



UNFCCC Clean Development Mechanism Monitoring Report

Aguascalientes - EcoMethane Landfill Gas to Electricity Project

CDM registration number 0425

Monitoring period 18/10/06 – 07/09/07

Document ID: CDM0425-M2

Date: 17 December 2007

Project background

Aguascalientes - EcoMethane Landfill Gas to Electricity Project has been registered as CDM project by the UNFCCC on 15 July 2006 under reference number 0425.

Further background on this project can be found in the PDD and associated documents, which are available on the UNFCCC website:

<http://cdm.unfccc.int/Projects/DB/DNV-CUK1146574758.66/view.html>

Parties involved are Mexico (Host Country) and the United Kingdom of Great Britain and Northern Ireland (other Parties). The project participants are Biogas Technology S.A de C.V. (project developer in Host Country), Biogas Technology Ltd (project developer in Annex I Country) and EcoSecurities (carbon buyer).

Monitoring background

Basis for the calculation of emission reductions is the monitoring plan in the Project Design Document (PDD). The calculation of emission reduction in the PDD applied methodologies ACM0001 (version 02 of 30/09/05) and AMS-I-D (03/03/06).

Monitoring results

Emission reduction

The calculated emission reductions amount to **102,368 ton CO₂eq.**

Monitoring period covered

This is the second monitoring period. It covers the period 18/10/06 – 07/09/07.

Open issues from previous verifications

The first periodic verification took place over the period 15/07/06 – 17/10/06. The TUEV verification report 851404 of 13/12/06 raised 2 FARs, which are discussed below.

FAR1: correct peak LFG flow values that are attributable to power fluctuations.

Action: Since the system is now working in a steady state conditions, quite rarely this problem has happened again. Special attention has been paid to these values by filtering the data once received and verifying that higher and lower values are realistic.

FAR2: local environmental regulations require that a gas measurement must take place before 06/12/06.

Action: San Nicolas Landfill is recognized by the ISO 14001 for its quality in landfill operations which helps to comply with local regulations. The local authorities' environmental requirements have been met and all documentation is available on site.

Presentation of monitoring results - spreadsheets

All monitoring data have been included in Excel workbooks, (one workbook per flare, with a total of 3 flares involved in the project, one for Cumbres landfill and two for San Nicolas landfill). Each workbook includes:

1. Calculations. Shows the calculation of emission reductions on the basis of raw data. Missing values or corrected values have been colour-coded.
2. Raw data. Contains the raw monitoring data submitted by the project developer.
3. Reference data. A list of the default values and/or values defined in the PDD which are used to calculate emission reductions.

Calculation methodology

Calculation took place in the following steps for the data generated by each of the 3 flares:

1. Landfill gas to flare [LFG flared], methane content [w ch4] and temperature of combustion [T] are recorded every 30 minutes.
2. The LFG flared flow is multiplied with methane content to obtain CH4 flow in Nm³/h if the flare has been operational within specified conditions. Otherwise the CH4 flow is set to zero.
3. The CH4 flow in Nm³/hour is multiplied with the flare efficiency and the methane density in order to calculate the MD_{project}.
4. MD_{reg} is calculated by applying an adjustment factor of 5% to MD_{project}.
5. There was no displacement of power on the grid. EL is therefore zero.
6. Power consumption from the grid was measured by the project developer and the grid company. The values on the monthly electricity invoices were used. The total amount of electricity consumed was multiplied with a grid emission factor of 0.531 tCO₂/MWh.
7. The emission reduction ER has been calculated as $[MD_{project} - MD_{reg}] * 21 - [MWh \text{ power consumption} * \text{grid emission factor}]$.

ANNEX – SUMMARY OF MONITORING RESULTS

| | | | |
|-------------|----------------|------|------------|
| Site | AQUASCALIENTES | from | 10/18/2006 |
| CMD ID | CDM0425 | to | 9/7/2007 |
| Methodology | ACM0001 v2 | days | 325 |

MONITORED DATA

| ID | variable | unit | value | remarks |
|----------------|--|---|------------|---------|
| LFGtotal | Total amount of landfill gas captured | m ³ | 14,399,964 | 1 |
| LFGflare | Amount of landfill gas flared | m ³ | 14,399,964 | 2 |
| LFGelectricity | Amount of landfill gas combusted in power plant | m ³ | - | 3 |
| LFGthermal | Amount of methane combusted in boiler | m ³ | - | 4 |
| FE | Flare efficiency | % | 99.8 | 5 |
| Wch4 | Methane fraction in the landfill gas | m ³ CH ₄ / m ³ LFG | 0.48 | 6 |
| T | Temperature of the landfill gas | °C | N/A | 7 |
| P | Pressure of the landfill gas | Pa | 110,325 | 8 |
| 9 | Total amount of electricity and/or other energy carriers used in the project for gas pumping and heat transport (not derived from the gas) | MWh | 154 | 9 |
| 10 | CO ₂ emission intensity of the electricity and/or other energy carriers in ID 9. | t CO ₂ / MWh | 0.531 | 10 |
| 11 | Regulatory requirements relating to landfill gas projects | Test | OK | 11 |

FIXED PARAMETERS

| ID | variable | unit | value | remarks |
|---------|----------------------------------|--------------------------------------|-----------|---------|
| AF | Adjustment factor | % | 5 | 12 |
| Dch4 | Density of methane | tCH ₄ /m ³ | 0.0007168 | 13 |
| GWP CH4 | Global Warming Potential methane | tCO ₂ eq/tCH ₄ | 21 | 14 |

CALCULATIONS

| ID | variable | unit | value | remarks |
|---------------|--|----------------------|---------|---------|
| MDreg | methane that would have been combusted in absence of project | tCH ₄ | 257 | 15 |
| MDproject | methane combusted/destroyed by project | tCH ₄ | 5,135 | 16 |
| MDflared | methane destroyed by flaring | tCH ₄ | 5,135 | 17 |
| MDthermal | methane destroyed by generation of thermal energy | tCH ₄ | - | 18 |
| MDelectricity | methane destroyed by generation of electricity | tCH ₄ | - | 19 |
| EGi | power import | MWh | 154 | 20 |
| EGe | power export | MWh | - | 21 |
| F | fuel consumption to operate project | t | - | 22 |
| LHV | lower heating value fuel | GJ/t fuel | N/A | 23 |
| EFF | emission factor fuel | tCO ₂ /GJ | N/A | 24 |
| ER | emission reduction by project | tCO ₂ eq | 102,368 | 25 |

REMARKS

- 1 LFGtotal = LFGflare since LFGelectricity and LFGthermal are zero
- 2 Measured in Nm³ with thermal mass flow meter
- 3 There was no power plant operating on site during the monitoring period
- 4 There was no boiler operating on site during the monitoring period
- 5 No methane was detected in the exhaust gas of the flare during any of the quarterly flare tests [detection limit < 0.1% CH₄], a conservative flare efficiency has been applied
- 6 This is the average value for the monitoring period, the actual continuously measured values were used in the calculation of MDflared
- 7 No temperature needs to be measured since a thermal mass flow meter was used, see http://cdm.unfccc.int/UserManagement/FileStorage/AM_CLAR_XURFEX9N1DBCDDWH8IFJ47F4GGRLNZD
- 8 A thermal mass flow meter was used, LFG pressure reading is not used for emission reduction calculation purposes; see http://cdm.unfccc.int/UserManagement/FileStorage/AM_CLAR_XURFEX9N1DBCDDWH8IFJ47F4GGRLNZD
- 9 No power was generated on site
- 10 As per PDD, used for whole crediting period. See http://cdm.unfccc.int/UserManagement/FileStorage/AM_CLAR_4Q0FZJXV2X4M63GBW4FP5AKSYZZUD
- 11 The project complies with all relevant national legislation. No legislation relevant to landfills was introduced during the monitoring period
- 12 As per PDD
- 13 As per PDD
- 14 As per PDD
- 15 MDproject * AF
- 16 MDproject = MDflared, since MDelectricity and MDthermal are zero
- 17 MDflared = LFGflared * Dch4 * Wch4 * FE, calculated from the continuously monitored values of LFG flared and Wch4
- 18 Not applicable
- 19 Not applicable
- 20 From invoices
- 21 Not applicable
- 22 No fossil fuel was combused on site during the monitoring period
- 23 No fossil fuel was combused on site during the monitoring period
- 24 No fossil fuel was combused on site during the monitoring period
- 25 ER = (MDproject - MDreg) * GWP CH4 - power import * CO₂ intensity imported power