Monitoring report form (Version 03.2)

Monitoring report

Title of the project activity	Proactiva Tijuquinhas Landfill Gas Capture and Flaring Project
Reference number of the project activity	1506
Version number of the monitoring report	03
Completion date of the monitoring report	29/04/2014 – version 03
Registration date of the project activity	13/08/2008
Monitoring period number and duration of this monitoring period	04 (01/12/2011 – 30/04/2013; 517 days)
Project participant(s)	Proactiva Meio Ambiente – Brasil Proactiva Medio Ambiente Veolia Propreté
Host Party(ies)	Brazil
Sectoral scope(s) and applied methodology(ies)	Sectoral scope 13: Waste handling and disposal Methodology: ACM0001 / Version 05
Estimated amount of GHG emission reductions or net anthropogenic GHG removals by sinks for this monitoring period in the registered PDD	**Registered PDD:** **299,411 tCO_2e** (apportioning PDD annual estimates with effective fraction of time included in the monitoring period: • 31 days in 2011 + 366 days in 2012 resulting in 218,125 tCO_2e over the 1st commitment period • 120 days in 2013 resulting in 81,286 tCO_2e over the 2nd commitment period) **With updated GWP_{CH4} = 25 tCO_2e / tCH_4 for 2nd commitment period (only applied from 1st January 2013 onwards):** **314,964 tCO_2e** (apportioning PDD annual estimates with effective fraction of time included in the monitoring period: • 31 days in 2011 + 366 days in 2012 resulting in 218,125 tCO_2e over the 1st commitment period • 120 days in 2013 resulting in 96,839 tCO_2e over the 2nd commitment period)
Actual GHG emission reductions or net anthropogenic GHG removals by sinks achieved in this monitoring period	**320,505 tCO_2e** divided as:
Actual GHG emission reductions or net anthropogenic GHG removals by sinks achieved during the period up to 31 December 2012 (if applicable)	**233,619 tCO_2e** (with former GWP_{CH4} = 21 tCO_2e / tCH_4)
Actual GHG emission reductions or net anthropogenic GHG removals by sinks achieved during the period from 1 January 2013 onwards (if applicable).	**86,886 tCO_2e** (with updated GWP_{CH4} = 25 tCO_2e / tCH_4)

SECTION A. Description of project activity

A.1. Purpose and general description of project activity

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(a) Purpose of the project activity and the measures taken for GHG emission reductions or net anthropogenic GHG removals by sinks;

Proactiva Tijuquinhas Landfill Gas Capture and Flaring project involves landfill gas capture and flaring at the Tijuquinhas municipal solid waste landfill site in Biguaçu in the state of Santa Catarina in Brazil. The Tijuquinhas Landfill started to receive waste in 1991. The landfill is used for disposal of the waste generated by the one million inhabitants of 22 municipalities in the county of Florianópolis.

The project activity consists in the installation of gas collection and flaring equipment in order to capture and destroy the methane generated by the anaerobic digestion of the municipal solid waste, so that it would not be released to the atmosphere. The resulting reduced emissions of methane to the atmosphere will lead to a significant reduction in greenhouse gas emissions.

(b) Brief description of the installed technology and equipment;

The installed technology and equipment is composed of a Landfill gas network ("LFG Network") and a Landfill Gas Plant ("LFG Plant").

Landfill gas network

The landfill gas network consists of a set of horizontal drains and vertical wells implemented within the waste mass at regular distance (every 10 meters in height for the horizontal drains, on a square mesh of 35 meters per 35 meters for the vertical wells). Horizontal and vertical drainage systems are interconnected to ensure high efficiency and robustness of the gas collection system over landfilling period. They consist of perforated HDPE piping surrounded by gravel or other suitable drainage material. The LFG network operates under negative pressure through the use of centrifugal blowers. The horizontal drains and vertical wells are connected to HDPE main carriers located over the surface which convey the gas to the LFG plant.

Every time it is possible, the condensate is sent back to the landfill by gravity through the existing horizontal drains and vertical wells in order to optimize the landfill gas collection. The remaining condensate is removed at the entrance of the LFG plant by condensate traps. They are sent to the leachate treatment plant.

Blowers and enclosed high efficiency flares

Three centrifugal blowers of 45 kW have been installed but the operation of two of them is sufficient to provide a full gas collection, so that there is always a third spare blower available in case of emergency. They have a pressure head of 230 mbars and are able to deliver the required quantity of landfill gas to the flares. The blowers are responsible for extraction of the landfill gas from the tipping zones to the LFG Plant. Currently, the LFG Plant consists in two (2) enclosed flares of 2000 Nm^3/hour of landfill gas each.

Figure 1: general view of the LFG Plant

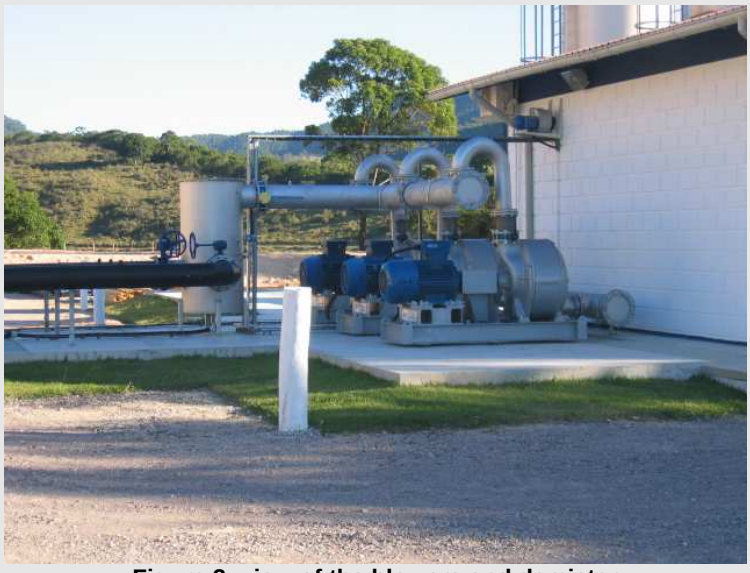

Figure 2: view of the blowers and demister

Controls & Instrumentation

A building for analysis purpose gathers all the instrumentation necessary for gas analysis:
- CH_4, CO_2, O_2 from the captured landfill gas
- CH_4 and O_2 from the exhaust gas of the flares

Apart from CDM monitoring, these instruments are very important for safety, process and operating purposes. The instrumentation installed throughout the facility is connected to a data logger which allows controlling the main parameters of the plant from the control room.

(c) Relevant dates for the project activity (e.g. construction, commissioning, continued operation periods, etc.);

The project activity is implemented on the Tijuquinhas Landfill site, which has been operating since November 1991. Its development can be divided in 2 main phases:

i. Landfill gas network ("LFG Network"),
ii. Blowers and flares plant ("LFG Plant");

Phase i is a continuous task since the gas collection system is implemented as the landfilling is progressing.

Phase ii has been completed in two steps:

- Installation of the first 2000 Nm^3/hr enclosed flare in October 2008.
- Installation of the second 2000 Nm^3/hr enclosed flare in January 2009 to reach the full flaring projected capacity.

The site started to be fully operational 29th October 2008. It corresponds to the takeover of the work by the project participant.

(d) Total GHG emission reductions or net anthropogenic GHG removals by sinks achieved in this monitoring period.

The emission reductions achieved during the 4th Monitoring Period starting the 1st December 2011 at 00:00:00 (Brazilian time, GMT -2) and finishing the 30th April 2013 at 23:59:59 (Brazilian time, GMT -2) are **320,505 tCO_2e**.

A.2. Location of project activity

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(a) Host Party(ies);

Brazil is the Host Party of the project activity.

(b) Region/ State/ Province, etc.;

The project activity is located in the Sate of Santa Catarina, South of Brazil.

(c) City/ Town/ Community, etc.;

The landfill associated with the project activity is located in the municipality of Biguaçu, Brazil, around 30 km northwest of Florianópolis on the continental side of the Santa Catarina coast

(d) Physical/ Geographical location.

The site access is by BR 101, km 177.6. The landfill area is delimited by the following coordinates: 732;734 East and 6970;6972 South. Figure 3 hereafter gives further details about geographical location of the project activity.

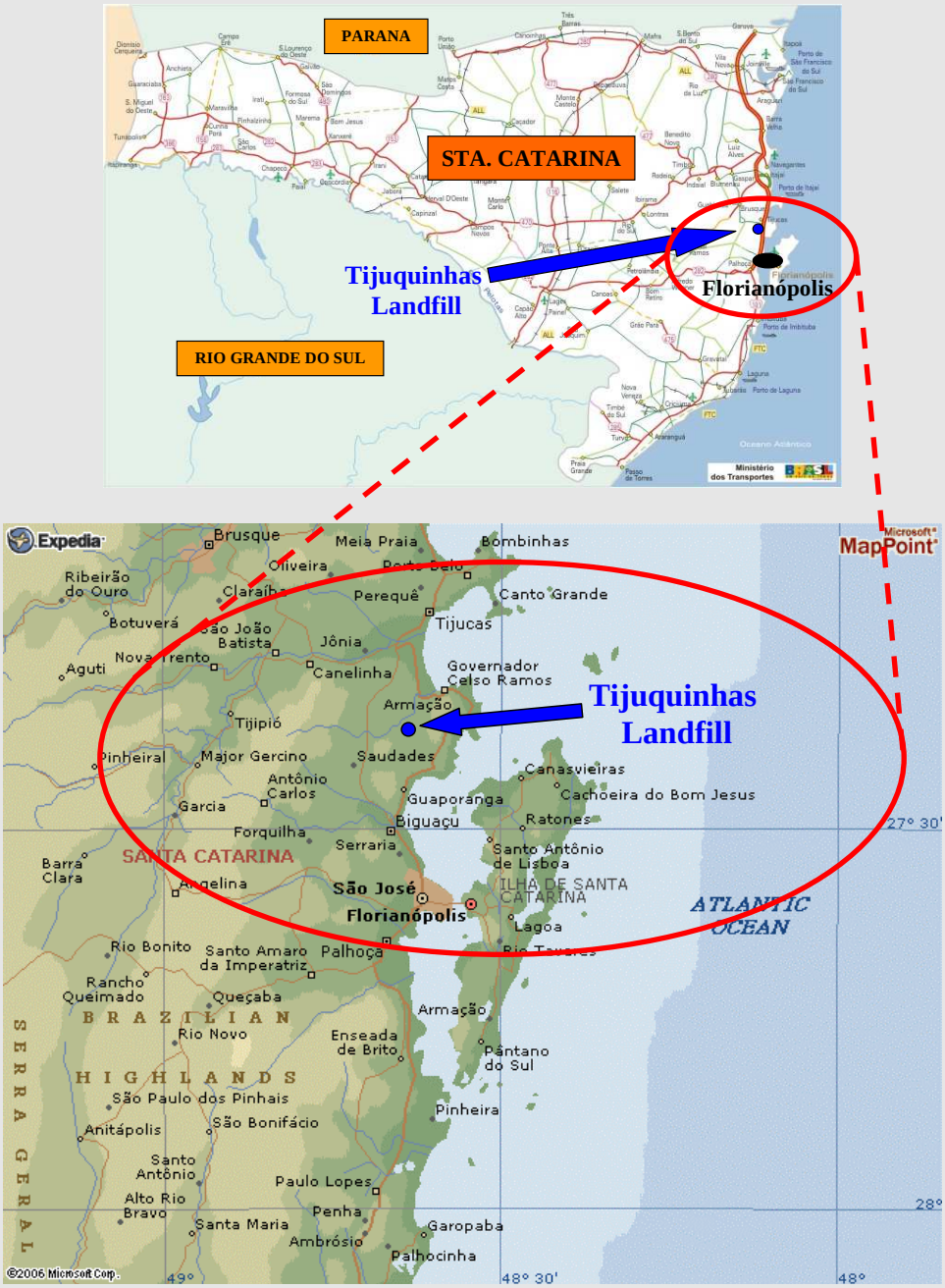

Figure 3: detail on the landfill physical location

A.3. Parties and project participant(s)

Party involved ((host) indicates a host Party)	Private and/or public entity(ies) project participants (as applicable)	Indicate if the Party involved wishes to be considered as project participant (Yes/No)
Brazil (host)	Proactiva Meio Ambiente - Brasil	No
Spain	Proactiva Medio Ambiente	No
France	Veolia Propreté	No

A.4. Reference of applied methodology

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a) Applied methodology(ies)

"Consolidated baseline methodology for landfill gas project activities" – ACM0001 / version 05 is applied to the project activity in conjunction with the "Consolidated monitoring methodology for landfill gas project activities" – ACM0001 / version 05. It is available at:
http://cdm.unfccc.int/filestorage/C/D/M/CDMWF_AM_V66J3B48JSA77ID045VYMSLQX2BGFI/EB28_repan09_ACM0001_ver05.pdf?t=QXl8bW1nMjY3fDAaiD4DAyL4kiuhFUP2H6-t

b) Tools and other methodologies to which the applied methodology(ies) refers

According to the recommendation of ACM0001 / version 05, the following tools were used:

- Version 4 of the "Tool for the demonstration and assessment of additionality" available at:
http://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-01-v4.pdf

- Version 1 of the "Tool to determine project emissions from flaring gases containing methane" available at:
http://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-06-v1.pdf

- Version 1 of the "Tool to calculate baseline, project and/or leakage emissions from electricity consumption" available at:
http://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-05-v1.pdf

A.5. Crediting period of project activity

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The Crediting Period is a 7-years renewable crediting period.
Its start date is 29th October 2008 at 00:00:00 (Brazilian time, GMT -2).
This date has been accepted by the EB on request of the project participants after the project registration.
The start date of the crediting period is associated to the takeover of the equipment by the project participants.

SECTION B. Implementation of project activity

B.1. Description of implemented registered project activity

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Below is a summary of the equipment and technology installed as part of the project activity:

Lateral collection drains

Lateral collection drains are placed at regular distance as landfilling progresses. The horizontal trenches are installed in order to obtain a grid allowing an optimal landfill gas collection rate. They consist of piping surrounded by gravel or other suitable drainage material.

Vertical wells

Vertical wells advanced during filling were used. They consist of cylindrical wire mesh baskets filled with stone and constructed with central HDPE pipe.
Vertical wells are equipped with wellheads that enable monitoring of gas flow and quality. Also valves are provided to allow adjustment of the available vacuum at each well.

Leachate drainage systems

In some cases, leachate can prevent proper collection of landfill gas. Consequently, leachate collection has been improved by enhancing the quality of the drainage layer for the landfilling areas that were prepared after 2008. Since the beginning of 2008, even the leachate drains at the bottom of the cells are equipped

with HDPE pipes in order to improve the velocity of the drainage, so that leachate accumulation within the landfill is reduced and the useful life of the drainage layer is increased. The lateral distance between the leachate drains has been reduced from 50 to 35 meters. The minimum slope for the drains installation has been increased so that the drains remain functional even with the landfill differential settlements. Connections have been systematically realized between the horizontal drainage system and the HDPE vertical gas wells so that the vertical communication between the layers ensures a quick migration of leachate by gravity.

Collection piping
A high-density polyethylene (HDPE) collection piping system is installed to convey the landfill gas from the well network to the blowers and flares system. The layout of the future systems is implemented in order to minimize the low points which could disturb or prevent the gas collection (due to condensate blockages).

Figure 4: view of the main pipes and connection to the horizontal drains

The landfill gas combustion system consists of the following equipment:

Flare facility
The installed flare facility consists of 2 enclosed flare stacks, each providing a retention time above 0.3 second. Flares are temperature controlled, at high temperature above 700°C, in order to assure methane destruction rate close to 100%.

Controls
The flare is equipped with automatic safety and monitoring controls.

Blowers
Three blowers were installed to create the required vacuum in the collection network to extract the LFG. The operation of two of them is sufficient to provide a full collection of the landfill gas. The third one works as a spare part in case of emergency.

Diesel generator
A diesel generator of 113 kW is used as a back-up system to supply electricity to the project in case of power grid failures or other unexpected events related to grid electricity supply. It is also used to substitute grid electricity supply during peak hours. This diesel generator is dedicated to the CDM project. Electricity is supplied either from the grid or from the diesel generator but not simultaneously from both sources. This diesel generator entered in operation on 1st, September 2010.

Key operational dates
The LFG Plant was installed in two steps:

- First step: one flare stack, two blowers and the associated monitoring instrumentation were installed on site in October 2008 to be fully commissioned on the 28th of October 2008. The flare stack 1 treatment process started to be fully operational 29th October 2008. This date corresponds to the

takeover of the work by the project participant.

- Second step: an additional flare stack and blower were installed in January 2009 with the associated monitoring instrumentation and fully commissioned on the 23rd of January 2009. The flare stack 2 treatment process started to be fully operational 24th January 2009.

In the mean time, the landfill gas network was implemented in the Zones 1, 2, 3-A, 3-B and 3-C of the landfill as described in the figure and schedule below.

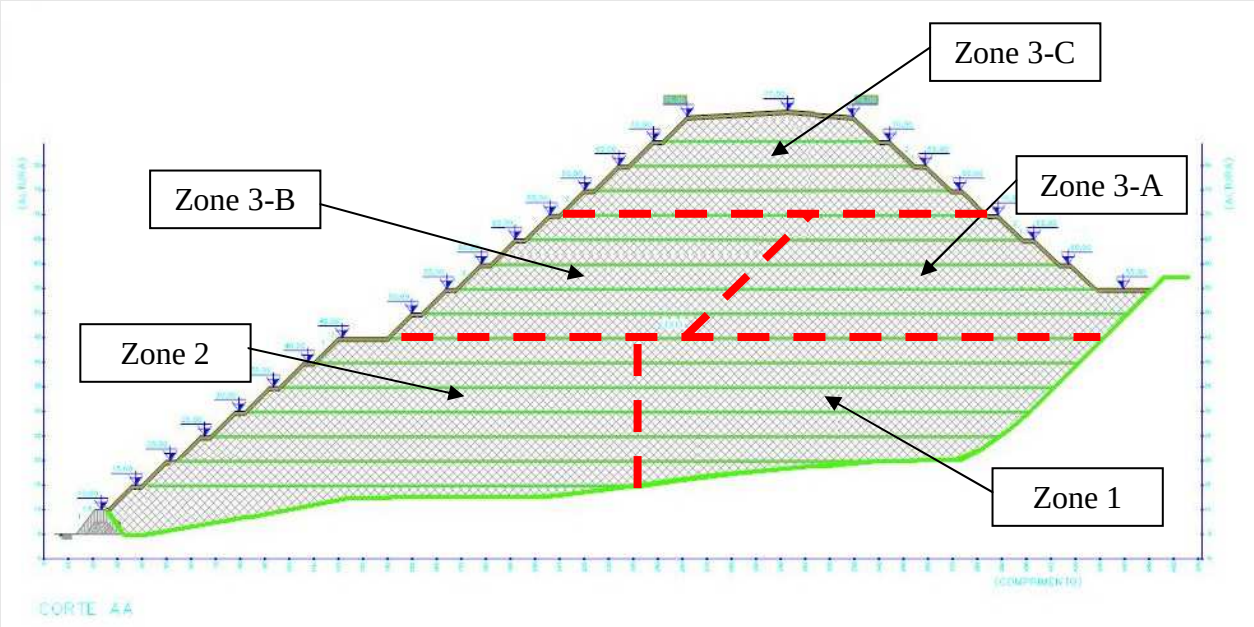

Figure 5: Cross section of the landfilling zones

- Zone 1: It received waste between 1991 and 2004. 9 horizontal drains interconnected with existing wells were installed in 2008 to provide gas collection.
- Zone 2: It received waste between 2004 and 2007. Gas collection system was installed in 2008. It consists of 10 horizontal drains interconnected with 24 vertical wells and 6 additional vertical wells directly connected to the main carriers.
- Zone 3-A: It received waste between 2007 and 2009. Gas collection system installation began in 2008. Extensions were provided as landfilling progressed until final elevation was reached at the end of 2009. At the beginning of the 4th Monitoring Period, the gas collection system consisted of 14 horizontal drains interconnected with 33 vertical wells. During the 4th Monitoring Period, it was completed by two horizontal drains connected by November 2012 to increase collection efficiency.
- Zone 3-B: It received waste between January 2010 and May 2012. Gas collection system installation began in 2010. Extensions were provided as landfilling progressed until final elevation was reached in May 2012. At the beginning of the 4th Monitoring Period, the gas collection system consisted of 11 horizontal drains interconnected with 34 vertical wells. During the 4th Monitoring Period, it was completed by four horizontal drains connected between May and October 2012 to increase collection efficiency.
- Zone 3-C: It began receiving waste in May 2012 and is still the current disposal area. It overlies Zone 3-A and Zone 3-B. It was created as soon as Zone 3-B reached the same elevation as Zone 3-A. During the 4th Monitoring Period, existing vertical wells from Zone 3-A and Zone 3-B were extended up through Zone 3-C as landfilling progressed. Additionally, a set of 7 horizontal drains interconnected with such vertical wells were put into operation over the 4th Monitoring Period to provide gas collection in the new disposal cells.

All the horizontal drains and vertical wells connected to the main carriers are equipped with butterfly valves and sample points that facilitate local adjustments and optimization of the vacuum for every branch of the gas collection system.

Important efforts have also been made to improve the collection and treatment of leachate on-site beyond the initial scope described in the PDD. A drainage layer has been disposed over the liner on the basis of Zone 3-A and 3-B. It is composed of a 10 centimeters depth gravel layer overlaid by a 20 centimeters depth

crushed stone layer. The leachate drainage was improved within the drainage layer by the placement of HDPE pipes surrounded by crushed stones and half perforated on the upper section. These pipes increase drainage velocity compared to a single gravel layer, and consequently reduce leachate accumulation within the landfill and incrustation of the drainage layer.

Both leachate and landfill gas collection systems have to be extended through an on-going field work dependent on the landfilling progress.

Special events during operation

The takeover, subject to the correction of some snags, was made on the 29th October 2008.

The table below summarises the major incidents and maintenance leading to the loss of CERs for a period greater than 6 hours during the 4th Monitoring Period (from 01/12/2011 until 30/04/2013).

Date (GMT-2)	Event	Comment
From 05/02/2012 20:16:18 To 06/02/2012 07:28:18	A power blackout caused the shutdown of the plant during a weekend. The diesel generator didn't start up automatically. A failure of communication caused the delay to restart the LFG Plant.	The LFG Plant was not operating over this period. No CERs are claimed.
From 21/02/2012 01:48:18 To 21/02/2012 14:12:18	A connection failure at the output of the gas analyser stopped the data transmission to the PLC of the system and to the data logger. This was fixed up by the operator after checking the connectors at the output board of the gas analyser	The LFG Plant was operating over this period but no CERs are claimed as data from gas analysis were not available.
From 03/06/2012 07:40:51 To 03/06/2012 15:52:51	A power blackout caused the shutdown of the plant during the weekend. The diesel generator didn´t start up automatically. The data transmission needed to be reset to remove a failure caused by the blackout and the LFG Plant had to be restarted. This was fixed up only through the intervention of the LFG technician.	The LFG Plant was not operating over this period. No CERs are claimed.
From 18/08/2012 13:51:15 To 18/08/2012 20:03:15	A power blackout caused the shutdown of the plant during the weekend. A failure of communication caused the delay to restart the LFG Plant.	The LFG Plant was not operating over this period. No CERs are claimed.
From 19/08/2012 21:00:51 To 20/08/2012 10:24:13	A connection failure at the output of the gas analyser stopped the data transmission to the PLC of the system and to the data logger. This was fixed up by the operator after checking the connectors at the output board of the gas analyser	The LFG Plant was operating over this period but no CERs are claimed as data from gas analysis were not available.
From 25/08/2012 23:44:13 To 26/08/2012 08:21:19	A power blackout caused the shutdown of the plant during the weekend. The data transmission needed to be reset to remove a failure caused by the blackout and the LFG Plant had to be restarted. This was fixed up only through the intervention of the LFG technician.	The LFG Plant was not operating over this period. No CERs are claimed.

From 03/09/2012 20:28:13 To 06/09/2012 13:15:01	The motherboard of the gas analyser was damaged and needed to be replaced. The LFG analyser remained inoperative until it was repaired by the supplier (ABB) through installation of a new motherboard.	The LFG Plant was operating most of the time during this period but no CERs are claimed as data from gas analysis were not available.
From 15/10/2012 14:32:30 To 16/10/2012 06:37:16	For unidentified reason, there is a lack of data relative to Flare 1 over this period.	The LFG Plant was operating over this period. CERs are claimed only for Flare 2 as data from Flare 1 are not available.
From 02/12/2012 07:50:56 To 02/12/2012 14:13:33	A power blackout caused the shutdown of the plant during the weekend. A failure of communication caused the delay to restart the LFG Plant.	The LFG Plant was not operating over this period. No CERs are claimed.
From 12/12/2012 23:58:56 To 13/12/2012 15:53:56	The calibration certificate of Flare 1 thermocouple is valid one year and its validity expired on 12/12/2012. It was substituted by a new calibrated thermocouple on 13/12/2012 around 15:40:00. As no measurement of the residual error was available for the replaced thermocouple, the Project Participants have chosen not to claim CERs for Flare 1 over this period of non compliance regarding the calibration requirements.	The Flare 1 operated normally during this period but no CERs are claimed for Flare 1 as calibration certificate for Flare 1 temperature measurement was overdue.
From 12/12/2012 23:58:56 To 13/12/2012 16:29:33	The calibration certificate of Flare 2 thermocouple is valid one year and its validity expired on 12/12/2012. It was substituted by a new calibrated thermocouple on 13/12/2012 around 15:55:00. As no measurement of the residual error was available for the replaced thermocouple, the Project Participants have chosen not to claim CERs for Flare 2 over this period of non compliance regarding the calibration requirements.	The Flare 2 operated normally during this period but no CERs are claimed for Flare 2 as calibration certificate for Flare 2 temperature measurement was overdue.
From 01/01/2013 21:13:56 To 02/01/2013 07:45:33	A power blackout caused the shutdown of the plant. A failure of communication caused the delay to restart the LFG Plant.	The LFG Plant was not operating over this period. No CERs are claimed.

Table 1: Major incidents

Date	Type of equipment	Serial number of replaced equipment	Serial number of new equipment
11/01/2012	Flare 1 temperature transmitter – Residual gas	PT100-CR01106/11	PT100-CR12910/11
11/01/2012	Flare 1 thermocouple – Flared gas	TC-CR01107/11	TC-CR12909/11
11/01/2012	Flare 2 thermocouple – Flared gas	TC-CR01108/11	TC-CR12908/11
26/06/2012	Flare 1 absolute pressure transmitter – Residual gas	A7F9668F/C282814	A7F9666F/C282803
16/07/2012	Flare 1 absolute pressure transmitter – Residual gas	A7F9666F/C282803	A7F9668F/C282814
16/07/2012	Flare 2 absolute pressure transmitter – Residual gas	A7F9667F/C282810	A7F9666F/C282803
01/08/2012	Flare 2 absolute pressure transmitter – Residual gas	A7F9666F/C282803	A7F9667F/C282810
21/09/2012	Flare 2 temperature transmitter – Residual gas	PT100-CR09923/11	PT100-LV34114-12
13/12/2012	Flare 1 temperature transmitter – Residual gas	PT100-CR12910/11	PT100-CR11191/12
13/12/2012	Flare 1 thermocouple – Flared gas	TC-CR12909/11	TC-CR11189/12
13/12/2012	Flare 2 thermocouple – Flared gas	TC-CR12908/11	TC-CR11190/12

Table 2: Equipment exchanges

B.2. Post registration changes

B.2.1. Temporary deviations from registered monitoring plan or applied methodology

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As issuance of CERs was requested for the Monitoring Period n° 2 at the end of 2011, a request for review was received on December 30th, 2011 that pointed out a deviation from the monitoring plan and monitoring methodology. Indeed, it was identified that the monitoring of the temperature of the exhaust gases was done in the combustion zone of the flare while the Version 1 of the "Tool to determine project emissions from flaring gases containing methane" requires flare temperature to be monitored at 80% of total flare height.

Upon reception of the request for review, the PPs moved the flare temperature sampling point to 80% flare height in order to comply with the Tool. These changes were effectively achieved by January 7th, 2012. Therefore, a request for temporary deviation is required to address the issue of flare temperature monitoring between 2010-09-01 and 2012-01-07 (both days included). The 4th Monitoring Period is partially impacted by such deviation from 2011-12-01 to 2012-01-07 (both days included).

To be conservative, it was evidenced that a minimum temperature of 780°C is enough to ensure that temperature of the exhaust gases of the flare is above 500°C at 80% of total flare height. Therefore, a request for Temporary deviations from the monitoring plan or the monitoring methodology (TDEV) was submitted and approved by the EB on August 29th, 2012 under the reference number PRC-1506-001.

As per the approved request for temporary deviation, a minimum temperature of 780°C must be guaranteed for the monitored flare temperature (combustion zone) in order to claim emission reductions over the monitoring period from 2010-09-01 to 2012-01-07 (both days included). Therefore, from 2011-12-01 to 2012-01-07 (both days included), the emission reductions of the 4th monitoring period were calculated taking into account such requirement on flare temperature. It does result in a decrease of 42 tCO2e from the total emission reductions claimed over the monitoring period n° 4. From 2012-01-08 onwards, the flare temperature was monitored at 80% of total flare height as per the applicable Tool and a minimum temperature of 500°C (tool value) was considered to calculate emission reductions.

B.2.2. Corrections

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No correction to project information or parameters fixed at validation has been approved during this monitoring period or submitted with this monitoring report.

B.2.3. Permanent changes from registered monitoring plan or applied methodology

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No permanent change from the registered monitoring plan or applied methodologies has been approved during this monitoring period or submitted with this monitoring report.

Prior to the submission of this monitoring report for request for issuance, some permanent changes to the registered PDD were submitted and approved by the EB.

Indeed, a diesel generator was installed as a backup-up system to provide electricity to the project activity and began operation on 1st, September 2011. As no diesel engine was contemplated in the original registered PDD for project electricity supply, this was a permanent change to the project activity. Neither the scale, nor the additionality, nor the methodology applicability of the project activity were impacted. Therefore, a Notification of changes was required to address this issue. The monitoring plan was revised through an adjustment of the $CEF_{electricity}$ to the value of 1.56 tCO_{2eq}/MWh for all sources (both grid and diesel generator).

Furthermore, it was evidenced that both waste inputs and collection efficiency were higher than the forecast values of the original registered PDD, which tends to increase claimed emissions reductions compared to PDD ex-ante estimates. Therefore, a Notification of changes was required to update the PDD emissions reductions estimates.

This Notification of changes was approved by the EB on 24th, August 2011. The revised PDD was completed in July 2011 under the version number 4.3.

B.2.4. Changes to project design of registered project activity

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No change to the project design of the project activity has been approved during this monitoring period or submitted with this monitoring report.

B.2.5. Changes to start date of crediting period

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No change to the start date of the crediting period has been approved during this monitoring period or submitted with this monitoring report.

B.2.6. Types of changes specific to afforestation or reforestation project activity

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This project is a landfill gas capture and flaring project, not applicable.

SECTION C. Description of monitoring system

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Monitoring System

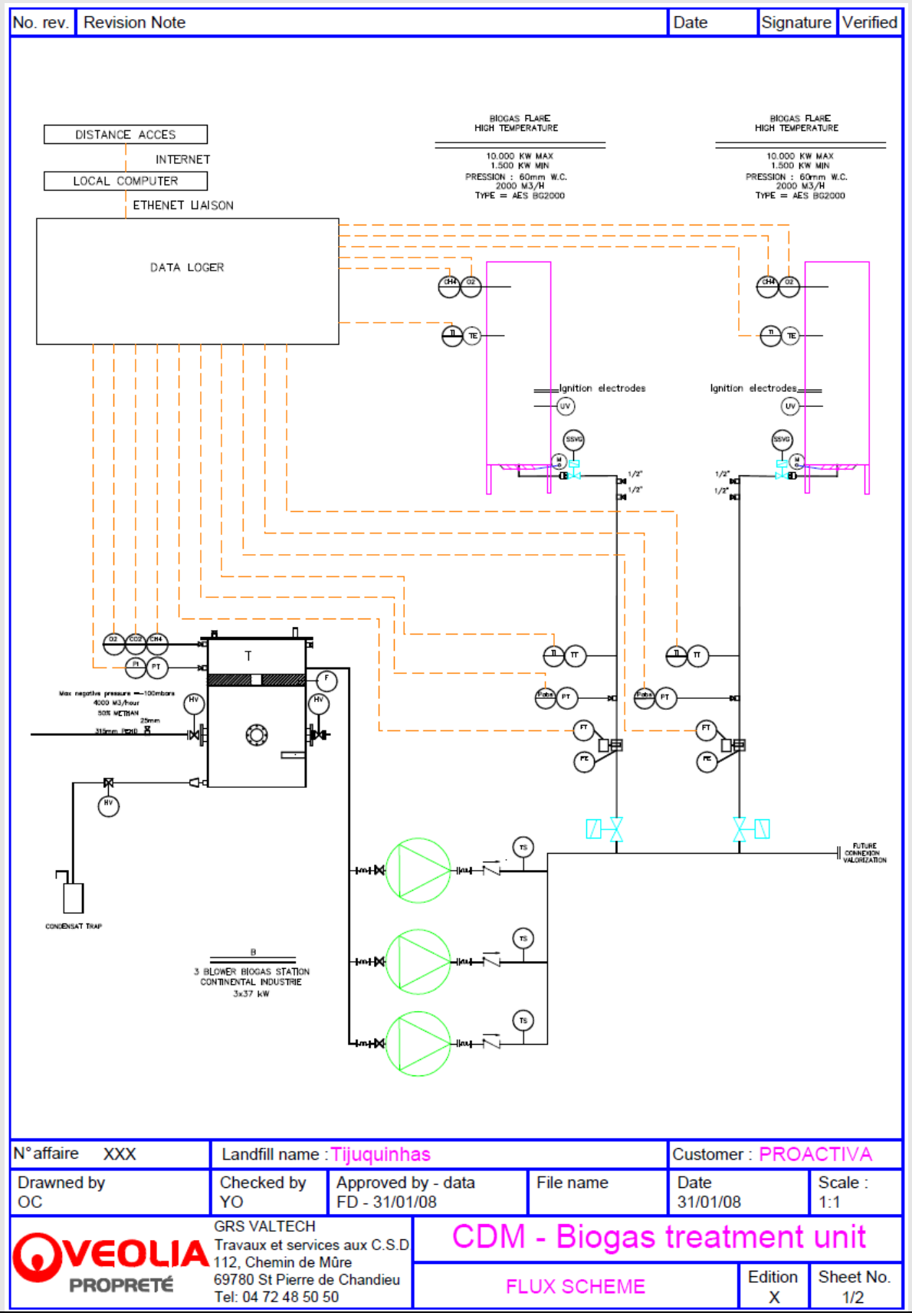
The monitoring system consists of measurement instruments connected to a data logger. The data are recorded and stored within encrypted files which cannot be altered. This system provides a robust solution that guarantees the integrity of the data.

The instruments communicate through a 4-20mA signal. The raw signal is sent to encrypted data logger. Each instrument is also fitted with its own calculator to provide operational data to the operator.

Data are extracted from this system and transferred onto an Excel file in order to finalize the calculation of the emission reductions as per the methodology ACM0001 / version 05. Calculations are made by using a macro to avoid the data manipulation.

The layout of the system is shown in the diagram below.

Details of the monitoring system are described below.



No. rev.	Revision Note	Date	Signature	Verified

LEGEND

T	CONDENSATE TRAP
F	FILTER
FE	FLOW ELEMENT (V–CONE)
FT	FLOW TRANSMITTER
HV	HAND VALVE
PT	PRESSURE TRANSMITTER
PI	RELATIVE PRESSURE INDICATOR
Pabs	ABSOLUTE PRESSURE
M	SERVO–MOTOR
SSGV	SAFETY SOLENOID GAS VALVE
TE	TEMPERATURE ELEMENT
TI	TEMPERATURE INDICATOR
TT	TEMPERATURE TRANSMITTER
TS	TEMPERATURE SWITCH
UV	UV CELL
CH4, CO2, O2	GAS ANALISIS
– – – – – – –	ELECTRICAL CONNEXION
———	PRINCIPAL BIOGAS PIPE
	DISPLAY ON TACTILE SCREEN
	LOCAL ELEMENT
	FLEXIBLE COMPENSATOR
	NON RETURN VALVE
	FLAME ARRESTER
	AUTOMATICALLY CONTROLED VALVE
	MANUAL VALVE

N°affaire XXX	Landfill name : Tijuquinhas			Customer : PROACTIVA	
Drawned by OC	Checked by YO	Approved by - data FD - 31/01/08	File name	Date 31/01/08	Scale : 1:1
VEOLIA PROPRETÉ	GRS VALTECH Travaux et services aux C.S.D 112, Chemin de Mûre 69780 St Pierre de Chandieu Tel: 04 72 48 50 50	CDM - Biogas treatment unit			
		FLUX SCHEME		Edition X	Sheet No. 2/2

Figure 6: Layout of the LFG Plant monitoring system

The abstraction and flaring unit can be represented as shown below.

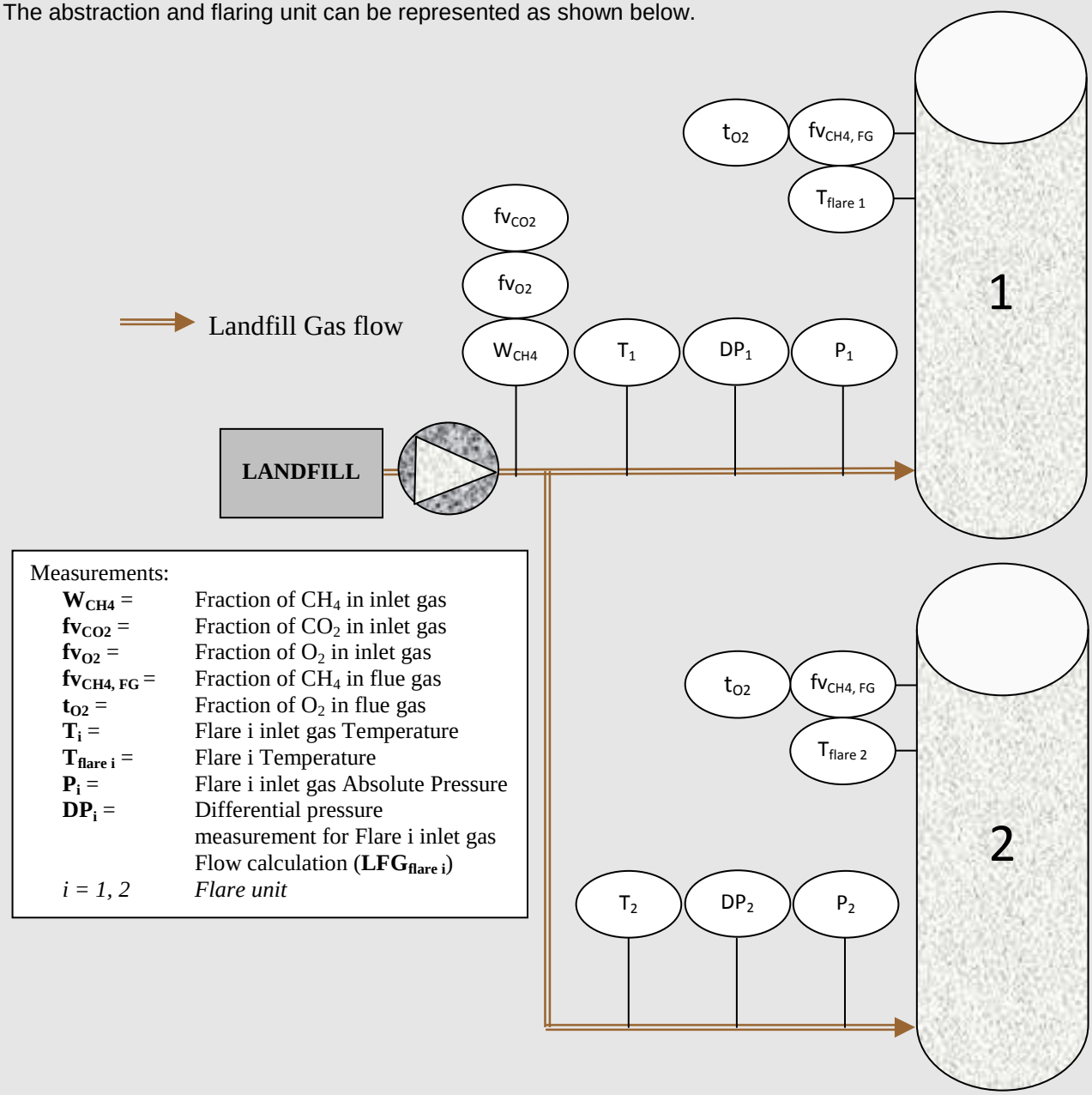


Figure 7 : P&I Diagram implemented at Proactiva Tijuquinhas Landfill site

Calibration Procedures

Instrumentation is calibrated as recommended by manufacturers or by the methodology ACM0001 / version 05. The most stringent procedures are used. Calibration frequency and procedures are detailed in the table below.

However, for the electricity import meter, the residual errors for two of the last 3 calibrations over the 4th monitoring period were slightly beyond the permissible error indicated by manufacturer and no correction of the drift was possible for this kind of equipment. In this case the most stringent value between the drift indicated in the last 3 calibration certificates and the accuracy of the device has been used to offset the calculation and to provide a conservative value. This correction has been applied over the entire period during which the instrument was part of the monitoring system. This algorithm has been applied in accordance with the "Guideline for assessing compliance with the calibration frequency requirements" [EB52, Annex 60].

Moreover, the substitution of the Flare 1 thermocouple ($T_{flare\ 1}$) was performed one day after the date required as per the calibration frequency requirement (annual substitution or calibration). No measurement of the drift of the replaced thermocouple is available. Therefore, for purpose of conservativeness, the PPs

have chosen not to claim CERs for Flare 1 during the non compliance period which ranges from 13/12/2012 00:00:00 GMT-2 to 13/12/2012 15:53:56 GMT-2 (the new calibrated instrument was installed around 15:40:00 as per evidence provided from data logger record).

Finally, the substitution of the Flare 2 thermocouple ($T_{flare\ 2}$) was performed one day after the date required as per the calibration frequency requirement (annual substitution or calibration). No measurement of the drift of the replaced thermocouple is available. Therefore, for purpose of conservativeness, the PPs have chosen not to claim CERs for Flare 2 during the non compliance period which ranges from 13/12/2012 00:00:00 GMT-2 to 13/12/2012 16:29:33 GMT-2 (the new calibrated instrument was installed around 15:55:00 as per evidence provided from data logger record).

CDM CALIBRATION SCHEDULE

	Methodology ID	Serial number	Date of last calibration	2012 MONITORING PERIOD n° 4 Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	2013 Jan	Feb	Mar	Apr
Flare 1	LFG $_{flare\ 1}$	07-1656 + A8B7518F / 1QB5114	16/05/2012						●											
	T_1	PT100-CR01106/11 + PT100-CR12910/11 + PT100-CR11191/12	14/11/2012	●	▲										●	▲				
	P_1	A7F9668F / C282814	04/07/2012								●									
		A7F9666F / C282803	15/06/2012							●										
	$T_{flare\ 1}$	TC CR01107/11 + TC CR12909/11 + TC CR 11189/12	19/11/2012	●	▲										●	▲				
Flare 2	LFG $_{flare\ 2}$	08-3033 + A7F9524F / 1LA1250	16/05/2012						●											
	T_2	PT100-CR09923/11 + PT100-LV34114-12	29/08/2012									●	▲							
	P_2	A7F9667F / C282810	24/07/2012								●									
		A7F9666F / C282803	15/06/2012							●										
	$T_{flare\ 2}$	TC CR01108/11 + TC CR12908/11 + TC CR11190/12	19/11/2012	●	▲										●	▲				
Residual gas	W_{CH4}	3.345730.8	12/03/2013				●												●	
	Fv_{O2}	3.345730.8	12/03/2013				●												●	
	Fv_{CO2}	3.345730.8	12/03/2013				●												●	
Flue gas	$Fv_{CH4,\ FG}$	3.345731.8	12/03/2013				●												●	
	t_{O2}	3.345731.8	12/03/2013				●												●	
Elec	EL_{IMP}	38004935	16/04/2013			●														●

●	Calibration certificate issued for installed device with residual error below manufacturer permissible error
▲	Substitution of installed device by a similar one provided with calibration certificate
▲	Substitution of installed device by a similar one provided with calibration certificate but calibration of previous device was overdue at the date of installation
●	Calibration certificate issued for installed device with residual error above manufacturer specification
	Period for which the values are adjusted because the residual error identified after calibration is above manufacturer specification

Table 3: Calibration frequency and procedures

The following table summarizes the action taken in line with the "Guideline for assessing compliance with the calibration frequency requirements" [EB52, Annex 60], for the devices that happened to show an identified error above the manufacturer specification with no possibility to correct the drift directly on the calibrated device, or for the devices having a calibration certificate overdue during the monitoring period. This situation occurs with the following instruments:

- Electricity import meter:
  During 2 of the last 3 calibrations that cover the 4th Monitoring Period, it has shown a residual relative error slightly above manufacturer specification (+/- 3%), respectively: -3.51% on 24/03/2011, -3.18% on 16/02/2012 and -1.00% on 16/04/2013. However, as no amplification of the drift was evidenced between the first and last calibration, the instrument was maintained as part of the monitoring system for transparency purpose. Indeed, keeping the same instrument in place ensures that the total electricity imported for the project activity is recorded and cumulated continuously through the same meter since project start date. In the meantime, the maximum

identified residual error among the last 3 calibrations (+/-3.51%) has been used to offset the calculation and to provide a conservative calculation of the project emission reductions. Though the drift indicated at last calibration (-1.00%) was lower than the initial drift at the beginning of the 4th Monitoring Period (-3.51%), PPs have chosen to consider maximum initial drift for the correction applied over the entire 4th monitoring period. This approach is conservative and in line with the "Guideline for assessing compliance with the calibration frequency requirements" [EB52, Annex 60]

- Flare 1 thermocouple:
  As per the monitoring plan, calibration or substitution of the thermocouple must be done on an annual basis. The substitution of the flare 1 thermocouple was completed at 13/12/2012 15:53:56 (GMT-2) whereas the validity of the replaced thermocouple expired at 13/12/2012 00:00:00 (GMT-2). As no measurement of the drift of the replaced instrument is available, the PPs have chosen not to claim CERs for Flare 1 over the period during which the calibration certificate was overdue (around 16 hours on 13/12/2012).

- Flare 2 thermocouple:
  As per the monitoring plan, calibration or substitution of the thermocouple must be done on an annual basis. The substitution of the flare 2 thermocouple was completed at 13/12/2012 16:29:33 (GMT-2) whereas the validity of the replaced thermocouple expired at 13/12/2012 00:00:00 (GMT-2). As no measurement of the drift of the replaced instrument is available, the PPs have chosen not to claim CERs for Flare 2 over the period during which the calibration certificate was overdue (around 16 hours on 13/12/2012).

	Monitored Parameter	Instrument Type	Serial No.	Calibration / Substitution Frequency	Date of installation	Date of last calibration	Due date for next calibration / substitution	Effective date of completed calibration / substitution	Range	Permissible Error	Identified Error	Compliance with the calibration frequency requirements	Compliance of residual error with manufacturer permissible error	Start date of the non-compliance period	End date of the non-compliance period	Correction used for the Emission Reduction calculation
FLARE 1	$LFG_{flare\ 1}$	Differential pressure transmitter	A8B7518F / 1QB5114	Annual	27/10/08	23/05/11	23/05/12	16/05/12	0..40 mbar	+/-0.04 mbar	+/-0.03 mbar	Yes	Yes	NA	NA	NA
		V-Cone Flow meter	07-1656	NA	27/10/08	NA	NA	NA	250..2500 Nm3/h	+/-1.0 % reading	NA	Yes	Yes	NA	NA	NA
	T_1	Temperature transmitter	PT100-CR01106/11	Annual	11/02/11	28/01/11	28/01/12	11/01/12	0..100 °C	+/-0.35 °C	+/-0.07 °C	Yes	Yes	NA	NA	NA
			PT100-CR12910/11		11/01/12	14/12/11	14/12/12	13/12/12			+/-0.05 °C					
			PT100-CR11191/12		13/12/12	14/11/12	14/11/13	To be completed			+/-0.09 °C					
	P_1	Absolute pressure transmitter	A7F9668F / C282814	Annual	27/10/08	31/07/11	31/07/12	26/06/12	800..1200 mbar	+/-0.8 mbar	+/-0.5 mbar	Yes	Yes	NA	NA	NA
			A7F9666F / C282803		26/06/12	15/06/12	15/06/13	16/07/12			+/-0.8 mbar					
			A7F9668F / C282814		16/07/12	04/07/12	04/07/13	To be completed			+/-0.1 mbar					
	$T_{flare\ 1}$	Thermocouple	TC CR01107/11	Annual	11/02/11	27/01/11	27/01/12	11/01/12	0..1200 °C	+/-0.4 % reading	+/-0.4 % reading	Yes	Yes	NA	NA	NA
			TC CR12909/11		11/01/12	12/12/11	12/12/12	13/12/12			+/-0.16 % reading	No	NA	13/12/12 00:00:00	13/12/12 15:53:56	No CERs claimed Flare 1
			TC CR11189/12		13/12/12	19/11/12	19/11/13	To be completed			+/-0.33 % reading	Yes	Yes	NA	NA	NA
FLARE 2	$LFG_{flare\ 2}$	Differential pressure transmitter	A7F9524F / 1LA1250	Annual	22/01/09	23/05/11	23/05/12	16/05/12	0..40 mbar	+/-0.04 mbar	+/-0.03 mbar	Yes	Yes	NA	NA	NA
		V-Cone Flow meter	08-3033	NA	22/01/09	NA	NA	NA	250..2500 Nm3/h	+/-1.0 % reading	NA	Yes	Yes	NA	NA	NA
	T_2	Temperature transmitter	PT100-CR09923/11	Annual	27/09/11	21/09/11	21/09/12	21/09/12	0...100 °C	+/-0.35 °C	+/-0.18 °C	Yes	Yes	NA	NA	NA
			PT100-LV34114-12		21/09/12	29/08/12	29/08/13	To be completed			+/-0.04 °C	Yes	Yes	NA	NA	NA
	P_2	Absolute pressure transmitter	A7F9667F / C282810	Annual	22/01/09	19/07/11	19/07/12	16/07/12	800..1200 mbar	+/-0.8 mbar	+/-0.5 mbar	Yes	Yes	NA	NA	NA
			A7F9666F / C282803		16/07/12	15/06/12	15/06/13	01/08/12			+/-0.8 mbar					
			A7F9667F / C282810		01/08/12	24/07/12	24/07/13	To be completed			+/-0.1 mbar					
	$T_{flare\ 2}$	Thermocouple	TC CR01108/11	Annual	29/09/11	27/01/11	27/01/12	11/01/12	0..1200 °C	+/-0.4 % reading	+/-0.4 % reading	Yes	Yes	NA	NA	NA
			TC CR12908/11		11/01/12	12/12/11	12/12/12	13/12/12			+/-0.1 % reading	No	NA	13/12/12 00:00:00	13/12/12 16:29:33	No CERs claimed Flare 2
			TC CR11190/12		13/12/12	19/11/12	19/11/13	To be completed			+/-0.33 % reading	Yes	Yes	NA	NA	NA
RESIDUAL GAS	W_{CH4}	Infrared analyzer	3.345730.8	Annual	27/10/08	13/04/11	13/04/12	12/03/12	0..100 %vol	+/-0.5 %vol	+/-0.02 %	Yes	Yes	NA	NA	NA
						12/03/12	12/03/13	12/03/13			+/-0.00 %					
	fv_{O2}	Oxygen sensor	3.345730.8	Annual	27/10/08	13/04/11	13/04/12	12/03/12	0..25 %vol	+/-0.125 %vol	+/-0.00 %	Yes	Yes	NA	NA	NA
						12/03/12	12/03/13	12/03/13			+/-0.00 %					
	fv_{CO2}	Infrared analyzer	3.345730.8	Annual	27/10/08	13/04/11	13/04/12	12/03/12	0..100 %vol	+/-0.5 %vol	+/-0.02 %	Yes	Yes	NA	NA	NA
						12/03/12	12/03/13	12/03/13			+/-0.02 %					
FLUE GAS	$fv_{CH4,rG}$	Infrared analyzer	3.345731.8	Annual	27/10/08	13/04/11	13/04/12	12/03/12	0..3000 ppmv	+/-15 ppmv	+/-0 ppmv	Yes	Yes	NA	NA	NA
						12/03/12	12/03/13	12/03/13			+/-2 ppmv					
	t_{O2}	Oxygen sensor	3.345731.8	Annual	27/10/08	13/04/11	13/04/12	12/03/12	0..25 %vol	+/-0.125 %vol	0.00 % vol	Yes	Yes	NA	NA	NA
						12/03/12	12/03/13	12/03/13			+/-0.00 %					
ELEC	EL_{IMP}	Electricity Import Meter	38004935	Annual	20/10/08	26/08/10	26/08/11	24/03/11	0..2,147x 10^9 MWh	+/-3.0 % reading	+/-3.51%	No	No	01/12/11 00:00:00	01/05/13 00:00:00	3.51%
						24/03/11	24/03/12	16/02/12			+/-3.18%					
						16/02/12	16/02/13	16/04/13			+/-1.00%					

Table 4: Corrections and calibration non-compliance periods

Procedures for record handling

Most data is recorded through a protected data logger. The raw data cannot be altered guaranteeing the integrity of the system. The data logger file is converted into a spreadsheet using a pre-defined format. The

spreadsheet is then directly used for the verification report.

Only electricity import meter archiving and the annual verification of the regulatory environment evolution are made manually. The value of the electricity meter is integrated onto the monitoring file manually on a monthly basis.

The paper forms are aggregated and kept on site. Electronic data are stored onsite on a computer hard drive.

Monthly, data from the data logger is downloaded in an office based computer and transferred on a dedicated spreadsheet. Computer is located in a separate office than the data logger. In addition, a back-up system is in place onsite allowing the record of all the raw data on the local network on a weekly basis and posterior copy to an archive system.

An electronic log book is kept on-site and sent on a regular basis to the Proactiva CDM Project Manager.

Procedures for internal audits, performance reviews and corrective actions to be taken

On a monthly basis, the Landfill Manager and the CDM Project Manager review the performance of the project activity and identify the possible improvements to be implemented:

- Plant availability factor
- Landfill gas collection efficiency
- Flaring efficiency
- Preventive and corrective maintenance
- Leachate drainage or pumping
- Scheduling and execution of the gas collection system extension.

The periodical renewal of the operation licenses requires the site to check and to comply with the latest regulation. No additional audit is considered to be necessary.

Data collection and aggregation

Daily visual inspection is carried out by a Landfill Gas Technician. During this visit, the Landfill Gas Technician checks the instrumentation and monitoring data such as gas quality, gas flow, vacuum, and flare temperature. Once a day, he measures with portable devices most of the monitored parameters, such as landfill gas flow rate, landfill gas methane fraction, landfill gas temperature, relative pressure within the LFG Plant pipes, atmospheric pressure. These measurements are not used for the emission reduction calculation but they provide some useful information to ensure early detection of any drift of the fixed instruments.

During this daily visit, the Landfill Gas Technician analyses the data and balances the landfill gas collection system to the adequate suction of the landfill to maintain a steady gas quality and flow.

Periodically, gas quality and vacuum level are checked directly at each individual gas well, using a portable meter. This routine monitoring allows to identify underperforming gas wells and to take necessary corrective actions.

The combination of these two inspections optimizes the landfill gas collection efficiency.

Data Analysis and calculation

The data are analyzed on a daily basis by the operator. In case of a drift of one parameter, the operator can react quickly and fix any potential problem. The operator is using the on-site supervisory equipment to check the status of the facility on the day to day.

The raw data are recorded on the data logger. A macro is used to calculate the parameters and the emission reduction to be claimed integrating the requirements of the methodology.

Data are automatically checked to ensure their coherence within a range of acceptability that represents the possible operating conditions. If the system identified an erroneous value, it will not be taken into account.

In case of inconsistent values, the system will set the associated emissions reductions to 0 if it impacts the number of CERs and if the methodology or tools do not allow for default value.

If the methodology and tools do allow for a default value, this value will be used.

All data required for the emission reductions calculation is kept in the onsite-monitoring database. This information is reported on a monthly basis.

Apart from the net incremental electricity imported for the project activity, all the others monitored parameters are recorded through the data logger. The raw data sets are divided in 3 groups inside the database:

- Group **TOTAL**: it contains all the data about landfill gas analysis (W_{CH4}, fv_{CO2}, fv_{O2}).
- Group **FLARE1**: it contains all the data specific to Flare 1 (P_1, T_1, Differential Pressure DP_1, $T_{flare\ 1}$) and to the Flare 1 exhaust gases analysis ($t_{CH4,flare\ 1}$, $t_{O2,\ flare\ 1}$).
- Group **FLARE2**: it contains all the data specific to Flare 2 (P_2, T_2, Differential Pressure DP_2, $T_{flare\ 2}$) and to the Flare 2 exhaust gases analysis ($t_{CH4,flare\ 2}$, $t_{O2,\ flare\ 2}$).

Using the "Database Manager" program provided with the data logger, it is possible to extract the raw data into excel sheets. The data integrity is preserved as the sheets are protected by a password of the data logger manufacturer.
For each of the 3 groups, one single file is created that gathers all the group raw data over the monitored period:

- "TOTAL Raw Data - Fourth Monitoring Period.xls" for the TOTAL group;
- "FLARE1 Raw Data - Fourth Monitoring Period.xls" for the FLARE1 group;
- "FLARE2 Raw Data - Fourth Monitoring Period.xls" for the FLARE2 group;

All the cells of these files containing raw data are protected.
Then a VBA macro is used to calculate the emission reduction on a monthly basis. The monthly specific raw data and the calculation sheets are aggregated into a single file named:
"Tijuquinhas Emissions Reductions *Year-Month*_Version 2.xls"

This file contains the following raw data sheets:

- **TOTAL (i):** Gathered the raw data from the TOTAL group relevant for the month of calculation (actually any sheet that contains relevant raw data for the specified month is entirely copied from "TOTAL Raw Data - Fourth Monitoring Period.xls" to the aggregated file, so that the protection of the raw data sheet remains valid in the destination file); the index i corresponds to the sheet number.
- **FLARE1 (j):** Gathered the raw data from the FLARE1 group relevant for the month of calculation (actually any sheet that contains relevant raw data for the specified month is entirely copied from "FLARE1 Raw Data - Fourth Monitoring Period.xls" to the aggregated file, so that the protection of the raw data sheet remains valid in the destination file); the index j corresponds to the sheet number.
- **FLARE2 (k):** Gathered the raw data from the FLARE2 group relevant for the month of calculation (actually any sheet that contains relevant raw data for the specified month is entirely copied from "FLARE2 Raw Data - Fourth Monitoring Period.xls" to the aggregated file, so that the protection of the raw data sheet remains valid in the destination file); the index k corresponds to the sheet number.

In addition to the raw data, the aggregated file **"Tijuquinhas Emissions Reductions *Year-Month*_Version 2.xls"** contains the following sheets:

- **Daily report:** It is a summary sheet providing the daily average of the operating data as well as a summary of the monthly emission reductions on a daily basis.
- **FLARE1 ER Calculation:** it is the sheet that effectively presents all the detailed formulas and criteria used to calculate from raw data the exact amount of Emissions Reductions by flaring through Flare 1 over the specified month (before subtraction of the project emissions due to electricity importation). The duration associated to each raw data set for the emission reduction calculation is limited to 4 minutes, which is the recording time step of the data logger.
- **FLARE2 ER Calculation:** it is the sheet that effectively presents all the detailed formulas

and criteria used to calculate from raw data the exact amount of Emissions Reductions by flaring through Flare 2 over the specified month (before subtraction of the project emissions due to electricity importation). The duration associated to each raw data set for the emission reduction calculation is limited to 4 minutes, which is the recording time step of the data logger.

- **Corrections**: this sheet defines all the corrections and non-compliance periods used in case of calibration non-compliance to provide a conservative calculation of the monthly emissions reduction.
- **Boundaries&Calculation criteria**: it presents the range of acceptability defined for all the monitored parameters and the criteria used to apply default values whenever it is conservative e justifiable.
- **Electricity Imported:** it summarizes the record of the net cumulated electricity imported for the project activity monitored at the electricity import meter.
- **Flowmeters constants**: it presents for both Flare 1 and Flare 2 flowmeters, the application sizing, geometrical, and physical constants that are used in the landfill gas flow rate calculation, according the V-Cone manufacture determinations.
- **Methodology Constants**: it gives a summary of the calculation constants that are defined in the Consolidated Methodology ACM0001 / version 05 and in the "Tool to determine project emissions from flaring gases containing methane" / version 1.
- **Variables Description**: it gives a complete description of all the variables used within the calculation sheets (name, address within the workbook, unit, and description).
- **Constants Description**: it gives a complete description of all the constants used within the calculation sheets (name, address within the workbook, value, unit, description).

All the calculation formulas have been indicated explicitly for transparency purposes.

At the end of the fourth monitoring period, the monthly report files have been aggregated into a single file named "ER-Fourth Monitoring Period_Version 2.xls" that covers the period under the scope of this verification.

Data Storage

Data is monitored and archived as described in the ACM0001 / version 05 monitoring methodology.
As recommended, data is kept for two years after the end of the crediting period or the last issuance of CERs for this project activity, whatever occurs the latest.

A back-up system is in place. An automatic back-up is made on a weekly basis. In addition, all data are sent on a monthly basis via email to the CDM manager which records this data on his own computer.

Project Management Responsibility

The project implementation and operation is under the direct Supervision of both Landfill Manager and CDM Project Manager. The Landfill Manager takes care of all the operational aspects. The CDM Project Manager is responsible for all the CDM procedures and requirements. They have to work together to define project performance objectives and to discuss the gas collection system extension. They both report to the Treatment Facilities Manager and/or Proactiva Meio Ambiente - Brasil Director.

Project management organization

The monitoring, measurement, and reporting are realized following the below procedure.
This procedure allows for numerous crosschecks of the validity of the data.

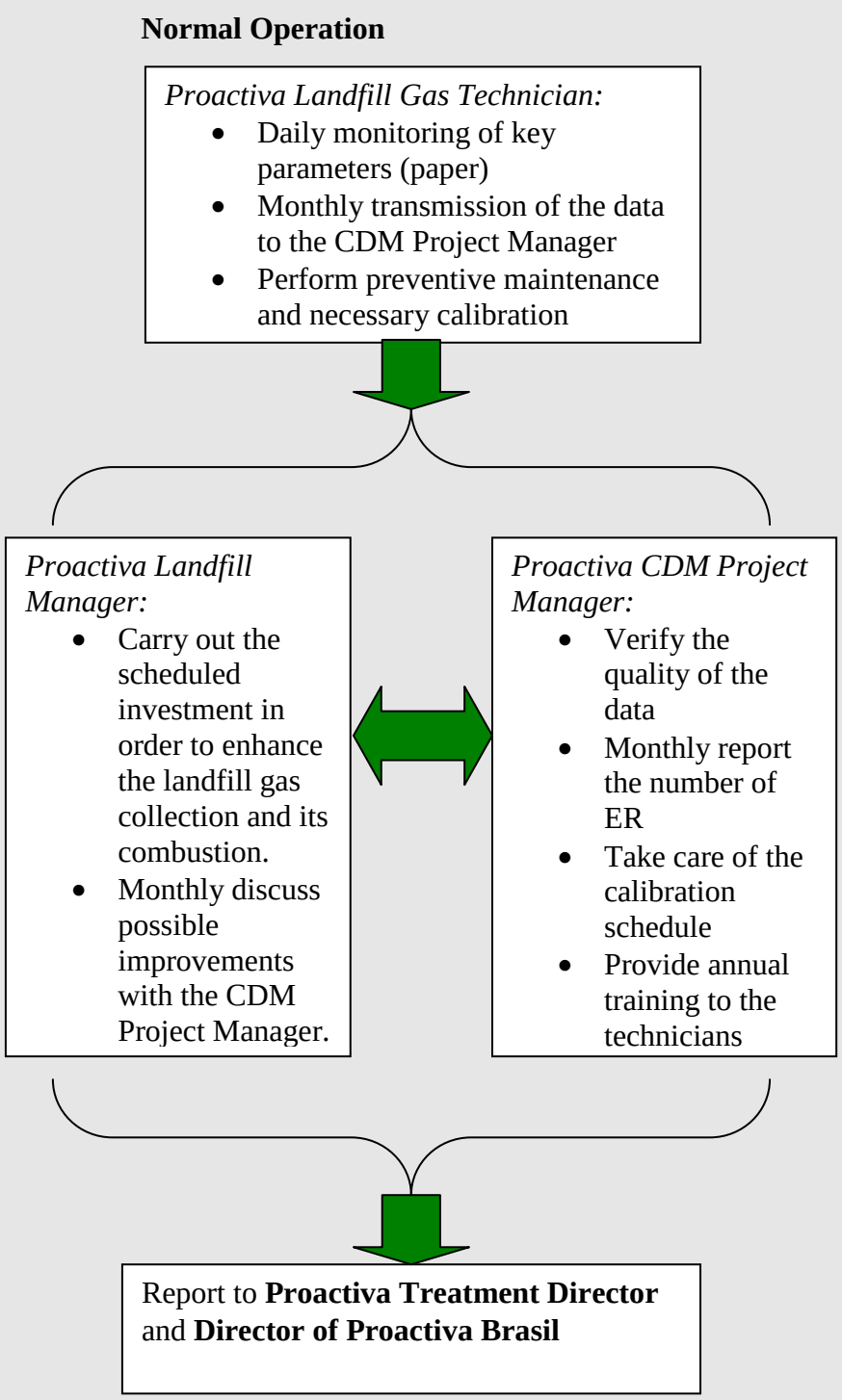


Figure 8: Monitoring and reporting organization.

Training of monitoring personnel

According to the recommendation of the PDD, the employees working directly on the CDM activity have been trained. An initial training session was carried out by the supplier of the equipment between the 28th and 30th of October 2008 regarding the operation of the facility and the maintenance and calibration of the equipment.
In addition, further training on CDM and landfill gas collection system balancing were provided when new people joined the project especially. Training sessions took place in October 2008, November 2008, April 2010, October 2010, January 2011, February 2011, April 2011, August 2012 and March 2013.

Date	Training provider	Capacitated personnel		Training content
		Function	Company	
28/10/2008 to 30/10/2008	GRS Valtech	CDM Project Manager	Proactiva Meio Ambiente Brasil	Operation and Maintenance of a Landfill Gas Capture and Flaring Facility
28/10/2008 to 30/10/2008	GRS Valtech	Landfill Gas Technician	Proactiva Meio Ambiente Brasil	
28/10/2008 to 30/10/2008	GRS Valtech	Landfill Gas Technician Assistant (1)	Proactiva Meio Ambiente Brasil	
31/10/2008	Proactiva Medio Ambiente	CDM Project Manager	Proactiva Meio Ambiente Brasil	CDM Concepts for Operation and Monitoring of a Landfill Gas Capture and Flaring Facility
03/11/2008	Proactiva Medio Ambiente	CDM Project Manager	Proactiva Meio Ambiente Brasil	Concepts for Operation, Balancing and Maintenance of a Landfill Gas Collection Network
03/11/2008	Proactiva Medio Ambiente	Landfill Gas Technician	Proactiva Meio Ambiente Brasil	
03/11/2008	Proactiva Medio Ambiente	Landfill Gas Technician Assistant (1)	Proactiva Meio Ambiente Brasil	
15/04/2010	Proactiva Meio Ambiente Brasil	Landfill Gas Technician Assistant (2)	Proactiva Meio Ambiente Brasil	Operation and Maintenance of a Landfill Gas Capture and Flaring Facility
15/04/2010	Proactiva Meio Ambiente Brasil	Landfill Gas Technician Assistant (2)	Proactiva Meio Ambiente Brasil	Concepts for Operation, Balancing and Maintenance of a Landfill Gas Collection Network
06/10/2010	Proactiva Meio Ambiente Brasil	Landfill Gas Technician Assistant (1)	Proactiva Meio Ambiente Brasil	Operation and Maintenance of a Landfill Gas Capture and Flaring Facility
06/10/2010	Proactiva Meio Ambiente Brasil	Landfill Gas Technician Assistant (1)	Proactiva Meio Ambiente Brasil	Concepts for Operation, Balancing and Maintenance of a Landfill Gas Collection Network
19/01/2011	Proactiva Meio Ambiente Brasil	CDM Project Manager Assistant	Proactiva Meio Ambiente Brasil	Concepts for Operation, Balancing and Maintenance of a Landfill Gas Collection Network
19/01/2011	Proactiva Meio Ambiente Brasil	CDM Project Manager Assistant	Proactiva Meio Ambiente Brasil	Operation and Maintenance of a Landfill Gas Capture and Flaring Facility
24/02/2011 to 25/02/2011	McFLUID	CDM Project Manager Assistant – Landfill Gas Technician – Landfill Gas Technician Assistant (1)	Proactiva Meio Ambiente Brasil	Operation and maintenance of HDPE Pipe Fittings Fusion Equipments
12/04/2011	Proactiva Meio Ambiente Brasil	CDM Project Manager Assistant	Proactiva Meio Ambiente Brasil	CDM Concepts for Operation and Monitoring of a Landfill Gas Capture and Flaring Facility
30/08/2012	Proactiva Meio Ambiente Brasil	Landfill Gas Technician Assistant (2)	Proactiva Meio Ambiente Brasil	Operation and Maintenance of a Landfill Gas Capture and Flaring Facility
30/08/2012	Proactiva Meio Ambiente Brasil	Landfill Gas Technician Assistant (2)	Proactiva Meio Ambiente Brasil	Concepts for Operation, Balancing and Maintenance of a Landfill Gas Collection Network
27/03/2013	Proactiva Meio Ambiente Brasil	Landfill Gas Technician Assistant (1)	Proactiva Meio Ambiente Brasil	Operation and Maintenance of a Landfill Gas Capture and Flaring Facility
27/03/2013	Proactiva Meio Ambiente Brasil	Landfill Gas Technician Assistant (1)	Proactiva Meio Ambiente Brasil	Concepts for Operation, Balancing and Maintenance of a Landfill Gas Collection Network

Table 5: Training provided

Procedure in case of failure

If there is an equipment (flow meter, gas analyzer, gauge, etc.) failure, the equipment supplier will be immediately notified. If possible, repairs will be carried out. If the damaged equipment cannot be repaired, it will be replaced by the same or an equivalent unit as soon as possible. In some cases, portable tools will be used in order to carry out daily monitoring of the missing parameter(s). These data will be recorded on paper.

The flare station is equipped with a telemetry system that allows notifying the landfill gas technician in case the flare is stopped.
If the flare station is stopped, no landfill gas is burned and no credits are claimed during this period. The running hours of the flare are monitored as part of the monitoring procedures.
An emergency plan in case of explosion, fire, or landfill gas leakage has been defined and implemented for the project activity.

Calculation

The main parameters are electronically controlled: a range of acceptable values is defined for each relevant parameter. If the value is out of the range, automatic or manual actions are taken. The parameters, the operating ranges and the actions taken are defined in the table below:

	Methodology Parameter	Associated raw data parameter ("F1" stands for FLARE1 and "F2" for FLARE2)				Action taken when outside of range
		Name	Unit	Min	Max	
FLARE 1	$LFG_{flare\ 1}$	F1_DP	mbar	0	40	No CERs are claimed for Flare 1
	T_1	F1_T	°C	15	100	No CERs are claimed for Flare 1
	P_1	F1_P	mbar	900	1250	No CERs are claimed for Flare 1
	$T_{flare\ 1}$	F1_T_flare	°C	780	1400	No CERs are claimed for Flare 1 *(from 01/12/2011 to 07/01/2012)*
				500		No CERs are claimed for Flare 1 *(from 08/01/2012 to 30/04/2013)*
FLARE2	$LFG_{flare\ 2}$	F2_DP	mbar	0	40	No CERs are claimed for Flare 2
	T_2	F2_T	°C	15	100	No CERs are claimed for Flare 2
	P_2	F2_P	mbar	900	1250	No CERs are claimed for Flare 2
	$T_{flare\ 2}$	F2_T_flare	°C	780	1400	No CERs are claimed for Flare 2 *(from 01/12/2011 to 07/01/2012)*
				500		No CERs are claimed for Flare 2 *(from 08/01/2012 to 30/04/2013)*
RESIDUAL GAS	W_{CH4}	F1_wCH4 and F2_wCH4	Dimensionless	10%	70%	No CERs are claimed
	fv_{O2}	F1_fvO2 and F2_fvO2	Dimensionless	-1.5%	21%	***For the landfill gas flow rate calculation:*** - fv_{O2} is set to (1 - W_{CH4} - fv_{CO2}) if (fv_{O2} > Max or fv_{O2} < Min) - fv_{O2} is set to 0 if (Min ≤ fv_{O2} < 0) ***For the flare efficiency calculation:*** - fv_{O2} is set to 0 if (fv_{O2} < 0 or fv_{O2} > Max)
	fv_{CO2}	F1_fvCO2 and F2_fvCO2	Dimensionless	10%	70%	No CERs are claimed
FLUE GAS	$fv_{CH4,FG}$	F1_tCH4 and F2_tCH4	ppmv	-30	3030	***For the flare efficiency calculation:*** - Flare efficiency is set to default value 90% if (tCH4 < Min or tCH4 > Max) - $fv_{CH4,FG}$ is set to 0 if (Min ≤ tCH4 < 0)
	t_{O2}	F1_tO2 and F2_tO2	Dimensionless	1%	20.50%	***For the flare efficiency calculation:*** - Flare efficiency is set to default value 90% if (t_{O2} < Min or t_{O2} > Max)

Table 6: Emission reduction calculation criteria and default values

SECTION D. Data and parameters

D.1. Data and parameters fixed ex ante or at renewal of crediting period

Data / Parameter:	**GWP_{CH4}: Factor Used for Converting Methane to Carbon Dioxide Equivalents**
Unit:	tCO_{2e}/tCH_4
Description:	Regulatory requirements relating to landfill gas projects.
Source of data:	IPCC Guideline for National Greenhouse Gas Inventories, in accordance with decision 4/CMP.7
Value(s) applied:	21 (until 31st December 2012 – 1st commitment period) 25 (from 1st January 2013 onwards – 2nd commitment period)
Purpose of data:	Used for the Baseline and Project emission calculations
Additional comment:	

Data / Parameter:	**D_{CH4}: Methane density**
Unit:	tCH_4/m^3CH_4
Description:	Conversion factor
Source of data:	ACM0001 / version 5
Value(s) applied:	0.0007168
Purpose of data:	Used for the Baseline and Project emission calculations
Additional comment:	

Data / Parameter:	**$CEF_{electricity}$**
Unit:	tCO_{2eq}/MWh
Description:	CO_2 emissions intensity if electricity imported
Source of data:	"Tool to calculate baseline, project and/or leakage emissions from electricity consumption" / version 1
Value(s) applied:	1.56 tCO_{2eq}/MWh The case C.III of the "Tool to calculate baseline, project and/or leakage emissions from electricity consumption – Version 1" has been used. The default value applicable according to the Tool is: $CEF_{electricity,y} = EFEL,y * (1+ TDL_y) = 1.3* (1 + 20\%) = 1.56\ tCO_2/MWh$
Purpose of data:	Used for the Project emission calculations
Additional comment:	As per last revision of the monitoring plan, this conservative value is used through the crediting period from the start-up of the diesel generator (1st, September 2010) onwards.

Data / Parameter:	**EF_{EL}**
Unit:	tCO_{2eq}/MWh
Description:	Emission factor for electricity generation for Project activity consumption
Source of data:	"Tool to calculate baseline, project and/or leakage emissions from electricity consumption" / version 1
Value(s) applied:	1.3 tCO_{2eq}/MWh The case C.III of the "Tool to calculate baseline, project and/or leakage emissions from electricity consumption – Version 1" has been used. The default value applicable for project consumption sources is 1.3 tCO_2/MWh.
Purpose of data:	Used for the Project emission calculations

Additional comment:	As per last revision of the monitoring plan, this conservative value is used through the crediting period from the start-up of the diesel generator (1st, September 2010) onwards.

Data / Parameter:	**TDL**
Unit:	-
Description:	Average technical transmission and distribution losses for providing electricity to project activity
Source of data:	"Tool to calculate baseline, project and/or leakage emissions from electricity consumption" / version 1
Value(s) applied:	20% The case C.III of the "Tool to calculate baseline, project and/or leakage emissions from electricity consumption – Version 1" has been used. The default value applicable for project consumption sources is 20%.
Purpose of data:	Used for the Project emission calculations
Additional comment:	As per last revision of the monitoring plan, this conservative value is used through the crediting period from the start-up of the diesel generator (1st, September 2010) onwards.

Data / Parameter:	**Pn: Atmospheric pressure at normal conditions**
Unit:	Pa
Description:	Atmospheric pressure at normal conditions – Physical constant
Source of data:	"Tool to determine project emissions from flaring gases containing methane" / version 1
Value(s) applied:	101325 Pa
Purpose of data:	Used for the Baseline and Project emission calculations
Additional comment:	

Data / Parameter:	**Ru: Universal ideal gas constant**
Unit:	$Pa.m^3/kmol.K$
Description:	Universal ideal gas constant
Source of data:	"Tool to determine project emissions from flaring gases containing methane" / version 1
Value(s) applied:	8314.472 $Pa.m^3/kmol.K$
Purpose of data:	Used for the Baseline and Project emission calculations
Additional comment:	

Data / Parameter:	**T_n: Temperature at normal conditions**
Unit:	K
Description:	Temperature at normal conditions – Physical constant
Source of data:	"Tool to determine project emissions from flaring gases containing methane" / version 1
Value(s) applied:	273.15 K
Purpose of data:	Used for the Baseline and Project emission calculations
Additional comment:	

Data / Parameter:	**AM_j: Atomic Mass of element j**
Unit:	kg/mol
Description:	Atomic mass of element j (j= Carbon or hydrogen, oxygen and nitrogen)
Source of data:	Mendeleev table
Value(s) applied:	AM_C = 12.00 kg/mol AM_O = 16.00 kg/mol

	AM_H = 1.01 kg/mol AM_N = 14.01 kg/mol
Purpose of data:	Used for the Baseline and Project emission calculations
Additional comment:	

Data / Parameter:	**MV_n: Volume of one mol of any ideal gas at normal conditions**
Unit:	m^3/kmol
Description:	Volume of one mol of any ideal gas at normal conditions
Source of data:	"Tool to determine project emissions from flaring gases containing methane" / version 1
Value(s) applied:	22.414 m^3/kmol
Purpose of data:	Used for the Baseline and Project emission calculations
Additional comment:	

Data / Parameter:	**MM_i: Molecular mass of component i**
Unit:	Kg/kmol
Description:	Molecular mass of component i (i = methane, carbon dioxide, oxygen or nitrogen)
Source of data:	"Tool to determine project emissions from flaring gases containing methane" / version 1
Value(s) applied:	MM_{CH4} = 16.04 kg/kmol MM_{CO2} = 44.01 kg/kmol MM_{O2} = 32 kg/kmol MM_{N2} = 28.02 kg/kmol
Purpose of data:	Used for the Baseline and Project emission calculations
Additional comment:	

Data / Parameter:	**MF_{O2}: Oxygen volumetric fraction of air**
Unit:	Dimensionless
Description:	Oxygen volumetric fraction of air
Source of data:	"Tool to determine project emissions from flaring gases containing methane" / version 1
Value(s) applied:	MF_{O2} = 0.21
Purpose of data:	Used for the Baseline and Project emission calculations
Additional comment:	

Data / Parameter:	**AF**
Unit:	Dimensionless
Description:	Adjustment Factor
Source of data:	Analysis carried out by the project participant
Value(s) applied:	10%
Purpose of data:	Used for the Baseline and Project emission calculations
Additional comment:	

D.2. Data and parameters monitored

Data / Parameter:	**$LFG_{flare\ 1}$ for flare stack 1**
Unit:	m^3
Description:	Total amount of landfill gas captured for flare stack 1
Measured /Calculated /Default:	Measured
Source of data:	Flow meter

Value(s) of monitored parameter:	Refer to annex 1
Monitoring equipment:	Type: V-Cone + Differential pressure transmitter Accuracy class: +/- 0.1% span (for the pressure transmitter) Serial number: 07-1656 + A8B7518F / 1QB5114 Calibration frequency: 12 months Date of last calibrations: 23/5/2011, 16/05/2012 Validity: 16/5/2013
Measuring/ Reading/ Recording frequency:	Measuring : Continuous Reading : Continuous Recording : Every 4 minutes
Calculation method (if applicable):	This type of volumetric flow meter is particularly adapted for monitoring flow on landfill gas. The device uses the Bernoulli principle generating a pressure drop through an obstacle. The manufacturer provides then an algorithm to translate the monitored pressure difference into a flow (Manual of GRS-Valtech/MAIN/). This algorithm is expressed below: (All the constants applicable to the flow calculation are provided by the V-Cone manufacturer (McCROMETER) in the document entitled 'Final Inspection Check list Vcone 07-1656' provided within the section 19 of the Manual of GRS Valtech): First the residual gas density at flowing conditions must be calculated as follows for landfill gas ("F1" refers to Flare 1 parameters): **(Eq. A)** $F1\_\rho RG\_flow\ (kg/m^3) = [F1\_wCH4 * MM\_CH4 + F1\_fvCO2 * MM\_CO2 + F1\_fvO2\_flow * MM\_O2 + (1-F1\_wCH4-F1\_fvCO2-F1\_fvO2\_flow) * MM\_N2] / MVn / Z * F1\_P / (Pn/100) * Tn / (Tn+F1\_T)$ Where Z is the flowing gas compressibility factor (Z = 0,9991 for this application, as provided by the V-Cone manufacturer in 'Final Inspection Check list Vcone 07-1656') Then, the gas expansion factor must be calculated as follows: **(Eq. B)** $F1\_Y = 1 - (0.755+6.787 * F1\_Vcone\_Beta^8) * F1\_DP / Vcone\_k / F1\_P$ Where F1_DP is the differential pressure measured at the Flare 1 V-Cone and Vcone_k, F1_Vcone_Beta are application sizing constants provided by the V-Cone manufacturer in 'Final Inspection Check list Vcone 07-1656': $F1\_Vcone\_Beta = 0.7499$ $Vcone\_k = 1.293$ It is now possible to get the gas flow rate at flowing conditions with the following formula: **(Eq. C)** $F1\_FV\_real\ (m^3/h) = \pi/4 * [2 * (F1\_DP * 100) / F1\_\rho RG\_flow / (1-F1\_Vcone\_Beta\text{^}4)]^{0,5} * (Vcone\_Dm * F1\_Vcone\_Beta)^2 * F1\_Vcone\_Cd * F1\_Y * 3600$ Where Vcone_Dm is the inside diameter of the V-Cone and F1_Vcone_Cd an application sizing constant provided by the V-Cone manufacturer in 'Final Inspection Check list Vcone 07-1656':

	Vcone_Dm = 0.14633 m ***F1_Vcone_Cd = 0.9282*** At last, the gas flow rate at normal conditions is given by the following conversion formula: **(Eq. D)** ***F1_FV_RG (Nm^3/h) = F1_FV_real * F1_P/(Pn/100) * Tn/(Tn+F1_T)*** A demoisturizing unit is installed upstream of the blowers where the Residual gas temperature is at all time below 60°C, ensuring flow and gas quality are monitored on the same basis as per the Version 1 of the "Tool to determine project emissions from flaring gases containing methane."
QA/QC procedures:	Daily the technician checks that the flow is within the operating range of the differential pressure transmitter (0 to 40 mbars). Moreover, he measures the residual gas velocity in several points of the LFG plant using a portable anemometer: Flare 1 pipe, Flare 2 pipe, and main HDPE pipes. He registers the values on an electronic daily control sheet which automatically inform him about the gas flow rate estimate for each point of measurement. These daily control provides numerous crosschecks of the validity of the V-Cone flowmeter measurement. The geometric profile of V-Cone does not require any periodic calibration, as it does not suffer alterations over the operating conditions. As recommended by the V-Cone manufacturer, the device is opened and cleaned once a year to verify there is no accidental obstruction of the flow. Therefore, only the differential pressure transmitter, constituting the flowmeter shall be calibrated. This calibration is carried out with a pressure generator and a certified digital manometer. The values registered in the data logger are directly compared to the measurements of the reference instrument, so that the scope of the calibration covers the entire process of data recording.
Purpose of data:	Used for the Baseline and Project emission calculations
Additional comment:	

Data / Parameter:	**$LFG_{flare\ 2}$ for flare stack 2**
Unit:	m^3
Description:	Total amount of landfill gas captured for flare stack 2
Measured /Calculated /Default:	Measured
Source of data:	Flow meter
Value(s) of monitored parameter:	Refer to annex 1
Monitoring equipment:	Type: V-Cone + Differential pressure transmitter Accuracy class: +/- 0.1 % span (for the pressure transmitter) Serial number: 08-3033 + A7F9524F / 1LA1250 Calibration frequency: 12 months Date of last calibrations: 23/05/2011, 16/05/2012 Validity: 16/05/2013
Measuring/ Reading/ Recording frequency:	Measuring : Continuous Reading : Continuous Recording : Every 4 minutes
Calculation method (if applicable):	This type of volumetric flow meter is particularly adapted for monitoring flow on landfill gas. The device uses the Bernoulli principle generating a

pressure drop through an obstacle. The manufacturer provides then an algorithm to translate the monitored pressure difference into a flow (Manual of GRS-Valtech).
This algorithm is expressed below:
(All the constants applicable to the flow calculation are provided by the V-Cone manufacturer (McCROMETER) in the document entitled 'Final Inspection Check list Vcone 08-3033' provided within the section 19 of the Manual of GRS Valtech):

First the residual gas density at flowing conditions must be calculated as follows for landfill gas ("F2" refers to Flare 2 parameters):

(Eq. A)

$$F2\_\rho RG\_flow\ (kg/m^3) = [F2\_wCH4 * MM\_CH4 + F2\_fvCO2 * MM\_CO2 + F2\_fvO2\_flow * MM\_O2 + (1 - F2\_wCH4 - F2\_fvCO2 - F2\_fvO2\_flow) * MM\_N2] / MVn / Z * F2\_P / (Pn/100) * Tn / (Tn + F2\_T)$$

Where Z is the flowing gas compressibility factor (Z = 0,9991 for this application, as provided by the V-Cone manufacturer in 'Final Inspection Check list Vcone 08-3033')

Then, the gas expansion factor must be calculated as follows:

(Eq. B)

$$F2\_Y = 1 - (0.755 + 6.787 * F2\_Vcone\_Beta^8) * F2\_DP / Vcone\_k / F2\_P$$

Where F2_DP is the differential pressure measured at the Flare 2 V-Cone and Vcone_k, F2_Vcone_Beta are application sizing constants provided by the V-Cone manufacturer in 'Final Inspection Check list Vcone 08-3033':

$$F2\_Vcone\_Beta = 0.7501$$
$$Vcone\_k = 1.293$$

It is now possible to get the gas flow rate at flowing conditions with the following formula:

(Eq. C)

$$F2\_FV\_real\ (m^3/h) = \pi/4 * [2 * (F2\_DP * 100) / F2\_\rho RG\_flow / (1 - F2\_Vcone\_Beta\text{^}4)]^{0,5} * (Vcone\_Dm * F2\_Vcone\_Beta)^2 * F2\_Vcone\_Cd * F2\_Y * 3600$$

Where Vcone_Dm is the inside diameter of the V-Cone and F2_Vcone_Cd an application sizing constant provided by the V-Cone manufacturer in 'Final Inspection Check list Vcone 08-3033':

$$Vcone\_Dm = 0.14633\ m$$
$$F2\_Vcone\_Cd = 0.9078$$

At last, the gas flow rate at normal conditions is given by the following conversion formula:

(Eq. D)

$$F2\_FV\_RG\ (Nm^3/h) = F2\_FV\_real * F2\_P / (Pn/100) * Tn / (Tn + F2\_T)$$

A demoisturizing unit is installed upstream of the blowers where the Residual gas temperature is at all time below 60°C, ensuring flow and

	gas quality are monitored on the same basis as per the Version 1 of the "Tool to determine project emissions from flaring gases containing methane."
QA/QC procedures:	Daily the technician checks that the flow is within the operating range of the differential pressure transmitter (0 to 40 mbars). Moreover, he measures the residual gas velocity in several points of the LFG plant using a portable anemometer: Flare 1 pipe, Flare 2 pipe, and main HDPE pipes. He registers the values on an electronic daily control sheet which automatically inform him about the gas flow rate estimate for each point of measurement. These daily control provides numerous crosschecks of the validity of the V-Cone flowmeter measurement. The geometric profile of V-Cone does not require any periodic calibration, as it does not suffer alterations over the operating conditions. As recommended by the V-Cone manufacturer, the device is opened and cleaned once a year to verify there is no accidental obstruction of the flow. Therefore, only the differential pressure transmitter, constituting the flowmeter shall be calibrated. This calibration is carried out with a pressure generator and a certified digital manometer. The values registered in the data logger are directly compared to the measurements of the reference instrument, so that the scope of the calibration covers the entire process of data recording.
Purpose of data:	Used for the Baseline and Project emission calculations
Additional comment:	

Data / Parameter:	**$PE_{flare\ 1}$ for flare stack 1**
Unit:	tCO_2
Description:	Project emissions from flaring of the residual gas stream through flare stack 1
Measured /Calculated /Default:	Calculated
Source of data:	Calculated from the listed parameters W_{CH4}, fv_i, $fv_{CH4,FG}$, t_{O2}, $LFG_{flare\ 1}$
Value(s) of monitored parameter:	Refer to annex 1
Monitoring equipment:	N/A
Measuring/ Reading/ Recording frequency:	Calculated every 4 minutes
Calculation method (if applicable):	As per the "Tool to determine methane emissions avoided from flaring gases containing methane" / version 1.
QA/QC procedures:	The calculation is automated with the macro used to calculate the emission reductions to avoid manual intervention.
Purpose of data:	Used for the Baseline and Project emission calculations
Additional comment:	

Data / Parameter:	**$PE_{flare\ 2}$ for flare stack 2**
Unit:	tCO_2
Description:	Project emissions from flaring of the residual gas stream through flare stack 2
Measured /Calculated /Default:	Calculated
Source of data:	Calculated from the listed parameters W_{CH4}, fv_i, $fv_{CH4,FG}$, t_{O2}, $LFG_{flare\ 2}$
Value(s) of monitored parameter:	Refer to annex 1
Monitoring equipment:	N/A
Measuring/ Reading/ Recording frequency:	Calculated every 4 minutes

Calculation method (if applicable):	As per the "Tool to determine methane emissions avoided from flaring gases containing methane" / version 1.
QA/QC procedures:	The calculation is automated with the macro used to calculate the emission reductions to avoid manual intervention.
Purpose of data:	Used for the Baseline and Project emission calculations
Additional comment:	

Data / Parameter:	**W_{CH4}**
Unit:	m^3 CH_4 / m^3 LFG
Description:	Methane fraction in the landfill gas
Measured /Calculated /Default:	Measured by continuous gas quality analyser.
Source of data:	Instrument
Value(s) of monitored parameter:	Refer to annex 1
Monitoring equipment:	Type: Infrared analyser Accuracy class: +/- 0.5 vol% Serial number: 3.345730.8 Calibration frequency: every 2 weeks for auto calibration and annually by a third party technician Date of last calibrations: 13/4/2011, 12/3/2012, 12/3/2013 Validity: 12/3/2014
Measuring/ Reading/ Recording frequency:	Measuring : Continuous Reading : Continuous Recording : Every 4 minutes
Calculation method (if applicable):	N/A
QA/QC procedures:	The equipment is fitted with an auto calibration system allowing checking the calibration every 2 weeks. Moreover, the technician measures daily the methane fraction of the landfill gas using a portable device. The value is registered on an electronic record. This crosscheck provides useful information to detect any drift of the infrared analyser. The calibration of the infrared analyser has to be made once a year by a third party technician. He uses certified gases mixtures to calibrate the span and the zero of the methane measurement size. At the same time, he calibrates the internal cell that is used for methane automatic calibration, so that the drift on automatic calibration is corrected as well.
Purpose of data:	Used for the Baseline and Project emission calculations
Additional comment:	

Data / Parameter:	**T_1 for flare stack 1**
Unit:	° C
Description:	Temperature of the landfill gas delivered to flare stack 1
Measured /Calculated /Default:	Measured
Source of data:	Instrument
Value(s) of monitored parameter:	Refer to excel spreadsheets
Monitoring equipment:	Type: Thermo-resistance PT100 Accuracy class: +/- 0.35°C Serial numbers: PT100-CR01106/11 and PT100-CR12910/11 and PT100-CR11191/12 Calibration frequency: annually Date of last calibrations: 28/1/2011, 14/12/2011, 14/11/2012 Validity: 14/11/2013
Measuring/ Reading/ Recording frequency:	Measuring : Continuous Reading : Continuous

	Recording : Every 4 minutes
Calculation method (if applicable):	N/A
QA/QC procedures:	PT100 are either verified annually or changed as recommended by the manufacturer. In case of verification, the values registered in the data logger can be directly compared to the measurements of the reference instrument, so that the scope of the calibration covers the entire process of data recording. The technician of the LFG Plant measures daily the landfill gas temperature using a portable device. This procedure makes it easy to detect any incoherence on the PT100 temperature measurement.
Purpose of data:	Used for the Baseline and Project emission calculations
Additional comment:	

Data / Parameter:	**T_2 for flare stack 2**
Unit:	° C
Description:	Temperature of the landfill gas delivered to flare stack 2
Measured /Calculated /Default:	Measured
Source of data:	Instrument
Value(s) of monitored parameter:	Refer to excel spreadsheets
Monitoring equipment:	Type: Thermo-resistance PT100 Accuracy class: +/- 0.35°C Serial numbers: PT100-CR09923/11 and PT100-LV34114-12 Calibration frequency: annually Date of last calibrations: 21/9/2011, 29/8/2012 Validity: 29/8/2013
Measuring/ Reading/ Recording frequency:	Measuring : Continuous Reading : Continuous Recording : Every 4 minutes
Calculation method (if applicable):	N/A
QA/QC procedures:	PT100 are either verified annually or changed as recommended by the manufacturer. In case of verification, the values registered in the data logger can be directly compared to the measurements of the reference instrument, so that the scope of the calibration covers the entire process of data recording. The technician of the LFG Plant measures daily the landfill gas temperature using a portable device. This procedure makes it easy to detect any incoherence on the PT100 temperature measurement.
Purpose of data:	Used for the Baseline and Project emission calculations
Additional comment:	

Data / Parameter:	**P_1 for flare stack 1**
Unit:	Pa
Description:	Pressure of the landfill gas delivered to flare stack 1
Measured /Calculated /Default:	Measured
Source of data:	Instrument
Value(s) of monitored parameter:	Refer to excel spreadsheets
Monitoring equipment:	Type: Capacitive silicon sensor Accuracy class: +/- 0.8 mbar Serial number: A7F9668F / C282814 and A7F9666F / C282803

	Calibration frequency: Annually Date of last calibrations: 31/7/2011, 15/06/2012, 4/7/2012 Validity: 4/7/2013
Measuring/ Reading/ Recording frequency:	Measuring : Continuous Reading : Continuous Recording : Every 4 minutes
Calculation method (if applicable):	N/A
QA/QC procedures:	Daily the technician measures with a portable pressure transmitter the relative pressure inside the Flare 1 pipe. Other portable device provides the atmospheric pressure, so that it is possible to estimate the absolute pressure inside the Flare 1 pipe. This information is registered on an electronic record and compared to the value delivered by the fixed pressure transmitter. Absolute pressure transmitters have to be calibrated each year. The calibration is carried out with a pressure generator, a certified digital manometer, and a certified digital barometer. The values registered in the data logger are directly compared to the measurements of the reference instrument, so that the scope of the calibration covers the entire process of data recording.
Purpose of data:	Used for the Baseline and Project emission calculations
Additional comment:	

Data / Parameter:	**P_2 for flare stack 2**
Unit:	Pa
Description:	Pressure of the landfill gas delivered to flare stack 2
Measured /Calculated /Default:	Measured
Source of data:	Instrument
Value(s) of monitored parameter:	Refer to excel spreadsheets
Monitoring equipment:	Type: Capacitive silicon sensor Accuracy class: +/- 0.8mbar Serial number: A7F9667F / C282810 and A7F9666F / C282803 Calibration frequency: Annually Date of last calibrations: 19/7/2011, 15/06/2012, 24/7/2012 Validity: 24/7/2013
Measuring/ Reading/ Recording frequency:	Measuring : Continuous Reading : Continuous Recording : Every 4 minutes
Calculation method (if applicable):	N/A
QA/QC procedures:	Daily the technician measures with a portable pressure transmitter the relative pressure inside the Flare 2 pipe. Other portable device provides the atmospheric pressure, so that it is possible to estimate the absolute pressure inside the Flare 2 pipe. This information is registered on an electronic record and compared to the value delivered by the fixed pressure transmitter. Absolute pressure transmitters have to be calibrated each year. The calibration is carried out with a pressure generator, a certified digital manometer, and a certified digital barometer. The values registered in the data logger are directly compared to the measurements of the reference instrument, so that the scope of the calibration covers the entire process of data recording.
Purpose of data:	Used for the Baseline and Project emission calculations
Additional comment:	

Data / Parameter:	EL_{IMP}
Unit:	MWh
Description:	Total amount of electricity imported to meet project requirement (from both grid and diesel generator)
Measured /Calculated /Default:	Measured
Source of data:	Commercial Meter
Value(s) of monitored parameter:	Refer to annex 1
Monitoring equipment:	Type: Microprocessed electricity meter Accuracy class: +/- 3% (+/- 1% of active energy reading for the electricity meter +/- 2% of active energy for the current transformers that are used in series with the electricity meter) Serial number: 38004935 Calibration frequency: Annual Date of last calibrations: 24/3/2011, 16/2/2012, 16/4/2013 Validity: 16/4/2014
Measuring/ Reading/ Recording frequency:	Measuring : Continuous Reading : Continuous Recording : Every month
Calculation method (if applicable):	N/A
QA/QC procedures:	The net cumulated electricity imported for the project activity is registered continuously on the electricity import meter. At least, once per month, the technician has to record manually the total cumulated electricity counted by the instrument with indication of the date and time of the record. The calibration of the electricity import meter is done once a year using a certified digital electricity meter that measures in parallel the same electricity demand of the LFG Plant as the instrument to be calibrated. The comparison of the energy records between the 2 instruments over this period is used to determine the relative error of the instrument.
Purpose of data:	Used for the Project emission calculation
Additional comment:	

Data / Parameter:	Regulatory requirements relating to landfill gas projects
Unit:	Test
Description:	Regulatory requirements relating to landfill gas projects
Measured /Calculated /Default:	
Source of data:	National Legislation or any other applicable
Value(s) of monitored parameter:	No change since project registration
Monitoring equipment:	N/A
Measuring/ Reading/ Recording frequency:	The information though recorded annually, is used for changes to the adjustment factor (AF) or directly MDreg,y at renewal of the crediting period.
Calculation method (if applicable):	N/A
QA/QC procedures:	
Purpose of data:	Used for the Baseline and Project emission calculations
Additional comment:	

Data / Parameter:	fv_i
Unit:	-
Description:	Volumetric fraction of component *i* in the residual dry gas where *i* = CO_2,

	O_2
Measured /Calculated /Default:	Measured
Source of data:	Gas analyser
Value(s) of monitored parameter:	Refer to annex 1
Monitoring equipment:	**Measurement of CO_2** Type: Infrared analyser Accuracy class: +/- 0.5 vol% Serial number: 3.345730.8 Calibration frequency: every 2 weeks for auto calibration and annually by a third party technician Date of last calibrations: 13/4/2011, 12/3/2012, 12/3/2013 Validity: 12/3/2014 **Measurement of O_2** Type: Electrochemical sensor Accuracy class: +/- 0.125 vol% Serial number: 3.345730.8 Calibration frequency: every 2 weeks for auto calibration and annually by a third party technician Date of last calibrations: 13/4/2011, 12/3/2012, 12/3/2013 Validity: 12/3/2014
Measuring/ Reading/ Recording frequency:	Measuring : Continuous Reading : Continuous Recording : Every 4 minutes
Calculation method (if applicable):	N/A
QA/QC procedures:	The tools and methodology does not require specific monitoring of these data. The Project participant has decided to install this additional equipment to increase the accuracy of the monitoring of the flare efficiency. If one of the parameter used in the calculation is out of its operating range, the value will not be taken into account and will be replaced by the conservative value described in the "Tool to determine methane emissions avoided from flaring gases containing methane" / version 1. The equipment is fitted with an auto calibration system allowing checking the calibration every 2 weeks. Moreover, the technician measures daily the carbon dioxide and oxygen fraction of the landfill gas using a portable device. The value is registered on an electronic record. This crosscheck provides useful information to detect any drift of the infrared analyser or electrochemical sensor. The calibration of the analyser has to be made once a year by a third party technician. He uses certified gas mixtures to calibrate the span and the zero for each measured gas range. At the same time, he calibrates the internal cell that is used for CO_2 automatic calibration, so that the drift on automatic calibration is corrected as well.
Purpose of data:	Used for the Baseline and Project emission calculations
Additional comment:	

Data / Parameter:	**$fv_{CH4,FG}$**
Unit:	mg/m^3
Description:	Concentration of methane in the exhaust gas of the flare in dry basis at normal conditions
Measured /Calculated /Default:	Measured
Source of data:	Gas analyser

Value(s) of monitored parameter:	Refer to excel spreadsheets
Monitoring equipment:	Type: infrared analyser Accuracy class: +/- 15 ppmv Serial number: 3.345731.8 Calibration frequency: every 2 weeks for auto calibration and annually by a third party technician Date of last calibrations: 13/4/2011, 12/3/2012, 12/3/2013 Validity: 12/3/2014
Measuring/ Reading/ Recording frequency:	Measuring : Continuous Reading : Continuous Recording : Every 4 minutes
Calculation method (if applicable):	N/A
QA/QC procedures:	The equipment is fitted with an auto calibration system allowing checking the calibration every 2 weeks. The calibration of the infrared analyzer has to be made once a year by a third party technician. He uses certified gases mixtures to calibrate the span and the zero of the methane measurement size. At the same time, he calibrates the internal cell that is used for automatic calibration, so that the drift on automatic calibration is corrected as well.
Purpose of data:	Used for the Baseline and Project emission calculations
Additional comment:	

Data / Parameter:	**t_{O2}**
Unit:	-
Description:	Volumetric fraction of O_2 in the exhaust gas of the flare
Measured /Calculated /Default:	Measured
Source of data:	Gas analyser
Value(s) of monitored parameter:	Refer to excel spreadsheets
Monitoring equipment:	Type: electrochemical sensor Accuracy class: +/- 0.125 vol% Serial number: 3.345731.8 Calibration frequency: every 2 weeks for auto calibration and annually by a third party technician Date of last calibrations: 13/4/2011, 12/3/2012, 12/3/2013 Validity: 12/3/2014
Measuring/ Reading/ Recording frequency:	Measuring : Continuous Reading : Continuous Recording : Every 4 minutes
Calculation method (if applicable):	N/A
QA/QC procedures:	The equipment is fitted with an auto calibration system allowing checking the calibration every 2 weeks. Moreover, the technician has a portable gas analyser that he can used to check the oxygen volumetric fraction of the flare exhaust gas by connecting to the exhaust gas collection hose. This crosscheck provides useful information to detect any drift of the exhaust gas electrochemical sensor. The calibration of the analyser has to be made once a year by a third party technician. He uses certified gas mixtures to calibrate the span and the zero of the oxygen measurement size.

Purpose of data:	Used for the Baseline and Project emission calculations
Additional comment:	

Data / Parameter:	**$T_{flare\ 1}$ for flare stack 1**
Unit:	° C
Description:	Temperature in the exhaust gas of the flare stack 1
Measured /Calculated /Default:	Measured
Source of data:	A thermocouple type N is used.
Value(s) of monitored parameter:	Refer to excel spreadsheets
Monitoring equipment:	Measuring : Continuous Reading : Continuous Recording : Every 4 minutes
Measuring/ Reading/ Recording frequency:	Type: TC type N Accuracy class: +/- 0.4% of the reading Serial number: TC-CR01107/11 and TC-CR12909/11 and TC-CR11189/12 Calibration frequency: annually Date of last calibrations: 27/1/2011, 12/12/2011, 19/11/2012 Validity: 19/11/2013
Calculation method (if applicable):	As per the Temporary deviations from the monitoring plan or the monitoring methodology (TDEV) approved by the EB under the reference number PRC-1506-001, a minimum value of 780°C for $T_{flare\ 1}$ is required from 1st December 2011 to 7th January 2012 (both days included) over the Monitoring period n° 4 to claim emission reductions through Flare stack 1.
QA/QC procedures:	The thermocouples type N are either verified annually or changed. In case of verification, the values registered in the data logger can be directly compared to the measurements of the reference instrument, so that the scope of the calibration covers the entire process of data recording. The failure of a thermocouple is generally easy to detect as the instrument starts to indicate a fixed temperature out of his measurement range, or starts to oscillate very quickly.
Purpose of data:	Used for the Baseline and Project emission calculations
Additional comment:	

Data / Parameter:	**$T_{flare\ 2}$ for flare stack 2**
Unit:	° C
Description:	Temperature in the exhaust gas of the flare stack 2
Measured /Calculated /Default:	Measured
Source of data:	A thermocouple type N is used.
Value(s) of monitored parameter:	Refer to excel spreadsheets
Monitoring equipment:	Measuring : Continuous Reading : Continuous Recording : Every 4 minutes
Measuring/ Reading/ Recording frequency:	Type: TC type N Accuracy class: +/- 0.4% of the reading Serial number: TC-CR01108/11 and TC-CR12908/11 and TC-CR11190/12 Calibration frequency: annually Date of last calibrations: 27/1/2011, 12/12/2011, 19/11/2012 Validity: 19/11/2013
Calculation method (if applicable):	As per the Temporary deviations from the monitoring plan or the monitoring methodology (TDEV) approved by the EB under the reference

	number PRC-1506-001, a minimum value of 780°C for $T_{flare\ 2}$ is required from 1st December 2011 to 7th January 2012 (both days included) over the Monitoring period n° 4 to claim emission reductions through Flare stack 2.
QA/QC procedures:	The thermocouples type N are either verified annually or changed. In case of verification, the values registered in the data logger can be directly compared to the measurements of the reference instrument, so that the scope of the calibration covers the entire process of data recording. The failure of a thermocouple is generally easy to detect as the instrument starts to indicate a fixed temperature out of his measurement range, or starts to oscillate very quickly.
Purpose of data:	Used for the Baseline and Project emission calculations
Additional comment:	

D.3. Implementation of sampling plan

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Not applicable.

SECTION E. Calculation of emission reductions or GHG removals by sinks

E.1. Calculation of baseline emissions or baseline net GHG removals by sinks

>>

As per the methodology, the baseline is proportional to the amount of landfill gas captured. The Baseline is defined through an Adjustment Factor define ex-ante. For the project of Tijuquinhas, the adjustment factor (AF) was set ex-ante at 10% for the duration of the crediting period.

The baseline can be calculated as follows:

$$BE = \sum_{u=1,2} \left[\sum_{n=1..N} \left[\left(LFG_{flare,u,n} * w_{CH4,n} * D_{CH4} * (1-AF) * GWP_{CH4} \right) - \left(PE_{flare,u,n} * (1-AF) \right) \right] \right]$$

Where,

BE	Baseline Emissions (tCO_2)
$LFG_{flare,u,n}$	Quantity of landfill gas flared measured in cubic meters (m^3) by the flare unit *u* during the time step associated to the set of record *n*
$W_{CH4,n}$	Methane fraction of the landfill gas during the time step associated to the set of record *n*
D_{CH4}	Methane density expressed in t_{CH4}/m^3_{CH4}
GWP_{CH4}	Global Warming Potential value for methane: • 21 tCO_{2eq}/tCH4 for first commitment period • 25 tCO_{2eq}/tCH4 for second commitment period
AF	Adjustment factor
$PE_{flare,u,n}$	Flare methane emissions through the flare unit *u* during the time step associated to the set of record *n*
N	Is the number of set of records during the monitoring period

In the baseline scenario, there was no consumption of electricity, fossil fuel. The baseline emissions only consist to the methane emission generated by the anaerobic digestion of the waste that would have been emitted to the atmosphere in the absence of the project activity.

The baseline is calculated and results are presented in section E4.

$PE_{flare, u, n}$ is calculated according to "the tool to determine project emissions from flaring gases containing methane".

$$PE_{flare,u,n} = \sum TM_{RG,u,n} * (1 - \eta_{flare,u,n}) * \frac{GWP_{CH4}}{1000}$$

Where

$PE_{flare,u,n}$	tCO_{2e}	Flare methane emissions through the flare unit *u* during the time step associated to the set of record *n*
$TM_{RG,u,n}$	Kg/h	Mass flow rate of methane in the residual gas of the flare unit *u* during the time step associated to the set of record *n*
GWP_{CH4}	tCO_{2e}/tCH_4	Global Warming Potential

E.2. Calculation of project emissions or actual net GHG removals by sinks

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The project emissions are only associated with the electricity consumption.

Indeed, the project emissions due to fossil fuel combustion through the diesel generator are included in the total project emissions from electricity consumption.

Electricity is imported from the grid and from an onsite diesel generator to supply the equipments installed as part of the project activity. The associated emissions are calculated as follows:

$$PE_{project} = EL_{IMP} * CEF_{electricity}$$

The $CEF_{electricity}$ has been determined as per the Version 1 of the "Tool to calculate baseline, project and/or leakage emissions from electricity consumption" and the applicable value for the fourth monitoring period is 1.56 tCO_{2eq}/MWh.
The total electricity consumption from all sources over the fourth monitoring period is equal to 867.377 MWh.

Consequently, the emissions of the project for the fourth monitoring period are 1,354 tCO_{2eq}.

The project emissions are calculated and results are presented in section E4.

E.3. Calculation of leakage

>>

There is no leakage associated with this project.

E.4. Summary of calculation of emission reductions or net anthropogenic GHG removals by sinks

>>

The emission reductions achieved by the project activity (ER_y) should be calculated from the following equation:

$$ER = \sum_{u=1,2} \left[\sum_{n=1..N} \left[\left(LFG_{flare,u,n} * w_{CH4,n} * D_{CH4} * (1 - AF) * GWP_{CH4} \right) - \left(PE_{flare,u,n} * (1 - AF) \right) \right] \right] - EL_{IMP} * CEF_{electricity}$$

Where,

$LFG_{flare,u,n}$	Quantity of landfill gas flared measured in cubic meters (m^3) by the flare unit u during the time step associated to the set of record *n*

$W_{CH4,n}$	Methane fraction of the landfill gas during the time step associated to the set of record *n*
D_{CH4}	Methane density expressed in t_{CH4}/m^3_{CH4}
EL_{IMP}	Net incremental electricity imported, defined as difference of project imports less any imports of electricity in the baseline, to meet the project requirements, in MWh
$CEF_{electricity}$	CO_2 emissions intensity of the electricity displaced, in tCO_{2eq}/MWh. This has been determined as per the version 1 of the "Tool to calculate baseline, project and/or leakage emissions from electricity consumption".
GWP_{CH4}	Global Warming Potential value for methane: • 21 tCO_{2eq}/tCH4 for first commitment period • 25 tCO_{2eq}/tCH4 for second commitment period
AF	Adjustment factor
$PE_{flare,u,n}$	Emissions from flaring of the residual gas stream in tCO_{2e} through the flare unit *u* during the time step associated to the set of record *n*
N	Is the number of set of records during the monitoring period

Applying this formula to the data collected over the monitoring period:

Item	Baseline emissions or baseline net GHG removals by sinks (tCO2e)	Project emissions or actual net GHG removals by sinks (tCO2e)	Leakage (tCO2e)	Emission reductions or net anthropogenic GHG removals by sinks (tCO2e)
Dec-2011	18,477.22	80.56	-	18,396.66
Jan-2012	17,717.90	79.01	-	17,638.88
Feb-2012	16,419.70	74.26	-	16,345.44
Mar-2012	17,909.84	83.19	-	17,826.65
Apr-2012	17,238.65	80.01	-	17,158.64
May-2012	18,533.51	83.55	-	18,449.96
Jun-2012	18,461.04	82.39	-	18,378.65
Jul-2012	18,782.22	84.33	-	18,697.89
Aug-2012	18,593.55	83.90	-	18,509.64
Sep-2012	16,728.48	76.72	-	16,651.76
Oct-2012	19,211.87	87.94	-	19,123.93
Nov-2012	18,493.04	84.51	-	18,408.53
Dec-2012	18,117.11	84.54	-	18,032.57
Jan-2013	21,455.72	82.97	-	21,372.75
Feb-2013	17,404.19	44.58	-	17,359.61
Mar-2013	24,707.49	82.65	-	24,624.84
Apr-2013	23,606.64	77.98	-	23,528.66
Total	**321,859**	**1,354**	**-**	**320,505**

E.5. Comparison of actual emission reductions or net anthropogenic GHG removals by sinks with estimates in registered PDD

Item	Values estimated in ex-ante calculation of registered PDD	Actual values achieved during this monitoring period
2011 Emission reductions (31 days)	**177,962*31/365 = 15,114 tCO_2e**	**18,397 tCO_2e**
2012 Emission reductions (366 days)	**203,011 tCO_2e**	**215,222 tCO_2e**

2013 Emission reductions (120 days)	In registered PDD: **247,244*120/365 = 81,286 tCO_2e** With GWP_{CH4} = 25 tCO_2e/tCH_4: **294,551*120/365 = 96,839 tCO_2e**	**86,886 tCO_2e**
Total Emission reductions or GHG removals by sinks (tCO_2e)	In registered PDD: **299,411 tCO_2e** With GWP_{CH4} = 25 tCO_2e/tCH_4: **314,964 tCO_2e**	**320,505 tCO_2e**

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

>>

Since the Global Warming Potential of methane GWP_{CH4} has been reevaluated to 25 tCO_2e / tCH_4 for the second commitment period, it is necessary to update the PDD estimates with the same hypothesis from 2013 onwards.

Base on GWP_{CH4} new assumption, the PDD updated emission reductions table for the 1st crediting period is the following:

Year		Annual estimation of emission reductions in tonne of CO_{2e}
2008	8 months	90,623
2009	12 months	166,889
2010	12 months	155,885
2011	12 months	177,962
2012	12 months	203,011
2013	12 months	294,551
2014	12 months	266,520
2015	4 months	80,386
Total estimated reductions (tonnes of CO_{2e})		1,435,827
Total number of crediting years		7 years
Annual average over the crediting period of estimated reductions (tonnes of CO_{2e})		205,118

Table 7: Updated annual estimation of emission reductions in tonnes of CO2e

From this updated table, the emission reductions estimate from PDD for the 4th Monitoring Period is calculated as follows (apportioning with effective fraction of time included in the monitoring period):

177,962 * (31 days / 365 days) + 203,011 + 294,551 * (120 days / 365 days) = **314,964 tCO_2e**

Therefore, the overall claimed emission reductions for the fourth monitoring period are higher than the ex-ante estimation of the revised PDD version 4.3 by 1.76%.

This variation is not imputable to waste input variation between PDD forecast and reality. Indeed, as shown in the table below, there is no difference between PDD data and real data until 2010 as the registered PDD version 4.3 was updated with the real waste input between 2006 and 2010. From 2011 to April 2013, there

are slight differences with real waste inputs lower than PDD forecasts by respectively 2.7% for 2011, 1.1% for 2012 and 5.8% for 2013 (first 4 months). In order to evaluate the impact on ERs forecast for the 4th Monitoring Period, a simulation was done through the registered PDD model with updated real waste input for 2011, 2012 and 2013. As per the simulation, the PDD Emission Reduction estimation would be reduced by 0.78% from 314,964 tCO_2e to 312,498 tCO_2e over the 4th monitoring period as effect of lower waste input in 2011, 2012 and 2013. Such impact does not explain the slight over performance of the project observed between claimed emission reductions and estimated value in the PDD.

		PDD	REAL DATA		
Year	Days considered	Waste Input (ton)	Weighbridge data (ton)	Variation	Annual growth
2006	365	256,046	256,046	0.0%	
2007	365	276,944	276,944	0.0%	8.2%
2008	366	299,478	299,478	0.0%	8.1%
2009	365	308,996	308,996	0.0%	3.2%
2010	365	326,150	326,150	0.0%	5.6%
2011	365	348,981	339,729	-2.7%	4.2%
2012	366	373,409	369,228	-1.1%	8.7%
2013 (January to April)	120	(*) 399,548 x 132,090 / 369,228 = 142,937	134,588	-5.8%	(**) 134,588 / 132,090 -1 = 1.89%
TOTAL		**2,332,941**	**2,311,159**	**-0.9%**	**6.5%**

(*) In order to account for seasonal variation, the estimation of waste input from PDD for the first 4 months of 2013 was calculated through the ratio: (real waste input 2012 from January to April = 132,090 ton) / (real waste input 2012 = 369,228 ton)

(**) In order to account for seasonal variation, the annual growth of real waste input from 2012 to 2013 was calculated over the period with available data (January to April): (real waste input 2013 from January to April = 134,588 ton) / (real waste input 2012 from January to April = 132,090 ton) - 1

Table 8: Comparison between the real waste input and the PDD estimation

In a general approach, the difference between project performance and PDD forecast is a cumulated effect of variations on the following parameters:

- Waste input
- Landfill Gas Plant availability factor
- Landfill Gas Plant methane destruction rate
- Project emissions due to electricity consumption
- Global methane capture rate

The table below provides the relevant impact of each of these parameters over the 4th monitoring period:

TIME FRAME		EMISSION REDUCTIONS COMPARISON			Impact of WASTE INPUT VARIATION on EMISSION REDUCTIONS			LFG PLANT AVAILIBILITY			LFG PLANT DESTRUCTION RATE			PROJECT EMISSIONS DUE TO ELECTRICITY CONSUMPTION			GLOBAL METHANE CAPTURE RATE		
Year	Days included within the 4th Monitoring Period	Ex-ante PDD (tCO_2e)	Claimed (tCO_2e)	Relative variation between estimated and claimed Emission Reductions	Ex-ante PDD (tCO_2e)	Updated PDD with real waste input (tCO_2e)	Relative impact of waste input variation on Emission Reductions forecast	Ex-ante PDD	Effective	Relative variation between presumed and effective LFG Plant Availibility	Ex-ante PDD	Effective	Relative variation between presumed and effective LFG Plant Destruction Rate	Ex-ante PDD (tCO_2e)	Effective (tCO_2e)	Impact on the relative variation between estimated and claimed Emission Reductions	Ex-ante PDD	Effective	Relative variation between presumed and effective Methane Capture Rate
2011	31 days	15,114	18,397	21.72%	15,114	15,100	-0.09%	100.0%	99.29%	-0.71%	100.0%	100.00%	0.00%	65	81	-0.10%	65.57%	80.54%	22.84%
2012	366 days	203,011	215,222	6.01%	203,011	201,975	-0.51%	100.0%	96.84%	-3.16%	100.0%	99.90%	-0.10%	898	985	-0.04%	66.44%	73.21%	10.19%
2013	120 days	96,839	86,886	-10.28%	96,839	95,423	-1.46%	100.0%	98.16%	-1.84%	100.0%	99.97%	-0.03%	369	288	0.08%	67.32%	62.41%	-7.29%
Total 4th Monitoring Period	**517 days**	**314,964**	**320,505**	**1.76%**	314,964	312,498	**-0.78%**	**100.0%**	**97.30%**	**-2.70%**	**100.0%**	**99.92%**	**-0.08%**	**1,332**	**1,354**	**-0.01%**	**66.63%**	**70.30%**	**5.50%**

Table 9: Comparison between project performances and PDD estimation

Considering the table above, the over performance of the project compared to PDD forecast is mainly due to a higher methane capture rate (70.30% instead of 66.63% forecast).

The methane capture rate is directly linked to the extension of the gas collection system as landfilling progresses. The amount of methane collected is higher than the model annual forecast because the improvements of landfill operation practices described over the third monitoring period were maintained:

- The size of the uncovered operation area was considerably reduced and its progress was scheduled

considering the direction of gas collection horizontal drains in order to impact no more than one gas collection drain at each landfilling step; this way, gas collection is maximized around the disposal area.

- Systematic monitoring of the vertical wells was implemented in order to identify the areas where gas collection through horizontal drains is not efficient. Indeed, most of the vertical wells used to be inaccessible because no wellhead was prepared before final elevation was reached. Over the 4th Monitoring Period, all the vertical wells were equipped with temporary wellheads that allow to measure gas pressure and composition. It makes it possible for the landfill gas team to clearly identify the area with a remaining gas collection potential and to carry out the relevant gas network extensions.
- The thickness of the temporary soil cover was increased from 30 to 40 cm on the landfill main platform in order to reduce landfill gas fugitive emissions.

The achieved methane capture rate is consistent with the range of values usually adopted for new collection systems. Indeed, according to pag. 4, Chapter 2 of the study *LFG Energy Project Development Handbook*[1] by USEPA[2]:

"EPA defines a "comprehensive" LFG collection system as a system of vertical wells and/or horizontal collectors providing 100 percent collection system coverage of all areas with waste within one year after the waste is deposited. According to EPA, collection efficiencies at such landfills typically range from 60 to 85 percent, with an average of 75 percent most commonly assumed."

The characteristics of the LFG collection system on the Tijuquinhas landfill are in line with the criteria used by the EPA to define a "comprehensive" system. As expected, both achieved methane capture rate (70.30%) and PDD forecast capture rate (66.63%) over the 4th monitoring period are within the range provided by the USEPA.
As the methane capture rate depends on a lot of factors (collection network design, scheduled implantation, soil cover, liner system, size of the uncovered disposal area, pressure adjustment of the drains and wells, condensate blockages,…), it is subject to variation over the landfill operation lifetime and its determination ex-ante is quite uncertain.

From the explained above, the difference between the PDD emission reductions estimation and the effective claimed emission reductions is reasonable given the uncertainty of landfill gas modeling.

E.7. Actual emission reductions or net anthropogenic GHG removals by sinks during the first commitment period and the period from 1 January 2013 onwards

Item	Actual values achieved up to 31 December 2012	Actual values achieved from 1 January 2013 onwards
Emission reductions or GHG removals by sinks (tCO2e)	**233,619 tCO_2e**	**86,886 tCO_2e**

[1] Available at http://www.epa.gov/lmop/documents/pdfs/pdh_chapter2.pdf
[2] United States Environmental Protection Agency

ANNEX 1

Calculated Emission Reductions over the Fourth Monitoring Period

Version 2

PROACTIVA MEIO AMBIENTE BRASIL

PROACTIVA TIJUQUINHAS LANDFILL GAS CAPTURE AND FLARING PROJECT

DOCUMENT: EMISSION REDUCTION MONTHLY REPORT

REPORTED PERIOD: Dec-11 To Apr-13

REVISION: 2 | DATE: 16/9/13 | Start Date Calculation Period: 01/12/2011 00:00:00 (GMT -2) | End Date Calculation Period: 01/05/2013 00:00:00 (GMT -2)

	FLARE N°1								FLARE N°2								ELECTRICITY	TOTAL
Month	Operating Time	Landfill Gas Analysis			Landfill Gas Volume	Flaring Project Emissions	Flare efficiency	Flare Emissions Reductions	Operating Time	Landfill Gas Analysis			Landfill Gas Volume	Flaring Project Emissions	Flare efficiency	Flare Emissions Reductions	Net incr. Electricity Imported	Project Emissions Reductions
		w_{CH4}	fv_{CO2}	fv_{O2}	LFG_{flare1} (Nm^3)	PE_{flare1} (tCO2e)	η_{flare1}	ER_{flare1} (tCO_2e)		w_{CH4}	fv_{CO2}	fv_{O2}	LFG_{flare2} (Nm^3)	PE_{flare2} (tCO2e)	η_{flare2}	ER_{flare2} (tCO_2e)	EL_{IMP} (MWh)	ER (tCO_2e)
Dec-11	30 days 17:36	52.26%	38.64%	1.27%	1,377,563	0.58	99.99%	9,752.61	30 days 19:48	52.22%	38.60%	1.29%	1,233,277	0.15	100.00%	8,724.61	51.641	18,396.66
Jan-12	29 days 15:38	52.55%	18.83%	1.32%	1,296,176	2.75	99.97%	9,224.46	29 days 20:13	52.55%	19.47%	1.32%	1,194,096	8.31	99.91%	8,493.43	50.648	17,638.88
Feb-12	27 days 05:57	53.60%	2.73%	1.14%	1,185,692	69.95	99.27%	8,547.11	27 days 05:57	53.61%	2.76%	1.14%	1,092,030	64.71	99.27%	7,872.59	47.602	16,345.44
Mar-12	30 days 10:00	51.80%	22.93%	1.72%	1,305,802	1.55	99.98%	9,162.37	30 days 10:20	51.79%	23.03%	1.72%	1,247,043	2.87	99.97%	8,747.47	53.328	17,826.65
Apr-12	29 days 19:56	51.84%	37.05%	1.79%	1,257,037	0.56	99.99%	8,827.48	29 days 19:08	51.83%	37.04%	1.79%	1,197,901	0.40	100.00%	8,411.17	51.288	17,158.64
May-12	30 days 17:56	52.17%	37.62%	1.65%	1,365,763	0.93	99.99%	9,652.35	30 days 19:24	52.18%	37.63%	1.65%	1,256,446	1.25	99.99%	8,881.16	53.557	18,449.96
Jun-12	29 days 13:56	52.77%	37.97%	1.45%	1,346,548	0.41	100.00%	9,626.74	29 days 13:52	52.77%	37.97%	1.45%	1,235,754	0.55	99.99%	8,834.29	52.816	18,378.65
Jul-12	30 days 15:44	52.63%	37.98%	1.55%	1,374,683	0.35	100.00%	9,801.56	30 days 15:34	52.63%	37.98%	1.55%	1,259,550	0.58	99.99%	8,980.66	54.057	18,697.89
Aug-12	29 days 15:28	52.55%	38.00%	1.70%	1,359,823	0.14	100.00%	9,680.39	29 days 15:36	52.55%	38.00%	1.70%	1,252,137	0.56	99.99%	8,913.16	53.785	18,509.64
Sep-12	27 days 01:00	53.51%	38.86%	1.75%	1,203,715	44.69	99.54%	8,685.14	27 days 00:30	53.50%	38.86%	1.76%	1,114,661	40.29	99.55%	8,043.34	49.178	16,651.76
Oct-12	30 days 01:44	52.28%	37.86%	1.69%	1,394,410	0.49	100.00%	9,875.29	30 days 17:33	52.28%	37.86%	1.69%	1,318,245	0.27	100.00%	9,336.58	56.373	19,123.93
Nov-12	29 days 19:42	52.10%	38.44%	1.50%	1,356,903	0.34	100.00%	9,577.43	29 days 19:46	52.11%	38.44%	1.50%	1,263,026	0.12	100.00%	8,915.62	54.176	18,408.53
Dec-12	29 days 07:28	52.28%	38.78%	1.46%	1,317,296	3.82	99.96%	9,325.68	29 days 07:07	52.27%	38.78%	1.46%	1,241,967	3.97	99.96%	8,791.44	54.194	18,032.57
Jan-13	29 days 23:40	51.69%	37.85%	1.79%	1,325,653	5.01	99.96%	11,047.19	30 days 00:21	51.69%	37.84%	1.79%	1,248,725	1.23	99.99%	10,408.53	53.183	21,372.75
Feb-13	27 days 14:28	55.55%	40.46%	0.62%	1,001,493	2.44	99.98%	8,970.58	27 days 15:32	55.55%	40.47%	0.62%	941,718	4.40	99.95%	8,433.61	28.579	17,359.61
Mar-13	30 days 12:04	56.85%	40.86%	0.36%	1,389,165	6.09	99.96%	12,730.34	30 days 11:32	56.84%	40.86%	0.36%	1,306,803	3.79	99.97%	11,977.15	52.983	24,624.84
Apr-13	29 days 16:35	57.27%	40.37%	0.36%	1,323,265	1.40	99.99%	12,221.47	29 days 15:49	57.27%	40.37%	0.36%	1,232,799	1.68	99.99%	11,385.17	49.988	23,528.66
TOTAL	502.54 days	53.12%	34.60%	1.37%	22,180,986	141.49	99.92%	166,708.18	503.50 days	53.12%	34.65%	1.37%	20,636,178	135.11	99.92%	155,149.98	867.377	320,505.05

PROACTIVA MEIO AMBIENTE BRASIL

PROACTIVA TIJUQUINHAS LANDFILL GAS CAPTURE AND FLARING PROJECT

DOCUMENT: EMISSION REDUCTION MONTHLY REPORT

REPORTED MONTH: December 2011

REVISION: 2 | DATE: 16/09/13 | Start Date Calculation Period: 01/12/2011 00:00:00 (GMT -2) | End Date Calculation Period: 01/01/2012 00:00:00 (GMT -2)

	FLARE N°1								FLARE N°2								ELECTRICITY	TOTAL
Month	Operating Time	Landfill Gas Analysis			Landfill Gas Volume	Flaring Project Emissions	Flare efficiency	Flare Emissions Reductions	Operating Time	Landfill Gas Analysis			Landfill Gas Volume	Flaring Project Emissions	Flare efficiency	Flare Emissions Reductions	Net incr. Electricity Imported	Project Emissions Reductions
		w_{CH4}	fv_{CO2}	fv_{O2}	LFG_{flare1} (Nm^3)	PE_{flare1} ($tCO2e$)	η_{flare1}	ER_{flare1} (tCO_2e)		w_{CH4}	fv_{CO2}	fv_{O2}	LFG_{flare2} (Nm^3)	PE_{flare2} ($tCO2e$)	η_{flare2}	ER_{flare2} (tCO_2e)	EL_{IMP} (MWh)	ER (tCO_2e)
01/12/11	23:23:07	52.90%	39.07%	0.99%	43,966.6	0.12	99.97%	314.96	23:28:00	52.90%	39.08%	0.99%	39,215.8	0.00	100.00%	281.03	1.648	593.41
02/12/11	21:04:00	52.64%	38.91%	1.15%	40,260.0	0.02	99.99%	287.07	23:04:00	51.71%	38.17%	1.53%	39,055.1	0.01	100.00%	273.58	1.650	558.08
03/12/11	24:00:00	52.62%	39.23%	0.96%	45,951.3	0.00	100.00%	327.59	24:00:00	52.62%	39.23%	0.96%	40,756.7	0.00	100.00%	290.56	1.663	615.55
04/12/11	24:00:00	52.62%	39.11%	0.94%	45,942.0	0.02	99.99%	327.49	24:00:00	52.62%	39.11%	0.94%	40,629.0	0.02	99.99%	289.62	1.663	614.52
05/12/11	24:00:00	52.39%	39.03%	0.98%	46,261.1	0.00	100.00%	328.33	24:00:00	52.39%	39.03%	0.98%	40,883.0	0.00	100.00%	290.16	1.683	615.86
06/12/11	24:00:00	52.06%	39.00%	1.01%	46,438.2	0.00	100.00%	327.51	24:00:00	52.06%	39.00%	1.01%	41,033.2	0.00	100.00%	289.39	1.696	614.26
07/12/11	24:00:00	52.40%	39.08%	0.96%	46,476.1	0.00	100.00%	329.95	24:00:00	52.40%	39.08%	0.96%	40,922.0	0.00	100.00%	290.52	1.693	617.83
08/12/11	23:48:00	52.68%	39.14%	0.97%	46,454.4	0.00	100.00%	331.55	23:48:00	52.68%	39.14%	0.97%	40,779.1	0.00	100.00%	291.04	1.694	619.94
09/12/11	23:04:24	52.83%	39.18%	1.01%	45,094.9	0.11	99.97%	322.64	23:04:44	52.84%	39.19%	1.01%	39,842.4	0.01	100.00%	285.22	1.674	605.25
10/12/11	24:00:00	53.06%	39.40%	0.91%	46,648.5	0.00	100.00%	335.30	24:00:00	53.06%	39.40%	0.91%	40,780.4	0.00	100.00%	293.12	1.663	625.83
11/12/11	24:00:00	52.77%	39.17%	0.96%	46,509.0	0.00	100.00%	332.49	24:00:00	52.77%	39.17%	0.96%	40,590.1	0.00	100.00%	290.17	1.663	620.06
12/12/11	24:00:00	52.55%	38.85%	1.09%	46,206.4	0.00	100.00%	328.94	24:00:00	52.55%	38.85%	1.09%	39,967.1	0.00	100.00%	284.51	1.660	610.86
13/12/11	23:40:00	52.85%	39.21%	1.02%	45,346.5	0.02	99.99%	324.66	23:42:50	52.85%	39.21%	1.02%	39,220.4	0.00	100.00%	280.81	1.642	602.90
14/12/11	24:00:00	53.69%	39.78%	0.86%	46,595.3	0.00	100.00%	338.90	24:00:00	53.69%	39.78%	0.86%	40,002.1	0.00	100.00%	290.95	1.664	627.26
15/12/11	24:00:00	53.80%	39.92%	0.80%	47,219.2	0.00	100.00%	344.18	24:00:00	53.80%	39.92%	0.80%	40,363.5	0.00	100.00%	294.20	1.679	635.76
16/12/11	23:33:12	53.09%	39.35%	1.02%	46,363.6	0.00	100.00%	333.45	23:33:12	53.08%	39.35%	1.02%	39,618.8	0.00	100.00%	284.92	1.693	615.73
17/12/11	24:00:00	52.03%	38.72%	1.34%	47,535.6	0.00	100.00%	335.04	24:00:00	52.02%	38.72%	1.34%	40,760.6	0.00	100.00%	287.28	1.699	619.67
18/12/11	24:00:00	51.56%	38.32%	1.50%	47,490.7	0.00	100.00%	331.72	24:00:00	51.56%	38.31%	1.50%	40,614.7	0.00	100.00%	283.68	1.699	612.75
19/12/11	23:56:00	51.40%	38.05%	1.61%	46,874.4	0.01	100.00%	326.38	23:56:00	51.39%	38.05%	1.61%	40,211.3	0.01	100.00%	279.97	1.686	603.72
20/12/11	24:00:00	51.73%	38.16%	1.53%	45,561.4	0.01	100.00%	319.27	24:00:00	51.74%	38.17%	1.52%	40,449.6	0.00	100.00%	283.53	1.651	600.23
21/12/11	24:00:00	51.66%	38.12%	1.50%	45,133.1	0.02	99.99%	315.85	24:00:00	51.66%	38.12%	1.50%	40,639.3	0.00	100.00%	284.42	1.639	597.71
22/12/11	24:00:00	51.35%	37.75%	1.60%	44,529.1	0.06	99.98%	309.73	24:00:00	51.35%	37.75%	1.60%	39,402.9	0.01	100.00%	274.10	1.616	581.31
23/12/11	23:40:00	51.28%	37.70%	1.63%	41,251.0	0.08	99.98%	286.50	23:44:00	51.31%	37.73%	1.62%	37,653.7	0.02	99.99%	261.74	1.637	545.69
24/12/11	24:00:00	51.29%	37.85%	1.67%	40,548.6	0.01	100.00%	281.77	24:00:00	51.30%	37.85%	1.67%	38,422.4	0.01	100.00%	267.00	1.654	546.19
25/12/11	24:00:00	51.65%	38.21%	1.60%	41,177.3	0.00	100.00%	288.13	24:00:00	51.65%	38.21%	1.60%	38,940.4	0.01	100.00%	272.48	1.654	558.03
26/12/11	23:52:00	51.64%	37.86%	1.71%	40,607.7	0.00	100.00%	284.07	23:52:00	51.64%	37.87%	1.71%	38,362.7	0.00	100.00%	268.37	1.655	549.86
27/12/11	23:48:00	51.57%	37.68%	1.77%	40,492.3	0.06	99.98%	282.83	23:48:00	51.57%	37.68%	1.77%	38,277.1	0.01	100.00%	267.40	1.669	547.62
28/12/11	23:48:00	52.08%	38.08%	1.60%	41,034.6	0.00	100.00%	289.51	23:48:00	52.08%	38.08%	1.60%	38,874.0	0.00	100.00%	274.27	1.676	561.17
29/12/11	24:00:00	51.82%	37.65%	1.77%	41,208.0	0.00	100.00%	289.27	24:00:00	51.82%	37.65%	1.77%	39,024.8	0.00	100.00%	273.94	1.663	560.62
30/12/11	24:00:00	51.32%	37.33%	1.87%	41,184.8	0.00	100.00%	286.31	24:00:00	51.32%	37.33%	1.87%	38,982.6	0.01	100.00%	270.99	1.656	554.72
31/12/11	24:00:00	52.17%	37.96%	1.62%	41,201.6	0.00	100.00%	291.19	24:00:00	52.17%	37.96%	1.62%	39,002.5	0.00	100.00%	275.65	1.656	564.26
Dec-11	**30 days 17:36**	**52.26%**	**38.64%**	**1.27%**	**1,377,563**	**0.58**	**99.99%**	**9,752.61**	**30 days 19:48**	**52.22%**	**38.60%**	**1.29%**	**1,233,277**	**0.15**	**100.00%**	**8,724.61**	**51.641**	**18,396.66**

PROACTIVA MEIO AMBIENTE BRASIL

PROACTIVA TIJUQUINHAS LANDFILL GAS CAPTURE AND FLARING PROJECT

DOCUMENT: EMISSION REDUCTION MONTHLY REPORT

REPORTED MONTH: January 2012

REVISION: 2 | DATE: 16/09/13 | Start Date Calculation Period: 01/01/2012 00:00:00 (GMT -2) | End Date Calculation Period: 01/02/2012 00:00:00 (GMT -2)

	FLARE N°1								FLARE N°2								ELECTRICITY	TOTAL
Month	Operating Time	Landfill Gas Analysis			Landfill Gas Volume	Flaring Project Emissions	Flare efficiency	Flare Emissions Reductions	Operating Time	Landfill Gas Analysis			Landfill Gas Volume	Flaring Project Emissions	Flare efficiency	Flare Emissions Reductions	Net incr. Electricity Imported	Project Emissions Reductions
		w_{CH4}	fv_{CO2}	fv_{O2}	LFG_{flare1} (Nm^3)	PE_{flare1} ($tCO2e$)	η_{flare1}	ER_{flare1} (tCO_2e)		w_{CH4}	fv_{CO2}	fv_{O2}	LFG_{flare2} (Nm^3)	PE_{flare2} ($tCO2e$)	η_{flare2}	ER_{flare2} (tCO_2e)	EL_{IMP} (MWh)	ER (tCO_2e)
01/01/12	24:00:00	52.81%	38.38%	1.55%	40,150.2	0.00	100.00%	287.25	24:00:00	52.81%	38.38%	1.55%	37,889.0	0.01	100.00%	271.07	1.656	555.74
02/01/12	24:00:00	53.00%	38.46%	1.48%	41,371.2	0.00	100.00%	297.06	24:00:00	53.00%	38.45%	1.48%	39,339.9	0.00	100.00%	282.44	1.698	576.85
03/01/12	23:38:33	52.12%	37.67%	1.72%	40,284.2	0.00	100.00%	284.46	23:52:47	52.11%	37.66%	1.73%	40,169.6	0.01	100.00%	283.56	1.717	565.35
04/01/12	24:00:00	51.42%	37.05%	1.94%	42,152.2	0.00	100.00%	293.64	24:00:00	51.41%	37.04%	1.94%	40,817.6	0.00	100.00%	284.31	1.730	575.25
05/01/12	23:04:00	52.38%	37.66%	1.65%	40,593.0	0.00	100.00%	288.03	23:52:00	52.46%	37.71%	1.63%	40,614.7	0.01	100.00%	288.64	1.495	574.33
06/01/12	19:20:41	53.75%	38.65%	1.29%	34,788.3	0.00	100.00%	253.30	19:25:36	53.76%	38.66%	1.28%	33,527.9	0.00	100.00%	244.21	1.632	494.96
07/01/12	23:36:00	53.25%	38.41%	1.38%	42,131.5	0.00	100.00%	303.94	23:48:00	53.24%	38.40%	1.38%	40,932.8	0.00	100.00%	295.25	1.745	596.47
08/01/12	24:00:00	52.70%	38.02%	1.53%	41,057.8	0.00	100.00%	293.12	24:00:00	52.71%	38.03%	1.53%	41,468.2	0.00	100.00%	296.10	1.736	586.51
09/01/12	23:45:46	53.00%	38.08%	1.40%	41,044.8	0.10	99.97%	294.63	23:51:22	53.00%	38.08%	1.41%	41,309.6	0.00	100.00%	296.60	1.752	588.50
10/01/12	20:40:13	53.60%	37.51%	1.04%	35,042.4	1.00	99.65%	253.56	21:13:29	53.28%	37.54%	1.17%	29,643.1	1.54	99.35%	212.60	1.634	463.60
11/01/12	20:04:00	52.08%	36.94%	1.40%	33,829.8	1.03	99.61%	237.77	21:52:00	52.37%	36.91%	1.25%	37,328.4	6.11	97.92%	259.36	1.572	494.68
12/01/12	24:00:00	50.70%	36.42%	1.73%	44,658.1	0.03	99.99%	306.69	24:00:00	50.69%	36.42%	1.73%	41,201.9	0.04	99.99%	282.93	1.572	587.17
13/01/12	24:00:00	50.53%	36.16%	1.50%	45,027.2	0.03	99.99%	308.22	24:00:00	50.53%	36.16%	1.50%	40,765.0	0.04	99.99%	279.02	1.572	584.79
14/01/12	24:00:00	50.60%	35.52%	1.01%	45,433.8	0.02	99.99%	311.41	24:00:00	50.60%	35.52%	1.01%	40,734.3	0.02	99.99%	279.20	1.674	588.00
15/01/12	22:49:26	48.54%	33.53%	1.32%	43,678.7	0.02	99.99%	287.20	22:49:26	48.54%	33.53%	1.32%	38,768.6	0.02	99.99%	254.93	1.727	539.43
16/01/12	20:34:34	47.56%	32.43%	1.38%	39,902.5	0.02	99.99%	257.06	20:34:34	47.56%	32.43%	1.38%	35,232.8	0.02	99.99%	226.98	1.699	481.38
17/01/12	14:05:34	49.59%	14.85%	0.94%	26,470.5	0.11	99.95%	177.75	14:57:34	50.04%	14.04%	0.90%	25,047.8	0.02	99.99%	169.77	1.589	345.05
18/01/12	24:00:00	54.26%	0.00%	0.92%	44,169.9	0.02	99.99%	324.69	24:00:00	54.26%	0.00%	0.92%	39,777.0	0.03	99.99%	292.39	1.595	614.59
19/01/12	24:00:00	53.72%	0.00%	1.13%	44,161.0	0.02	99.99%	321.37	24:00:00	53.72%	0.00%	1.13%	39,571.1	0.03	99.99%	287.96	1.632	606.79
20/01/12	20:00:01	53.90%	0.00%	1.11%	36,902.9	0.02	99.99%	269.44	19:56:12	53.90%	0.00%	1.11%	32,834.5	0.02	99.99%	239.73	1.456	506.90
21/01/12	24:00:00	53.59%	0.00%	1.20%	44,195.2	0.03	99.99%	320.84	24:00:00	53.59%	0.00%	1.20%	39,576.6	0.04	99.99%	287.31	1.546	605.74
22/01/12	24:00:00	53.22%	0.00%	1.33%	44,221.7	0.03	99.99%	318.83	24:00:00	53.22%	0.00%	1.33%	39,399.8	0.04	99.99%	284.06	1.641	600.33
23/01/12	24:00:00	53.05%	0.00%	1.37%	44,528.7	0.03	99.99%	319.99	24:00:00	53.05%	0.00%	1.37%	39,417.8	0.03	99.99%	283.26	1.651	600.67
24/01/12	24:00:00	52.65%	0.00%	1.48%	44,992.6	0.03	99.99%	320.87	24:00:00	52.65%	0.00%	1.48%	39,581.9	0.04	99.99%	282.28	1.657	600.56
25/01/12	24:00:00	52.78%	0.00%	1.39%	45,131.8	0.03	99.99%	322.70	24:00:00	52.78%	0.00%	1.39%	39,474.1	0.03	99.99%	282.24	1.625	602.40
26/01/12	24:00:00	54.07%	0.00%	1.00%	45,466.1	0.03	99.99%	333.05	24:00:00	54.07%	0.00%	1.00%	39,667.0	0.03	99.99%	290.56	1.563	621.17
27/01/12	24:00:00	54.51%	0.00%	0.89%	45,987.6	0.03	99.99%	339.56	24:00:00	54.51%	0.00%	0.89%	39,236.4	0.04	99.99%	289.69	1.500	626.91
28/01/12	24:00:00	54.02%	0.00%	1.04%	45,157.4	0.03	99.99%	330.46	24:00:00	54.01%	0.00%	1.04%	39,900.9	0.03	99.99%	291.94	1.599	619.90
29/01/12	24:00:00	53.50%	0.00%	1.19%	44,545.2	0.03	99.99%	322.86	24:00:00	53.50%	0.00%	1.19%	40,350.8	0.03	99.99%	292.45	1.659	612.72
30/01/12	24:00:00	53.45%	0.00%	1.25%	44,555.7	0.03	99.99%	322.61	24:00:00	53.45%	0.00%	1.25%	40,217.2	0.03	99.99%	291.20	1.665	611.21
31/01/12	24:00:00	53.38%	0.00%	1.24%	44,543.7	0.02	99.99%	322.09	24:00:00	53.38%	0.00%	1.24%	40,299.9	0.03	99.99%	291.40	1.661	610.90
Jan-12	**29 days 15:38**	**52.55%**	**18.83%**	**1.32%**	**1,296,176**	**2.75**	**99.97%**	**9,224.46**	**29 days 20:13**	**52.55%**	**19.47%**	**1.32%**	**1,194,096**	**8.31**	**99.91%**	**8,493.43**	**50.648**	**17,638.88**

PROACTIVA MEIO AMBIENTE BRASIL

PROACTIVA TIJUQUINHAS LANDFILL GAS CAPTURE AND FLARING PROJECT

DOCUMENT: EMISSION REDUCTION MONTHLY REPORT

REPORTED MONTH: February 2012

REVISION 2 | DATE 16/09/13 | Start Date Calculation Period: 01/02/2012 00:00:00 (GMT -2) | End Date Calculation Period: 01/03/2012 00:00:00 (GMT -2)

	FLARE N°1								FLARE N°2								ELECTRICITY	TOTAL
Month	Operating Time	Landfill Gas Analysis			Landfill Gas Volume	Flaring Project Emissions	Flare efficiency	Flare Emissions Reductions	Operating Time	Landfill Gas Analysis			Landfill Gas Volume	Flaring Project Emissions	Flare efficiency	Flare Emissions Reductions	Net incr. Electricity Imported	Project Emissions Reductions
		w_{CH4}	fv_{CO2}	fv_{O2}	LFG_{flare1} (Nm^3)	PE_{flare1} ($tCO2e$)	η_{flare1}	ER_{flare1} (tCO_2e)		w_{CH4}	fv_{CO2}	fv_{O2}	LFG_{flare2} (Nm^3)	PE_{flare2} ($tCO2e$)	η_{flare2}	ER_{flare2} (tCO_2e)	EL_{IMP} (MWh)	ER (tCO_2e)
01/02/12	24:00:00	52.16%	0.00%	1.50%	44,271.1	0.02	99.99%	312.82	24:00:00	52.16%	0.00%	1.50%	40,096.4	0.02	99.99%	283.32	1.655	593.55
02/02/12	24:00:00	51.83%	0.00%	1.61%	44,204.4	0.02	99.99%	310.39	24:00:00	51.83%	0.00%	1.61%	40,051.8	0.04	99.99%	281.22	1.665	589.02
03/02/12	24:00:00	52.12%	0.00%	1.55%	44,262.6	0.02	99.99%	312.50	24:00:00	52.12%	0.00%	1.55%	40,092.0	0.03	99.99%	283.05	1.691	592.91
04/02/12	24:00:00	52.39%	0.00%	1.43%	44,253.1	0.03	99.99%	314.03	24:00:00	52.39%	0.00%	1.42%	40,072.2	0.03	99.99%	284.37	1.457	596.13
05/02/12	20:16:18	52.20%	0.00%	1.45%	37,417.4	0.02	99.99%	264.60	20:16:18	52.20%	0.00%	1.45%	33,793.7	0.02	99.99%	238.96	1.331	501.49
06/02/12	16:23:42	53.17%	0.00%	1.26%	30,403.6	0.13	99.95%	218.90	16:23:42	53.17%	0.00%	1.26%	27,401.5	0.03	99.99%	197.36	1.567	413.81
07/02/12	24:00:00	52.64%	0.00%	1.27%	43,798.2	0.02	99.99%	312.32	24:00:00	52.64%	0.00%	1.27%	39,682.7	0.03	99.99%	282.97	1.712	592.62
08/02/12	24:00:00	53.46%	0.00%	1.04%	43,443.9	0.02	99.99%	314.61	24:00:00	53.46%	0.00%	1.04%	39,453.6	0.02	99.99%	285.71	1.717	597.63
09/02/12	18:48:00	54.11%	0.00%	0.89%	34,064.2	0.13	99.95%	249.61	18:48:00	54.11%	0.00%	0.89%	30,828.4	0.03	99.99%	225.99	1.460	473.32
10/02/12	24:00:00	53.08%	0.00%	1.36%	44,317.6	0.02	99.99%	318.66	24:00:00	53.08%	0.00%	1.36%	40,361.3	0.03	99.99%	290.21	1.554	606.44
11/02/12	24:00:00	54.07%	0.00%	1.06%	44,051.6	0.02	99.99%	322.66	24:00:00	54.07%	0.00%	1.06%	40,351.7	0.03	99.99%	295.55	1.716	615.54
12/02/12	24:00:00	54.32%	0.00%	0.92%	43,871.2	0.02	99.99%	322.84	24:00:00	54.32%	0.00%	0.93%	40,237.1	0.02	99.99%	296.09	1.742	616.21
13/02/12	23:56:00	54.27%	0.00%	0.94%	43,000.1	0.02	99.99%	316.13	24:00:00	54.27%	0.00%	0.94%	40,317.0	0.02	99.99%	296.41	1.592	610.06
14/02/12	20:36:00	55.01%	0.00%	0.84%	36,962.4	0.04	99.99%	275.43	20:36:00	55.01%	0.00%	0.84%	34,892.9	0.03	99.99%	260.02	1.677	532.84
15/02/12	20:32:00	54.89%	0.00%	0.94%	37,134.0	0.02	99.99%	276.12	20:32:00	54.89%	0.00%	0.94%	34,724.2	0.02	99.99%	258.20	1.596	531.83
16/02/12	21:40:00	54.67%	0.00%	1.01%	38,854.0	0.05	99.98%	287.73	21:40:00	54.67%	0.00%	1.01%	36,397.0	0.13	99.96%	269.48	1.564	554.77
17/02/12	24:00:00	54.08%	0.00%	1.11%	43,510.5	0.02	99.99%	318.74	24:00:00	54.08%	0.00%	1.11%	40,324.4	0.02	99.99%	295.40	1.647	611.57
18/02/12	24:00:00	54.23%	0.00%	1.08%	43,848.6	0.02	99.99%	322.12	24:00:00	54.23%	0.00%	1.08%	40,073.2	0.02	99.99%	294.39	1.680	613.88
19/02/12	24:00:00	54.45%	0.00%	1.01%	43,980.0	0.02	99.99%	324.39	24:00:00	54.45%	0.00%	1.01%	39,940.6	0.02	99.99%	294.60	1.682	616.36
20/02/12	24:00:00	54.18%	0.00%	1.06%	44,058.1	0.02	99.99%	323.37	24:00:00	54.18%	0.00%	1.06%	40,042.5	0.02	99.99%	293.89	1.685	614.63
21/02/12	10:05:06	54.29%	31.80%	1.04%	18,304.6	12.26	91.80%	123.60	10:05:06	54.30%	32.00%	1.03%	17,141.1	11.55	91.75%	115.69	1.687	236.66
22/02/12	23:52:00	53.93%	38.87%	1.04%	43,582.9	35.38	90.00%	286.59	23:48:00	53.93%	38.87%	1.04%	40,380.2	32.78	90.00%	265.52	1.715	549.43
23/02/12	22:32:23	54.82%	24.46%	0.88%	39,387.8	21.04	93.53%	273.58	22:44:23	54.54%	25.97%	0.94%	34,566.4	19.41	93.16%	237.95	1.591	509.04
24/02/12	23:32:00	54.16%	0.00%	1.00%	37,596.9	0.49	99.84%	275.43	23:20:00	54.38%	0.00%	0.95%	38,138.8	0.37	99.88%	280.65	1.556	553.65
25/02/12	24:00:00	53.30%	0.00%	1.15%	42,351.8	0.00	100.00%	305.84	24:00:00	53.30%	0.00%	1.15%	40,353.5	0.00	100.00%	291.40	1.680	594.62
26/02/12	24:00:00	53.94%	0.00%	1.02%	42,194.4	0.00	100.00%	308.33	24:00:00	53.94%	0.00%	1.02%	40,042.7	0.00	100.00%	292.60	1.735	598.23
27/02/12	24:00:00	53.68%	0.00%	1.01%	43,869.9	0.00	100.00%	319.01	24:00:00	53.67%	0.00%	1.01%	40,663.2	0.00	100.00%	295.67	1.743	611.96
28/02/12	24:00:00	53.18%	0.00%	1.14%	44,735.5	0.00	100.00%	322.32	24:00:00	53.18%	0.00%	1.14%	41,108.0	0.00	100.00%	296.18	1.754	615.77
29/02/12	23:44:00	52.81%	0.00%	1.28%	43,961.4	0.08	99.98%	314.44	23:44:00	52.81%	0.00%	1.28%	40,501.5	0.00	100.00%	289.76	1.750	601.47
Feb-12	**27 days 05:57**	**53.60%**	**2.73%**	**1.14%**	**1,185,692**	**69.95**	**99.27%**	**8,547.11**	**27 days 05:57**	**53.61%**	**2.76%**	**1.14%**	**1,092,030**	**64.71**	**99.27%**	**7,872.59**	**47.602**	**16,345.44**

PROACTIVA MEIO AMBIENTE BRASIL

PROACTIVA TIJUQUINHAS LANDFILL GAS CAPTURE AND FLARING PROJECT

DOCUMENT: EMISSION REDUCTION MONTHLY REPORT

REPORTED MONTH: March 2012

REVISION: 2 | DATE: 16/09/13 | Start Date Calculation Period: 01/03/2012 00:00:00 (GMT -2) | End Date Calculation Period: 01/04/2012 00:00:00 (GMT -2)

	FLARE N°1								FLARE N°2								ELECTRICITY	TOTAL
Month	Operating Time	Landfill Gas Analysis			Landfill Gas Volume	Flaring Project Emissions	Flare efficiency	Flare Emissions Reductions	Operating Time	Landfill Gas Analysis			Landfill Gas Volume	Flaring Project Emissions	Flare efficiency	Flare Emissions Reductions	Net incr. Electricity Imported	Project Emissions Reductions
		w_{CH4}	fv_{CO2}	fv_{O2}	LFG_{flare1} (Nm^3)	PE_{flare1} ($tCO2e$)	η_{flare1}	ER_{flare1} (tCO_2e)		w_{CH4}	fv_{CO2}	fv_{O2}	LFG_{flare2} (Nm^3)	PE_{flare2} ($tCO2e$)	η_{flare2}	ER_{flare2} (tCO_2e)	EL_{IMP} (MWh)	ER (tCO_2e)
01/03/12	23:28:00	52.88%	0.00%	1.32%	43,396.7	0.11	99.97%	310.82	23:28:00	52.88%	0.00%	1.32%	40,114.9	0.00	100.00%	287.40	1.754	595.49
02/03/12	24:00:00	52.17%	0.00%	1.50%	43,275.5	0.00	100.00%	305.85	24:00:00	52.17%	0.00%	1.50%	41,184.9	0.00	100.00%	291.07	1.832	594.07
03/03/12	24:00:00	51.56%	0.00%	1.65%	43,225.4	0.10	99.97%	301.85	24:00:00	51.56%	0.00%	1.65%	41,371.1	0.04	99.99%	288.96	1.741	588.09
04/03/12	24:00:00	51.75%	0.00%	1.58%	43,240.7	0.00	100.00%	303.17	24:00:00	51.75%	0.00%	1.58%	41,326.5	0.00	100.00%	289.75	1.671	590.32
05/03/12	21:48:00	52.23%	0.00%	1.48%	39,816.5	0.00	100.00%	281.73	21:48:00	52.23%	0.00%	1.48%	37,468.5	0.00	100.00%	265.12	1.703	544.19
06/03/12	23:48:00	51.90%	0.00%	1.53%	43,901.7	0.03	99.99%	308.68	23:48:00	51.90%	0.00%	1.53%	40,539.9	0.05	99.98%	285.02	1.727	591.01
07/03/12	24:00:00	51.69%	0.00%	1.58%	43,421.3	0.00	100.00%	304.08	24:00:00	51.70%	0.00%	1.58%	41,085.2	0.00	100.00%	287.76	1.776	589.07
08/03/12	24:00:00	51.81%	0.00%	1.55%	43,121.0	0.00	100.00%	302.67	24:00:00	51.81%	0.00%	1.55%	41,159.5	0.00	100.00%	288.92	1.790	588.80
09/03/12	24:00:00	51.87%	0.00%	1.53%	43,059.2	0.00	100.00%	302.59	24:00:00	51.87%	0.00%	1.53%	41,210.7	0.00	100.00%	289.61	1.782	589.42
10/03/12	24:00:00	51.73%	0.00%	1.60%	43,068.2	0.00	100.00%	301.82	24:00:00	51.73%	0.00%	1.60%	41,251.5	0.00	100.00%	289.08	1.652	588.32
11/03/12	24:00:00	51.88%	0.00%	1.56%	42,924.5	0.00	100.00%	301.72	24:00:00	51.88%	0.00%	1.56%	41,109.6	0.00	100.00%	288.96	1.574	588.22
12/03/12	16:27:17	53.36%	23.32%	1.40%	30,093.7	0.68	99.72%	216.93	16:51:17	53.16%	23.69%	1.40%	29,187.6	1.91	99.18%	208.48	1.646	422.85
13/03/12	24:00:00	52.10%	36.66%	1.77%	43,856.9	0.00	100.00%	309.56	24:00:00	52.10%	36.67%	1.77%	42,026.2	0.00	100.00%	296.64	1.742	603.49
14/03/12	24:00:00	51.03%	36.06%	1.97%	43,406.1	0.10	99.97%	300.01	24:00:00	51.03%	36.06%	1.97%	41,497.6	0.07	99.98%	286.82	1.758	584.08
15/03/12	24:00:00	50.68%	35.85%	2.04%	42,258.4	0.01	100.00%	290.13	24:00:00	50.68%	35.85%	2.04%	40,578.6	0.12	99.96%	278.50	1.721	565.94
16/03/12	23:56:00	51.32%	36.14%	1.92%	41,686.1	0.01	100.00%	289.79	24:00:00	51.32%	36.14%	1.92%	40,104.0	0.07	99.98%	278.78	1.710	565.90
17/03/12	22:28:00	52.11%	36.66%	1.78%	40,197.1	0.23	99.93%	283.55	22:16:00	52.05%	36.62%	1.79%	38,325.2	0.03	99.99%	270.21	1.703	551.10
18/03/12	24:00:00	50.87%	35.92%	2.14%	43,353.1	0.00	100.00%	298.76	24:00:00	50.87%	35.92%	2.14%	41,716.7	0.03	99.99%	287.45	1.697	583.57
19/03/12	24:00:00	51.81%	36.46%	1.84%	42,651.7	0.00	100.00%	299.39	24:00:00	51.81%	36.45%	1.84%	41,014.1	0.01	100.00%	287.87	1.705	584.61
20/03/12	24:00:00	52.28%	36.68%	1.72%	42,602.0	0.00	100.00%	301.73	24:00:00	52.28%	36.68%	1.72%	40,810.5	0.01	100.00%	289.03	1.730	588.06
21/03/12	23:56:00	52.04%	36.60%	1.75%	42,723.2	0.00	100.00%	301.18	24:00:00	52.04%	36.60%	1.75%	41,127.4	0.01	100.00%	289.93	1.737	588.40
22/03/12	24:00:00	52.23%	36.78%	1.70%	42,875.9	0.00	100.00%	303.40	24:00:00	52.23%	36.77%	1.70%	41,054.7	0.01	100.00%	290.50	1.729	591.20
23/03/12	24:00:00	52.62%	37.01%	1.55%	42,035.4	0.00	100.00%	299.64	24:00:00	52.62%	37.01%	1.55%	40,237.8	0.02	99.99%	286.82	1.683	583.83
24/03/12	24:00:00	52.74%	37.12%	1.45%	42,240.5	0.00	100.00%	301.78	24:00:00	52.74%	37.12%	1.45%	40,472.0	0.01	100.00%	289.14	1.706	588.26
25/03/12	24:00:00	52.36%	36.82%	1.56%	42,300.3	0.00	100.00%	300.08	24:00:00	52.36%	36.82%	1.56%	40,551.0	0.04	99.99%	287.63	1.736	585.00
26/03/12	24:00:00	52.83%	37.11%	1.45%	42,189.4	0.00	100.00%	301.94	24:00:00	52.82%	37.11%	1.45%	40,212.8	0.03	99.99%	287.74	1.728	586.98
27/03/12	24:00:00	51.85%	36.58%	1.68%	42,525.2	0.00	100.00%	298.69	24:00:00	51.85%	36.58%	1.68%	40,770.0	0.01	100.00%	286.35	1.734	582.33
28/03/12	24:00:00	50.07%	35.54%	2.19%	42,623.5	0.02	99.99%	289.10	24:00:00	50.07%	35.54%	2.19%	40,878.8	0.18	99.94%	277.11	1.741	563.49
29/03/12	23:56:00	49.64%	35.07%	2.47%	42,422.5	0.13	99.96%	285.16	23:56:00	49.64%	35.07%	2.47%	40,687.6	0.21	99.93%	273.42	1.724	555.89
30/03/12	24:00:00	51.23%	36.07%	2.10%	41,739.9	0.02	99.99%	289.67	24:00:00	51.23%	36.07%	2.10%	40,005.9	0.00	100.00%	277.64	1.701	564.66
31/03/12	22:13:12	51.67%	36.61%	1.92%	39,570.4	0.11	99.96%	276.90	22:13:12	51.67%	36.61%	1.92%	37,961.5	0.00	100.00%	265.75	1.694	540.02
Mar-12	**30 days 10:00**	**51.80%**	**22.93%**	**1.72%**	**1,305,802**	**1.55**	**99.98%**	**9,162.37**	**30 days 10:20**	**51.79%**	**23.03%**	**1.72%**	**1,247,043**	**2.87**	**99.97%**	**8,747.47**	**53.328**	**17,826.65**

PROACTIVA MEIO AMBIENTE BRASIL

PROACTIVA TIJUQUINHAS LANDFILL GAS CAPTURE AND FLARING PROJECT

DOCUMENT — EMISSION REDUCTION MONTHLY REPORT

REPORTED MONTH — **April 2012**

REVISION 2 | DATE 16/09/13 | Start Date Calculation Period: 01/04/2012 00:00:00 (GMT -2) | End Date Calculation Period: 01/05/2012 00:00:00 (GMT -2)

	FLARE N°1								FLARE N°2								ELECTRICITY	TOTAL
Month	Operating Time	Landfill Gas Analysis			Landfill Gas Volume	Flaring Project Emissions	Flare efficiency	Flare Emissions Reductions	Operating Time	Landfill Gas Analysis			Landfill Gas Volume	Flaring Project Emissions	Flare efficiency	Flare Emissions Reductions	Net incr. Electricity Imported	Project Emissions Reductions
		w_{CH4}	fv_{CO2}	fv_{O2}	LFG_{flare1} (Nm^3)	PE_{flare1} (tCO2e)	η_{flare1}	ER_{flare1} (tCO_2e)		w_{CH4}	fv_{CO2}	fv_{O2}	LFG_{flare2} (Nm^3)	PE_{flare2} (tCO2e)	η_{flare2}	ER_{flare2} (tCO_2e)	EL_{IMP} (MWh)	ER (tCO_2e)
01/04/12	24:00:00	51.17%	36.32%	2.05%	43,173.5	0.00	100.00%	299.26	24:00:00	51.16%	36.31%	2.05%	41,445.9	0.00	100.00%	287.29	1.694	583.91
02/04/12	24:00:00	51.73%	36.58%	1.92%	42,121.4	0.00	100.00%	295.19	24:00:00	51.73%	36.58%	1.92%	40,447.9	0.00	100.00%	283.45	1.701	575.99
03/04/12	24:00:00	52.42%	37.09%	1.66%	41,616.8	0.00	100.00%	295.54	24:00:00	52.42%	37.09%	1.66%	39,810.8	0.00	100.00%	282.71	1.708	575.58
04/04/12	24:00:00	52.29%	37.07%	1.66%	41,783.4	0.00	100.00%	295.97	24:00:00	52.29%	37.07%	1.66%	40,044.1	0.00	100.00%	283.65	1.763	576.87
05/04/12	24:00:00	52.56%	37.43%	1.54%	41,743.1	0.00	100.00%	297.25	24:00:00	52.56%	37.42%	1.54%	39,995.7	0.00	100.00%	284.81	1.713	579.39
06/04/12	24:00:00	52.41%	37.40%	1.54%	41,643.7	0.00	100.00%	295.67	24:00:00	52.41%	37.40%	1.54%	39,881.8	0.00	100.00%	283.17	1.673	576.23
07/04/12	24:00:00	52.50%	37.36%	1.54%	41,589.0	0.00	100.00%	295.78	24:00:00	52.50%	37.36%	1.54%	39,870.2	0.00	100.00%	283.56	1.666	576.74
08/04/12	23:04:00	52.90%	37.56%	1.46%	40,010.0	0.01	100.00%	286.71	22:56:00	52.87%	37.55%	1.46%	38,178.1	0.00	100.00%	273.46	1.662	557.58
09/04/12	24:00:00	51.78%	36.86%	1.73%	41,754.6	0.01	100.00%	292.92	24:00:00	51.78%	36.86%	1.73%	39,998.4	0.00	100.00%	280.61	1.691	570.89
10/04/12	23:32:00	51.61%	36.67%	1.83%	41,194.2	0.02	99.99%	287.98	23:32:00	51.61%	36.67%	1.83%	39,503.7	0.00	100.00%	276.18	1.716	561.49
11/04/12	24:00:00	51.59%	36.65%	1.90%	42,181.5	0.22	99.93%	294.64	24:00:00	51.59%	36.65%	1.90%	40,525.3	0.12	99.96%	283.15	1.716	575.11
12/04/12	24:00:00	51.75%	36.59%	1.96%	41,800.0	0.00	100.00%	293.05	24:00:00	51.75%	36.59%	1.96%	40,082.9	0.00	100.00%	281.01	1.723	571.38
13/04/12	24:00:00	51.78%	36.81%	1.92%	42,096.0	0.00	100.00%	295.31	24:00:00	51.78%	36.81%	1.92%	40,305.1	0.00	100.00%	282.75	1.731	575.36
14/04/12	24:00:00	51.40%	36.69%	1.99%	41,983.0	0.00	100.00%	292.35	24:00:00	51.40%	36.69%	1.99%	40,293.4	0.00	100.00%	280.59	1.721	570.26
15/04/12	24:00:00	51.43%	36.59%	1.99%	41,676.5	0.00	100.00%	290.36	24:00:00	51.43%	36.59%	1.99%	40,000.8	0.00	100.00%	278.69	1.714	566.39
16/04/12	24:00:00	51.14%	36.40%	2.03%	42,033.4	0.00	100.00%	291.24	24:00:00	51.14%	36.40%	2.03%	40,306.6	0.00	100.00%	279.27	1.726	567.82
17/04/12	24:00:00	51.61%	36.68%	1.92%	41,969.3	0.01	100.00%	293.47	24:00:00	51.61%	36.68%	1.92%	40,210.1	0.00	100.00%	281.17	1.722	571.95
18/04/12	24:00:00	52.05%	37.01%	1.79%	41,786.2	0.00	100.00%	294.67	24:00:00	52.05%	37.01%	1.79%	40,080.2	0.00	100.00%	282.64	1.710	574.65
19/04/12	24:00:00	51.97%	36.97%	1.79%	41,456.4	0.00	100.00%	291.89	24:00:00	51.97%	36.97%	1.79%	39,792.0	0.00	100.00%	280.17	1.703	569.40
20/04/12	24:00:00	52.09%	37.32%	1.69%	41,616.8	0.00	100.00%	293.68	24:00:00	52.09%	37.32%	1.69%	39,904.5	0.00	100.00%	281.60	1.711	572.61
21/04/12	24:00:00	51.74%	37.49%	1.70%	42,197.9	0.00	100.00%	295.77	24:00:00	51.74%	37.49%	1.70%	40,411.5	0.00	100.00%	283.25	1.743	576.29
22/04/12	24:00:00	50.78%	36.66%	2.02%	42,797.9	0.00	100.00%	294.43	24:00:00	50.78%	36.66%	2.02%	40,930.2	0.00	100.00%	281.58	1.763	573.26
23/04/12	24:00:00	50.91%	36.65%	2.03%	42,024.2	0.00	100.00%	289.85	24:00:00	50.91%	36.65%	2.03%	40,251.7	0.00	100.00%	277.62	1.731	564.77
24/04/12	23:44:00	50.39%	36.38%	2.18%	41,158.1	0.11	99.97%	280.87	23:44:00	50.39%	36.38%	2.18%	39,434.5	0.01	100.00%	269.18	1.705	547.39
25/04/12	24:00:00	50.68%	36.78%	2.00%	41,393.4	0.02	99.99%	284.15	24:00:00	50.68%	36.78%	2.00%	39,655.0	0.02	99.99%	272.22	1.704	553.71
26/04/12	24:00:00	52.20%	37.84%	1.58%	41,761.5	0.02	99.99%	295.31	24:00:00	52.20%	37.84%	1.58%	39,988.8	0.02	99.99%	282.77	1.596	575.59
27/04/12	21:36:00	53.30%	38.38%	1.38%	37,747.6	0.06	99.98%	272.52	20:56:00	53.25%	38.34%	1.39%	34,587.6	0.15	99.94%	249.36	1.588	519.40
28/04/12	24:00:00	52.06%	37.61%	1.70%	44,220.5	0.03	99.99%	311.84	24:00:00	52.06%	37.61%	1.70%	40,651.9	0.02	99.99%	286.68	1.766	595.76
29/04/12	24:00:00	53.19%	38.35%	1.45%	43,936.5	0.03	99.99%	316.55	24:00:00	53.19%	38.35%	1.45%	40,384.6	0.02	99.99%	290.96	1.766	604.76
30/04/12	24:00:00	51.88%	37.37%	1.82%	44,570.6	0.03	99.99%	313.23	24:00:00	51.88%	37.37%	1.82%	40,927.9	0.02	99.99%	287.63	1.762	598.11
Apr-12	**29 days 19:56**	**51.84%**	**37.05%**	**1.79%**	**1,257,037**	**0.56**	**99.99%**	**8,827.48**	**29 days 19:08**	**51.83%**	**37.04%**	**1.79%**	**1,197,901**	**0.40**	**100.00%**	**8,411.17**	**51.288**	**17,158.64**

PROACTIVA MEIO AMBIENTE BRASIL

PROACTIVA TIJUQUINHAS LANDFILL GAS CAPTURE AND FLARING PROJECT

DOCUMENT: EMISSION REDUCTION MONTHLY REPORT

REPORTED MONTH: May 2012

REVISION: 2 | DATE: 16/09/13 | Start Date Calculation Period: 01/05/2012 00:00:00 (GMT -2) | End Date Calculation Period: 01/06/2012 00:00:00 (GMT -2)

	FLARE N°1								FLARE N°2								ELECTRICITY	TOTAL
Month	Operating Time	Landfill Gas Analysis			Landfill Gas Volume	Flaring Project Emissions	Flare efficiency	Flare Emissions Reductions	Operating Time	Landfill Gas Analysis			Landfill Gas Volume	Flaring Project Emissions	Flare efficiency	Flare Emissions Reductions	Net incr. Electricity Imported	Project Emissions Reductions
		w_{CH4}	fv_{CO2}	fv_{O2}	LFG_{flare1} (Nm^3)	PE_{flare1} ($tCO2e$)	η_{flare1}	ER_{flare1} (tCO_2e)		w_{CH4}	fv_{CO2}	fv_{O2}	LFG_{flare2} (Nm^3)	PE_{flare2} ($tCO2e$)	η_{flare2}	ER_{flare2} (tCO_2e)	EL_{IMP} (MWh)	ER (tCO_2e)
01/05/12	24:00:00	51.49%	37.01%	1.99%	44,332.1	0.03	99.99%	309.22	24:00:00	51.49%	37.01%	1.99%	40,822.6	0.02	99.99%	284.75	1.737	591.26
02/05/12	24:00:00	51.39%	36.86%	2.03%	44,456.9	0.02	99.99%	309.51	24:00:00	51.39%	36.86%	2.03%	40,869.8	0.02	99.99%	284.54	1.750	591.32
03/05/12	24:00:00	51.58%	37.01%	1.92%	44,546.0	0.02	99.99%	311.26	24:00:00	51.58%	37.01%	1.92%	40,945.0	0.02	99.99%	286.10	1.759	594.62
04/05/12	23:56:00	52.42%	37.67%	1.67%	44,025.5	0.11	99.97%	312.57	24:00:00	52.42%	37.67%	1.67%	40,168.1	0.01	100.00%	285.25	1.753	595.09
05/05/12	24:00:00	51.95%	37.31%	1.83%	44,205.1	0.00	100.00%	311.14	24:00:00	51.95%	37.31%	1.83%	40,698.2	0.00	100.00%	286.46	1.724	594.91
06/05/12	24:00:00	51.75%	37.08%	1.90%	44,181.5	0.00	100.00%	309.73	24:00:00	51.75%	37.08%	1.90%	40,637.5	0.00	100.00%	284.89	1.707	591.95
07/05/12	22:56:00	51.73%	36.89%	2.01%	42,113.2	0.11	99.97%	295.02	22:56:00	51.72%	36.89%	2.01%	38,593.7	0.08	99.97%	270.37	1.719	562.71
08/05/12	24:00:00	52.03%	37.22%	1.82%	44,592.7	0.00	100.00%	314.33	24:00:00	52.03%	37.22%	1.82%	41,000.9	0.11	99.97%	288.91	1.760	600.50
09/05/12	24:00:00	52.03%	37.25%	1.80%	44,726.2	0.00	100.00%	315.25	24:00:00	52.03%	37.25%	1.80%	41,049.8	0.00	100.00%	289.34	1.768	601.83
10/05/12	24:00:00	52.28%	37.55%	1.67%	44,343.2	0.00	100.00%	314.07	24:00:00	52.28%	37.55%	1.67%	40,713.8	0.00	100.00%	288.36	1.749	599.70
11/05/12	24:00:00	51.92%	37.36%	1.75%	43,848.3	0.00	100.00%	308.41	24:00:00	51.92%	37.36%	1.75%	40,224.9	0.00	100.00%	282.93	1.735	588.63
12/05/12	24:00:00	51.24%	36.91%	1.97%	43,756.9	0.00	100.00%	303.75	24:00:00	51.24%	36.91%	1.97%	40,151.8	0.00	100.00%	278.72	1.732	579.76
13/05/12	24:00:00	50.35%	36.25%	2.23%	43,962.9	0.00	100.00%	299.88	24:00:00	50.35%	36.25%	2.23%	40,279.7	0.00	100.00%	274.76	1.733	571.93
14/05/12	24:00:00	50.06%	36.06%	2.25%	44,102.0	0.00	100.00%	299.10	24:00:00	50.06%	36.06%	2.25%	40,411.8	0.00	100.00%	274.07	1.737	570.46
15/05/12	24:00:00	50.90%	36.53%	2.02%	43,468.1	0.00	100.00%	299.72	24:00:00	50.90%	36.53%	2.02%	39,849.5	0.00	100.00%	274.77	1.720	571.81
16/05/12	21:32:00	51.21%	36.64%	2.04%	38,315.9	0.51	99.83%	265.34	22:52:00	51.57%	36.87%	1.93%	37,558.1	0.92	99.68%	261.59	1.660	524.34
17/05/12	24:00:00	50.86%	36.51%	2.06%	43,489.6	0.01	100.00%	299.64	24:00:00	50.86%	36.51%	2.06%	39,861.6	0.02	99.99%	274.63	1.631	571.72
18/05/12	24:00:00	51.08%	36.78%	1.93%	43,406.8	0.00	100.00%	300.37	24:00:00	51.08%	36.78%	1.93%	39,757.3	0.01	100.00%	275.11	1.685	572.86
19/05/12	24:00:00	51.21%	37.03%	1.82%	43,111.2	0.00	100.00%	299.07	24:00:00	51.21%	37.03%	1.82%	39,479.7	0.01	100.00%	273.87	1.712	570.26
20/05/12	24:00:00	52.32%	37.95%	1.47%	43,029.8	0.00	100.00%	304.98	24:00:00	52.32%	37.95%	1.47%	39,396.6	0.01	100.00%	279.22	1.709	581.53
21/05/12	24:00:00	52.61%	38.14%	1.41%	43,412.1	0.00	100.00%	309.43	24:00:00	52.61%	38.14%	1.41%	39,751.3	0.00	100.00%	283.34	1.725	590.08
22/05/12	24:00:00	52.40%	38.09%	1.46%	44,283.9	0.00	100.00%	314.39	24:00:00	52.40%	38.09%	1.46%	40,605.6	0.00	100.00%	288.28	1.712	600.00
23/05/12	24:00:00	52.78%	38.24%	1.45%	45,612.5	0.00	100.00%	326.14	24:00:00	52.78%	38.24%	1.45%	41,878.1	0.00	100.00%	299.44	1.725	622.90
24/05/12	24:00:00	52.95%	38.44%	1.34%	45,609.7	0.00	100.00%	327.16	24:00:00	52.95%	38.44%	1.34%	41,980.2	0.00	100.00%	301.13	1.730	625.59
25/05/12	24:00:00	54.49%	39.81%	0.84%	45,592.1	0.00	100.00%	336.58	24:00:00	54.49%	39.81%	0.84%	42,011.8	0.00	100.00%	310.15	1.738	644.02
26/05/12	24:00:00	54.43%	39.57%	0.88%	45,495.1	0.00	100.00%	335.47	24:00:00	54.43%	39.57%	0.88%	41,860.6	0.00	100.00%	308.67	1.744	641.41
27/05/12	24:00:00	53.70%	38.86%	1.16%	45,571.7	0.00	100.00%	331.52	24:00:00	53.70%	38.86%	1.16%	41,914.3	0.00	100.00%	304.91	1.743	633.72
28/05/12	23:44:00	54.05%	39.08%	1.04%	45,057.1	0.11	99.97%	329.83	23:44:00	54.05%	39.08%	1.04%	41,466.4	0.01	100.00%	303.63	1.761	630.71
29/05/12	21:48:00	54.41%	39.34%	0.90%	41,239.9	0.00	100.00%	304.01	21:52:00	54.41%	39.34%	0.90%	37,953.3	0.01	100.00%	279.77	1.693	581.14
30/05/12	24:00:00	53.15%	38.59%	1.22%	45,688.9	0.00	100.00%	328.98	24:00:00	53.15%	38.59%	1.22%	42,066.4	0.00	100.00%	302.89	1.742	629.16
31/05/12	24:00:00	52.18%	37.90%	1.52%	46,185.6	0.00	100.00%	326.46	24:00:00	52.18%	37.90%	1.52%	42,487.3	0.00	100.00%	300.32	1.763	624.04
May-12	**30 days 17:56**	**52.17%**	**37.62%**	**1.65%**	**1,365,763**	**0.93**	**99.99%**	**9,652.35**	**30 days 19:24**	**52.18%**	**37.63%**	**1.65%**	**1,256,446**	**1.25**	**99.99%**	**8,881.16**	**53.557**	**18,449.96**

PROACTIVA MEIO AMBIENTE BRASIL

PROACTIVA TIJUQUINHAS LANDFILL GAS CAPTURE AND FLARING PROJECT

DOCUMENT — EMISSION REDUCTION MONTHLY REPORT

REPORTED MONTH — **June 2012**

REVISION 2 | DATE 16/09/13 | Start Date Calculation Period: 01/06/2012 00:00:00 (GMT -2) | End Date Calculation Period: 01/07/2012 00:00:00 (GMT -2)

	FLARE N°1								FLARE N°2								ELECTRICITY	TOTAL
Month	Operating Time	Landfill Gas Analysis			Landfill Gas Volume	Flaring Project Emissions	Flare efficiency	Flare Emissions Reductions	Operating Time	Landfill Gas Analysis			Landfill Gas Volume	Flaring Project Emissions	Flare efficiency	Flare Emissions Reductions	Net incr. Electricity Imported	Project Emissions Reductions
		w_{CH4}	fv_{CO2}	fv_{O2}	LFG_{flare1} (Nm^3)	PE_{flare1} ($tCO2e$)	η_{flare1}	ER_{flare1} (tCO_2e)		w_{CH4}	fv_{CO2}	fv_{O2}	LFG_{flare2} (Nm^3)	PE_{flare2} ($tCO2e$)	η_{flare2}	ER_{flare2} (tCO_2e)	EL_{IMP} (MWh)	ER (tCO_2e)
01/06/12	23:12:00	52.07%	37.76%	1.59%	44,203.5	0.11	99.97%	311.75	23:12:00	52.07%	37.76%	1.59%	40,687.5	0.00	100.00%	287.03	1.780	596.00
02/06/12	24:00:00	52.05%	37.77%	1.57%	45,332.6	0.00	100.00%	319.64	24:00:00	52.05%	37.77%	1.57%	41,708.7	0.02	100.00%	294.07	1.607	611.20
03/06/12	15:48:00	53.04%	38.41%	1.35%	29,790.9	0.11	99.95%	213.96	15:48:00	53.04%	38.41%	1.35%	27,396.4	0.01	100.00%	196.84	1.490	408.48
04/06/12	24:00:00	53.27%	38.61%	1.24%	45,404.7	0.00	100.00%	327.68	24:00:00	53.27%	38.61%	1.24%	41,764.1	0.00	100.00%	301.41	1.680	626.47
05/06/12	23:52:00	54.43%	39.31%	0.90%	45,061.9	0.06	99.98%	332.24	23:48:00	54.43%	39.31%	0.90%	41,361.0	0.00	100.00%	304.99	1.785	634.45
06/06/12	24:00:00	53.66%	38.76%	1.10%	45,523.7	0.00	100.00%	330.94	24:00:00	53.66%	38.76%	1.10%	41,833.2	0.01	100.00%	304.10	1.790	632.25
07/06/12	24:00:00	52.81%	38.10%	1.35%	45,859.8	0.00	100.00%	328.10	24:00:00	52.81%	38.10%	1.35%	42,138.4	0.02	99.99%	301.46	1.798	626.76
08/06/12	24:00:00	52.37%	37.76%	1.51%	45,966.0	0.00	100.00%	326.15	24:00:00	52.37%	37.76%	1.51%	42,229.6	0.01	100.00%	299.63	1.796	622.97
09/06/12	24:00:00	52.09%	37.54%	1.61%	45,958.7	0.00	100.00%	324.35	24:00:00	52.09%	37.54%	1.61%	42,221.2	0.02	99.99%	297.95	1.790	619.50
10/06/12	24:00:00	52.59%	37.94%	1.44%	45,594.4	0.00	100.00%	324.84	24:00:00	52.59%	37.94%	1.44%	41,901.9	0.01	100.00%	298.53	1.787	620.59
11/06/12	24:00:00	53.12%	38.36%	1.30%	45,340.3	0.00	100.00%	326.28	24:00:00	53.12%	38.36%	1.30%	41,647.7	0.00	100.00%	299.71	1.785	623.20
12/06/12	24:00:00	51.96%	37.66%	1.61%	45,038.6	0.00	100.00%	317.06	24:00:00	51.96%	37.66%	1.61%	41,377.9	0.01	100.00%	291.29	1.775	605.58
13/06/12	23:52:00	52.53%	37.85%	1.49%	44,651.1	0.00	100.00%	317.76	23:52:00	52.53%	37.85%	1.49%	41,043.5	0.13	99.96%	291.97	1.764	606.98
14/06/12	23:44:00	52.81%	37.97%	1.46%	44,718.7	0.00	100.00%	319.96	23:48:00	52.81%	37.97%	1.46%	41,082.7	0.12	99.96%	293.83	1.771	611.03
15/06/12	24:00:00	52.62%	37.85%	1.47%	45,088.4	0.00	100.00%	321.42	24:00:00	52.62%	37.85%	1.47%	41,330.2	0.03	99.99%	294.60	1.778	613.25
16/06/12	24:00:00	52.66%	37.93%	1.44%	44,796.8	0.00	100.00%	319.58	24:00:00	52.66%	37.93%	1.44%	41,121.0	0.02	99.99%	293.34	1.768	610.16
17/06/12	24:00:00	52.26%	37.62%	1.56%	44,954.2	0.00	100.00%	318.25	24:00:00	52.26%	37.62%	1.56%	41,285.7	0.01	100.00%	292.27	1.766	607.76
18/06/12	24:00:00	53.85%	38.64%	1.15%	44,849.3	0.00	100.00%	327.22	24:00:00	53.85%	38.63%	1.15%	41,198.0	0.00	100.00%	300.57	1.763	625.04
19/06/12	24:00:00	53.21%	38.14%	1.36%	45,070.6	0.00	100.00%	324.89	24:00:00	53.21%	38.14%	1.36%	41,370.3	0.00	100.00%	298.22	1.775	620.34
20/06/12	23:48:00	52.80%	37.81%	1.55%	45,388.7	0.00	100.00%	324.67	23:52:00	52.81%	37.81%	1.55%	41,773.9	0.09	99.97%	298.76	1.781	620.65
21/06/12	24:00:00	52.71%	37.69%	1.62%	45,602.7	0.00	100.00%	325.62	24:00:00	52.71%	37.69%	1.62%	41,846.0	0.01	100.00%	298.79	1.783	621.62
22/06/12	24:00:00	53.30%	38.12%	1.43%	46,078.7	0.00	100.00%	332.70	24:00:00	53.30%	38.12%	1.43%	42,261.4	0.00	100.00%	305.14	1.813	635.01
23/06/12	24:00:00	52.46%	37.43%	1.67%	45,951.7	0.00	100.00%	326.60	24:00:00	52.46%	37.43%	1.67%	42,086.1	0.01	100.00%	299.12	1.804	622.90
24/06/12	24:00:00	52.70%	37.66%	1.60%	45,676.8	0.00	100.00%	326.11	24:00:00	52.70%	37.66%	1.60%	41,933.8	0.01	100.00%	299.38	1.789	622.70
25/06/12	24:00:00	52.38%	37.48%	1.66%	45,871.2	0.00	100.00%	325.50	24:00:00	52.38%	37.48%	1.66%	42,106.9	0.00	100.00%	298.79	1.792	621.49
26/06/12	23:52:00	52.58%	37.64%	1.55%	45,465.1	0.00	100.00%	323.87	24:00:00	52.59%	37.65%	1.55%	41,943.8	0.00	100.00%	298.81	1.786	619.90
27/06/12	23:56:00	52.76%	37.78%	1.51%	45,886.6	0.00	100.00%	327.96	23:40:00	52.72%	37.76%	1.52%	41,468.9	0.00	100.00%	296.16	1.777	621.35
28/06/12	24:00:00	52.31%	37.51%	1.63%	46,112.6	0.00	100.00%	326.78	24:00:00	52.31%	37.51%	1.63%	42,174.4	0.00	100.00%	298.88	1.800	622.85
29/06/12	23:52:00	52.84%	37.94%	1.46%	45,860.1	0.11	99.97%	328.22	23:52:00	52.85%	37.94%	1.46%	41,895.6	0.00	100.00%	299.94	1.785	625.37
30/06/12	24:00:00	53.05%	38.24%	1.33%	45,450.1	0.00	100.00%	326.64	24:00:00	53.05%	38.24%	1.33%	41,564.0	0.00	100.00%	298.71	1.656	622.76
Jun-12	**29 days 13:56**	**52.77%**	**37.97%**	**1.45%**	**1,346,548**	**0.41**	**100.00%**	**9,626.74**	**29 days 13:52**	**52.77%**	**37.97%**	**1.45%**	**1,235,754**	**0.55**	**99.99%**	**8,834.29**	**52.816**	**18,378.65**

PROACTIVA MEIO AMBIENTE BRASIL

PROACTIVA TIJUQUINHAS LANDFILL GAS CAPTURE AND FLARING PROJECT

DOCUMENT: EMISSION REDUCTION MONTHLY REPORT

REPORTED MONTH: July 2012

REVISION: 2 | DATE: 16/09/13 | Start Date Calculation Period: 01/07/2012 00:00:00 (GMT -2) | End Date Calculation Period: 01/08/2012 00:00:00 (GMT -2)

	FLARE N°1								FLARE N°2								ELECTRICITY	TOTAL
Month	Operating Time	Landfill Gas Analysis			Landfill Gas Volume	Flaring Project Emissions	Flare efficiency	Flare Emissions Reductions	Operating Time	Landfill Gas Analysis			Landfill Gas Volume	Flaring Project Emissions	Flare efficiency	Flare Emissions Reductions	Net incr. Electricity Imported	Project Emissions Reductions
		w_{CH4}	fv_{CO2}	fv_{O2}	LFG_{flare1} (Nm^3)	PE_{flare1} ($tCO2e$)	η_{flare1}	ER_{flare1} (tCO_2e)		w_{CH4}	fv_{CO2}	fv_{O2}	LFG_{flare2} (Nm^3)	PE_{flare2} ($tCO2e$)	η_{flare2}	ER_{flare2} (tCO_2e)	EL_{IMP} (MWh)	ER (tCO_2e)
01/07/12	24:00:00	52.78%	38.06%	1.40%	45,397.7	0.00	100.00%	324.60	24:00:00	52.78%	38.06%	1.40%	41,540.9	0.00	100.00%	297.02	1.590	619.14
02/07/12	19:01:21	53.29%	38.32%	1.36%	36,170.5	0.13	99.95%	260.99	18:58:08	53.26%	38.31%	1.37%	33,041.8	0.00	100.00%	238.43	1.706	496.75
03/07/12	24:00:00	51.83%	37.40%	1.70%	45,418.4	0.00	100.00%	318.89	24:00:00	51.83%	37.40%	1.70%	41,607.9	0.05	99.98%	292.10	1.733	608.29
04/07/12	23:13:21	52.34%	37.67%	1.60%	44,215.8	0.00	100.00%	313.50	23:12:06	52.33%	37.67%	1.61%	40,472.8	0.02	99.99%	286.92	1.752	597.68
05/07/12	24:00:00	51.90%	37.40%	1.71%	45,683.1	0.00	100.00%	321.23	24:00:00	51.90%	37.40%	1.71%	41,822.4	0.01	100.00%	294.07	1.770	612.53
06/07/12	24:00:00	51.62%	37.26%	1.75%	44,862.1	0.00	100.00%	313.75	24:00:00	51.62%	37.26%	1.75%	41,077.2	0.04	99.99%	287.25	1.759	598.26
07/07/12	24:00:00	51.03%	36.98%	1.86%	45,295.7	0.00	100.00%	313.16	24:00:00	51.03%	36.98%	1.86%	41,493.3	0.11	99.97%	286.78	1.763	597.20
08/07/12	24:00:00	50.96%	36.85%	1.88%	45,135.0	0.00	100.00%	311.60	24:00:00	50.96%	36.85%	1.88%	41,282.3	0.19	99.94%	284.83	1.767	593.68
09/07/12	24:00:00	51.13%	36.95%	1.84%	44,402.1	0.00	100.00%	307.59	24:00:00	51.13%	36.95%	1.84%	40,616.4	0.03	99.99%	281.35	1.697	586.29
10/07/12	22:52:00	52.16%	37.70%	1.59%	42,232.6	0.00	100.00%	298.45	22:49:52	52.14%	37.69%	1.59%	38,553.8	0.02	99.99%	272.30	1.707	568.08
11/07/12	24:00:00	51.24%	37.22%	1.80%	43,265.8	0.00	100.00%	300.36	24:00:00	51.24%	37.22%	1.80%	39,477.7	0.00	100.00%	274.07	1.720	571.75
12/07/12	24:00:00	51.73%	37.55%	1.66%	43,586.0	0.00	100.00%	305.46	24:00:00	51.73%	37.55%	1.66%	39,775.3	0.00	100.00%	278.75	1.716	581.53
13/07/12	24:00:00	51.74%	37.39%	1.65%	44,008.8	0.00	100.00%	308.50	24:00:00	51.74%	37.39%	1.65%	40,175.6	0.00	100.00%	281.63	1.727	587.44
14/07/12	24:00:00	51.73%	37.26%	1.67%	43,977.4	0.00	100.00%	308.22	24:00:00	51.73%	37.26%	1.67%	40,135.7	0.00	100.00%	281.30	1.734	586.81
15/07/12	24:00:00	51.24%	36.89%	1.82%	44,292.6	0.00	100.00%	307.48	24:00:00	51.24%	36.89%	1.82%	40,422.7	0.00	100.00%	280.61	1.735	585.39
16/07/12	23:52:00	51.64%	37.14%	1.71%	43,921.1	0.00	100.00%	307.28	23:44:00	51.65%	37.15%	1.71%	39,939.1	0.00	100.00%	279.47	1.732	584.05
17/07/12	23:48:00	53.01%	37.98%	1.39%	43,961.6	0.19	99.95%	315.56	23:48:00	53.01%	37.98%	1.39%	40,242.9	0.00	100.00%	289.02	1.766	601.83
18/07/12	23:44:00	54.40%	38.70%	1.26%	45,234.7	0.00	100.00%	333.37	23:43:00	54.39%	38.70%	1.26%	41,398.9	0.00	100.00%	305.07	1.806	635.62
19/07/12	24:00:00	52.92%	37.76%	1.74%	46,695.5	0.00	100.00%	334.75	24:00:00	52.92%	37.76%	1.74%	42,812.6	0.00	100.00%	306.91	1.810	638.84
20/07/12	24:00:00	51.71%	37.12%	2.02%	44,963.6	0.00	100.00%	315.01	24:00:00	51.71%	37.12%	2.02%	41,243.5	0.00	100.00%	288.94	1.764	601.20
21/07/12	23:29:59	52.14%	37.70%	1.80%	43,160.6	0.01	100.00%	304.84	23:35:07	52.14%	37.70%	1.80%	39,688.9	0.12	99.96%	280.23	1.729	582.38
22/07/12	24:00:00	51.80%	37.74%	1.84%	44,133.1	0.00	100.00%	309.71	24:00:00	51.80%	37.74%	1.84%	40,545.7	0.00	100.00%	284.53	1.723	591.56
23/07/12	24:00:00	51.35%	37.14%	2.05%	44,496.8	0.00	100.00%	309.57	24:00:00	51.35%	37.14%	2.05%	40,919.0	0.00	100.00%	284.67	1.738	591.53
24/07/12	24:00:00	52.34%	38.03%	1.69%	44,686.3	0.00	100.00%	316.85	24:00:00	52.34%	38.03%	1.69%	41,063.6	0.00	100.00%	291.16	1.757	605.26
25/07/12	24:00:00	52.49%	38.13%	1.64%	44,827.8	0.00	100.00%	318.76	24:00:00	52.49%	38.13%	1.64%	41,218.2	0.00	100.00%	293.08	1.752	609.11
26/07/12	23:44:00	54.79%	39.57%	1.01%	44,046.0	0.00	100.00%	326.95	23:44:00	54.79%	39.57%	1.01%	40,489.2	0.00	100.00%	300.55	1.754	624.76
27/07/12	24:00:00	55.02%	39.77%	0.95%	45,314.2	0.00	100.00%	337.77	24:00:00	55.02%	39.77%	0.95%	41,664.0	0.00	100.00%	310.57	1.760	645.59
28/07/12	24:00:00	55.10%	40.09%	0.89%	45,286.9	0.00	100.00%	338.06	24:00:00	55.10%	40.09%	0.89%	41,625.1	0.00	100.00%	310.72	1.768	646.02
29/07/12	24:00:00	55.29%	40.12%	0.88%	45,226.3	0.00	100.00%	338.79	24:00:00	55.29%	40.12%	0.88%	41,604.6	0.00	100.00%	311.66	1.775	647.67
30/07/12	24:00:00	55.07%	39.75%	0.95%	45,650.1	0.00	100.00%	340.55	24:00:00	55.07%	39.75%	0.95%	42,036.1	0.00	100.00%	313.59	1.780	651.37
31/07/12	24:00:00	55.60%	39.72%	0.91%	45,134.8	0.00	100.00%	339.97	24:00:00	55.60%	39.72%	0.91%	41,563.3	0.00	100.00%	313.07	1.766	650.28
Jul-12	**30 days 15:44**	**52.63%**	**37.98%**	**1.55%**	**1,374,683**	**0.35**	**100.00%**	**9,801.56**	**30 days 15:34**	**52.63%**	**37.98%**	**1.55%**	**1,259,550**	**0.58**	**99.99%**	**8,980.66**	**54.057**	**18,697.89**

PROACTIVA MEIO AMBIENTE BRASIL

PROACTIVA TIJUQUINHAS LANDFILL GAS CAPTURE AND FLARING PROJECT

DOCUMENT: EMISSION REDUCTION MONTHLY REPORT

REPORTED MONTH: August 2012

REVISION: 2 | DATE: 16/09/13 | Start Date Calculation Period: 01/08/2012 00:00:00 (GMT -2) | End Date Calculation Period: 01/09/2012 00:00:00 (GMT -2)

	FLARE N°1								FLARE N°2								ELECTRICITY	TOTAL
Month	Operating Time	Landfill Gas Analysis			Landfill Gas Volume	Flaring Project Emissions	Flare efficiency	Flare Emissions Reductions	Operating Time	Landfill Gas Analysis			Landfill Gas Volume	Flaring Project Emissions	Flare efficiency	Flare Emissions Reductions	Net incr. Electricity Imported	Project Emissions Reductions
		w_{CH4}	fv_{CO2}	fv_{O2}	LFG_{flare1} (Nm^3)	PE_{flare1} ($tCO2e$)	η_{flare1}	ER_{flare1} (tCO_2e)		w_{CH4}	fv_{CO2}	fv_{O2}	LFG_{flare2} (Nm^3)	PE_{flare2} ($tCO2e$)	η_{flare2}	ER_{flare2} (tCO_2e)	EL_{IMP} (MWh)	ER (tCO_2e)
01/08/12	24:00:00	55.88%	40.06%	0.86%	45,126.2	0.00	100.00%	341.60	23:56:00	55.88%	40.06%	0.86%	41,344.4	0.00	100.00%	312.97	1.765	651.81
02/08/12	24:00:00	54.46%	39.36%	1.25%	45,768.3	0.00	100.00%	337.71	24:00:00	54.46%	39.36%	1.25%	42,024.0	0.00	100.00%	310.08	1.771	645.02
03/08/12	24:00:00	54.82%	39.60%	1.11%	45,883.8	0.00	100.00%	340.77	24:00:00	54.82%	39.60%	1.11%	42,118.9	0.00	100.00%	312.81	1.777	650.81
04/08/12	24:00:00	54.21%	39.09%	1.32%	46,025.9	0.00	100.00%	338.03	24:00:00	54.21%	39.09%	1.32%	42,237.8	0.00	100.00%	310.21	1.790	645.44
05/08/12	24:00:00	52.72%	37.94%	1.80%	46,554.7	0.00	100.00%	332.51	24:00:00	52.72%	37.94%	1.80%	42,739.1	0.00	100.00%	305.25	1.795	634.96
06/08/12	24:00:00	51.83%	37.33%	2.01%	46,949.8	0.00	100.00%	329.69	24:00:00	51.83%	37.33%	2.01%	43,087.1	0.00	100.00%	302.56	1.804	629.43
07/08/12	24:00:00	52.58%	37.94%	1.74%	46,673.7	0.00	100.00%	332.48	24:00:00	52.58%	37.94%	1.74%	42,834.6	0.00	100.00%	305.13	1.806	634.79
08/08/12	24:00:00	52.70%	37.89%	1.72%	46,644.6	0.00	100.00%	333.02	24:00:00	52.70%	37.89%	1.72%	42,790.9	0.00	100.00%	305.51	1.798	635.72
09/08/12	24:00:00	52.60%	37.89%	1.78%	46,557.7	0.00	100.00%	331.79	24:00:00	52.60%	37.89%	1.78%	42,721.0	0.00	100.00%	304.45	1.803	633.43
10/08/12	24:00:00	52.10%	37.65%	1.90%	47,000.8	0.00	100.00%	331.72	24:00:00	52.10%	37.65%	1.90%	43,106.7	0.00	100.00%	304.23	1.808	633.13
11/08/12	24:00:00	52.49%	38.03%	1.70%	46,681.5	0.00	100.00%	331.95	24:00:00	52.49%	38.03%	1.70%	42,807.7	0.00	100.00%	304.40	1.803	633.53
12/08/12	24:00:00	52.31%	37.86%	1.76%	46,592.4	0.00	100.00%	330.19	24:00:00	52.31%	37.86%	1.76%	42,696.9	0.00	100.00%	302.58	1.801	629.96
13/08/12	24:00:00	52.32%	37.82%	1.74%	46,269.7	0.00	100.00%	327.95	24:00:00	52.32%	37.82%	1.74%	42,475.2	0.00	100.00%	301.06	1.789	626.22
14/08/12	24:00:00	52.68%	38.07%	1.57%	46,121.0	0.00	100.00%	329.13	24:00:00	52.67%	38.06%	1.57%	42,343.6	0.00	100.00%	302.17	1.790	628.50
15/08/12	24:00:00	52.43%	37.98%	1.63%	46,520.4	0.00	100.00%	330.43	24:00:00	52.43%	37.98%	1.63%	42,592.7	0.00	100.00%	302.53	1.801	630.15
16/08/12	24:00:00	52.53%	38.07%	1.59%	46,307.9	0.00	100.00%	329.55	24:00:00	52.53%	38.07%	1.59%	42,391.3	0.00	100.00%	301.68	1.800	628.42
17/08/12	24:00:00	52.59%	38.10%	1.56%	46,109.4	0.00	100.00%	328.50	24:00:00	52.59%	38.10%	1.56%	42,259.1	0.00	100.00%	301.07	1.791	626.78
18/08/12	17:48:00	52.73%	38.12%	1.58%	34,426.4	0.00	100.00%	245.95	17:44:19	52.72%	38.11%	1.59%	31,458.7	0.12	99.95%	224.59	1.647	467.97
19/08/12	21:00:51	52.71%	38.20%	1.55%	40,411.3	0.00	100.00%	288.55	21:00:51	52.71%	38.20%	1.55%	37,237.3	0.00	100.00%	265.88	1.562	551.99
20/08/12	13:31:47	52.85%	38.03%	1.68%	24,927.4	0.08	99.96%	178.41	13:31:47	52.85%	38.03%	1.68%	23,097.6	0.02	99.99%	165.36	1.620	341.24
21/08/12	23:56:00	52.60%	37.99%	1.62%	43,878.4	0.00	100.00%	312.67	23:56:00	52.60%	37.99%	1.61%	40,627.7	0.00	100.00%	289.51	1.705	599.52
22/08/12	24:00:00	52.62%	38.21%	1.60%	45,214.8	0.00	100.00%	322.34	24:00:00	52.62%	38.21%	1.60%	41,887.0	0.00	100.00%	298.62	1.618	618.43
23/08/12	20:04:00	53.37%	38.83%	1.42%	38,348.1	0.06	99.98%	277.21	20:04:49	53.36%	38.83%	1.42%	35,411.0	0.02	99.99%	255.99	1.666	530.60
24/08/12	24:00:00	52.27%	38.07%	1.75%	45,669.3	0.00	100.00%	323.40	24:00:00	52.27%	38.07%	1.75%	42,249.4	0.00	100.00%	299.18	1.761	619.83
25/08/12	23:44:13	51.98%	37.79%	1.85%	45,148.7	0.00	100.00%	317.91	23:44:13	51.98%	37.79%	1.85%	41,787.8	0.00	100.00%	294.24	1.583	609.69
26/08/12	15:23:47	52.69%	38.11%	1.69%	29,437.0	0.00	100.00%	210.12	15:38:41	52.78%	38.16%	1.66%	27,687.7	0.30	99.86%	197.69	1.464	405.53
27/08/12	24:00:00	50.75%	36.72%	2.28%	45,634.6	0.00	100.00%	313.76	24:00:00	50.75%	36.72%	2.28%	42,392.7	0.02	99.99%	291.46	1.659	602.62
28/08/12	24:00:00	49.99%	36.28%	2.44%	45,293.9	0.00	100.00%	306.72	24:00:00	49.98%	36.28%	2.44%	42,059.2	0.07	99.98%	284.74	1.774	588.70
29/08/12	24:00:00	50.95%	36.98%	2.11%	44,488.7	0.00	100.00%	307.08	24:00:00	50.95%	36.98%	2.11%	41,169.9	0.00	100.00%	284.17	1.754	588.51
30/08/12	24:00:00	51.00%	36.91%	2.14%	44,542.6	0.00	100.00%	307.77	24:00:00	51.00%	36.91%	2.14%	41,220.0	0.00	100.00%	284.81	1.738	589.87
31/08/12	24:00:00	51.54%	37.31%	1.98%	44,613.8	0.00	100.00%	311.52	24:00:00	51.54%	37.31%	1.98%	41,279.8	0.00	100.00%	288.24	1.742	597.04
Aug-12	**29 days 15:28**	**52.55%**	**38.00%**	**1.70%**	**1,359,823**	**0.14**	**100.00%**	**9,680.39**	**29 days 15:36**	**52.55%**	**38.00%**	**1.70%**	**1,252,137**	**0.56**	**99.99%**	**8,913.16**	**53.785**	**18,509.64**

PROACTIVA MEIO AMBIENTE BRASIL

PROACTIVA TIJUQUINHAS LANDFILL GAS CAPTURE AND FLARING PROJECT

DOCUMENT — EMISSION REDUCTION MONTHLY REPORT

REPORTED MONTH — **September 2012**

REVISION 2 | DATE 16/09/13 | Start Date Calculation Period: 01/09/2012 00:00:00 (GMT -2) | End Date Calculation Period: 01/10/2012 00:00:00 (GMT -2)

	FLARE N°1								FLARE N°2								ELECTRICITY	TOTAL
Month	Operating Time	Landfill Gas Analysis			Landfill Gas Volume	Flaring Project Emissions	Flare efficiency	Flare Emissions Reductions	Operating Time	Landfill Gas Analysis			Landfill Gas Volume	Flaring Project Emissions	Flare efficiency	Flare Emissions Reductions	Net incr. Electricity Imported	Project Emissions Reductions
		w_{CH4}	fv_{CO2}	fv_{O2}	LFG_{flare1} (Nm^3)	PE_{flare1} ($tCO2e$)	η_{flare1}	ER_{flare1} (tCO_2e)		w_{CH4}	fv_{CO2}	fv_{O2}	LFG_{flare2} (Nm^3)	PE_{flare2} ($tCO2e$)	η_{flare2}	ER_{flare2} (tCO_2e)	EL_{IMP} (MWh)	ER (tCO_2e)
01/09/12	24:00:00	52.10%	37.79%	1.72%	44,931.9	0.00	100.00%	317.16	24:00:00	52.10%	37.79%	1.72%	41,562.6	0.02	99.99%	293.36	1.739	607.80
02/09/12	24:00:00	52.12%	37.77%	1.72%	44,515.0	3.76	98.92%	310.93	24:00:00	52.12%	37.77%	1.72%	41,188.4	3.47	98.93%	287.71	1.734	595.94
03/09/12	20:24:13	51.62%	37.46%	1.87%	38,276.3	29.74	90.00%	240.92	20:24:13	51.62%	37.46%	1.87%	35,433.7	27.53	90.00%	223.03	1.335	461.86
04/09/12	0:00:00				0.0	0.00		0.00	0:00:00				0.0	0.00		0.00	0.807	-1.26
05/09/12	0:00:00				0.0	0.00		0.00	0:00:00				0.0	0.00		0.00	0.599	-0.93
06/09/12	10:05:46	55.30%	41.66%	1.60%	18,358.3	8.02	94.75%	130.31	10:05:46	55.30%	41.66%	1.60%	17,014.0	7.52	94.69%	120.70	1.165	249.19
07/09/12	23:51:42	54.20%	40.07%	1.90%	43,925.6	0.03	99.99%	322.52	23:51:42	54.20%	40.07%	1.90%	40,678.1	0.06	99.98%	298.64	1.652	618.58
08/09/12	23:40:00	54.58%	40.22%	1.81%	43,917.7	0.22	99.94%	324.54	23:40:00	54.58%	40.22%	1.81%	40,684.7	0.03	99.99%	300.81	1.752	622.61
09/09/12	24:00:00	53.72%	39.53%	2.02%	45,261.3	0.02	99.99%	329.38	24:00:00	53.72%	39.53%	2.02%	41,928.6	0.01	100.00%	305.13	1.761	631.76
10/09/12	23:48:00	54.10%	39.76%	1.89%	44,817.1	0.02	99.99%	328.47	23:48:00	54.10%	39.76%	1.89%	41,542.0	0.29	99.92%	304.23	1.756	629.96
11/09/12	23:56:00	56.46%	41.32%	1.28%	44,448.4	0.02	99.99%	339.97	23:56:00	56.46%	41.32%	1.28%	41,184.3	0.01	100.00%	315.01	1.760	652.23
12/09/12	24:00:00	55.65%	41.10%	1.38%	45,320.8	0.02	99.99%	341.68	24:00:00	55.65%	41.10%	1.38%	41,995.7	0.01	100.00%	316.62	1.783	655.52
13/09/12	24:00:00	55.27%	40.80%	1.50%	45,620.0	0.02	99.99%	341.55	24:00:00	55.27%	40.80%	1.50%	42,267.3	0.01	100.00%	316.46	1.785	655.23
14/09/12	24:00:00	55.01%	40.34%	1.60%	45,494.1	0.02	99.99%	339.00	24:00:00	55.01%	40.34%	1.60%	42,150.0	0.01	100.00%	314.08	1.781	650.30
15/09/12	24:00:00	55.00%	40.34%	1.60%	45,222.3	0.02	100.00%	336.93	24:00:00	55.00%	40.34%	1.60%	41,889.2	0.01	100.00%	312.10	1.775	646.26
16/09/12	24:00:00	55.02%	40.35%	1.58%	44,938.0	0.02	100.00%	334.92	24:00:00	55.02%	40.35%	1.58%	41,634.9	0.01	100.00%	310.31	1.771	642.46
17/09/12	24:00:00	55.15%	40.48%	1.55%	44,695.7	0.02	100.00%	333.92	24:00:00	55.15%	40.48%	1.55%	41,408.5	0.01	100.00%	309.37	1.766	640.54
18/09/12	24:00:00	54.60%	40.04%	1.75%	44,080.3	0.02	100.00%	326.03	24:00:00	54.60%	40.04%	1.75%	40,817.9	0.01	100.00%	301.91	1.741	625.23
19/09/12	23:21:23	53.79%	39.50%	1.97%	42,398.8	0.40	99.88%	308.62	23:22:49	53.79%	39.50%	1.97%	39,300.6	0.08	99.97%	286.33	1.734	592.24
20/09/12	23:44:00	52.32%	38.01%	2.07%	44,065.3	0.02	100.00%	312.35	23:44:00	52.32%	38.01%	2.07%	40,809.1	0.18	99.94%	289.12	1.753	598.73
21/09/12	23:48:00	52.35%	37.67%	1.89%	44,175.4	0.77	99.78%	312.62	23:48:00	52.35%	37.67%	1.89%	40,937.1	0.01	100.00%	290.33	1.753	600.21
22/09/12	24:00:00	52.90%	37.65%	1.61%	44,311.2	0.00	100.00%	317.59	24:00:00	52.90%	37.65%	1.61%	41,038.7	0.00	100.00%	294.13	1.721	609.04
23/09/12	22:52:00	52.82%	37.54%	1.64%	42,297.9	0.00	100.00%	302.70	22:48:18	52.81%	37.53%	1.65%	39,119.1	0.03	99.99%	279.86	1.705	579.90
24/09/12	22:20:00	53.04%	37.73%	1.65%	39,628.1	1.34	99.58%	283.52	21:52:00	53.00%	37.70%	1.65%	36,360.6	0.96	99.67%	260.19	1.658	541.12
25/09/12	23:52:00	52.36%	37.32%	1.78%	44,507.5	0.00	100.00%	315.72	23:49:28	52.36%	37.32%	1.78%	41,155.1	0.00	100.00%	291.93	1.724	604.96
26/09/12	23:17:01	51.18%	36.49%	2.09%	43,703.3	0.01	100.00%	302.99	23:19:49	51.17%	36.49%	2.09%	40,584.4	0.00	100.00%	281.36	1.747	581.62
27/09/12	24:00:00	50.74%	36.15%	2.25%	44,327.5	0.00	100.00%	304.72	24:00:00	50.74%	36.15%	2.25%	41,056.7	0.00	100.00%	282.23	1.742	584.23
28/09/12	24:00:00	51.51%	36.75%	2.07%	43,904.7	0.17	99.95%	306.25	24:00:00	51.51%	36.75%	2.07%	40,667.3	0.00	100.00%	283.81	1.740	587.35
29/09/12	24:00:00	52.64%	37.52%	1.70%	43,420.7	0.00	100.00%	309.63	24:00:00	52.64%	37.52%	1.70%	40,243.2	0.00	100.00%	286.97	1.723	593.91
30/09/12	24:00:00	53.07%	37.86%	1.59%	43,151.5	0.00	100.00%	310.22	24:00:00	53.07%	37.86%	1.59%	40,009.2	0.00	100.00%	287.63	1.717	595.17
Sep-12	**27 days 01:00**	**53.51%**	**38.86%**	**1.75%**	**1,203,715**	**44.69**	**99.54%**	**8,685.14**	**27 days 00:30**	**53.50%**	**38.86%**	**1.76%**	**1,114,661**	**40.29**	**99.55%**	**8,043.34**	**49.178**	**16,651.76**

PROACTIVA MEIO AMBIENTE BRASIL

PROACTIVA TIJUQUINHAS LANDFILL GAS CAPTURE AND FLARING PROJECT

DOCUMENT: EMISSION REDUCTION MONTHLY REPORT

REPORTED MONTH: October 2012

REVISION: 2 | DATE: 16/09/13 | Start Date Calculation Period: 01/10/2012 00:00:00 (GMT -2) | End Date Calculation Period: 01/11/2012 00:00:00 (GMT -2)

	FLARE N°1								FLARE N°2								ELECTRICITY	TOTAL
Month	Operating Time	Landfill Gas Analysis			Landfill Gas Volume	Flaring Project Emissions	Flare efficiency	Flare Emissions Reductions	Operating Time	Landfill Gas Analysis			Landfill Gas Volume	Flaring Project Emissions	Flare efficiency	Flare Emissions Reductions	Net incr. Electricity Imported	Project Emissions Reductions
		w_{CH4}	fv_{CO2}	fv_{O2}	LFG_{flare1} (Nm^3)	PE_{flare1} ($tCO2e$)	η_{flare1}	ER_{flare1} (tCO_2e)		w_{CH4}	fv_{CO2}	fv_{O2}	LFG_{flare2} (Nm^3)	PE_{flare2} ($tCO2e$)	η_{flare2}	ER_{flare2} (tCO_2e)	EL_{IMP} (MWh)	ER (tCO_2e)
01/10/12	24:00:00	53.55%	38.27%	1.43%	42,932.4	0.00	100.00%	311.49	24:00:00	53.55%	38.27%	1.43%	39,817.1	0.00	100.00%	288.88	1.710	597.70
02/10/12	23:57:33	53.70%	38.36%	1.42%	43,542.5	0.00	100.00%	316.77	23:57:19	53.70%	38.36%	1.42%	40,349.1	0.00	100.00%	293.54	1.719	607.63
03/10/12	22:37:35	51.80%	37.20%	2.05%	43,372.3	0.00	100.00%	304.37	22:32:35	51.78%	37.19%	2.05%	39,982.5	0.00	100.00%	280.50	1.738	582.15
04/10/12	23:56:00	51.61%	37.07%	2.08%	45,656.2	0.00	100.00%	319.22	23:56:00	51.61%	37.07%	2.08%	42,310.2	0.02	99.99%	295.81	1.771	612.27
05/10/12	24:00:00	51.95%	37.33%	1.99%	45,835.9	0.00	100.00%	322.61	24:00:00	51.95%	37.33%	1.99%	42,446.2	0.00	100.00%	298.75	1.802	618.54
06/10/12	24:00:00	52.39%	37.66%	1.84%	46,722.2	0.00	100.00%	331.62	24:00:00	52.39%	37.66%	1.84%	43,249.9	0.00	100.00%	306.98	1.812	635.77
07/10/12	24:00:00	52.61%	37.78%	1.72%	46,371.9	0.00	100.00%	330.52	24:00:00	52.61%	37.78%	1.72%	42,885.9	0.00	100.00%	305.67	1.812	633.37
08/10/12	24:00:00	52.81%	37.88%	1.66%	46,538.6	0.00	100.00%	332.93	24:00:00	52.81%	37.88%	1.66%	43,034.5	0.00	100.00%	307.86	1.823	637.95
09/10/12	24:00:00	53.46%	38.41%	1.43%	46,979.7	0.00	100.00%	340.22	24:00:00	53.46%	38.41%	1.43%	43,432.1	0.00	100.00%	314.53	1.835	651.89
10/10/12	24:00:00	52.89%	38.05%	1.61%	47,037.1	0.00	100.00%	337.05	24:00:00	52.89%	38.05%	1.61%	43,475.2	0.00	100.00%	311.52	1.870	645.65
11/10/12	23:56:00	51.40%	37.06%	2.00%	47,423.8	0.03	99.99%	330.21	23:56:00	51.40%	37.06%	2.00%	43,901.7	0.08	99.98%	305.63	1.895	632.88
12/10/12	24:00:00	52.38%	37.75%	1.66%	47,377.0	0.00	100.00%	336.22	24:00:00	52.38%	37.75%	1.66%	43,820.6	0.00	100.00%	310.99	1.898	644.25
13/10/12	24:00:00	52.12%	37.51%	1.77%	47,127.5	0.00	100.00%	332.78	24:00:00	52.12%	37.51%	1.77%	43,600.3	0.00	100.00%	307.87	1.873	637.74
14/10/12	24:00:00	51.94%	37.42%	1.81%	46,966.4	0.00	100.00%	330.50	24:00:00	51.94%	37.42%	1.81%	43,418.9	0.00	100.00%	305.54	1.858	633.14
15/10/12	14:32:30	51.86%	37.42%	1.84%	28,315.2	0.00	100.00%	198.93	24:00:00	52.18%	37.69%	1.73%	43,348.9	0.00	100.00%	306.45	1.861	502.48
16/10/12	17:22:44	52.61%	38.26%	1.51%	34,131.1	0.00	100.00%	243.28	24:00:00	52.45%	38.15%	1.56%	43,722.1	0.00	100.00%	310.68	1.880	551.02
17/10/12	24:00:00	52.82%	38.42%	1.46%	46,969.8	0.00	100.00%	336.08	24:00:00	52.81%	38.42%	1.46%	43,409.9	0.00	100.00%	310.60	1.884	643.74
18/10/12	24:00:00	51.32%	37.33%	1.94%	46,795.8	0.00	100.00%	325.37	24:00:00	51.32%	37.33%	1.94%	43,246.1	0.00	100.00%	300.69	1.850	623.17
19/10/12	24:00:00	50.57%	36.89%	2.19%	45,678.9	0.00	100.00%	312.95	24:00:00	50.57%	36.89%	2.19%	42,257.3	0.03	99.99%	289.48	1.840	599.56
20/10/12	24:00:00	51.84%	37.83%	1.77%	46,636.0	0.00	100.00%	327.55	24:00:00	51.84%	37.83%	1.77%	43,074.6	0.00	100.00%	302.53	1.800	627.27
21/10/12	21:58:51	52.32%	38.26%	1.64%	42,502.9	0.00	100.00%	301.25	21:56:03	52.31%	38.26%	1.64%	39,200.8	0.00	100.00%	277.81	1.773	576.29
22/10/12	23:29:04	52.86%	38.66%	1.40%	45,362.0	0.08	99.98%	324.79	23:29:06	52.86%	38.66%	1.40%	41,975.0	0.00	100.00%	300.60	1.757	622.65
23/10/12	22:38:20	53.61%	39.13%	1.13%	43,921.1	0.12	99.97%	318.87	22:42:12	53.61%	39.13%	1.13%	40,654.1	0.00	100.00%	295.26	1.798	611.33
24/10/12	24:00:00	52.27%	38.17%	1.51%	46,821.1	0.00	100.00%	331.53	24:00:00	52.27%	38.17%	1.51%	43,221.5	0.00	100.00%	306.04	1.840	634.70
25/10/12	24:00:00	51.97%	37.94%	1.61%	46,721.4	0.00	100.00%	328.92	24:00:00	51.97%	37.94%	1.61%	43,125.1	0.00	100.00%	303.60	1.824	629.68
26/10/12	24:00:00	52.10%	37.99%	1.59%	46,709.1	0.00	100.00%	329.66	24:00:00	52.10%	37.99%	1.59%	43,202.3	0.00	100.00%	304.91	1.831	631.71
27/10/12	23:20:00	52.43%	38.20%	1.50%	45,236.2	0.12	99.97%	321.19	23:20:00	52.43%	38.20%	1.50%	41,837.2	0.03	99.99%	297.13	1.796	615.52
28/10/12	24:00:00	52.27%	38.03%	1.56%	46,032.4	0.01	100.00%	325.97	24:00:00	52.27%	38.03%	1.56%	42,597.6	0.00	100.00%	301.65	1.775	624.86
29/10/12	24:00:00	52.03%	37.85%	1.65%	46,101.5	0.11	99.97%	324.86	24:00:00	52.03%	37.85%	1.65%	42,633.0	0.00	100.00%	300.51	1.802	622.55
30/10/12	23:56:00	52.03%	37.94%	1.65%	45,961.2	0.01	100.00%	323.94	23:44:00	52.03%	37.94%	1.65%	42,042.0	0.10	99.97%	296.26	1.816	617.36
31/10/12	24:00:00	51.24%	37.54%	1.88%	46,630.4	0.01	100.00%	323.67	24:00:00	51.24%	37.54%	1.88%	42,973.2	0.00	100.00%	298.29	1.828	619.11
Oct-12	**30 days 01:44**	**52.28%**	**37.86%**	**1.69%**	**1,394,410**	**0.49**	**100.00%**	**9,875.29**	**30 days 17:33**	**52.28%**	**37.86%**	**1.69%**	**1,318,245**	**0.27**	**100.00%**	**9,336.58**	**56.373**	**19,123.93**

PROACTIVA MEIO AMBIENTE BRASIL

PROACTIVA TIJUQUINHAS LANDFILL GAS CAPTURE AND FLARING PROJECT

DOCUMENT — EMISSION REDUCTION MONTHLY REPORT

REPORTED MONTH — **November 2012**

REVISION 2 | DATE 16/09/13 | Start Date Calculation Period: 01/11/2012 00:00:00 (GMT -2) | End Date Calculation Period: 01/12/2012 00:00:00 (GMT -2)

	FLARE N°1								FLARE N°2								ELECTRICITY	TOTAL
Month	Operating Time	Landfill Gas Analysis			Landfill Gas Volume	Flaring Project Emissions	Flare efficiency	Flare Emissions Reductions	Operating Time	Landfill Gas Analysis			Landfill Gas Volume	Flaring Project Emissions	Flare efficiency	Flare Emissions Reductions	Net incr. Electricity Imported	Project Emissions Reductions
		w_{CH4}	fv_{CO2}	fv_{O2}	LFG_{flare1} (Nm^3)	PE_{flare1} (tCO2e)	η_{flare1}	ER_{flare1} (tCO_2e)		w_{CH4}	fv_{CO2}	fv_{O2}	LFG_{flare2} (Nm^3)	PE_{flare2} (tCO2e)	η_{flare2}	ER_{flare2} (tCO_2e)	EL_{IMP} (MWh)	ER (tCO_2e)
01/11/12	24:00:00	51.03%	37.34%	1.95%	46,651.1	0.01	100.00%	322.48	24:00:00	51.03%	37.34%	1.95%	43,059.1	0.00	100.00%	297.65	1.837	617.26
02/11/12	24:00:00	51.36%	37.51%	1.86%	46,275.9	0.01	100.00%	321.97	24:00:00	51.36%	37.51%	1.86%	42,686.4	0.00	100.00%	297.00	1.839	616.10
03/11/12	24:00:00	51.37%	37.44%	1.89%	46,061.0	0.00	100.00%	320.57	24:00:00	51.37%	37.44%	1.89%	42,462.6	0.00	100.00%	295.53	1.817	613.27
04/11/12	24:00:00	51.43%	37.48%	1.88%	45,811.0	0.00	100.00%	319.16	24:00:00	51.43%	37.48%	1.88%	42,228.7	0.00	100.00%	294.21	1.806	610.55
05/11/12	24:00:00	51.43%	37.52%	1.87%	45,593.5	0.00	100.00%	317.65	24:00:00	51.43%	37.52%	1.87%	42,023.9	0.00	100.00%	292.78	1.805	607.61
06/11/12	24:00:00	51.68%	37.80%	1.71%	45,285.9	0.00	100.00%	317.05	24:00:00	51.68%	37.80%	1.71%	41,735.0	0.00	100.00%	292.19	1.802	606.42
07/11/12	24:00:00	51.82%	38.22%	1.55%	45,633.6	0.00	100.00%	320.38	24:00:00	51.82%	38.22%	1.55%	42,064.2	0.00	100.00%	295.32	1.802	612.88
08/11/12	24:00:00	51.99%	38.45%	1.54%	45,665.0	0.01	100.00%	321.60	24:00:00	51.99%	38.45%	1.54%	42,138.5	0.00	100.00%	296.77	1.819	615.53
09/11/12	24:00:00	52.32%	38.93%	1.38%	45,727.1	0.01	100.00%	324.09	24:00:00	52.32%	38.93%	1.38%	42,217.4	0.00	100.00%	299.23	1.814	620.49
10/11/12	24:00:00	52.56%	39.17%	1.30%	45,697.9	0.01	100.00%	325.39	24:00:00	52.56%	39.17%	1.30%	42,175.5	0.00	100.00%	300.31	1.803	622.89
11/11/12	24:00:00	52.73%	39.18%	1.26%	45,423.8	0.01	100.00%	324.50	24:00:00	52.73%	39.18%	1.26%	41,923.8	0.00	100.00%	299.50	1.801	621.20
12/11/12	24:00:00	51.78%	38.53%	1.52%	45,934.4	0.00	100.00%	322.21	24:00:00	51.78%	38.53%	1.52%	42,374.8	0.00	100.00%	297.25	1.813	616.63
13/11/12	24:00:00	51.24%	38.28%	1.56%	46,113.2	0.00	100.00%	320.13	24:00:00	51.24%	38.29%	1.56%	42,554.4	0.00	100.00%	295.43	1.818	612.72
14/11/12	24:00:00	51.56%	38.42%	1.46%	45,762.0	0.00	100.00%	319.66	24:00:00	51.56%	38.42%	1.46%	42,231.4	0.00	100.00%	295.00	1.815	611.83
15/11/12	24:00:00	51.88%	38.62%	1.38%	45,611.2	0.00	100.00%	320.58	24:00:00	51.88%	38.62%	1.38%	42,105.2	0.00	100.00%	295.94	1.814	613.68
16/11/12	24:00:00	52.49%	38.98%	1.22%	45,453.3	0.00	100.00%	323.22	24:00:00	52.49%	38.98%	1.22%	42,158.8	0.00	100.00%	299.79	1.808	620.19
17/11/12	24:00:00	52.39%	38.81%	1.28%	45,173.4	0.00	100.00%	320.61	24:00:00	52.39%	38.81%	1.28%	42,314.7	0.00	100.00%	300.33	1.792	618.14
18/11/12	24:00:00	52.59%	38.91%	1.23%	45,100.0	0.00	100.00%	321.34	24:00:00	52.59%	38.91%	1.23%	42,218.4	0.00	100.00%	300.81	1.786	619.36
19/11/12	24:00:00	52.98%	39.20%	1.13%	44,995.1	0.00	100.00%	322.95	24:00:00	52.98%	39.20%	1.13%	42,086.9	0.00	100.00%	302.08	1.789	622.23
20/11/12	24:00:00	53.20%	39.35%	1.09%	44,870.4	0.00	100.00%	323.37	24:00:00	53.20%	39.35%	1.09%	41,959.0	0.00	100.00%	302.38	1.787	622.96
21/11/12	23:25:56	53.19%	39.33%	1.05%	43,834.2	0.00	100.00%	315.89	23:26:56	53.19%	39.33%	1.05%	41,097.4	0.00	100.00%	296.17	1.706	609.39
22/11/12	22:18:04	53.44%	39.27%	1.14%	42,142.8	0.21	99.94%	304.92	22:18:27	53.44%	39.26%	1.14%	39,373.6	0.09	99.97%	284.97	1.779	587.11
23/11/12	24:00:00	53.00%	38.82%	1.43%	44,732.3	0.00	100.00%	321.17	24:00:00	53.00%	38.82%	1.43%	42,427.4	0.00	100.00%	304.62	1.841	622.93
24/11/12	22:25:00	52.98%	38.83%	1.40%	42,198.8	0.06	99.98%	302.81	22:25:23	52.98%	38.83%	1.40%	40,046.2	0.00	100.00%	287.42	1.790	587.44
25/11/12	24:00:00	52.35%	38.41%	1.50%	45,651.9	0.00	100.00%	323.78	24:00:00	52.35%	38.41%	1.50%	43,403.6	0.00	100.00%	307.84	1.763	628.87
26/11/12	24:00:00	52.36%	38.42%	1.51%	45,889.0	0.00	100.00%	325.50	24:00:00	52.36%	38.41%	1.51%	43,449.2	0.00	100.00%	308.18	1.819	630.84
27/11/12	24:00:00	52.67%	38.82%	1.42%	45,740.8	0.00	100.00%	326.39	24:00:00	52.67%	38.82%	1.42%	43,072.7	0.00	100.00%	307.35	1.854	630.85
28/11/12	24:00:00	51.96%	38.25%	1.66%	44,550.9	0.00	100.00%	313.58	24:00:00	51.96%	38.25%	1.66%	41,932.5	0.00	100.00%	295.15	1.818	605.90
29/11/12	23:33:00	50.54%	37.27%	2.04%	43,701.6	0.00	100.00%	299.20	23:36:00	50.54%	37.27%	2.04%	40,941.6	0.01	100.00%	280.30	1.815	576.67
30/11/12	24:00:00	51.01%	37.84%	1.81%	45,622.3	0.01	100.00%	315.28	24:00:00	51.01%	37.84%	1.81%	42,563.4	0.00	100.00%	294.14	1.825	606.57
Nov-12	**29 days 19:42**	**52.10%**	**38.44%**	**1.50%**	**1,356,903**	**0.34**	**100.00%**	**9,577.43**	**29 days 19:46**	**52.11%**	**38.44%**	**1.50%**	**1,263,026**	**0.12**	**100.00%**	**8,915.62**	**54.176**	**18,408.53**

PROACTIVA MEIO AMBIENTE BRASIL

PROACTIVA TIJUQUINHAS LANDFILL GAS CAPTURE AND FLARING PROJECT

DOCUMENT — EMISSION REDUCTION MONTHLY REPORT

REPORTED MONTH — **December 2012**

REVISION 2 | DATE 16/09/13 | Start Date Calculation Period: 01/12/2012 00:00:00 (GMT -2) | End Date Calculation Period: 01/01/2013 00:00:00 (GMT -2)

	FLARE N°1								FLARE N°2								ELECTRICITY	TOTAL
Month	Operating Time	Landfill Gas Analysis			Landfill Gas Volume	Flaring Project Emissions	Flare efficiency	Flare Emissions Reductions	Operating Time	Landfill Gas Analysis			Landfill Gas Volume	Flaring Project Emissions	Flare efficiency	Flare Emissions Reductions	Net incr. Electricity Imported	Project Emissions Reductions
		w_{CH4}	fv_{CO2}	fv_{O2}	LFG_{flare1} (Nm^3)	PE_{flare1} (tCO2e)	η_{flare1}	ER_{flare1} (tCO_2e)		w_{CH4}	fv_{CO2}	fv_{O2}	LFG_{flare2} (Nm^3)	PE_{flare2} (tCO2e)	η_{flare2}	ER_{flare2} (tCO_2e)	EL_{IMP} (MWh)	ER (tCO_2e)
01/12/12	24:00:00	51.36%	38.32%	1.64%	45,171.6	0.05	99.99%	314.23	24:00:00	51.36%	38.32%	1.64%	42,148.1	0.04	99.99%	293.21	1.638	604.89
02/12/12	16:25:00	52.58%	38.93%	1.38%	30,925.9	0.13	99.95%	220.16	16:21:23	52.54%	38.91%	1.39%	28,653.6	0.10	99.96%	203.85	1.543	421.60
03/12/12	24:00:00	52.13%	38.32%	1.61%	44,855.4	0.01	100.00%	316.79	24:00:00	52.13%	38.32%	1.61%	41,835.9	0.00	100.00%	295.47	1.749	609.54
04/12/12	24:00:00	51.48%	37.93%	1.82%	45,021.8	0.00	100.00%	313.97	24:00:00	51.48%	37.93%	1.82%	41,937.2	0.00	100.00%	292.46	1.843	603.56
05/12/12	23:44:00	51.53%	38.66%	1.64%	43,166.2	1.87	99.44%	299.65	24:00:00	51.51%	38.65%	1.64%	40,572.5	2.71	99.14%	280.71	1.784	577.58
06/12/12	24:00:00	52.02%	38.96%	1.50%	44,977.2	0.00	100.00%	316.99	24:00:00	52.02%	38.96%	1.50%	42,023.5	0.00	100.00%	296.19	1.827	610.33
07/12/12	23:44:00	52.23%	39.04%	1.46%	43,857.6	0.01	100.00%	310.34	23:44:00	52.23%	39.04%	1.46%	41,504.0	0.00	100.00%	293.69	1.801	601.23
08/12/12	23:08:00	51.73%	38.58%	1.60%	43,334.7	0.11	99.97%	303.60	23:12:00	51.74%	38.59%	1.60%	41,119.4	0.05	99.99%	288.20	1.806	588.98
09/12/12	24:00:00	52.01%	38.60%	1.55%	44,656.2	0.00	100.00%	314.64	24:00:00	52.01%	38.60%	1.55%	42,248.5	0.00	100.00%	297.68	1.824	609.47
10/12/12	24:00:00	52.52%	39.01%	1.36%	44,403.8	0.00	100.00%	315.92	24:00:00	52.52%	39.01%	1.36%	41,992.1	0.00	100.00%	298.76	1.807	611.86
11/12/12	23:05:00	52.76%	39.27%	1.27%	42,668.7	0.01	100.00%	304.96	23:08:00	52.76%	39.28%	1.26%	40,494.1	0.01	100.00%	289.43	1.764	591.64
12/12/12	23:42:56	52.14%	38.65%	1.44%	43,912.8	0.01	100.00%	310.19	23:42:56	52.14%	38.65%	1.44%	41,817.9	0.00	100.00%	295.40	1.783	602.80
13/12/12	7:54:04	54.04%	39.45%	1.01%	14,569.3	0.00	100.00%	106.67	7:18:27	53.75%	39.27%	1.08%	12,850.1	0.00	100.00%	93.57	1.763	197.49
14/12/12	22:49:00	52.97%	38.81%	1.28%	42,106.6	0.02	99.99%	302.14	22:52:00	52.97%	38.82%	1.28%	40,313.1	0.21	99.94%	289.12	1.751	588.53
15/12/12	24:00:00	52.35%	38.40%	1.44%	44,145.8	0.00	100.00%	313.10	24:00:00	52.35%	38.40%	1.44%	42,193.8	0.00	100.00%	299.26	1.756	609.62
16/12/12	24:00:00	52.45%	38.50%	1.40%	43,761.4	0.00	100.00%	310.95	24:00:00	52.45%	38.50%	1.40%	41,903.2	0.00	100.00%	297.75	1.756	605.97
17/12/12	23:48:00	52.88%	38.84%	1.31%	43,017.1	0.28	99.92%	307.91	23:48:00	52.88%	38.83%	1.31%	41,040.3	0.23	99.93%	293.79	1.796	598.89
18/12/12	23:56:00	52.56%	38.95%	1.38%	43,850.8	0.02	99.99%	312.19	23:56:00	52.56%	38.95%	1.38%	41,864.0	0.00	100.00%	298.08	1.810	607.45
19/12/12	23:08:00	52.54%	38.96%	1.39%	42,977.9	0.00	100.00%	305.90	23:09:23	52.54%	38.96%	1.39%	41,067.1	0.07	99.98%	292.25	1.789	595.35
20/12/12	23:53:00	53.00%	39.20%	1.32%	44,184.4	0.02	100.00%	317.21	23:53:23	53.00%	39.20%	1.32%	42,083.8	0.00	100.00%	302.16	1.788	616.58
21/12/12	23:29:00	52.37%	38.86%	1.51%	44,031.1	0.40	99.88%	312.05	23:29:23	52.37%	38.86%	1.51%	41,303.6	0.35	99.89%	292.74	1.789	602.00
22/12/12	24:00:00	51.57%	38.46%	1.73%	45,503.0	0.00	100.00%	317.90	24:00:00	51.57%	38.46%	1.73%	42,628.4	0.00	100.00%	297.82	1.800	612.92
23/12/12	24:00:00	51.35%	38.45%	1.69%	46,424.5	0.00	100.00%	322.96	24:00:00	51.35%	38.45%	1.69%	43,553.9	0.00	100.00%	302.99	1.842	623.08
24/12/12	24:00:00	52.18%	39.00%	1.44%	46,029.5	0.00	100.00%	325.37	24:00:00	52.18%	39.00%	1.44%	43,202.0	0.00	100.00%	305.39	1.629	628.22
25/12/12	19:52:00	53.58%	39.94%	1.06%	37,575.9	0.12	99.96%	272.66	19:52:00	53.58%	39.94%	1.06%	35,422.4	0.00	100.00%	257.13	1.710	527.13
26/12/12	22:56:00	52.63%	39.32%	1.32%	43,563.9	0.00	100.00%	310.59	22:56:00	52.63%	39.32%	1.32%	40,993.2	0.06	99.98%	292.21	1.779	600.03
27/12/12	22:17:56	51.56%	38.46%	1.58%	42,883.0	0.00	100.00%	299.52	22:18:56	51.56%	38.46%	1.58%	40,433.8	0.00	100.00%	282.41	1.648	579.36
28/12/12	21:46:04	53.06%	39.32%	1.24%	41,725.5	0.43	99.87%	299.54	21:42:27	53.05%	39.31%	1.24%	39,152.9	0.12	99.96%	281.26	1.694	578.16
29/12/12	21:50:00	52.96%	39.19%	1.26%	41,936.7	0.31	99.91%	300.62	21:42:46	52.94%	39.18%	1.27%	39,312.4	0.02	99.99%	281.95	1.671	579.96
30/12/12	24:00:00	52.27%	38.72%	1.45%	46,075.3	0.01	100.00%	326.26	24:00:00	52.27%	38.72%	1.45%	43,182.8	0.00	100.00%	305.78	1.627	629.50
31/12/12	24:00:00	51.48%	38.02%	1.81%	45,982.2	0.01	100.00%	320.67	24:00:00	51.48%	38.02%	1.81%	43,119.6	0.00	100.00%	300.72	1.627	618.85
Dec-12	**29 days 07:28**	**52.28%**	**38.78%**	**1.46%**	**1,317,296**	**3.82**	**99.96%**	**9,325.68**	**29 days 07:07**	**52.27%**	**38.78%**	**1.46%**	**1,241,967**	**3.97**	**99.96%**	**8,791.44**	**54.194**	**18,032.57**

PROACTIVA MEIO AMBIENTE BRASIL

PROACTIVA TIJUQUINHAS LANDFILL GAS CAPTURE AND FLARING PROJECT

DOCUMENT — EMISSION REDUCTION MONTHLY REPORT

REPORTED MONTH — **January 2013**

REVISION 2 | DATE 16/09/13 | Start Date Calculation Period: 01/01/2013 00:00:00 (GMT -2) | End Date Calculation Period: 01/02/2013 00:00:00 (GMT -2)

	FLARE N°1								FLARE N°2								ELECTRICITY	TOTAL
Month	Operating Time	Landfill Gas Analysis			Landfill Gas Volume	Flaring Project Emissions	Flare efficiency	Flare Emissions Reductions	Operating Time	Landfill Gas Analysis			Landfill Gas Volume	Flaring Project Emissions	Flare efficiency	Flare Emissions Reductions	Net incr. Electricity Imported	Project Emissions Reductions
		w_{CH4}	fv_{CO2}	fv_{O2}	LFG_{flare1} (Nm^3)	PE_{flare1} ($tCO2e$)	η_{flare1}	ER_{flare1} (tCO_2e)		w_{CH4}	fv_{CO2}	fv_{O2}	LFG_{flare2} (Nm^3)	PE_{flare2} ($tCO2e$)	η_{flare2}	ER_{flare2} (tCO_2e)	EL_{IMP} (MWh)	ER (tCO_2e)
01/01/13	21:13:56	51.15%	37.97%	1.92%	40,556.0	0.01	100.00%	334.54	21:13:33	51.15%	37.97%	1.92%	38,021.4	0.00	100.00%	313.64	1.627	645.64
02/01/13	16:02:04	51.42%	37.98%	1.87%	30,905.7	0.09	99.97%	256.21	16:02:27	51.42%	37.98%	1.87%	29,134.2	0.00	100.00%	241.61	1.777	495.05
03/01/13	24:00:00	51.13%	37.75%	1.88%	45,988.6	0.00	100.00%	379.22	24:00:00	51.13%	37.75%	1.88%	43,293.5	0.00	100.00%	357.00	1.846	733.34
04/01/13	23:52:00	51.32%	37.81%	1.85%	45,639.1	0.35	99.92%	377.42	23:52:00	51.32%	37.81%	1.85%	42,828.0	0.00	100.00%	354.46	1.829	729.02
05/01/13	24:00:00	51.98%	38.08%	1.73%	45,533.3	0.00	100.00%	381.70	24:00:00	51.98%	38.08%	1.73%	42,855.1	0.00	100.00%	359.25	1.711	738.29
06/01/13	21:44:20	53.25%	39.18%	1.44%	40,949.8	0.00	100.00%	351.70	21:45:43	53.25%	39.18%	1.44%	38,730.4	0.00	100.00%	332.64	1.740	681.63
07/01/13	23:48:00	52.89%	38.60%	1.50%	44,347.0	0.94	99.78%	377.42	23:48:00	52.89%	38.60%	1.50%	41,870.3	0.00	100.00%	357.14	1.805	731.75
08/01/13	22:48:22	51.88%	37.90%	1.73%	42,466.0	0.00	100.00%	355.32	22:48:22	51.88%	37.90%	1.73%	40,099.4	0.00	100.00%	335.52	1.725	688.14
09/01/13	23:15:19	51.38%	37.40%	1.96%	43,371.7	0.18	99.95%	359.25	23:11:19	51.36%	37.39%	1.96%	40,813.0	0.01	100.00%	338.03	1.743	694.56
10/01/13	24:00:00	50.34%	36.45%	2.26%	44,682.1	0.00	100.00%	362.78	24:00:00	50.34%	36.45%	2.26%	42,172.2	0.00	100.00%	342.40	1.794	702.38
11/01/13	23:52:00	50.51%	36.56%	2.20%	44,102.1	0.58	99.85%	358.76	23:52:00	50.51%	36.56%	2.20%	41,595.5	0.00	100.00%	338.84	1.780	694.82
12/01/13	24:00:00	50.71%	36.75%	2.13%	44,054.6	0.00	100.00%	360.30	24:00:00	50.71%	36.75%	2.13%	41,589.6	0.00	100.00%	340.13	1.773	697.66
13/01/13	24:00:00	50.40%	36.62%	2.19%	44,156.3	0.00	100.00%	358.93	24:00:00	50.40%	36.62%	2.19%	41,682.8	0.01	100.00%	338.82	1.773	694.98
14/01/13	24:00:00	50.50%	36.99%	2.11%	43,889.9	0.00	100.00%	357.50	24:00:00	50.51%	36.99%	2.11%	41,426.3	0.02	99.99%	337.42	1.753	692.18
15/01/13	24:00:00	51.38%	37.52%	1.87%	43,556.3	0.00	100.00%	360.93	24:00:00	51.38%	37.52%	1.87%	41,037.6	0.00	100.00%	340.05	1.767	698.22
16/01/13	23:56:00	51.02%	37.18%	2.09%	44,313.2	0.00	100.00%	364.67	23:52:00	51.02%	37.18%	2.09%	41,400.0	0.11	99.97%	340.58	1.801	702.44
17/01/13	24:00:00	50.67%	37.10%	2.14%	44,818.3	0.00	100.00%	366.23	24:00:00	50.67%	37.10%	2.14%	42,173.6	0.00	100.00%	344.62	1.770	708.08
18/01/13	22:12:00	50.98%	37.37%	2.00%	41,756.4	0.28	99.93%	343.10	22:08:00	50.97%	37.36%	2.01%	39,271.5	0.04	99.99%	322.80	1.757	663.16
19/01/13	24:00:00	50.10%	36.99%	2.18%	44,818.2	0.00	100.00%	362.16	24:00:00	50.10%	36.99%	2.18%	42,421.9	0.00	100.00%	342.80	1.760	702.21
20/01/13	23:32:00	49.94%	36.66%	2.27%	44,033.4	0.04	99.99%	354.62	23:28:00	49.93%	36.65%	2.27%	41,560.8	0.13	99.96%	334.55	1.760	686.43
21/01/13	23:52:00	49.82%	36.67%	2.33%	44,956.6	1.03	99.74%	360.33	23:52:00	49.83%	36.67%	2.33%	42,412.4	0.01	100.00%	340.81	1.797	698.33
22/01/13	24:00:00	51.38%	37.69%	1.91%	44,781.2	0.00	100.00%	371.05	24:00:00	51.37%	37.68%	1.91%	42,171.6	0.04	99.99%	349.38	1.820	717.59
23/01/13	23:56:00	52.59%	38.67%	1.47%	44,483.1	0.03	99.99%	377.26	23:56:00	52.59%	38.67%	1.47%	41,753.5	0.00	100.00%	354.14	1.650	728.83
24/01/13	19:48:00	53.89%	39.46%	1.08%	36,303.2	0.13	99.96%	315.39	19:44:00	53.87%	39.45%	1.08%	33,894.5	0.04	99.99%	294.45	1.684	607.22
25/01/13	22:44:00	53.44%	39.23%	1.19%	41,415.8	0.32	99.92%	356.63	23:48:00	53.42%	39.18%	1.21%	40,864.1	0.00	100.00%	352.04	1.773	705.90
26/01/13	24:00:00	52.55%	38.56%	1.46%	44,485.1	0.00	100.00%	377.03	24:00:00	52.55%	38.56%	1.46%	41,540.7	0.00	100.00%	352.08	1.785	726.33
27/01/13	24:00:00	52.25%	38.26%	1.55%	44,721.2	0.00	100.00%	376.89	24:00:00	52.25%	38.26%	1.55%	41,749.2	0.00	100.00%	351.85	1.785	725.96
28/01/13	23:56:00	52.35%	38.26%	1.55%	44,551.2	0.33	99.92%	375.84	23:56:00	52.35%	38.26%	1.55%	41,753.8	0.00	100.00%	352.52	1.785	725.57
29/01/13	23:12:00	53.26%	38.83%	1.35%	43,354.4	0.17	99.96%	372.28	23:08:00	53.25%	38.82%	1.35%	40,568.1	0.00	100.00%	348.37	1.743	717.93
30/01/13	23:56:13	53.58%	39.18%	1.22%	40,207.0	0.00	100.00%	347.47	23:56:13	53.59%	39.18%	1.22%	37,650.6	0.73	99.80%	324.72	1.259	670.23
31/01/13	24:00:00	56.30%	41.11%	0.37%	32,456.6	0.52	99.84%	294.24	24:00:00	56.30%	41.11%	0.37%	30,389.0	0.07	99.98%	275.87	0.810	568.85
Jan-13	**29 days 23:40**	**51.69%**	**37.85%**	**1.79%**	**1,325,653**	**5.01**	**99.96%**	**11,047.19**	**30 days 00:21**	**51.69%**	**37.84%**	**1.79%**	**1,248,725**	**1.23**	**99.99%**	**10,408.53**	**53.183**	**21,372.75**

PROACTIVA MEIO AMBIENTE BRASIL

PROACTIVA TIJUQUINHAS LANDFILL GAS CAPTURE AND FLARING PROJECT

DOCUMENT: EMISSION REDUCTION MONTHLY REPORT

REPORTED MONTH: February 2013

REVISION: 2 | DATE: 16/09/13 | Start Date Calculation Period: 01/02/2013 00:00:00 (GMT -2) | End Date Calculation Period: 01/03/2013 00:00:00 (GMT -2)

	FLARE N°1								FLARE N°2								ELECTRICITY	TOTAL
Month	Operating Time	Landfill Gas Analysis			Landfill Gas Volume	Flaring Project Emissions	Flare efficiency	Flare Emissions Reductions	Operating Time	Landfill Gas Analysis			Landfill Gas Volume	Flaring Project Emissions	Flare efficiency	Flare Emissions Reductions	Net incr. Electricity Imported	Project Emissions Reductions
		w_{CH4}	fv_{CO2}	fv_{O2}	LFG_{flare1} (Nm^3)	PE_{flare1} (tCO2e)	η_{flare1}	ER_{flare1} (tCO_2e)		w_{CH4}	fv_{CO2}	fv_{O2}	LFG_{flare2} (Nm^3)	PE_{flare2} (tCO2e)	η_{flare2}	ER_{flare2} (tCO_2e)	EL_{IMP} (MWh)	ER (tCO_2e)
01/02/13	17:52:00	55.08%	40.28%	0.81%	24,722.0	1.06	99.57%	218.66	18:56:00	55.18%	40.34%	0.81%	24,123.6	1.32	99.45%	213.51	0.707	431.06
02/02/13	24:00:00	56.20%	40.90%	0.35%	30,760.2	0.01	100.00%	278.79	24:00:00	56.20%	40.90%	0.35%	28,724.4	0.00	100.00%	260.34	0.707	538.03
03/02/13	24:00:00	56.11%	40.90%	0.35%	30,424.3	0.01	100.00%	275.32	24:00:00	56.11%	40.90%	0.35%	28,445.9	0.00	100.00%	257.43	0.707	531.65
04/02/13	23:00:00	56.08%	40.85%	0.35%	29,544.9	0.07	99.98%	267.18	23:00:00	56.08%	40.85%	0.35%	27,708.8	0.10	99.97%	250.55	0.682	516.67
05/02/13	23:48:00	56.09%	40.81%	0.36%	30,687.9	0.00	100.00%	277.61	23:48:00	56.09%	40.81%	0.36%	28,837.1	0.23	99.92%	260.66	0.682	537.20
06/02/13	23:56:00	56.08%	40.86%	0.42%	32,131.2	0.04	99.99%	290.59	23:56:00	56.08%	40.86%	0.41%	30,178.0	1.37	99.55%	271.73	0.731	561.18
07/02/13	24:00:00	56.22%	41.04%	0.35%	33,566.6	0.01	100.00%	304.37	24:00:00	56.22%	41.04%	0.35%	31,543.7	0.38	99.88%	285.69	0.803	588.81
08/02/13	23:52:00	56.12%	41.15%	0.36%	34,705.0	0.14	99.96%	313.98	23:52:00	56.12%	41.15%	0.36%	32,654.0	0.15	99.95%	295.41	0.878	608.02
09/02/13	24:00:00	56.46%	41.33%	0.35%	34,636.7	0.00	100.00%	315.38	24:00:00	56.46%	41.33%	0.35%	32,564.5	0.00	100.00%	296.51	0.887	610.51
10/02/13	24:00:00	56.56%	41.27%	0.34%	34,866.6	0.00	100.00%	318.07	24:00:00	56.56%	41.27%	0.34%	32,817.7	0.01	100.00%	299.38	0.870	616.09
11/02/13	24:00:00	56.55%	41.21%	0.35%	34,902.6	0.00	100.00%	318.35	24:00:00	56.55%	41.21%	0.35%	32,859.4	0.02	99.99%	299.69	0.858	616.70
12/02/13	24:00:00	56.72%	41.06%	0.35%	32,555.1	0.00	100.00%	297.78	24:00:00	56.72%	41.06%	0.35%	30,643.0	0.06	99.98%	280.24	0.858	576.68
13/02/13	23:32:00	56.78%	41.13%	0.35%	33,960.6	0.10	99.97%	310.91	23:36:00	56.78%	41.13%	0.35%	31,925.4	0.01	100.00%	292.35	0.924	601.82
14/02/13	23:40:00	56.96%	41.16%	0.34%	36,171.2	0.00	100.00%	332.30	23:40:00	56.96%	41.16%	0.34%	34,028.3	0.00	100.00%	312.62	0.984	643.38
15/02/13	23:52:00	56.75%	41.09%	0.38%	36,676.5	0.00	100.00%	335.70	23:52:00	56.75%	41.09%	0.38%	34,499.2	0.35	99.90%	315.46	0.962	649.67
16/02/13	24:00:00	56.45%	41.03%	0.34%	36,382.2	0.00	100.00%	331.24	24:00:00	56.45%	41.03%	0.34%	34,174.2	0.00	100.00%	311.14	0.944	640.90
17/02/13	24:00:00	56.43%	40.98%	0.34%	35,202.5	0.00	100.00%	320.40	24:00:00	56.43%	40.98%	0.34%	33,094.0	0.00	100.00%	301.21	0.944	620.14
18/02/13	23:52:00	56.38%	40.94%	0.36%	34,703.2	0.19	99.95%	315.36	23:52:00	56.38%	40.94%	0.36%	32,634.5	0.00	100.00%	296.72	0.928	610.63
19/02/13	24:00:00	56.43%	40.97%	0.35%	34,180.0	0.00	100.00%	311.07	24:00:00	56.43%	40.97%	0.35%	32,196.3	0.02	99.99%	293.00	0.844	602.75
20/02/13	24:00:00	56.51%	41.03%	0.34%	33,463.0	0.01	100.00%	305.00	24:00:00	56.51%	41.03%	0.34%	31,516.7	0.07	99.98%	287.20	0.814	590.93
21/02/13	23:56:00	56.60%	41.06%	0.35%	34,099.9	0.00	100.00%	311.26	23:56:00	56.60%	41.06%	0.35%	32,128.4	0.04	99.99%	293.23	0.860	603.14
22/02/13	23:40:00	55.70%	40.44%	0.61%	37,459.3	0.32	99.92%	336.20	23:40:00	55.69%	40.44%	0.61%	35,246.0	0.12	99.96%	316.48	1.249	650.73
23/02/13	24:00:00	52.27%	38.37%	1.55%	46,515.6	0.00	100.00%	392.12	24:00:00	52.27%	38.37%	1.55%	43,778.8	0.00	100.00%	369.04	1.688	758.53
24/02/13	24:00:00	52.37%	38.45%	1.54%	46,152.7	0.00	100.00%	389.84	24:00:00	52.37%	38.45%	1.54%	43,386.9	0.00	100.00%	366.48	1.820	753.48
25/02/13	23:52:00	52.86%	38.70%	1.42%	45,606.8	0.00	100.00%	388.80	23:52:00	52.86%	38.70%	1.43%	42,795.4	0.00	100.00%	364.82	1.835	750.76
26/02/13	23:44:01	53.56%	39.19%	1.21%	45,550.4	0.14	99.97%	393.32	23:40:02	53.55%	39.19%	1.21%	42,535.8	0.00	100.00%	367.33	1.823	757.81
27/02/13	24:00:00	52.83%	38.82%	1.40%	45,450.4	0.00	100.00%	387.23	24:00:00	52.82%	38.82%	1.41%	42,621.6	0.00	100.00%	363.09	1.527	747.94
28/02/13	23:52:00	56.88%	40.98%	0.40%	36,415.3	0.35	99.91%	333.75	23:52:00	56.88%	40.98%	0.40%	34,056.5	0.15	99.96%	312.29	1.064	644.38
Feb-13	**27 days 14:28**	**55.55%**	**40.46%**	**0.62%**	**1,001,493**	**2.44**	**99.98%**	**8,970.58**	**27 days 15:32**	**55.55%**	**40.47%**	**0.62%**	**941,718**	**4.40**	**99.95%**	**8,433.61**	**28.579**	**17,359.61**

PROACTIVA MEIO AMBIENTE BRASIL

PROACTIVA TIJUQUINHAS LANDFILL GAS CAPTURE AND FLARING PROJECT

DOCUMENT — EMISSION REDUCTION MONTHLY REPORT

REPORTED MONTH — **March 2013**

REVISION 2 | DATE 16/09/13 | Start Date Calculation Period: 01/03/2013 00:00:00 (GMT -2) | End Date Calculation Period: 01/04/2013 00:00:00 (GMT -2)

	FLARE N°1								FLARE N°2								ELECTRICITY	TOTAL
Month	Operating Time	Landfill Gas Analysis			Landfill Gas Volume	Flaring Project Emissions	Flare efficiency	Flare Emissions Reductions	Operating Time	Landfill Gas Analysis			Landfill Gas Volume	Flaring Project Emissions	Flare efficiency	Flare Emissions Reductions	Net incr. Electricity Imported	Project Emissions Reductions
		w_{CH4}	fv_{CO2}	fv_{O2}	LFG_{flare1} (Nm^3)	PE_{flare1} ($tCO2e$)	η_{flare1}	ER_{flare1} (tCO_2e)		w_{CH4}	fv_{CO2}	fv_{O2}	LFG_{flare2} (Nm^3)	PE_{flare2} ($tCO2e$)	η_{flare2}	ER_{flare2} (tCO_2e)	EL_{IMP} (MWh)	ER (tCO_2e)
01/03/13	24:00:00	56.75%	40.92%	0.38%	38,350.1	0.00	100.00%	351.04	24:00:00	56.76%	40.92%	0.38%	35,877.7	0.00	100.00%	328.41	1.140	677.66
02/03/13	24:00:00	55.94%	40.48%	0.51%	40,847.6	0.00	100.00%	368.52	24:00:00	55.94%	40.47%	0.51%	38,234.1	0.00	100.00%	344.93	1.440	711.20
03/03/13	24:00:00	56.17%	40.77%	0.35%	41,437.4	0.00	100.00%	375.39	24:00:00	56.17%	40.77%	0.35%	38,826.4	0.00	100.00%	351.73	1.530	724.74
04/03/13	24:00:00	56.14%	40.70%	0.37%	40,972.7	0.00	100.00%	370.95	24:00:00	56.14%	40.70%	0.37%	38,354.6	0.00	100.00%	347.25	1.502	715.86
05/03/13	23:44:00	56.41%	40.88%	0.36%	42,143.3	0.00	100.00%	383.43	23:44:00	56.41%	40.88%	0.36%	39,678.7	0.31	99.92%	360.73	1.527	741.78
06/03/13	24:00:00	56.18%	40.78%	0.47%	44,011.6	0.00	100.00%	398.78	24:00:00	56.18%	40.78%	0.47%	41,406.1	0.00	100.00%	375.17	1.553	771.53
07/03/13	20:52:46	56.57%	40.73%	0.56%	35,412.4	0.25	99.93%	322.85	20:52:48	56.57%	40.73%	0.56%	33,316.6	1.31	99.61%	302.78	1.445	623.38
08/03/13	24:00:00	56.77%	41.03%	0.39%	43,454.8	0.03	99.99%	397.85	24:00:00	56.77%	41.03%	0.39%	40,931.6	0.04	99.99%	374.74	1.673	769.99
09/03/13	21:20:00	56.84%	41.25%	0.34%	41,297.9	2.96	99.30%	375.91	21:20:00	56.84%	41.25%	0.34%	38,945.2	0.04	99.99%	356.98	1.849	730.00
10/03/13	24:00:00	57.06%	41.25%	0.30%	47,748.1	0.00	100.00%	439.39	24:00:00	57.06%	41.25%	0.30%	45,095.2	0.00	100.00%	414.98	1.849	851.49
11/03/13	23:24:00	56.94%	41.00%	0.35%	45,912.7	0.12	99.97%	421.52	23:16:00	56.94%	40.99%	0.35%	43,118.3	0.53	99.88%	395.46	1.940	813.96
12/03/13	24:00:00	56.85%	41.10%	0.33%	48,067.6	0.00	100.00%	440.76	24:00:00	56.85%	41.10%	0.33%	45,390.2	0.00	100.00%	416.21	2.031	853.79
13/03/13	23:40:00	56.91%	41.00%	0.35%	47,338.2	0.01	100.00%	434.50	23:41:02	56.91%	41.00%	0.35%	44,651.1	0.15	99.97%	409.71	1.906	841.24
14/03/13	24:00:00	56.95%	40.65%	0.40%	46,575.3	0.00	100.00%	427.79	24:00:00	56.95%	40.65%	0.40%	43,888.9	0.00	100.00%	403.11	1.689	828.27
15/03/13	23:44:00	56.89%	40.70%	0.38%	43,936.4	0.00	100.00%	403.12	23:44:00	56.89%	40.70%	0.38%	41,328.0	0.21	99.95%	379.00	1.575	779.67
16/03/13	24:00:00	57.11%	41.01%	0.35%	44,907.3	0.00	100.00%	413.66	24:00:00	57.11%	41.01%	0.35%	42,285.5	0.00	100.00%	389.51	1.553	800.74
17/03/13	24:00:00	57.16%	40.86%	0.34%	43,424.5	0.00	100.00%	400.34	24:00:00	57.16%	40.86%	0.34%	40,861.0	0.00	100.00%	376.71	1.553	774.63
18/03/13	23:44:00	56.79%	40.69%	0.45%	44,787.3	0.47	99.90%	409.82	23:44:00	56.79%	40.69%	0.45%	42,166.0	0.00	100.00%	386.23	1.666	793.44
19/03/13	24:00:00	57.07%	41.04%	0.38%	47,274.5	0.00	100.00%	435.12	24:00:00	57.07%	41.04%	0.38%	44,544.3	0.00	100.00%	409.99	1.847	842.23
20/03/13	23:15:48	57.30%	41.42%	0.28%	48,290.9	0.13	99.97%	446.15	23:01:59	57.29%	41.42%	0.28%	45,233.5	0.14	99.97%	417.82	1.970	860.89
21/03/13	22:04:00	57.77%	41.65%	0.20%	45,183.7	0.00	100.00%	420.96	22:00:40	57.76%	41.65%	0.20%	42,577.9	0.28	99.94%	396.38	2.019	814.19
22/03/13	23:44:00	57.05%	41.04%	0.33%	48,624.6	0.00	100.00%	447.43	23:44:00	57.05%	41.04%	0.33%	45,859.6	0.24	99.95%	421.77	1.997	866.09
23/03/13	22:56:00	57.24%	41.01%	0.34%	46,534.9	0.15	99.97%	429.45	22:48:11	57.23%	41.00%	0.34%	43,609.5	0.26	99.94%	402.28	1.886	828.79
24/03/13	24:00:00	57.24%	41.02%	0.34%	47,794.7	0.00	100.00%	441.21	24:00:00	57.24%	41.02%	0.34%	45,026.5	0.00	100.00%	415.66	1.829	854.01
25/03/13	23:52:00	57.04%	40.85%	0.37%	48,224.1	0.00	100.00%	443.66	23:52:00	57.04%	40.85%	0.37%	45,451.1	0.24	99.95%	417.93	1.869	858.67
26/03/13	23:44:00	56.82%	40.60%	0.35%	47,958.2	1.97	99.60%	437.74	23:44:00	56.82%	40.60%	0.35%	45,194.3	0.05	99.99%	414.14	1.927	848.88
27/03/13	24:00:00	56.69%	40.52%	0.35%	48,900.0	0.00	100.00%	447.08	24:00:00	56.69%	40.52%	0.35%	46,052.2	0.00	100.00%	421.04	1.941	865.10
28/03/13	24:00:00	56.71%	40.42%	0.35%	47,101.0	0.00	100.00%	430.77	24:00:00	56.71%	40.42%	0.35%	44,328.6	0.00	100.00%	405.42	1.706	833.53
29/03/13	24:00:00	56.78%	40.40%	0.34%	44,087.7	0.00	100.00%	403.70	24:00:00	56.78%	40.40%	0.34%	41,394.6	0.00	100.00%	379.04	1.567	780.29
30/03/13	24:00:00	56.78%	40.41%	0.34%	44,719.2	0.00	100.00%	409.55	24:00:00	56.79%	40.41%	0.34%	42,005.7	0.00	100.00%	384.70	1.527	791.87
31/03/13	24:00:00	56.83%	40.46%	0.35%	43,845.9	0.00	100.00%	401.88	24:00:00	56.83%	40.46%	0.35%	41,169.5	0.00	100.00%	377.35	1.477	776.93
Mar-13	**30 days 12:04**	**56.85%**	**40.86%**	**0.36%**	**1,389,165**	**6.09**	**99.96%**	**12,730.34**	**30 days 11:32**	**56.84%**	**40.86%**	**0.36%**	**1,306,803**	**3.79**	**99.97%**	**11,977.15**	**52.983**	**24,624.84**

PROACTIVA MEIO AMBIENTE BRASIL

PROACTIVA TIJUQUINHAS LANDFILL GAS CAPTURE AND FLARING PROJECT

DOCUMENT: EMISSION REDUCTION MONTHLY REPORT

REPORTED MONTH: April 2013

REVISION: 2 | DATE: 16/09/13 | Start Date Calculation Period: 01/04/2013 00:00:00 (GMT -2) | End Date Calculation Period: 01/05/2013 00:00:00 (GMT -2)

	FLARE N°1								FLARE N°2								ELECTRICITY	TOTAL
Month	Operating Time	Landfill Gas Analysis			Landfill Gas Volume	Flaring Project Emissions	Flare efficiency	Flare Emissions Reductions	Operating Time	Landfill Gas Analysis			Landfill Gas Volume	Flaring Project Emissions	Flare efficiency	Flare Emissions Reductions	Net incr. Electricity Imported	Project Emissions Reductions
		w_{CH4}	fv_{CO2}	fv_{O2}	LFG_{flare1} (Nm^3)	PE_{flare1} (tCO2e)	η_{flare1}	ER_{flare1} (tCO_2e)		w_{CH4}	fv_{CO2}	fv_{O2}	LFG_{flare2} (Nm^3)	PE_{flare2} (tCO2e)	η_{flare2}	ER_{flare2} (tCO_2e)	EL_{IMP} (MWh)	ER (tCO_2e)
01/04/13	22:57:41	56.96%	40.56%	0.35%	43,829.6	0.14	99.97%	402.54	22:49:04	56.95%	40.55%	0.35%	40,745.4	0.22	99.95%	374.07	1.584	774.14
02/04/13	24:00:00	57.13%	40.72%	0.35%	45,371.5	0.00	100.00%	418.06	24:00:00	57.13%	40.72%	0.35%	42,449.1	0.00	100.00%	391.14	1.741	806.48
03/04/13	24:00:00	57.35%	40.82%	0.34%	47,357.5	0.00	100.00%	438.01	24:00:00	57.35%	40.82%	0.34%	44,378.5	0.00	100.00%	410.46	1.927	845.46
04/04/13	23:48:00	57.60%	41.02%	0.30%	47,570.6	0.01	100.00%	441.87	23:42:13	57.59%	41.02%	0.30%	44,491.5	0.00	100.00%	413.27	2.015	852.00
05/04/13	23:16:00	57.85%	41.07%	0.26%	47,191.7	0.15	99.97%	440.19	23:11:31	57.85%	41.06%	0.26%	44,090.5	0.01	100.00%	411.34	2.037	848.35
06/04/13	24:00:00	57.47%	40.59%	0.34%	48,164.9	0.00	100.00%	446.46	24:00:00	57.47%	40.59%	0.34%	45,028.7	0.00	100.00%	417.39	1.929	860.84
07/04/13	24:00:00	57.34%	40.53%	0.34%	47,440.6	0.00	100.00%	438.72	24:00:00	57.34%	40.53%	0.34%	44,337.1	0.00	100.00%	410.02	1.858	845.85
08/04/13	22:36:00	57.37%	40.59%	0.34%	44,411.6	0.00	100.00%	410.95	22:36:00	57.37%	40.59%	0.34%	41,424.3	0.13	99.97%	383.19	1.749	791.41
09/04/13	23:48:00	57.39%	40.58%	0.35%	46,556.9	0.21	99.96%	430.75	23:48:00	57.39%	40.58%	0.35%	43,498.4	0.00	100.00%	402.62	1.792	830.58
10/04/13	24:00:00	57.44%	40.46%	0.35%	47,184.2	0.00	100.00%	437.13	24:00:00	57.44%	40.46%	0.35%	44,116.8	0.00	100.00%	408.71	1.828	842.99
11/04/13	24:00:00	57.44%	40.31%	0.36%	47,642.7	0.00	100.00%	441.39	24:00:00	57.44%	40.31%	0.36%	44,588.8	0.00	100.00%	413.10	1.842	851.61
12/04/13	23:44:00	57.35%	40.28%	0.38%	46,777.4	0.31	99.94%	432.42	23:44:00	57.35%	40.28%	0.38%	43,822.4	0.11	99.98%	405.27	1.833	834.83
13/04/13	24:00:00	57.36%	40.34%	0.36%	46,517.3	0.00	100.00%	430.31	24:00:00	57.36%	40.34%	0.36%	43,474.1	0.00	100.00%	402.16	1.687	829.84
14/04/13	24:00:00	57.18%	40.25%	0.37%	45,430.0	0.00	100.00%	418.97	24:00:00	57.18%	40.25%	0.37%	42,379.0	0.00	100.00%	390.83	1.611	807.28
15/04/13	23:52:00	57.27%	40.33%	0.38%	44,717.0	0.00	100.00%	413.04	23:52:00	57.27%	40.33%	0.38%	41,726.0	0.11	99.97%	385.31	1.592	795.86
16/04/13	23:50:17	57.51%	40.45%	0.36%	43,998.7	0.00	100.00%	408.10	23:50:17	57.51%	40.45%	0.36%	41,042.5	0.00	100.00%	380.68	1.551	786.36
17/04/13	23:56:00	57.26%	40.31%	0.39%	42,509.3	0.00	100.00%	392.60	23:56:00	57.26%	40.31%	0.39%	39,590.4	0.02	100.00%	365.62	1.462	755.94
18/04/13	24:00:00	57.19%	40.27%	0.38%	43,459.8	0.00	100.00%	400.88	24:00:00	57.19%	40.27%	0.38%	40,505.4	0.00	100.00%	373.62	1.596	772.01
19/04/13	23:48:00	57.01%	40.22%	0.38%	43,771.7	0.00	100.00%	402.44	23:48:00	57.01%	40.22%	0.38%	40,800.7	0.12	99.97%	375.02	1.772	774.70
20/04/13	24:00:00	57.05%	40.28%	0.38%	43,980.7	0.00	100.00%	404.66	24:00:00	57.05%	40.28%	0.38%	41,015.0	0.00	100.00%	377.37	1.716	779.36
21/04/13	24:00:00	57.01%	40.24%	0.37%	43,439.4	0.00	100.00%	399.37	24:00:00	57.01%	40.24%	0.37%	40,473.5	0.00	100.00%	372.11	1.657	768.89
22/04/13	24:00:00	56.97%	40.19%	0.37%	43,391.5	0.00	100.00%	398.66	24:00:00	56.97%	40.19%	0.37%	40,114.1	0.02	100.00%	368.53	1.661	764.60
23/04/13	24:00:00	57.01%	40.09%	0.36%	43,100.9	0.00	100.00%	396.29	24:00:00	57.01%	40.09%	0.36%	39,840.6	0.00	100.00%	366.32	1.668	760.01
24/04/13	23:08:00	57.09%	40.07%	0.36%	41,258.1	0.30	99.93%	379.64	22:56:00	57.07%	40.05%	0.36%	37,803.5	0.11	99.97%	347.83	1.505	725.12
25/04/13	23:24:00	57.26%	40.20%	0.43%	38,912.7	0.14	99.97%	359.23	23:24:00	57.26%	40.20%	0.43%	36,176.2	0.27	99.93%	333.83	1.390	690.90
26/04/13	23:44:00	57.38%	40.26%	0.35%	40,542.5	0.00	100.00%	375.21	23:44:00	57.38%	40.26%	0.35%	37,693.0	0.11	99.97%	348.73	1.424	721.71
27/04/13	23:35:40	57.31%	40.10%	0.35%	40,537.0	0.03	99.99%	374.64	23:31:40	57.30%	40.10%	0.35%	37,587.0	0.13	99.97%	347.25	1.428	719.66
28/04/13	24:00:00	57.37%	40.03%	0.34%	40,071.9	0.03	99.99%	370.72	24:00:00	57.37%	40.03%	0.34%	37,275.6	0.04	99.99%	344.84	1.416	713.35
29/04/13	24:00:00	57.06%	39.83%	0.42%	39,459.7	0.03	99.99%	363.14	24:00:00	57.06%	39.83%	0.42%	36,730.4	0.12	99.97%	337.94	1.338	698.99
30/04/13	23:08:19	56.94%	39.80%	0.38%	38,667.6	0.04	99.99%	355.07	22:56:19	56.91%	39.79%	0.39%	35,600.2	0.16	99.96%	326.63	1.380	679.55
Apr-13	29 days 16:35	57.27%	40.37%	0.36%	1,323,265	1.40	99.99%	12,221.47	29 days 15:49	57.27%	40.37%	0.36%	1,232,799	1.68	99.99%	11,385.17	49.988	23,528.66

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Document information

Version	*Date*	*Description*
03.2	5 November 2013	Editorial revision to correct table in page 1.
03.1	2 January 2013	Editorial revision to correct table in section E.5.
03.0	3 December 2012	Revision required to introduce a provision on reporting actual emission reductions or net anthropogenic GHG removals by sinks for the period up to 31 December 2012 and the period from 1 January 2013 onwards (EB70, Annex 11).
02.0	13 March 2012	Revision required to ensure consistency with the "Guidelines for completing the monitoring report form" (EB 66, Annex 20).
01	28 May 2010	EB 54, Annex 34. Initial adoption.

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