



**Methane to Markets**

***Partnership in Action***

***Landfill Biogas Project  
Support in Ecuador***

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# Objectives



- **Opportunity**
  - Technical assessments & pre-feasibility studies of selected disposal sites
  - Financial impacts and opportunities
- **Knowledge**
  - Disseminate understanding of the potential for landfill biogas capture and use
  - Local and practical training (capacity building)
- **Tools**
  - Development of an Ecuador specific Landfill Biogas Model
- **Benefits**
  - Local and global environmental benefits through development of a landfill gas projects and industry
  - Social through skills transfer
  - Economic



# Opportunity

## *Stage 1: Assessment Studies*



### ● Objectives of Landfill Biogas Assessment Study:

- Evaluate technical feasibility of landfill biogas capture and use project
- Estimate potential greenhouse gas emission reductions from the project – destruction of landfill methane – and other local air pollutants
- Identify opportunities and constraints
- Recommendations for optimizing biogas collection



# Opportunity

## *Stage 1: Assessment Studies*



- **Five Landfills have been selected**
  - Chabay Landfill, Azogues
  - El Valle Landfill, Cuenca
  - Pichacay Landfill, Cuenca
  - Municipal Landfill of Loja
  - Las Iguanas Landfill, Guayaquil
- **Site Visits took place between 23rd and 28th October**



# Opportunity

## *Stage 2: Pre-feasibility Study*



- **Select the two best sites from the Assessment Studies for Pre-feasibility Study;**
- **Pump test**
  - Purpose is to evaluate biogas extraction rates using partial collection system
  - Extrapolate LFG flows to entire waste volume to estimate current biogas recovery rates from site
  - Results can be used to adjust model estimates
  - Provides useful experience operating system at site – indicates extent of potential problems with drilling operations and leachate



# Opportunity

## *Stage 2: Pre-feasibility Study*



### ● **The pre-feasibility study will provide:**

- Identification of technical constraints for extraction of biogas from the site.
- Allow extrapolation of results to whole site.
- Provide an estimate of the installation and operation costs of gas collection for the site.
- Estimate the investment returns for the project (NPV & IRR)
- Calibrate model estimates of amount of biogas available for recovery
- Provide input data and experience for the development of an Ecuador Landfill Biogas Model.



# Tools

## *Ecuador Landfill Biogas Model*



- **Develop EPA's first-order decay model – *Ecuador Landfill Biogas Model***
- **Allow site owners to develop**
  - Good estimates of biogas recovery needed to evaluate project design, size, feasibility and economics
  - Adjustment model to account for waste and engineering of the landfill
- **Generate a Landfill Biogas curve**
  - Biogas recovery potential – maximum recoverable amount
  - Estimated limitations of collection system
  - Comparison to project requirements



# Knowledge *Training Program*



- **Basic Landfill Biogas Training**

- Discussion of the results of the Assessment Studies and Pre-feasibility studies
- Use of the Ecuador Landfill Biogas Model
- Open to Municipalities and Stakeholders in Landfill Gas Development in Ecuador





# Knowledge *Reporting*

**Those sites that were not selected for pre-feasibility studies will obtain:**

- **Site Assessment Report**
  - Delivered to each Municipality
- **Training in use of the Ecuador Biogas Model**
  - Available on the M2M and LMOP Web Sites
- **Basic landfill biogas training program**
  - Technical information sharing
- **Public Data**
  - Reports are publicly available
  - Published on the M2M web site
  - First stop for project developers (investment opportunity)





# Benefits



- **The M2M Project Will**

- Allow Municipalities to understand the technical and economic considerations and potential of their sites.
- Encourage political decision makers to advance projects

- **Assist the Development of a Landfill Biogas Industry in Ecuador**

- Study data will assist & encourage developers of landfill biogas projects.

- **Move Towards Operating Projects Which**

- Create local employment and income
- Reduce local pollution and global emissions of greenhouse gases.





# Project Timeline



- **August - September 06: Collect background data**
- **October 06: Assessment Study Visits**
- **November 06: Select sites for pre-feasibility studies (pump test)**
- **November - December 06: Prepare Assessment Reports**
  - **December - January 06: presentation of reports to 4 Municipal Authorities & stakeholders**
- **January - March 07: Design and Implementation of Pump Tests**
- **April - June 07: Prepare report and conclusions and recommendations**
  - **July 07 Seminar on landfill biogas opportunities, including**
    - ◆ Reporting of trial
    - ◆ Basic landfill biogas training course
    - ◆ Presentation of Ecuador Landfill Biogas Model