MONITORING REPORT FORM (CDM-MR) *
Version 01 - in effect as of: 28/09/2010

CONTENTS

* as contained within the document entitled "Guidelines for completing the monitoring report form (CDM-MR)" (EB 54 meeting report, annex 34).

MONITORING REPORT
Version 1 - 28/12/2011

ESTRE'S Paulínia Landfill Gas Project (EPLGP)
Project 0165
12th monitoring period (01/05/2011 - 30/11/2011)

SECTION A. General description of the project activity

A.1. Brief description of the project activity:

EPLGP is a landfill gas collection and flare project in Brazil. The project's core idea is to avoid methane emissions from the landfill managed by ESTRE in Paulínia municipality.

The project activity comprises the installation of a new active LFG extraction system and flare. The main equipments currently installed in this project activity are:

- 4 blowers;
- 5 flares;
- 2 backup diesel generators;
- Several collection wells, manifolds and transmission pipelines;

See section A.4. for further details on the technology employed.

The project activity construction started in March 2006 and the commissioning date is 14/09/2006. The commissioning date of flare 3 is 18/02/2008 and for flares 4 and 5 is 01/03/2010.

ESTRE's landfill in Paulínia counts on the best management practices for such business. Besides counting on a sorting system for recyclables, where the "dry matter" – recyclable – is sorted by the members of a cooperative, modern engineering has been applied during design, leachate is collected and sent for treatment, and all the pertinent environmental variables are continuously monitored.

The landfill gas was collected only through a passive system, with no systematic and monitored flare. Therefore, an extra-incentive was needed for ESTRE to make additional investments and enhance its landfill gas collection rate and install appropriate facilities to properly flare the methane produced at the site.

Landfill gas generation will be guaranteed throughout EPLGP's lifetime from various strategic aspects CGR Paulínia enjoys:

- CGR Paulínia is located in the metropolitan region of Campinas, which is formed by 18 municipalities, which, in most cases, do not have feasible areas where landfills could be developed. In fact, most of such municipalities are either facing problems regarding their rubbish dumps/landfills capacity or environmental demands by the environmental agency in state of São Paulo (CETESB); requiring the dumps' areas to be recovered and obliging the authorities to find proper destination to the waste generated.
- ESTRE has now 10 municipalities in the region under contract to dispose waste in CGR Paulínia. Considering these clients, as well as the private ones, CGR Paulínia receives around 2.500 tonnes of waste daily. Initially designed to receive 6.5 million tonnes, CGR Paulínia is

now under expansion, with neighbour areas already under ESTRE's ownership. In the end, CGR Paulínia will have received about 16 millions of tonnes.

- CGR Paulínia is strategically located in the metropolitan region of Campinas. Its location favours the landfill as the adequate destination for the municipalities and private clients nearby, as transportation costs are low and therefore make it more feasible to have ESTRE disposing the waste than opening and managing their own landfills. Studies conducted by ESTRE show that landfill development and operation is only feasible for waste disposition rates of at least 500 tonnes of waste per day. And moreover, there are no potential feasible areas for landfill development in the region, as it is highly urbanized and fragile environmental systems are protected by legislation.

EPLGP has a major positive impact towards sustainable development. Firstly, while it is reducing methane emissions that would enhance climate change, it is also minimizing the risk that any explosions happen in the site – even though ESTRE's landfills count on the best engineering and design to avoid accidents. Second, this sort of initiative is still new in Brazil, which means technology transfer will need to be in place for project's implementation and operation. Third, specialized operators will be needed for project operation, which means a positive impact in employment and capacity-building. For all of these facts, it can be clearly seen the project contributes towards sustainable development.

The total emission reductions achieved in this period is 307,836 tCO_2e.

A.2. Project Participants

Name of Party involved (*) ((host) indicates a host Party)	Private and/or public entity(ies) project participants (*) (as applicable)	Kindly indicate if the Party involved wishes to be considered as project participant (Yes/No)
Brazil (host)	• Private entity ESTRE Ambiental S/A.	No
United Kingdom of Great Britain and Northern Ireland	• NATIXIS Environment & Infrastructures • European Carbon Fund	No
Switzerland	• European Carbon Fund	No

(*) In accordance with the CDM modalities and procedures, at the time of making the CDM-PDD public at the stage of validation, a Party involved may or may not have provided its approval. At the time of requesting registration, the approval by the Party(ies) involved is required.

A.3. Location of the project activity:

The project activity takes place in *Centro de Gerenciamento de Resíduos (CGR) Paulínia*, ESTRE's landfill in municipality of Paulínia, around 130 km north of São Paulo city, as shown in figure 7.

The EPLGP is located at Estrada Municipal PLN 190, s/no., Parque da Represa, Paulínia – SP, Brazil (Latitude -22.773506°, Longitude -47.196161°)

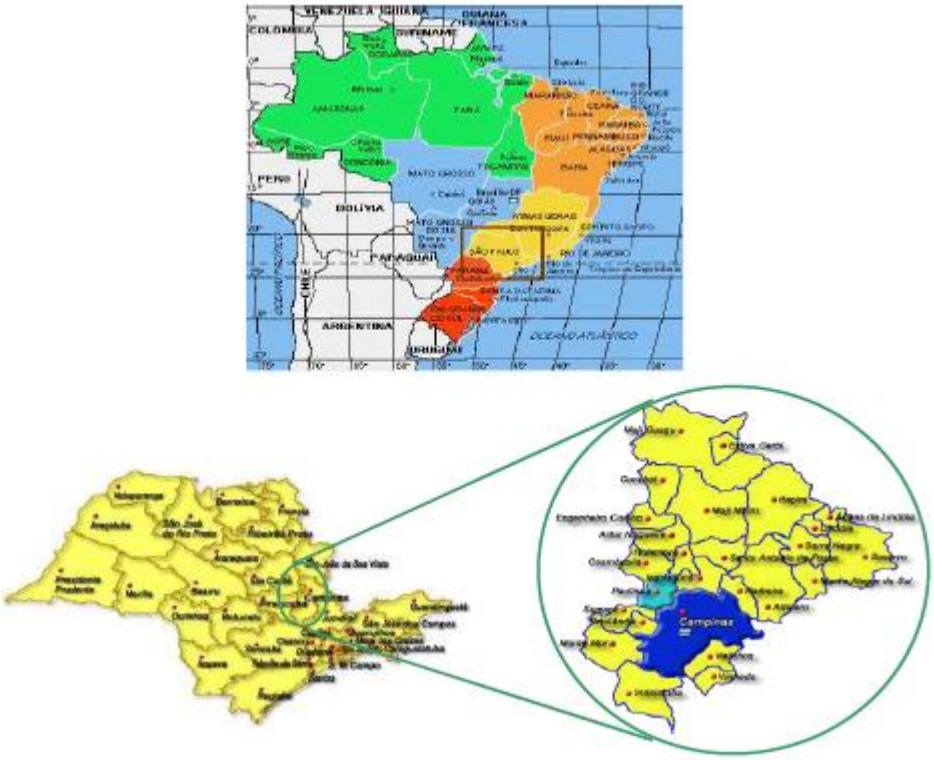


Figure 1 – Paulínia's location

Note: Paulínia is the region appearing in light blue.
Source: SEBRAE-SP[1]

A.4. Technical description of the project

The technology employed is the improvement of landfill gas collection and flaring, through the installation of an active recovery system composed by a collection and transportation pipeline network and a flaring system, as shown in Figure 1.

[1] www.sebraesp.sp.gov.br

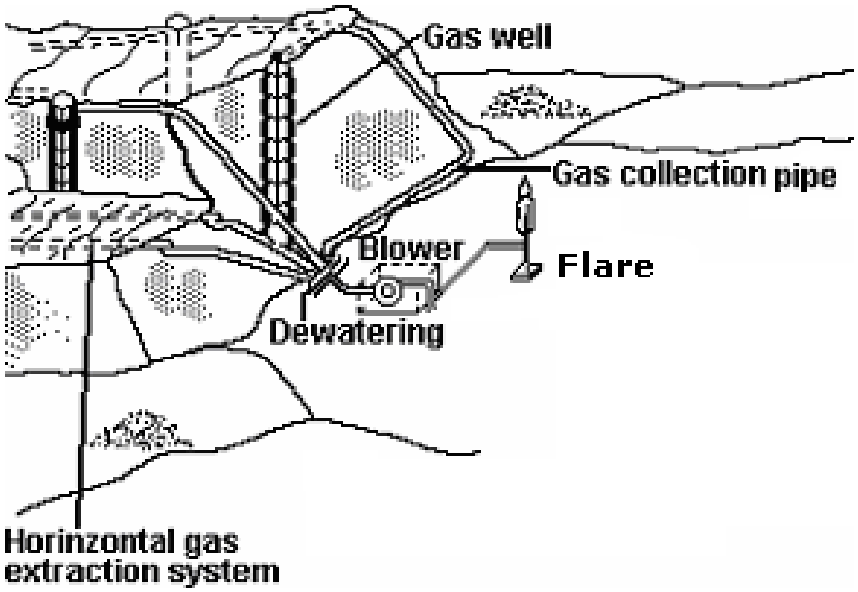


Figure 2 – Schematic situation of a landfill with active gas recovery (Source: WILHELM, 1991)

Following concrete examples from other landfill gas projects in the world, the EPLGP involves the installation of wellheads at the existing concrete wells to avoid the emission of methane to the atmosphere. An example of wellhead and the detail of its construction are shown on Figure 3 and Figure 4.

Figure 3 – Example of wellhead (source: Biogás Ambiental[2])

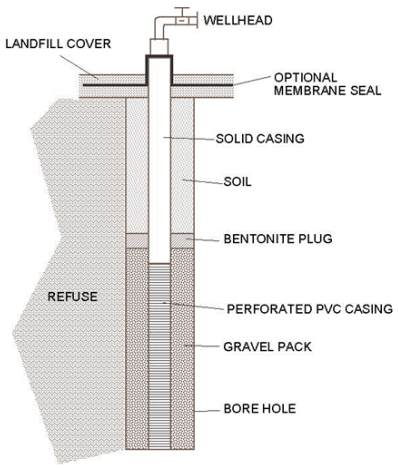


Figure 4 – Internal detail of a well and wellhead

The use of the existing wells represents a distinct advantage since they are already installed and because at that location most of the gas flows to the atmosphere. However, some physical barriers might interrupt the gas flow from the generation point to the well, so new wells might need to be drilled.

[2] Biogás Ambiental: available at <http://www.biogas-ambiental.com.br/instalacaorede.htm>; accessed on Jan 31st, 2006.

A common practice all over the world is to use HDPE equipment. It has the advantage to be more flexible and more resistant to high pressure, if compared to metal or concrete equipment. The disadvantage is represented by the high cost involved. The EPLGP has installed HDPE wells.

The wellheads are connected to a collecting pipeline. This pipeline transports the landfill gas to the manifolds. The manifolds are equipment that can be connected with more than 10 wellheads and transfer the collected gas to the transmission pipeline.

Figure 5 – Example of manifold, connected with the transmission pipeline

The transmission pipeline is the last step of the collecting system. It transports the collected landfill gas to the flare. The transmission pipeline is connected to all manifolds around the landfill.

In order to preserve the operation of the equipment, a dewatering system was installed to remove the condensate.

Figure 6 – Example of a transmission pipeline

The collecting pipeline and the transmission pipeline are both in HDPE, because this material can support high pressures and is flexible. The transmission pipeline is finally connected to the flare.

Figure 7 – Biogas facility (source: ESTRE Ambiental)

The figure below summarizes the project activity:

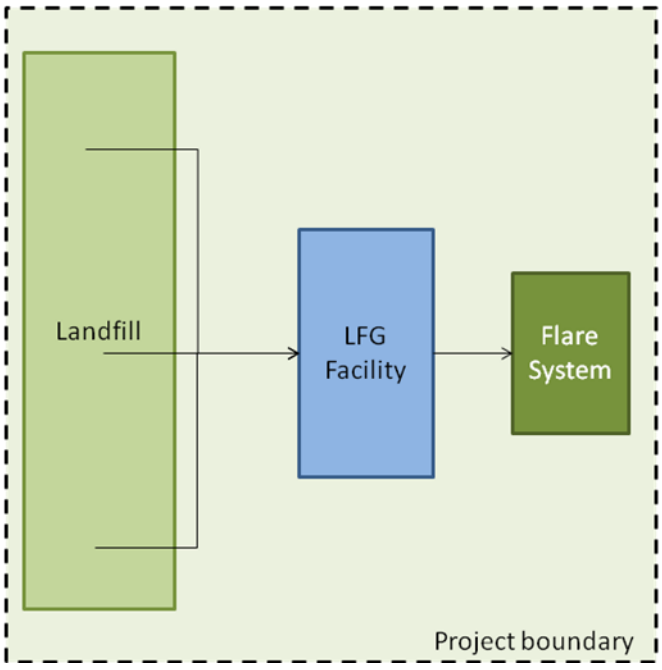


Figure 8 – Project diagram

A.5. Title, reference and version of the baseline and monitoring methodology applied to the project activity:

AM0003 ver.3 – Simplified financial analysis for landfill gas capture projects.

A.6. Registration date of the project activity:

03 March 2006

A.7. Crediting period of the project activity and related information (start date and choice of crediting period):

The renewable crediting period from 01 May 2006 to 30 April 2013, later changed to 14 September 2006 to 13 September 2013.

A.8. Name of responsible person(s)/entity(ies):

This monitoring report was developed and reviewed by:

João Augusto S. Sprovieri
Econergy Brasil Ltda.
Avenida Angélica, 2530 – conjunto 35
São Paulo – SP
Brazil
CEP: 01228-200
Phone: + 55 (11) 3555-5700
Fax: + 55 (11) 3555-5735
http://www.econergy.com.br

Bruno Tyaki de Araújo Caldas
ESTRE Ambiental S/A
Estrada Municipal PLN 190, s/nº
Parque da Represa,
Paulínia – SP
Brazil
CEP: 13140-000.
Phone: +55 (19) 3984-9244
Fax: 55 (19) 3984-9245
http://www.estre.com.br

SECTION B. Implementation of the project activity

B.1. Implementation status of the project activity

EPLGP started its operation in 14 September 2006. During this monitoring period, the project has operated with five flares and four blowers, destroying the LFG collected in only one landfill (ESTRE Paulinia) site.

Flare 1	Manufacturer	Biotecnogás (BTG)
	Commissioning date	14/09/2006
	Model	2000 HT
	Serial number	133/05A
	Year of manufacturing	2006
	Nominal gas flow	2000 Nm^3/h
	Minimum retention time	greater than 0.3 sec
	Oxygen in the exhaust gas	greater than 3%
	Minimum methane content	30% of CH_4

	Minimum efficiency	97%
	Lowest operation temperature	850ºC
Flare 2	Manufacturer	Biotecnogás (BTG)
	Commissioning date	14/09/2006
	Model	2000 HT
	Serial number	133/05B
	Year of manufacturing	2006
	Nominal gas flow	2000 Nm³/h
	Minimum retention time	greater than 0.3 sec
	Oxygen in the exhaust gas	greater than 3%
	Minimum methane content	30% of CH_4
	Minimum efficiency	97%
	Lowest operation temperature	850 °C
Flare 3	Manufacturer	Biotecnogás (BTG)
	Commissioning date	18/02/2008
	Model	2500 HT
	Serial number	110/07-C
	Year of manufacturing	2007
	Nominal gas flow	2500 Nm³/h
	Minimum retention time	greater than 0.3 sec
	Oxygen in the exhaust gas	greater than 3%
	Minimum methane content	30% of CH_4
	Minimum efficiency	97%
	Lowest operation temperature	850 °C
Flare 4	Manufacturer	Biotecnogás (BTG)
	Commissioning date	01/03/2010
	Model	2500 HT
	Serial number	076/09-D
	Year of manufacturing	2009
	Nominal gas flow	2500 Nm³/h
	Minimum retention time	greater than 0.3 sec
	Oxygen in the exhaust gas	greater than 3%
	Minimum methane content	30% of CH_4
	Minimum efficiency	97%
	Lowest operation temperature	850 °C
Flare 5	Manufacturer	Biotecnogás (BTG)
	Commissioning date	01/03/2010
	Model	2500 HT
	Serial number	076/09-E
	Year of manufacturing	2009
	Nominal gas flow	2500 Nm³/h

	Minimum retention time	greater than 0.3 sec
	Oxygen in the exhaust gas	greater than 3%
	Minimum methane content	30% of CH_4
	Minimum efficiency	97%
	Lowest operation temperature	850 °C
Blower 1	Year	2006
	Commissioning date	14/09/2006
	Model	77A1.03
	Serial number	0677A051
	Maximum capacity	5000 Nm³/h
	Manufacturer	Continental Industrie
	Motor Capacity	75kW
Blower 2	Year	2006
	Commissioning date	14/09/2006
	Model	77A1.03
	Serial number	0677A050
	Maximum capacity	5000 Nm³/h
	Manufacturer	Continental Industrie
	Motor Capacity	75kW
Blower 3	Year	2009
	Commissioning date	01/03/2010
	Model	77A1.03
	Serial number	0977A084
	Maximum capacity	5000 Nm³/h
	Manufacturer	Continental Industrie
	Motor Capacity	75kW
Blower 4	Year	2009
	Commissioning date	01/03/2010
	Model	77A1.03
	Serial number	0977A083
	Maximum capacity	5000 Nm³/h
	Manufacturer	Continental Industrie
	Motor Capacity	75kW

Table 1 –Technical details of equipments installed at EPLGP

The system has installed backup diesel generators, to supply electricity for the project in case of power shortage. The specification of these equipments is presented in the table below:

Generator Manufacturer: STEMAC (WEG) Generator Model: GTA Engine Manufacturer: STEMAC (Cummins)	Generator Manufacturer: Heimer Generator Model: 40/41 Serial Number: 9P0263

Engine Model: NTA63 Serial Number: 0450533001 Capacity: 450 kVA Frequency: 60 Hz Tension: 380 V Current: 614 A Year: 10/2001 Commissioning date: 14/09/2006	Capacity: 512 kVA Frequency: 60 Hz Tension: 220V / 380V / 440V Current: 1344 Year: 10/2009 Commissioning date: 19/02/2010

Table 2 - Diesel generators specifications

Most of this monitoring period the system has been in normal operation. There were a few days with relevant down period, as listed below:

No other significant system shutdown happened in this period, and the ones that happened (listed above) have no impact on the methodology applicability.

B.2. Revision of the monitoring plan

A revised monitoring plan was submitted to the UNFCCC, mainly modifying and including the following parameters:

- The version of the monitoring methodology, changed from version 2 to version 3;
- Inclusion of the monitoring of the temperature and pressure of the LFG. Those parameters has been monitored since the project operation started, but were not listed in the monitoring plan;
- Inclusion of the parameter "Total amount electricity used for gas pumping from the diesel fuelled generator" and the emission factor for diesel generation;
- The change of the recording frequency of flare efficiency (exhaust gas analyses) to quarterly instead of semi-annual before;

This revised Monitoring Plan is dated of 09 February 2009 and was approved on 25 April 2009.

A second revision of the monitoring plan, dated of 26/08/2010 was submitted to UNFCCC, requesting the modification of the following parameters:

- Change the flow measurement from m^3 to Nm^3. This means that the new flow meter automatically converts the flow to Nm^3. Consequently it is not needed to monitor the LFG Temperature or Pressure separately;
- Change the electricity data unit from kWh to MWh.

This revision of the monitoring plan was approved on 11/12/2010.

B.3. Request for deviation applied to this monitoring period

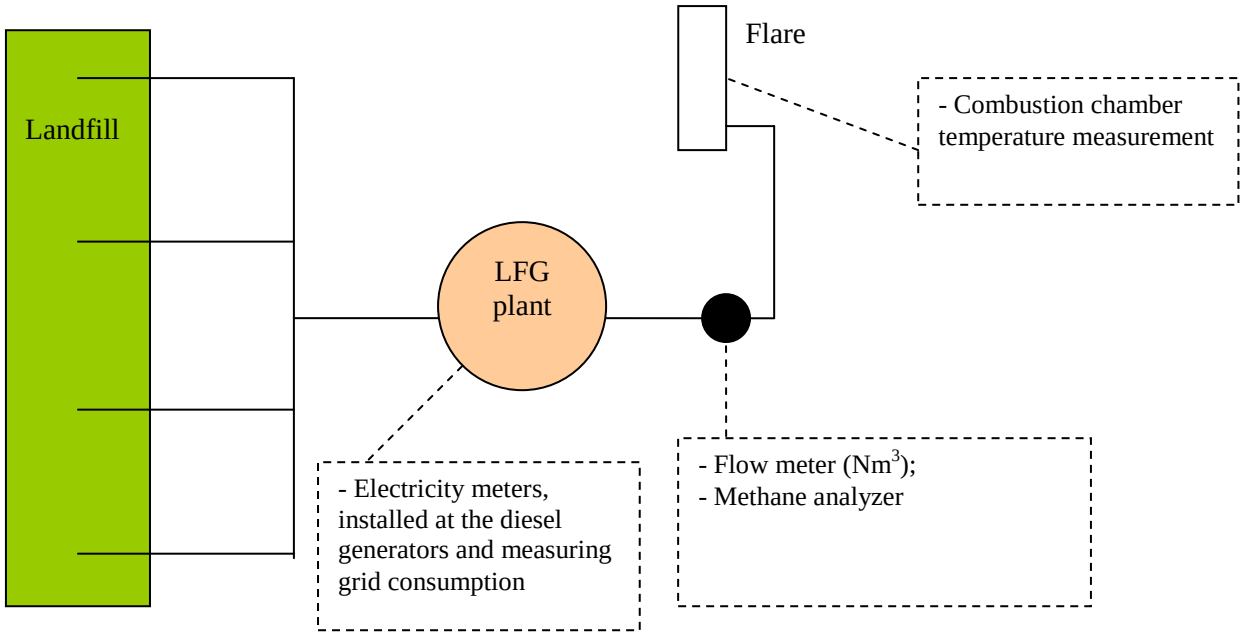
Not applicable.

B.4. Notification or request of approval of changes

A Notification is being made and the Request for submission for issuance of this verification will only happen after approval of that notification.

SECTION C. Description of the monitoring system

The monitoring equipments of the EPLGP and their location are presented in below.



All monitoring instruments were running properly and calibrated during this monitoring period.

The electricity consumption data, flow data, methane (CH_4) content data and flare operational parameter data are measured on-line and hourly compiled in an Excel data sheet. All the data transmission and compilation is made electronically to the calculation spreadsheet.

The methane content of the flare exhaust gas is measured at least quarterly by an independent company specialized in gas analysis. Then the flare efficiency is calculated and this value will be used until the next methane content analysis is conducted.

The Table 3 provides information on the errors and uncertainties of the equipments used in the project.

All data (except the parameters "flare efficiency" and "regulatory requirements") are continuously monitored and every 2 minutes recorded. Besides, once per hour the "hourly report sheet" is generated and once a day the "daily report sheet" is generated.

Type	Manufacturer	Model	Location	Range

Flow Meter[3]	ABB	S-4000	Main pipeline	0 – 20,000 m³/h
Pressure Transmitter	ABB	2600T	Main Pipeline	0.07 kPA – 160 kPA
Temperature Sensor	ABB	TSP321	Main Pipeline	-200°C to 600°C
Electricity meter from the grid	CIBER	UPD200 2480M	Electricity cabin	300V 5A
Electricity meter from the Diesel generation	CIBER	UPD200 2480M	Electricity cabin	300V 5A
Methane content analyzer in the residual gas	SIEMENS	ULTRAMAT 23	Container – analysis room	O_2 0-25% CH_4 0-100%

Table 3 – Monitoring instruments

[3] Using data from temperature sensor and pressure transmitter the flow computer (FCU400G) converts the flow to Nm3.

The errors and uncertainties applied in the relevant monitoring period are presented below:

Measurement equipment of operation data						*From 01/05/2011 to 30/11/2011*	
Data	**Equipment**	**Manufacturer**	**Model**	**Serial Number**	**Last calibration**	**Error (+/-%)**	**Uncertainty**
Total Flow	Flow Meter	ABB	S-4000	240297184/X001	07/02/2011	0.0570	0.0091
Temperature	Temperature Sensor	ABB	TSP 321	210000516854001	07/02/2011	0.0770	0.0720
Pressure	Pressure transmitter	ABB	2600T	6410001002	07/02/2011	0.0000	0.2000
Methane content	Methane analyzer	Siemens	Ultramat 23	N1-U4-0790	11/01/2011	0.4478	0.2478
Methane collected	Flow Computer	ABB	FCU 400-G	31635618	-	0.5000	0.0000
			Total error + uncertainty			0.8947	

Electricity meters						*From 01/02/2011 to 07/02/2011*	
Data	**Equipment**	**Manufacturer**	**Model**	**Serial Number**	**Last calibration**	**Error (+/-%)**	**Uncertainty**
Electricity consumption from the grid	Grid meter	CIBER	UPD200-2480M	40991700175	11/02/2011	0.44	0.046
			Total error + uncertainty			0.4860	

Data	**Equipment**	**Manufacturer**	**Model**	**Serial Number**	**Last calibration**	**Error (+/-%)**	**Uncertainty**
Electricity consumption in the Diesel generators	Medidor-Diesel	CIBER	UPD200-2480M	40962200099	11/02/2011	0.6000	0.0800
			Total error + uncertainty			0.6800	

* as contained within the document entitled "Guidelines for completing the monitoring report form (CDM-MR)" (EB 54 meeting report, annex 34).

Responsibilities and roles:

ESTRE and Econergy are the companies responsible for monitoring and reporting the emissions reductions from EPLGP. The personnel involved with monitoring will be responsible for carrying out the following tasks:

- Supervise and verify metering and recording (ESTRE responsibility): The staff will coordinate internally with other departments to ensure and verify adequate metering and recording of data.
- Collection of additional data (ESTRE responsibility): The staff will collect any data deemed necessary to calculate and report the emission reductions for each monitoring period, such as daily operational reports of project.
- Calibration (ESTRE responsibility): The staff will coordinate internally to ensure that calibration of the metering instruments is carried out in accordance with the equipment manufacturers' specifications. Third parties might be hired to conduct the calibration procedures.
- Preparation of monitoring report (Econergy): The staff will prepare the monitoring report for verification.
- Data Archives (ESTRE / Econergy): The staff will be responsible for keeping all monitoring data, and making it available to the DOE for the verification of the emission reductions.

ESTRE's organizational structure is presented in the figure below:

* as contained within the document entitled "Guidelines for completing the monitoring report form (CDM-MR)" (EB 54 meeting report, annex 34).

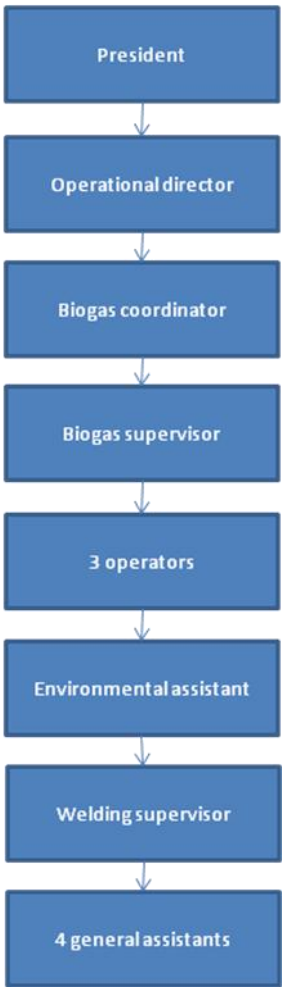


Figure 9. ESTRE's organizational structure

All data (besides the regulatory requirements and flare efficiency) is electronically collected (PLC - Programmable Logic Controller) and archived. A daily back-up of daily and hourly reports occurs to a second, independent server. Besides, daily two hard-disc copies of the reports and daily printouts of the hourly reports and monthly printouts of the daily reports are made.

SECTION D. Data and parameters

D.1. Data and parameters determined at registration and not monitored during the monitoring period, including default values and factors

Data / Parameter:	**EF** (ID 4.1)
Data unit:	tCO_2e/MWh
Description:	CO_2 emission factor of the grid
Source of data used:	ONS
Value(s) :	0.2677
Indicate what the data are used for (Baseline/ Project/	Project emissions

Leakage emission calculations)	
Additional comment:	This emission factor is calculated *ex-ante*.

Data / Parameter:	**EF_{BM}**
Data unit:	tCO_2e/MWh
Description:	Build Margin
Source of data used:	ONS
Value(s) :	0.1045
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Project Emissions
Additional comment:	-

Data / Parameter:	**EF_{OM}**
Data unit:	tCO_2e/MWh
Description:	Operating Margin
Source of data used:	ONS
Value(s) :	0.4310
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Project emissions
Additional comment:	

Data / Parameter:	**EF_{diesel}** (ID 4.2)
Data unit:	tCO_2e/MWh
Description:	CO_2 emission factor of the diesel
Source of data used:	AMS I – D version 13
Value(s) :	0.8
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Project emissions
Additional comment:	This value is used based on the capacity of the diesel generators currently installed 450kVA and 512 kVA (360 kW and 409.6 kW). Required to determine CO_2 emissions from use of electricity from diesel generators to operate the project activity.

Data / Parameter:	**AF**
Data unit:	%
Description:	Methane Destruction in the Baseline
Source of data used:	PDD
Value(s) :	20
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Baseline emissions

Additional comment:	-

Data / Parameter:	**D_{CH4}**
Data unit:	ton/m^3
Description:	Methane density at Standard Temperature and Pressure
Source of data used:	AM0003 version 3
Value(s) :	0.0007168
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Baseline emissions
Additional comment:	STP - 0 degree Celsius and 1.013 bar

Data / Parameter:	**GWP_{CH4}**
Data unit:	tCO_2e/tCH_4
Description:	Methane Global Warming Potential
Source of data used:	UNFCCC website
Value(s) :	21
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Baseline emissions
Additional comment:	Based on 100 years time horizon. Information available at: http://unfccc.int/ghg_data/items/3825.php, accessed on 17/06/2010.

D.2. Data and parameters monitored

Data / Parameter:	**Regulatory requirements relating to landfill gas projects** (ID 11)
Data unit:	N/A
Description:	Legal requirements of methane destruction
Measured /Calculated /Default:	-
Source of data:	National Legislation (through the Green Solution software)
Value(s) of monitored parameter:	N.A.
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Baseline emissions
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	NA
Measuring/ Reading/ Recording frequency:	Required for any changes to the adjustment factor (AF), monitored annually.
Calculation method (if applicable):	NA

QA/QC procedures applied:	NA

Data / Parameter:	**LFG_y** (ID 1)
Data unit:	Nm^3
Description:	Amount of landfill gas collected and sent to flares
Measured /Calculated /Default:	Measured
Source of data:	PLC records
Value(s) of monitored parameter:	See excel calculation tool.
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Baseline emissions
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	**From 01/05/2011 to 30/11/2011** Flow meter: Manufacturer: ABB Model: S-4000 Accuracy class: 0.5% Serial Number: 240297184/X001 Calibration frequency: 3 years Date of last calibration: 07 February 2011 Validity: 06 February 2014 Pressure transmitter: Manufacturer: ABB Model: 2600T Accuracy class: 0.075% Serial Number: 6410001002 Calibration frequency: 3 years Date of last calibration: 07 February 2011 Validity: 06 February 2014 Temperature sensor: Manufacturer: ABB Model: TSP321 Accuracy class: 0.35% Serial Number: 210000516854001 Calibration frequency: 3 years Date of last calibration: 07 February 2011 Validity: 06 February 2014 Flow computer: Manufacturer: ABB Model: FCU 400-G Accuracy class: variable as per the table below

Flow [Nm^3/h]	**Accuracy class**
3,000	1.000%

	6,000 | 0.500% (applicable for this Monitoring Period)[4] 9,000 | 0.333% 12,000 | 0.250% 15,000 | 0.200% Serial number: 31635618 Calibration frequency: Not Applicable, as this equipment only calculates the flow to Nm^3.
Measuring/ Reading/ Recording frequency:	Continuous measurement, end every 2 minutes recording.
Calculation method (if applicable):	NA
QA/QC procedures applied:	The flow meter is subject to regular maintenance (weekly visual inspection and repair, on a need basis) as per PAT 4.4.6-24 procedure which refers to SGA 096 (Programme of preventive maintenance).

Data / Parameter:	$w_{CH4, y}$ (ID 5)
Data unit:	% of volume
Description:	Percentage of methane in biogas
Measured /Calculated /Default:	Measured
Source of data:	PLC records
Value(s) of monitored parameter:	Variable but available in a separate spreadsheet
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Baseline emissions
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	From 01/05/2011 to 30/11/2011 Manufacturer: SIEMENS Model: ULTRAMAT 23 Range: CH4 0-100% Serial Number: N1-U4-0790 Accuracy class: 0.5% Calibration frequency: yearly Date of calibration: 11/01/2011 Validity: 10/01/2012
Measuring/ Reading/ Recording frequency:	Continuous reading and recorded every two minutes.
Calculation method (if applicable):	NA
QA/QC procedures applied:	This meter is subject to regular maintenance (weekly inspection and repair, on a need basis and semi-annual cross-check with standard gas) and annual calibration as per PAT 4.4.6-24 procedure which refer to SGA 096 (Programme of preventive maintenance).

Data / Parameter:	EG_y (ID 3.1)
Data unit:	MWh

[4] Value applicable for this monitoring period, as the flow range was between 6,213 Nm^3/h and 9,067 Nm^3/h (average 8,401 Nm^3/h), and this is the highest, thus more conservative, accuracy value close to this range

Description:	Amount of electricity imported from the grid
Measured /Calculated /Default:	Measured
Source of data:	PLC records
Value(s) of monitored parameter:	Variable but available in a separate spreadsheet
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Leakage
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	From 01/05/2011 to 30/11/2011 Manufacturer: CIBER Model: UPD200-2480M Range: maximum 300V and 5 A; Accuracy class: 0.5%; Serial Number: 40991700175 Calibration frequency: yearly Date of last calibration: 11/02/2011 Validity: 10/02/2012
Measuring/ Reading/ Recording frequency:	Continuous reading and recorded every two minutes.
Calculation method (if applicable):	NA
QA/QC procedures applied:	Calibration is made yearly.

Data / Parameter:	**EG_{diesel}** (ID 3.2)
Data unit:	MWh
Description:	Electricity consumption from the Diesel generator
Measured /Calculated /Default:	Measured
Source of data:	PLC records
Value(s) of monitored parameter:	Variable but available in a separate spreadsheet
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Leakage
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	From 01/05/2011 to 30/11/2011 Manufacturer: CIBER Model: UPD200-2480M Range: maximum 300V and 5 A; Accuracy class: 0.5%; Serial Number: 40962200099 Calibration frequency: yearly Date of last calibration: 11/02/2011 Validity: 10/02/2012
Measuring/ Reading/ Recording frequency:	Continuous reading and recorded every two minutes.
Calculation method (if applicable):	NA

QA/QC procedures applied:	Calibration is made yearly.

Data / Parameter:	**FE** (ID 4)
Data unit:	%
Description:	Flare efficiency
Measured /Calculated /Default:	Measured and calculated
Source of data:	Methane exhaust gas analyses and internal data collection sheets
Value(s) of monitored parameter:	Values applied in each day of the monitoring period are available in a different spreadsheet. However the lowest values of flare efficiencies measured in this period are presented in the table below:

Item	**Lowest flare efficiency measured per flare [%]**		
	Mar/2011	Jun/2011	Set/2011
Flare 1	99.9990	99.9991	99.9983
Flare 2	99.9992	99.9991	99.9991
Flare 3	99.9990	99.9991	99.9986
Flare 4	99.9993	99.9991	99.9991
Flare 5	99.9989	99.9991	99.9991
Lowest flare efficiency by period	99.9989	99.9991	99.9983
Overall lowest flare efficiency	**99.9983**		

Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Baseline emissions
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	The LFG flow meter, w_{CH4} meter are used in this process (please see description above). The methane content in the exhaust gas is measured by a third party company.
Measuring/ Reading/ Recording frequency:	Quarterly
Calculation method (if applicable):	Calculated based on the residual gas flow and methane and oxygen content in the exhaust gas and methane and oxygen content in the residual gas.
QA/QC procedures applied:	Flare efficiency will be checked quarterly.

SECTION E. Emission reductions calculation

E.1. Baseline emissions calculation

The calculation of baseline emission reductions was made using the formulas listed in the following table:

A	Total LFG collected	Nm^3
B	Methane content on LFG	$\%_{methane}$

C = $B \times A$	Methane collected	Nm^3
D =	Flare Efficiency	%
E = C x D	Total methane destroyed	Nm^3
F =	Flow-meter Error	%
G =	Flow-meter Uncertainty	%
H =	Methane analyzer Error	%
I =	Methane analyzer Uncertainty	%
J =	Pressure transmitter Error	%
K =	Pressure transmitter Uncertainty	%
L =	Temperature sensor Error	%
M =	Temperature sensor Uncertainty	%
N = $\sqrt{(F+G)^2+(H+I)^2+(J+K)^2+(L+M)^2}$	Equivalent error of gas measuring equipment	%
O = E . (1-N/100)	Total methane destroyed corrected	Nm^3
P = O . 0.0007168	Total methane destroyed corrected	$t_{methane}$
Q = P . 21	Total CO_2e destroyed	tCO_2e
R =Q . 0.2	Total CO_2e destroyed in the baseline[5]	tCO_2e

All information used in this calculation was made available for the DOE in a separate spreadsheet.

E.2. Project emissions calculation

According to AM0003 – version 03, no project emissions need to be addressed.

E.3. Leakage calculation

S	Total electricity imported	MWh
T	Emission factor of the grid which EPLGP is connected	tCO_2e/MWh
U	Grid electricity meter error	%
V	Grid electricity meter uncertainty	%
W = $\sqrt{(U+V)^2}$	Equivalent error of Grid electricity measuring equipment	%
X = S . T . (1+W/100)	Emissions due to the import of electricity	tCO_2e
Y	Electricity produced by the diesel generators	MWh
Z	Emission factor of the diesel electricity generation	tCO_2e/MWh
AA	Diesel electricity meter error	%
AB	Diesel electricity meter uncertainty	%
AC = $\sqrt{(AA+AB)^2}$	Equivalent error of diesel electricity measuring equipment	%
AD = Y . Z . (1+AC/100)	Emissions due to the production of electricity using diesel	tCO_2e

E.4. Emission reductions calculation / table

[5] During the monitoring period, the Adjustment Factor adopted was 20% (according with AM0003 – version 3) as no obligatory requirement (law/regulation) on LFG destruction was identified in São Paulo State or in Brazil.

The baseline emissions, leakage and emission reductions achieved in this monitoring period are compiled in the Table 4 below:

Q	Total CO2e destroyed	%
R	Total CO2e destroyed in the baseline	%
X	Emissions due to the import of electricity	tCO_2e
AD	Emissions due to the production of electricity using Diesel	tCO_2e
AE = Q – R – X – AD	Emission reductions by the project	tCO_2e

ESTRE Paulinia Landfill Gas Project		
Baseline Emissions	308,063	tCO_2e
Leakage Emissions	222	tCO_2e
Emissions Reductions	307,836	tCO_2e

Table 4 - Emission Reductions achieved

E.5. Comparison of actual emission reductions with estimates in the CDM-PDD

Item	Values applied in ex-ante calculation of the registered CDM-PDD	Actual values reached during the monitoring period
Emission reductions (tCO_2e)	**130,349**[6]	**307,836**

E.6. Remarks on difference from estimated value in the PDD

The CER volume claimed in this report is higher than the estimated in the PDD (before notification). This is caused by an increase of the amount of waste which is received by Estre Paulinia landfill site (up to 5,000 t/day, which is evidenced by the landfill license) compared to the amount used in the baseline emission calculation (2,500 t/day) as well as an improved efficiency of gas extraction.
This increase in the landfill capacity was forecasted in the registered PDD but no details were available at that moment, as the project was in an early stage. At that moment important details such as environmental approvals were still rough estimations. This is the main reason for the difference between the actual emission reductions and the values presented in the PDD.
In addition, the waste disposal rate are not fully under the project participants control, as it is a market parameter and depends on environmental licenses, number of disposal areas available in the relevant region and number of competitors, among others.

The CER volume claimed is 136.16% higher than the estimated in the PDD.

[6] Calculated using the PDD estimation for 2011 (223,368) times the number of days in this monitoring period (213 days) divided by the number of days in the year (365 days).

$$\frac{307,836tCO_2 - 130,349tCO_2}{130,349tCO_2} \times 100 = 136.16\%$$