

# *Assessment Process for International Landfills*

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# Presentation Outline

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- **Factors affecting a site's potential for landfill gas utilization**
- **Which disposal sites are ideal for landfill gas utilization projects**
- **5 Step Assessment Process**
- **Conclusions**

# Potential Landfill Gas Project Sites

- **Factors affecting a site's potential for landfill gas utilization**
  - Site location
  - Waste quantity and composition
  - Waste disposal rates: past and future
  - Climate and moisture
  - Other considerations



# Site Location

- **Site acceptance**
  - Landfill gas utilization project is to be accepted by the local government and community



# Waste Disposal Rates

- **Waste quantity**
  - >0.3 million metric tons of waste in place and >0.5 million metric tons capacity
- **Waste composition**
  - Higher organic waste % = higher methane production
- **Waste age**
  - Older waste produces less methane



# Site Conditions

- **Status of Landfill Operation**
  - Open or recently closed
- **Landfill Type**
  - Managed Landfills
    - daily cover
    - compaction
    - final cover
  - Open Dumps
    - present challenges
- **Landfill Depth**
  - Greater than 10 meters is optimal



# Climate and Moisture Levels

- **Climate**
  - High rainfall contributes to rapid waste decay
- **Management of Moisture in the Landfill**
  - Leachate management
  - Landfill stability



# Other Considerations

- **Geology/  
Hydrogeology**
  - Presence of liner and/or clay soils beneath site
- **Temperature**
  - Methane production is maximized between 35-57 degrees Celsius
- **Other factors:**
  - Landfill design
  - Site-specific factors





# LMOP's 5-Step International Landfill Assessment Process

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- Collect written information via landfill profile forms and phone calls
- Prioritize best candidate landfills for site visit
- Conduct initial site visit – **a critical step**
- Select a subset of sites to conduct pump test and/or detailed pre-feasibility study
- Prepare LFG assessment report or pre-feasibility study

**Engage stakeholders throughout the process!**

# Before the Site Visit

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- Stakeholder engagement
  - Outline purpose and goals of the project
  - Manage and clearly communicate roles, expectations, project deliverables, and schedule
- Site visit preparation
  - Before visit, meet with officials to outline site visit activities (presentation, meetings, walking the landfill, gas analyses and equipment, photos, safety)

# What to Evaluate During the Site Visit?

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- **Landfill Conditions**
- **Landfill Operations**
- **Political and Institutional Constraints**

# What to Evaluate During the Site Visit: Subsurface Fires



# What to Evaluate During the Site Visit: Steepness of Slopes



# What to Evaluate During the Site Visit: Leachate Management



# What to Evaluate During the Site Visit: Waste Diversion



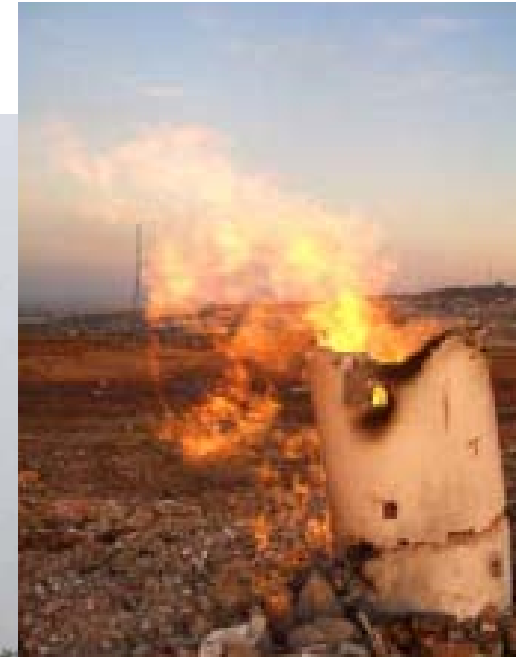
# What to Evaluate During the Site Visit: Waste Exposure, Cap and Cover





# What to Evaluate During the Site Visit: Existing LFG System (if any)

- Design and operation of any existing gas wells
- Gas rights
  - Existing contracts
  - Ownership of landfill and authority to sign contracts for gas collection and use



# What to Evaluate During the Site Visit: Energy Potential

- Nearby energy users
- Interaction and interests of stakeholders
- Local information affecting LFGE feasibility
  - Energy prices
  - Incentives for renewable energy
  - Local project costs
  - Energy demands



# LMOP Assessments: Next Steps

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- Apply pump test results to region and country-specific LFG models
  - Model parameters can be adjusted so that projected recovery matches pump test results
- Train landfill owners/operators and other stakeholders on how to use and interpret model results
- Train landfill owners/operators on O&M best practices to improve gas recovery
  - Daily cover, size of working face
  - Compaction
  - Preventing and extinguishing landfill fires
- Identify types of energy end-users commonly located near landfills
  - Cement plants
  - Waste incinerators

# Conclusions

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- The nearly 70 landfill assessments in 14 Partner Countries provided an opportunity to gather data on landfill design, waste characteristics, site operations, and political and institutional factors such as energy pricing and regulation.
- These data are starting to help craft regionally-specific gas models and parameters, which provide calibrated predictions of gas recovery, instead of using defaults from models designed for U.S. or European landfills.
- These data also helped identify types of energy end-users that were commonly located near the landfills such power generation, waste incinerators, and cement plants.

# For More Information

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