Monitoring report form
(Version 05.1)

MONITORING REPORT		
Title of the project activity	Central de Resíduos do Recreio Landfill Gas Project (CRRLGP)	
UNFCCC reference number of the project activity	0648	
Version number of the monitoring report	1.0	
Completion date of the monitoring report	10/03/2016	
Monitoring period number and duration of this monitoring period	Monitoring period: #9 01/12/2014 - 31/12/2015	
Project participant(s)	Companhia Riograndense de Valorização de Resíduos S/A	
Host Party	Brazil	
Sectoral scope(s)	13 - Waste handling and disposal	
Selected methodology(ies)	ACM0001 - “Flaring or use of landfill gas” (version 15.0)	
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	421,529 tCO_2e	
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
	-	388,863 tCO_2e

SECTION A. Description of project activity

A.1. Purpose and general description of project activity

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The CDM project activity Central de Resíduos do Recreio Landfill Gas Project - CRRLGP currently comprises collection of landfill gas (LFG) and its destruction (by combustion in high temperature enclosed flare) and its utilization as gaseous fuel in a more recently implemented new electricity generation facility[1]. LFG is generated at the Central de Resíduos do Recreio (CRR) landfill as a result of anaerobic de composition of solid waste disposed in the landfill. This landfill is located in the city of Minas do Leão, State of Rio Grande do Sul, in the Southern region of Brazil.

The CRR landfill was built in October 2001. The landfill is implemented in the valley of an old and not any longer under operation coal exploration mine. The CRR landfill has an area of 1,280,020 m^2 and by considering average disposal of 90,000 ton of solid waste per month, the landfill has a forecasted lifetime of 22 years[2]. The total designed solid waste disposal capacity for the CRR landfill is of approximately 30 million ton.

The CRR landfill currently serves as solid waste final disposal site for more than one hundred and thirty public and private clients, with the vast majority of these clients (in volume basis) representing municipalities located in different regions of the Rio Grande do Sul State (which is a Federal State located in the Southern Region of Brazil). The CRR landfill thus plays an important role as a major municipal solid waste (MSW) disposal site in this important region of Brazil.

The CDM project activity "Central de Resíduos do Recreio Landfill Gas Project (CRRLGP)" had its implementation initiated in year 2007 by the former host country project participant SIL - Soluções Ambientais Ltda.[3], which has also operated the CRR landfill since the start of its operations.

As part of the operation of the project activity, during the considered monitoring period, LFG generated at the CRR landfill was collected and converted into carbon dioxide (CO_2) through combustion in a high temperature enclosed flare and utilized as gaseous fuel for electricity generation in the engine-generator sets of the new electricity generation facility. The operation of the project activity thus mitigated emissions of the greenhouse gas (GHG) methane (CH_4) that would otherwise be directly emitted into the atmosphere in the absence of the project and also promoted displacement of an equivalent amount of electricity generated by the project's new electricity generation facility which would otherwise be generated by existing grid-connected power plants (and addition of new power generation units) within the National Electricity Grid of Brazil.

During the considered monitoring period, there were 210 existent LFG extraction wells at the CRR landfill, of which an average of 145 were under regular operation.

During the considered monitoring period the project activity operated under complete conformance with project design information and applicable monitoring requirements as per the registered PDD

[1] It is important to note that, as indicated in the latest version of the registered PDD valid for the 2nd 7-year crediting period of the project activity, (version 9.1, dated 14/09/2015), as per the current project design configuration, LFG generated at the CRR landfill is to be priority utilized as gaseous fuel for electricity generation in an electricity generation facility. While such new electricity generation facility only started its continuous operations on 25/06/2015, there were no utilization of LFG as gaseous fuel for electricity generation during the share of the considered monitoring period from 01/12/2014 to 24/06/2015.

[2] An operative lifetime of 22 years is established in the CRR landfill's Operating License 41/2014-DL

[3] As outlined in the registered PDD, as a result of an occurred corporate mergering process between the waste management companies/enterprises SIL Soluções Ambientais Ltda. and Solvi Group S.A., the CRR landfill is since12/09/2012 owned and operated by the established enterprise Companhia Riograndense de Valorização de Resíduos S/A (CRVR). This change of the host country project participant for the project activity is reflected in the latest version of the Modalities of Communication (MoC) form valid for the project activity (valid as of 30/11/2015).

valid for 2nd 7-year crediting period of the project activity (PDD version 9.1, dated 14/09/2015, herein after termed "registered PDD").

Emission Reductions (ER) achieved during the 9th monitoring period from 01/12/2014 to 31/12/2015 are reported as **388,863** tCO_2e**.**

Period	Achieved emission reductions (tCO_2e)
01/12/2014 to 31/12/2015	**388,863**

A.2. Location of project activity

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The project activity is implemented in the Central de Resíduos do Recreio (CRR) landfill which is located in the Municipality of Minas do Leão, Rio Grande do Sul State (approximately 80 km Western from the Porto Alegre city) in the Southern Region of Brazil.

The geographical coordinates of the project site (in decimal notation format and in DMS – Degree, Minute, Second) are as follows:

Geographical coordinates format	Latitude	Longitude
Decimal	-30.1469444	-52.0258333
Degree Minutes Seconds (DMS)	30° 8' 49" S	52° 1' 33" W

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)	Companhia Riograndense de Valorização de Resíduos S/A	No

A.4. Reference of applied methodology and standardized baseline

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The project activity applies the following large-scale CDM baseline and monitoring methodology:

- ACM0001 - "Flaring or use of landfill gas" (version 15.0) (http://cdm.unfccc.int/methodologies/DB/D44X8FH8SFCXREE6037AXJSBGGFVDO);

For the considered monitoring period, as also established in the PDD, the following methodological tools are also applied[4]:

- "Tool to calculate baseline, project and/or leakage emissions from electricity consumption" (version 01) (http://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-05-v1.pdf).

[4] The PDD also refers to the methodological tool "Emissions from solid waste disposal sites" (version 06.0.1, EB66). However, it is crucial to note that, as outlined in the registered PDD, applicable guidance of this methodological tool is only applied in the context of ex-ante estimation of emission reductions to be achieved by the project activity during the 2nd 7-year crediting period. This methodological tool is not applied for the ex-post determination of emission reductions achieved by the project activity.

The application of this tool refers to the ex-post application of the latest version of the "Tool to calculate the emission factor for an electricity system" (version 04.0) (http://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-07-v4.0.pdf)

- "Tool to calculate project or leakage CO_2 emissions from fossil fuel combustion" (version 02) (http://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-03-v2.pdf)

- "Project emissions from flaring" (version 02.0.0, EB 68) (http://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-06-v2.0.pdf);

- "Tool to determine the mass flow of a greenhouse gas in a gaseous stream" (version 02.0.0, EB 61) (http://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-08-v2.0.0.pdf);

A.5. Crediting period of project activity

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2nd 7-year renewable crediting period from 01/12/2014 to 30/11/2021

A.6. Contact information of responsible persons/entities

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Completion date for the application of the CDM-MR-FORM: 29/02/2016 (date of the initial version of this Monitoring Report).

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 Companhia Riograndense de Valorização de Resíduos 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

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During the considered monitoring period the project activity encompassed the operation of the following equipment:

- LFG gas extraction system composed of 210 vertical extraction wells, of which 145 were under operation, connected by HDPE pipes.
- Four centrifugal blowers each with a 3,350 Nm^3/h capacity and total capacity of 13,400 Nm^3/h.

- One enclosed high temperature flare (designed and supplied by Arquipélago Engenharia Ambiental Ltda.) The flare is equipped with a pilot flame fuelled by LPG[5]. The flare has a declared maximum LFG flow operational capacity of 8,100 Nm^3/h.
- One off-grid captive backup electricity generator (fuelled by diesel) with 180 kVA of nameplate power generation capacity. As per the project design, this back-up off-grid electricity generator is used for emergency purposes only (during temporary interruptions of supply of grid-sourced electricity to the project activity). This power generation unit is composed by a diesel powered engine (model 6.10.TCA, manufactured by MWM International) (215 HP (160.3 kW) of power output), and a brushless electricity generator set of 180 kVA of nameplate power generation capacity. The unit is assembled/packed by STEMAC Grupos Geradores S.A. This power generator set was designed to supply electricity to only 2 of the 4 existing centrifugal blowers and to the plant control/monitoring systems during emergency situations. The back-up power generator normally enters into operation automatically whenever an interruption of supply of grid-sourced electricity to the project activity occurs.
- The new electricity generation facility comprising 6 engine-generator modular package sets (container based assembly) of which each one includes an engine-generator set manufactured by GE Jenbacher, of type 4 model G-420 with nameplate installed capacity of 1.426 MW.

The monitoring equipment is described in section C of the monitoring report.

During the whole monitoring period covered by this Monitoring Report, the project activity has operated in accordance with the technical project description as per the registered PDD. From an operational perspective, there were no post-registration changes on the project activity during the considered monitoring period.

B.2. Post-registration changes

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

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Not applicable.

B.2.2. Corrections

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Not applicable.

B.2.3. Changes to start date of crediting period

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Not applicable.

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

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Not applicable.

[5] The pilot flame system for the installed high temperature enclosed flare is fuelled by LPG which is sourced (when under operation) by 2 LPG cylinders with 45 kg of LPG each.

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

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Not applicable.

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

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Not applicable.

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

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Not applicable.

SECTION C. Description of monitoring system

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C.1. INSTRUMENTATION

Figure 1 and 2 show a schematic instrumentation diagram of the project's monitoring system as per the two configurations available during the monitoring period.

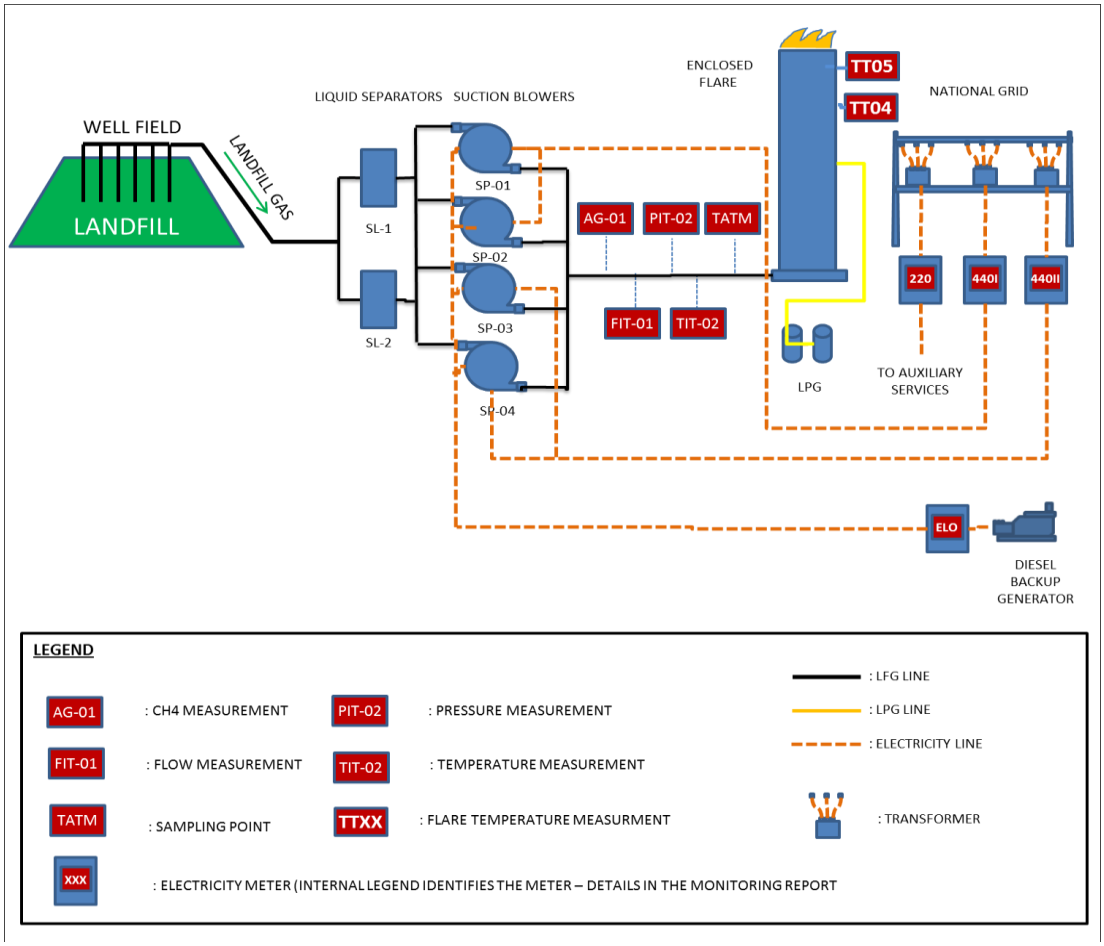


Figure 1: Schematic instrumentation diagram of the monitoring system from 01/12/2014 to 24/06/2015

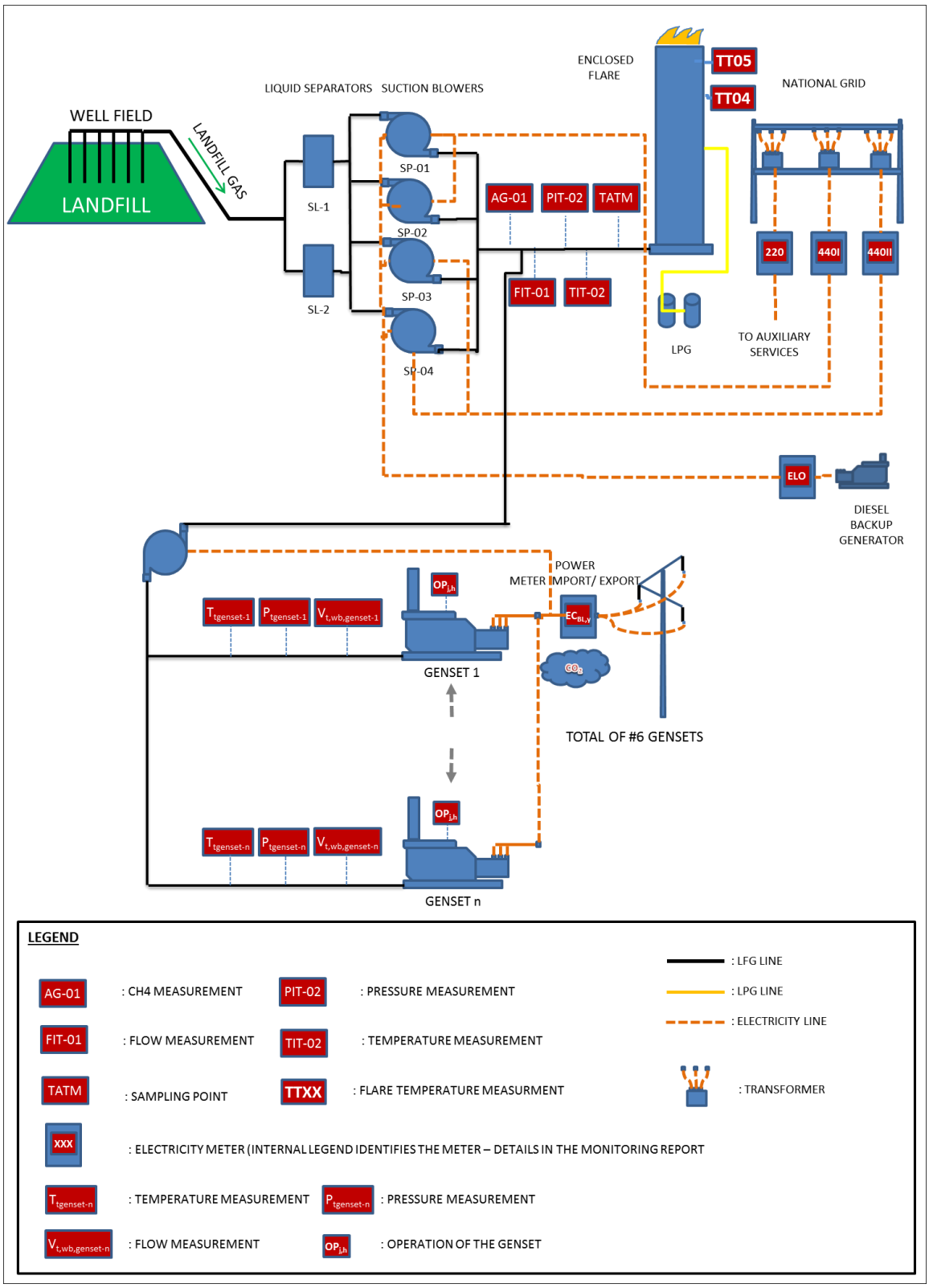


Figure 2: Schematic instrumentation diagram of the monitoring system
From 25/06/2015 onwards

Project's LFG collection and destruction component (incl. the LFG flaring facility):

As part of the project activity, the following instruments/equipment[6] are installed along the main LFG collection pipeline in its final section (between the installed centrifugal blowers and the enclosed flare):

- One thermal mass flow meter model ST98, manufactured by Fluid Components International (FCI), with accuracy of ±1% (Company internal instrument ID. FIT-01). This measurement unit measures the flow of LFG collected by the project activity which is sent to the flare for combustion.
- One LFG pressure sensor coupled to one pressure data transmitter set model LD301. The instrument set (sensor + data transmitter unit) is manufactured by SMAR Equipamentos Ind. Ltda. (Company internal instrument ID. PIT-02). This instrument set measures LFG pressure in the section between the centrifugal blowers and the high temperature enclosed flare in the LFG collection pipeline. The instrument set has accuracy of ± 0.1%.
- One LFG temperature sensor coupled to a temperature data transmitter set model TT301 manufactured by SMAR Equipamentos Ind. Ltda. The data transmitter unit has accuracy ± 0.2 ºC. The LFG temperature sensor is a PT100 thermo-resistance RTD sensor manufactured by Consistec Controles e Sistemas de Automação Industrial Ltda. (Company internal instrument ID. TIT-02). This instrument set measures the LFG temperature in the LFG collection pipeline in the section between the centrifugal blowers and the high temperature enclosed. The sensor has accuracy of ± 1ºC.
- One continuous CH_4/O_2 content gas analyzer unit, manufactured by Siemens AG, model Ultramat 23, with accuracy of ±1%. (Company internal instrument ID. AG-01). This equipment provides continuous measurement of methane fraction in collected LFG. The LFG sampling point for the AG-01 equipment is located in the main LFG collection pipeline in a section close to the location of the LFG flow meter (in a section located between the centrifugal blowers and the flare). While the project's LFG collection process ensures that most of the humidity of the collected LFG is removed by condensation (in available condensation removal traps) prior of having collected LFG passing through the installed LFG flow meter and the installed CH_4/O_2 content gas analyzer unit, flow of collected LFG being sent to the flare and CH_4 fraction of collected LFG can thus be regarded as measured under the same basis/conditions in terms of moisture.
- Two thermocouple and temperature transmitters (Company internal instrument ID. TT-04 and TT-05) that measure the temperature in the exhaust gas of the flare (T_{flare}). Such measurements are considered in order to assure the operation of flare as per the operation conditions defined by the flare manufacturer. Measurements from the thermocouple TT-04 are only required to be considered whenever the flare operates with flow of LFG higher than 3,000 Nm^3/h. Measurements from the thermocouple TT-05 are only required to be considered whenever the flare operates with flow of LFG up to 3,000 Nm^3/h. Both thermocouples TT-04 and TT-05 are the model ATC-204, type N manufactured by Ecil Met Tec Ltda. The installed thermocouple has accuracy of ±0.75%. Spare units (with identical specifications) are kept for both installed thermocouples. The thermocouples are located in the upper section of the installed flare and are only used to monitor the flare temperature from an operational point of view and in order to ensure that high flare combustion efficiency is achieved.
- One UV flame detector, manufactured by Honeywell Analytics Ltd., model C7061A. For every minute that flame is detected in the flare, its operational status is considered as "On" and emission reductions are thus accounted for such given minute.
- LFG sample collecting points are available in the upper section of the flare stack in order to collect samples of LFG in order to determine (based on measurements regularly performed by independent 3rd party inspection service company) the residual methane content in the exhaust gas of the flare. As defined in the monitoring plan of the registered PDD, such periodical measurements of residual methane content in the exhaust gas are required to periodically determine applicable values for flare efficiency (in terms of combustion of methane) in order to determine emission reductions achieved by the project activity.

[6] Each of the instruments installed might have several backup units used and changed according to maintenance/calibration requirements. Details of the equipment used are presented in section D.2.

Further details for the monitoring parameter FE are made available in sections D.2 and E.2. For the considered monitoring period, related measurements, which are required to be performed quarterly (4 times per year) as per the monitoring plan from the registered PDD, were performed by the independent 3rd party inspection service company BIOAGRI Ambiental Ltda.

Project's electricity generation component:

- Six LFG flow meters of differential pressure type to measure flow of LFG which is sent to the engine-generator sets of the electricity generation facility (1 for each individual engine-generator set).
- Six pressure sensors to measure pressure of the LFG which is sent to the engine-generator sets of the electricity generation facility (1 for each individual engine-generator set).
- Six temperature sensors to measure temperature of LFG which is sent to the engine-generator sets of the electricity generation facility (1 for each individual engine-generator set).

Since 25/06/2015, the electricity demand of the project activity has been regularly met by electricity generated in the project's new electricity generation facility. During the period from 01/12/2014 to 25/06/2015 and also for the time periods for which the project's new electricity generation facility was out of operation, continuous supply of grid-sourced electricity to the project's LFG flaring facility was made through 3 independent internal power distribution lines which are each one connected to a power transformer. The 3 power transformers have internal identification as "440V I", "440V II" and "220V". In the 3 independent electricity distribution lines (1 line connected to each power transformer) there are 2 electricity meters installed. The electricity supply internal distribution line which is connected to the power transformer "440V I" supplies grid-sourced electricity to the project's centrifugal blower with internal TAG/ID "SP-01" and "SP-02". The electricity supply internal distribution line which is connected power transformer "440V II" supplies grid-sourced electricity to the project's centrifugal blowers with internal TAG/ID "SP-03" and "SP-04". Finally, the electricity supply internal distribution line which is connected to the power transformer "220V", supplies grid-sourced electricity to the project's plant control/monitoring equipment's. The sum of the highest applicable accumulated measurement values of grid-sourced electricity consumption (in each internal grid electricity distribution line) (as indicated in the 2 installed electricity meters installed in each one of the 3 existent internal electricity supply distribution lines) is considered for the purpose of monitoring the total amount of grid-sourced electricity consumed by the project activity during the considered monitoring period.

A backup off-grid captive diesel backup electricity generator (fuelled by diesel) is also used as an electricity supply source to the whole project activity whenever there are temporary interruptions on the supply of grid-sourced electricity to the project activity[7]. The internal electricity supply distribution line which is connected uniquely to the off-grid backup electricity generator is also equipped with two electricity meters. These meters are used to monitor the amount of electricity generated by the backup electricity generator and consumed by the project activity. Further details about the electricity meters and related monitoring procedures are described in section D.2.

While ancillary equipment for the project's electricity generation component normally consumes electricity by the its own engine-generator sets, under situations when such project component is not generating electricity, grid-sourced electricity is supplied through the same transmission line used for exporting electricity generated by the project activity.

[7] The off-grid backup electricity generator is equipped with automatic switching and control system which ensures its operation whenever there is an interruption in the supply of grid-sourced electricity to the project activity.

C.2. DATA ACQUISITION, STORAGE AND MANAGEMENT SYSTEM

As part of the monitoring process for the project activity, all continuous measurements of LFG related monitoring parameters (including measurements of temperature of exhaust gas of the flare) and also measurements of electricity generated by the electricity generation facility are recorded/reported every minute in an installed data acquisition unit of manufacturer/model Chessell 5000B.

This data acquisition system is manufactured by Eurotherm Invensys Plc. The following is outlined in the specification details for this equipment:
"*The equipment is designed for maximum security of data and for flexible functionality. It has 16 Mbyte of non-volatile Flash memory for historical data storage with a logging and archiving strategy that protects the data from loss or tampering*".[8]

During the considered monitoring period, monitoring data was thus recorded by the utilized data acquisition unit in an encrypted format. Recorded LFG related monitoring data (+ measurement records for temperature of temperature of exhaust gas of the flare) are regarded as "raw data" for processing emission reduction calculations valid for the considered monitoring period. As part of the implemented monitoring procedure for the project activity, such "raw data" is transmitted/exported to a local PC station via cable (or using an Ethernet Interface). Also as part of the implemented monitoring procedure, the following additional tasks/routines are performed in terms of monitoring data handling:

- On an every 3-week basis, recorded raw data is transmitted from the Chessell 5000B data acquisition unit to a local PC (available in the project's control room) via Ethernet Interface (LAN cable) by the project operation supervisor. Raw data is thus also kept recorded in a data management system in an encrypted file format.
- On an every month basis, transmitted/exported "raw data" is converted into "*.txt*" text format for reporting of monitoring data and for performance of emission reduction calculations valid for the considered monitoring period. A "*.txt*" format text file is thus generated for each individual month of the considered monitoring period. These "*.txt*" format files are then directly converted into MS-Excel spreadsheet format for generating the emission reduction calculation spreadsheets which are enclosed to this Monitoring Report.

All related operation and monitoring working procedures are described in the project's operational manual (named "*Manual de Partida e Operação – Ampliação da Planta de Biogás*" ref.#BR1100648/R01/V01/10). All relevant operational working procedures are also described in the project's maintenance manual (named "*Manual de Manutenção – ampliação Planta de Biogás*", ref.#BR1100648/R02/V01/10). These manuals were developed by the consultancy company "Arquipélago Engenharia Ambiental Ltda." The project's monitoring manual (named "*Manual de Monitoramento – Ampliação da Planta de Biogás*" ref# BR1100648/R03/V01/10), also includes relevant operational details for the project activity.

General safety procedures are described in the project's risk management plan (named "*Programa de Gerenciamento de Riscos*", ref.# BR1100735/R01/V01/10) and in the project's emergency plan manual (named "*Plano de Ação de Emergência*", ref.#BR1100735/R02/V01/10).

All project operational staff are trained for related operation, maintenance and safety procedures. Related training certificates were issued and are kept achieved. All relevant operational events (emergency, failures, maintenance, etc.) are registered in operation workbooks. All performed maintenance and/or repair events applicable for the critical pieces of equipment (flare, centrifugal blowers, CH_4/O_2 content gas analyzer unit, air compressor, engine-generator modular package sets, etc.) are also registered in the project's operation workbooks.

[8] http://www.eurotherm.net.au/recorder/5000/5000b1.php

Instruments/equipment calibration records and evidences are also registered in workbooks. The calibration certificates and registries for all performed calibration events are also kept in files. Calibration procedures are performed in accordance with applicable recommendation and requirements as established by equipment manufacturers and are also under conformance with applicable CDM requirements. The project's maintenance manual also includes related calibration procedures, requirements and instructions.

The following internal working procedures were prepared by Companhia Riograndense de Valorização de Resíduos S/A to ensure a systematic and satisfactory monitoring process for the project activity:

- CRR SCQB # 001 "*Cópia digital de Segurança do Registrador de Dados*" (Backing-up electronic data from the data acquisition system);
- CRR SCQB # 002 "*Registros de Operação*" (Recording of operation);
- CRR SCQB # 003 "*Instrumentos PQB Manutenções e Calibrações*" (Instrumentation maintenance and calibration);
- CRR SCQB # 004 "*Apuração de créditos de carbono*" (Emission reductions determination);
- CRR SCQB # 005 "*Auditoria interna créditos de carbono"* (Internal audits of accountancy of CERs);
- CRR SCQB # 006 "*Qualificação e Habilitação*" (Operational staff qualifications);
- CRR SCQB # 007 "*Arquivamento Relatórios de Eficiência do Queimador (FLARE) (Versão 3)*" (Archiving of flare efficiency reports);
- SCQB # 008 "*Registros de Requisições Regulatórias*" (Registries of regulatory requirements).

C.3. MANAGERIAL RESPONSIBILITIES

Operating the project activity under compliance with all applicable CDM requirements is responsibility of the CDM Operational Manager of Companhia Riograndense de Valorização de Resíduos S/A. The CDM Project Manager (who directly reports to the vice-president of the organization), is in charge of all validation and verification related activities (including development of PDD, Monitoring Reports and supporting documentation). The CEO and the CDM Project Manager are co-responsible for the correct application of the monitoring plan.

Under an operational perspective, the CDM operations manager and CDM supervisor are in charge of performing all field monitoring activities and ensuring appropriate monitoring data logging and recording. They are also responsible for the performance of related calibration events as well as all applicable planned or unplanned maintenance and repair events.

Preventative maintenance events are executed by field technicians in order to ensure that monitoring instruments/equipment are fully operating.

Figure 2 shows the organizational chart for the project activity.

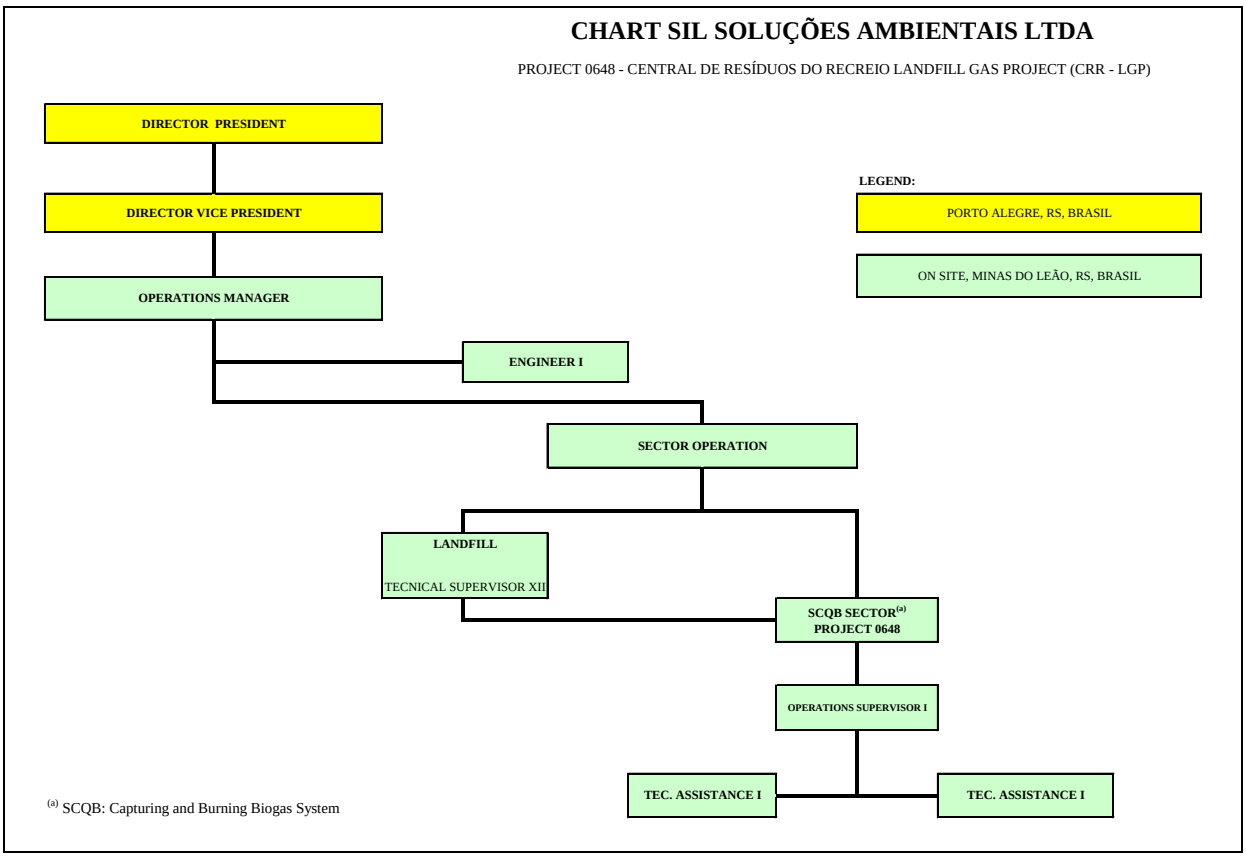


Figure 2: Management organization for the project activity

SECTION D. Data and parameters

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

Data/parameter:	**OX_{top_layer}**
Unit	Dimensionless
Description	Fraction of methane that would be oxidized in the top layer of the SWDS in the baseline.
Source of data	The PDD refers to the default value as per the CDM baseline and monitoring methodology ACM0001 (version 15.0). The value is consistent with how oxidation is accounted for in the methodological tool “Emissions from solid waste disposal sites” (version 06.0.1).
Value(s) applied)	0.1

Choice of data or measurement methods and procedures	Default value as per the applied CDM baseline and monitoring methodology ACM0001 “Flaring or use of landfill gas” (version 15.0)
Purpose of data	Calculation of baseline emissions
Additional comments	-

Data/parameter:	**GWP_{CH4}**
Unit	tCO_2/tCH_4
Description	Global Warming Potential of CH_4
Source of data	The PDD refers to the "Global Warming Potential for Given Time Horizon" in table 2.14 of the errata to the contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change, based on the effects of greenhouse gases over a 100-year time horizon. Available at: www.ipcc.ch/publications_and_data/ar4/wg1/en/ch2s2-10-2.html#table-2-14 The applied value is also in accordance with the "Standard for application of the global warming potential to clean development mechanism project activities and programmes of activities for the second commitment period of the Kyoto Protocol".
Value(s) applied)	25
Choice of data or measurement methods and procedures	-
Purpose of data	Calculation of baseline emissions
Additional comments	**-**

Data/parameter:	**R_u**
Unit	$Pa.m^3/kmol.K$
Description	Universal ideal gases constant
Source of data	The PDD refers to the default value as per the "Tool to determine the mass flow of a greenhouse gas in a gaseous stream" (version 02.0.0).
Value(s) applied)	8,314
Choice of data or measurement methods and procedures	-
Purpose of data	Calculation of baseline emissions
Additional comments	**-**

Data/parameter:	**MM_k**
Unit	kg/kmol
Description	Molecular mass of gas *k*
Source of data	The PDD refers to the default value as per the "Tool to determine the mass flow of a greenhouse gas in a gaseous stream" (version 02.0.0).
Value(s) applied)	As outlined in the PDD, for considered gases *k* that are greenhouse gases (GHGs), the values in the table below are applied for MM_i. As per the "Tool to determine the mass flow of a greenhouse gas in a gaseous stream": "*The determination of the molecular mass of the gaseous stream ($MM_{t,db}$) requires measuring the volumetric fraction of all gases (k) in the considered gaseous stream. However as a simplification, only the volumetric fraction of gases k that are greenhouse gases and are considered in the emission reduction calculation in the underlying methodology must be monitored and the difference to 100% may be considered as pure nitrogen. The simplification is not acceptable if it is differently specified in the underlying methodology.*" ACM0001 (version 15.0) does not include any restriction to such simplification. Thus, only the volumetric fraction of gases that are greenhouse gases and are considered in related calculations (CH_4 in the particular case of the project activity) should be considered and the difference to 100% is just considered as pure nitrogen. Compound: Nitrogen; Structure: N_2; Molecular mass (kg/mol): 28.01
Choice of data or measurement methods and procedures	-
Purpose of data	Calculation of baseline emissions
Additional comments	**-**

Data/parameter:	**MM_i**
Unit	kg/kmol
Description	Molecular mass of greenhouse gas *i*
Source of data	The PDD refers to the default value as per the "Tool to determine the mass flow of a greenhouse gas in a gaseous stream" (version 02.0.0).
Value(s) applied)	As outlined in the PDD, the following value of molecular mass is applicable for CH_4 (the only GHG which is considered): Compound: Methane; Structure: CH_4; Molecular mass (kg/mol): 16.04
Choice of data or measurement methods and procedures	-

Purpose of data	Calculation of baseline emissions
Additional comments	-

Data/parameter:	**P_n**
Unit	Pa
Description	Total pressure at normal conditions
Source of data	The PDD refers to the default value as per the "Tool to determine the mass flow of a greenhouse gas in a gaseous stream" (version 02.0.0).
Value(s) applied)	101,325
Choice of data or measurement methods and procedures	-
Purpose of data	Calculation of baseline emissions
Additional comments	In accordance with the PDD, since measurements of LFG flow are automatically converted and recorded in normalized cubic meters (by considering standard temperature and pressure (STP) conditions), the ex-ante determined parameters Temperature at normal conditions (T_n) and Total pressure at normal conditions (P_n) are not considered.

Data/parameter:	**MM_{H2O}**
Unit	kg/kmol
Description	Molecular mass of water
Source of data	The PDD refers to the default value as per the "Tool to determine the mass flow of a greenhouse gas in a gaseous stream" (version 02.0.0).
Value(s) applied)	18.0152
Choice of data or measurement methods and procedures	-
Purpose of data	Calculation of baseline emissions
Additional comments	-

Data/parameter:	**T_n**
Unit	K
Description	Temperature at normal conditions
Source of data	The PDD refers to the default value as per the "Tool to determine the mass flow of a greenhouse gas in a gaseous stream" (version 02.0.0).
Value(s) applied)	273.15
Choice of data or measurement methods and procedures	-
Purpose of data	Calculation of baseline emissions
Additional comments	In accordance with the PDD, since measurements of LFG flow are automatically converted and recorded in normalized cubic meters (by considering standard temperature and pressure (STP) conditions), the ex-ante determined parameters Temperature at normal conditions (T_n) and Total pressure at normal conditions (P_n) are not considered.

Data/parameter:	**$TDL_{grid,y}$**
Unit	Dimensionless
Description	Average technical transmission and distribution losses for providing electricity to the grid and for grid sourced electricity consumed by the project activity
Source of data	The PDD refers to the 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 project emissions (due to 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	The PDD refers to the applicable default value as per the "Tool to calculate the emission factor for an electricity system" (version 4.0). The selected value is valid for the whole 2nd 7-year renewable crediting period.
Value(s) applied)	0.75 (50%)
Choice of data or measurement methods and procedures	The applicable value valid for 2nd crediting period as per the "Tool to calculate the emission factor for an electricity system" (Version 4.0) is selected.
Purpose of data	Calculation of project emissions (due to consumption of grid-sourced electricity by the project activity).
Additional comments	**-**

Data/parameter:	**w_{OM}**
Unit	%
Description	Weighting of operating margin emissions factor
Source of data	The PDD refers to the applicable default value as per the "Tool to calculate the emission factor for an electricity system" (version 4.0). The selected value is valid for the whole 2nd 7-year renewable crediting period.
Value(s) applied)	0.25 (50%)
Choice of data or measurement methods and procedures	The applicable value for the 2nd crediting period as per the "Tool to calculate the emission factor for an electricity system" (version 4.0) is selected.
Purpose of data	Calculation of project emissions (due to consumption of grid-sourced electricity by the project activity).
Additional comments	**-**

Data/parameter:	**$EF_{grid,BM,y}$**
Unit	tCO_2/MWh
Description	Build margin CO2 emission factor in year *y*

Source of data	As outlined in the PDD, data is ex-ante determined as per applicable guidance of the "Tool to calculate the emission factor for an electricity system" and value is valid for the whole 2nd 7-year crediting period. The selected value is the value calculated by the DNA of Brazil and valid for year 2014 ($EF_{grid,BM,2014}$).
Value(s) applied)	0.2963
Choice of data or measurement methods and procedures	Data is determined as per applicable guidance of the "Tool to calculate the emission factor for an electricity system" valid for 2nd crediting period.
Purpose of data	Calculation of project emissions (due to consumption of grid-sourced electricity by the project activity) and baseline emissions (due to the displacement of an equivalent amount of electricity generated by the project's new electricity generation facility which would otherwise be generated by existing grid-connected power plants (and addition of new power generation units) within the National Electricity Grid of Brazil).
Additional comments	-

Data/parameter:	**$SPEC_{flare}$**
Unit	°C (for temperature values) Nm^3/h (for LFG flow values) Number of days (for maintenance schedule interval values)
Description	Manufacturer's flare specifications for temperature, flow rate and maintenance schedule interval.
Source of data	The PDD refers to data as per the flare manufacturer. Data is used as a reference for later ex-post determination of values of flare efficiency ($\eta_{flare,m}$) for each individual high temperature enclosed flare in the context of determination of baseline emissions.
Value(s) applied)	

$SPEC_{flare}$	Min.	Max.
Operational LFG flow (for continuous operation):	300 Nm^3/h	8,100 Nm^3/h
Required temperature of the exhaust gas of the flare (to ensure LFG destruction (combustion) under high CH_4 destruction efficiency):	500 ^oC	1,000 ^oC
Required minimum frequency for inspection and maintenance service (incl. inspection in the conditions of the flare isolation ceramics revetment material):	Min. every year (every 365 days)	
Required/recommended minimum frequency for replacement of the flare isolation ceramics revetment material:	after 10 years of regular and appropriate operation	

Choice of data or measurement methods and procedures	As established by the methodological tool "Project emissions from flaring", the flare specifications and operational + maintenance requirements (as set/recommended by the equipment manufacturer) are documented and considered for the ex-ante determination of applicable values for the parameter $SPEC_{flare}$. During the 2nd 7-year crediting period, ex-ante selected data will be compared against monitored data related to the operation of the flares, including: a) Minimum and maximum monitoring records for data regarding inlet LFG flow rate, (b) Minimum and maximum monitoring records for data of temperature in the exhaust gas of each individual high temperature enclosed flare; and (c) Duration in days of time periods between maintenance events for each individual high temperature enclosed flare.
Purpose of data	Calculation of baseline emissions
Additional comments	All flare specification and operation details/requirements are based on information provided by the equipment manufacturer.

Data/parameter:	**$PP_{CP,Diesel\text{-}generator}$**
Unit	MW
Description	Rated capacity of the installed captive backup electricity generators fuelled by diesel
Source of data	Name plate capacity of the captive generators, manufacturer's specifications or catalogue references
Value(s) applied)	0.144 The power generation unit is composed by a MWM International diesel powered engine (model 6.10.TCA) (215 HP of power output), and a brushless electricity generator set of 180 kVA of nameplate power generation capacity and nameplate power factor of 0.8.
Choice of data or measurement methods and procedures	Specifications of the installed captive backup electricity generators.
Purpose of data	Calculation of project emissions (due to the consumption of electricity sourced by captive off-grid electricity generator by the project activity).
Additional comments	The ex-ante determined default value for $PP_{CP,Diesel\text{-}generator}$ will only be used in case alternative approach 4 is used for the determination of Project emissions due to the consumption of electricity sourced by backup captive off-grid electricity generators (fuelled by Diesel) ($PE_{EC,captive,y}$).

Data/parameter:	**$TDL_{captive,y}$**
Unit	-
Description	Average technical transmission and distribution losses for electricity sourced by the captive electricity generator
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)	0

Choice of data or measurement methods and procedures	-
Purpose of data	Calculation of project emissions (due to the consumption of electricity sourced by captive off-grid electricity generator by the project activity).
Additional comments	The ex-ante determined default value for $TDL_{captive,y}$ will only be used in case alternative approach 1 or approach 2 is used for the determination of Project emissions due to the consumption of electricity sourced by backup captive off-grid electricity generators (fuelled by Diesel) ($PE_{EC,captive,y}$).

Data/parameter:	**$EF_{EL,captive,y}$**
Unit	tCO_2/MWh
Description	CO_2 emission factor for electricity sourced by the captive off-grid electricity generators
Source of data	Applicable default as per the "Tool to calculate baseline, project and/or leakage emissions from electricity consumption" (version 01) (in case the *Alternative approach 2* is selected (by following option B2 of the "Tool to calculate baseline, project and/or leakage emissions from electricity consumption").
Value(s) applied)	1.3
Choice of data or measurement methods and procedures	Data is determined as per applicable guidance of the "Tool to calculate baseline, project and/or leakage emissions from electricity consumption" (version 01).
Purpose of data	Calculation of project emissions (due to the consumption of electricity sourced by captive off-grid electricity generator by the project activity).
Additional comments	The ex-ante determined default value for $EF_{EL,captive,y}$ will only be used in case alternative approach 2 is used for the determination of Project emissions due to the consumption of electricity sourced by backup captive off-grid electricity generators (fuelled by Diesel) ($PE_{EC,captive,y}$).

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})
- Default value for model correction factor to account for model uncertainties ($\varphi_{default}$)
- 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) (F)
- Fraction of degradable organic carbon (DOC) in MSW that decomposes in the considered SWDS ($DOC_{f,default}$)
- Methane correction factor ($MCF_{default}$)
- Fraction of degradable organic carbon in the waste type j (weight fraction) (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 registered 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 in the LFG which is destroyed or utilized by the project activity" ($F_{CH4,PJ,y}$) (in the context of ex-ante estimation of emission reductions to be achieved by the project activity during the 2nd 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:	**Management of SWDS**
Unit	Dimensionless
Description	Management of the SWDS
Measured/calculated/default	As per the adopted monitoring procedure for the project activity, the management of the CRR landfill is yearly compared against the previously conceived original construction and operational design of the landfill in order to confirm that the overall management and operation for CRR landfill (including relevant aspects related to landfilling practice) were not modified with the unique aim to increase generation of methane on site. By performing the checking annually, it is monitored whether any practice aiming to increase methane generation in the landfill has occurred. As required by ACM0001 (version 15.0), any change in the management of the landfill after the implementation of the project activity should be justified by referring to

	applicable technical or regulatory specifications.
Source of data	A technical evaluation was performed by the independent 3rd party engineering company "HAR Engenharia e Meio Ambiente Ltda.". The findings for the performed evaluations are reported in a declaration document issued by such company that is dated 05/01/2016. As part of the performed technical evaluation, the current configuration and operational conditions of the CRR landfill were compared against the previously conceived design and operational conditions of the landfill prior to the implementation of the project activity on the basis of different sources, including inter alia: - Original design documents of the landfill (as described in the documentation required for all phases of the environmental licensing for the CRR landfill); - Applicable local or national regulations - Expertise and experience of "HAR Engenharia e Meio Ambiente Ltda." with the CRR landfill. Since the start of operation of the CRR landfill "HAR Engenharia e Meio Ambiente Ltda." has performed regular technical inspections at the CRR landfill as part of the continuously performed assessment of geotechnical stability monitoring for the landfill cells. Such regular assessments are required by the competent environmental authority from Rio Grande do Sul State (Fundação Estadual de Proteção Ambiental - FEPAM) for the validity of the environmental and safety permit/licensing for the CRR landfill.
Value(s) of monitored parameter	As outlined in the issued internal technical evaluation/declaration report dated 05/01/2016, the previously conceived original design of the landfill (dated prior to the implementation of the project activity) is confirmed not to being modified during the period from 01/12/2007 (date when the project activity started to operate) to 05/01/2016. This report confirms that no practice to increase methane generation at the CRR landfill have occurred (when compared to management and MSW landfilling practices prior to implementation of the project activity). Aspects, conditions and circumstances related to management of the landfill (e.g. waste disposal, waste covering, waste compacting, management of leachate, draining of rainwater, etc.) were not changed with an aim to increase methane generation on site. It is relavant to note that MSW management business (collection and disposal of MSW) in Brazil (and in most of the developing countries) has its own economics, dynamics, politics and related regulations. That makes MSW disposal activity for the CRR landfill and other similar landfills in Brazil completely independent from the CDM mechanism and/or revenues of commercialization of CERs generated by project based destruction of methane in landfills. In the particular case of the CRR landfill, it is important to note that this landfill was designed and it has operated inter alia as per terms and conditions for solid waste disposal contracts established with the different municipalities and private companies. The design and operation of the landfill is also under conformance with terms and conditions for the environmental licensing that were previously defined and are regularly monitored by the competent environmental authority from Rio Grande do Sul State (FEPAM). Currently, there is still no climate change of waste management policy in Brazil which would provide an incentive or a mandate to have MSW being disposed in landfills with better/improved LFG collection / destruction systems (such as the project's LFG collection and destruction system currently implemented at the CRR landfill).

Monitoring equipment	Not applicable. No measuring equipment is used for monitoring management of the CRR landfill.
Measuring/reading/recording frequency:	Annual checking is performed.
Calculation method (if applicable):	Not applicable.
QA/QC procedures:	Procedures related to collection/gathering, recording, storing and reporting of monitoring data for the project activity are performed at Companhia Riograndense de Valorização de Resíduos S/A. (private entity) in accordance with detailed working instructions that are included in the company's quality management and control (QA/QC) and environmental management system (EMS).
Purpose of data:	Calculation of baseline emissions
Additional comments:	As required by ACM0001 (version 15.0), any change in the management of the landfill after the implementation of the project activity will be justified by referring to technical or regulatory specifications and impacts of such changes in the determination of baseline emissions should in this case be taken into account appropriately. Such monitoring requirement will be used for the determination/confirmation of baseline emissions and/or confirmation of the project's implementation as described in the PDD (in terms of operation and management conditions of the landfill from which LFG is combusted).

Data/parameter:	**$V_{t,wb,j}$**
Unit	m^3 wet gas/h
Description	Volumetric flow of LFG stream in time interval *t* on a wet basis for *j* (where *j* is the LFG delivery pipeline to each item of electricity generation and LFG delivery pipeline to the flare(s))
Measured/calculated/default	Continuously measured by 7 LFG flow meters (one flow meter for the high temperature enclosed flare and one flow meter for each individual engine-generator set of the electricity generation facility).
Source of data	Continuous measurements performed by 7 LFG flow meters are recorded in a the project's acquisition system with an every-minute frequency.
Value(s) of monitored parameter	The monthly emission reduction calculation spreadsheets (that are enclosed to this Monitoring Report) include all records of measurement data of LFG flow sent to the installed high temperature enclosed flare and to each individual engine-generator set of the electricity generation facility during the considered monitoring period. Measurement data is recorded and reported with an every-minute frequency. While measurements are performed by installed 7 LFG flow meters (one flow meter for the high temperature enclosed flare and one flow meter for each individual engine-generator set of the electricity generation facility), the monitoring parameter $V_{t,wb}$ is thus measured, recorded and reported on the basis of the following sub-parameters: - $V_{t,wb,flare}$: Volumetric flow of LFG to the Flare - $V_{t,wb,genset-1}$: Volumetric flow of LFG to the engine-generator set 1 - $V_{t,wb,genset-2}$: Volumetric flow of LFG to the engine-generator set 2 - $V_{t,wb,genset-3}$: Volumetric flow of LFG to the engine-generator set 3

	- $V_{t,wb,genset-4}$: Volumetric flow of LFG to the engine-generator set 4 - $V_{t,wb,genset-5}$: Volumetric flow of LFG to the engine-generator set 5 - $V_{t,wb,genset-6}$: Volumetric flow of LFG to the engine-generator set 6
Monitoring equipment	Measurements of LFG flow sent to the flare are performed by a LFG flow meter installed in an independent section of the LFG pipeline located between the centrifugal blowers and the installed high temperature enclosed flare. Measurements of LFG flow sent to each one of the 6 engine-generator sets of the project's electricity generation component are performed by 6 LFG flow meters installed in an independent section of the LFG pipeline for each engine-generator modular package set prior next to the engine-generator set. It is thus ensured that the flow of LFG sent to the flare and to each element of project's electricity generation component (each engine-generator set) is independently and continuously measured. *Specifications and calibration details for the installed LFG flow meters:* *LFG flow meter used for measuring $V_{t,wb,flare}$ (Flare):* Two identical LFG flow meters of thermal mass type were used alternately during the considering monitoring period. Their specifications are given below: - CRVR´s instrument/equipment internal ID reference: FIT-01 - Manufacturer: Fluid Components International (FCI) - Model: ST98 - Accuracy: ±1% - Serial numbers (S/N): 294032 and 282572 - Calibration frequency and maintenance requirements [9]: Every 18 months (minimum). - Calibration events and period-in-use valid for the utilized flow meters and applicable for the considered monitoring period :

Serial Number (S/N)	Calibration Certificate			Period-in-use within the considered monitoring period	
	Certificate Number	Calibration event date	Validity of the performed calibration event	Starting	Ending
282572	0098/2014	14/04/2014	14/10/2015	01/12/2014	31/12/2014
294032	0226/2014	11/08/2014	11/02/2016	01/01/2015	07/05/2015
282572	0018/2015	13/04/2015	13/10/2016	08/05/2015	02/12/2015
294032	0101/2015	27/08/2015	27/02/2017	03/12/2015	31/12/2015

All calibration events were performed by Hirsa Sistemas de Automação e Controle Ltda.

LFG flow meter used for measuring $V_{t,wb,genset-1}$ (engine-generator set 1):

- Serial number (S/N): 2043021
- Calibration frequency and maintenance requirements: Every 2 years

[9] The calibration frequencies adopted for the installed LFG flow meter, CH_4/O_2 content gas analyzer unit, LFG pressure sensor and LFG temperature sensor are all as per the recommendations of related equipment/instrument manufacturers. The registered PDD and ACM0001 (version 15.0) do not specify any frequency for the calibration of such equipment/instruments. Moreover, the registered PDD and ACM0001 (version 15.0) do not specify any accuracy or other specification requirement for such instruments/equipment either.

	(minimum). - Dates for performed calibration events valid for the considered monitoring period: 19/09/2014 - Validity of the performed calibration event: valid until 19/09/2016 (2 years) *LFG flow meter used for measuring $V_{t,wb,genset-2}$ (engine-generator set 2):* - Serial number (S/N): 2043020 - Calibration frequency and maintenance requirements: Every 2 years (minimum). - Dates for performed calibration events valid for the considered monitoring period: 19/09/2014 - Validity of the performed calibration event: valid until 19/09/2016 (2 years) *LF flow meter used for measuring $V_{t,wb,genset-3}$ (engine-generator set 3):* - Serial number (S/N): 2043023 - Calibration frequency and maintenance requirements: Every 2 years (minimum). - Dates for performed calibration events valid for the considered monitoring period: 19/09/2014 - Validity of the performed calibration event: valid until 19/09/2016 (2 years) *LFG flow meter used for measuring $V_{t,wb,genset-4}$ (engine-generator set 4):* - Serial number (S/N): 2043033 - Calibration frequency and maintenance requirements: Every 2 years (minimum). - Dates for performed calibration events valid for the considered monitoring period: 19/09/2014 - Validity of the performed calibration event: valid until 19/09/2016 (2 years) *LFG flow meter used for measuring $V_{t,wb,genset-5}$ (engine-generator set 5):* - Serial number (S/N): 2043037 - Calibration frequency and maintenance requirements: Every 2 years (minimum). - Dates for performed calibration events valid for the considered monitoring period: 19/09/2014 - Validity of the performed calibration event: valid until 19/09/2016 (2 years) *LFG flow meter used for measuring $V_{t,wb,genset-6}$ (engine-generator set 6):* - Serial number (S/N): 2042985 - Calibration frequency and maintenance requirements: Every 2 years (minimum). - Dates for performed calibration events valid for the considered monitoring period: 19/09/2014 - Validity of the performed calibration event: valid until 19/09/2016 (2 years)
Measuring/reading/recording frequency:	Continuous measurements are recorded and reported with an every-minute frequency.
Calculation method (if applicable):	Not applicable.

QA/QC procedures:	Monitoring equipment/instruments are calibrated and maintained as per instrument specifications and/or recommendations of their manufacturer. Procedures related to collection/gathering, recording, storing and reporting of monitoring data for the project activity are performed at Companhia Riograndense de Valorização de Resíduos S/A in accordance with detailed working instructions that are included in the company's quality management and control (QA/QC) and environmental management system (EMS).
Purpose of data:	Calculation of baseline emissions
Additional comments:	The design of the installed LFG flow meter for measuring the LFG flow to the flare ensures that measurement data is automatically converted and recorded in normal cubic meters per hour (Nm^3/h). Due to that, as further explained in Section D.1, measurements of LFG pressure and LFG temperature are not required for determining $V_{t,wb,flare}$. Reported values of $V_{t,wb,flare}$ are used for the determination of the amount of methane in the LFG flared by the project activity ($F_{CH4,flared,y}$) as per Option C of the applicable methodological "Tool to determine the mass flow of a greenhouse gas in a gaseous stream" (measurements of volume flow in a wet basis). For the particular case of the LFG flow meters used for continuously measuring flow of LFG sent to each one of the engine-generator sets, while such instruments do not automatically convert measurements in normal cubic meter per hour (Nm^3/h), measurements of LFG pressure and LFG temperature (monitoring parameters "Temperature of the LFG stream in time interval *t"* (T_t) and "Pressure of the LFG stream in time interval *t"* (P_t) respectively) are considered for converting measurements of $V_{t,wb,genset-n}$ into in normal cubic meter per hour (Nm^3/h) ($V_{t,wb,genset-n}$) (where n = 1, 2, 3, 4, 5 and 6).

Data/parameter:	$v_{CH4,t,wb,j}$
Unit	m^3 CH_4/m^3 wet gas
Description	Volumetric fraction of CH_4 in the collected LFG in time interval *t* on a wet basis for *j* (where *j* is the LFG delivery pipeline to each item of electricity generation and LFG delivery pipeline to the flare(s))
Measured/calculated/default	Continuously measured by continuous CH_4/O_2 content gas analyzer.
Source of data	Measured as part of the operation of the project activity by applying appropriate monitoring instruments (CH_4/O_2 content gas analyser) (with recordable electronic signal).
Value(s) of monitored parameter	The monthly emission reduction calculation spreadsheets (that are enclosed to this Monitoring Report) include measurement data for $v_{CH4,t,wb,j}$ that are recorded and reported with an every-minute frequency.

<table>
<tr><td>Monitoring equipment</td><td>
Continuous CH_4/O_2 content gas analyzer unit:

Two identical equipments were used alternately used during the considered monitoring period. A backup unit of the equipment is always available.

Specifications of the installed continuous CH_4/O_2 content gas analyzer are described below:

- CRVR's instrument/equipment internal ID reference: AG-01
- Manufacturer: Siemens AG
- Model: Ultramat 23
- Accuracy: ±1%[10]
- Serial number (S/N): N1-V7-899 and N1-C8-283
- Calibration frequency and maintenance requirements: Each unit is calibrated at least every six months.
- Calibration events and period in use for the units during valid for the considered monitoring period :

<table>
<tr><th rowspan="2">Serial Number</th><th colspan="3">Calibration Certificate</th><th colspan="2">Period in use within the considered monitoring period</th></tr>
<tr><th>Number</th><th>Calibration event date</th><th>Validity of the performed calibration event</th><th>Starting</th><th>Ending</th></tr>
<tr><td rowspan="6">N1-V7-899</td><td>237/2014</td><td>17/04/2014</td><td>17/10/2014</td><td rowspan="6">01/12/2014</td><td rowspan="6">07/12/2015</td></tr>
<tr><td>708/2014</td><td>22/10/2014</td><td>22/04/2015</td></tr>
<tr><td>83/2015</td><td>23/01/2015</td><td>23/07/2015</td></tr>
<tr><td>199/2015</td><td>31/03/2015</td><td>31/09/2015</td></tr>
<tr><td>370/2015</td><td>09/07/2015</td><td>09/01/2016</td></tr>
<tr><td>552/2015</td><td>29/10/2015</td><td>29/04/2016</td></tr>
<tr><td>N1-C8-283</td><td>551/2015</td><td>29/10/2015</td><td>29/04/2016</td><td>07/12/2015</td><td>31/12/2015</td></tr>
</table>

All the calibration events were performed by ISOCELL Comércio de Instrumentação Ltda.
</td></tr>
<tr><td>Measuring/reading/recording frequency:</td><td>Continuously measurements are recorded/reported every minute.</td></tr>
<tr><td>Calculation method (if applicable):</td><td>Not applicable.</td></tr>
<tr><td>QA/QC procedures:</td><td>Monitoring equipment/instruments are calibrated and maintained as per instrument specifications and/or recommendations of their manufacturer.

Procedures related to collection/gathering, recording, storing and reporting of monitoring data for the project activity are performed at Companhia Riograndense de Valorização de Resíduos S/A in accordance with detailed working instructions that are included in the company's quality management and control (QA/QC) and environmental management system (EMS).</td></tr>
<tr><td>Purpose of data:</td><td>Calculation of baseline emissions</td></tr>
</table>

[10] Siemens A.G.– Operating Instructions - ULTRAMAT 23, Edition 03/2005, page 3-14.

Additional comments:	-

Data/parameter:	**T_t**
Unit	K
Description	Temperature of the LFG stream in time interval *t*
Measured/calculated/default	Continuously measured by LFG temperature measurement set (comprising temperature sensor element and a data transmitter). Measurements are primarily recorded and reported in ^{o}C. Recorded/reported data is converted into Kelvin and data is also reported in this unit, thus meeting the related monitoring requirement as per the PDD.
Source of data	Measured as part of the operation of the project activity by applying appropriate monitoring instruments (LFG temperature sensor) (with recordable electronic signal).
Value(s) of monitored parameter	The monthly emission reduction calculation spreadsheets (that are enclosed to this Monitoring Report) include measurement data for T_t that are recorded and reported with an every-minute frequency. While measurements are performed by installed 7 LFG temperature sensors (one temperature sensor for the high temperature enclosed flare and one temperature sensor for each individual engine-generator set of the electricity generation facility), the monitoring parameter T_t is thus measured, recorded and reported on the basis of the following sub-parameters: - T_{tflare}: Temperature of the LFG sent to the Flare - $T_{tgenset-1}$: Temperature of the LFG sent to the engine-generator set 1 - $T_{tgenset-2}$: Temperature of the LFG sent to the engine-generator set 2 - $T_{tgenset-3}$: Temperature of the LFG sent to the engine-generator set 3 - $T_{tgenset-4}$: Temperature of the LFG sent to the engine-generator set 4 - $T_{tgenset-5}$: Temperature of the LFG sent to the engine-generator set 5 - $T_{tgenset-6}$: Temperature of the LFG sent to the engine-generator set 6

Monitoring equipment

Measurements of temperature of LFG which is sent to the flare are performed by installed LFG temperature sensor that is installed in the main LFG pipeline in a section between the centrifugal blowers and the high temperature enclosed flares. Measurements of temperature of LFG which is sent to each one of the 6 engine-generator sets of the project's electricity generation component are performed by 6 LFG temperature sensors installed in an independent section of the LFG pipeline for each engine-generator modular package set prior next to the engine-generator set. It is thus ensured that the temperature of LFG which is sent to the flare and to each element of project's electricity generation component (each engine-generator set) is independently and continuously measured.

LFG temperature sensors used for measuring T_{tflare} (Flare):

Two identical instrument sets were used alternately used during the considered monitoring period. A backup unit of the instrument set is always available. Their specifications are as follows;

- Instrument type: (data transmitter + sensor element (RTD))
- CRVRs instrument/equipment internal ID reference: TIT-02
- Manufacturer:
  - Data transmitter: SMAR Equipamentos Ind. Ltda.
  - Sensor element: Consistec Controles e Sistemas de Automação Ltda.
- Model: TT301 with a RTD PT100 sensor (respectively)
- Accuracy: ± 0.2ºC for the data transmitter and ± 1.0ºC for the sensor
- Serial number (S/N): As per the table below
- Calibration frequency and maintenance requirements: Annual
- Calibration events valid for the considered monitoring period (data transmitter + sensor element set):

Serial Number	Calibration Certificate			Period in use within the considered monitoring period	
	Number	Calibration event date	Validity of the performed calibration event	Starting	Ending
57235 (data transmitter) 110813 (sensor element)	654/2013	16/09/2013	16/09/2014	01/12/2014	31/12/2014
62274 (data transmitter) 110813 (sensor element)	469/2014	31/07/2014	31/07/2015	01/01/2015	24/06/2015
57235 (data transmitter) 110813 (sensor element)	234/2015	20/04/2015	20/04/2016	24/06/2015	02/12/2015

62274 (data transmitter) 110813 (sensor element)	9184/2015	28/09/2015	28/09/2016	02/12/2015	31/12/2015

The calibration events of 16/09/2013. 31/07/2014 and 20/04/2015 were performed by ISOCELL Comércio de Instrumentação Ltda. The calibration event of 28/09/2015 was performed by SGS do Brasil Ltda.

LFG temperature sensor used for measuring $T_{tgenset-1}$ (engine-generator set 1):

- Instrument type: (data transmitter + sensor element (RTD))
- Model: Y1-SEM203P (data transmitter) and G1.U10-P20-B0150-S00 (sensor element)
- Serial number (S/N): E14PT0680
- Dates for performed calibration events valid for the considered monitoring period: 24/07/2014 (Calibration Certificate EL14/0530)

LFG temperature sensor used for measuring $T_{tgenset-2}$ (engine-generator set 2):

- Instrument type: (data transmitter + sensor element (RTD))
- Model: Y1-SEM203P (data transmitter) and G1.U10-P20-B0150-S00 (sensor element)
- Serial number (S/N): E14PT0678
- Dates for performed calibration events valid for the considered monitoring period: 24/07/2014 (Calibration Certificate EL14/0528)

LFG temperature sensor used for measuring $T_{tgenset-3}$ (engine-generator set 3):

- Instrument type: (data transmitter + sensor element (RTD))
- Model: Y1-SEM203P (data transmitter) and G1.U10-P20-B0150-S00 (sensor element)
- Serial number (S/N): E14PT0677
- Dates for performed calibration events valid for the considered monitoring period: 24/07/2014 (Calibration Certificate EL14/0527)

LFG temperature sensor used for measuring $T_{tgenset-4}$ (engine-generator set 4):

- Instrument type: (data transmitter + sensor element (RTD))
- Model: Y1-SEM203P (data transmitter) and G1.U10-P20-B0150-S00 (sensor element)
- Serial number (S/N): E14PT0675
- Dates for performed calibration events valid for the considered monitoring period: 24/07/2014 (Calibration Certificate EL14/0525)

LFG temperature sensor used for measuring $T_{tgenset-5}$ (engine-generator set 5):

- Instrument type: (data transmitter + sensor element (RTD))
- Model: Y1-SEM203P (data transmitter) and G1.U10-P20-B0150-S00 (sensor element)
- Serial number (S/N): E14PT00743
- Dates for performed calibration events valid for the considered monitoring period: 24/07/2014 (Calibration Certificate EL14/0598)

LFG temperature sensor used for measuring $T_{tgenset-6}$ (engine-generator set 6):

- Instrument type: (data transmitter + sensor element (RTD))
- Model: Y1-SEM203P (data transmitter) and G1.U10-P20-B0150-S00 (sensor element)

	- Serial number (S/N): E14PT0679 - Dates for performed calibration events valid for the considered monitoring period: 24/07/2014 (Calibration Certificate EL14/0529)
Measuring/reading/recording frequency:	Continuously measurements are recorded/reported every minute.
Calculation method (if applicable):	Not applicable.
QA/QC procedures:	Monitoring equipment/instruments are calibrated and maintained as per instrument specifications and/or recommendations of their manufacturer. Procedures related to collection/gathering, recording, storing and reporting of monitoring data for the project activity are performed at Companhia Riograndense de Valorização de Resíduos S/A in accordance with detailed working instructions that are included in the company's quality management and control (QA/QC) and environmental management system (EMS).
Purpose of data:	Calculation of baseline emissions
Additional comments:	-

Data/parameter:	**P_t**
Unit	Pa
Description	Pressure of the LFG stream in time interval *t*
Measured/calculated/default	Continuously measured by LFG pressure sensor. Measurements are primarily recorded and reported in mbar. Recorded/reported data is converted into Pascal and data is also reported in this unit, thus meeting the related monitoring requirement as per the PDD.
Source of data	Measured as part of the operation of the project activity by applying appropriate monitoring instruments (pressure sensor) (with recordable electronic signal).
Value(s) of monitored parameter	The monthly emission reduction calculation spreadsheet (that is enclosed to this Monitoring Report) includes measurement data for P_t that are recorded and reported with an every-minute frequency. While measurements are performed by installed 7 LFG pressure sensors (one pressure sensor for the high temperature enclosed flare and one pressure sensor for each individual engine-generator set of the electricity generation facility), the monitoring parameter P_t is thus measured, recorded and reported on the basis of the following sub-parameters: - P_{tflare}: Pressure of the LFG sent to the Flare - $P_{tgenset-1}$: Pressure of the LFG sent to the engine-generator set 1 - $P_{tgenset-2}$: Pressure of the LFG sent to the engine-generator set 2 - $P_{tgenset-3}$: Pressure of the LFG sent to the engine-generator set 3 - $P_{tgenset-4}$: Pressure of the LFG sent to the engine-generator set 4 - $P_{tgenset-5}$: Pressure of the LFG sent to the engine-generator set 5 - $P_{tgenset-6}$: Pressure of the LFG sent to the engine-generator set 6

Monitoring equipment

Measurements of pressure of LFG which is sent to the flare are performed by installed LFG pressure sensor that is installed in the main LFG pipeline in a section between the centrifugal blowers and the high temperature enclosed flares. Measurements of pressure of LFG which is sent to each one of the 6 engine-generator sets of the project's electricity generation component are performed by 6 LFG pressure sensors installed in an independent section of the LFG pipeline for each engine-generator modular package set prior next to the engine-generator set. It is thus ensured that the pressure of LFG which is sent to the flare and to each element of project's electricity generation component (each engine-generator set) is independently and continuously measured.

LFG pressure sensors used for measuring P_{tflare} (Flare):

Three identical instruments were used alternately used during the considered monitoring period. A backup unit of the instrument is always available. Their specifications are as follows;

- CRVR's instrument/equipment internal ID reference: PIT-02
- Manufacturer / model / Serial Number:
  SMAR Equipamentos Ind. Ltda. / LD301 / 249691
  Siemens A.G. / Sitrans P / N1-E704-9211232
  Siemens A.G. / Sitrans P / N1-E704-9211231
- Calibration frequency and maintenance requirements: Annual
- Calibration events valid for the monitoring:

Serial Number	Calibration Certificate			Period in use within the considered monitoring period	
	Number	Calibration event date	Validity of the performed calibration event	Starting	Ending
249691	24/2014	15/01/2014	15/01/2015	01/12/2014	17/12/2014
N1-E704-9211232	799/2014	02/12/2014	02/02/2015	17/12/2014	02/12/2015
N1-E704-9211231	9188/2015	28/09/2015	28/09/2016	02/12/2015	31/12/2015

The calibration events of 15/01/2014 and 02/12/2014 were performed by ISOCELL Comércio de Instrumentação Ltda. The calibration event of 28/09/2015 was performed by SGS do Brasil Ltda.

LFG pressure sensor used for measuring $P_{tgenset-1}$ (engine-generator set 1):

- Model: 2600T
- Serial number (S/N): 2043631
- Calibration frequency and maintenance requirements: Every 2 years (minimum).
- Dates for performed calibration events valid for the considered monitoring period: 23/09/2014
- Validity of the performed calibration event: valid until 23/09/2016 (2 years)

LFG pressure sensor used for measuring $P_{tgenset-2}$ (engine-generator set 2):

- Model: 2600T
- Serial number (S/N): 2043634
- Calibration frequency and maintenance requirements: Every 2 years

	(minimum). - Dates for performed calibration events valid for the considered monitoring period: 22/09/2014 - Validity of the performed calibration event: valid until 22/09/2016 (2 years) *LFG pressure sensor used for measuring $P_{tgenset-3}$ (engine-generator set 3):* - Model: 2600T - Serial number (S/N): 4073985 - Calibration frequency and maintenance requirements: Every 2 years (minimum). - Dates for performed calibration events valid for the considered monitoring period: 22/09/2014 - Validity of the performed calibration event: valid until 22/09/2016 (2 years) *LFG pressure sensor used for measuring $P_{tgenset-4}$ (engine-generator set 4):* - Model: 2600T - Serial number (S/N): 4073993 - Calibration frequency and maintenance requirements: Every 2 years (minimum). - Dates for performed calibration events valid for the considered monitoring period: 23/09/2014 - Validity of the performed calibration event: valid until 23/09/2016 (2 years) - *LFG pressure sensor used for measuring $P_{tgenset-5}$ (engine-generator set 5):* - Model: 2600T - Serial number (S/N): 4073988 - Calibration frequency and maintenance requirements: Every 2 years (minimum). - Dates for performed calibration events valid for the considered monitoring period: 23/09/2014 - Validity of the performed calibration event: valid until 23/09/2016 (2 years) *LFG pressure sensor used for measuring $P_{tgenset-6}$ (engine-generator set 6):* - Model: 2600T - Serial number (S/N): 4073986 - Calibration frequency and maintenance requirements: Every 2 years (minimum). - Dates for performed calibration events valid for the considered monitoring period: 23/09/2014 - Validity of the performed calibration event: valid until 23/09/2016 (2 years)
Measuring/reading/recording frequency:	Continuously measurements are recorded/reported every minute.
Calculation method (if applicable):	Not applicable.
QA/QC procedures:	Monitoring equipment/instruments are calibrated and maintained as per instrument specifications and/or recommendations of manufacturer. Procedures related to collection/gathering, recording, storing and reporting of monitoring data for the project activity are performed at Companhia Riograndense de Valorização de Resíduos S/A in accordance with detailed working instructions that are included in the company's quality management and control (QA/QC) and environmental management system (EMS).
Purpose of data:	Calculation of baseline emissions

Additional comments:	-

Data/parameter:	**$EC_{PJ,grid,y}$**
Unit	MWh
Description	Amount of grid electricity consumed by the project activity during the year *y*
Measured/calculated/default	Continuously measured by electricity meter.
Source of data	Installed electricity meters. By taking into account the layout of the electrical wiring installation sourcing grid electricity to the project site (through different power transformers), consumption of grid-sourced electricity by the project activity is measured continuously by a set of 6 electronic electricity meters (with readings being accumulated). While consumption of grid-sourced electricity is measured and registered in kWh, monitoring data is converted and reported in MWh in order to meet data reporting requirement as per the monitoring plan from the registered PDD.
Value(s) of monitored parameter	Monthly records of grid-sourced electricity consumption valid for the considered monitoring period:

Month	**Amount of consumed grid electricity in the LFG flaring plant (kWh)**	**Amount of consumed grid electricity in the LFG electricity generation plant (kWh)**	**Total amount of consumed grid electricity (kWh)**
Dec. 2014	62,748		62,748
Jan. 2015	64,797		64,797
Feb. 2015	57,099		57,099
Mar. 2015	60,616		60,616
Apr. 2015	52,041		52,041
May 2015	31,716		31,716
Jun. 2015	50,681	39,939	90,620
Jul. 2015	59,176	3,816	62,992
Aug. 2015	58,467	1,947	60,414
Sep. 2015	56,328	3,193	59,521
Oct. 2015	52,771	2,136	54,907
Nov. 2015	54,840	1,728	56,568
Dec. 2015	54,140	3,423	57 563

<table>
<tr><td>Monitoring equipment</td><td>Grid electricity consumed by the project activity during the considered monitoring period was measured separately for each one of the three installed power transformers which supply grid-sourced electricity to the project site. The electricity meters are identified as “220 V”, “440V I” and “440 VII”.

Specification for the installed electricity meters:
- Manufacturer: Ello Sistemas Eletrônicos Ltda.
- Model:
- 2106 D (electricity meters with serial number (S/N) 901193797 and 901193798)
- 2106 for all the remaining electricity meters
- Accuracy: ±1%
- Calibration frequency and maintenance requirements: Every 5 years
- Calibration events valid for the monitoring period:

<table>
<tr><th colspan="2">Instrument</th><th colspan="3">Calibration events</th></tr>
<tr><th>TAG</th><th>Serial Number</th><th>Number of the calibration certificate</th><th>Calibration event date</th><th>Validity of the performed calibration event</th></tr>
<tr><td>220V</td><td>901193798</td><td>-</td><td>09/08/2011</td><td>09/08/2016</td></tr>
<tr><td>440V I</td><td>900192720</td><td>E0273/2011</td><td>25/02/2011</td><td>25/02/2016</td></tr>
<tr><td>440V II</td><td>900192721</td><td>E0397/2011</td><td>25/02/2011</td><td>25/02/2016</td></tr>
</table>

Regarding the LFG electricity generation plant the electricity imported from the grid was directly measured by CCEE – Camera de Comercialização de Energia Elétrica, i.e., Electricity Commercialization Chamber, the entity that controls the electricity generated by electricity generation plants.</td></tr>
<tr><td>Measuring/reading/recording frequency:</td><td>Accumulated values for continuous measurements of grid-sourced electricity consumption are recorded once a month.</td></tr>
<tr><td>Calculation method (if applicable):</td><td>Not applicable.</td></tr>
<tr><td>QA/QC procedures:</td><td>Monitoring equipment/instruments are calibrated and maintained as per instrument specifications and/or recommendations of manufacturer.

Procedures related to collection/gathering, recording, storing and reporting of monitoring data for the project activity are performed at Companhia Riograndense de Valorização de Resíduos S/A in accordance with detailed working instructions that are included in the company’s quality management and control (QA/QC) and environmental management system (EMS).</td></tr>
<tr><td>Purpose of data:</td><td>Calculation of project emissions (due to consumption of grid-sourced electricity by the project activity).</td></tr>
<tr><td>Additional comments:</td><td>The amount of grid electricity consumed by the project activity consists in the sum of the values measured by both electricity meters.</td></tr>
</table>

<table>
<tr><td>Data/parameter:</td><td>$EC_{BL,y}$</td></tr>
<tr><td>Unit</td><td>MWh</td></tr>
<tr><td>Description</td><td>Amount of electricity generated using LFG by the project activity in year y</td></tr>
<tr><td>Measured/calculated/default</td><td>Measured as part of the operation of the project activity by applying appropriate electricity meter(s).</td></tr>
<tr><td>Source of data</td><td>Value for year 2014 is selected. Selected value is the average of monthly official values as calculated and currently made available (published) by the DNA of Brazil. Monthly official values are made available online: http://www.mct.gov.br/index.php/content/view/354731.html#ancora</td></tr>
<tr><td>Value(s) of monitored parameter</td><td>Monthly records of electricity generated by the project activity valid for the considered monitoring period:

<table>
<tr><th>Month</th><th>Amount of electricity generated using LFG (kWh)</th></tr>
<tr><td>Jun. 2015 (25/06/2015 to 30/06/2015)</td><td>485,467</td></tr>
<tr><td>Jul. 2015</td><td>4,695,776</td></tr>
<tr><td>Aug. 2015</td><td>5,251,054</td></tr>
<tr><td>Sep. 2015</td><td>4,973,347</td></tr>
<tr><td>Oct. 2015</td><td>5,286,575</td></tr>
<tr><td>Nov. 2015</td><td>4,993,985</td></tr>
<tr><td>Dec. 2015</td><td>5,099,860</td></tr>
</table>
</td></tr>
<tr><td>Monitoring equipment</td><td>Measured by CCEE – Camera de Comercialização de Energia Elétrica, i.e., Electricity Commercialization Chamber, the entity that controls the electricity generated by electricity generation plants.</td></tr>
<tr><td>Measuring/reading/recording frequency:</td><td>Continuous measurements are aggregated automatically. Accumulated measurement records are reported every month.</td></tr>
<tr><td>Calculation method (if applicable):</td><td>Not applicable.</td></tr>
<tr><td>QA/QC procedures:</td><td>Monitoring equipment/instruments are calibrated and maintained as per instrument specifications and/or recommendations of manufacturer.

Procedures related to collection/gathering, recording, storing and reporting of monitoring data for the project activity are performed at Companhia Riograndense de Valorização de Resíduos S/A in accordance with detailed working instructions that are included in the company’s quality management and control (QA/QC) and environmental management system (EMS).</td></tr>
<tr><td>Purpose of data:</td><td>Calculation of baseline emissions (due to the displacement of an equivalent amount of electricity generated by the project’s new electricity generation facility which would otherwise be generated by existing grid-connected power plants (and addition of new power generation units) within the National Electricity Grid of Brazil).</td></tr>
<tr><td>Additional comments:</td><td>-</td></tr>
</table>

Data/parameter:	$EF_{grid,OM,y}$ = $EF_{grid,OM-DD,y}$
Unit	tCO_2/MWh
Description	Operation margin CO_2 emission factor in year *y* = Dispatch data analysis operating margin CO_2 emission factor in year *y*
Measured/calculated/default	Calculated (based on official monthly values as calculated and published by the DNA of Brazil).
Source of data	Value for year 2014 is selected. Selected value is the average of monthly official values as calculated and currently made available (published) by the DNA of Brazil. Monthly official values are made available online: http://www.mct.gov.br/index.php/content/view/354731.html#ancora
Value(s) of monitored parameter	0.5822 tCO_2/MWh
Monitoring equipment	Not applicable
Measuring/reading/recording frequency:	Values are calculated annually.
Calculation method (if applicable):	Value applicable for year 2014 is calculated by the DNA of Brazil as per applicable guidance of the calculation method "dispatch data analysis operating margin CO_2 emission factor" of the "Tool to calculate the emission factor for an electricity system".
QA/QC procedures:	Procedures related to collection/gathering, recording, storing and reporting of monitoring data for the project activity are performed at Companhia Riograndense de Valorização de Resíduos S/A in accordance with detailed working instructions that are included in the company's quality management and control (QA/QC) and environmental management system (EMS).
Purpose of data:	Calculation of project emissions (due to consumption of grid-sourced electricity by the project activity) and baseline emissions (due to the displacement of an equivalent amount of electricity generated by the project's new electricity generation facility which would otherwise be generated by existing grid-connected power plants (and addition of new power generation units) within the National Electricity Grid of Brazil).
Additional comments:	-

Data/parameter:	$Op_{j,h}$
Unit	-
Description	Operation of the equipment that consumes LFG (engine-generator sets of the electricity generation facility).
Measured/calculated/default	For each equipment unit j using the LFG monitor that the plant is operating in hour h by the monitoring any one or more of the following three parameters: (a) Temperature. Determine the location for temperature measurements and minimum operational temperature based on manufacturer's specifications of the burning equipment. Document and justify the location and minimum threshold in the PDD; (b) Flame. Flame detection system is used to ensure

	that the equipment is in operation; (c) Products generated. Monitor the generation of steam for the case of boilers and air-heaters and glass for the case of glass melting furnances. This option is not applicable to brick kilns. Opj,h=0 when: (a) One of more temperature measurements are missing or below the minimum threshold in hour h (instantaneous measurements are made at least every minute); (b) Flame is not detected continuously in hour h (instantaneous measurements are made at least every minute); (c) No products are generated in the hour h. Otherwise, Opj,h=1
Source of data	Measured as part of the operation of the project activity.
Value(s) of monitored parameter	-
Monitoring equipment	Not applicable
Measuring/reading/recording frequency:	Values are reported on a minute basis.
Calculation method (if applicable):	
QA/QC procedures:	Procedures related to collection/gathering, recording, storing and reporting of monitoring data for the project activity are performed at Companhia Riograndense de Valorização de Resíduos S/A in accordance with detailed working instructions that are included in the company's quality management and control (QA/QC) and environmental management system (EMS).
Purpose of data:	Calculation baseline emissions (due to the displacement of an equivalent amount of electricity generated by the project's new electricity generation facility which would otherwise be generated by existing grid-connected power plants (and addition of new power generation units) within the National Electricity Grid of Brazil).
Additional comments:	-

Data/parameter:	**$F_{CH4,EG,t}$**
Unit	kg
Description	Mass flow of methane in the exhaust gas of the flare(s) on a dry basis at reference conditions in the time period *t*
Measured/calculated/default	Measurements performed by a third party accredited entity.
Source of data	Related measurements were performed by the independent third party inspection services company "BIOAGRI Ambiental Ltda." Biannual measurements of mass flow of methane in the exhaust gas are performed on the basis of measurements of CH_4 concentration in a collected gas sample + measurements of speed of exhaust gas in the upper section of the flare with one hour of duration each. Measurements are performed as per applicable guidance of the following standards: US-EPA Method 25A – Determination Of Total Gaseous Organic Concentration Using a Flame Ionization Analyzer (available online: http://www.epa.gov/ttnemc01/promgate/m-25a.pdf); CETESB L9.221 - *Dutos e chaminés de fontes estacionárias - determinação*

	dos pontos de amostragem: procedimento (translated into English language as "Stacks and chimneys in stationary emission sources- Sampling points determination procedure) (available online: http://www.cetesb.sp.gov.br/userfiles/file/servicos/normas/vigentes/L9.221_Dutos%20e%20chamin%C3%A9s%20de%20fontes%20estacion%C3%A1rias%20-%20determina%C3%A7%C3%A3o%20dos.pdf) CETESB L9.222 - *Dutos e chaminés de fontes estacionárias - determinação da velocidade e vazão dos gases: método de ensaio* (translated into English language as "Stacks and chimneys in stationary emission sources – Determination of speed and outflow of gases) (available online: http://www.cetesb.sp.gov.br/userfiles/file/servicos/normas/vigentes/L9.222_Dutos%20e%20chamin%C3%A9s%20de%20fontes%20estacion%C3%A1rias%20-%20determina%C3%A7%C3%A3o%20da.pdf)
Value(s) of monitored parameter	For the determination of values of $F_{CH4,EG,t}$, average of the accumulated mass of methane measured during one hour measurements are considered (average of every-minute measurements). The table below summarizes the performed biannual determination of $F_{CH4,EG,t}$ for the installed flare valid for the considered monitoring period: **Measurements performed on 16/02/2015 (kg)**: 0.7493 **Measurements performed on 05/08/2015 (kg)**: 23.9967
Monitoring equipment	Measurements were performed by the independent 3rd party inspection service company "BIOAGRI Ambiental Ltda." using an appropriated chromatographer and a pitot tube
Measuring/reading/recording frequency:	Biannual
Calculation method (if applicable):	-
QA/QC procedures:	Procedures related to collection/gathering, recording, storing and reporting of monitoring data for the project activity are performed at Companhia Riograndense de Valorização de Resíduos S/A in accordance with detailed working instructions that are included in the company's quality management and control (QA/QC) and environmental management system (EMS). BIOAGRI Ambiental Ltda. is a licensed independent third party inspections services company specialized in inspections and testing of air emissions from stationary sources. In Brazil, operation of inspection entities and labs are regulated by the Instituto Nacional de Metrologia, Qualidade e Tecnologia (INMETRO) (the Brazilian national authority for metrology and certification affairs).
Purpose of data:	Calculation of baseline emissions
Additional comments:	-

Data/parameter:	**$T_{EG,m}$**
Unit	^{o}C

<table>
<tr><td>Description</td><td>Temperature in the exhaust gas of the enclosed flare in minute m</td></tr>
<tr><td>Measured/calculated/default</td><td>Continuously measured by thermocouples installed in the upper section of the flare</td></tr>
<tr><td>Source of data</td><td>Measured as part of the operation of the project activity by applying appropriate monitoring instruments (thermocouples) (with recordable electronic signal).</td></tr>
<tr><td>Value(s) of monitored parameter</td><td>Values for the installed high temperature enclosed flares are reported in the monthly emission reduction calculation spreadsheets (that are enclosed to this Monitoring Report). Measurement data is recorded and reported with an every-minute frequency.</td></tr>
<tr><td>Monitoring equipment</td><td>Two identical equipment were used simultaneously during the considered monitoring period. Their specifications are as follows;
- SIL’s instrument/equipment internal ID reference: TT-04 and TT-05
- Manufacturer: ECIL Met Tec Ltda.
- Model: ATC-204, type N
- Accuracy: ±0.75%
- Calibration frequency and maintenance requirements: Every 2 years
- Calibration events valid for the monitoring period:

<table>
<tr><th rowspan="2">Instrument
TAG</th><th rowspan="2">Calibration certificate</th><th rowspan="2">Calibration event date</th><th rowspan="2">Validity of the performed calibration event</th><th colspan="2">Period in use within the considered monitoring period</th></tr>
<tr><th>Starting</th><th>Ending</th></tr>
<tr><td>TT-04</td><td>0605/14</td><td>17/01/2014</td><td>17/01/2016</td><td>01/12/2014</td><td>31/12/2014</td></tr>
<tr><td>TT-05</td><td>0606/14</td><td>17/01/2014</td><td>17/01/2016</td><td>01/12/2014</td><td>31/12/2014</td></tr>
<tr><td rowspan="2">TT-04</td><td>466/15</td><td>29/01/2015</td><td>29/01/2016</td><td rowspan="2">01/01/2015</td><td rowspan="2">31/12/2015</td></tr>
<tr><td>10412/15</td><td>26/11/2015</td><td>26/11/2016</td></tr>
<tr><td rowspan="2">TT-05</td><td>465/15</td><td>29/01/2015</td><td>29/01/2016</td><td rowspan="2">01/01/2015</td><td rowspan="2">31/12/2015</td></tr>
<tr><td>10413/15</td><td>26/11/2015</td><td>26/11/2016</td></tr>
</table>

The calibration events of 17/01/2014 and 29/01/2015 were performed by ECIL Produtos e Sistemas de Medição e Controle Ltda. The calibration events of 26/11/2015 were performed by SGS do Brasil Ltda.</td></tr>
<tr><td>Measuring/reading/recording frequency:</td><td>Continuously measurements are recorded/reported every minute.</td></tr>
<tr><td>Calculation method (if applicable):</td><td>-</td></tr>
<tr><td>QA/QC procedures:</td><td>Monitoring equipment/instruments are calibrated and maintained as per instrument specifications and/or recommendations of manufacturer.

Procedures related to collection/gathering, recording, storing and reporting of monitoring data for the project activity are performed at Companhia Riograndense de Valorização de Resíduos S/A in accordance with detailed working instructions that are included in the company’s quality management and control (QA/QC) and environmental management system (EMS).</td></tr>
<tr><td>Purpose of data:</td><td>Calculation of baseline emissions</td></tr>
<tr><td>Additional comments:</td><td>Measurements outside the operational temperature specified/recommended</td></tr>
</table>

	by the manufacturer may indicate that the flare is not functioning correctly and may require maintenance. Unexpected changes such as a sudden increase/drop in temperature can occur for different reasons. As part of the monitoring procedure, these events are noted in the site records along with any corrective action that was implemented to correct the issue. Measurements are required to determine if manufacturer's flare specifications for operating temperature are met.

Data/parameter:	**$Flame_m$**
Unit	Flame status "*on*" or flame status "*off*"
Description	Flame detection of flare in the minute *m*
Measured/calculated/default	Continuously measured by Ultra violet (UV) flame detector
Source of data	Whenever flame is detected in the flare, flame status "*on*" or "1" value is attributed. Whenever no flame is detected in the flare, flame status "*off*" or "0" is attributed.
Value(s) of monitored parameter	Values for the installed high temperature enclosed flare are reported in the monthly emission reduction calculation spreadsheets (that is enclosed to this Monitoring Report). Measurement data is recorded and reported with an every-minute frequency.
Monitoring equipment	*Specifications and calibration details for the installed/utilized UV Flame detector:* - Manufacturer: Honeywell Analytics Ltd. - Model: C7061A Dynamic Se - lf-Check Ultra-Violet Flame Detector - Serial Number: 1037 1 - Calibration frequency: No calibration is required as the equipment has a self-checking function.
Measuring/reading/recording frequency:	Continuously measurements are recorded/reported every minute.
Calculation method (if applicable):	Not applicable
QA/QC procedures:	Monitoring equipment/instruments are calibrated and maintained as per instrument specifications and/or recommendations of manufacturer. Procedures related to collection/gathering, recording, storing and reporting of monitoring data for the project activity are performed at Companhia Riograndense de Valorização de Resíduos S/A in accordance with detailed working instructions that are included in the company's quality management and control (QA/QC) and environmental management system (EMS).
Purpose of data:	Calculation of baseline emissions
Additional comments:	Not applicable.

Data/parameter:	**$Maintenance_y$**
Unit	Calendar dates

Description	Maintenance events completed in year *y* as monitored by the project participants.
Measured/calculated/default	-
Source of data	Maintenance logs
Value(s) of monitored parameter	The following relevant maintenance events (inspection and maintenance services) are applicable for the flares during the considered monitoring period: - 03/02/2015: General inspection/maintenance service on the Flare (incl. inspection of the condition of the flare isolation ceramics revetment material, checking of conditions of the LPG supply valve for pilot flame, checking of condition/function of the air inlet dumpers, checking of the conditions of the thermocouples, checking of the condition of the UV flame detector, checking of the condition of the flame arrester valve, checking of the conditions of the LFG injectors, checking of painting conditions). - 16/07/2015: General inspection/maintenance service on the Flare (incl. inspection of the condition of the flare isolation ceramics revetment material, checking of conditions of the LPG supply valve for pilot flame, checking of condition/function of the air inlet dumpers, checking of the conditions of the thermocouples, checking of the condition of the UV flame detector, checking of the condition of the flame arrester valve, checking of the conditions of the LFG injectors, checking of painting conditions). As per the applied maintenance practice for the project activity, general inspection/maintenance services on the flare are opportunely performed during planned or unplanned interruptions of operation of the flare within a time interval between 2 performed inspection/maintenance services events never higher than 6 months. The expected lifetime for the isolation ceramics revetment material for the flare is of at least 10 years (as established in details for the ex-ante determined parameter "Manufacturer's flare specifications for temperature, flow rate and maintenance schedule interval" ($SPEC_{flare}$)). Performed maintenance and overhauling services in the flare are performed under by specialized technical service team under conformance with maintenance requirements for the flares (as established by equipment manufacturer) and as required by the ex-ante determined parameter $SPEC_{flare}$. Further details about the parameter $SPEC_{flare}$ are included in Section D.1.
Monitoring equipment	Not applicable.
Measuring/reading/recording frequency:	Not applicable.
Calculation method (if applicable):	Not applicable.
QA/QC procedures:	The maintenance event logs and documentation for the whole project activity are recorded as per requirement of the company's quality and control (QA/QC) and environmental management (EMS) system that is implemented for activities undertaken at the CRR landfill.
Purpose of data:	Calculation of baseline emissions

Additional comments:	Monitoring of this parameter is required for the case of enclosed flare and the project participant selects Option B to determine flare efficiency. These dates are required so that they can be compared to the maintenance schedule to check that maintenance events were completed within the minimum time between maintenance events specified by the manufacturer ($SPEC_{flare}$).

Data/parameter:	**$FC_{LPG,y}$**
Unit	ton
Description	Quantity of LPG consumed by the project activity in year *y*
Measured/calculated/default	Measured.
Source of data	Monitored values of $FC_{LPG,y}$ are based on measurements performed by the local LPG distribution company Liquigás Distribuidora S.A.
Value(s) of monitored parameter	

LPG purchasing receipt		Reported amount of purchased LPG[11]
Number	**Date**	
1958	09/07/2014	2 * 45 kg = 90 kg
2032	21/12/2014	2 * 45 kg = 90 kg
2047	03/02/2015	2 * 45 kg = 90 kg
2068	14/04/2015	2 * 45 kg = 90 kg
2115	28/06/2015	2 * 45 kg = 90 kg

As per the adopted monitoring procedure, the total amount of LPG consumed by the project activity during the considered monitoring period was measured as 540 kg (0.54 ton).

LPG was consumed for lighting/igniting the flare (flare pilot).
.

[11] LPG supply is based on supply of filled LPG cylinders with 45 kg of net mass of LPG.

Monitoring equipment	LPG consumption was monitored based on monitoring of the quantity of purchased LPG cylinders for which the amount of LPG filled are checked and monitored by the LPG distribution company Liquigás Distribuidora S.A. at the LPG filling station / distributor warehouse through the use of appropriate weight scale. Specifications for the weight scale used for the monitoring/checking the amount of LPG filled in the LPG cylinders supplied are summarized below: *Specifications of the weight scale for measurements of FC_{LPG}:* - Manufacturer: Mettler-Toledo Inc. - Model: IND560 - Capacity: max. 250 kg - Serial Number: 10582593 - Date of valid calibration: 08/03/2012 (Calibration Certificate 9006087413).
Measuring/reading/recording frequency:	Amount of LPG is measured upon the supply of cylinders of LPG with 45 kg capacity each, and cross checked with LPG purchasing receipts.
Calculation method (if applicable):	Not applicable.
QA/QC procedures:	The amount of consumed LPG is cross-checked with internal records of cost expenditures for fuel LPG as per the internal financial/accounting management system of Companhia Riograndense de Valorização de Resíduos S/A. Monitoring equipment/instruments are calibrated and maintained as per instrument specifications and/or recommendations of manufacturer. Procedures related to collection/gathering, recording, storing and reporting of monitoring data for the project activity are performed at Companhia Riograndense de Valorização de Resíduos S/A in accordance with detailed working instructions that are included in the company's quality management and control (QA/QC) and environmental management system (EMS).
Purpose of data:	Calculation of project emissions (due to consumption of LPG by the project activity).
Additional comments:	-

Data/parameter:	**$NCV_{LPG,y}$**
Unit	GJ/ton LPG
Description	Net calorific value of the fuel LPG in year *y*
Measured/calculated/default	Default value is selected.
Source of data	National default value as per the Brazilian National Energetic Balance Report for year 2014 (Balanço Energético Nacional (BEN) – 2015) / Table VIII.9 – Specific Mass and Heating Values (Higher Heating Value). This annual report is the latest issued version and it is based on data valid for year 2014. This official document was published by the public entity Empresas de Pesquisas Energéticas (EPE). While create and established in accordance

	with the Federal Law 10.847 of 15/03/2004, the EPE is a governmental entity that undertakes energy planning related investigation and research services. The BEN-2014 report is available online: https://ben.epe.gov.br/BENRelatorioFinal.aspx?anoColeta=2015&anoFimColeta=2014 Reported value in kcal/kg is converted into GJ/ton.
Value(s) of monitored parameter	46.5
Monitoring equipment	Not applicable.
Measuring/reading/recording frequency:	In accordance with the PDD, as national default value is considered, an every year monitoring frequency is thus applied.
Calculation method (if applicable):	Not applicable.
QA/QC procedures:	Procedures related to collection/gathering, recording, storing and reporting of monitoring data for the project activity are performed in accordance with detailed working instructions that are included in the company's quality management and control (QA/QC) and environmental management system (EMS).
Purpose of data:	Calculation of project emissions (due to consumption of LPG by the project activity)
Additional comments:	-

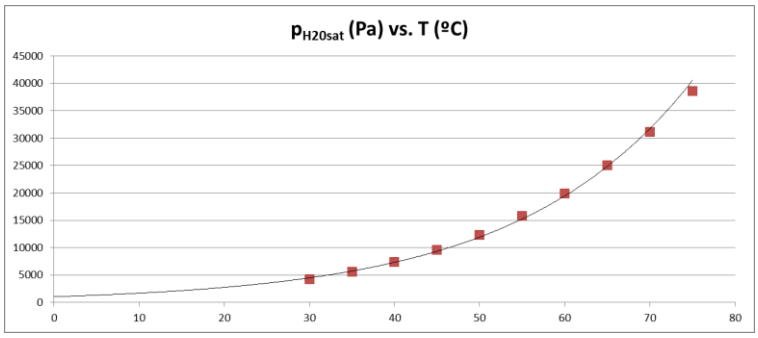
Data/parameter:	**$EF_{CO2,LPG,y}$**
Unit	tCO_2/GJ LPG
Description	CO_2 emission factor of fuel LPG in year *y*
Measured/calculated/default	Default value is selected.
Source of data	Value is selected as per 2006 IPCC Guidelines on National GHG Inventories (applicable value at upper limit of uncertainty at 95% confidence interval as provided in Table 1.4 of Chapter 1 of Vol. 2 (Energy)).
Value(s) of monitored parameter	0.0656
Monitoring equipment	Not applicable.
Measuring/reading/recording frequency:	In accordance with the PDD, as IPCC default value is considered, an every year monitoring frequency is thus applied.
Calculation method (if applicable):	Not applicable.
QA/QC procedures:	Procedures related to collection/gathering, recording, storing and reporting of monitoring data for the project activity are performed in accordance with detailed working instructions that are included in the company's quality management and control (QA/QC) and environmental management system (EMS).
Purpose of data:	Calculation of project emissions (due to consumption of LPG by the project activity)
Additional comments:	-

Data/parameter:	**$p_{H2O,t,Sat}$**
Unit	Pa
Description	Saturation pressure of H_2O at temperature T_t in time interval *t*
Measured/calculated/default	Default values as per selected literature.
Source of data	Data selected as per the literature "*Fundamentals of Classical Thermodynamics*". Authors: Gordon J. Van Wylen, Richard E. Sonntag and Borgnakke; 3rd Edition 1986. Published by John Wiley & Sons, Inc.
Value(s) of monitored parameter	$p_{H2O,t,Sat}$ is determined as a function of temperature of LFG (T_t by the equation: $p_{H2O,t,sat}$ = 1,031.3 * e ^ (0.049 * T_t), with a correlation coefficient of R^2 = 0.998. Further details are presented below in "Calculation Method".
Monitoring equipment	Not applicable.
Measuring/reading/recording	Not applicable

frequency:	
Calculation method (if applicable):	The Absolute Vapor Pressure of Water was obtained from the mentioned literature and is presented in the following table within the rage of interest for the required calculations:

Temperature	**$p_{H2O,t,Sat}$**
ºC	Pa
30	4,246
35	5,628
40	7,384
45	9,593
50	12,349
55	15,758
60	19,940
65	25,030
70	31,190
75	38,580

The following graphic represents the above data and the regression calculated to adjust data:



As $p_{H2O,t,Sat}$ is a function of temperature and best represented by an exponential function, the exponential regression method is applied to the above data and the following equation is obtained:

$p_{H2O,t,sat} = 1{,}031.3 * e^{(0.049 * Tt)}$

This equation represents the above data with a correlation coefficient of $R^2 = 0.998$.

Thus, by applying the above equation, $p_{H2O,t,sat}$ is determined as a function of the temperature.

QA/QC procedures:	Not applicable.
Purpose of data:	Calculation of baseline emissions.
Additional comments:	It is important to note that $p_{H2O,t,Sat}$ is only used in the context of the determination of the methane mass flow in the residual gas (in a dry basis) for each minute *m* of the two time periods in year *y* during which the flare efficiency is measured (parameter $F_{CH4,RG,t}$). The calculations of every-minute values of $p_{H2O,t,Sat}$ for the 2 time periods during which the flare efficiency is measured is thus presented only in the flare efficiency calculation spreadsheet. “MR 9 - Recreio - V.1 - 10.13.2016 - FE”.

Data/parameter:	**$EC_{PJ,captive,y}$**
Unit	MWh
Description	Quantity of electricity generated in captive diesel backup generator during the year *y*
Measured/calculated/default	Measurements by the project participants.
Source of data	Electricity meters. While consumption of electricity sourced by the captive off-grid electricity generator is measured and registered in kWh, data is converted and also reported in MWh in order to meet data reporting requirement as per the monitoring plan from the registered PDD.
Value(s) of monitored parameter	Monthly records of captive diesel sourced electricity consumption valid for the considered monitoring period:

Month	**Amount of consumed diesel backup sourced electricity (kWh)**
Dec. 2014	2,760
Jan. 2015	800
Feb. 2015	120
Mar. 2015	0
Apr. 2015	160
May 2015	200
Jun. 2015	80
Jul. 2015	1,480
Aug. 2015	400
Sep. 2015	1,960
Oct. 2015	3,680
Nov. 2015	1,520
Dec. 2015	1,600

Monitoring equipment	There are 2 electricity meters to measure the amount of electricity sourced by the installed captive off-grid backup electricity generator, (fuelled by diesel). The highest measurement value from the set of meters is considered in the context of the determination of related project emissions. The installed electricity meters have the following specifications: - Manufacturer: Ello Sistemas Eletrônicos Ltda. - Model: 2106 - Serial Number: 00008150 and 00045288 - Accuracy: ±1% - Calibration frequency and maintenance requirements: 5 years Both installed electricity meters are under operation since 08/02/2012. The installed instruments are made in Brazil and are of construction and design approved by the Brazilian Metrology authority INMETRO[12]. As part the manufacturing process and commercialization approvals valid for the installed electricity meters, such meters are not any longer required to be individually calibrated by the equipment manufacturer prior to be made available to commercialization and later utilization. The manufacturing, calibration, verification and testing procedures applicable for the installed electricity meters are regulated by the INMETRO's Decree No. 431 (dated 04/12/2007)[13]. This decree is currently replaced by the more recently passed INMETRO's Decree No. 587 (dated 05/11/2012)[14]. By taking into account the design and construction technology currently commonly applied for electronic electricity meters for active and reactive power, both Decree No. 431 and Decree No. 587 establish that homologated electronic electricity meters manufactured in Brazil in controlled production batches are to be calibrated, verified and tested on a sampling basis (by applying specific calibration, testing and verification procedures which are approved and prescribed by INMETRO). Besides of the applicable calibration, verification and testing procedures under responsibility of the instrument manufacturer, as indicated in the operation and commissioning manual/report for the installed captive off-grid electricity generator[15] issued by 5EC Engenharia Ltda., the installed electricity meters S/N 00008150 and 00045288 were also tested and approved as part of the related commissioning work performed by 5EC Engenharia Ltda. Results of performed field verifications in the instruments are presented in the operation and commissioning manual/report for the installed captive off-grid electricity generator. By taking into account above-presented information and also by considering that the electricity meters are to be calibrated at least every 5 years (as declared in the service and operation manual for the installed electricity meters[16]), the installed instruments met applicable calibration requirements.

[12] Information confirming the approval of the applied manufacturing and testing/verification procedures for the electricity meter model 2106 (manufactured by Ello Sistemas Eletrônicos Ltda.) is available online: http://www.inmetro.gov.br/pam/pdf/PAM004192.pdf

[13] The INMETRO's Decree No. 431 is available online: http://www.inmetro.gov.br/rtac/pdf/RTAC001248.pdf

[14] The INMETRO's Decree No. 587 is available online:

http://www.inmetro.gov.br/legislacao/rtac/pdf/RTAC001929.pdf

[15] The operation and commissioning manual/report for the installed equipment package of the captive off-grid electricity generator (fuelled by diesel) is titled "*SCQB SMCEE Manual de Oper. e Manut. - GERADOR ass PP*". The results of the performed measurement tests in the installed electricity meters are presented under Section "*Relatório de Verificação Inicial*" of the manual/report.

[16] The service and operation manual for the electricity meter 2106 model manufactured by Ello Sistemas Eletrônicos Ltda. Is available online at http://www.elonet.com.br/downloads/man2106_002.pdf

Measuring/reading/recording frequency:	The reading of each meter is recorded manually every week, and converted to spreadsheets.
Calculation method (if applicable):	Not applicable.
QA/QC procedures:	
Purpose of data:	Data is used for the determination of project emissions.
Additional comments:	During the present monitoring period the values registered by the two meters are exactly the same.

Data/parameter:	**CAPEX and OPEX**
Unit	BRL (values in Brazilian Real (BRL) will be converted and also reported in Euros (EUR))
Description	Total investment to implement the project and total cost to operate the project
Measured/calculated/default	Measured
Source of data	Engineering procurement and construction contracts; and maintenance contracts and internal records
Value(s) of monitored parameter	CAPEX

Year	Description	Cost (R$)	Exchange rate (R$/€)	Cost (€)
2006	Construction of the LFG collection and flaring system	3,500,000	2.73	1,281,629
2009	Technical study of the Expansion of the LFG collection and flaring system	270,000	2.76	97,565
2010	Expansion of the LFG collection and flaring system	839,491	2.33	360,096
2015	Expansion of the LFG collection and flaring system	1,380,900	3.70	373,176
2015	Construction of the LFG Electricity generation plant	3,000,000	3.70	810,723
Total		8 990,391		2,923,188

OPEX

Year	Description	Cost (R$)	Exchange rate (R$/€)	Cost (€)
2015	Staff and maintenance costs involved in the operation of the collection and flaring system	3,500,000	3.70	945,844
2015	Staff and maintenance costs involved in the operation of new electricity generation facility	2,848,019	3.70	769,652

Monitoring equipment	Not applicable.
Measuring/reading/recording frequency:	Total investment value will be calculated by project participants based on documentation from equipment suppliers, construction contractors and maintenance contracts. Operational costs will be calculated based on internal records.
Calculation method (if applicable):	Not applicable.
QA/QC procedures:	-
Purpose of data:	Data will be occasionally used by the CDM Executive Board.
Additional comments:	The information provided for CAPEX will indicate the investment made: (i) in the collection and flaring system; (ii) in the new electricity generation facility and its connection to the National Electricity Grid of Brazil. The information supplied for OPEX shall indicate the costs for: (i) staff and maintenance involved in the operation of the collection and flaring system; and (ii) staff and maintenance involved in the operation of new electricity generation facility. The monitoring of this parameter is required as the simplified procedures to identify the baseline scenario and demonstrate additionality was applied as outlined in Section B.4 and B.5 of the previously registered PDD valid for the currently expired 1st t-year renewable crediting period.

Data/parameter:	**Tariff of electricity exported**
Unit	BRL (values in Brazilian Real (BRL) will be converted and also reported in Euros (EUR))
Description	Tariff of the electricity exported
Measured/calculated/default	Measured
Source of data	Power purchase agreement
Value(s) of monitored parameter	

Year	Tariff (R$/MWh)	Exchange rate (R$/€)	Tariff (€/MWh)
2015	50.59	3.70	13.67

Monitoring equipment	Not applicable.
Measuring/reading/recording frequency:	At the first issuance request after each phase of the project is fully implemented.
Calculation method (if applicable):	Not applicable.
QA/QC procedures:	-
Purpose of data:	Data will be occasionally used by the CDM Executive Board.
Additional comments:	The monitoring of this parameter is required as the simplified procedures to identify the baseline scenario and demonstrate additionality is applied as outlined in Section B.4 and B.5 of the previously registered PDD valid for the currently expired 1st t-year renewable crediting period.

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 baseline emissions achieved by the project activity during the considered monitoring period:

- Volumetric flow of LFG stream in time interval t on a dry basis for *j* (where *j* is the LFG delivery pipeline to each item of electricity generation and LFG delivery pipeline to the flare(s)) ($V_{t,db,j}$)
- Volumetric fraction of CH4 in the collected LFG in time interval t on a dry basis for *j* (where *j* is the LFG delivery pipeline to each item of electricity generation and LFG delivery pipeline to the flare(s)) ($v_{CH4,t,db,j}$)
- Mass flow of the LFG stream in time interval t on dry basis for *j* (where *j* is the LFG delivery pipeline to each item of electricity generation and LFG delivery pipeline to the flare(s)) ($M_{t,db,j}$)
- Quantity of fuel Diesel combusted by the captive off-grid electricity generator ($FC_{Diesel,y}$)
- Net calorific value of the fuel Diesel in year *y* ($NCV_{Diesel,y}$)
- CO_2 emission factor of fuel Diesel in year *y* ($EF_{CO2,Diesel,y}$)
- Quantity of electricity generated in captive diesel backup generator during the year *y* ($EG_{Diesel\text{-}Generator,y}$)

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

>>
Baseline emissions (BE_y) are determined (in tCO_2e) as follows:

$$BE_y = BE_{CH4,y} + BE_{EC,y}$$

Where:

$BE_{CH4,y}$ Baseline emissions of methane from the SWDS[17].

$BE_{EC,y}$ Baseline emissions associated with electricity generation in year *y* (in tCO_2e/yr) [18].

[17] SWDS = Solid Waste Disposal Site. For the case of the project activity, the SWDS is the CRR landfill.

[18] It is important to note that, as outlined in Section A.1, while the electricity generation facility only started its operations on 02/07/2015, no LFG was thus utilized for electricity generation during the period from 01/12/2014 to 25/06/2015 within the considered monitoring period. Thus, $BE_{EC,y}$ is null during such period.

Determination of baseline emissions associated with electricity generation ($BE_{EC,y}$)

Baseline emissions associated with electricity generation ($BE_{EC,y}$) is determined as follows:

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

Where:

$EC_{BL,y}$ Net amount of electricity generated using LFG in year y (in MWh). As per the applied monitoring procedure, monthly records of electricity generated using LFG by the project activity for the considered monitoring period are summarized below:

Month	Amount of electricity generated using LFG (kWh)
Jun. 2015 (25/06/2015 to 30/06/2015)	485,467
Jul. 2015	4,695,776
Aug. 2015	5,251,054
Sep. 2015	4,973,347
Oct. 2015	5,286,575
Nov. 2015	4,993,985
Dec. 2015	5,099,860

Additional monitoring details about the monitoring parameter $EC_{BL,y}$ are included in Section D.2.

$EF_{EL,grid,y}$ Emission factor for grid sourced electricity in year *y* (in tCO_2/MWh). $EF_{EL,grid,y}$ is determined as the combined margin emission factor ($EF_{grid,CM,y}$) that is calculated as the weighted average of the operating margin and build margin emission factors. To weight these two factors, the default values applicable to both for the 2nd crediting period are applied. The combined margin emission factor is thus obtained as follows:

$$EF_{grid,CM,y} = w_{OM} * EF_{grid,OM,y} + w_{BM} * EF_{grid,BM,y}$$

Where:

w_{OM} Weighting of operating margin emissions factor. w_{OM} is ex-ante selected as 0.25%. Further details about the ex-ante selected parameter w_{OM} are included in Section D.1 and in the registered PDD.

w_{BM} Weighting of operating margin emissions factor. w_{BM} is ex-ante selected as 0.75%. Further details about the ex-ante selected parameter w_{BM} are included in Section D.1 and in the registered PDD.

$EF_{grid,OM,y}$ Operating margin CO_2 emission factor in year *y*. As per the applied monitoring procedure, the selected value for the monitoring parameter $EF_{grid,OM,y}$ = $EF_{grid,OM-DD,y}$ (0.5822 tCO_2/MWh) represents to the official average value for year (vintage) 2014 as calculated and made public available by

the DNA of Brazil. Further details about the monitoring parameter $EF_{grid,OM}$ are included in Section D.2.

$EF_{grid,BM,y}$ Build margin CO_2 emission factor in year *y*. $EF_{grid,BM}$ is ex-ante determined as 0.2963 tCO_2/MWh. Further details about the ex-ante determined parameter $EF_{grid,BM}$ are included in Section D.1.

For the considered monitoring period, $EF_{EL,grid,y}$ is thus calculated as 0.3678 tCO_2/MWh.

Baseline emissions associated with electricity generation in year *y* ($BE_{EC,y}$) for the considered monitoring period are reported as 13,588 tCO_2e.

Determination of baseline emissions of methane from the SWDS ($BE_{CH4,y}$):

Baseline emissions of methane from the SWDS ($BE_{CH4,y}$) are determined as follows:

$BE_{CH4,y}$ Baseline emissions of methane from the SWDS[19]. As established by both ACM0001 (version 15.0) and the registered PDD, the determination of $BE_{CH4,y}$ is based on the amount of methane that is actually captured and combusted (through destruction utilization as gaseous fuel for electricity generation) by the project activity and also by taking into account the amount of methane that, in the absence of the project activity (baseline scenario), would be otherwise captured and destroyed in the landfill by pre-project previously existent conventional LFG destruction system. In addition, the effect of methane oxidation (that, as per ACM0001 (version 15.0) is assumed as existing in the baseline and not in the project scenario) is also taken into account. $BE_{CH4,y}$ is thus determined as follows:

$$BE_{CH4,y} = ((1 - OX_{top\_layer}) * F_{CH4,PJ,y} - F_{CH4,BL,y}) * GWP_{CH4}$$

Where:

OX_{top_layer} Fraction of methane in the LFG that would be oxidized in the top layer of the SWDS in the baseline scenario. OX_{top_layer} is ex-ante determined as 10%. Further details about the selection of the value for OX_{top_layer} is included in Section D.1 and in the PDD.

$GWP_{CH4,y}$ Global warming potential of CH_4. GWP_{CH4} is ex-ante determined as 25. Further details about the selection of the value for GWP_{CH4} is included in Section D.1 and in the PDD.

$F_{CH4,BL,y}$ Amount of methane in the LFG that would be flared in the baseline scenario (absence of project activity). As outlined in Section B.6.1 of the PDD, $F_{CH4,BL,y}$ is calculated as follows:

$$F_{CH4,BL,y} = 0.2 * F_{CH4,PJ,capt,y}$$

Where:

$F_{CH4,PJ,capt,y}$ Amount of methane collected by the project activity. In the particular case of the project activity and for the considered monitoring period (no LFG being utilized for electricity generation during the period from

[19] SWDS = Solid Waste Disposal Site. For the case of the project activity, the SWDS is the CRR landfill.

01/12/2014 to 25/06/2015), $F_{CH4,PJ,capt,y}$ is determined as follows:

Period from 01/12/2014 to 25/06/2015 (prior of starting of operation of the project's electricity generation component):

While during the share of the considered monitoring period encompassing the period 01/12/2014 to 25/06/2015 all collected LFG was sent for combustion in the high temperature enclosed flare, $F_{CH4,PJ,capt,y}$ is thus determined as follows for such period:

$$F_{CH4,PJ,capt,y} = F_{CH4,sent,flare,y}$$

Where:

$F_{CH4,sent,flare,y}$	Amount of methane in the LFG which is sent to the flare. Details for the determination of every-minute values for $F_{CH4,sent\_flare,y}$ are presented below (under "*Determination of every-minute values for the calculation parameters $F_{CH4,sent\_flare,y}$ and $F_{CH4,EL,y}$*").

Period from 25/06/2015 to 31/12/2015 (right after the starting of operation of the project's electricity generation component):

While during the share of the considered monitoring encompassing the period from 25/06/2015 to 31/12/2015 collected LFG was sent for combustion both in the high temperature enclosed flare and in the engine-generator sets of the project's electricity generation component, $F_{CH4,PJ,capt,y}$ is thus determined as follows for such period:

$$F_{CH4,PJ,capt,y} = F_{CH4,sent,flare,y} + F_{CH4,EL,y}$$

Where:

$F_{CH4,EL,y}$	Amount of methane in the LFG which is used for electricity generation in year y (in tCH_4/yr). Details for the determination of every-minute values for $F_{CH4,EL,y}$ are presented below (under "*Determination of every-minute values for the calculation parameters $F_{CH4,sent\_flare,y}$ and $F_{CH4,EL,y}$*").

For the considered monitoring period, the accumulated value for $F_{CH4,BL,y}$ is calculated as 3,975 tCH_4.

$F_{CH4,PJ,y}$	Amount of methane in the LFG which is flared and/or used in the project activity. In the particular case of the project activity, $F_{CH4,PJ,y}$ is determined as follows:

$F_{CH4,PJ,y} = F_{CH4,flared,y} + F_{CH4,EL,y}$

Where:

$F_{CH4,EL,y}$ Amount of methane in the LFG which is used for electricity generation in year *y* (in tCH_4/yr)[20] (during the share of the considered monitoring period encompassing the period from 02/07/2015 to 31/12/2015). Details for the determination of every-minute values for $F_{CH4,EL,y}$ for each individual engine-generator set during the period are presented below (under "*Determination of every-minute values for the calculation parameters $F_{CH4,sent\_flare,y}$ and $F_{CH4,EL,y}$*").

$F_{CH4,flared,y}$ Amount of methane in the LFG flared by the project activity (in tCH_4) during the whole monitoring period. In accordance with calculation guidance included in the PDD and by following applicable guidance of the "Tool to determine the mass flow of a greenhouse gas in a gaseous stream", for each individual flare every-minute values for $F_{CH4,flared,y}$ are determined as the difference between the amount of methane supplied to the flares and residual methane emissions from combustion of LFG in the flares, as follows:

$F_{CH4,flared,y} = F_{CH4,sent\_flare,y} – (PE_{flare,y} / GWP_{CH4})$

Where:

$F_{CH4,sent\_flare,y}$ Amount of methane in the LFG which is sent to the flare. Details for the determination of every-minute values for $F_{CH4,sent\_flare,y}$ for each individual flare are presented below (under "*Determination of every-minute values for the calculation parameters $F_{CH4,sent\_flare,y}$ and $F_{CH4,EL,y}$*").

$PE_{flare,y}$ Project emissions from flaring of the residual gas stream. Details for the determination of every-minute values for $PE_{flare,y}$ for each individual flare are presented below (under "*Determination of $PE_{flare,y}$*").

Determination of every-minute values for the calculation parameters $F_{CH4,sent\_flare,y}$ and $F_{CH4,EL,y}$:
For the considered monitoring period, Option C of the "Tool to determine the mass flow of a greenhouse gas in a gaseous stream" (where the gaseous stream the tool shall be applied to is the stream of collected LFG that is sent to the flare and to the electricity generation facility)[21] is the

[20] While no LFG was utilized for electricity generation during the period from 01/12/2014 to 25/06/2015, $F_{CH4,EL,y}$ is null during such period.

[21] It is relevant to note that the PDD states the following regarding the calculation approach for values of $F_{CH4,sent\_flare,y}$: "*Applicable guidance of the "Tool to determine the mass flow of a greenhouse gas in a gaseous stream" will be applied to determine $F_{CH4,sent\_flare,y}$ and $F_{CH4,EL,y}$ by using Option 2: Simplified calculation without measurement of the moisture content, and one of the options A, C or D. The selection of the determination option will depend on project conditions and equipment to be installed."*

selected option for determination of values of $F_{CH4,sent\_flare,y}$ (applicable for flare) and independent values of $F_{CH4,EL,y}$ (applicable for each individual engine-generator set of the electricity generation facility (calculation sub-parameters $F_{CH4,EL,y,genset-1}$, $F_{CH4,EL,y,\ genset-2}$, $F_{CH4,EL,y,\ genset-3}$, $F_{CH4,EL,y,\ genset-4}$, $F_{CH4,EL,y,\ genset-5}$, $F_{CH4,EL,y,\ genset-6}$).

$F_{CH4,sent\_flare,y}$:

By following calculation option C (that is one of the applicable calculation methods the PDD refers to), the mass flow of greenhouse gas *i* ($F_{i,t}$) (*i* = CH_4) for the installed flare during the whole considered monitoring period is determined as follows:

$$F_{CH4,sent\_flare,y} = F_{CH4,t} = V_{t,wb,n,flare} * v_{CH4,t,wb,flare} * \rho_{CH4,n}$$

Where:

$V_{t,wb,n,flare}$ Volumetric flow of the gaseous stream (LFG) to the flare in time interval *t* on a wet basis at normal conditions. For the considered monitoring period, every-minute values of the calculation parameter $V_{t,wb,n.flare}$ are measured and reported (in Nm³ wet gas/h) in the monthly emission reduction calculation spreadsheets valid for the considered monitoring period (and enclosed to this Monitoring Report). While in the particular case of the project activity, during the considered monitoring period, volumetric flow of the gaseous stream (LFG) is already measured in Nm³ of wet gas/h (normal conditions), the following assumption is thus valid:

$V_{t,wb,n,flare}$ is equivalent to $V_{t,wb,flare}$

Where:

$V_{t,wb,flare}$ Volumetric flow of the gaseous stream (LFG) sent to the flare in time interval *t* on a wet basis

Note: in accordance with the PDD, since measurements of LFG flow sent to the flare are automatically converted and recorded in normalized cubic meters (by considering standard temperature and pressure (STP) conditions), monitoring of "Pressure of the LFG stream in time interval t" (P_t) and "Temperature of the LFG stream in time interval *t*" (T_t) are thus not required for the determination of $V_{t,wb,n,flare}$.

$v_{CH4,t,wb}$ Volumetric fraction of CH_4 in the gaseous stream in time interval *t* on a wet basis. As per the applied monitoring procedure, every-minute values of the monitoring parameter $v_{CH4,t,wb}$ (in m³ of CH_4 / m³ of wet LFG) are reported in the monthly emission reduction calculation spreadsheet valid for the considered monitoring period (and enclosed to this Monitoring Report). Further monitoring details about the monitoring parameter $v_{CH4,t,wb}$ are included in Section D.2.

$\rho_{CH4,n}$ Density of CH_4 in the gaseous stream (LFG) at normal conditions. For the considered monitoring period, value of $\rho_{CH4,n}$ (in kg of CH_4 / m^3 of CH_4) is calculated and reported in the monthly emission reduction calculation spreadsheet valid for the considered monitoring period (and enclosed to this Monitoring Report) as follows:

$$\rho_{CH4,n} = (P_n * MM_i) / (R_u * T_n)$$

Where:

P_n Absolute pressure at normal conditions. P_n is ex-ante determined as 101,325 Pa. Further details about the ex-ante determined parameter P_n are included in Section D.1 and in the registered PDD.

T_n Temperature at normal conditions. T_n is ex-ante determined as 273.15 Kelvin. Further details about the ex-ante determined parameter T_n are included in Section D.1 and in the registered PDD.

MM_i Molecular mass of greenhouse gas *i* (*i* = CH_4). MM_i (*i* = CH_4) is ex-ante determined as 16.04 kg/mol. Further details about the ex-ante determined parameter MM_i (*i* = CH_4) are presented in Section D.1 and in the registered PDD.

R_u Universal ideal gases constant. R_u is ex-ante determined as 8,314 $Pa.m^3$ /kmol.K. Further details about the ex-ante determined parameter R_u are presented in Section D.1 and in the registered PDD.

$\rho_{CH4,n}$ is calculated as 0.7156650 $kgCH_4$ / m^3CH_4 as reported in the monthly emission reduction calculation spreadsheet valid for the considered monitoring period.

$F_{CH4,EL,y}$ (calculation sub-parameters $F_{CH4,EL,y,genset-1}$, $F_{CH4,EL,y,\ genset-2}$, $F_{CH4,EL,y,\ genset-3}$, $F_{CH4,EL,y,\ genset-4}$, $F_{CH4,EL,y,\ genset-5}$, $F_{CH4,EL,y,\ genset-6}$):

By following calculation option C (that is one of the applicable calculation methods the PDD refers to), the mass flow of greenhouse gas i ($F_{i,t}$) (i = CH_4) to each individual engine-generator set of the project's electricity generation component ($F_{CH4,EL,y,genset-1}$, $F_{CH4,EL,y,\ genset-2}$, $F_{CH4,EL,y,\ genset-3}$, $F_{CH4,EL,y,\ genset-4}$, $F_{CH4,EL,y,\ genset-5}$, $F_{CH4,EL,y,\ genset-6}$) during the during the share of the considered monitoring period encompassing the period from 25/06/2015 to 31/12/2015 is determined as follows:

$$F_{CH4,EL,y,\ genset-6} = V_{t,wb,n,genset-n} * v_{CH4,t,wb,flare} * \rho_{CH4,n}$$

Where:

n The engine-generator set in question (n = 1, 2, 3, 4, 5 and 6)

$V_{t,wb,n,genset-n}$ Volumetric flow of the gaseous stream (LFG) to the engine-generator set n in time interval *t* on a wet basis at normal conditions. For the considered monitoring period, every-minute values of the calculation parameters $V_{t,wb,n.genset-n}$ are processed and reported (in Nm^3 wet gas/h) in the monthly emission reduction calculation spreadsheets valid for the considered monitoring period (and enclosed to this Monitoring Report). While in the particular case of the project activity, during the considered monitoring period, measurements of volumetric flow of the gaseous stream (LFG) sent to each one of the engine-generator sets *n* are processed and recorded in Nm^3 of wet gas/h (normal conditions), the following assumption is thus valid:

$V_{t,wb,n,genset-n}$ is equivalent to $V_{t,wb,genset-n}$

Where:

$V_{t,wb,genset-n}$ Volumetric flow of the gaseous stream (LFG) sent to the engine-generator set *n* in time interval *t* on a wet basis (where *n* = 1, 2, 3, 4, 5 and 6).

$v_{CH4,t,wb}$ Volumetric fraction of CH_4 in the gaseous stream in time interval *t* on a wet basis. Further monitoring details about the monitoring parameter $v_{CH4,t,wb}$ are included above and in Section D.2.

$\rho_{CH4,n}$ Density of CH_4 in the gaseous stream (LFG) at normal conditions. $\rho_{CH4,n}$ is calculated as 0.7156650 $kgCH_4$ / m^3CH_4 as reported in the monthly emission reduction calculation spreadsheet valid for the considered monitoring period. Details about the determination of $\rho_{CH4,n}$ are presented above.

Determination of $PE_{flare,y}$:
$PE_{flare,y}$ is determined by following the applicable stepwise guidance of the methodological tool "Project emissions from flaring" (version 2). Every minute values for $PE_{flare,y}$ are determined as a function of every-minute records of mass flow of methane sent to the flare as well as based on calculated values for flare efficiency ($\eta_{flare,m} = \eta_{flare,calc,y}$) as follows:

$$PE_{flare,y} = GWP_{CH4} * \sum_{m=1}^{525,600} F_{CH4,RG,m} * (1 - \eta_{flare,m}) * 10^{-3}$$

Where:

$F_{CH4,RG,m}$ Methane mass flow in the residual gas of the flare. For each minute *m* of the considered monitoring period, values for $F_{CH4,RG,m}$ are equal to every-minute reported measurement records of the calculation sub-parameter "Amount of methane in the LFG which is sent to the flare" ($F_{CH4,sent\_flare,y}$).

$\eta_{flare,m}$ Flare efficiency in minute m. For the considered monitoring period, $\eta_{flare,m}$ is calculated based on performed measurements of methane in the exhaust gas of the flare by following applicable guidance as per Option B (Measured flare efficiency) of the methodological tool "Project emissions from flaring" from which the following related guidance of the PDD is applied:

> *"(…)*
> *<u>Option B: Measured flare efficiency:</u>*
> *For each high temperature enclosed flare installed as part of the project activity, the flare efficiency in the minute m is determined as a value which is calculated based on performed related measurements ($\eta_{flare,m} = \eta_{flare,calc,m}$) when the following two conditions are simultaneously met (in order to demonstrate that the flare is operating):*
> *(1) The temperature of the exhaust gas of the flare (monitoring parameter $T_{EG.m}$) and the flow rate LFG to the flare (monitoring parameter $F_{RG,m}$) is within the manufacturer's specification for the flare ($SPEC_{flare}$) in minute m*
> *(2) Flame is detected in the flare in minute m (monitoring parameter $Flame_m$).*
>
> *Otherwise $\eta_{flare,m}$ is set as 0%.*
> *(…)"*

In applying Option B, the project participants chose to determine $\eta_{flare,calc,m}$ by applying guidance of Option B.1 (with related measurements of emission of methane in the exhaust gas of the flare being performed by an accredited independent third party entity (e.g. an independent inspection/analysis service company) on a biannual basis).

In order to calculate the flare efficiency value for the installed flare ($\eta_{flare,calc,m}$) biannual values for the monitoring parameter "Mass flow of methane in the exhaust

gas of the flare on a dry basis at reference conditions in the time period t" ($F_{CH4,EG,t}$)) are considered as per the following calculation formula:

Option B.1: Biannual measurement of the flare efficiency":

The calculated flare efficiency $\eta_{flare,calc,y}$ for the installed flare is determined as follows:

$$\eta_{flare,calc,y} = 1 - \frac{1}{2}\sum_{t=1}^{2}\left(\frac{F_{CH4,EG,t}}{F_{CH4,RG,t}}\right)$$

Where:

$F_{CH4,EG,t}$ Mass flow of methane in the exhaust gas of the flare on a dry basis at reference conditions in the time period *t*. As established by the PDD, for the considered monitoring period, $F_{CH4,EG,t}$ was measured as per appropriate national or international standard during 2 set of measurement events within the year encompassed by the considered monitoring period (year of 2014). 1-hour length biannual measurements of residual methane in the exhaust gas of the flare and measurements of speed of exhaust gas of the flare (for the determination of flow of methane exhaust gas of the flares) were performed by the third party inspection service company BIOAGRI Ambiental Ltda. is an inspection service company which is specialized in emission measurements and air pollution inspections.

t The two time periods in year y during which the flare efficiency is measured, each a minimum of one hour and separated by at least six months.

$F_{CH4,RG,t}$ Mass flow of methane in the residual gas on a dry basis at reference conditions in the time period *t.* Details for the determination of every-minute values for $F_{CH4,RG,t}$ are presented below.

Determination of $F_{CH4,RG,t}$:

As per the applicable guidance of the methodological tool "Project emissions from flaring" and also as per the PDD, the methane mass flow in the residual gas (in a dry basis) for each minute *m* of the two time periods in year *y* during which the flare efficiency is measured shall be calculated by following the applicable guidance of the "Tool to determine the mass flow of a greenhouse gas in a gaseous stream". Values for the parameter $F_{CH4,RG,t}$ are thus calculated as follows:

$F_{CH4,RG,t} = V_{t,db,n} * v_{CH4,t,db} * \rho_{CH4,n}$

Where:

$\rho_{CH4,n}$ Density of greenhouse gas *i* (*i* = CH_4) in the gaseous stream (LFG) at normal conditions. Further details for the determination of $\rho_{CH4,n}$ are presented above under the sub-section "*Determination of every-minute values for the calculation parameter $F_{CH4,sent\_flare,y}$*".

$v_{CH4,t,db}$ Volumetric fraction of greenhouse gas *i* (*i* = CH_4) in the gaseous stream in a time interval *t* on a dry basis. The

following is stated in footnote 3 of the methodological tool "Tool to determine the mass flow of a greenhouse gas in a gaseous stream":

> "*(…) Flow measurement on a dry basis is not feasible at reasonable costs for a wet gaseous stream, so there will be no difference in the readings for volumetric fraction in wet basis analyzers and dry basis analyzers (…).*"

Thus, every-minute values of $v_{CH4,t,db}$ are regarded as equal to every-minute values of the monitoring parameter $v_{CH4,t,wb}$ (for which further details are presented above under the sub-section "*Determination of every-minute values for the calculation parameter $F_{CH4,sent\_flare,y}$*").

$V_{t,db,n,flare}$ Volumetric flow of the gaseous stream (LFG) in time interval *t* on a dry basis which is sent to the flare. As per Option B of the applicable methodological "Tool to determine the mass flow of a greenhouse gas in a gaseous stream", the volumetric flow of the gaseous stream on a dry basis which is sent to the flare is determined by converting the measured volumetric flow from wet basis to dry basis as follows:

$$V_{t,db,n,flare} = V_{t,wb,n,flare} / (1 + v_{H2O,t,db})$$

Where:

$V_{t,wb,n,flare}$ Volumetric flow of the gaseous stream (LFG) in time interval *t* on a wet basis at normal conditions. Further details of $V_{t,wb,n}$ are presented above under the sub-section "*Determination of every-minute values for the calculation parameter $F_{CH4,sent\_flare,y,flare}$*"

$v_{H2O,t,db}$ Volumetric fraction of H_2O in the gaseous stream in time interval *t* on a dry basis. As per applicable guidance of the methodological "Tool to determine the mass flow of a greenhouse gas in a gaseous stream", $v_{H2O,t,db}$ is calculated as follows:

$$v_{H2O,t,db} = \frac{m_{H2O,t,db} * MM_{t,db}}{MM_{H2O}}$$

Where:

MM_{H2O} Molecular mass of H_2O. MM_{H2O} is ex-ante determined as 18.0152 kg/kmol. Further details about the ex-ante determined parameter MM_{H2O} are included in Section D.1 and in the registered PDD.

$MM_{t,db}$ Molecular mass of the gaseous stream in time interval *t* on a dry basis. As per applicable guidance of the methodological "Tool to determine the mass flow of a

greenhouse gas in a gaseous stream", $MM_{t,db}$ is calculated as follows:

$$MM_{t,db} = \sum_{k} (v_{k,t,db} * MM_{k})$$

Where:

k	All gases, except H_2O, contained in the gaseous stream (e.g. N_2, CO_2, O_2, CO, H_2, CH_4, N_2O, NO, NO_2, SO_2, SF_6 and PFCs). See simplification below.
$V_{k,t,db}$	Volumetric fraction of gas *k* in the gaseous stream in time interval *t* on a dry basis. As per applicable guidance of the methodological "Tool to determine the mass flow of a greenhouse gas in a gaseous stream", "*(…) The determination of the molecular mass of the gaseous stream ($MM_{t,db}$) requires measuring the volumetric fraction of all gases (k) in the gaseous stream. However, as a simplification, the volumetric fraction of only the gases k that are greenhouse gases and are considered in the emission reduction calculation in the underlying methodology must be monitored and the difference to 100% may be considered as pure nitrogen."* ACM0001 (version 15.0) does not include any restriction to such simplification. Thus, only the volumetric fraction of gases that are greenhouse gases and are considered in related calculations (CH_4 in the particular case of the project activity) should be measured and the difference to 100% is just considered as pure nitrogen. Further details for the determination of the volumetric fraction of CH_4 in the gaseous stream ($V_{k,t,db}$ = $v_{CH4,t,db}$) are presented above under the calculation parameter $v_{CH4,t,db.}$
MM_k	Molecular mass of gas *k* (*k* = CH_4 and N_2). The molecular mass of CH_4 and N_2 are ex-ante determined as 16.04 and 28.01, respectively. Further details about the ex-ante determined values for

MM_k are included in Section D.1 and in the registered PDD.

$m_{H2O,t,db}$ Absolute humidity in the gaseous stream in time interval *t* n a dry basis. As per Option 2 of the methodological "Tool to determine the mass flow of a greenhouse gas in a gaseous stream", by conservatively assuming that the gaseous stream is saturated ($m_{H2O,t,db} = m_{H2O,t,db,Sat}$), $m_{H2O,t,db}$ is calculated as follows [22]:

$$m_{H2O,t,db,Sat} = \frac{p_{H2O,t,Sat} * MM_{H2O}}{(P_t - p_{H2O,t,Sat}) * MM_{t,db}}$$

Where:

MM_{H2O} Molecular mass of H_2O. MM_{H2O} is ex-ante determined as 18.0152. Further details about the ex-ante determined values for MM_{H2O} are included in Section D.1 and in the registered PDD.

P_t Absolute pressure of the gaseous stream in time interval *t*. Further monitoring details for P_t are included in Section D.2.

$MM_{t,db}$ Molecular mass of the gaseous stream in a time interval *t* on a dry basis. Further details for the determination of

[22] It is important to note that the simplified calculation for the absolute humidity of the gaseous stream ($m_{H2O,t,db}$) presented in Option 2 of the methodological "Tool to determine the mass flow of a greenhouse gas in a gaseous stream" shall be applied by assuming the gaseous stream is dry or saturated depending on which is the conservative situation. Footnote 4 of the "Tool to determine the mass flow of a greenhouse gas in a gaseous stream" states the following: "*An assumption that the gaseous stream is saturated is conservative for the situation that the mass flow of greenhouse gas I is underestimated (applicable for calculating baseline emissions). Conversely, an assumption that the gas stream is dry is conservative for the situation that the greenhouse gas t is overestimated (applicable for calculating project emissions).*". In this particular case, $m_{H2O,t,db}$ is calculated for the determination of the mass flow of methane in the residual gas on a dry basis during the time period t ($F_{CH4,RG,t}$). While $F_{CH4,RG,t}$ is used for the determination of the parameter $PE_{flare,y}$ (project emissions from flaring the residual gas), the assumption that the gaseous stream is dry (conservatively applicable for calculating project emissions) would not be conservative in this case as an overestimation of the amount of methane in the residual gas would actually increase the calculated efficiency of the flares, thus resulting in a reduction of $PE_{flare,y}$ and consequent increment of emission reductions.

$MM_{t,db}$ are presented above.

$p_{H2O,t,Sat}$ Saturation pressure of H_2O at temperature T in time *t*, Further monitoring details about the monitoring parameter $p_{H2O,t,Sat}$ are included in Section D.2.

In summary, for the considered monitoring period, a value of 0. 0.9937476 was obtained for the parameter $\eta_{flare,m} = \eta_{flare,calc,y}$.

As per the applied monitoring procedure, compliance with operational and maintenance requirements for the flares, as established by the *ex-ante* determined parameter "Manufacturer's flare specifications for temperature, flow rate and maintenance schedule interval" ($SPEC_{flare}$), is also considered for the determination and application of the values of $\eta_{flare,m} = \eta_{flare,calc,y}$ for the determination of $F_{CH4,PJ,y} = F_{CH4,flared,y}$ along the considered monitoring period. This is reflected in the monthly emission reduction spreadsheets. Data records for the monitoring parameter "Flame detection of flare in the minute *m*" ($Flame_m$) are also considered for the determination and application of the values of $\eta_{flare,m}$ for the determination of values of $F_{CH4,PJ,y} = F_{CH4,flared,y}$ along the considered monitoring period. This is reflected in the monthly emission reduction spreadsheet.

The time the flare has operated is determined by monitoring the flame combustion status/condition by using an UV flame detector (of which status signal (flame status "*on*" or "*off*") is continuously recorded and reported). Moreover, the monitoring requirements related to operational requirements/conditions for the flare (as provided by the manufacturer's specifications for operating conditions as per the ex-ante determined parameter $SPEC_{flare}$ (min. and max. flow of LFG to the flare + temperature of exhaust gas of the flare + meeting of maintenance requirements) are also considered in the context of the application of determined values for $\eta_{flare,m}$ along the considered monitoring period. As outlined in the monthly emission reduction spreadsheets, for each minute *m* within the considered monitoring period when the flare have combusted LFG by not operating in accordance with the operational criteria as established by the ex-ante estimated parameter $SPEC_{flare}$ (in terms of LFG flow, temperature of exhaust gas or maintenance practice), no destruction of methane is accounted as part of the calculation values of $F_{CH4,PJ,y} = F_{CH4,flared,y}$ achieved by the project activity.

For the considered monitoring period, the accumulated value for $F_{CH4,PJ,y} = F_{CH4,flared,y} + F_{CH4,EL,y}$ is calculated as 20,670 tCH_4.

For the considered monitoring period, baseline emissions of methane from the SWDS ($BE_{CH4,y}$) are calculated as 389,226 tCO_2e.

The summarized emission reduction calculation spreadsheets (that are enclosed to this Monitoring Report) summarizes the determination of $BE_y = BE_{CH4,y} + BE_{EC,y}$ for the considered monitoring period.

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

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As outlined in the PDD, regardless of starting of electricity generation by the project activity since 25/06/2015, the operation of the project activity still requires consumption of grid-sourced electricity, electricity sourced by the installed backup off-grid electricity generator fuelled by Diesel. Moreover, Liquefied Petroleum Gas (LPG) is also consumed by the project activity. As also established in the PDD, project emissions due to consumption of these energy carriers are determined by following the applicable guidance of the "Tool to calculated baseline, project and/or leakage emissions from electricity consumption" and "Tool to calculate project or leakage CO_2 emissions from fossil fuel combustion".

Project emissions (PE_y) for the considered monitoring period are determined (in tCO_2e) as follows:

$$PE_y = PE_{EC,grid,y} + PE_{EC,captive,y} + PE_{LPG,y}$$

Where:

$PE_{EC,grid,y}$ Project emissions due to the consumption of grid electricity due to the project activity in year *y* (in tCO_2/year)

$PE_{EC,captive,y}$ Project emissions from consumption of electricity generated by a captive off-grid electricity generator fuelled by fossil fuel (diesel) in year *y* (in tCO_2/yr)

$PE_{LPG,y}$ Project emissions due to the consumption of LPG by the project activity in year *y* (in tCO_2/year)

Project emissions due to the consumption of grid-sourced electricity by the project activity ($PE_{EC,grid,y}$):

Project emissions due to the consumption of grid-sourced electricity by the project activity ($PE_{EC,grid,y}$) are calculated as per the "Tool to calculate baseline, project and/or leakage emissions from electricity consumption" (version 01) as follows:

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

Where:

$TDL_{grid,y}$ Average technical transmission and distribution losses for grid sourced electricity consumed by the project activity in year *y.* $TDL_{grid,y}$ is ex-ante selected as 20%. Further details about the ex-ante determined parameter $TDL_{grid,y}$ are included in Section D.1 and in the registered PDD.

$EC_{PJ,grid,y}$ Quantity of grid sourced electricity consumed by the project activity in year *y* (in MWh). As per the applied monitoring procedure, monthly records of grid-sourced electricity consumption valid for the considered monitoring period are summarized below:

Month	Amount of consumed diesel backup sourced electricity (kWh)
Dec. 2014	2,760
Jan. 2015	800
Feb. 2015	120
Mar. 2015	0

Apr. 2015	160
May 2015	200
Jun. 2015	80
Jul. 2015	1,480
Aug. 2015	400
Sep. 2015	1,960
Oct. 2015	3,680
Nov. 2015	1,520
Dec. 2015	1,600

Additional monitoring details about the monitoring parameter $EC_{PJ,grid,y}$ are included in Section D.2.

$EF_{EL,grid,y}$ Emission factor for grid sourced electricity in year *y* (in tCO_2/MWh). $EF_{EL,grid,y}$ is determined as the combined margin emission factor ($EF_{grid,CM,y}$) that is calculated as the weighted average of the operating margin and build margin emission factors. To weight these two factors, the default values applicable to both for the 2nd crediting period are applied. The combined margin emission factor is thus obtained as follows:

$$EF_{grid,CM,y} = w_{OM} * EF_{grid,OM,y} + w_{BM} * EF_{grid,BM,y}$$

Where:

w_{OM} Weighting of operating margin emissions factor. w_{OM} is ex-ante selected as 0.25%. Further details about the ex-ante selected parameter w_{OM} are included in Section D.1 and in the registered PDD.

w_{BM} Weighting of operating margin emissions factor. w_{BM} is ex-ante selected as 0.75%. Further details about the ex-ante selected parameter w_{BM} are included in Section D.1 and in the registered PDD.

$EF_{grid,OM,y}$ Operating margin CO_2 emission factor in year *y*. As per the applied monitoring procedure, the selected value for the monitoring parameter $EF_{grid,OM,y} = EF_{grid,OM-DD,y}$ (0.5822 tCO_2/MWh) represents to the official average value for year (vintage) 2014 as calculated and made public available by the DNA of Brazil. Further details about the monitoring parameter $EF_{grid,OM}$ are included in Section D.2.

$EF_{grid,BM,y}$ Build margin CO_2 emission factor in year *y*. Further details about the ex-ante selected parameter $EF_{grid,BM}$ are included in Section D.1 and in the registered PDD.

For the considered monitoring period, project emissions due to the consumption of grid-sourced electricity by the project activity ($PE_{EC,grid,y}$) are calculated as follows:

$PE_{EC,grid,y}$ = 771.602 MWh * (0.25 * 0.5822 tCO_2/MWh + 0.75 * 0.2963 tCO_2/MWh) = 341 tCO_2 (rounded value)

The summarized emission reduction calculation spreadsheet (that is enclosed to this Monitoring Report) includes all calculations related to the determination of $PE_{EC,grid,y}$ for the considered monitoring period.

Project emissions from consumption of electricity generated by a captive off-grid electricity generator fuelled by fossil fuel (diesel) in year y (in tCO_2/yr):

Project emissions from consumption of electricity generated by a captive off-grid electricity generator fuelled by fossil fuel (diesel) in year *y* ($PE_{EC,captive,y}$) are calculated by following option B.2 of the "Tool to calculate baseline, project and/or leakage emissions from electricity consumption" as follows:

$$PE_{EC,captive,y} = EC_{PJ,captive,y} * EF_{EL,captive,y} * (1 + TDL_{captive,y})$$

Where:

$EC_{PJ,captive,y}$ Amount of electricity sourced by the captive electricity generator (fuelled by Diesel) and consumed by the project activity. $EC_{captive,y}$ will be measured and monitored in MWh as per the provisions of the "Tool to calculate baseline, project and/or leakage emissions from electricity consumption".

$TDL_{captive,y}$ Average technical transmission and distribution losses for electricity sourced by the captive electricity generator. In accordance with the applicable provisions of the "Tool to calculate baseline, project and/or leakage emissions from electricity consumption", as a simplification, $TDL_{captive,y}$ is ex-ante determined as zero (fixed value along the whole crediting period).

$EF_{EL,captive,y}$ CO_2 emission factor for electricity sourced by the captive off-grid electricity generators (in tCO_2/MWh). As per Option B.2 of the "Tool to calculate baseline, project and/or leakage emissions from electricity consumption", $EF_{EL,captive,y}$ is ex-ante determined as 1.3 tCO_2/MWh.

For the considered monitoring period, project emissions due to the consumption of electricity sourced by the backup captive off-grid electricity generator ($PE_{EC,captive,y}$) are calculated as follows:

$$PE_{EC,captive,y} = 14.760\ MWh * 1.3\ tCO_2/MWh * (1 + 0) = 20\ tCO_2$$

Project emissions due to consumption of LPG by the project activity:

Project emissions due to the consumption of LPG by the project activity ($PE_{LPG,y}$) are calculated as per the "Tool to calculate project or leakage CO_2 emissions from fossil fuel combustion" (version 02) as follows:

$PE_{LPG,y} = FC_{LPG,y} * COEF_{LPG,y}$

Where:

$FC_{LPG,y}$ Quantity of LPG consumed by the project activity in year *y*. As per the adopted monitoring procedure, during the considered monitoring $FC_{LPG,y}$ is determined as 540 kg (0.540 ton) of LPG. Additional monitoring details for the monitoring parameter $FC_{LPG,y}$ are included in Section D.2.

$COEF_{LPG,y}$ CO2 emission coefficient for LPG. As established in the registered PDD, $COEF_{LPG,y}$ is determined by following applicable guidance as per Option B of the "Tool to calculate project or leakage CO2 emissions from fossil fuel combustion" as follows:

$COEF_{LPG,y} = NCV_{LPG,y} * EF_{CO2,LPG,y}$

Where:

$EF_{CO2,LPG,y}$ CO_2 emission factor of fuel LPG (in energy basis). As per the applied monitoring procedure, $EF_{CO2,LPG,y}$ is determined as 0.0656 tCO_2/GJ. Further details about the monitoring parameter $EF_{CO2,LPG,y}$ are included in Section D.2.

$NCV_{LPG,y}$ Net calorific value of the fuel LPG. As per the applied monitoring procedure, $NCV_{LPG,y}$ is determined as 46.5 GJ/ton for the considered monitoring period. Further details about the monitoring parameter $NCV_{LPG,y}$ are included in Section D.2

Thus, $COEF_{LPG,y}$ = 0.0656 tCO_2/GJ * 46.5 GJ/ton = 3.05 tCO_2/ton

In summary, $PE_{LPG,y}$ is calculated as follows:

$PE_{LPG,y}$ = 0.540 ton LPG * 3.05 tCO_2/ton LPG = 2 tCO_2 (rounded value)

Project emissions due to the consumption of LPG are thus determined as 2 tCO_2 (rounded value). The summarized emission reduction calculation spreadsheet (that is enclosed to this Monitoring Report) includes all calculations related to the determination of $PE_{LPG,y}$ for the considered monitoring period.

Total project emissions (PE_y) are calculated as 363 tCO_2 (rounded value).

E.3. Calculation of leakage

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Not applicable.

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 project emissions (PE_y) determined for such period. Calculations of baseline emissions (BE_y) are presented in Section E.1. Calculations of project emissions (PE_y) are presented in Section E.2. As summarized in the table below, during the monitoring period from 01/12/2014 to 31/12/2015, achieved emission reductions are calculated and reported as 388,863 tCO_2e (rounded value):

Item	Baseline emissions or baseline net GHG removals by sinks (t CO_2e)	Project emissions or actual net GHG removals by sinks (t CO_2e)	Leakage (t CO_2e)	GHG emission reductions or net GHG removals by sinks (t CO_2e) achieved in the monitoring period		
				Up to 31/12/2012	From 01/01/2013	Total amount
Total	389,226	363	-	-	388,863	388,863

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_2e)	421,529[23]	388,863

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

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Achieved emission reductions for the project activity are about ~8% lower than the calculated value of ex-ante estimation of emission reductions as per the PDD that is valid for the considered 396-day monitoring period within years of 2014 and 2015. The following aspects justify and explain the relative difference between such value for ex-ante estimation of emission reductions as per the PDD (calculated as applicable for the considered monitoring period) and emission reductions actually achieved by the project activity during the considered monitoring period:

Aspects/conditions which represent a decrease factor of reported 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 CRR landfill and collected by the project activity was derived by applying the First Order Decay (FOD) model as per the methodological tool

[23] The 421,529 tCO_2e value is calculated as the sum of the share of the estimated total emission reductions for year 2014 to be achieved during the 31-day length considered monitoring period within year 2014 (calculated as 306,117 tCO_2e * 257 / 365) and the estimated total emission reductions for year 2015.

"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 2nd 7-year renewable crediting period. By taking in 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 overestimated the amount of LFG to be actually generated and collected by the project activity. In this particular context, it is crucial to note that, while the PDD assumes a LFG collection efficiency of 92.80% (ex-ante determined parameter "Efficiency of the LFG capture system that will be installed in the project activity" (η_{PJ})) in the context of the ex-ante estimates of emission reductions, as outlined in Section A.1 and B.2, during the considered monitoring period there were relevant number of LFG collection wells and conventional LFG venting/combustion drains that were not connected to project activity, thus negatively affecting the collection efficiency of LFG generated in the site during the considered period. Besides of minor uncertainty aspects, this particular aspect represents a relevant negative impact over emission reductions achieved during the period (when compared to estimates in the PDD).

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	Companhia Riograndense de Valorização de Resíduos S/A
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Direct tel.	

Project participant and/or responsible person/ entity	☒ Project participant ☐ Person/entity responsible for completing the CDM-MR-FORM
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Personal e-mail	

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Document information

Version	*Date*	*Description*
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 *F-CDM-MR* to *CDM-MR-FORM*; • 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