



**Monitoring report form
(Version 05.1)**

MONITORING REPORT

Title of the project activity	Salvador da Bahia Landfill Gas Management Project	
UNFCCC reference number of the project activity	0052	
Version number of the monitoring report	1	
Completion date of the monitoring report	10/07/2015	
Monitoring period number and duration of this monitoring period	Monitoring period: #4 01/01/2007 – 31/12/2010	
Project participant(s)	BATTRE Bahia Transferencia e Tratamento de Resíduos S.A. Showa Shell Sekiyu K.K. Shell Trading International Limited Electrabel S.A.	
Host Party	Brazil	
Sectoral scope(s)	CDM Sectoral Scope 13 – Waste handling and disposal	
Selected methodology(ies)	AM0002 - Greenhouse Gas Emission through Landfill Gas Capture and Flaring where the Baseline is established by a Public Concession Contract (Version 1)	
Selected standardized baseline(s)	Not applicable.	
Estimated amount of GHG emission reductions or net GHG removals by sinks for this monitoring period in the registered PDD	1,769,339 tCO ₂ e	
Total amount of GHG emission reductions or net GHG removals by sinks achieved in this monitoring period	GHG emission reductions or net GHG removals by sinks reported up to 31 December 2012	GHG emission reductions or net GHG removals by sinks reported from 1 January 2013 onwards
	1,856,028 tCO ₂ e	-

SECTION A. Description of project activity

A.1. Purpose and general description of project activity

>>

During the 4-year length monitoring period from 01/01/2007 to 31/12/2010, as established in the Project Design Document (PDD) for CDM the project activity "Salvador da Bahia Landfill Gas Management Project", this project activity has operated as a project based initiative encompassing capture and destruction (by flaring) of landfill gas (LFG) at the Aterro Metropolitano Centro (AMC) landfill.¹

The project activity has been under regular operation since 12 March 2004 and LFG has been historically generated at AMC landfill due to anaerobic decomposition of Municipal Solid Waste (MSW) disposed in the site. Under the project scenario, all collected LFG (which is rich in CH₄) has been combusted in high temperature enclosed flares in order to abate methane (CH₄) that would otherwise be freely directly emitted into the atmosphere through the surface of the landfill and through conventional passive LFG venting/combustion drains. CH₄ is a powerful greenhouse gas (GHG). From 1 January 2011 onwards (thus since a period beyond the considered monitoring period) an electricity generation facility (with total capacity of 20.1 MW) has been operating as part of the project activity¹.

The project activity is implemented in the *Aterro Metropolitano Centro* (AMC) and has operated as per the PDD (version 7, dated 28/01/2015). In the context of the ex-post determination of GHG emission reduction achieved by the project activity, the PDD applies methodological approaches as per the CDM baseline and monitoring methodology AM0002 (version 1) and the following methodological tools:

- Tool to calculate baseline, project and/or leakage emissions from electricity consumption (version 01)
- Tool to calculate project or leakage CO₂ emissions from fossil fuel consumption (version 02)

The project activity has been operated by the host-country project participant and project owner Bahia Transferência e Tratamento de Resíduos Ltda. (BATTRE) since its implementation and commissioning. BATTRE is a special purpose waste management company that was established to undertake services of collection, transport and disposal of all MSW generated in the city of Salvador, Bahia in Brazil. All BATTRE's operations related to management of MSW (including the construction and operation of the AMC landfill) have been performed as per the directives/requirements of a previously established public service concession contract for MSW management that was previously established between BATTRE and the Administration of the Municipality of Salvador in year 1999 the context of a public tendering process .

The design and construction of the project's LFG collecting and flaring system (that was not a requirement under the public service concession contract previously established between BATTRE and the Administration of the Municipality of Salvador) took place during the period from May 2003 to October 2003. Commissioning and testing phases for the project activity occurred in October 2003. The project's validation under the CDM initiated in February 2003 (as indicated in the Validation Report issued by the DOE Det Norske Veritas Certification A.S. (DNV) of number 2003-1598 version 3 which was issued in January 2004). A Letter of Approval (LoA) for the project activity was granted from the DNA of Brazil on 02/06/2004. The project was finally registered as a CDM project activity on 15/08/2005. After finalization of all construction/commissioning activities,

¹ As outlined in the registered version of the PDD for the project activity, since 01/01/2011 the project activity has been continuously operated with most of captured LFG being utilized as gaseous fuel for electricity generation in a new 20.1 MW electricity generation facility that entered into operation on that date. Information/clarification and further details about the implementation of this new electricity generation facility as a permanent post-registration change in the design of the registered CDM project activity (in the context of a yet to be renewed 7-year crediting period (also starting on 01/01/2011)) are presented in Appendix 3 of the revised version of the PDD (version 7, dated 28/01/2015).

the project activity finally started to operate in March 2004 (thus prior of its registration as a CDM project activity).

The “Salvador da Bahia Landfill Gas Management Project” represents one of the first CDM project activities encompassing LFG collection and destruction ever implemented and registered as CDM project activity worldwide. The project design and the CDM baseline and monitoring methodology AM0002 (version 1) were both elaborated by BATTRE in a very early stage of the CDM.

Apart of receiving and disposing all MSW daily collected in the city of Salvador (the capital of Bahia State in Brazil, with about 3,000,000 inhabitants), the AMC landfill also serves as disposal site for MSW generated in two other cities located in the neighbouring area of Salvador (Municipalities of Simões Filho and Lauro de Freitas). Although the total area of the AMC landfill is 2,500,000 m², its area currently reserved for disposal of MSW is about 600,000 m². The AMC landfill has a total disposal capacity of 20,000,000 m³ and currently receives approximately 1,000,000 ton of MSW per year. The average organic content of the disposed MSW is about 60%. During the monitoring period from 01/01/2007 to 31/12/2010, 3,664,317 ton of MSW were disposed at the AMC landfill.

The LFG collection system which is implemented at the AMC landfill as part of the project activity consists of a series of vertical LFG extraction wells and horizontal trenches which are interconnected each other through a high density polyethylene pipeline. During the whole monitoring period from 01/01/2007 to 31/12/2010, all collected LFG (extracted from the landfill with the use of centrifugal blowers and LFG extracting wells) was conducted through a main LFG pipeline and sent to three enclosed flares for high efficiency destruction in high temperature combustion. As required by AM0002 (version 1), the amount and quality of the collected LFG sent to the flares have been continuously measured by appropriate measurement instruments on the basis of monitoring of the following aspects:

- Volume of collected LFG sent to the flares (determined on the basis of continuous measurements of LFG flow),
- CH₄ content of collected LFG,
- temperature of collected LFG,
- pressure of collected LFG.

All applied monitoring instruments (including a continuous CH₄/O₂ content gas analyzer unit) are installed along the main LFG pipeline (after the centrifugal blowers) and all LFG related measurement data are electronically recorded and stored in a computerized database located in the existent project's control room.

The following pictures show the configuration of the project activity during the whole period encompassing the currently expired 1st 7-year renewable crediting period for the project activity (period from March 2004 to 31/12/2010))¹:



Figure 1: View of the project's LFG collection and destruction station equipped with 3 enclosed flares



Figure 2: Partial view of the landfill area showing MSW disposal cell (where the project's LFG collecting wells are installed) and the project's LFG destruction station²

The project's vertical LFG extracting wells and horizontal trenches collect LFG from the inner area of the landfill up to the top of the surface. All collected LFG is transported to the LFG destruction station through the existing HDPE pipeline network. In the LFG destruction station the following equipment/instruments were installed during the monitoring period from 01/01/2007 to 31/12/2010:

- 1 condensation trap that separate liquids in collected LFG (leachate and condensate);
- 3 centrifugal blowers that provide negative pressure in the LFG pipeline, thus sucking LFG from the landfill;
- 3 high temperature enclosed flares (with nameplate LFG flaring capacity of 6,000 m³/hour each and operating temperature of the exhaust gas within the range from 500°C to 1,200°C);

² It is noteworthy that, as also visible in Figure 2, no electricity generation facility using collected LFG as fuel was implemented along the whole monitoring period from 01/01/2007 to 31/12/2010. As further explained in the PDD, a new electricity generation facility (with nameplate installed electricity generation capacity of 20.1 MW) started to operate on 1 January 2011.

- Set of LFG monitoring equipment/instruments including:
 - o 1 LFG flow meter,
 - o 1 LFG temperature sensor,
 - o 1 LFG pressure sensor,
 - o 1 continuous CH₄/O₂ content gas analyzer unit,
 - o 1 thermocouple in the upper section of each individual high temperature enclosed flare (for measuring the temperature of the exhaust gas of each flare) (3 thermocouples in total).

The quantity of working hours for the flares is determined by the installed programmable logic controller unit (PLC unit) which considers/incorporates in its programming the calculation of total flare working hours for the flares based on the sum of the time each one of the flare has operated with temperature of the exhaust gas higher than 500°C (for each flare in operation)³.

During the considered monitoring period, the project system went out of operation mainly due to the following reasons:

- Needed corrective maintenance interventions (overhauling and repair) in the project's infrastructure;
- Preventive maintenance interventions
- Temporary interruption of the supply of grid-sourced electricity to the project activity;

All interventions in the project's infrastructure are registered in completed paper forms and also in electronic spreadsheets. All maintenance procedures in the critical pieces of equipment (flares, blowers, gas analyzer, air-compressor) are registered in service and maintenance workbooks. Instrumentation calibration records are also registered in a workbook and the related certificates of calibration are kept in files.

Total GHG emissions reductions achieved and reported for the project activity during the monitoring period from 01/01/ 2007 to 31/12/2010 are summarized as follows:

Monitoring Period	Achieved Emission Reductions (tCO ₂ e)
From 01/01/2007 to 31/12/2010	1,856,028

A.2. Location of project activity

>>

The project activity is implemented at the AMC landfill. This landfill is located in a suburban rural region of the city of Salvador (about 20 km towards North-East direction from the city's central region). The AMC landfill is located within the limits of the city of Lauro de Freitas, which is a satellite city to the city of Salvador in Bahia State, Brazil.

³ As part of the application of the monitoring plan for the project activity, the sum of flares working hours (for each individual flare) is measured as the amount of hours of which each one of the 3 flares have operated with temperature of exhaust gas higher than 500°C (for all flares). Thus, in the context of the application of the monitoring plan, differently than the typical case of other LFG collection and destruction CDM project activities adopting more recent versions of the ACM0001 methodology (which refers to the methodological tool "Project emissions from flaring" (version 02.0.0)), continuously measurements of temperature of the exhaust gas of the flares are not used to determine the values for parameter flare efficiency (FE) in the particular case of the project activity. In the context of the monitoring for the "Salvador da Bahia Landfill Gas Management" project, such measurements of temperature of the exhaust gas of each flare are merely used to determine the monitoring parameter "flare operating hours". It is also crucial to note that, in the context of the application of the monitoring plan for the project activity, monitoring of "flare operating hours" is to be seen as a mere QA/QC procedure for the determination of the amount of methane which is combusted in the flares. By comparing the reported total amount of flare working hour for the flares during one day of the monitoring period with the total amount of flare methane for the same day, one can roughly confirm the plausibility of reported values of daily amount of destroyed methane.

Address of the AMC landfill:

Cia. Aeroporto, Road, km 6.5

Geographical location: 12°51'45"S (-12.8625) and 38°21'59"W (-38.3636)

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 whether the Party involved wishes to be considered as project participant (yes/no)
Brazil (host country)	Bahia Transferência e Tratamento de Resíduos S.A.	No.
Japan	Showa Shell Sekiyu K.K.	No.
United Kingdom of Great Britain and Northern Ireland	Shell Trading International Limited	No.
Netherlands	Electrabel S.A.	No.

A.4. Reference of applied methodology and standardized baseline

>>

The CDM project activity "Salvador da Bahia Landfill Gas Management Project" applies the CDM baseline and monitoring methodology AM0002 – "Greenhouse gas emission reductions through landfill gas capture and flaring where the baseline is established by a public concession contract" (version 1).

AM0002 (version 1) was especially designed for the CDM project activity "Salvador da Bahia Landfill Gas Management Project" and was approved in a very early and initial stage of the CDM. This particular CDM baseline and monitoring methodology, which was later consolidated into ACM0001 methodology, was never applied by a CDM Project activity other than the "Salvador da Bahia Landfill Gas Management Project".

As per the PDD, the following methodological tools are applied for the determination of leakage emissions due to the consumption of grid electricity and LPG by the project activity:

- Tool to calculate baseline, project and/or leakage emissions from electricity consumption (version 01)
- Tool to calculate project or leakage CO₂ emissions from fossil fuel consumption (version 02)

A.5. Crediting period of project activity

>>

7-year renewable crediting period from 01/01/2004 to 31/12/2010⁴. No changes to the start date of the crediting period were ever requested or occurred.

⁴ The first 7-year renewable crediting period was finalized on 31/12/2010. As established by applicable CDM rules, the project participant BATTRE has previously notified the CDM Executive Board (CDM-EB) about the intention of the project participants to renew the crediting period for the CDM project activity "Salvador da Bahia Landfill Gas Management Project".

A.6. Contact information of responsible persons/entities

>>

Completion date for the application of the CDM-MR-FORM: 10/07/2015

Responsible entity / person:

Mr. Nuno Barbosa
 nuno@unicarbo.com.br
 UniCarbo Energia e Biogás Ltda.
 São Paulo, Brazil

UniCarbo Energia e Biogás Ltda. is a CDM consulting and advisory services company hired by the project participant Essencis Soluções Ambientais S.A. UniCarbo Energia e Biogás Ltda. is not a project participant.

SECTION B. Implementation of project activity**B.1. Description of implemented registered project activity**

>>

The project's LFG collection and destruction station was designed to continuously operate (24-hour per day).

During the monitoring period from 01/01/2007 to 31/12/2010 the project activity operated on the basis of 3 high temperature enclosed flares, 3 centrifugal blowers, 1 condensation pot (for removing condensate moisture/liquids from collected LFG) and about 300 LFG extracting wells (which were connected to 4 main branches of the project's HDPE main LFG collecting pipeline (that directed all collected LFG from the landfill area to the LFG destruction station)).

During the whole considered monitoring period the project activity operated in accordance with the revised version of the PDD⁵.

During the considered monitoring period, in accordance to provisions in the PDD, all collected LFG was sent to destruction by high temperature combustion in the 3 operating enclosed flares. Thus, during the entire monitoring period, no collected LFG was ever utilized as fuel for electricity generation or as any other energy source purpose (i.e. bottled, inserted in a natural gas distribution pipeline, fuel for heating, etc.).

Number of LFG extraction wells:

By the end of 2005, the number of wells from the LFG capturing system was increased from 140 (as per original project design) to up to 300. Since the project's system start-up, the average collection efficiency of each individual gas well has been verified as substantially lower than previously expected. Thus, a denser network of LFG extracting wells was assumed as necessary in order to compensate such low average LFG collection efficiency in the wells. As part of the operation of the landfill, new waste disposal cells are initiated and new LFG collecting wells are thus built.

⁵ It is noteworthy that since 01/01/2011, the project activity had its initial design modified (as a result of the implementation and start of continuous operation of a new 20.1 MW electricity generation facility which uses collected LFG as fuel for electricity generation). It is anyway crucial to note that, as further substantiated in Appendix 3 of the revised PDD, the occurred change in the project design is regarded as a change that occurred after the expiration of the 1st 7-year renewable crediting period (from 01/01/2004 to 31/12/2010). Thus, it is assumed that this change does not represent a permanent post-registration change in the project design which is required to be addressed in the context of the verification for the project activity encompassed by this Monitoring Report.

Grid-sourced electricity consumed by the project activity:

All grid-sourced electricity consumed by the AMC landfill (including the project activity) is supplied by the local electricity distribution company COELBA. The project activity was designed to have all grid electricity consumption being measured with an electricity meter. It is however noteworthy that the electricity meter installed at the project site was found as not operating properly during the previous monitoring periods. As further explained in Section B.2.1, this monitoring failure was addressed as a temporary deviation from the application of the monitoring plan for the project activity during the previous 2nd periodic verification (monitoring period from 01/01/2005 to 31/12/2005). As an alternative calculation approach to address such occurred deviation, the determination of the total amount of grid-sourced electricity consumed by the project activity during the whole monitoring period (monitoring which is required for the determination of leakage emissions due to the consumption of grid-sourced electricity by the project activity as established by AM0002 (version 1)), a conservative determination approach is applied. Further details about the determination of leakage emissions due to the consumption of grid-sourced electricity by the project activity are available in Section E.3.

LPG consumed by the project activity:

As part of the operation of the project activity, liquefied petroleum gas (LPG) has been utilized during required flare ignition events. According to the PDD, the consumption of LPG has been monitored and accounted as leakage emissions due to the consumption of fossil fuel by the project activity. Further details about the determination of leakage emissions due to the consumption of LPG by the project activity are available in Section E.3.

B.2. Post-registration changes⁶**B.2.1. Temporary deviations from registered monitoring plan, applied methodology or applied standardized baseline**

>>

Temporary deviations⁷ of the registered monitoring plan have occurred during the considered monitoring period. Due to improper functioning of the electricity meter installed to measure the amount of grid-sourced electricity consumed by the project activity, consumption of grid-sourced electricity by the project activity was thus not determined based on measurements as established by the monitoring plan of the registered PDD. By applying a conservative approach, consumption of grid-sourced electricity by the project activity during the considered monitoring period was estimated by following the applicable provisions of the Clean Development Mechanism Project Standard (CDM-PS) (version 09.0, EB82)⁸.

The CDM-PS establishes the following guidance:

⁶ As part of the verification assessment for the previous 2nd periodic verification for the project activity (monitoring period from 01/01/2005 to 31/12/2005), post-registration changes were addressed and assessed by the verifying DOE under two assessment events, resulting in two revised versions of the PDD (PDD version 6, dated 27/12/2013 and PDD version 7, dated 28/01/2015). While post-registration changes addressed in version 6 of the revised PDD were assessed by the verifying DOE and later approved by the CDM-EB on 18/07/2014 under the so-called "Prior-approval process track" (PRC ref PRC-0052-001 / <http://cdm.unfccc.int/PRCContainer/DB/prcp23882402/view>); the post-registration changes addressed in version 7 of the revised PDD (+ an occurred temporary deviation from registered monitoring plan that did not result in changes in the PDD) were assessed by the verifying DOE and are yet to be approved by the CDM-EB under the so-called "Issuance process track".

⁷ Changes that do not require approval from the Board as per the provisions of Clean Development Mechanism Project Standard (Version 09.0, EB82)

⁸ As per item 2.3 of Appendix 1: "Changes that do not require prior approval by the Executive Board of the clean development mechanism" in "Temporary deviations from the registered monitoring plan, applied methodology or applied standardized baseline".

“(...) If project participants or the coordinating/managing entity have temporarily not monitored parameters related to project GHG emissions or are unable to produce evidence related to such monitoring, prior approval by the Board is not required if project participants or the coordinating/managing estimate these parameters assuming that the source of the GHG emissions operated at maximum capacity for the full period of the missing data. In the case of project GHG emissions related to the consumption of electricity, the estimate shall include an addition of 10 per cent to account for transmission and distribution losses. (...)”.

The above-quoted guidance is applied in the context of the determination of amount of grid-sourced electricity consumed by the project activity during the considered monitoring period (monitoring parameter “EC_{grid,y}”). Further details are included under details for the monitoring parameter “EC_{grid,y}” in Section D.2 and also in the validation opinion report for post-registration changes issued by the DOE GLC in the context of the previous 2nd periodic verification for the project activity “Salvador da Bahia Landfill Gas Management Project” (report number GLC 089.2, submitted in the context of a request of approval of post-registration changes under the “Issuance” process track as part of the previous 2nd monitoring period).).

B.2.2. Corrections

>>

Not applicable.

B.2.3. Changes to start date of crediting period

>>

Not applicable.

B.2.4. Inclusion of a monitoring plan to the registered PDD that was not included at registration

>>

Not applicable.

B.2.5. Permanent changes from registered monitoring plan, applied methodology or applied standardized baseline

>>

Not applicable.

B.2.6. Changes to project design of registered project activity

>>

Not applicable.

B.2.7. Types of changes specific to afforestation or reforestation project activity

>>

Not applicable.

SECTION C. Description of monitoring system

>>

As established in the monitoring plan of the PDD, monitoring data required for the determination of the parameter “Amount of methane flared” (LFG flow, LFG pressure, LFG temperature, methane content of LFG, temperature of the exhaust gases of the flares) have been continuously measured by related instruments/equipment. The images below show some of the monitoring

instruments/equipment installed (as per the implemented project configuration during the period from March 2004 to the end of year 2010):

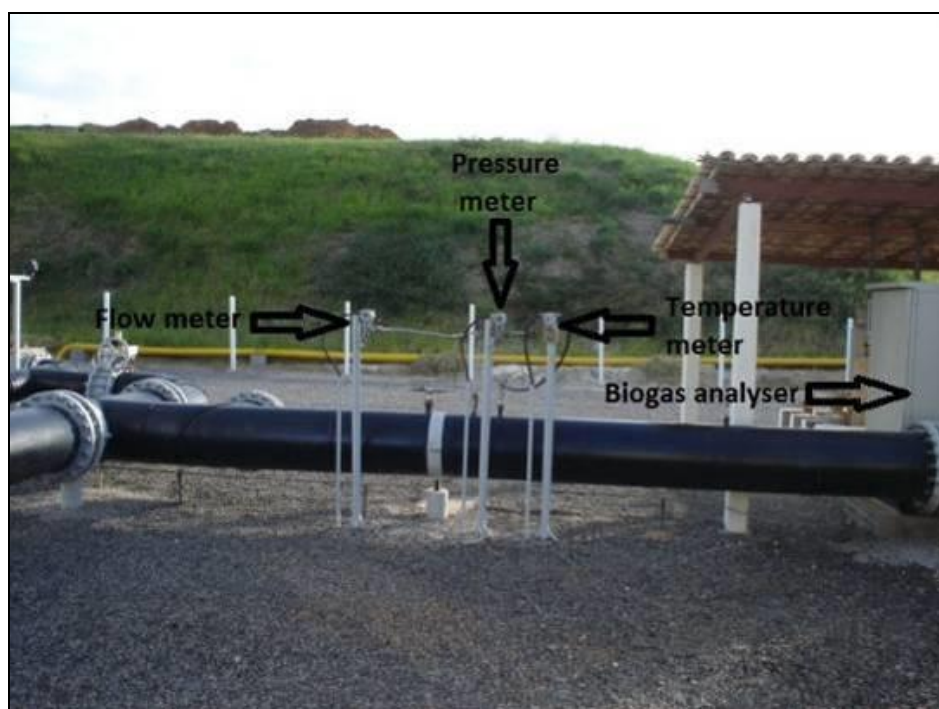


Figure 3: Location of the LFG flow meter, LFG pressure sensor, LFG temperature sensor and the CH₄/O₂ content gas analyzer unit



Figure 4: Location of the LFG pressure sensor and LFG temperature sensor

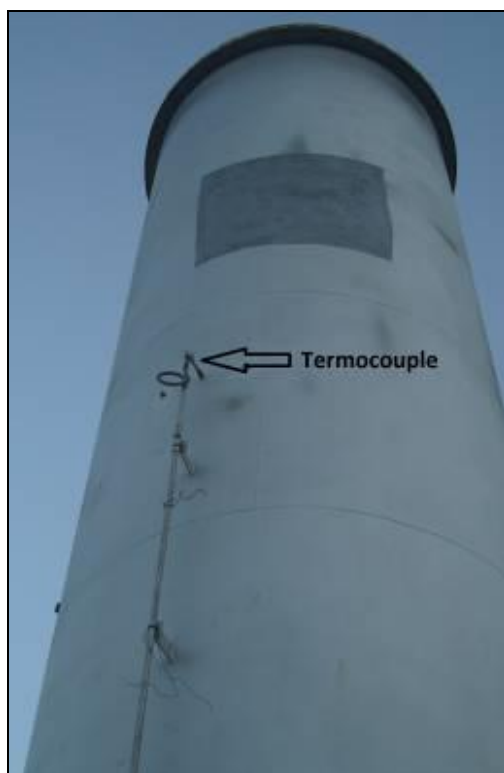


Figure 5 – Location of the thermocouple to measure temperature of the exhaust gas of the flare (1 thermocouple for each flare)



Figure 6 – Panel of the installed CH₄/O₂ content gas analyzer unit



Figure 7 – PC control screen with real-time information of the operation of the LFG destruction station

As part of the application of the monitoring plan, continuous measurements of LFG flow, LFG temperature, LFG pressure, CH₄ content of collected LFG were processed by an existent programmable logic controller (PLC) unit and recorded every 20 seconds in a local customized MS-Access™ database (installed in a local computer).

The amount of methane flared (monitoring parameter CH_{4,flared,y}) is directly calculated by the PLC unit on an every-hour basis and such hourly values are regularly automatically recorded/reported (every hour) in a main/master data reporting & recording MS-Excel™ spreadsheet file titled “*Salvador da Bahia LFG Management_MVP Workbook_V03 October 2.xls*”. The total time of which all flares have operated with exhaust gas temperature above 500°C during each individual day of the monitoring period is also directly calculated by the PLC unit and updated accumulated daily value is regularly recorded/reported (every hour) in the same MS-Excel™ spreadsheet.

The main/master data recording & reporting spreadsheet file titled “*Salvador da Bahia LFG Management_MVP Workbook_V03 October 2.xls*” has been developed by IT experts and synchronized with the PLC unit during the project construction and commissioning phase. This file is updated every hour and it currently includes about 7 years of historical monitoring records (since the first operational day of the project activity in year 2004 until 31/12/2010).

The existent MS-Access™ database works as a monitoring data back-up and it also works as proof of authenticity of data which is recorded/reported in the main/master data recording & reporting MS-Excel™ spreadsheet in an every-hour basis. Data recorded in the existent MS-Access™ database is thus not used for formal reporting purposes, but it can be used as a reliable data cross-checking. As per BATTRE’s monitoring system, all information recorded and stored in the customized MS-Access™ based database is also regularly archived in back-up CD units.

As per the project design, grid electricity consumption by the project activity was expected to be measured with a KRON (model MKM-D) electricity met. As outlined in Section B.1, this electricity meter was found as not operating properly during previous monitoring periods. Thus, electricity

consumption was determined by adopting a deemed conservative alternative estimation approach as further described in Sections B.1 and E.3.

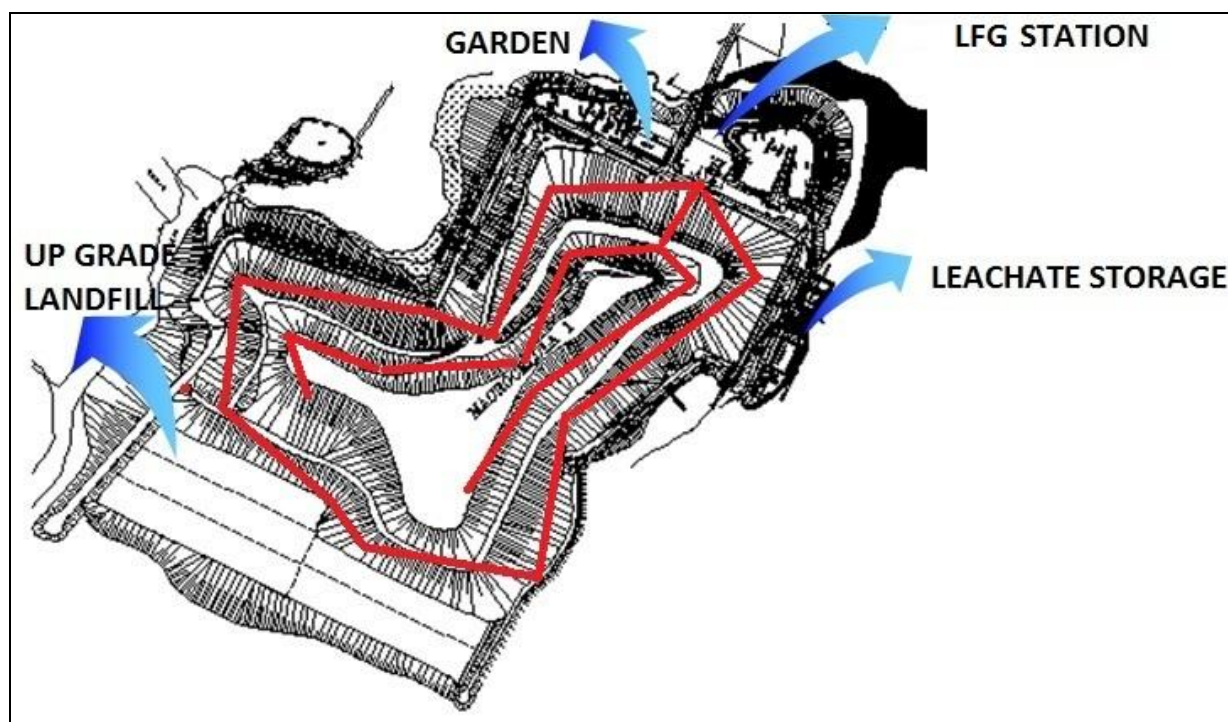


Figure 8 – Lay-Out of the landfill, infrastructure and LFG pipeline network (in red)

The total volume of methane collected and destroyed in the flares has been determined by also taking into account the selected value of the ex-post determined parameter flare efficiency (FE). As part of the implemented monitoring procedure, the value for FE is determined for the whole monitoring period as the lowest of the applicable twenty calculated values (based on the twenty performed flare efficiency tests (as per conducted sample measurements/tests on the basis of sample analysis/tests of residual methane in the exhaust gases of the flares which were performed during the monitoring period)).

For reporting the monitoring parameters and performing the calculation of emission reductions, an emission reduction calculation spreadsheet was compiled for the monitoring period from 01/01/2007 to 31/12/2010 (file titled: "Salvador da Bahia LFG_2007_2010.Rev1").

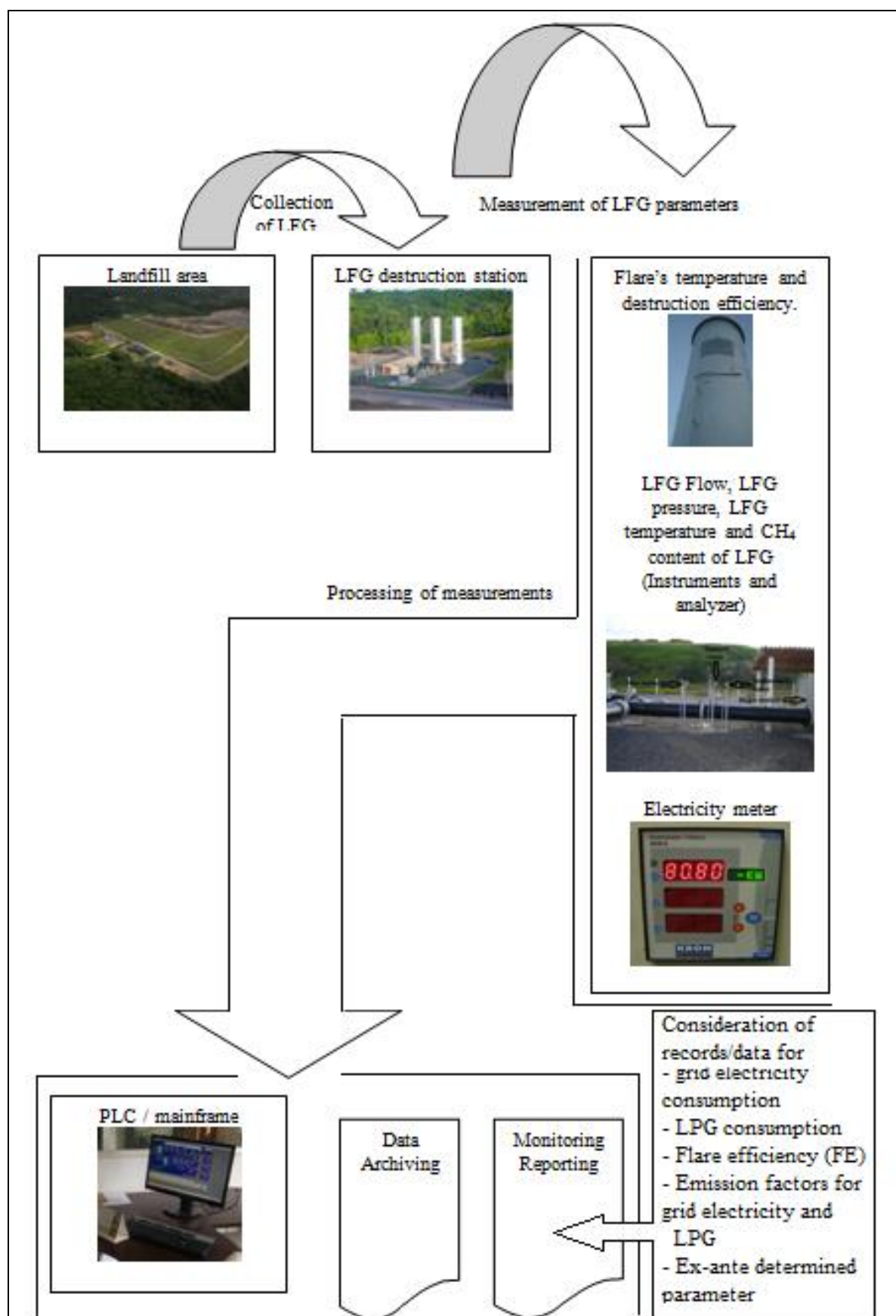


Figure 9 – Monitoring data, information processing and archiving flow applicable for the monitoring period from 01/01/2007 to 31/12/2010

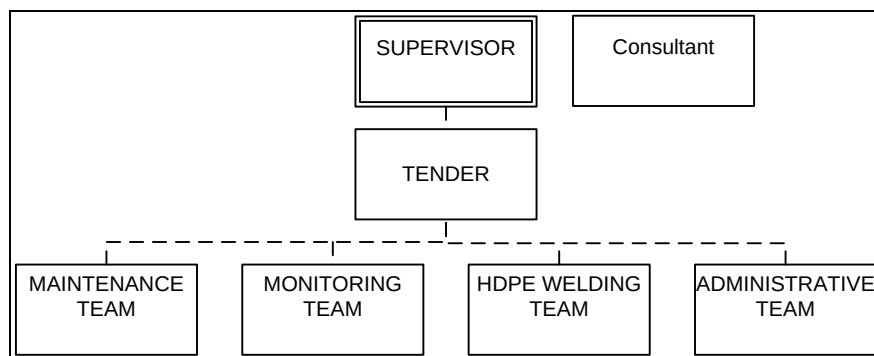


Figure 10 – Organizational structure for the project activity applicable for the monitoring period from 01/01/2007 to 31/12/2010

Responsibilities and Roles:

As per the implemented organizational structure valid by the time of the monitoring period from 01/01/2007 to 31/12/2010, the technical project staff of BATTRE has the following responsibilities⁹:

CDM project consultant: Responsible for the monitoring report and general LFG process coordination.

CDM project supervisor: Supervise the LFG collections and destruction process.

CDM project tender: Operate the LFG station, storage data's and calibrations procedures and coordinate the maintenance, monitoring, welding and administrative team.

CDM project maintenance team: Responsible for the field maintenance and upgrade of the LFG collection system.

CDM project monitoring team: Responsible for the wellhead monitoring/regulations and field report.

CDM project HDPE welding team: Responsible for the HDPE welding and pipes slope adjustments.

CDM project administrative team: responsible for operational internal reports and equipment calibrations.

Quality Assurance and Quality Control:

Along the monitoring period from 01/01/2007 to 31/12/2010, the implemented LFG collection and destruction project (internally named as "biogas system") was part of the scope of the BATTRE's ISO 9001 and 14001 certified QA/QC/EMS systems. By the time of the previous 2nd monitoring period (from 01/01/2005 to 31/12/2005), the quality assurance and environmental certification scopes for the operation of the LFG project were audited and certified by the Certification Entity ABS Quality Evaluations on 23/12/2005¹⁰. Moreover, all quality assurance and quality control measures (as also required as per the Monitoring Plan of the PDD) have been systematically followed by the project operational team.

Emergency procedures for the monitoring system:

BATTRE has created and implemented a set of precautions, safety and emergency procedures to ensure the integrity and safety for the monitoring process and overall project operation. The operation of the monitoring system is performed on the basis of equipment and instruments which always have spare (back-up) units and follow documented maintenance and calibration schedules. Moreover, the project operational staff works in shifts thus assuring 24-hour support to the operation and maintenance of the project activity.

⁹ As a result of the starting of operation of the new electricity generation facility powered by LFG on 01/01/2011 (as a modification in the project activity), a revised organization structure was implemented by BATTRE.

¹⁰ BATTRE currently holds valid certificates of compliance of its quality assurance and environmental management system within the requirements of ISO 9001 and ISO 14001 standards. The certificates were issued by the Certification Entity ABS Quality Evaluations on 15/09/2010 (ISO 9001 compliance certification) and on 26/01/2009 (ISO 14001 compliance certification). It is noteworthy that the new electricity generation facility powered by LFG is not yet included in the scope of the BATTRE's quality assurance and environmental management system.

Relative delay on performing/concluding the periodic verification for the monitoring period from 01/01/2007 to 31/12/2010:

Appendix 6 of the registered PDD (version 7, dated 28/01/2015) includes reasons and explanations for the relative and undesirable long delays for performing periodic verifications for the project activity. Appendix 6 of the registered PDD includes a detailed timeline that explains in an objective way the reasons for the occurred relative long delay for performing periodic verifications for project activity. Besides of information included in Appendix 6 of the PDD, it is also noteworthy that the decision of the DOE Germanischer Lloyd Certification GmbH (GLC) to voluntarily cease the provision of CDM certification services and withdraw its accreditation as a DOE¹¹ also promoted additional delays for the performance of verifications encompassed by the considered monitoring period.

SECTION D. Data and parameters

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

Data/parameter:	WASTE _{contract,y}
Unit	ton
Description	Reference quantity of waste projected to be disposed at the AMC landfill as per contractual requirements set between BATTRE and the Administration of the Municipality of Salvador (municipal authority).
Source of data	Defined as per as per contractual requirements set between BATTRE and the Administration of the Municipality of Salvador (municipal authority).
Value(s) applied)	870,000
Choice of data or measurement methods and procedures	-

¹¹ Further information about the the decision of the DOE Germanischer Lloyd Certification GmbH (GLC) to cease the provision of CDM certification services and withdraw its accreditation as a DOE are available online:

- DNV GL: “DNV GL is ceasing to provide validation and verification services for CDM”

(<https://www.dnvgl.com/news/dnv-gl-is-ceasing-to-provide-validation-and-verification-services-for-cdm-6611>)

- UNFCCC / CDM-EB: “The Board took note of the voluntary withdrawal of accreditation status by the following entities: (...)

(b) E-0042 “Germanischer Lloyd Certification GmbH” (GLC) for sectoral scopes 2, 4, 5, 7–10 and 15, as of 20 March 2015.”

CDM-EB84 Meeting report (para. 20)

(http://cdm.unfccc.int/filestorage/5/R/V/5RVNFL73WJ41QT2HKCOGBIMSU8X69Y/eb84_report.pdf?t=azV8bnJqN29ofDAF8qKJ-wkqLk0YN7GAhn-2)

Purpose of data	As per AM0002 (version 1), $WASTE_{contract,y}$ is applied for the determination of the quantity of methane flared at the baseline scenario ($CH4_{baseline,y}$) as a function of the quantity of methane flared at the baseline scenario as established under the contractual agreement ($CH4_{contract,y}$). It is however crucial to note that in the context of the applied more appropriate approach for determining the annual amount of methane that would be destroyed in the baseline scenario ¹² , the ex-ante determined value for $WASTE_{contract,y}$ is not taken into account. Anyway, for sake of completeness, this ex-ante determined parameter is kept in the list of ex-ante determined parameters.
Additional comments	-

Data/parameter:	CH4/LFG_{contract}
Unit	-
Description	Reference weighted average methane content in landfill gas as per contractual requirements set between BATTRE and the Administration of the Municipality of Salvador.
Source of data	Defined as per as per contractual requirements set between BATTRE and the Administration of the Municipality of Salvador (municipal authority).
Value(s) applied)	50%
Choice of data or measurement methods and procedures	-
Purpose of data	As per AM0002 (version 1), $CH4/LFG_{contract}$ is applied for the determination of the quantity of methane flared at the baseline scenario ($CH4_{baseline,y}$) as a function of the quantity of methane flared at the baseline scenario as established under the contractual agreement ($CH4_{contract,y}$). It is however crucial to note that in the context of the applied more appropriate approach for determining the annual amount of methane that would be destroyed in the baseline scenario, the ex-ante determined value for $CH4/LFG_{contract}$ is not taken into account. Anyway, for sake of completeness, this ex-ante determined parameter is kept in the list of ex-ante determined parameters.
Additional comments	-

¹² The use of a more appropriate approach for determining the annual amount of methane that would be destroyed in the baseline scenario (absence of the project activity) (with related calculation approach also being included in the PDD in Section B.6.1 - Explanation of methodological choices) was addressed in the previously revised version of the PDD (version 6) as a post-registration change (under the category "permanent change in the monitoring plan from the registered PDD"). This needed change was based on applicable contractual requirements and data/information made available by the Administration of the Municipality of Salvador (municipal authority). By applying such revised monitoring approach, it is assumed that the quantitative value for the parameter $CH4_{baseline,y}$ is equal to the value for the monitoring parameter $CH4_{contract,y}$ for each year of the crediting period.

Data/parameter:	GWP_CH4
Unit	tCO ₂ /tCH ₄
Description	Global Warming Potential value for methane
Source of data	Default as per AM0002 (Version 01)
Value(s) applied	21
Choice of data or measurement methods and procedures	Default as per AM0002 (Version 01) Note: Since this PDD is valid only for the 1 st 7-year renewable crediting period (which was finalized in 31/12/2010), the GWP value applicable for the 1 st commitment period of the Kyoto Protocol is selected.
Purpose of data	Calculation of baseline emissions
Additional comments	-

Data/parameter:	CF								
Unit	ton/m ³								
Description	Conversion factor								
Source of data	Approved/published baseline and monitoring methodologies and methodological tools: - ACM0001 (version 11), (more recent versions of ACM0001 refers to the tools indicated below for value of methane density); - "Project emissions from flaring" (Version 02.0.0); - "Tool to determine the mass flow of a greenhouse gas in a gaseous stream (version 2.0.0)". CF corresponds to density of methane (CH₄). The previous applicable default value for CF (as set by AM0002 (Version 1.0)) was 0.00062 ton/m³. The following is explicitly indicated in all versions of AM0002 (versions 1, 2 and 3): "(...) Conversion Factor¹ <table><tr><th>Factor</th><th>Unit</th><th>Period Applicable</th><th>Description/Source</th></tr><tr><td>0.000662</td><td>ton CH₄/m³(STP) CH₄</td><td>Default</td><td></td></tr></table> 1) This table is updated as more scientific information becomes available or reporting guidelines are modified. (...)"	Factor	Unit	Period Applicable	Description/Source	0.000662	ton CH ₄ /m ³ (STP) CH ₄	Default	
Factor	Unit	Period Applicable	Description/Source						
0.000662	ton CH ₄ /m ³ (STP) CH ₄	Default							

	By following not only the above-quoted requirement of AM0002 to update and/or correct the value if applicable, but also currently valid applicable guidance of the CDM Project Cycle Procedure for addressing post-registration changes (corrections of values of ex-ante selected parameters), the value is updated/corrected by taking into account that the value of 0.0007168 ton/m³ is defined as the appropriate value for density of methane gas (at normal (STP) conditions) by the following more recently approved/published CDM baseline and monitoring methodologies and CDM methodological tools: - ACM0001 (version 11), (more recent versions of ACM0001 refers to the tools indicated below for value of methane density); - "Project emissions from flaring" (Version 02.0.0); - "Tool to determine the mass flow of a greenhouse gas in a gaseous stream (version 2.0.0)", etc.)
Value(s) applied)	0.0007168
Choice of data or measurement methods and procedures	-
Purpose of data	Calculation of baseline emissions
Additional comments	-

Data/parameter:	TDL_{grid,y}
Unit	-
Description	Transmission and distribution losses for electricity generation in the National Electricity Grid of Brazil
Source of data	Applicable default as per the "Tool to calculate baseline, project and/or leakage emissions from electricity consumption" (Version 01)
Value(s) applied)	20%
Choice of data or measurement methods and procedures	-
Purpose of data	Calculation of leakage emissions (due to the consumption of grid-sourced electricity by the project activity)
Additional comments	-

Data/parameter:	W_{BM}
Unit	%
Description	Weighting of build margin emissions factor

Source of data	Applicable default value as per the “Tool to calculate the emission factor for an electricity system” (version 03.0.0)
Value(s) applied)	0.50 (50%) during the 1 st 7-year crediting period
Choice of data or measurement methods and procedures	The applicable value as per the “Tool to calculate the emission factor for an electricity system” (version 3.0.0) is selected.
Purpose of data	Calculation of leakage emissions (due to the consumption of grid-sourced electricity by the project activity)
Additional comments	The ex-ante determined value for w_{BM} will be considered only in case the emission factor for grid-sourced electricity generation in year y ($EF_{EL,grid,y}$) is determined and calculated as the Combined margin CO ₂ emission factor ($EF_{grid,CM,y}$) as per the “Tool to calculate the emission factor for an electricity system”.

Data/parameter:	w_{OM}
Unit	%
Description	Weighting of operating margin emissions factor
Source of data	Applicable default value as per the “Tool to calculate the emission factor for an electricity system” (version 3.0.0)
Value(s) applied)	0.50 (50%) during the 1 st 7-year crediting period
Choice of data or measurement methods and procedures	The applicable value as per the “Tool to calculate the emission factor for an electricity system” (version 3.0.0) is selected.
Purpose of data	Calculation of leakage emissions (due to the consumption of grid-sourced electricity by the project activity)
Additional comments	The ex-ante determined value for w_{OM} will be considered only in case the emission factor for grid-sourced electricity generation in year y ($EF_{EL,grid,y}$) is determined and calculated as the Combined margin CO ₂ emission factor ($EF_{grid,CM,y}$) as per the “Tool to calculate the emission factor for an electricity system”.

Ex-ante determined parameters not used in the context of ex-post determination and calculation of emission reductions achieved by the project activity:

The following ex-ante determined parameters (that are also included in the PDD) are not used for the purpose of ex-post determination of baseline emissions and project emissions achieved by the project activity during the considered monitoring period:

- Efficiency of the LFG capture system that will be installed in the project activity (η_{PJ})
- Model correction factor to account for model uncertainties (ϕ_v)
- Oxidation factor (reflecting the amount of methane from the considered SWDS that is oxidized in the soil (or other material covering the waste)) (OX)
- Fraction of methane in the SWDS gas (volume fraction of methane in the collected LFG) (F)
- Fraction of degradable organic carbon (DOC) in MSW that decomposes in the considered SWDS ($DOC_{f,default}$)
- Methane correction factor (MCF)
- Fraction of degradable organic carbon (by weight) in the waste type j (DOC_j)
- Decay rate for the waste type j (k_j)
- Weight fraction of the waste type j (W_j)

As also outlined in the PDD, data for the above-listed parameters are used only in the context of ex-ante estimation of annual accumulated values for the amount of methane destroyed by the project activity ($CH4_{flared,y}$) (in the context of ex-ante estimation of emission reductions to be achieved by the project activity during the 1st 7-year renewable crediting period). Due to that, details for the above-listed parameters are not included in this Section as they are not relevant in the context of determination of emission reductions achieved by the project activity during the considered monitoring period. Relevant details for such not reported parameters are included in Section B.6.2 of the PDD.

D.2. Data and parameters monitored

Data/parameter:	WASTE _{actual}
Unit	ton
Description	Annual Waste Landfilled. (Monitored quantity of waste actually disposed at the landfill during the years from 2007 to 2010)
Measured/calculated/default	Measured at weight bridge
Source of data	Monitored at the entrance of the landfill by two weight bridge scales. All trucks loaded with MSW to be disposed in the landfill are weighted at the entrance and exit of the landfill. The amount of MSW disposed by each truck is determined as the difference of the vehicle total weight in both measurements.
Value(s) of monitored parameter	3,664,317
Monitoring equipment	Type of measurement equipment: - Weight Bridge Scales BATTRE's internal instrument/equipment ID reference: - BAL 01 and BAL 02 Manufacturer: - Toledo do Brasil Indústria de Balanças Ltda. Model: 810 II (equipped with 9091 indicator) (BAL 01) 820 (equipped with 8530 Cougar indicator) (BAL 02) Accuracy: ±10 kg Serial number: 984214709 (BAL 1) and 3500011350 (BAL 2) Calibration frequency: - Annually (As recommended by the equipment manufacturer. No calibration requirements are specified in the monitoring plan of the PDD or by AM0002.) Date(s) for the calibration event(s) valid for the monitoring period: - BAL 01 - 17/12/2006, 25/05/2007, 18/05/2008, 27/04/2009 and 15/04/2010 - BAL 02 - 18/12/2006, 25/05/2007, 18/05/2008, 27/04/2009 and 15/04/2010
Measuring/reading/recording frequency:	Measurement data are recorded by staff from the Administration of the Municipality of Salvador (which are permanently based in the landfill) using a SPA Software (Waste Scale, Landfill Production System) Data is consolidated daily and reports are consolidated into monthly and annual basis.
Calculation method (if applicable):	WASTE_{actual} represents the quantity of waste actually disposed at the landfill during the year encompassed by the considered monitoring period. The amount of MSW disposed by each truck is determined as the difference of the vehicle total weight in both measurements.

QA/QC procedures:	Equipment (scales) are regularly calibrated (annually) and data collection procedures are implemented as per company's ISO 9001 and ISO 14001 certified quality & environmental management system.
Purpose of data:	As per AM0002 (version 1), $WASTE_{actual}$ is applied for the determination of the quantity of methane flared at the baseline scenario ($CH_4_{baseline,y}$) as a function of the quantity of methane flared at the baseline scenario as established under the contractual agreement ($CH_4_{contract,y}$). It is however crucial to note that in the context of the applied more appropriate approach for determining the annual amount of methane that would be destroyed in the baseline scenario ¹³ , records of $WASTE_{actual}$ are not taken into account. Anyway, for sake of completeness, this monitoring parameter is kept in the monitoring plan of the project activity for the 1 st 7-year crediting period and it is thus required to be monitored accordingly.
Additional comments:	-

Data/parameter:	CH₄/LFG_{actual}
Unit	%
Description	Annual calculated weighted average methane content in landfill gas during the year encompassed by the considered monitoring period
Measured/calculated/default	Measurements performed on-site.
Source of data	Measurements of CH ₄ content of collected LFG are performed in the main LFG pipeline between the blowers and the enclosed flares.
Value(s) of monitored parameter	40.70%

¹³ The use of a more appropriate approach for determining the annual amount of methane that would be destroyed in the baseline scenario (absence of the project activity) was addressed in the previously revised version of the PDD (version 6) as a post-registration change (under the category "permanent change in the monitoring plan from the registered PDD"). This needed change was based on applicable contractual requirements and data/information made available by the Administration of the Municipality of Salvador (municipal authority). By applying such revised monitoring approach, it is assumed that the quantitative value for the parameter $CH_4_{baseline,y}$ is equal to the value for the monitoring parameter $CH_4_{contract,y}$ for each year of the crediting period.

Monitoring equipment	Methane content in the captured LFG is measured with an infrared CH₄/O₂ content gas analyzer unit. Measured data is consolidated daily as per ISO9001 certified QA/QC's working procedure/instruction number PTO 034. BATTRE's internal instrument/equipment ID. reference: • AI001 Manufacturer: • Fisher Rosemount - Rosemount Analytical Model: • MLT1TIRIRPO2 Accuracy: • ±1% Serial number (S/N): • 30011429704 Calibration frequency: • Every 2 weeks as per the implemented BATTRE's monitoring procedure¹⁴. Calibration events valid for the monitoring period from 01/01/2007 to 31/12/2010: Dates of the calibration events valid for the monitoring period (dd/mm/yy): <table border="1"> <tr><td>Dec. 2006</td><td>04/12</td><td>11/12</td><td>14/12</td><td>21/12</td><td>26/12</td></tr> <tr><td>Jan. 2007</td><td>02/01</td><td>09/01</td><td>16/01</td><td>24/01</td><td>29/01</td></tr> <tr><td>Feb. 2007</td><td>06/02</td><td>12/02</td><td>19/02</td><td>26/02</td><td></td></tr> <tr><td>Mar. 2007</td><td>05/03</td><td>13/03</td><td>19/03</td><td>26/03</td><td></td></tr> <tr><td>Apr. 2007</td><td>02/04</td><td>09/04</td><td>16/04</td><td>23/04</td><td>30/04</td></tr> <tr><td>May 2007</td><td>07/05</td><td>14/05</td><td>21/05</td><td>28/05</td><td></td></tr> <tr><td>Jun. 2007</td><td>04/06</td><td>13/06</td><td>19/06</td><td>25/06</td><td></td></tr> <tr><td>Jul. 2007</td><td>02/07</td><td>09/07</td><td>16/07</td><td>23/07</td><td>30/07</td></tr> <tr><td>Aug. 2007</td><td>07/08</td><td>09/08</td><td>14/08</td><td>20/08</td><td>27/08</td></tr> <tr><td>Sep. 2007</td><td>03/09</td><td>10/09</td><td>17/09</td><td>20/09</td><td>24/09</td></tr> <tr><td>Oct. 2007</td><td>01/10</td><td>08/10</td><td>15/10</td><td>22/10</td><td>29/10</td></tr> <tr><td>Nov. 2007</td><td>05/11</td><td>12/11</td><td>19/11</td><td>26/11</td><td></td></tr> <tr><td>Dec. 2007</td><td>03/12</td><td>10/12</td><td>14/12</td><td>22/12</td><td>24/12</td></tr> <tr><td>Jan. 2008</td><td>07/01</td><td>14/01</td><td>21/01</td><td>28/01</td><td></td></tr> <tr><td>Feb. 2008</td><td>04/02</td><td>11/02</td><td>14/02</td><td>20/02</td><td>26/02</td></tr> <tr><td>Mar. 2008</td><td>03/03</td><td>10/03</td><td>20/03</td><td>24/03</td><td>31/03</td></tr> <tr><td>Apr. 2008</td><td>06/04</td><td>07/04</td><td>14/04</td><td>21/04</td><td>28/04</td></tr> <tr><td>May 2008</td><td>05/05</td><td>12/05</td><td>19/05</td><td>26/05</td><td></td></tr> <tr><td>Jun. 2008</td><td>02/06</td><td>09/06</td><td>16/06</td><td>23/06</td><td>30/06</td></tr> <tr><td>Jul. 2008</td><td>04/07</td><td>07/07</td><td>14/07</td><td>21/07</td><td>28/07</td></tr> <tr><td>Aug. 2008</td><td>04/08</td><td>11/08</td><td>18/08</td><td>22/08</td><td>25/08</td></tr> </table>	Dec. 2006	04/12	11/12	14/12	21/12	26/12	Jan. 2007	02/01	09/01	16/01	24/01	29/01	Feb. 2007	06/02	12/02	19/02	26/02		Mar. 2007	05/03	13/03	19/03	26/03		Apr. 2007	02/04	09/04	16/04	23/04	30/04	May 2007	07/05	14/05	21/05	28/05		Jun. 2007	04/06	13/06	19/06	25/06		Jul. 2007	02/07	09/07	16/07	23/07	30/07	Aug. 2007	07/08	09/08	14/08	20/08	27/08	Sep. 2007	03/09	10/09	17/09	20/09	24/09	Oct. 2007	01/10	08/10	15/10	22/10	29/10	Nov. 2007	05/11	12/11	19/11	26/11		Dec. 2007	03/12	10/12	14/12	22/12	24/12	Jan. 2008	07/01	14/01	21/01	28/01		Feb. 2008	04/02	11/02	14/02	20/02	26/02	Mar. 2008	03/03	10/03	20/03	24/03	31/03	Apr. 2008	06/04	07/04	14/04	21/04	28/04	May 2008	05/05	12/05	19/05	26/05		Jun. 2008	02/06	09/06	16/06	23/06	30/06	Jul. 2008	04/07	07/07	14/07	21/07	28/07	Aug. 2008	04/08	11/08	18/08	22/08	25/08
Dec. 2006	04/12	11/12	14/12	21/12	26/12																																																																																																																										
Jan. 2007	02/01	09/01	16/01	24/01	29/01																																																																																																																										
Feb. 2007	06/02	12/02	19/02	26/02																																																																																																																											
Mar. 2007	05/03	13/03	19/03	26/03																																																																																																																											
Apr. 2007	02/04	09/04	16/04	23/04	30/04																																																																																																																										
May 2007	07/05	14/05	21/05	28/05																																																																																																																											
Jun. 2007	04/06	13/06	19/06	25/06																																																																																																																											
Jul. 2007	02/07	09/07	16/07	23/07	30/07																																																																																																																										
Aug. 2007	07/08	09/08	14/08	20/08	27/08																																																																																																																										
Sep. 2007	03/09	10/09	17/09	20/09	24/09																																																																																																																										
Oct. 2007	01/10	08/10	15/10	22/10	29/10																																																																																																																										
Nov. 2007	05/11	12/11	19/11	26/11																																																																																																																											
Dec. 2007	03/12	10/12	14/12	22/12	24/12																																																																																																																										
Jan. 2008	07/01	14/01	21/01	28/01																																																																																																																											
Feb. 2008	04/02	11/02	14/02	20/02	26/02																																																																																																																										
Mar. 2008	03/03	10/03	20/03	24/03	31/03																																																																																																																										
Apr. 2008	06/04	07/04	14/04	21/04	28/04																																																																																																																										
May 2008	05/05	12/05	19/05	26/05																																																																																																																											
Jun. 2008	02/06	09/06	16/06	23/06	30/06																																																																																																																										
Jul. 2008	04/07	07/07	14/07	21/07	28/07																																																																																																																										
Aug. 2008	04/08	11/08	18/08	22/08	25/08																																																																																																																										

¹⁴ The PDD (version 7) and AM0002 (version 1) monitoring methodology do not specify any calibration frequency for the installed CH₄/O₂ content gas analyzer unit, neither does the equipment manufacturer. The every 2 weeks (14-days) calibration interval adopted by BATTRE was selected by taking into consideration BATTRE's experience with the equipment and also by performing a benchmarking with other similar LFG collection and destruction/utilization projects under the CDM hosted in Brazil (which uses similar equipment for measuring CH₄ content of collected LFG).

	Sep. 2008	01/09	08/09	15/09	22/09	29/09
	Oct. 2008	06/10	13/10	20/10	27/10	
	Nov. 2008	03/11	10/11	17/11	24/11	
	Dec. 2008	01/12	08/12	15/12	22/12	29/12
	Jan. 2009	05/01	12/01	19/01	26/01	
	Feb. 2009	02/02	09/02	16/02	23/02	
	Mar. 2009	02/03	09/03	16/03	23/03	30/03
	Apr. 2009	06/04	13/04	20/04	27/04	
	May 2009	04/05	11/05	18/05	25/05	
	Jun. 2009	02/06	09/06	16/06	22/06	29/06
	Jul. 2009	06/07	13/07	20/07	27/07	
	Aug. 2009	03/08	10/08	17/08	24/08	31/08
	Sep. 2009	07/09	14/09	21/09	28/09	
	Oct. 2009	05/10	10/10	13/10	19/10	26/10
	Nov. 2009	02/11	09/11	16/11	23/11	30/11
	Dec. 2009	01/12	08/12	15/12	22/12	29/12
	Jan. 2010	04/01	07/01	11/01	19/01	25/01
	Feb. 2010	01/02	08/02	11/02	18/02	25/02
	Mar. 2010	01/03	08/03	15/03	19/03	26/03
	Apr. 2010	02/04	09/04	17/04	22/04	30/04
	May 2010	03/05	10/05	17/05	24/05	31/05
	Jun. 2010	03/06	10/06	17/06	21/06	31/06
	Jul. 2010	05/07	12/07	19/07	26/07	
	Aug. 2010	02/08	09/08	16/08	23/08	26/08
	Sep. 2010	02/09	09/09	16/09	23/09	30/09
	Oct. 2010	04/10	11/10	21/10	25/10	29/10
Nov. 2010	03/11	08/11	15/11	22/11	29/11	
Dec. 2010	02/12	13/12	20/12	27/12		
Jan. 2011	04/01					
Measuring/reading/recording frequency:	The installed PLC unit receives continuous measurement signals of CH ₄ content of LFG as input data and processes the related calculations and data recording. Continuous measurement records are directly recorded every 20 seconds in a MS-Access™ database which is available in a desk computer in the project operation/control room. Moreover, the average CH ₄ content on collected LFG (CH ₄ /LFG _{actual}) has been calculated by the PLC unit on an every-hour basis and such hourly values are regularly automatically recorded/reported every hour in a MS-Excel™ emission reduction calculation spreadsheet (which is also installed in the same desk computer in the project operation/control room).					
Calculation method (if applicable):	Average value for the year encompassed by the considered monitoring period is determined as the average of all every 20-second performed measurement records of fraction of methane in collected LFG. The value is automatically calculated by the project's electronic monitoring infrastructure.					
QA/QC procedures:	All calculations and monitoring procedures as per the internal ISO 9001 / ISO 14001 certified QA/QC procedure PTO 034. The related equipment is regularly calibrated and data collection procedures are implemented as per company's ISO 9001 and ISO 14001 certified quality & environmental management system.					

Purpose of data:	Determination of baseline emissions
Additional comments:	As per AM0002 (version 1), CH ₄ /LFG _{actual} is applied for the determination of the quantity of methane flared at the baseline scenario (CH ₄ _{baseline,y}) as a function of the quantity of methane flared at the baseline scenario as established under the contractual agreement (CH ₄ _{contract,y}). It is however crucial to note that in the context of the applied more appropriate approach for determining the annual amount of methane that would be destroyed in the baseline scenario, records of CH ₄ /LFG _{actual} are not taken into account.

Data/parameter:	CH ₄ _{flared,y}
Unit	tCH ₄ (and Nm ³) ¹⁵
Description	Amount of methane flared. (Monitored quantity of methane sent to the flares for combustion)
Measured/calculated/default	In accordance both with AM0002 (version 1) and project design, CH ₄ _{flared,y} is determined as part of the operation of the project activity on the basis of (i) continuous measurements of flow of collected LFG which is sent to the high temperature enclosed flares and (ii) continuous measurements of fraction of methane in the collected LFG. The ex-ante determined value for density of methane (parameter CF) is also considered for reporting the values in tCH ₄ . Related measurements are performed by installed LFG flow meter, CH ₄ /O ₂ content gas analyzer unit, LFG pressure sensor and LFG temperature sensor.
Source of data	Measurements of LFG flow, LFG temperature, LFG pressure and CH ₄ content of collected LFG are all performed in the main LFG pipeline between the blowers and the enclosed flares.
Value(s) of monitored parameter	94,953 tCH ₄ (for the whole monitoring period from 01/01/2007 to 31/12/2010). This value corresponds to 132,468,103 Nm ³ of CH ₄ . The value of CH ₄ _{flared,y} (in Nm ³) is also reported on an every hour, daily and monthly basis (accumulated daily and monthly values) as actually presented in the emission reduction calculation spreadsheet which is enclosed to the Monitoring Report. For sake of completeness, hourly, accumulated daily and monthly values of CH ₄ _{flared,y} are also reported in tCH ₄ (by multiplying reported values in Nm ³ by the ex-ante determined values of density of methane (parameter CF = 0.0007168 tCH ₄ / m ³ CH ₄ STP).

¹⁵ While as per AM0002 (version 1), the accumulated value of the monitoring parameter CH₄_{flared,y} is to be reported in tCH₄, the calculation procedure for baseline emissions in both the PDD (version 7) and AM0002 (version 1) requires the accumulated value of the monitoring parameter CH₄_{flared,y} to be accounted in Nm³ of CH₄. Due to that, values are to be reported in both units (by considering the ex-ante determined value of CH₄ density (parameter CF).

Monitoring equipment	<i>Installed LFG flow meter set:</i> The installed flow meter set include 2 main components: • an annular element (differential pressure measurement device which is installed inside the LFG pipeline) • a data converter/transmitter which is coupled to the annubar element. BATTRE's internal instrument/equipment ID reference: • Data converter/transmitter: FT001 • Annubar element: FE001 Manufacturer: • The data converter/transmitter is manufactured by SMAR Equipamentos Ind. Ltda. • The annubar element is manufactured by Digimat Montagem e Instrumentação Ltda. Model: • Data converter/transmitter: LD301 • Annubar element: Sonda 6 Accuracy: • Data converter/transmitter: $\pm 0.075\%$ • Annubar element: $\pm 2\%$ Serial number (S/N): • Data converter/transmitter: u205518 • Annubar element: There is no S/N or batch number for the installed annubar element. Calibration frequency and/or maintenance requirements ¹⁶: • Data converter/transmitter: calibration is to be performed yearly (as recommended by the equipment manufacturer). No calibration requirements are specified in the monitoring plan of the PDD or AM0002 (version 1). • Annubar element: no regular calibration is required for the annubar element as per declaration of the equipment manufacturer. Anyhow the manufacturer of the annubar element recommends a dimensional checking (metrology analysis) in the element every 5 years in order to confirm the dimensional integrity of the instrument (this is a required condition for its proper functioning). No calibration requirements are specified in the monitoring plan of the PDD or AM0002 (version 1) either. Calibration events valid for the monitoring period from 01/01/2007 to 31/12/2010: • Data converter/transmitter: Calibration events performed on 13/12/2005, 05/05/2009 and 03/05/2010 • Annubar element: No calibration event was performed in the annubar element. Anyhow, as required by the instrument manufacturer, a proper dimensional checking (metrology analysis) was performed on in the FE001 annubar component (which was connected to the transmitters FT001 or FT0002). A certificate of dimensional checking (of no. 10.103.2.281) was issued by the independent testing company Works Serviços Ltda. (certificate dated 03/01/2011). As
----------------------	--

¹⁶ The calibration frequencies adopted for the installed LFG flow meter, LFG pressure sensor and LFG temperature sensor are as per the recommendations of related equipment/instrument manufacturers. The PDD and AM0002 methodology do not specify any frequency for the calibration of such equipment/instruments. Moreover, the PDD and AM0002 methodology do not specify any accuracy or other specification requirement for such instruments/equipment either.

outlined in the certificate, results of the performed metrology analysis confirm proper functioning of the annubar element. The adopted testing procedure is common practice in terms of maintenance, checking for this type of measuring instrument.

Non-compliance with calibration frequency: There was a relative delay on performing the calibration event for the data converter/transmitter FT001. The next calibration event after the calibration event dated 13/12/2005 was supposed to be performed on 12/12/2006. However, the next calibration event was performed on 05/05/2009. By following applicable guidance of the UNFCCC's "Clean development mechanism validation and verification standard", a conservative deduction factor of +0.75% (equivalent to the equipment's accuracy) was applied to daily calculated values for CH₄ flared, y during the period from 01/01/2007 to 05/05/2009.

The application of such conservative deduction factor is further outlined in the emission reduction calculation spreadsheet.

Installed LFG Pressure sensor:

The utilized pressure sensor incorporates the measurement element and the data transmitter in a single unit.

BATTRE's internal instrument/equipment ID reference:

- PT002

Manufacturer:

- SMAR Equipamentos Ind. Ltda.

Model:

- LD301

Accuracy:

- $\pm 0.075\%$

Serial number (S/N):

- u194121

Calibration frequency:

- The available LFG pressure sensor is to be calibrated yearly (as recommended by the instrument manufacturer). No calibration requirements are specified in the monitoring plan of the PDD or AM0002 (version 1).

Calibration events valid for the monitoring period from 01/01/2007 to 31/12/2010:

- calibration events performed on 11/02/2006, 26/01/2007, 16/06/2007, 08/06/2008, 05/05/2009 and 03/05/2010

Installed LFG Temperature sensor:

The installed LFG temperature sensor set includes 2 main components: a sensor element and a data transmitter which is connected to the sensor element.

BATTRE's internal instrument/equipment ID reference:

- TT001 (data transmitter) and TE001 (sensor element)

Serial number (S/N):

- TT001 (data transmitter) - S/N: 30938
- TE001 (sensor element) – there is no S/N or batch number

	Manufacturer: - The transmitter TT001 was manufactured by SMAR Equipamentos Ind. Ltda. - The sensor element TE001 was manufactured by IOPE – Instrumentos de Precisão Ltda. Model: - Transmitter: TW-PT (TT301) - Sensor element: PT-100 Accuracy: ± 2 % for the sensor element and transmitter set. The data transmitter has a nameplate accuracy of $\pm 0.075\%$ Calibration frequency: - Both the transmitter and the sensor element are to be calibrated yearly (as established by the instrument manufacturer). No calibration frequency requirements are specified in the monitoring plan of the PDD or AM0002 (version 1). Date of the calibration events valid for the monitoring period: - TT001 - calibration events performed on 08/06/2006, 10/05/2007, 28/01/2008, 24/11/2008, 24/09/2009 and 03/05/2010 - TE 001 – calibration events performed on 30/05/2006, 10/05/2007, 28/01/2008, 24/11/2008, 24/09/2009 and 03/05/2010 <i>Installed infrared CH₄/O₂ content gas analyzer unit:</i> Details about the installed CH₄/O₂ content gas analyzer unit are indicated in the table for the monitoring parameter CH₄/LFG_{actual}.
Measuring/reading/recording frequency:	The installed PLC unit receives continuous measurement signals of LFG Flow, LFG Pressure, LFG Temperature and CH₄ content of LFG as input data and processes the related calculations and data recording. Continuous measurement records are directly recorded every 20 seconds in a MS-Access™ database which is available in a desk computer in the project operation/control room. Moreover, the amount of CH₄ flared (CH_{4,flared,y}) has been calculated by the PLC unit on an every-hour basis and such hourly values are regularly automatically recorded/reported every hour in a MS-Excel™ emission reduction calculation spreadsheet (which is also installed in the same desk computer in the project operation/control room).
Calculation method (if applicable):	Continuous measurements of (i) flow of collected LFG which is sent to the installed high temperature enclosed flares and continuous measurements of (ii) fraction of methane in the collected LFG are performed with appropriate measurement equipment (LFG flow meter, LFG temperature sensor, LFG pressure sensor and continuous CH₄ content gas analyser unit). Measurement records are used for the determination of hourly values of CH_{4,flared,y}. As further substantiated in Section E.1, the reported value includes the application of conservative deduction factor (applied for the calculation of daily values for the parameter CH_{4,flared,y}) due to the results/delays for calibration events for the installed LFG flow meter (transmitter unit) and CH₄/O₂ content gas analyzer unit.
QA/QC procedures:	All calculations and monitoring procedures as per the internal ISO 9001 / ISO 14001 certified QA/QC procedure PTO 034. The related equipment is regularly calibrated and data collection procedures are implemented as per company's ISO 9001 and ISO 14001 certified quality

	& environmental management system. Records of flare working hours are applied as a cross-checking.
Purpose of data:	Determination of baseline emissions
Additional comments:	By taking into consideration ex-ante defined values for the parameters CF (density of methane), the calculated values of $CH_4_{\text{flared},y}$ are also reported in tCH_4 .

Data/parameter:	$CH_4_{\text{contract},y}$																
Unit	Nm^3 (and tCH_4) ¹⁷																
Description	Contractual amount of methane flaring required in baseline																
Measured/calculated/default	Annual values of $CH_4_{\text{contract},y}$ are defined by the Administration of the Municipality of Salvador (municipal authority)																
Source of data	As established by AM0002 (version 1), $CH_4_{\text{contract},y}$ is the quantity of methane required to be flared in the absence of the project activity as per the contract requirements. The monitoring parameter $CH_4_{\text{contract},y}$ is actually equal to the Quantity of methane that would be flared in the absence of the project activity in the baseline scenario ($CH_4_{\text{baseline},y}$). $CH_4_{\text{baseline},y}$ represents the quantity of methane required to be flared in the absence of the project activity as established and monitored as per contractual requirements/agreement between the Administration of the Municipality of Salvador and BATTRE.																
Value(s) of monitored parameter	The following annual values are applied for the 1st 7-year renewable crediting period : <table border="1"> <thead> <tr> <th>Year</th><th>Value for $CH_4_{\text{contract},y}$ (Nm^3)</th></tr> </thead> <tbody> <tr><td>2004</td><td>1,623,789</td></tr> <tr><td>2005</td><td>1,971,601</td></tr> <tr><td>2006</td><td>2,349,427</td></tr> <tr><td>2007</td><td>1,890,050</td></tr> <tr><td>2008</td><td>2,064,097</td></tr> <tr><td>2009</td><td>1,790,928</td></tr> <tr><td>2010</td><td>1,533,000</td></tr> </tbody> </table> For the monitoring period from 01/01/2007 to 31/12/2010, $CH_4_{\text{contract},y}$ is thus reported as 7,278,075 Nm^3 (5,217 tCH_4).	Year	Value for $CH_4_{\text{contract},y}$ (Nm^3)	2004	1,623,789	2005	1,971,601	2006	2,349,427	2007	1,890,050	2008	2,064,097	2009	1,790,928	2010	1,533,000
Year	Value for $CH_4_{\text{contract},y}$ (Nm^3)																
2004	1,623,789																
2005	1,971,601																
2006	2,349,427																
2007	1,890,050																
2008	2,064,097																
2009	1,790,928																
2010	1,533,000																

¹⁷ While as per AM0002 (version 1), the value of the monitoring parameter $CH_4_{\text{contract},y}$ is to be reported in tCH_4 , the calculation procedure for baseline emissions in both the PDD and AM0002 (version 1) requires the value of the monitoring parameter $CH_4_{\text{contract},y}$ and calculation parameter $CH_4_{\text{baseline},y}$ to be both accounted in Nm^3 of CH_4 . Due to that the monitored values for $CH_4_{\text{contract},y}$ and the calculated value for $CH_4_{\text{baseline},y}$ are to be presented in both units (by considering the ex-ante determined value of CH_4 density (parameter CF)).

Monitoring equipment	As per the PDD, the value of CH ₄ _{contract,y} for every year is defined by the Administration of the Municipality of Salvador.
Measuring/reading/recording frequency:	Annually.
Calculation method (if applicable):	The values of CH₄_{contract,y} for years 2007, 2008, 2009 and 2010 were defined by the Administration of the Municipality of Salvador (in Nm³) as confirmed in the official communication dated 20/08/2010. The defined annual values take into account projections/assumptions of the amount/share of actually generated LFG (with the verified conditions in terms of methane content) that as per would technically be possible to collect/destroy using a “best practice” passive LFG flaring/venting system in the absence of the project. As earlier defined in the baseline determination for the project activity, it is assumed that a passive LFG flaring/venting system would be available in the absence of the project as a protective measure (e.g. security and sanitary reasons) in order to reduce the risk of explosion, landslides caused by destabilization and hazardous concentration of toxic gas. This is in accordance with AM0002 (version 1). As more recently outlined in the official communication issued by the Administration of the Municipality of Salvador, the findings from an independent technical study/evaluation also recently published by Companhia Ambiental do Estado de São Paulo (CETESB) (Environmental Agency for São Paulo State in Brazil) were taken into consideration by the technical staff from the Administration of the Municipality of Salvador for defining the set of annual values for the parameter CH₄_{contract,y} which are valid for years from 2005 to 2010. This independent technical evaluation¹⁸ (currently published at the website of CETESB) has encompassed a detailed theoretical/hypothetical analytical analysis of the potential of emission reductions of LFG by the use of passive LFG flare/venting systems (as a function of LFG generation) in a selected group of 35 landfills in Brazil (including the AMC landfill in Salvador). By taking defining the maximum amount/share of all generated LFG that would technically be possible to be collected/destroyed by using a “best practice” and realistic passive LFG flaring/venting system (considering the common practice in terms of design and operation of best practicing passive LFG flaring/venting systems in well managed landfills in Brazil), the results of the independent study was used as a basis used as the selected value for the parameter CH₄_{contract,y} by the Administration of the Municipality of Salvador. This evaluation approach is in accordance with the following applicable requirements of AM0002: • “(...) the stipulated amount of landfill gas to be flared (in the absence of the project) reflects performance among the top 20% in the previous five years for landfills operating under similar social, economic, environmental and technological circumstances.” • “the amount of landfill gas to be collected and flared under the terms of the contract meets or exceeds any regulatory requirements” Currently there are still no regional regulations (valid in the State of Bahia) or national regulations (applicable in the whole country of Brazil) requiring LFG to be collected and destroyed/utilized. Both the results of the independent study as well as the defined value of by the Administration of the Municipality

¹⁸ “Magalhães, G.HC.; Alves, J.W.S.; Santo Filho, F.; Kelson, M. Reducing the uncertainty of methane recovered (R) in greenhouse gas inventories from waste sector and of adjustment factor (AF) in landfill gas projects under the Clean Development Mechanism. Paper issued on 27 May 2010” (webhosted at the CETESB website: http://www.cetesb.sp.gov.br/userfiles/file/mudancasclimaticas/biogas/file/docs/artigos_dissertacoes/magalhaes_alves_santofilho_costa_kelson.pdf)

	of Salvador thus reflect practices in landfills in Brazil, thus beyond (in quantitative values) any Brazilian legal requirement.
QA/QC procedures:	-
Purpose of data:	Determination of baseline emissions.
Additional comments:	Contractual amount of methane flaring required in baseline adjusted by amount of waste received and actual methane content of the landfill gas ($CH_4^{\text{baseline},y}$) is demonstrated to be equal to $CH_4^{\text{contract},y}$.

Data/parameter:	FE
Unit	%
Description	Flare efficiency
Measured/calculated/default	FE is determined <i>inter-alia</i> on the basis of measurements of the amount of residual methane content in the exhaust gas of the flare, which are performed at least 4 times per year by a third party independent inspection service company. The operational status of the flare (which is also considered in the context of the determination of adopted FE values for every minute of the considered monitoring period) is also determined based on continuous monitoring of the temperature of exhaust gas of the flares (T_{flare}).
Source of data	Related measurements and calculations applicable for the determination of periodical values for FE were performed by the third party independent inspection service company "ERM do Brasil Ltda." As part of each FE determination event, the efficiency of the flares (FE) was determined on basis of the following: - measurements of residual concentration of methane in collected samples of the exhaust gas of the flares. - out flow of exhaust gas in the flare being evaluated - inflow of methane in the flare being evaluated

Value(s) of monitored parameter	As a conservative approach, FE is determined for the whole monitoring period from 01/01/2007 to 31/12/2010 as the lowest calculated value on all the twenty performed flare efficiency tests which are applicable to the considered monitoring period. A maximum and a minimum value for FE were determined for each flare as part of each performed test events. During the considered monitoring period, 20 sets of measurement + calculation events were performed as summarized below. <table border="1"> <thead> <tr> <th>Test Number</th><th>Date of performed test section</th></tr> </thead> <tbody> <tr><td>1st FE periodic test</td><td>27/12/2006</td></tr> <tr><td>2nd FE periodic test</td><td>13/03/2007</td></tr> <tr><td>3rd FE periodic test</td><td>09/06/2007</td></tr> <tr><td>4th FE periodic test</td><td>30/08/2007</td></tr> <tr><td>5th FE periodic test</td><td>22/11/2007</td></tr> <tr><td>6th FE periodic test</td><td>05/02/2008</td></tr> <tr><td>7th FE periodic test</td><td>28/04/2008</td></tr> <tr><td>8th FE periodic test</td><td>17/07/2008</td></tr> <tr><td>9th FE periodic test</td><td>02/09/2008</td></tr> <tr><td>10th FE periodic test</td><td>27/11/2008</td></tr> <tr><td>11th FE periodic test</td><td>26/02/2009</td></tr> <tr><td>12th FE periodic test</td><td>20/05/2009</td></tr> <tr><td>13th FE periodic test</td><td>13/08/2009</td></tr> <tr><td>14th FE periodic test</td><td>09/10/2009</td></tr> <tr><td>15th FE periodic test</td><td>18/12/2009</td></tr> <tr><td>16th FE periodic test</td><td>26/01/2010</td></tr> <tr><td>17th FE periodic test</td><td>12/04/2010</td></tr> <tr><td>18th FE periodic test</td><td>09/07/2010</td></tr> <tr><td>19th FE periodic test</td><td>07/10/2010</td></tr> <tr><td>20th FE periodic test</td><td>05/01/2011</td></tr> </tbody> </table> The lowest determined value of FE (99.96149%) is applied in the calculation of the parameter MD_{project,y} during the whole monitoring period from 01/01/2007 to 31/12/2010.	Test Number	Date of performed test section	1 st FE periodic test	27/12/2006	2 nd FE periodic test	13/03/2007	3 rd FE periodic test	09/06/2007	4 th FE periodic test	30/08/2007	5 th FE periodic test	22/11/2007	6 th FE periodic test	05/02/2008	7 th FE periodic test	28/04/2008	8 th FE periodic test	17/07/2008	9 th FE periodic test	02/09/2008	10 th FE periodic test	27/11/2008	11 th FE periodic test	26/02/2009	12 th FE periodic test	20/05/2009	13 th FE periodic test	13/08/2009	14 th FE periodic test	09/10/2009	15 th FE periodic test	18/12/2009	16 th FE periodic test	26/01/2010	17 th FE periodic test	12/04/2010	18 th FE periodic test	09/07/2010	19 th FE periodic test	07/10/2010	20 th FE periodic test	05/01/2011
Test Number	Date of performed test section																																										
1 st FE periodic test	27/12/2006																																										
2 nd FE periodic test	13/03/2007																																										
3 rd FE periodic test	09/06/2007																																										
4 th FE periodic test	30/08/2007																																										
5 th FE periodic test	22/11/2007																																										
6 th FE periodic test	05/02/2008																																										
7 th FE periodic test	28/04/2008																																										
8 th FE periodic test	17/07/2008																																										
9 th FE periodic test	02/09/2008																																										
10 th FE periodic test	27/11/2008																																										
11 th FE periodic test	26/02/2009																																										
12 th FE periodic test	20/05/2009																																										
13 th FE periodic test	13/08/2009																																										
14 th FE periodic test	09/10/2009																																										
15 th FE periodic test	18/12/2009																																										
16 th FE periodic test	26/01/2010																																										
17 th FE periodic test	12/04/2010																																										
18 th FE periodic test	09/07/2010																																										
19 th FE periodic test	07/10/2010																																										
20 th FE periodic test	05/01/2011																																										
Monitoring equipment	As per information made available in the test/evaluation technical reports issued by the third party independent inspection service company “ERM do Brasil Ltda.”, the measurements of residual methane in the flare were performed by using a gas analyzer manufactured by FID / California Analytical Instruments (CAI), model 300 M. The methodology applied in the analysis is as per the Method 3 – “Gas Analysis for Carbon Dioxide, Oxygen, Excess Air and Dry Molecular Weight”, Method 4 - “Determination of Moisture in Stack Gases”, Method 25A – “Determination of Total Gaseous Organic Concentration Using a Flame Ionization Analyzer”. All these methods are from the US EPA – United States Environmental Protection Agency. For determining the speed of exhaust gas flow in the flare (in order to calculate the flow of outgoing exhaust gas of the flare), an appropriate Pitot tube was used.																																										
Measuring/reading/recording frequency:	In accordance with AM0002 (version 1), measurements and calculations for the determination of FE values are to be performed 4 times per year.																																										

Calculation method (if applicable):	See Section E.1.
QA/QC procedures:	-
Purpose of data:	Calculation of baseline emissions.
Additional comments:	-

Data/parameter:	EC_{grid,y}
Unit	MWh
Description	Amount of grid electricity consumed by the project activity during the year y
Measured/calculated/default	As per the monitoring plan of the PDD, this parameter is to be measured by project participants by using electricity meters. However, due to the lack of properly working electricity meters, consumption of grid-sourced electricity is estimated in a conservative manner by assuming that all installed electrical equipment as part of the project activity have operated 24 hours a day at 100% load during the whole monitoring period.
Source of data	Technical description and specifications of electrical equipment installed as part of the project activity
Value(s) of monitored parameter	7,569 MWh (1,892 MWh for each year of the considered monitoring period)
Monitoring equipment	Not applicable.
Measuring/reading/recording frequency:	Not applicable.
Calculation method (if applicable):	Due the high incidence of thunders in the region of the project site, the electricity meter installed at the project site has unfortunately presented malfunction during the time it was under operation along the crediting period (from 12/03/2004 to 31/12/2010). This electricity meter was finally replaced on 01/01/2011, thus after the end of the 1 st 7-year renewable crediting period. In order to address the relative non-reliability of performed measurements of grid electricity consumption, the determination of the EC _{grid,y} was performed by taking into account the nameplate installed power output of the main power consuming equipment (3 existing blowers + an assumed 10 kW (as the needed power for the administration facility incl. office equipment such as air conditioner, lighting, computers, etc...)) as a conservative measure. In the context of such conservative calculation approach, it is also assumed that all power consuming equipment/devices have operated under full power 24-hour a day during the whole monitoring period (4 years). That accounts to a grid electricity consumption of 7,569 MWh during the whole monitoring period from 01/01/2007 to 31/12/2010. The name plate power output of the installed blowers are 125 HP (94 kW), 75 HP (56 kW) and 75 HP (56 kW).
QA/QC procedures:	-
Purpose of data:	Determination of leakage emissions (due to the consumption of grid-sourced electricity by the project activity).

Additional comments:	For estimating the consumption of grid-sourced electricity during the monitoring period, the sum of values of nominal power output for each individual electrical equipment installed as part of the project activity was determined as 216 kW.
----------------------	---

Data/parameter:	EF_{EL,grid,y}
Unit	tCO ₂ /MWh
Description	Emission factor for grid electricity generation in year y
Measured/calculated/default	The applicable default value as per the “Tool to calculate baseline, project and/or leakage emissions from electricity consumption” is applied for the monitoring period from 01/01/2007 to 31/12/2010.
Source of data	Default value as per the “Tool to calculate baseline, project and/or leakage emissions from electricity consumption”.
Value(s) of monitored parameter	1.3 tCO ₂ /MWh
Monitoring equipment	Not applicable.
Measuring/reading/recording frequency:	Not applicable.
Calculation method (if applicable):	Conservative default value as per the “Tool to calculate baseline, project and/or leakage emissions from electricity consumption”
QA/QC procedures:	-
Purpose of data:	Determination of leakage emissions (due to the consumption of grid-sourced electricity by the project activity)
Additional comments:	-

Data/parameter:	FC_{LPG,y}
Unit	ton of LPG
Description	Quantity of LPG consumed by the project activity
Measured/calculated/default	During the considered monitoring period, LPG has been delivered to the project site by trucks of a local LPG distributor loaded with LPG (in bulk). An existent LPG tank has been filled directly by the trucks loaded with LPG in bulk. As a monitoring procedure, all trucks delivering LPG were weighted in the entrance of the landfill and also weighted in the exit of the landfill (after unloading the amount of LPG in bulk sold to BATTRE). The trucks were weighted by the same bridge scales used for weighting the amount of MSW disposed in the AMC landfill.

Source of data	Quantity of LPG consumed by the project activity was measured by the same bridge scales used for weighting the amount of MSW disposed in the AMC landfill										
Value(s) of monitored parameter	As per the adopted monitoring procedure, the amount of LPG consumed by the project activity during the monitoring period from 01/01/2007 to 31/12/2010 is summarized as follows: <table border="1"> <thead> <tr> <th>Year</th><th>Amount of LPG consumed by the project activity (ton of LPG)</th></tr> </thead> <tbody> <tr> <td>2007</td><td>0.310</td></tr> <tr> <td>2008</td><td>0.120</td></tr> <tr> <td>2009</td><td>0.270</td></tr> <tr> <td>2010</td><td>0.270</td></tr> </tbody> </table> Thus, for the monitoring period from 01/01/2007 to 31/12/2010, $FC_{LPG,y} = 0.970 \text{ ton}_{LPG}$. LPG was consumed for lighting/igniting the flares (flare pilot). Some reduced share of consumed LPG corresponds to LPG consumption at the employees' kitchen facility of AMC landfill.	Year	Amount of LPG consumed by the project activity (ton of LPG)	2007	0.310	2008	0.120	2009	0.270	2010	0.270
Year	Amount of LPG consumed by the project activity (ton of LPG)										
2007	0.310										
2008	0.120										
2009	0.270										
2010	0.270										
Monitoring equipment	The details of the weight bridges used to measure the amount of LPG delivered to the project activity are included in the table with monitoring details for the parameter $WASTE_{actual}$.										
Measuring/reading/recording frequency:	Measurements of quantity of LPG by the project activity are performed at every LPG delivery event and records are reported at the end of every month in a customized form with records of LPG delivered to the project activity.										
Calculation method (if applicable):	Measurements using weight bridge scales										
QA/QC procedures:	The amount consumed LPG consumed is cross-checked with internal records of cost expenditures for fuel LPG as per the internal financial/accounting management system of BATTRE.										
Purpose of data:	Determination of leakage emissions (due to the consumption of fossil fuel LPG by the project activity)										
Additional comments:	-										

Data/parameter:	$NCV_{LPG,y}$
Unit	GJ/ton
Description	Net calorific value for fossil fuel LPG
Measured/calculated/default	Default value

Source of data	Selected as per option c) of the “Tool to calculate project or leakage CO ₂ emissions from fossil fuel combustion”: “Regional or national default values” For the current monitoring period, the adopted value for NCV _{LPG,y} is selected as per the Brazilian Energetic Balance Report, year 2010. Available online: https://ben.epe.gov.br/BENRelatorioFinal.aspx?anoColeta=2010&anoFimColeta=2009
Value(s) of monitored parameter	0.0000465 GJ/ton
Monitoring equipment	Not applicable.
Measuring/reading/recording frequency:	Not applicable.
Calculation method (if applicable):	Not applicable.
QA/QC procedures:	Not applicable.
Purpose of data:	Determination of leakage emissions (due to the consumption of fossil fuel LPG by the project activity).
Additional comments:	-

Data/parameter:	EF_{CO₂,LPG,y}
Unit	tCO ₂ /GJ LPG
Description	CO ₂ emission factor for fossil fuel LPG.
Measured/calculated/default	Default value.
Source of data	The applicable conservative default value as established by the “Tool to calculate baseline, project and/or leakage emissions from fossil fuel combustion” is selected.
Value(s) of monitored parameter	65,600 tCO ₂ /GJ (as per IPCC 2006 volume 2 chapter 1)
Monitoring equipment	Not applicable.
Measuring/reading/recording frequency:	Not applicable.
Calculation method (if applicable):	Not applicable.
QA/QC procedures:	Not applicable.
Purpose of data:	Determination of leakage emissions (due to the consumption of fossil fuel LPG by the project activity).
Additional comments:	-

The following monitoring parameters (which are also included in the monitoring plan of the registered PDD) were not monitored as the methodological options for which they are applicable were not selected as the monitoring or calculation approaches for the determination of the monitoring parameter “*Emission factor for grid electricity generation in year y*” ($EF_{EL,grid,y}$) during the considered monitoring period:

- Operation margin CO₂ emission factor in year y = Dispatch data analysis operating margin CO₂ emission factor in year y ($EF_{grid,OM,y} = EF_{grid,OM-DD,y}$)
- Build margin CO₂ emission factor in year y ($EF_{grid,BM,y}$)

D.3. Implementation of sampling plan

>>

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 established by the PDD and also in accordance with AM0002 (version 1), baseline emissions (ER_y) are calculated as follows:

$$ER_y = (ER_{CH4_y} * CF * GWP_{CH4})$$

Where:

CF Conversion factor density. CF is ex-ante determined as 0.0007168 ton CH₄/m³ CH₄

GWP_{CH4} Global Warming Potential (GWP) of methane. GWP_{CH4} is ex-ante determined as 21 tCO₂e/ tCH₄ (default value)

ER_{CH4_y} Methane emission reduction (in m³ of CH₄), where:

$$ER_{CH4_y} = (CH4_{flared,y} * FE) - CH4_{baseline,y}$$

Where:

CH_{4baseline,y} Quantity of methane that would be flared in the absence of the project activity in baseline scenario (as adjusted with eventual differences of quantity of disposed MSW and methane content) (in m³ of CH₄). As per the monitoring and calculation approach applied by the project activity, CH_{4baseline,y} is determined as follows:

$$CH4_{baseline,y} = CH4_{contract,y}$$

Where:

CH_{4contract,y} Quantity of methane that would be flared in the absence of the project activity in baseline scenario as defined by the contractual

requirements set between BATTRE and the Administration of the Municipality of Salvador. The following annual values were defined by municipality of Salvador:

Year	CH _{4,contract,y} (tCH ₄)	CH _{4,contract,y} (Nm ³ CH ₄)
2007	1,355	1,890,050
2008	1,480	2,064,097
2009	1,284	1,790,928
2010	1,099	1,533,000

Thus, as defined by Administration of the Municipality of Salvador, CH_{4,contract,y} is reported as 2,349,427 Nm³ for the whole considered monitoring period. Monitoring details for CH_{4,contract,y} are presented in Section D.2.

CH_{4,flared,y} Quantity of methane actually flared (in m³ of CH₄). In accordance with both AM0002 (version 1) and the project design, CH_{4,flared,y} is determined as part of the operation of the project activity on the basis of (i) continuous measurements of flow of collected LFG which is sent to the high temperature enclosed flares and (ii) continuous measurements of fraction of methane in the collected LFG. The ex-ante determined value for density of methane (parameter CF) is also considered for also reporting values for CH_{4,flared,y} in tCH₄

FE Flare efficiency.

Consideration of ex-post determined value(s) for methane combustion efficiency of the flares (FE) for the calculation of ER CH_{4,y}

AM0002 (version 1) explicitly establishes that “the methane content of the flare emissions will be analyzed quarterly” (...) “lab analysis 4 times/year”. While this is not indeed reflected in the formulae for calculating ER_CH_{4,y} as presented in AM0002 (version 1), the total volume of methane collected and destroyed in the flares (CH_{4,flared}) is thus adjusted by also considering the monitored value of FE.

Determination of FE value:

In order to determine the FE value applicable for the monitoring period from 01/01/2007 to 31/12/2010¹⁹, BATTRE has hired the third part company “ERM do Brasil Ltda.” (specialized in emission measurements and air pollution inspections) to periodically perform the following tasks:

- (a) measurements of residual concentration of methane in sample the exhaust gas of the flares (wCH_{4,residual-2-hour,n,f})
- (b) perform the determination of flow of exhaust gas in the flares (Flow_Exhaust_Gas_flare_{2-hours,n,f})
- (c) perform the calculations of values of FE based on (a), (b)²⁰

¹⁹ As further described in Section D.2, as a conservative approach, FE is determined for the whole monitoring period from 01/01/2007 to 31/12/2010 as the lowest calculated value on all the performed valid flare efficiency tests.

In accordance with AM0002 (version 1) requirement, the test/evaluation is performed at least 4 times per year (every 3 months).

As per information available in the seven flare efficiency analysis reports issued by the inspection services company “ERM do Brasil Ltda.” which are valid for the considered monitoring period, the lowest and highest measurements of residual CH₄ concentration in collected sample of exhaust gas of each flare (during a pre-defined 2-hour period) (Min._wCH₄_{residual-2-hour,n,f} and Max._wCH₄_{residual-2-hour,n,f}) were performed using a gas analyzer FID / California Analytical Instruments (CAI), model 300 M.

For each flare evaluation/test, the minimum and maximum values of Methane combustion efficiency (FE) for each flare were determined/calculated as follows:

$$\text{Min.}_{FE_{n,f}} = 1 - (\text{Max.}_{CH_4_{\text{residual},n,f}} / \text{Average-CH}_4_{\text{Flared-2hour},n,f})$$

$$\text{Max.}_{FE_{n,f}} = 1 - (\text{Min.}_{CH_4_{\text{residual},n,f}} / \text{Average-CH}_4_{\text{Flared-2hour},n,f})$$

(Min._FE_{n,f} is the lowest calculated value for FE_{n,f} and Max._FE_{n,f} is the highest calculated value for FE_{n,f})

Where:

n Number of evaluation. Seven performed evaluations are valid for the considered monitoring period (n = 1,2,3,...,20).

f Flare number (f = 1,2 and 3).

Average-CH₄_{Flared-2hour,n,f} Average flow of methane sent to the flare (which was being tested) during a selected 2-hour period (in kg CH₄/h). The 2-hour period is the same time period of which measurements of wCH₄_{residual-2-hour,n,f} were performed. As per the calculation method adopted by “ERM do Brasil Ltda.”, records for the monitoring parameter “Amount of methane flared” (CH₄_{flared,y}) were considered. As further explained in Section D.2, hourly values of CH₄_{flared,y} are automatically calculated (in Nm³ CH₄ and tCH₄) by the installed PLC unit every hour on the basis of every 20-seconds monitoring records of continuous measurements of:

- LFG flow (converted to standard conditions using LFG temperature and LFG pressure records)
- CH₄ content in the collected LFG.

Min._CH₄_{residual-2-hour,n,f} Minimum of residual flow of methane in the exhaust gas of the flare under evaluation during a selected 2-hour period (in kg CH₄/h).

Max._CH₄_{residual-2-hour,n,f} Maximum of residual flow of methane in the exhaust gas of the flare under evaluation during a selected 2-hour period (in kg CH₄/h).

Min._CH₄_{residual-2-hour,n,f} and Max._CH₄_{residual-2-hour,n,f} are determined as follows:

$$\text{Min.}_{CH_4_{\text{residual-2-hour},n,f}} = \text{Flow_Exhaust_Gas_flare}_{2\text{-hour},n,f} * \text{Min.}_{wCH_4_{\text{residual-2-hour},n,f}} * CF$$

$$\text{Max.}_{CH_4_{\text{residual-2-hour},n,f}} = \text{Flow_Exhaust_Gas_flare}_{2\text{-hour},n,f} * \text{Max.}_{wCH_4_{\text{residual-2-hour},n,f}} * CF$$

Where:

²⁰ The monitoring plan of the PDD (version 7) does not include any reference about how to perform the related measurement and how to actually calculate the values of FE. AM0002 (version 1) merely establishes that “the methane content of the flare emissions will be analyzed quarterly”.

CF

Density of CH₄

Flow_Exhaust_Gas_flare_{2-hour,n,f} Determined accumulated flow of exhaust gas of the flare f (in Nm³ exhaust gas/h).

Min._wCH_{4residual-2-hour,n,f} Minimum measurement of residual CH₄ concentration in the exhaust gas of the flare f (in ppm CH₄)

Max._wCH_{4residual-2-hour,n,f} Maximum measurement of residual CH₄ concentration in the exhaust gas of the flare f (in ppm CH₄)

Min._wCH_{4residual-2-hour,n,f} and Max._wCH_{4residual-2-hour,n,f} are determined based on performed measurements using a gas analyzer FID / California Analytical Instruments (CAI), model 300 M (in ppm CH₄). During the 2-hour selected period, a set of 25 measurements of residual CH₄ concentration in the exhaust gas of each flare were performed for each one of the seven performed tests/evaluations.

As indicated in the technical testing reports issued by “ERM do Brasil Ltda.”, the resulted calculated values of Min_FE_{n,f} and Max_FE_{n,f} for each one of the seven third-party evaluation/tests are as follow:

Date	n	Flare number (f)	Min._FE _{n,f} (%)	Max._FE _{n,f} (%)
27/12/2006	1	1	99.98598%	99.99843%
		2	99.98479%	99.99754%
		3	99.96643%	99.99675%
13/03/2007	2	1	99.99813%	99.99947%
		2	99.99711%	99.99868%
		3	99.99663%	99.99738%
09/06/2007	3	1	99.99861%	99.99980%
		2	99.99695%	99.99927%
		3	99.99638%	99.99962%
30/08/2007	4	1	99.99670%	99.99913%
		2	99.99478%	99.99869%
		3	99.98956%	99.99956%
22/11/2007	5	1	99.97414%	99.99419%
		2	99.99645%	99.99743%
		3	99.99822%	99.99985%
05/02/2008	6	1	99.96149%	99.99243%
		2	99.99126%	99.99961%
		3	99.99178%	99.99781%
28/04/2008	7	1	99.99546%	99.99911%
		2	99.99105%	99.99750%
		3	99.99289%	99.99930%
17/07/2008	8	1	99.99746%	99.99878%
		2	99.99758%	99.99975%
		3	99.99348%	99.99879%
02/09/2008	9	1	99.99711%	99.99970%
		2	99.99489%	99.99799%
		3	99.99561%	99.99913%
27/11/2008	10	1	99.97212%	99.99452%

		2	99.99330%	99.99741%
		3	99.99668%	99.99911%
26/02/2009	11	1	99.98830%	99.99723%
		2	99.99310%	99.99823%
		3	99.99901%	99.99985%
20/05/2009	12	1	99.99168%	99.99848%
		2	99.98401%	99.99613%
		3	99.99434%	99.99803%
13/08/2009	13	1	99.99706%	99.99961%
		2	99.99491%	99.99829%
		3	99.99665%	99.99910%
09/10/2009	14	1	99.99116%	99.99877%
		2	99.99492%	99.99725%
		3	99.99737%	99.99906%
18/12/2009	15	1	99.97903%	99.99650%
		2	99.99031%	99.99727%
		3	99.99640%	99.99874%
26/01/2010	16	1	99.99469%	99.99695%
		2	99.98738%	99.99615%
		3	99.96890%	99.99415%
12/04/2010	17	1	99.99353%	99.99853%
		2	99.98203%	99.99957%
		3	99.99175%	99.99786%
09/07/2010	18	1	99.98854%	99.99539%
		2	99.99371%	99.99864%
		3	99.97772%	99.99459%
07/10/2010	19	1	99.99130%	99.99545%
		2	99.97928%	99.99672%
		3	99.98960%	99.99300%
05/01/2011	20	1	99.98755%	99.99348%
		2	99.97901%	99.99668%
		3	99.98732%	99.99147%

As a conservative approach, the selected value for the monitoring parameter FE valid or the whole monitoring period is determined as the lowest calculated value on all the performed flare efficiency tests. FE is thus equal to $\text{Min_FE}_{6,1} = 99.96149\%$

All the equations and calculation approaches presented above are presented in the emission reductions calculation spreadsheet, which is customized for the monitoring period in question (file titled: “*Salvador da Bahia LFG_2007_2010.Rev1*”). This spreadsheet is enclosed to the Monitoring Report.

The calculated accumulated value for methane emission reduction (ER_CH_4) is reported as 124,085,963 Nm^3 of CH_4 (88,945 t CH_4) for the monitoring period from 01/01/2007 to 31/12/2010.

By multiplying the determined value ER_CH_4 (in Nm^3 of CH_4) by the ex-ante determined values of CH_4 density (CF) and GWP_CH_4 , baseline emissions are thus calculated as 1,867,840 t CO_2e .

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

>>

Not applicable.

E.3. Calculation of leakage

>>

As established in the latest version of the PDD (version 7), GHG emissions due to consumption of grid-sourced electricity and fossil fuel (LPG) by the project activity are accounted as leakage emissions as follows:

$$LE_y = LE_{EC,grid,y} + LE_{FC,LPG,y}$$

Where:

LE_y	Total Leakage emissions in year y (in tCO ₂ /yr)
$LE_{EC,grid,y}$	Leakage emissions due to the consumption of grid electricity by the project activity in year y (in tCO ₂ /yr)
$LE_{FC,LPG,y}$	Leakage emissions due to the consumption of fossil fuel by the project activity (for purposes other than electricity generation) in year y (in tCO ₂ /yr)

Leakage emissions due to the consumption of grid-sourced electricity by the project activity in year y:

As per the latest version of the PDD (version 7), leakage emissions due to consumption of grid-sourced electricity in year y ($LE_{EC,grid,y}$) are determined by following the applicable guidance of the "Tool to calculate baseline, project and/or leakage emissions from electricity consumption" (version 01) as follows:

$$LE_{EC,grid,y} = EC_{grid,y} * EF_{EL,grid,y} * (1 + TDL_{grid,y})$$

Where:

$EC_{grid,y}$ Quantity of grid-sourced electricity consumed by the project activity in year y (in MWh). Due to an unexpected technical problem with the installed electricity meter used to measure electricity consumption by the project activity, an alternative determination approach is applied as follows:

- It was taken into account the nameplate installed power output for the main power consuming equipment for the project activity (3 existing centrifugal blowers²¹ + an assumed power of 10 kW (as the estimated required power for running the remaining equipment and project activity's administration facility incl. office equipment such as air conditioner (HVAC), lighting, computers, control equipment, etc)).
- It was assumed occurrence of continuous operation of such equipment/devices under full load (24-hour a day) during the whole monitoring period from 01/01/2007 to 31/12/2010 (4-year period).

The applied conservative approach is in accordance with applicable guidance included in the CDM Project Standard (CDM-PS). For further details about monitoring of $EC_{grid,y}$ are included in Section D.2

The application of the above-summarized conservative approach resulted in a conservative estimation of grid-sourced electricity consumption by the project activity during the considered monitoring period of 7,559 MWh (206 kW+10 kW

²¹ The nameplate power output of the blowers are 125 HP (94 kW), 75 HP (56 kW) and 75 HP (56 kW).

(administration) multiplied by 24-hour per day and 365 days per year for a period of 4 years).

$TDL_{grid,y}$ Average technical transmission and distribution losses in the National Grid of Brazil in year y . The applicable default value of 20% is adopted as per the “Tool to calculate baseline, project and/or leakage emissions from electricity consumption” (version 01).

$EF_{EL,grid,y}$ Emission factor for grid electricity generation in year y (in tCO_2/MWh). The applicable default value of 1.3 tCO_2/MWh as per the “Tool to calculate baseline, project and/or leakage emissions from electricity consumption” (version 01) is adopted.

Leakage emissions due to the consumption of grid electricity by the project activity during the monitoring period from 01/01/2007 to 31/12/2010 are thus calculated as follows:

$$LE_{EC,grid,y} = EC_{grid,y} * EF_{EL,grid,y} * (1 + 20\%) = 7,559 \text{ MWh} * 1.3 * 1.2 = 11,808 \text{ tCO}_2.$$

Leakage emissions due to the consumption of LPG by the project activity in year y :

As per the PDD (version 7), leakage emissions due to the consumption of LPG by the project activity are determined by following the applicable guidance of the “Tool to calculate project or leakage CO_2 emissions from fossil fuel combustion” (version 02) as follows:

$$LE_{FC,LPG,y} = FC_{LPG,y} * COEF_{LPG,y}$$

Where:

$FC_{LPG,y}$ Quantity of fuel LPG combusted by the project activity. As per the adopted monitoring procedure, the total amount of LPG consumed by the project activity during the considered monitoring period is reported as 0,970 kg (0.970 ton) of LPG. Thus, $FC_{LPG,y} = 0.970 \text{ ton}_{LPG}$. Additional monitoring details for $FC_{LPG,y}$ are outlined in Section D.2.

$COEF_{LPG,y}$ Conversion emissions factor for fossil fuel LPG. The Emission factor for LPG ($COEF_{LPG,y}$) is determined as the product between Net calorific value for fossil fuel LPG ($NCV_{LPG,y}$) and CO_2 emission factor for fossil fuel LPG ($EF_{CO_2,LPG,y}$) as follows:

$$COEF_{LPG,y} = NCV_{LPG,y} * EF_{CO_2,LPG,y}$$

Where:

$NCV_{LPG,y}$ Net calorific value of fossil fuel LPG. $NCV_{LPG,y}$ is determined as 0.0000465 GJ/ton (source: Brazilian Energetic Balance Report, year 2010).

$EF_{CO_2,LPG,y}$ CO_2 emission factor for fossil fuel LPG. $EF_{CO_2,LPG,y}$ is determined as 65,600 tCO_2/GJ (source: IPCC Guidelines for National Greenhouse Gas Inventories, 2006, Chapter 1, Volume 2, Table 1.4).

Leakage emissions due to the consumption of grid electricity by the project activity during the monitoring period from 01/01/2007 to 31/12/2010 are thus calculated as 4 tCO_2 .

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

Emission reductions achieved by the project activity during the considered monitoring period are determined as the difference between baseline emissions (BE_y) and Leakage emissions (LE_y) determined for such period. Calculations of baseline emissions (BE_y) are presented in Section E.1. Calculations of leakage emissions (LE_y) are presented in Section E.3. As summarized in the table below, during the monitoring period from 01/01/2007 to 31/10/2010, achieved emission reductions are calculated and reported as 1,856,028 tCO₂e (rounded value):

Item	Baseline emissions or baseline net GHG removals by sinks (t CO ₂ e)	Project emissions or actual net GHG removals by sinks (t CO ₂ e)	Leakage (t CO ₂ e)	GHG emission reductions or net GHG removals by sinks (t CO ₂ e) achieved in the monitoring period		
				Up to 31/12/2012	From 01/01/2013	Total amount
Total	1,867,840	-	11,812	1,856,028	-	1,856,028

E.5. Comparison of actual emission reductions or net 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
Emission reductions or GHG removals by sinks (t CO ₂ e)	1,769,339	1,856,028

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

>>

For the monitoring period encompassing the years of 2007 to 2010 (from 01/01/2007 to 31/12/2010), the achieved emission reductions for the project activity are about ~6% higher than the comparable value for the *ex-ante* estimation of emission reductions as per the PDD which is applicable for such monitoring period.

The following aspects justify and explain the relative difference between the *ex-ante* estimation of emission reductions in the PDD and emission reductions actually achieved during the monitoring period from 01/01/2007 to 31/12/2010:

1) Aspects/conditions that represent relative increment factors of reported achieved emission reductions for the considered monitoring period when compared against the *ex-ante* estimation of emission reduction for the same period in the PDD:

- 1) *Uncertainties associated with the application of First Order Decay (FOD) multi-phased model for estimating the emission reductions in the PDD:*

As outlined in the PDD, like other similar CDM project activities encompassing LFG collection and destruction/utilization, the amount of methane to be generated by decomposition of MSW disposed at the AMC landfill and collected by the project activity was derived by applying the First Order Decay (FOD) model as per the methodological tool "Emission from Solid Waste Disposal Sites" (version 06.0.1) in the context of the determination of ex-ante estimated emission reductions to be achieved during the 1st 7-year

renewable crediting period. By taking into account all potential uncertainties associated with the application of such multi-phased decay model, it is reasonable to assume that, in the particular case of the project activity during the considered monitoring period, the application of this model somehow underestimated the amount of LFG to be actually generated and collected by the project activity.

Appendix 1. Contact information of project participants and responsible persons/entities

Project participant and/or responsible person/ entity	☒ Project participant ☐ Person/entity responsible for completing the CDM-MR-FORM
Organization name	BATTRE: Bahia Tranferencia e Tratamento de Residuos S.A.
Street/P.O. Box	Estrada Cia-Aeroporto, km 6.5
Building	
City	Municipio de Salvador
State/region	Estado da Bahia
Postcode	41.505-050
Country	Brazil
Telephone	+ 55.71.491.8488
Fax	
E-mail	atanuri@vega.com.br
Website	www.vega.com.br ; www.sita.com ; www.suez.com
Contact person	
Title	CEO
Salutation	Mr.
Last name	Radel
Middle name	Quintas
First name	Lucas
Department	Bahia Transferencia e Tratamento de Residuos S.A.
Mobile	
Direct fax	+ 55.11.6165.3561
Direct tel.	+ 55.11.6165.3574
Personal e-mail	

Project participant and/or responsible person/ entity	☒ Project participant ☐ Person/entity responsible for completing the CDM-MR-FORM
Organization name	Shell Trading International Limited
Street/P.O. Box	80 Strand
Building	80 Strand
City	London
State/region	
Postcode	WC2R 0ZA
Country	United Kingdom
Telephone	+44 20 7546 5000
Fax	+44 20 7546 5134
E-mail	Roon.osman@shell.com
Website	http://www.shell.com
Contact person	
Title	CDM manager
Salutation	Miss
Last name	Osman
Middle name	
First name	Roon
Department	Environmental Products Trading Business
Mobile	+44 7984 767 099
Direct fax	+44 20 7546 5134
Direct tel.	+44 20 7546 5126
Personal e-mail	Roon.osman@shell.com

Project participant and/or responsible person/ entity	☒ Project participant ☐ Person/entity responsible for completing the CDM-MR-FORM
Organization name	Showa Shell Sekiyu K.K.
Street/P.O. Box	3-2, Daiba 2 chome, Minato-ku
Building	Daiba Frontier Building
City	Tokyo
State/region	
Postcode	135-8074
Country	Japan
Telephone	+ 81-3-5531-5627
Fax	+ 81-3-5531-5767
E-mail	Takashi.Hasegawa@showa-shell.co.jp
Website	www.showa-shell.co.jp
Contact person	
Title	GHG manager
Salutation	Mr.
Last name	Hasegawa
Middle name	
First name	Takashi
Department	New Business Development Division
Mobile	
Direct fax	+ 81-3-5531-5767
Direct tel.	+ 81-3-5531-5627
Personal e-mail	

Project participant and/or responsible person/ entity	☒ Project participant ☐ Person/entity responsible for completing the CDM-MR-FORM
Organization name	Electrabel S.A.
Street/P.O. Box	Boulevard du Régent 8
Building	-
City	Brussels
State/region	
Postcode	B-1000
Country	Belgium
Telephone	32 (0) 2 518 61 11
Fax	32 (0) 2 518 6297
E-mail	Lieven.bloeyaert@electrabel.com
Website	www.electrabel.com
Contact person	
Title	Head of Environmental Markets
Salutation	Mr.
Last name	Bloeyaert
Middle name	
First name	Lieven
Department	Environmental Trading
Mobile	
Direct fax	32 (0) 2 518 62 97
Direct tel.	32 (0) 2 501 59 94
Personal e-mail	Lieven.bloeyaert@electrabel.com

Project participant and/or responsible person/ entity	☐ Project participant ☒ Person/entity responsible for completing the CDM-MR-FORM
Organization name	UniCarbo Energia e Biogás Ltda.
Street/P.O. Box	Avenida Eng. Luis Carlos Berrini, 1140 – 72
Building	
City	São Paulo
State/region	São Paulo, SP
Postcode	04571-000
Country	Brazil
Telephone	+ 55 11 9 8596 0950
Fax	+ 55 11 9 8596 0950
E-mail	nuno@unicarbo.com.br
Website	www.unicarbo.com.br
Contact person	Nuno Barbosa
Title	Mr.
Salutation	
Last name	Barbosa
Middle name	
First name	Nuno
Department	
Mobile	
Direct fax	
Direct tel.	
Personal e-mail	

- - - - -

Document information

<i>Version</i>	<i>Date</i>	<i>Description</i>
05.1	4 May 2015	Editorial revision to correct version numbering.
05.0	1 April 2015	Revisions to: • Include provisions related to delayed submission of a monitoring plan; • Provisions related to the Host Party; • Remove reference to programme of activities; • Overall editorial improvement.
04.0	25 June 2014	Revisions to: • Include the Attachment: Instructions for filling out the monitoring report form (these instructions supersede the "Guideline: Completing the monitoring report form" (Version 04.0)); • Include provisions related to standardized baselines; • Add contact information on a responsible person(s)/ entity(ies) for completing the CDM-MR-FORM in A.6 and Appendix 1; • Change the reference number from <i>F-CDM-MR</i> to <i>CDM-MR-FORM</i>; • Editorial improvement.
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 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.

Decision Class: Regulatory
Document Type: Form
Business Function: Issuance
Keywords: monitoring report