Part 4: Financing Options

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Outline

- Introduction
- Financing Considerations
- Project Costs
- Project Revenues
- Project Financing
- Risk Management
- Summary
Introduction

- Ideally, Landfill gas projects should be economically sustainable
- Landfill gas projects may require investment or funding support from third parties
- Landfill gas projects have an additional benefit... consideration of “non-price” factors such as environmental benefits to justify project economics
Financing Considerations

- Landfill gas project financing considerations
  - Planning Period
  - Financial Assessment Criteria
  - Project Quantities
Planning Period

- 15-years is typical for landfill gas projects
- Shorter planning period for small and closed landfills
- Longer planning period for larger operational sites
Financial Assessment Criteria

- **Three main techniques for determining economic feasibility of LFG TE projects**
  - Payback Method
  - Discounted Cash Flow Method (NPV)
  - Internal Rate of Return Method (IRR)

- **Sensitivity analyses should be carried out to examine impacts of changes in project conditions**
Project Quantities

Establish project quantities on an annual basis by looking at

- Landfill Gas as Recovery Rate
  - Estimate rate annually
  - Estimate rate over the life of the project

- Landfill Gas as Utilization Rate
  - Estimate annually and over the life of the project
  - Plant capacity
  - On-line availability
Project Quantities

Project Quantities can also be determined by

- Emission Reductions
  - Can be calculated annually and over the life of the project
    - LFG utilization
    - LFG flaring
    - Report in terms of CO₂ or CO₂ equivalent

- Carbon Abatement
  - Calculate additional emission reductions benefits from the LFGTE project due to displacement of fossil fuels
    - Oil
    - Naturalgas
    - Coal
Project Costs

- Capital costs
  - Landfill Improvements
  - LFG Collection System
  - LFG Utilization System

- Operation and Maintenance Costs

- Other Project Costs
  - Permitting Fees
  - Consultants
Landfill Improvements

- Additional financial resources may be required to improve a landfill before a landfill gas project can proceed
  - Revising waste placement practices
  - Installing landfill capping
  - Improving storm water control
  - Controlling and managing leachate
  - Increasing slope stability
  - Providing adequate site access
LFG Collection/Control System

- Capital costs may include:
  - Vertical extraction wells
  - Horizontal collectors
  - Other collection points
  - Laterals and headers
  - Condensate system
  - Blower/flare station
  - Monitoring system

- Labor and other direct costs associated with operating and maintaining the LFG recovery system (typically approximately 10% of LFG system capital cost on an annual basis)
LFG Utilization System

- Capital costs may include
  - Power plant
  - Electrical interconnect
  - Pipeline
  - Equipment conversion
  - Utilities (water, sewer)
  - Offices
  - Equipment storage
  - Maintenance areas

- Labor and other direct costs associated with operating and maintaining the system

- Costs depend on utilization option and equipment selected
Other Project Costs

- Other project costs may include:
  - System design
  - Legal
  - Royalty payments
  - Financing
Project Revenues

- **Energy Sales**
  - Plant capacity
  - Plant on-line availability
  - Energy price/contract

- **Incentive Programs**
  - Tax credits
  - Incentives that promote development of renewable energy sources
  - Grants/Loans

- **Emission Reduction Credits**
  - Additional revenue possible if an international market for emission reduction credits emerges
Project Financing

- Local Financing
  - Partnering with Local Organizations
  - In-Country Assistance

- International Financing Organizations
Local Financing

- Financing for landfill gas projects may be available through:
  - Local Organizations
  - Municipalities
  - Private Companies
  - Lending Institutions
- In-country assistance programs supporting
  - Energy Policy
  - Environmental Protection
  - Development of New Technologies
International Financing

Financing may also be able available from International organizations including:

- World Bank
- Multilateral Development Banks
- U.S. Government Agency Programs
- U.S. Initiative on Joint Implementation
- United Nations
How To Obtain Funding

• Review types of assistance available
  - Grants
  - Loans
  - Loan Guarantees
  - Venture Capital Funds
  - Business Consulting Services

• Identify Funding Requirements
  - Program Objectives
  - Resource Allocation

• Select Sources of Funding
Project Risks: Technical

Main Risk:
- Quantity of organic waste
- Landfill stability
- Recovery of methane
- Performance of the utilization system

Mitigation Measures:
- Focus on larger landfills
- Assessment and analysis
- Verify Landfill gas recovery rates
- Use of proven technologies
Project Risks: Financial

Main Risk:
- Project revenue shortfall
- Availability of funding
- Project implementation and operation

Mitigation Measures:
- Obtain a long-term energy contract
- Involve project stakeholders
- Obtain technical support and training
Summary

- Landfill gas projects can provide a cost-effective means of controlling methane emissions from landfills.
- Project revenue is primarily derived from the sale of recovered energy.
- May earn additional revenue from incentive programs or emission reduction credits.
A sound project development strategy is important and should include:

- Capital costs
- Potential revenue; and
- Identification and mitigation of technical and financial risks

A number of options may be available for additional project financing:

- Think creatively
- Apply for assistance