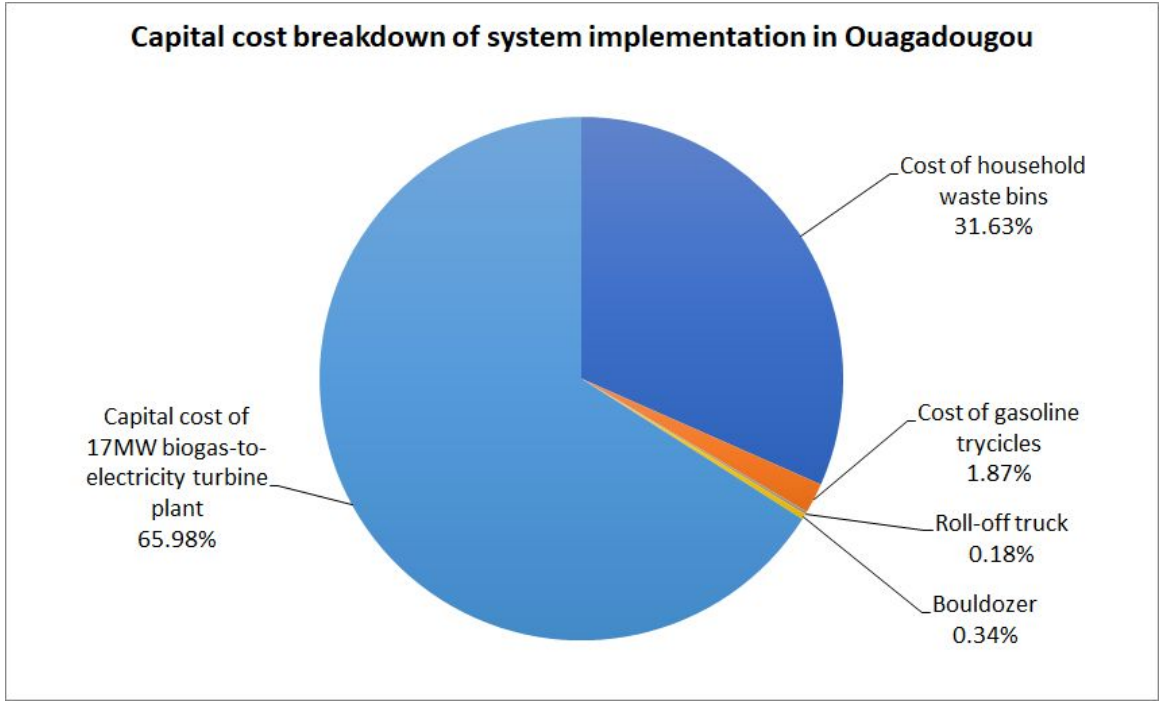
Client option - gasoline

Suggested - All-Electric

Capital Cost Estimation

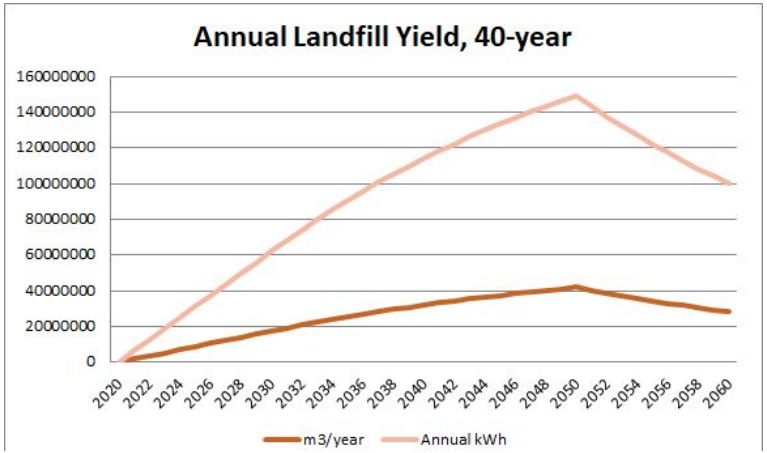
Total cost of system implementation in Ouagadougou, mln $	22.13
Total cost of system implementation with electric transport, mln $	23.37
Difference in capital cost for Electric collection over Gasoline, %	5.6
System revenue over 30-year horizon, mln $	283.0
System revenue over 30-year horizon, with electric transport, mln $	295.3

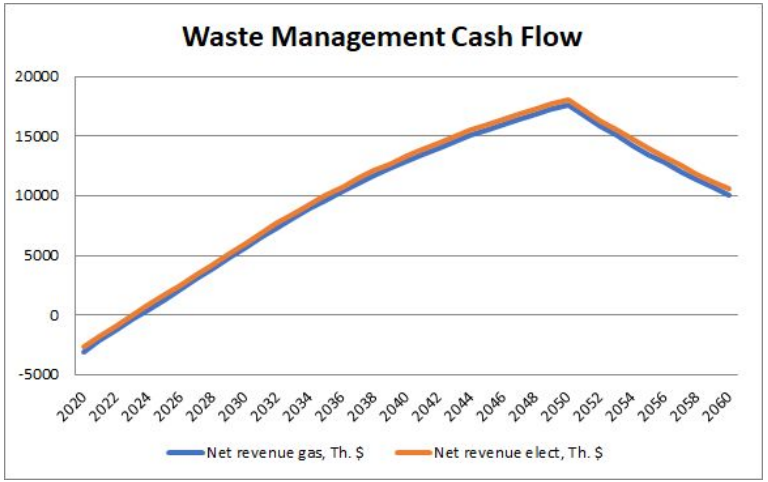
Capital Cost Breakdown



Results

- Both collection systems turn profitable on the 4th year of operation.
- 9 years to recover capital cost with electric waste collection
- 10 years to recover capital cost with gasoline waste collection
- Estimated 1270 new full-time jobs





Recommendations

- Should not continue into D-lab two
- Next step: client conduct small scale feasibility study in a sector of city
- Take findings from study and economic analysis to get grant
- System will be financially sustainable after 4th year of landfill operation

References

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