




**Verification and certification report form for  
CDM project activities  
(Version 03.0)**

**BASIC INFORMATION**

<b>Title and UNFCCC reference number of the project activity</b>	Oeste de Caucaia Landfill Project Activity UNFCCC Ref. Number 10261
<b>Scale of the project activity</b>	<input checked="" type="checkbox"/> Large-scale <input type="checkbox"/> Small-scale
<b>Version number of the verification and certification report</b>	1.1
<b>Completion date of the verification and certification report</b>	20/05/2021
<b>Monitoring period number and duration of this monitoring period</b>	2 <sup>nd</sup> monitoring period 22/12/2017 to 23/09/2020 (including both days)
<b>Version number of the monitoring report to which this report applies</b>	3
<b>Crediting period of the project activity corresponding to this monitoring period</b>	Renewable – 7 years Form 22/04/2016 to 21/04/2023
<b>Project participants</b>	GNR Fortaleza Valorização de Biogás Ltda.
<b>Host Party</b>	Brazil
<b>Applied methodologies and standardized baselines</b>	ACM0001: Flaring or use of landfill gas, version 15.0
<b>Mandatory sectoral scopes</b>	Sectoral Scope: 13 - Waste handling and disposal
<b>Conditional sectoral scopes, if applicable</b>	Sectoral Scope: 1 - Energy industries (renewable - / non-renewable sources)
<b>Estimated amount of GHG emission reductions or GHG removals for this monitoring duration in the registered PDD</b>	1,431,429 tCO <sub>2e</sub>
<b>Certified amount of GHG emission reductions or GHG removals for this monitoring period</b>	1,081,131 tCO <sub>2e</sub>
<b>Name and UNFCCC reference number of the DOE</b>	Name: KBS Certification Services Pvt. Ltd. UNFCCC reference number: E-0051
<b>Name, position and signature of the approver of the verification and certification report</b>	 Kaushal Goyal Managing Director KBS Certification Services Pvt. Ltd.

## SECTION A. Executive summary

KBS Certification Services Pvt. Ltd. has been commissioned by GNR Fortaleza Valorização de Biogás Ltda. to perform an independent verification of its registered CDM project, “Oeste de Caucaia Landfill Project Activity”, UNFCCC ref. no. 10261 for the reported GHG emission reductions for the given monitoring period 22/12/2017 to 23/09/2020 (both dates included). The CDM must undergo independent third-party verification and certification of emission reductions as the basis for issuance of Certified Emission Reductions (CERs). The CDM projects must undergo independent third-party verification and certification of emission reductions as the basis for issuance of Certified Emission Reductions (CERs).

The objectives of this verification exercise are, by review of objective, to establish that:

- The project activity has been implemented and operated in accordance with the registered PDD or any approved revised PDD;
- The actual monitoring systems and procedures are in compliance with the monitoring systems and procedures described in the monitoring plan;
- The GHG emission reduction data and calculation have been assessed to correctly support the emission reductions being claimed and that the reported GHG emission reduction data is free from material misstatement;
- To verify that reported GHG emission data is sufficient supported by evidence.

### Scope:

The scope of the verification is the independent and objective review and ex post determination of the monitored reductions in GHG emission by the project activity. The verification is based on review of monitoring report, supporting information and

- (a) The registered PDD, including the monitoring plan and the corresponding validation opinion(s);
- (b) Previous verification reports, deviation requests, Post registration changes;
- (c) Monitoring report for the monitoring period under verification including CER calculations sheets and all supporting documents;
- (d) The applied monitoring methodology;
- (e) The applied standardized baseline (if applicable);
- (f) Relevant decisions, clarifications and guidance from the CMP and the CDM Executive Board;
- (g) All information and references relevant to the project activity’s resulting in emission reductions
- (h) The project is assessed against the requirements of the Kyoto Protocol, the CDM Modalities and Procedures and related rules and guidance.

KBS has, based on the recommendations in the latest version of CDM Validation and Verification Standard for project activity, employed a rule-based approach in the verification, focusing on the identification of significant reporting risks and the reliability of project monitoring.

### Description of project:

The “Oeste de Caucaia Landfill Project Activity” was implemented with the objective to capture, purification and injection of the landfill gas (LFG) generated at the landfill of Oeste de Caucaia into a natural gas distribution network, at Caucaia Municipality (in the state of Ceará), in order to avoid emissions of methane to the atmosphere produced by the anaerobic decomposition of the dumped waste from Caucaia Municipality and displacing the use of natural gas. Any LFG excess will be flared.

The project consists of three phases:

- Phase I: LFG capture, upgraded facility and distribution to the natural gas network, reducing uncontrolled release to atmosphere;
- Phase II and III: Increase of the LFG processing capacity depending on the project performance.

The capture system was operational in 12/2015 and the upgrading facility started operation in 12/2017.

### Methodology:

KBS follows a rule based verification approach, wherein, as a first step, the contract review is undertaken as per latest version of CDM Accreditation Standard. Subsequently, after the contract is signed, the monitoring report of the project activity is made publicly available at UNFCCC website as per CDM procedures. A desk review of the project documentation is undertaken, which is followed by a remote site visit by the members of verification team in accordance with the latest version of CDM AS. The verification protocol is filled by the verification team that is based on standard auditing practices and version 02.0 of CDM VVS for project activity, to capture the assessment of applicable CDM requirements viz., version 02.0 of CDM Project Standard for project activity, registered PDD, applied methodology, applied standardized baseline and/or tools and recent decisions. The verification protocol provides transparent means to record the observations and compliances by the verification team members and the nonconformities, if any. The verification protocol

is an internal document, and is available on request. Following are the major milestones for the verification under consideration.

Publication of MR	30/11/2020
Remote site verification	22/12/2020
Draft Verification Report	25/01/2021
Final Verification Report	20/05/2021

KBS Certification Services Pvt. Ltd. Confirms that the monitoring system is in place and the emission reductions are calculated without material misstatements.

Based on the information seen and evaluated we confirm that the implementation of the project has resulted in 965,391 tCO<sub>2</sub>e (round down) emission reductions during period 22/12/2017 to 23/09/2020 (Including both the days).

The following points were raised in the request for issuance Incomplete received on 26/04/2021. The responses are provided bellow. The MR (version 3 of 19/05/2021) and related documents were updated accordingly.

1: Paragraph 283 of VVS-PA:

The DOE is requested to explain how it validated the temporary deviation from the registered monitoring plan, in particular:

(a) Deviation 1:

(i) It is not evident that the formulas described on page 8 of the monitoring report are applied in the ER sheets;

(ii) The ER sheets (for example in file "Annex 30 to CER Sheet") include parameter "Maximum LFG Methane fraction in DEVIATION" in sheet "Assumptions" which is used to determine "LFG Methane fraction (%)". However, there is no explanation what this parameter is and why it is used in the calculation;

(iii) On page 8, the monitoring report concluded that the estimate presented is conservative since it does not add the methane losses in the biogas purification process (DC) to the result of methane concentration in biogas. The DOE is requested to substantiate how this is conservative, considering that lower D (for not adding methane losses in the biogas purification process) would result in higher volumetric fraction of CH<sub>4</sub> in the LFG and eventually higher BE<sub>CH<sub>4</sub>,y</sub> which not conservative;

(iv) The DOE is requested to substantiate how it is conservative not to consider fraction of the biomethane which was flared. The monitoring report on page 11 states that biomethane which does not reach the required parameters to be delivered to the NG distribution system is flared. As this may include biomethane with volumetric fraction lower than the requirement, excluding lower volumetric fraction would result in volumetric fraction of CH<sub>4</sub> in the LFG being overestimated, and eventually BE<sub>CH<sub>4</sub>,y</sub> being overestimated;

Response: Regarding to deviation 1, PP explained that the sensor responsible for measuring the methane fraction in the LFG was not operational between 21/09/2018 (10h:52m) and 22/10/2020 (08h:20m). The deviation proposed initially aimed to determine the methane content in the LFG from the volume of gas and methane fraction in biomethane at the end of the process.

However, as detailed in item 5 below, a new approach has been adopted consisting of a statistical analysis of the methane content measurements recorded immediately before and after the period in which the sensor was not operational.

Consequently, the requests related to Deviation 1 (items *i* to *iv* above) are no longer applicable to the revision of the Monitoring Report and related documents. Request 5 below details the deviation 1 revision. The spreadsheet "Historical statistical analysis CH<sub>4</sub> MR.xlsx" presents the results of the statistical analysis.

(b) Deviation 3:

(i) The PP considered the highest temperature of LFG as 78 degree C whereas the value observed is 78.333 degree C, instead of rounded down value 78 degree C;

Response: The PP has reassessed data from temperature of LFG throughout the entire monitored period and found that the highest temperature value is of 78.473 °C which has not been rounded with the purpose of determining emission reductions.

(ii) The ER sheet for August 2020 shows that the highest measured temperature is 1370.

KBS response: The value recorded 1370 for temperature of LFG is not a real operative value. This is in fact a value registered by the supervisory system when the temperature meter presents transmission signal

errors. Throughout the entire monitoring period, the error values have been detected and replaced by Deviation 3 result (item b i, above).

2: Paragraph 309(b) of VVS-PA:

The DOE is requested to explain how it validated the changes to the project design, in particular:

(a) There is no opinion on assessment on the reasons for the expansion of landfill area;

Response: The ASMOC landfill has received waste, since its opening, from the metropolitan region of Fortaleza. The origin of the waste that will be deposited in the expansion area is the same, as stated in the Environmental Impact Assessment (EIA) and environmental permits. The Environmental Impact Assessment related to the expansion of the landfill is dated 2011. At that time the report mentioned that the lifetime of the existent landfill area was of four more years, i.e., the landfill would be closed by 2015. Therefore, for the waste collected in the metropolitan region of Fortaleza to have an adequate final destination, the expansion would be necessary. As stated in the EIA, based on the literature, in Brazil there are no other practices rather than landfilling MSW such as incineration, composting or recycling that would postpone or avoid the landfill expansion.

(b) There is no explanation how the expected annual amount of waste is lower than the amount described in the registered PDD with the increased area of landfill.

Response: The reference for the amount of waste considered in the PDD was the gas capture study conducted by a specialized company (LANDTEC), while for the PDD PRC the amount of waste monitored by the company until 2019 and the estimates made in the environmental impact study regarding the expansion of the landfill area were considered (from 2020 until the end of the crediting period).

Evidence of the amount of waste deposited between 2005 and 2019 as monitored by the landfill manager (ECOFOR) was provided for the DOE and updated accordingly in the PRC PDD.

The expansion area started receiving waste in 2020. The estimated waste disposal capacity for the landfill expansion area as per the EIA is 22,139,996 t until the expected lifetime is reached.

If we sum the amount of waste considered in the PDD between 2020 and 2031 (last year of the third crediting period) the result is 29,869,279 t of MSW (according to LANDTEC study), while the total waste considered in the PRC PDD is 24,881,314 t. Therefore, the projection of waste to be disposed as stated in the PDD PRC in the coming years is more conservative and was considered as being more appropriate to determine the ex-ante emission reductions of the project.

It should be noted that the design of the landfill as stated in the EIA took into account modern construction techniques to ensure the stability of the slopes and that, despite having been executed in 2011, the projections of the amount of waste disposed in the last three years (2017, 2018 and 2019) proved to be quite consistent with the data monitored by ECOFOR.

Year	MSW (t) EIA projection	MSW (t) Monitored
2017	1,620,316	1,641,774
2018	1,672,291	1,654,471
2019	1,726,010	1,728,751

3: Paragraph 272 (e) of VVS-PA:

In the validation report for PRC the DOE referred to paragraph 338(b) and 339 of the VVS-PA for the requirement for mandatory site visit. However, it has not considered the relevant requirement for mandatory site visit applicable to PRC, i.e., paragraph 301 of VVS-PA.

Response: The paragraph was correctly updated in section C.3 of this report.

4: Paragraph 258 of PS-PA:

(i) Monitoring report on page 13 lists the equipment for measurement. However, each equipment is not shown in the monitoring diagram described on page 8 of monitoring report;

(ii) Total number of gas meters listed on page 13 of monitoring report (i.e., 3 meters) does not match total number of gas meters shown in the monitoring diagram on page 8 of monitoring report (i.e., 7 meters).

Response: The illustrative diagram on page 8 of the Monitoring Report was included with the purpose of emphasizing the location of the meters from which data used in the Deviation 1 was taken. Deviation 1 was revised (see request 5 below). In this sense the diagram is no longer presented in the revised version of the

Monitoring Report. In addition, a revised illustrative diagram reflecting equipment listed in page 13 was included.

5: Paragraph 373(c) of VVS-PA:

The monitoring report on page 28 states that during the monitored period Options A and B were used to determine the mass flow of gases containing methane. Option B is applicable when the volume flow in wet basis and volumetric fraction in dry basis. The DOE is requested to explain how it verified the correctness of application of option B, in particular the application of equation 6 of the revised PDD for the period October 2018 to August 2020, as it is observed in some instances that LFG temperature is above 60 degree C (which shows that the volume flow is wet basis), however equation 6 is not used to convert volumetric flow from wet basis to dry basis.

Response: The CERs calculation has been revised and is now considering the application of Options A and B to determine the mass flow of gases containing methane throughout the entire monitoring period, considering the temperature threshold and corrected application of equation 6 of the revised PDD.

6: Paragraph 373(e) of VVS-PA:

The DOE is requested to explain how it verified parameter "Methane density at standard T and P" which value is fixed for the entire monitoring period as 0.7168 kg/m<sup>3</sup> as:

- (i) Version 15 of ACM0001 does not have this value;
- (ii) The revised PDD does not include this parameter as parameters fixed ex-ante;
- (iii) The revised PDD requires that the density be calculated as per equation 5;
- (iv) The monitoring report states that the flow meter measures the flow at normal conditions whereas this parameter refers to standard conditions.

Response: All flow meters used in the project activity during the monitored period measures stream flows at normal condition automatically according to meters specification. However, the parameter Volumetric flow of greenhouse gas ( $V_{i,db}$ ) presented in the "Tool to determine the mass flow of a greenhouse gas in a gaseous stream -Version 02.0.0" is not under normal conditions, neither the Density of greenhouse gas. So, considering the normalized flow meters installed at the project plant, the calculation of the Density of greenhouse gas should be under normal conditions as well.

Thus, Density of greenhouse gas was calculated as follows:

$$\rho_{i,n} = \frac{P_n * MM_i}{R_u * T_n}$$

Where:

- $\rho_{i,n}$  = Density of greenhouse gas i in the gaseous stream at normal conditions (kg gas i/wet m<sup>3</sup> gas i);
- $P_n$  = Absolute pressure at normal conditions (Pa);
- $MM_i$  = Molecular mass of greenhouse gas i (kg/kmol);
- $R_u$  = Universal ideal gases constant (8,314 Pa.m<sup>3</sup>/kmol.K);
- $T_n$  = Temperature at normal conditions (K).

## SECTION B. Verification team, technical reviewer and approver

### B.1. Verification team member

No.	Role	Type of resource	Last name	First name	Affiliation (e.g. name of central or other office of DOE or outsourced entity)	Involvement in			
						Desk/document review	On-site inspection	Interviews	Verification findings
1.	Team Leader/Technical Expert (TA 13.1)	EI	Leiroz	Andrea	Central Office	✓	Remote audit	✓	✓

**B.2. Technical reviewer and approver of the verification and certification report**

No.	Role	Type of resource	Last name	First name	Affiliation (e.g. name of central or other office of DOE or outsourced entity)
1.	Technical reviewer	IR	Kandari	Sanjay	Central Office
2.	Manager Technical & Certification	IR	Chaudhari	Tushar Eknath	Central Office
3.	Authorizer	IR	Goyal	Kaushal	Central Office

**SECTION C. Application of materiality****C.1. Consideration of materiality in planning the verification**

No.	Risk that could lead to material errors, omissions or misstatements	Assessment of the risk		Response to the risk in the verification plan and/or sampling plan
		Risk level	Justification	
1.	Error in the transfer of data to CERs spreadsheet.	High	Data is automatically measured and errors can be perceived during the information transfer to the CERs spreadsheet. Errors in the data transference have direct impact in the CERs calculation.	Check all the input for monitored parameters. Check raw data to confirm the correct data transference.
2.	Parameters calculation.	Low	Human errors can be perceived during entering formulas and data in the CERs spreadsheet.	Check all input for monitored parameters. Cross checked raw data. All formula were checked against to the methodology and respective methodology tools.

**C.2. Consideration of materiality in conducting the verification**

The prescribed thresholds for materiality, as per §308 of “CDM validation and verification standard for project activities” Version 02.0 /07/.

Prescribed range of Ers/annum	500,000+	300,000+ to 500,000	300,000	SSC PAs	MSC PAs
Prescribed Threshold	0.5%	1.0%	2.0%	5.0%	10.0%

The identified/selected materiality threshold for the project activity under current monitoring period is 0.5% as project activity is large scale project activity higher than 500,00 ERs/annum.

	MR Version (Draft) /1.1/	MR Version (Final) /1.2/
Emission reductions/monitoring period	880,572 tCO <sub>2</sub>	1,081,131 tCO <sub>2</sub>
Identified Threshold	0.5%	0.5%

The emission reductions for this monitoring period have been increased due to raised CAR 12 which have been successfully closed. Refer Appendix 4 of this report for more details.

Verification team has checked the 100% values of reported data. The complete dataset for the project activity was checked and it can be confirmed that the values are consistent with their sources. The assessment team confirms that the reported emission reductions are free from material errors, omissions or misstatements.

**SECTION D. Means of verification**

**D.1. Desk/document review**

A desk review is undertaken, involving but not limited to,

- A review of the data and information presented to verify their completeness;
- A review of the revised PDD;
- A review of the monitoring plan and monitoring methodology, paying particular attention to the frequency of measurements, the quality of metering equipment including calibration requirements, and the quality assurance and quality control procedures;
- An evaluation of data management and the quality assurance and quality control system in the context of their influence on the generation and reporting of emission reductions.

The list of documents reviewed is included in the section ‘Appendix 3’ of this report.

**D.2. On-site inspection**

Duration of on-site inspection: DD/MM/YYYY to DD/MM/YYYY				
No.	Activity performed on-site	Site location	Date	Team member
1.				

As result of the COVID-19 pandemic, taking into account the rules of relevant national and local authorities (local to the DOE offices as well as to locality of the site visits), World Health Organization (WHO) recommendations, policies of the DOE and other relevant travel restrictions and guidance (for example, a requirement to self-isolate upon return from specific countries), a DOE may postpone site visits for onsite inspections required by the “Validation and Verification Standard for project activities” version 02.0 /9/.

If the site visits cannot be postponed, a proper justification should be provided by the DOE why the site visits cannot be postponed, including the demonstration of a significant impact of delaying the site visits on the DOE, or project participants or coordinating/ managing entity (e.g. commitment/ timeline as per the validation or verification contract, CER delivery commitment by project participants) reliance on applicable force majeure provisions in the validation or verification contracts, if needed.

For this project, PP has made commitment/timeline as per the verification contract /45/. Hence, the DOE has skipped the on-site visit /46/. However, as per the CDM EB, the DOE may use other standard auditing techniques for validation or verification as referred to in sections 9.1.3 of the VVS-PA /9/.

Verification team has used the following alternative means for its assessment and to justify that they are sufficient for the purpose of verification. Along with desk review, audit team has conducted remote audit interview as follows:

- A complete desk review of the revised PDD /6/, submitted MR (initial and final versions) /1/ /2/, as well as applicable country legal requirement and supportive evidences have been checked by the Verification Team.
- Verification team has performed a remote site inspection via videoconference (Skype) with PP in order to check implementation, project boundary, current situation, evaluation of data management, QA/QC system, monitoring and metering equipment, monitoring procedures, calibration etc. Interview questions were filled as per Verification team interview checklist and also videos were captured.
- Cross-checks between information provided by interviews, under the scope of all information and references provided in MR and supporting documents.
- Cross-checked evaluation, for information received from interviews, under the scope of all information and references provided in MR and supporting documents.

Details of interviewees, topics covered and additional information presented in the below section “C.3 – Interviews”.

Verification team has also checked the site visit requirements mentioned in the VVS for PA version 02.0 /9/. The justification for not conducting the on-site visit as per VVS PA version 02.0 /9/ have been mentioned below:

VVS PA version 02.0 requirements	Verification team justification
Para 338 (b) (b) On-site inspection taking into account paragraphs 339–341 below, involving: (i) An assessment of the implementation and operation of the registered CDM project	Verification team has done the follow-up actions by: 1. Teleconference with PP. Skype was used with video camera function. A video was recorded in the plant so that the verification team was able to check that the project is installed as

<p>activity as per the registered PDD or any approved revised PDD;</p> <p>(ii) A review of information flows for generating, aggregating and reporting the monitoring parameters;</p> <p>(iii) Interviews with relevant personnel to determine whether the operational and data collection procedures are implemented in accordance with the registered monitoring plan;</p> <p>(iv) Cross checks between information provided in the monitoring report and data from other sources such as plant logbooks, inventories, purchase records or similar data sources;</p> <p>(v) A check of the monitoring equipment including calibration performance and observations of monitoring practices against the requirements of the PDD, the applied methodologies, the applied standardized baselines and the other applied methodological regulatory documents;</p> <p>(vi) A review of calculations and assumptions made in determining the GHG data and GHG emission reductions or net anthropogenic GHG removals;</p> <p>(vii) An identification of quality control and quality assurance procedures in place to prevent, or identify and correct, any errors or omissions in the reported monitoring parameters.</p>	<p>described in the PDD.</p> <ol style="list-style-type: none"> <li>2. The supervisory system was checked.</li> <li>3. Cross checks between information provided by interviewed personnel (i.e. by checking sources or other interviews) to ensure that no relevant information has been omitted.</li> <li>4. PP presented during the videoconference all documents related to the verification of the MR.</li> <li>5. The calculations and assumptions made in determining the CERs were reviewed and discussed with PP by videoconference.</li> </ol>
<p>Para 339 It is mandatory for the DOE to conduct an on-site inspection at verification for the registered CDM project activity if:</p> <ol style="list-style-type: none"> <li>(a) It is the first verification for the DOE with regard to this project activity;</li> <li>(b) More than three years have elapsed since the last on-site inspection conducted for verification for the project activity; or</li> <li>(c) The project activity has achieved more than 300,000 tCO<sub>2</sub>eq of GHG emission reductions or net anthropogenic GHG removals since the last verification when an on-site inspection was conducted.</li> </ol>	<p>It is the first verification for KBS with regard to this project activity and no more than three years have elapsed since the last on-site inspection conducted for verification for the CPA (this is the first verification), the project activity has achieved more than 300,000 tCO<sub>2</sub>eq of GHG emission reductions since the last verification when an on-site inspection was conducted.</p> <p>However, the presential site visit was not conducted due to the COVID-19 pandemic. The site visit cannot be postponed since PP has made commitment/timeline as per the verification contract /45/.</p>

**D.3. Interviews**

No.	Interviewee			Date	Subject	Team member
	Last name	First name	Affiliation			
1.	Sampaio	Fernanda	GNR	22/12/2020	Project implementation, management, operation and monitoring.	Andrea Leiroz
2.	Veiga	Ana Paula	BENG		CERs calculation, project monitoring and data analysis.	
3.	Sprovieri	João	BENG			

**D.4. Sampling approach**

No sampling approach is used during verification.

**D.5. Clarification requests (CLs), corrective action requests (CARs) and forward action requests (FARs) raised**

Areas of verification findings	No. of CL	No. of CAR	No. of FAR
Compliance of the monitoring report with the monitoring report form	-	01	-
Compliance of the project implementation and operation with the registered PDD	-	-	-
Post-registration changes	-	02	-
Compliance of the registered monitoring plan with the methodologies including applicable tools and standardized baselines	-	-	-
Compliance of monitoring activities with the registered monitoring plan	02	08	-
Compliance with the calibration frequency requirements for measuring instruments	-	-	-
Assessment of data and calculation of emission reductions or net removals	01	02	-
Assessment of reported sustainable development co-benefits	-	-	-
Global stakeholder consultation	-	-	-
Others (please specify)	-	-	-
<b>Total</b>	03	13	-

**SECTION E. Verification findings****E.1. Compliance of the monitoring report with the monitoring report form**

<b>Means of verification</b>	Verification team checked the monitoring report with latest version of MR available in the UNFCCC website (i.e., version 7.0) and “Instructions for filling out the monitoring report form” mentioned as attachment to Monitoring report form (version 7.0) /12/.
<b>Findings</b>	CAR 01 was raised and successfully closed. Refer to Appendix 4 for further details.
<b>Conclusion</b>	In accordance with §352 of CDM validation and verification standard for project activities, version 02.0 /9/, verification team confirms that final monitoring report is completed using the latest valid version of the applicable monitoring report form /12/.

**E.2. Remaining forward action requests from validation and/or previous verifications**

Verification team had checked the validation report of the project activity /7/ and found that no FAR has been raised during validation.

**E.3. Compliance of the project implementation and operation with the registered project design document**

<b>Means of verification</b>	<p>The “Oeste de Caucaia Landfill Project Activity” consists in the capture, purification and injection of the landfill gas (LFG) generated at the landfill of Oeste de Caucaia into a natural gas distribution network, at Caucaia Municipality (in the state of Ceará), in order to avoid emissions of methane to the atmosphere produced by the anaerobic decomposition of the dumped waste from Caucaia Municipality and displacing the use of natural gas. Any LFG excess will be flared.</p> <p>The main equipment installed are;</p> <ul style="list-style-type: none"> <li>• Open flare manufactured by John Zink – model ZEF 16”X45” – serial number BF - 9149501;</li> <li>• Two blowers manufactured by John Zink – model 12604 – serial numbers 0514110-37597 and 0514109-37597;</li> <li>• Three flow meters manufactured by ABB – model FMT500-IG – serial</li> </ul>
------------------------------	---

	<p>numbers V14224-002961 (LFG flow inlet to biomethane), V14224-002969 (LFG flow inlet direct to flare) and serial number V14224-002962 (biomethane flow inlet return to flare);</p> <ul style="list-style-type: none"> <li>• One gas analyser manufactured by ABB – model PGC-1000 – serial number T170268182;</li> <li>• One temperature meter manufactured by WARME – model WTT-6001 – serial number TI.3243;</li> <li>• One pressure meter manufactured by Rosemount– model 3051 – serial number 2593163;</li> </ul> <p>The flare system became operational in 12/2015 /48/ and the gas pipeline became fully operational in 12/2017 /56/.</p> <p>KBS verified the environmental licenses /48/ /55/ applicable to the Oeste de Caucaia to operate the plant in accordance with the Environmental agency requirements.</p> <p>Verified during the remote audit that technology, project equipment and monitoring and metering equipment is implemented and operational in accordance with the registered PDD /4/.</p>
<b>Findings</b>	No findings have been raised.
<b>Conclusion</b>	<p>The verification team confirms that:</p> <p>a) The project activity is implemented as per the revised PDD, the project activity was fully operational in 12/2017.</p> <p>b) The actual operation of the proposed CDM project activity is in line to the revised PDD /6/;</p> <p>c) A temporary deviation and a request for approval of changes from the project activity were requested in the current monitoring period.</p> <p>d) The actual emission reductions are lower than the expected emission reductions for the current monitoring period.</p> <p>It has reviewed the revised PDD, including the monitoring plan and the corresponding validation report, the applied monitoring methodology, relevant decisions from the CMP and the CDM EB and found that the revised MR for this monitoring period is in line with all the above mentioned documents.</p>

**E.4. Post-registration changes**

**E.4.1. Temporary deviations from the registered monitoring plan, applied methodologies, standardized baselines or other methodological regulatory documents<sup>1</sup>**

Deviation 1:

In the registered monitoring plan described in the PDD, the parameter  $v_{i,t,db}$  (volumetric fraction of greenhouse gas CH<sub>4</sub> in the LFG), which is applied on calculation of project and baseline emissions, is continuously measured by a gas analyser (on dry basis), and it is aggregated hourly (at least). This procedure is also in line with “Tool to determine the mass flow of a greenhouse gas in a gaseous stream” version 02.0.0 /20/.

As verified during the remote audit, the gas analyser has two sensors that measures both the methane fraction in the LFG in the inlet of the plant and in the biomethane in the outlet of the upgrading plant. For the period from 21/09/2018 (10h:52min) to 23/09/2020 (23h:59 min), the gas analyser sensor that should provide the measurement of the volumetric fraction in the LFG was not operational and thus, the parameter  $v_{i,t,db}$  could not be monitored in accordance with the registered monitoring plan. Nevertheless, the sensor responsible for the reading the methane fraction in the biomethane was operational.

According to CDM project standard for project activities, version 02.0, para 231 /10/, CDM validation and verification standard for project activities, version 02.0, para 283 /9/ and in order to apply conservative assumptions or discount factors to the calculations to the extent required to ensure that emission reductions will not be overestimated as a result of the temporary deviation for the requested monitoring period, the conservative procedure will be elaborated as follows:

- A temporary deviation is proposed in order to provide this parameter using an alternative method. This parameter was calculated during this period, based on a statistical analysis using conservative assumptions defining a non-overestimated conservative choice of default data.

<sup>1</sup> Other standards, methodologies, methodological tools and guidelines (to be) applied in accordance with the applied(selected) methodologies are collectively referred to as the other (applied) methodological regulatory documents).

- The statistical analysis took into consideration two sample periods (range of data). One period before the interruption of vi,t,db readings (from 22/12/2017 at 15h:24m to 21/09/2018 10h:51m – inside the monitored period) and another period after the interruption of vi,t,db readings (from 22/10/2020 at 08h:21m to 01/05/2021 00h:00m – outside the monitoring period) /61/. Both sample periods had the equipment responsible for measuring the vi,t,db (gas analyser in dry basis) proper calibrated /32/. Data was cross checked against the raw data downloaded from the supervisory system /63/.
- Since a range of data was used, the conservative default data has been calculated assuming a range that represents the lower 95% confidence limits of a normally distributed dataset. The Microsoft Excel © formulae “PERCENTILE” has been used taking into account (i) the sample periods range of data and (ii) the interval percentile value (k) of 2.5% /61/.
- The result of this statistical analysis returned a conservative default value of 58.318962% of CH<sub>4</sub> in LFG and has been used to replace missing vi,t,db (volumetric fraction of greenhouse gas CH<sub>4</sub> in the LFG in dry basis) data throughout the Deviation 1 period.

KBS verified the conservativeness of the proposed measurement method observing that PP considered that the result is also not overestimated, since it is lower than the sample average (59.197308% CH<sub>4</sub> in LFG) and sample median (59.21520% CH<sub>4</sub> in LFG). Thus, the volumetric fraction of the greenhouse gas CH<sub>4</sub> in the LFG was considered as the percentile of the sample values.

CAR 02 was raised and successfully closed. Refer to Appendix 4 for further details.

Deviation 2:

For the monitoring period from 22/12/2017 to 23/09/2020, the parameter “Flame detection of flare in the minute m” (Flame<sub>m</sub>) was not implemented for the flare line and thus, not registered by the supervisory system.

According to CDM project standard for project activities, version 02.0, para 231, CDM validation and verification standard for project activities, version 02.0, para 283 and in order to apply conservative assumptions or discount factors to the calculations to the extent required to ensure that emission reductions will not be overestimated as a result of the temporary deviation for the requested monitoring period, the conservative procedure will be elaborated as follows:

- It has been demonstrated that the flare is equipped with valves on the input gas line that close automatically if the device becomes non- operational /52/. Thus, if LFG flow is registered for the flare line, then the LFG flow is combusted by this destruction device.
- As per flare operational description provided by manufacturer /52/, the gas flows to the pilot device and a spark is generated to ignite the pilot flame and the automatic mode attempts to light the pilot three times.
- At the end of these attempts, if pilot flame is not ignited, “Pilot Failure” lamp will be illuminated and the operator will have to press the reset push-button to restart the unit.
- Upon proving the pilot flame, the automatic block valve is opened and the gas blower is started allowing gas flow to the flare.

KBS verified the manufacturer’s specifications /52/ and verified that although the parameter was not formally recorded, the gas flow is automatically blocked by the system when the flame is not lit. Thus, KBS considered that the deviation described above is conservative.

Deviation 3:

In the registered monitoring plan described in the PDD, the parameter T<sub>t</sub> (Temperature of the gaseous stream in time interval t), which is applied on calculation of project and baseline emissions, is continuously measured by temperature sensor meter, and it is aggregated hourly (at least). This procedure is also in line with “Tool to determine the mass flow of a greenhouse gas in a gaseous stream” (Version 02.0.0) /20/. For the entire months 12/2017, 01/2018, 02/2018, 09/2020 and 08/2020 (from 28/08/2020 (11h:23m) to 31/08/2020 (23h:59m)), the temperature sensor meter that should provide the measurement was not operational and the parameter T<sub>t</sub> could not be monitored in accordance with registered monitoring plan as verified against the monthly raw data downloaded from the supervisory system /30/.

According to CDM project standard for project activities, version 02.0, para 231 /10/, CDM validation and verification standard for project activities, version 02.0, para 283 /9/ and in order to apply conservative assumptions or discount factors to the calculations to the extent required to ensure that emission reductions will not be overestimated as a result of the temporary deviation for the requested monitoring period, the conservative procedure will be elaborated as follows:

- As stated in the “Tool to determine the mass flow of a greenhouse gas in a gaseous stream” /20/, it is necessary to demonstrate that the gaseous stream is dry or wet by demonstrating that the temperature of the gaseous stream (T<sub>t</sub>) is less than 60°C (dry basis) or higher than 60°C (wet basis) at the flow measurement point.

- For the deviation period, since it was not possible to demonstrate if the gaseous stream is dry or wet, it was conservatively adopted a temperature of 78.473°C (wet basis, being the highest LFG temperature registered during the entire monitoring period) /62/ and thus, converting the measured volumetric flow from wet basis to dry basis, as defined in Option B of the “Tool to determine the mass flow of a greenhouse gas in a gaseous stream” /20/.

KBS verified the raw data downloaded from the supervisory /30/ during the remote audit and confirmed that 78.473°C was the highest temperature during the monitoring period and consider conservative to adopt this value for the months which the temperature was not monitored. Moreover, it was verified an error in the measurement of the temperature. The wrong value recorded 1370 for temperature of LFG is not a real operative value. This is in fact a value registered by the supervisory system when the temperature meter presents transmission signal errors. Throughout the entire monitoring period, the error values have been detected and replaced by 78.473°C.

The conservativeness of the proposed assumption was confirmed checking the calculation considering a lower temperature than 78.473°C, for example 70°C. Considering this lower temperature, the quantity of total methane collected and sent to consumer will increase and as a consequence, the baseline emissions associated with natural gas use will also increase. Therefore, consider the highest temperature monitored during the monitoring period for the months where the temperature sensor was not operational is more conservative than adopt any other temperature below this value. The table below shows the comparison done for the month 09/2020.

Temperature	Total methane collected and sent to consumer	Baseline emissions associated with natural gas use
70°C	1,295,250 Nm <sup>3</sup>	2,724 tCO <sub>2e</sub>
78.473°C	1,057,753 Nm <sup>3</sup>	2,224 tCO <sub>2e</sub>

CAR 03 was raised and successfully closed. Refer to Appendix 4 for further details.

**E.4.2. Corrections**

Not applicable.

**E.4.3. Changes to the start date of the crediting period**

Not applicable.

**E.4.4. Inclusion of a monitoring plan**

Not applicable.

**E.4.5. Permanent changes from registered monitoring plan, or permanent deviation of monitoring from the applied methodologies, standardized baselines or other methodological regulatory documents**

The revised PDD presents permanent changes in the monitoring plan related to the revision of section B.6.1 in order to include additional options to determine the mass flow of gases containing methane depending on the properties (e.g., temperature, humidity, among others) of the monitored gas flow (i.e., LFG or biomethane).

During the remote audit, it was verified through the raw data downloaded from the supervisory /30/ that there are temperatures below and above 60°C. Furthermore, it was verified that the volumetric fraction of methane is measured on a dry basis. Therefore, it was confirmed the necessity to revise the monitoring plan.

As stated in the MR, the inclusion of other options provided by the methodology tool “Tool to determine the mass flow of a greenhouse gas in a gaseous stream” /20/ that were not considered in the registered version of the PDD /5/ sought to increase consistency between the PDD and the operational reality of the project. Thus, option B was included as an option to determine the mass flow of gases containing methane and the following parameters were included in section B.6.2 and B.7.1, respectively:

- MM<sub>H2O</sub>: The molecular mass of water is 18.0152 kg/kmol is according to the methodology tool “Tool to determine the mass flow of a greenhouse gas in a gaseous stream” /20/ application criteria as the methane is the greenhouse gas considered and the remaining gases are pure nitrogen for simplification.
- P<sub>H2O,t,Sat</sub>: Saturation pressure of H<sub>2</sub>O at temperature T<sub>t</sub> in time interval t. This parameter is solely a function of the gaseous stream temperature T<sub>t</sub> and can be found at reference [1] of the methodology

tool “Tool to determine the mass flow of a greenhouse gas in a gaseous stream” /20/ for a total pressure equal to 101 325 Pa.

In addition, some adjustments were made in the following parameters:

#### Parameters that are made available ex-ante

- $R_u$ : The universal ideal gases constant used is 8 314 Pa.m<sup>3</sup>/kmol.K is according to the “Tool to determine the mass flow of a greenhouse gas in a gaseous stream” /20/. The purpose of data was updated since this parameter is used for the determination of the baseline emissions and the information regarding to “Additional comment” was removed;
- $MM_i$ : The molecular mass of greenhouse gas methane is 16.04 kg/kmol is according to the “Tool to determine the mass flow of a greenhouse gas in a gaseous stream” /20/ application criteria as the methane is the greenhouse gas considered and the remaining gases are pure nitrogen for simplification. The purpose of data was updated since this parameter is used for the determination of the baseline emissions and the information regarding to “Additional comment” was removed;
- $MM_k$ : The molecular mass of greenhouse gas nitrogen is 28.01 kg/kmol is according to the “Tool to determine the mass flow of a greenhouse gas in a gaseous stream” /20/ application criteria as the methane is the greenhouse gas considered and the remaining gases are pure nitrogen for simplification. The information regarding to “Additional comment” was removed;
- $P_n$ : The total pressure at normal conditions is 101,325 Pa is according to the “Tool to determine the mass flow of a greenhouse gas in a gaseous stream” /20/. The information included under “Additional comment” was removed;
- $T_n$ : The temperature at normal conditions is 273.15 K is according to the “Tool to determine the mass flow of a greenhouse gas in a gaseous stream” /20/. The information included under “Additional comment” was removed.

#### Parameters monitored ex-post

- $V_{t,db}$ : Volumetric flow of the gaseous stream in time interval  $t$  on a dry basis (m<sup>3</sup>/h). The information under “Additional comment” was revised according to the “Tool to determine the mass flow of a greenhouse gas in a gaseous stream” /20/;
- $V_{t,wb}$ : Volumetric flow of the gaseous stream in time interval  $t$  on a wet basis (m<sup>3</sup>/h). The information under “Additional comment” was revised according to the “Tool to determine the mass flow of a greenhouse gas in a gaseous stream” /20/;
- $v_{i,t,db}$ : Volumetric fraction of greenhouse gas  $i$  in a time interval  $t$  in a dry basis. The information under “Additional comment” was revised according to the “Tool to determine the mass flow of a greenhouse gas in a gaseous stream” /20/ to include option B;
- $v_{i,t,wb}$ : Volumetric fraction of greenhouse gas  $i$  in a time interval  $t$  in a wet basis. The information under “Additional comment” was revised according to the “Tool to determine the mass flow of a greenhouse gas in a gaseous stream” /20/ to include option A;
- $T_t$ : temperature of the gaseous stream in time interval  $t$ . The information under “Additional comment” was revised according to the “Tool to determine the mass flow of a greenhouse gas in a gaseous stream” /20/;
- $P_t$ : Pressure of the gaseous stream in time interval  $t$ . The information under “Additional comment” was revised according to the “Tool to determine the mass flow of a greenhouse gas in a gaseous stream” /20/.

It was confirmed that there is no increase in capacity of the LFG capture system or addition of new equipment that increases its capacity to upgrade the captured landfill gas. Hence, these revisions do not affect the applicability of the methodology nor the additionality and scale of the project.

#### **E.4.6. Changes to the project design**

Along with this verification, it is being proposed a project design change in the registered PDD. A revised PDD version 5 dated 15/02/2021 /6/ is being submitted along with this verification report.

The post-registration change consisted of an update of the existent landfill area from what was described in the registered PDD /6/.

The amount of waste deposited at the project site was also updated according to the most recent data monitored by the project proponent /58/ /59/, which were not available during the validation of the Project Activity. No significant difference can be observed with respect to the information provided in the first registered version of the PDD /5/, but emission reductions were revised accordingly. Nonetheless, this update resulted in a more conservative ex-ante estimative, since there will be no increase in the *ex-ante* estimated LFG generation capacity.

**E.4.7. Changes specific to afforestation and reforestation project activities**

Not applicable.

**E.5. Compliance of the registered monitoring plan with applied methodologies, applied standardized baselines, and other applied methodological regulatory documents**

<b>Means of verification</b>	<p>The project applies the approved methodology ACM0001 - Flaring or use of landfill gas, version 15.0 /13/.</p> <p>The registered PDD /4/ also refers to the following tools:</p> <ul style="list-style-type: none"> <li>• TOOL02 Methodological tool: “Combined tool to identify the baseline scenario and demonstrate additionality” (version 0.5.0.0) /14/;</li> <li>• TOOL03 Methodological tool: “Tool to calculate project or leakage CO<sub>2</sub> emissions from fossil fuel combustion” (Version 02.0) /15/;</li> <li>• TOOL04 Methodological tool: “Emissions from solid waste disposal sites” (Version 07.0) /16/;</li> <li>• TOOL05 Methodological tool: “Baseline, project and/or leakage emissions from electricity consumption and monitoring of electricity generation” (Version 01.0) /17/;</li> <li>• TOOL06 Methodological tool: Project emissions from flaring (Version 02.0.0) /18/;</li> <li>• TOOL07 Methodological tool: Tool to calculate the emission factor for an electricity system (Version 04.0) /19/;</li> <li>• TOOL08 Methodological tool: “Tool to determine the mass flow of a greenhouse gas in a gaseous stream” (Version 02.0) /20/;</li> <li>• TOOL09 Methodological tool: “Determining the baseline efficiency of thermal or electric energy generation systems” (Version 01.0) /21/;</li> <li>• TOOL10 Methodological tool: “Tool to determine the remaining lifetime of equipment” (Version 01) /22/;</li> <li>• TOOL11 Methodological tool: “Assessment of the validity of the original/current baseline and update of the baseline at the renewal of the crediting period” (version 03.0.1);</li> <li>• TOOL12 Methodological tool: “Project and leakage emissions from transportation of freight” (Version 01.1.0) /24/.</li> </ul> <p>The monitoring plan of the registered PDD /5/ was reviewed against the monitoring requirements of the applied methodology and applicable tools.</p>
<b>Findings</b>	No findings have been raised.
<b>Conclusion</b>	As per para 357 and 358 of CDM VVS for project activity version 02.0 /9/, in the opinion of the verification team the monitoring plan of the registered PDD complies with the monitoring requirement of the applied approved methodology ACM0001, version 15.0 /13/ in the context of the project activity.

**E.6. Compliance of monitoring activities with the registered monitoring plan**

**E.6.1. Data and parameters fixed ex ante or at renewal of crediting period**

<b>Means of verification</b>	<p>The parameters were available at the validation stage, which do not need to monitor during the crediting period, as per the revised registered PDD version 5 of 15/02/2021 /6/.</p> <ul style="list-style-type: none"> <li>• <math>OX_{top\_layer}</math> – Fraction of methane that would be oxidized in the top layer of the SWDS in the baseline. KBS verified that the value of 0.1 applied is described in the registered PDD /6/ in accordance with the default value described in ACM0001 /13/;</li> <li>• <math>GWP_{CH_4}</math> – Global warming potential of CH<sub>4</sub>. KBS verified that the value of 25 tCO<sub>2e</sub>/tCH<sub>4</sub> is described in the registered PDD /6/ in accordance with Standard for application of the global warming potentials to clean development mechanism project activities for the second commitment period of the Kyoto protocol /26//27/;</li> <li>• <math>NCV_{CH_4}</math> – Net calorific value of methane at reference conditions. KBS verified that the value of 0.0504 TJ/CH<sub>4</sub> is described in the registered PDD</li> </ul>
------------------------------	---

- /6/ in accordance with the default value described in ACM0001 /13/;
- $R_u$  – Universal ideal gases constant. KBS verified that the value of 8.314 Pa.m<sup>3</sup>/kmol.K is described in the registered PDD /6/ in accordance with the methodology tool “Tool to determine the mass flow of a greenhouse gas in a gaseous stream” (Version 02.0) /20/;
- $MM_i$  – Molecular mass of greenhouse gas CH<sub>4</sub>. KBS verified that the value of 16.04kg/kmol is described in the registered PDD /6/ in accordance with the methodology tool “Tool to determine the mass flow of a greenhouse gas in a gaseous stream” (Version 02.0) /20/;
- $MM_K$  – Molecular mass of gas N<sub>2</sub>. KBS verified that the value of 28.01 kg/kmol is described in the registered PDD /6/ in accordance with the methodology tool “Tool to determine the mass flow of a greenhouse gas in a gaseous stream” (Version 02.0) /20/;
- $MM_{H_2O}$  – Molecular mass of water. KBS verified that the value of 18.0152 kg/kmol is described in the registered PDD /6/ in accordance with the methodology tool “Tool to determine the mass flow of a greenhouse gas in a gaseous stream” (Version 02.0) /20/;
- $P_n$  – Total pressure at normal conditions. KBS verified that the value of 101,325 Pa is described in the registered PDD /6/ in accordance with the methodology tool “Tool to determine the mass flow of a greenhouse gas in a gaseous stream” (Version 02.0) /20/;
- $T_n$  – Temperature at normal conditions. KBS verified that the value of 273.15 K is described in the registered PDD /6/ in accordance with the methodology tool “Tool to determine the mass flow of a greenhouse gas in a gaseous stream” (Version 02.0) /20/;
- $EF_{grid,OM-adj,y}$  – Simple adjusted operating margin CO<sub>2</sub> emission factor in year y. KBS verified that the value of 0.3612 tCO<sub>2</sub>/MWh is described in the registered PDD /6/ in accordance with the methodology tool “Tool to calculate the emission factor for an electricity system” (Version 04.0) /19/;
- $EF_{BM,2013}$  – Build margin CO<sub>2</sub> emission factor in year y. KBS verified that the value of 0.2850 tCO<sub>2</sub>/MWh is described in the registered PDD /6/ in accordance with the methodology tool “Tool to calculate the emission factor for an electricity system” (Version 04.0) /19/.

The following ex-ante determined parameters (that are also included in the PDD /6/) 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:

- Waste composition;
- Efficiency of the LFG capture system that will be installed in the project activity ( $\eta_{PJ}$ );
- Default value for model correction factor to account for model uncertainties ( $\Phi_{default}$ );
- Fraction of methane captured at the SWDS and flared, combusted or used in another manner that prevents the emissions of methane to the atmosphere in year y ( $f_y$ );
- 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);
- Default value for the fraction of degradable organic carbon in MSW that decomposes in the 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 ( $k_j$ );
- Amount of fuel type i consumed by power plant/unit m, k or n (or in the project electricity system in case of  $FC_{i,y}$ ) in year y or hour h ( $FC_{i,m,y}$ ,  $FC_{i,y}$ ,  $FC_{i,k,y}$ ,  $FC_{i,n,y}$  and  $FC_{i,n,h}$ );
- CO<sub>2</sub> emission factor of fossil fuel type i used in power unit m in year y ( $EF_{CO_2,i,y}$  and  $EF_{CO_2,m,i,y}$ );
- Net electricity generated by power plant/unit m or k in year y ( $EG_{m,y}$  and

	<ul style="list-style-type: none"> <li>EG<sub>k,y</sub>);</li> <li>Average net energy conversion efficiency of power unit m in year y (<math>\eta_{m,y}</math>).</li> </ul>
<b>Findings</b>	CL 01 was raised and successfully closed. Refer to Appendix 4 for further details.
<b>Conclusion</b>	KBS confirms that the parameters listed above are fixed ex-ante and used for the baseline and project emissions calculation in accordance with the applied methodology /13/ and methodology tool /15/ - /24/ and they are the same used at the validation stage /7/ and in the previous verification /5/ in accordance with the revised PDD /6/.

**E.6.2. Data and parameters monitored**

<b>Means of verification</b>	<p>The monitoring has been carried out in accordance with the monitoring plan contained in the revised PDD of 15/02/2021 /6/.</p> <p>The below tables describe for each parameter, which is to be measured according to the monitoring plan, how KBS has verified that i) the actual monitoring complies with the monitoring plan and that ii) data have been assessed to correctly support the emission reductions being claimed.</p> <p>The follow parameters have not been used during the current monitoring period:</p> <ul style="list-style-type: none"> <li>V<sub>i,t,wb</sub> - Volumetric fraction of greenhouse gas i in a time interval t on a wet basis;</li> <li>FC<sub>i,j,y</sub> – Quantity of fuel type i combusted in process j during the year y;</li> <li>NCV<sub>i,y</sub> – Weighted average net calorific value of fuel type i in year y;</li> <li>EF<sub>CO2,i,y</sub> – Weighted average CO2 emission factor of fuel type i in year y.</li> </ul>																						
	<table border="1"> <thead> <tr> <th></th> <th>Assessment/ Observation</th> </tr> </thead> <tbody> <tr> <td>Data / Parameter: (as in monitoring plan):</td> <td>Management of SWDS</td> </tr> <tr> <td>Measured / calculated / default:</td> <td>Environmental Impact Assessment /58/ and Environmental Permits /48/.</td> </tr> <tr> <td>Value(s) of monitored parameter:</td> <td>N/A</td> </tr> <tr> <td>Measuring / Reading / Recording frequency:</td> <td>Annually</td> </tr> <tr> <td>Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)</td> <td>Yes.</td> </tr> <tr> <td>Type of monitoring equipment:</td> <td>N/A</td> </tr> <tr> <td>Is accuracy of the monitoring equipment as stated in the monitoring plan? If the monitoring plan does not specify the accuracy of the monitoring equipment, does the accuracy of the monitoring equipment comply with local/national standards, or as per the manufacturer's specification?</td> <td>N/A</td> </tr> <tr> <td>Is the accuracy valid for the entire measuring range or do different accuracy levels apply to different measuring ranges?</td> <td>N/A</td> </tr> <tr> <td>Calibration frequency /interval:</td> <td>N/A</td> </tr> <tr> <td>Is the calibration interval in line with the monitoring plan and/or methodology? If the monitoring plan does not specify the frequency of calibration, is the selected frequency in accordance with the local/national standards, or as per the manufacturer's specifications (if local/national standards or the</td> <td>N/A</td> </tr> </tbody> </table>		Assessment/ Observation	Data / Parameter: (as in monitoring plan):	Management of SWDS	Measured / calculated / default:	Environmental Impact Assessment /58/ and Environmental Permits /48/.	Value(s) of monitored parameter:	N/A	Measuring / Reading / Recording frequency:	Annually	Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Yes.	Type of monitoring equipment:	N/A	Is accuracy of the monitoring equipment as stated in the monitoring plan? If the monitoring plan does not specify the accuracy of the monitoring equipment, does the accuracy of the monitoring equipment comply with local/national standards, or as per the manufacturer's specification?	N/A	Is the accuracy valid for the entire measuring range or do different accuracy levels apply to different measuring ranges?	N/A	Calibration frequency /interval:	N/A	Is the calibration interval in line with the monitoring plan and/or methodology? If the monitoring plan does not specify the frequency of calibration, is the selected frequency in accordance with the local/national standards, or as per the manufacturer's specifications (if local/national standards or the	N/A
		Assessment/ Observation																					
	Data / Parameter: (as in monitoring plan):	Management of SWDS																					
	Measured / calculated / default:	Environmental Impact Assessment /58/ and Environmental Permits /48/.																					
	Value(s) of monitored parameter:	N/A																					
	Measuring / Reading / Recording frequency:	Annually																					
	Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Yes.																					
	Type of monitoring equipment:	N/A																					
	Is accuracy of the monitoring equipment as stated in the monitoring plan? If the monitoring plan does not specify the accuracy of the monitoring equipment, does the accuracy of the monitoring equipment comply with local/national standards, or as per the manufacturer's specification?	N/A																					
	Is the accuracy valid for the entire measuring range or do different accuracy levels apply to different measuring ranges?	N/A																					
	Calibration frequency /interval:	N/A																					
Is the calibration interval in line with the monitoring plan and/or methodology? If the monitoring plan does not specify the frequency of calibration, is the selected frequency in accordance with the local/national standards, or as per the manufacturer's specifications (if local/national standards or the	N/A																						

	manufacturer's specifications are not available, international standards may be used)?	
	Is the calibration of measuring equipment carried out by an accredited person or institution?	N/A
	Did calibration confirm proper functioning of monitoring equipment? (Yes / No):	N/A
	Is(are) calibration(s) valid for the whole reporting period?	N/A
	If applicable, has the reported data been cross-checked with other available data?	N/A
	Is the calibration carried out for a measuring range comparable with the range for which measurements have been carried out?	N/A
	How were the values in the monitoring report verified?	The information was verified through interview and evidences provided by PP.
	Does the data management ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?	Yes. Data management was found to be reliable and appropriate.
In case project participants have temporarily not monitored the parameter, has either i) a deviation been approved by the CDM EB or ii) has the parameter been estimated as stipulated by Appendix 1 to the CDM Project Standard?	N/A	
		<b>Assessment/ Observation</b>
Data / Parameter: (as in monitoring plan):		$O_{pj,h}$ - operation of the equipment that consumes the LFG
Measured / calculated / default:		For each equipment unit j using the LFG monitor that the plant is operating in hour h: Flaring system: <u>Flame</u> . Flame detection system is used to ensure that the equipment is in operation. LFG upgrading facility: <u>Products generated</u> . Monitor the generation of upgraded LFG which is sold to the consumer. This information can be cross-checked against data from supervisory system. $O_{pj,h}=0$ when: Flame is not detected continuously in hour h (instantaneous measurements are made at least every minute); No products are generated in the hour h. Otherwise, $O_{pj,h}=1$
Value(s) of monitored parameter:		Several data reported in the CERs spreadsheet.
Measuring / Reading / Recording frequency:		Hourly
Is measuring and reporting		Yes.

	frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	
	Type of monitoring equipment:	Valve directing the product to CEGAS network and flame detection system integrated with the operation software of the landfill gas plant.
	Is accuracy of the monitoring equipment as stated in the monitoring plan? If the monitoring plan does not specify the accuracy of the monitoring equipment, does the accuracy of the monitoring equipment comply with local/national standards, or as per the manufacturer's specification?	Yes.
	Is the accuracy valid for the entire measuring range or do different accuracy levels apply to different measuring ranges?	Yes.
	Calibration frequency /interval:	N/A
	Is the calibration interval in line with the monitoring plan and/or methodology? If the monitoring plan does not specify the frequency of calibration, is the selected frequency in accordance with the local/national standards, or as per the manufacturer's specifications (if local/national standards or the manufacturer's specifications are not available, international standards may be used)?	N/A
	Is the calibration of measuring equipment carried out by an accredited person or institution?	NA
	Did calibration confirm proper functioning of monitoring equipment? (Yes / No):	N/A
	Is(are) calibration(s) valid for the whole reporting period?	N/A
	If applicable, has the reported data been cross-checked with other available data?	N/A
	Is the calibration carried out for a measuring range comparable with the range for which measurements have been carried out?	N/A
	How were the values in the monitoring report verified?	The information was verified against data provided in the CERs spreadsheet /4/.
	Does the data management ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?	Yes. Data management was found to be reliable and appropriate.
	In case project participants have temporarily not monitored the parameter, has either i) a	NA

	deviation been approved by the CDM EB or ii) has the parameter been estimated as stipulated by Appendix 1 to the CDM Project Standard?	
		<b>Assessment/ Observation</b>
	Data / Parameter: (as in monitoring plan):	EG <sub>EC,y</sub> – amount of electricity consumed by the project activity in year y
	Measured / calculated / default:	Measured.
	Value(s) of monitored parameter:	Several data reported in the CERs spreadsheet /4/.
	Measuring / Reading / Recording frequency:	Continuously measured and yearly recorded.
	Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Yes.
	Type of monitoring equipment:	12/2017 – No information provided by the local electricity distribution company.  From 01/2018 on - Bidirectional electricity meters manufactured by Schneider, model ION8650, accuracy class 0.1% /40/.
	Is accuracy of the monitoring equipment as stated in the monitoring plan? If the monitoring plan does not specify the accuracy of the monitoring equipment, does the accuracy of the monitoring equipment comply with local/national standards, or as per the manufacturer's specification?	The accuracy of the electricity meter is better than the accuracy mentioned in the revised PDD /40/.
	Is the accuracy valid for the entire measuring range or do different accuracy levels apply to different measuring ranges?	Yes. The accuracy is valid for the entire measuring range.
	Calibration frequency /interval:	5 years Electricity meter # MW-1709A919-02 calibrated on 18/02/2018 by 3C Services.
	Is the calibration interval in line with the monitoring plan and/or methodology? If the monitoring plan does not specify the frequency of calibration, is the selected frequency in accordance with the local/national standards, or as per the manufacturer's specifications (if local/national standards or the manufacturer's specifications are not available, international standards may be used)?	The electricity consumed from the grid is monitored by the electricity meter owned by ENEL (electricity distribution company), which is legally responsible for maintaining the calibration up to date.  The 5 years calibration frequency is recommended by ONS /60/.
	Is the calibration of measuring equipment carried out by an accredited person or institution?	The calibration was carried out by 3C Services for electricity meter # MW-1709A919-02.
Did calibration confirm proper functioning of monitoring equipment? (Yes / No):	Yes as checked in the calibration certificate.	

Is(are) calibration(s) valid for the whole reporting period?	Yes.
If applicable, has the reported data been cross-checked with other available data?	Data have been cross checked against the electricity invoices /41/ /42/ /43/ and CCEE reports /44/.
Is the calibration carried out for a measuring range comparable with the range for which measurements have been carried out?	Yes.
How were the values in the monitoring report verified?	Data have been cross checked against the electricity invoices /41/ /42/ /43/ and CCEE reports /44/.
Does the data management ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?	Yes. Data management was found to be reliable and appropriate.
In case project participants have temporarily not monitored the parameter, has either i) a deviation been approved by the CDM EB or ii) has the parameter been estimated as stipulated by Appendix 1 to the CDM Project Standard?	N/A

	Assessment/ Observation
Data / Parameter:	$V_{t,db}$ – volumetric flow of the gaseous stream in time interval $t$ on a dry basis.
Measured / calculated / default:	Measured.
Value(s) of monitored parameter:	Several data reported in the CERs spreadsheet.
Measuring / Reading / Recording frequency:	Continuously measured and aggregated hourly.
Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Yes.
Type of monitoring equipment:	Thermal mass flow meter manufactured by ABB, model FMT500-IG. Serial numbers: <ul style="list-style-type: none"> <li>• # V14224-002961 (FIT215);</li> <li>• # V14224-002969 (FIT206);</li> <li>• # V14224-002962 (FIT510).</li> </ul>
Is accuracy of the monitoring equipment as stated in the monitoring plan? If the monitoring plan does not specify the accuracy of the monitoring equipment, does the accuracy of the monitoring equipment comply with local/national standards, or as per the manufacturer's specification?	The PDD does not specify the flow meter accuracy. The accuracy class of the flow meters is 0.2% as per its manual /37/.
Is the accuracy valid for the entire measuring range or do different accuracy levels apply to different measuring ranges?	Yes, the accuracy is valid for the entire measuring range.
Calibration frequency /interval:	Every 3 years as per manufacturer specification /37/. <ul style="list-style-type: none"> <li>• Flow meter # V14224-002961</li> </ul>

		<p>(FIT215) calibrated on 05/12/2017 by ABB Automation Products GmbH /31/;</p> <ul style="list-style-type: none"> <li>• Flow meter # V14224-002969 (FIT206) calibrated on 05/12/2017 by ABB Automation Products GmbH /31/;</li> <li>• Flow meter # V14224-002962 (FIT510) calibrated on 05/12/2017 by ABB Automation Products GmbH /31/.</li> </ul>
	<p>Is the calibration interval in line with the monitoring plan and/or methodology? If the monitoring plan does not specify the frequency of calibration, is the selected frequency in accordance with the local/national standards, or as per the manufacturer's specifications (if local/national standards or the manufacturer's specifications are not available, international standards may be used)?</p>	<p>The 3 years calibration frequency is recommended by the manufacturer /37/. The PDD /6/ addresses periodical calibration as recommended by the manufacturer.</p>
	<p>Is the calibration of measuring equipment carried out by an accredited person or institution?</p>	<p>The calibration was carried out by ABB Automation Products GmbH for flow meter # V14224-002961 (FIT215), # V14224-002969 (FIT206) and # V14224-002962 (FIT510) /31/.</p>
	<p>Did calibration confirm proper functioning of monitoring equipment? (Yes / No):</p>	<p>Yes as checked in the calibration certificates /31/.</p>
	<p>Is(are) calibration(s) valid for the whole reporting period?</p>	<p>Yes. No delayed calibration has been verified.</p>
	<p>If applicable, has the reported data been cross-checked with other available data?</p>	<p>The values of the MR were reviewed during the remote site visit by crosschecking data of the monthly spreadsheets /4/ submitted with corresponding raw data generated from the supervisory system /30/.</p>
	<p>Is the calibration carried out for a measuring range comparable with the range for which measurements have been carried out?</p>	<p>Yes.</p>
	<p>How were the values in the monitoring report verified?</p>	<p>Cross check of actual figures from flow meter available at the moment of the remote audit were checked with instant records of supervisory system /30/.</p>
	<p>Does the data management (from monitoring equipment to emission reduction calculation) ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?</p>	<p>Yes. The supervisory system assures the traceability of all records and the spreadsheets could assure correct emission reduction calculations in a transparent way.</p>
	<p>In case only partial data are available because activity levels or non-activity parameters have not been monitored in accordance with the registered monitoring plan, has the most conservative</p>	<p>NA</p>

	assumption theoretically possible been applied or has a request for deviation been approved?	
		Assessment/ Observation
	Data / Parameter:	$V_{t,wb}$ – volumetric flow of the gaseous stream in time interval $t$ on a wet basis.
	Measured / calculated / default:	Measured.
	Value(s) of monitored parameter:	Several data reported in the CERs spreadsheet /4/.
	Measuring / Reading / Recording frequency:	Continuously measured and aggregated hourly.
	Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Yes.
	Type of monitoring equipment:	Flow meter manufactured by ABB, model FMT500-IG. Serial numbers: <ul style="list-style-type: none"> <li>• # V14224-002961 (FIT215);</li> <li>• # V14224-002969 (FIT206);</li> <li>• # V14224-002962 (FIT510).</li> </ul>
	Is accuracy of the monitoring equipment as stated in the monitoring plan? If the monitoring plan does not specify the accuracy of the monitoring equipment, does the accuracy of the monitoring equipment comply with local/national standards, or as per the manufacturer's specification?	The PDD does not specify the flow meter accuracy. The accuracy class of the flow meters is 0.2% as per its manual /37/.
	Is the accuracy valid for the entire measuring range or do different accuracy levels apply to different measuring ranges?	Yes, the accuracy is valid for the entire measuring range.
Calibration frequency /interval:	Every 3 years as per manufacturer specification /37/. <ul style="list-style-type: none"> <li>• Flow meter # V14224-002961 (FIT215) calibrated on 05/12/2017 by ABB Automation Products GmbH /31/;</li> <li>• Flow meter # V14224-002969 (FIT206) calibrated on 05/12/2017 by ABB Automation Products GmbH /31/;</li> <li>• Flow meter # V14224-002962 (FIT510) calibrated on 05/12/2017 by ABB Automation Products GmbH /31/.</li> </ul>	
Is the calibration interval in line with the monitoring plan and/or methodology? If the monitoring plan does not specify the frequency of calibration, is the selected frequency in accordance with the local/national standards, or as per the manufacturer's specifications (if local/national standards or the manufacturer's specifications are not available, international	The 3 years calibration frequency is recommended by the manufacturer /37/. The PDD /6/ addresses periodical calibration as recommended by the manufacturer.	

	standards may be used)?	
	Is the calibration of measuring equipment carried out by an accredited person or institution?	The calibration was carried out by ABB Automation Products GmbH for flow meter # V14224-002961 (FIT215), # V14224-002969 (FIT206) and # V14224-002962 (FIT510) /31/.
	Did calibration confirm proper functioning of monitoring equipment? (Yes / No):	Yes as checked in the calibration certificates /31/.
	Is(are) calibration(s) valid for the whole reporting period?	Yes. No delayed calibration has been verified.
	If applicable, has the reported data been cross-checked with other available data?	The values of the MR were reviewed during the remote site visit by crosschecking data of the monthly spreadsheets /4/ submitted with corresponding raw data generated from the supervisory system /30/.
	Is the calibration carried out for a measuring range comparable with the range for which measurements have been carried out?	Yes.
	How were the values in the monitoring report verified?	Cross check of actual figures from flow meter available at the moment of the remote audit were checked with instant records of supervisory system /30/.
	Does the data management (from monitoring equipment to emission reduction calculation) ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?	Yes. The supervisory system assures the traceability of all records and the spreadsheets could assure correct emission reduction calculations in a transparent way.
In case only partial data are available because activity levels or non-activity parameters have not been monitored in accordance with the registered monitoring plan, has the most conservative assumption theoretically possible been applied or has a request for deviation been approved?	NA	
		<b>Assessment/ Observation</b>
Data / Parameter:	$V_{i,t,db}$ – volumetric fraction of greenhouse gas $i$ on a time interval $t$ on a dry basis	
Measured / calculated / default:	Measured.	
Value(s) of monitored parameter:	Several data reported in the CERs spreadsheet /4/.	
Measuring / Reading / Recording frequency:	Continuously measured and aggregated hourly.	
Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	A deviation is requested for the period from 01/10/2018 to 23/09/2020 when the volume fraction of methane ( $Nm^3/h$ ) was measured and recorded as been the ratio of the volume fraction of methane in the biomethane times volumetric flow of biomethane by the volumetric flow of LFG. For more details, refers to section E.4.1 of this report.	
Type of monitoring equipment:	Gas analyser manufactured by ABB,	

	model PGC-1000. Serial number: T170268182.
Is accuracy of the monitoring equipment as stated in the monitoring plan? If the monitoring plan does not specify the accuracy of the monitoring equipment, does the accuracy of the monitoring equipment comply with local/national standards, or as per the manufacturer's specification?	The PDD does not specify the gas analyser accuracy. The equipment accuracy is +/-1% full scale /39/.
Is the accuracy valid for the entire measuring range or do different accuracy levels apply to different measuring ranges?	Yes, the accuracy is valid for the entire measuring range.
Calibration frequency /interval:	Yearly from 22/12/2017 to 05/02/2020. Each 6 months from 06/02/2020 to 23/09/2020.  Gas analyser # T170268182 calibrated on: <ul style="list-style-type: none"> <li>- 10/11/2017 during the commissioning by ABB Ltda and valid until 09/11/2018;</li> <li>- 23/10/2018 by Delmar Analytical do Brasil and valid until 22/10/2019;</li> <li>- 07/05/2019 by Delmar Analytical do Brasil and valid until 06/11/2019;</li> <li>- 06/02/2020 by Delmar Analytical do Brasil and valid until 05/08/2020;</li> <li>- 11/08/2020 by Delmar Analytical do Brasil and valid until 10/02/2021;</li> <li>- 14/10/2020 by Delmar Analytical do Brasil and valid until 13/04/2021 /32/.</li> </ul>
Is the calibration interval in line with the monitoring plan and/or methodology? If the monitoring plan does not specify the frequency of calibration, is the selected frequency in accordance with the local/national standards, or as per the manufacturer's specifications (if local/national standards or the manufacturer's specifications are not available, international standards may be used)?	The yearly and every 6 months calibration frequency is recommended by the manufacturer /39/. The PDD /6/ addresses periodical calibration as recommended by the manufacturer.
Is the calibration of measuring equipment carried out by an accredited person or institution?	Yes, as check in the calibration certificate /32/.
Did calibration confirm proper functioning of monitoring equipment? (Yes / No):	Yes, as check in the calibration certificate /32/.
Is(are) calibration(s) valid for the whole reporting period?	No. A delayed calibration has been verified.  Thus, there is a delay for the period from 06/08/2020 to 10/08/2020. Therefore, paragraphs 365 to 371 of the "Clean Development Mechanism

		<p><i>Validation and Verification Standard</i> /9/ were used to calculate the discount to be applied in the emission reductions for this period where the meters were out of calibration. According to paragraphs 365 to 371 of the <i>Clean Development Mechanism Validation and Verification Standard</i> /9/ project participants should apply the maximum error between the maximum permissible error of the instrument according to the manufacture and the result of the delayed calibration to all the measured values of the period which the calibration was delayed.</p> <p>Since the error showed in the calibration certificate (0.09%) /32/ was lower than the maximum permissible error of the gas analyser (<math>\pm 1\%</math> full scale), the maximum permissible error of the gas analyser was discounted from all values of methane fraction in the landfill gas for the period from 06/08/2020 to 10/08/2020.</p>						
	<p>If applicable, has the reported data been cross-checked with other available data?</p>	<p>The values of the MR were reviewed during the remote site visit by crosschecking data of the monthly spreadsheets /4/ submitted with corresponding raw data generated from the supervisory system /30/.</p>						
	<p>Is the calibration carried out for a measuring range comparable with the range for which measurements have been carried out?</p>	<p>Yes.</p>						
	<p>How were the values in the monitoring report verified?</p>	<p>Cross check of actual figures from the supervisory /30/ available at the moment of the remote site visit with data submitted monthly (Excel spreadsheets) /4/.</p>						
	<p>Does the data management (from monitoring equipment to emission reduction calculation) ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?</p>	<p>Yes. The supervisory assures the traceability of all records and the spreadsheets could assure correct emission reduction calculations in a transparent way.</p>						
	<p>In case only partial data are available because activity levels or non-activity parameters have not been monitored in accordance with the registered monitoring plan, has the most conservative assumption theoretically possible been applied or has a request for deviation been approved?</p>	<p>N/A</p>						
		<table border="1"> <thead> <tr> <th colspan="2" data-bbox="927 1906 1434 1939">Assessment/ Observation</th></tr> </thead> <tbody> <tr> <td data-bbox="491 1939 927 2033">Data / Parameter:</td><td data-bbox="927 1939 1434 2033"><math>V_{i,t,wb}</math> – volumetric fraction of greenhouse gas <math>i</math> on a time interval <math>t</math> on a wet basis</td></tr> <tr> <td data-bbox="491 2033 927 2065">Measured / calculated / default:</td><td data-bbox="927 2033 1434 2065">Measured.</td></tr> </tbody> </table>	Assessment/ Observation		Data / Parameter:	$V_{i,t,wb}$ – volumetric fraction of greenhouse gas $i$ on a time interval $t$ on a wet basis	Measured / calculated / default:	Measured.
Assessment/ Observation								
Data / Parameter:	$V_{i,t,wb}$ – volumetric fraction of greenhouse gas $i$ on a time interval $t$ on a wet basis							
Measured / calculated / default:	Measured.							

	<p>Value(s) of monitored parameter:</p> <p>Measuring / Reading / Recording frequency:</p> <p>Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)</p> <p>Type of monitoring equipment:</p> <p>Is accuracy of the monitoring equipment as stated in the monitoring plan? If the monitoring plan does not specify the accuracy of the monitoring equipment, does the accuracy of the monitoring equipment comply with local/national standards, or as per the manufacturer's specification?</p> <p>Is the accuracy valid for the entire measuring range or do different accuracy levels apply to different measuring ranges?</p> <p>Calibration frequency /interval:</p> <p>Is the calibration interval in line with the monitoring plan and/or methodology? If the monitoring plan does not specify the frequency of calibration, is the selected frequency in accordance with the local/national standards, or as per the manufacturer's specifications (if local/national standards or the manufacturer's specifications are</p>	<p>Several data reported in the CERs spreadsheet /4/.</p> <p>Continuously measured and aggregated hourly.</p> <p>A deviation is requested for the period from 01/10/2018 to 23/09/2020 when the volume fraction of methane (Nm<sup>3</sup>/h) was measured and recorded as been the ratio of the volume fraction of methane in the biomethane times volumetric flow of biomethane by the volumetric flow of LFG. For more details, refers to section E.4.1 of this report.</p> <p>Gas analyser manufactured by ABB, model PGC-1000. Serial number: T170268182.</p> <p>The PDD does not specify the gas analyser accuracy. The equipment accuracy is +/-1% full scale /39/.</p> <p>Yes, the accuracy is valid for the entire measuring range.</p> <p>Yearly from 22/12/2017 to 05/02/2020. Each 6 months from 06/02/2020 to 23/09/2020.</p> <p>Gas analyser # T170268182 calibrated on:</p> <ul style="list-style-type: none"> <li>- 10/11/2017 during the commissioning by ABB Ltda and valid until 09/11/2018;</li> <li>- 23/10/2018 by Delmar Analytical do Brasil and valid until 22/10/2019;</li> <li>- 07/05/2019 by Delmar Analytical do Brasil and valid until 06/11/2019;</li> <li>- 06/02/2020 by Delmar Analytical do Brasil and valid until 05/08/2020;</li> <li>- 11/08/2020 by Delmar Analytical do Brasil and valid until 10/02/2021;</li> <li>- 14/10/2020 by Delmar Analytical do Brasil and valid until 13/04/2021 /32/.</li> </ul> <p>The yearly and every 6 months calibration frequency is recommended by the manufacturer /39/. The PDD /6/ addresses periodical calibration as recommended by the manufacturer.</p>
--	---	---

	not available, international standards may be used)?	
	Is the calibration of measuring equipment carried out by an accredited person or institution?	Yes, as check in the calibration certificate /32/.
	Did calibration confirm proper functioning of monitoring equipment? (Yes / No):	Yes, as check in the calibration certificate /32/.
	Is(are) calibration(s) valid for the whole reporting period?	<p>No. A delayed calibration has been verified.</p> <p>Thus, there is a delay for the period from 06/08/2020 to 10/08/2020. Therefore, paragraphs 365 to 371 of the "Clean Development Mechanism Validation and Verification Standard" /9/ were used to calculate the discount to be applied in the emission reductions for this period where the meters were out of calibration. According to paragraphs 365 to 371 of the <i>Clean Development Mechanism Validation and Verification Standard</i> /9/ project participants should apply the maximum error between the maximum permissible error of the instrument according to the manufacture and the result of the delayed calibration to all the measured values of the period which the calibration was delayed.</p> <p>Since the error showed in the calibration certificate (0.09%) /32/ was lower than the maximum permissible error of the gas analyser (<math>\pm 1\%</math> full scale), the maximum permissible error of the gas analyser was discounted from all values of methane fraction in the landfill gas for the period from 06/08/2020 to 10/08/2020.</p>
	If applicable, has the reported data been cross-checked with other available data?	The values of the MR were reviewed during the remote site visit by crosschecking data of the monthly spreadsheets /4/ submitted with corresponding raw data generated from the supervisory system /30/.
	Is the calibration carried out for a measuring range comparable with the range for which measurements have been carried out?	Yes.
	How were the values in the monitoring report verified?	Cross check of actual figures from the supervisory /30/ available at the moment of the remote site visit with data submitted monthly (Excel spreadsheets) /4/.
	Does the data management (from monitoring equipment to emission reduction calculation) ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?	Yes. The supervisory assures the traceability of all records and the spreadsheets could assure correct emission reduction calculations in a transparent way.

	<p>In case only partial data are available because activity levels or non-activity parameters have not been monitored in accordance with the registered monitoring plan, has the most conservative assumption theoretically possible been applied or has a request for deviation been approved?</p>	<p>N/A</p>
		<p>Assessment/ Observation</p>
	<p>Data / Parameter:</p>	<p><math>T_t</math> – temperature of the gaseous stream in time interval <math>t</math>.</p>
	<p>Measured / calculated / default:</p>	<p>Measured by project participant.</p>
	<p>Value(s) of monitored parameter:</p>	<p>Several data reported in the CERs spreadsheet /4/.</p>
	<p>Measuring / Reading / Recording frequency:</p>	<p>Continuously measured and hourly aggregated.</p>
	<p>Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)</p>	<p>A deviation is requested for the entire months 12/2017, 01/2018, 02/2018 and 09/2020 when the temperature meter was not operational. For more details, refers to section E.4.1 of this report.</p>
	<p>Type of monitoring equipment:</p>	<p>Temperature meter manufactured by WÄRME, model WTT-6001. Serial number:  <ul style="list-style-type: none"> <li>• # TI.3243 (TE 210).</li> </ul> </p>
	<p>Is accuracy of the monitoring equipment as stated in the monitoring plan? If the monitoring plan does not specify the accuracy of the monitoring equipment, does the accuracy of the monitoring equipment comply with local/national standards, or as per the manufacturer's specification?</p>	<p>The PDD does not specify the temperature meter accuracy. The accuracy class of the temperature meter is <math>\pm 0.1</math> °C reading <math>\pm 0.05\%</math> full scale as per its manual /38/.</p>
	<p>Is the accuracy valid for the entire measuring range or do different accuracy levels apply to different measuring ranges?</p>	<p>Yes, the accuracy is valid for the entire measuring range.</p>
<p>Calibration frequency /interval:</p>	<p>Every 3 years as per manufacturer specification /38/.</p> <ul style="list-style-type: none"> <li>• Temperature meter # TI.3243 (TE 210) calibrated on 14/07/2017 by Escala Produtos e Serviços de Calibração Ltda;</li> <li>• Temperature meter # TI.3243 (TE 210) calibrated on 11/11/2020 by M&amp;M Instrumentação /33/.</li> </ul>	
<p>Is the calibration interval in line with the monitoring plan and/or methodology? If the monitoring plan does not specify the frequency of calibration, is the selected frequency in accordance with the local/national standards, or as per the manufacturer's specifications (if local/national standards or the manufacturer's specifications are not available, international</p>	<p>The 3 years calibration frequency is recommended by the manufacturer /38/. The PDD /6/ addresses periodical calibration as recommended by the manufacturer.</p>	

	standards may be used)?	
	Is the calibration of measuring equipment carried out by an accredited person or institution?	The calibration was carried out by Escala Produtos e Serviços de Calibração Ltda and by M&M Instrumentação for temperature meter # TI.3243 (TE 210) /33/.
	Did calibration confirm proper functioning of monitoring equipment? (Yes / No):	Yes as checked in the calibration certificates /33/. However, it was verified a delay in the calibration for the period from 14/07/2020 to 23/09/2020.
	Is(are) calibration(s) valid for the whole reporting period?	<p>No.</p> <p>Temperature meter # TI.3243 (TE 210) calibrated on 14/07/2017 by Escala Produtos e Serviços de Calibração Ltda and on 11/11/2020 by M&amp;M Instrumentação /33/.</p> <p>It was verified a delayed calibration for the period from 14/07/2020 to 23/09/2020.</p> <p>Therefore, paragraphs 365 to 371 of the "Clean Development Mechanism Validation and Verification Standard" /9/ were used to calculate the discount to be applied in the emission reductions for this period where the meters were out of calibration. According to paragraphs 365 to 371 of the <i>Clean Development Mechanism Validation and Verification Standard</i> /9/ project participants should apply the maximum error between the maximum permissible error of the instrument according to the manufacture and the result of the delayed calibration to all the measured values of the period which the calibration was delayed.</p> <p>Since the error showed in the calibration certificate (0.52 %) /33/ was greater than the maximum permissible error of the temperature meter (0.1 °C + 0.05%), the error showed in the calibration certificate was discounted from all values of temperature from 14/07/2020 to 23/09/2020.</p>
	If applicable, has the reported data been cross-checked with other available data?	The values of the monitoring report were reviewed during the remote audit by crosschecking of the data in submitted monthly spreadsheets /4/ with corresponding raw data generated from the supervisory system /30/.
	Is the calibration carried out for a measuring range comparable with the range for which measurements have been carried out?	Yes.
	How were the values in the monitoring report verified?	Cross check of actual figures from flow meter available at the moment of the remote audit were checked with instant records of supervisory system /30/.
	Does the data management (from monitoring equipment to emission reduction calculation) ensure correct transfer of data and	Yes. The supervisory system assures the traceability of all records and the spreadsheets could assure correct emission reduction calculations in a

	reporting of emission reductions and are necessary QA/QC processes in place?	transparent way.
	In case only partial data are available because activity levels or non-activity parameters have not been monitored in accordance with the registered monitoring plan, has the most conservative assumption theoretically possible been applied or has a request for deviation been approved?	N/A
		Assessment/ Observation
	Data / Parameter:	P <sub>t</sub> – pressure of the gaseous stream in time interval <i>t</i> .
	Measured / calculated / default:	Measured by project participant.
	Value(s) of monitored parameter:	Several data reported in the CERs spreadsheet /4/.
	Measuring / Reading / Recording frequency:	Continuously measured and hourly aggregated.
	Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Yes.
	Type of monitoring equipment:	Pressure meter manufactured by Rosemount, model 3051. Serial number # 2593164 (PIT 210).
	Is accuracy of the monitoring equipment as stated in the monitoring plan? If the monitoring plan does not specify the accuracy of the monitoring equipment, does the accuracy of the monitoring equipment comply with local/national standards, or as per the manufacturer's specification?	The PDD does not specify the pressure meter accuracy. The accuracy is 0.04% /50/.
Is the accuracy valid for the entire measuring range or do different accuracy levels apply to different measuring ranges?	Yes, the accuracy is valid for the entire measuring range.	
Calibration frequency /interval:	Every 3 years. <ul style="list-style-type: none"> <li>• Pressure meter # 2593164 (PIT 210) calibrated on 06/09/2017 by Elmec Capristano;</li> <li>• Pressure meter # 2593164 (PIT 210) calibrated on 04/11/2020 by M&amp;M Instrumentação /34/.</li> </ul>	
Is the calibration interval in line with the monitoring plan and/or methodology? If the monitoring plan does not specify the frequency of calibration, is the selected frequency in accordance with the local/national standards, or as per the manufacturer's specifications (if local/national standards or the manufacturer's specifications are not available, international standards may be used)?	The 3 years calibration frequency is recommended by the manufacturer /37/. The PDD /6/ addresses periodical calibration as recommended by the manufacturer.	

	Is the calibration of measuring equipment carried out by an accredited person or institution?	The calibration was performed by Elmec Capristano and M&M Instrumentação /34/.
	Did calibration confirm proper functioning of monitoring equipment? (Yes / No):	Yes as checked in the calibration certificates /31/. However, it was verified a delay in the calibration for the period from 06/09/2020 to 23/09/2020.
	Is(are) calibration(s) valid for the whole reporting period?	No. Pressure meter # 2593164 (PIT 210) calibrated on 06/09/2017 by Elmec Capristano and on 04/11/2020 by M&M Instrumentação /34/. It was verified a delayed calibration for the period from 06/09/2020 to 23/09/2020. Therefore, paragraphs 365 to 371 of the "Clean Development Mechanism Validation and Verification Standard" /9/ were used to calculate the discount to be applied in the emission reductions for this period where the meters were out of calibration. According to paragraphs 365 to 371 of the <i>Clean Development Mechanism Validation and Verification Standard</i> /9/ project participants should apply the maximum error between the maximum permissible error of the instrument according to the manufacture and the result of the delayed calibration to all the measured values of the period which the calibration was delayed. Since the error showed in the calibration certificate (0.08%) /34/ was greater than the maximum permissible error of the pressure meter (0.04%) /50/, the error showed in the calibration certificate was discounted from all values of pressure of the gaseous stream from 06/09/2020 to 23/09/2020.
	If applicable, has the reported data been cross-checked with other available data?	The values of the monitoring report were reviewed during the remote audit by crosschecking of the data in submitted monthly spreadsheets /4/ with corresponding raw data generated from the supervisory system /30/.
	Is the calibration carried out for a measuring range comparable with the range for which measurements have been carried out?	Yes.
	How were the values in the monitoring report verified?	The values of the monitoring report were verified their consistency with aggregated values of the excel spreadsheet /4/.
	Does the data management (from monitoring equipment to emission reduction calculation) ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?	Yes. The system assures the traceability of all records and the spreadsheets could assure correct emission reduction calculations in a transparent way.
	In case only partial data are	N/A

	<p>available because activity levels or non-activity parameters have not been monitored in accordance with the registered monitoring plan, has the most conservative assumption theoretically possible been applied or has a request for deviation been approved?</p>																											
	<table border="1"> <thead> <tr> <th data-bbox="933 436 1428 465">Assessment/ Observation</th> </tr> </thead> <tbody> <tr> <td data-bbox="933 465 1428 533"> <p>Data / Parameter: (as in monitoring plan):</p> </td> <td data-bbox="1428 465 1436 533"> <p><math>P_{H_2O,t,Sat}</math> – Saturation pressure of H<sub>2</sub>O at temperature <math>T_t</math> in time interval t.</p> </td> </tr> <tr> <td data-bbox="933 533 1428 562"> <p>Measured / calculated / default:</p> </td> <td data-bbox="1428 533 1436 562"> <p>Default value.</p> </td> </tr> <tr> <td data-bbox="933 562 1428 591"> <p>Value(s) of monitored parameter:</p> </td> <td data-bbox="1428 562 1436 591"> <p>N/A</p> </td> </tr> <tr> <td data-bbox="933 591 1428 808"> <p>Measuring / Reading / Recording frequency:</p> </td> <td data-bbox="1428 591 1436 808"> <p>This parameter is solely a function of the gaseous stream temperature <math>T_t</math> and can be found at reference [1] of the methodological tool “Tool to determine the mass flow of a greenhouse gas in a gaseous stream” /20/ for a total pressure equal to 101,325 Pa.</p> </td> </tr> <tr> <td data-bbox="933 808 1428 936"> <p>Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)</p> </td> <td data-bbox="1428 808 1436 936"> <p>N/A</p> </td> </tr> <tr> <td data-bbox="933 936 1428 965"> <p>Type of monitoring equipment:</p> </td> <td data-bbox="1428 936 1436 965"> <p>N/A</p> </td> </tr> <tr> <td data-bbox="933 965 1428 1272"> <p>Is accuracy of the monitoring equipment as stated in the monitoring plan? If the monitoring plan does not specify the accuracy of the monitoring equipment, does the accuracy of the monitoring equipment comply with local/national standards, or as per the manufacturer's specification?</p> </td> <td data-bbox="1428 965 1436 1272"> <p>N/A</p> </td> </tr> <tr> <td data-bbox="933 1272 1428 1400"> <p>Is the accuracy valid for the entire measuring range or do different accuracy levels apply to different measuring ranges?</p> </td> <td data-bbox="1428 1272 1436 1400"> <p>N/A</p> </td> </tr> <tr> <td data-bbox="933 1400 1428 1429"> <p>Calibration frequency /interval:</p> </td> <td data-bbox="1428 1400 1436 1429"> <p>N/A</p> </td> </tr> <tr> <td data-bbox="933 1429 1428 1825"> <p>Is the calibration interval in line with the monitoring plan and/or methodology? If the monitoring plan does not specify the frequency of calibration, is the selected frequency in accordance with the local/national standards, or as per the manufacturer's specifications (if local/national standards or the manufacturer's specifications are not available, international standards may be used)?</p> </td> <td data-bbox="1428 1429 1436 1825"> <p>N/A</p> </td> </tr> <tr> <td data-bbox="933 1825 1428 1921"> <p>Is the calibration of measuring equipment carried out by an accredited person or institution?</p> </td> <td data-bbox="1428 1825 1436 1921"> <p>N/A</p> </td> </tr> <tr> <td data-bbox="933 1921 1428 2018"> <p>Did calibration confirm proper functioning of monitoring equipment? (Yes / No):</p> </td> <td data-bbox="1428 1921 1436 2018"> <p>N/A</p> </td> </tr> <tr> <td data-bbox="933 2018 1428 2060"> <p>Is(are) calibration(s) valid for the whole reporting period?</p> </td> <td data-bbox="1428 2018 1436 2060"> <p>N/A</p> </td> </tr> </tbody> </table>	Assessment/ Observation	<p>Data / Parameter: (as in monitoring plan):</p>	<p><math>P_{H_2O,t,Sat}</math> – Saturation pressure of H<sub>2</sub>O at temperature <math>T_t</math> in time interval t.</p>	<p>Measured / calculated / default:</p>	<p>Default value.</p>	<p>Value(s) of monitored parameter:</p>	<p>N/A</p>	<p>Measuring / Reading / Recording frequency:</p>	<p>This parameter is solely a function of the gaseous stream temperature <math>T_t</math> and can be found at reference [1] of the methodological tool “Tool to determine the mass flow of a greenhouse gas in a gaseous stream” /20/ for a total pressure equal to 101,325 Pa.</p>	<p>Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)</p>	<p>N/A</p>	<p>Type of monitoring equipment:</p>	<p>N/A</p>	<p>Is accuracy of the monitoring equipment as stated in the monitoring plan? If the monitoring plan does not specify the accuracy of the monitoring equipment, does the accuracy of the monitoring equipment comply with local/national standards, or as per the manufacturer's specification?</p>	<p>N/A</p>	<p>Is the accuracy valid for the entire measuring range or do different accuracy levels apply to different measuring ranges?</p>	<p>N/A</p>	<p>Calibration frequency /interval:</p>	<p>N/A</p>	<p>Is the calibration interval in line with the monitoring plan and/or methodology? If the monitoring plan does not specify the frequency of calibration, is the selected frequency in accordance with the local/national standards, or as per the manufacturer's specifications (if local/national standards or the manufacturer's specifications are not available, international standards may be used)?</p>	<p>N/A</p>	<p>Is the calibration of measuring equipment carried out by an accredited person or institution?</p>	<p>N/A</p>	<p>Did calibration confirm proper functioning of monitoring equipment? (Yes / No):</p>	<p>N/A</p>	<p>Is(are) calibration(s) valid for the whole reporting period?</p>	<p>N/A</p>
Assessment/ Observation																												
<p>Data / Parameter: (as in monitoring plan):</p>	<p><math>P_{H_2O,t,Sat}</math> – Saturation pressure of H<sub>2</sub>O at temperature <math>T_t</math> in time interval t.</p>																											
<p>Measured / calculated / default:</p>	<p>Default value.</p>																											
<p>Value(s) of monitored parameter:</p>	<p>N/A</p>																											
<p>Measuring / Reading / Recording frequency:</p>	<p>This parameter is solely a function of the gaseous stream temperature <math>T_t</math> and can be found at reference [1] of the methodological tool “Tool to determine the mass flow of a greenhouse gas in a gaseous stream” /20/ for a total pressure equal to 101,325 Pa.</p>																											
<p>Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)</p>	<p>N/A</p>																											
<p>Type of monitoring equipment:</p>	<p>N/A</p>																											
<p>Is accuracy of the monitoring equipment as stated in the monitoring plan? If the monitoring plan does not specify the accuracy of the monitoring equipment, does the accuracy of the monitoring equipment comply with local/national standards, or as per the manufacturer's specification?</p>	<p>N/A</p>																											
<p>Is the accuracy valid for the entire measuring range or do different accuracy levels apply to different measuring ranges?</p>	<p>N/A</p>																											
<p>Calibration frequency /interval:</p>	<p>N/A</p>																											
<p>Is the calibration interval in line with the monitoring plan and/or methodology? If the monitoring plan does not specify the frequency of calibration, is the selected frequency in accordance with the local/national standards, or as per the manufacturer's specifications (if local/national standards or the manufacturer's specifications are not available, international standards may be used)?</p>	<p>N/A</p>																											
<p>Is the calibration of measuring equipment carried out by an accredited person or institution?</p>	<p>N/A</p>																											
<p>Did calibration confirm proper functioning of monitoring equipment? (Yes / No):</p>	<p>N/A</p>																											
<p>Is(are) calibration(s) valid for the whole reporting period?</p>	<p>N/A</p>																											

	If applicable, has the reported data been cross-checked with other available data?	N/A
	Is the calibration carried out for a measuring range comparable with the range for which measurements have been carried out?	N/A
	How were the values in the monitoring report verified?	N/A
	Does the data management ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?	N/A
	In case project participants have temporarily not monitored the parameter, has either i) a deviation been approved by the CDM EB or ii) has the parameter been estimated as stipulated by Appendix 1 to the CDM Project Standard?	N/A
		<b>Assessment/ Observation</b>
Data / Parameter:	Flame <sub>m</sub> – flame detection of flare in the minute <i>m</i> .	
Measured / calculated / default:	Measured by project participant.	
Value(s) of monitored parameter:	Several data reported in the CERs spreadsheet /4/.	
Measuring / Reading / Recording frequency:	Continuously measured and recorded on a minute basis.	
Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	A deviation is requested for the entire monitoring period when the flame detection of flare was not implemented for the flare line. For more details, refers to section E.4.1 of this report.	
Type of monitoring equipment:	A deviation is requested for the entire monitoring period when the flame detection of flare was not implemented for the flare line. For more details, refers to section E.4.1 of this report.	
Is accuracy of the monitoring equipment as stated in the monitoring plan? If the monitoring plan does not specify the accuracy of the monitoring equipment, does the accuracy of the monitoring equipment comply with local/national standards, or as per the manufacturer's specification?	N/A	
Is the accuracy valid for the entire measuring range or do different accuracy levels apply to different measuring ranges?	N/A	
Calibration frequency /interval:	A deviation is requested for the entire monitoring period when the flame detection of flare was not implemented for the flare line. For more details, refers to section E.4.1 of this report.	
Is the calibration interval in line	N/A	

	with the monitoring plan and/or methodology? If the monitoring plan does not specify the frequency of calibration, is the selected frequency in accordance with the local/national standards, or as per the manufacturer's specifications (if local/national standards or the manufacturer's specifications are not available, international standards may be used)?	
	Is the calibration of measuring equipment carried out by an accredited person or institution?	N/A
	Did calibration confirm proper functioning of monitoring equipment? (Yes / No):	N/A
	Is(are) calibration(s) valid for the whole reporting period?	N/A
	If applicable, has the reported data been cross-checked with other available data?	N/A
	Is the calibration carried out for a measuring range comparable with the range for which measurements have been carried out?	N/A
	How were the values in the monitoring report verified?	A deviation is requested for the entire monitoring period when the flame detection of flare was not implemented for the flare line. For more details, refers to section E.4.1 of this report.
	Does the data management (from monitoring equipment to emission reduction calculation) ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?	N/A
	In case only partial data are available because activity levels or non-activity parameters have not been monitored in accordance with the registered monitoring plan, has the most conservative assumption theoretically possible been applied or has a request for deviation been approved?	N/A
		<b>Assessment/ Observation</b>
Data / Parameter: (as in monitoring plan):	TDL <sub>y</sub> – average technical transmission and distribution losses for providing electricity to source j in year y.	
Measured / calculated / default: Value(s) of monitored parameter:	Default value. 2017: 13.95% 2018:14.44% 2019: 16.02% /29/.	
Measuring / Reading / Recording frequency:	Annually. In the absence of data from the relevant year, most recent figures should be used, but not older than 5 years.	

	Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Yes. The most recent source available for each year included in the monitoring period 22/12/2017 to 23/09/2020 is applied /29/.
	Type of monitoring equipment:	N/A
	Is accuracy of the monitoring equipment as stated in the monitoring plan? If the monitoring plan does not specify the accuracy of the monitoring equipment, does the accuracy of the monitoring equipment comply with local/national standards, or as per the manufacturer's specification?	N/A
	Is the accuracy valid for the entire measuring range or do different accuracy levels apply to different measuring ranges?	N/A
	Calibration frequency /interval:	N/A
	Is the calibration interval in line with the monitoring plan and/or methodology? If the monitoring plan does not specify the frequency of calibration, is the selected frequency in accordance with the local/national standards, or as per the manufacturer's specifications (if local/national standards or the manufacturer's specifications are not available, international standards may be used)?	N/A
	Is the calibration of measuring equipment carried out by an accredited person or institution?	N/A
	Did calibration confirm proper functioning of monitoring equipment? (Yes / No):	N/A
	Is(are) calibration(s) valid for the whole reporting period?	N/A
	If applicable, has the reported data been cross-checked with other available data?	N/A
	Is the calibration carried out for a measuring range comparable with the range for which measurements have been carried out?	N/A
	How were the values in the monitoring report verified?	Data in the monitoring report was cross checked against the ANEEL technical transmission and distribution losses report /29/.
	Does the data management ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?	Yes. Data management was found to be reliable and appropriate.
	In case project participants have temporarily not monitored the parameter, has either i) a deviation been approved by the	N/A

	<p>CDM EB or ii) has the parameter been estimated as stipulated by Appendix 1 to the CDM Project Standard?</p>													
	<p>Data / Parameter: (as in monitoring plan): Measured / calculated / default: Value(s) of monitored parameter:</p>	<p>Assessment/ Observation FC<sub>i,j,y</sub> – quantity of fuel type i combusted in process j during the year y (i = LPG) Measured.</p> <table border="1" data-bbox="941 470 1420 660"> <thead> <tr> <th>Year</th> <th>LPG (kg)</th> </tr> </thead> <tbody> <tr> <td>2017</td> <td>-</td> </tr> <tr> <td>2018</td> <td>45</td> </tr> <tr> <td>2019</td> <td>90</td> </tr> <tr> <td>2020</td> <td>90</td> </tr> <tr> <td>Total</td> <td>225</td> </tr> </tbody> </table>	Year	LPG (kg)	2017	-	2018	45	2019	90	2020	90	Total	225
	Year	LPG (kg)												
	2017	-												
	2018	45												
	2019	90												
	2020	90												
	Total	225												
	<p>Measuring / Reading / Recording frequency:</p>	<p>At every purchase of LPG.</p>												
	<p>Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)</p>	<p>Yes.</p>												
	<p>Type of monitoring equipment:</p>	<p>Internal records related to LPG purchase.</p>												
	<p>Is accuracy of the monitoring equipment as stated in the monitoring plan? If the monitoring plan does not specify the accuracy of the monitoring equipment, does the accuracy of the monitoring equipment comply with local/national standards, or as per the manufacturer's specification?</p>	<p>N/A</p>												
	<p>Is the accuracy valid for the entire measuring range or do different accuracy levels apply to different measuring ranges?</p>	<p>N/A</p>												
	<p>Calibration frequency /interval:</p>	<p>N/A</p>												
<p>Is the calibration interval in line with the monitoring plan and/or methodology? If the monitoring plan does not specify the frequency of calibration, is the selected frequency in accordance with the local/national standards, or as per the manufacturer's specifications (if local/national standards or the manufacturer's specifications are not available, international standards may be used)?</p>	<p>N/A</p>													
<p>Is the calibration of measuring equipment carried out by an accredited person or institution?</p>	<p>N/A</p>													
<p>Did calibration confirm proper functioning of monitoring equipment? (Yes / No):</p>	<p>N/A</p>													
<p>Is(are) calibration(s) valid for the whole reporting period?</p>	<p>N/A</p>													

	If applicable, has the reported data been cross-checked with other available data?	N/A
	Is the calibration carried out for a measuring range comparable with the range for which measurements have been carried out?	N/A
	How were the values in the monitoring report verified?	Data in the monitoring report was cross checked against the invoices /53/.
	Does the data management ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?	Yes. Data management was found to be reliable and appropriate.
	In case project participants have temporarily not monitored the parameter, has either i) a deviation been approved by the CDM EB or ii) has the parameter been estimated as stipulated by Appendix 1 to the CDM Project Standard?	N/A

	Assessment/ Observation
Data / Parameter: (as in monitoring plan):	NCV <sub>i,y</sub> – weighted average net calorific value of fuel type i in year y (i = LPG)
Measured / calculated / default:	Regional or national default value.
Value(s) of monitored parameter:	0.0464 GJ/kg
Measuring / Reading / Recording frequency:	Continuously.
Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Yes.
Type of monitoring equipment:	N/A
Is accuracy of the monitoring equipment as stated in the monitoring plan? If the monitoring plan does not specify the accuracy of the monitoring equipment, does the accuracy of the monitoring equipment comply with local/national standards, or as per the manufacturer's specification?	N/A
Is the accuracy valid for the entire measuring range or do different accuracy levels apply to different measuring ranges?	N/A
Calibration frequency /interval:	N/A
Is the calibration interval in line with the monitoring plan and/or methodology? If the monitoring plan does not specify the frequency of calibration, is the selected frequency in accordance with the local/national standards, or as per the manufacturer's specifications (if local/national standards or the manufacturer's specifications are	N/A

	not available, international standards may be used)?	
	Is the calibration of measuring equipment carried out by an accredited person or institution?	N/A
	Did calibration confirm proper functioning of monitoring equipment? (Yes / No):	N/A
	Is(are) calibration(s) valid for the whole reporting period?	N/A
	If applicable, has the reported data been cross-checked with other available data?	N/A
	Is the calibration carried out for a measuring range comparable with the range for which measurements have been carried out?	N/A
	How were the values in the monitoring report verified?	Data in the monitoring report was cross checked against Brazilian Energy Balance 2020 (2019 data vintage) /47/.
	Does the data management ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?	Yes. Data management was found to be reliable and appropriate.
	In case project participants have temporarily not monitored the parameter, has either i) a deviation been approved by the CDM EB or ii) has the parameter been estimated as stipulated by Appendix 1 to the CDM Project Standard?	N/A

	Assessment/ Observation
Data / Parameter: (as in monitoring plan):	EF <sub>CO<sub>2</sub>,i,y</sub> – weighted average CO <sub>2</sub> emission factor of fuel type i in year y (i = LPG)
Measured / calculated / default:	Default value.
Value(s) of monitored parameter:	0.0656 tCO <sub>2</sub> /GJ
Measuring / Reading / Recording frequency:	Continuously.
Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Any future revisions of the IPCC Guidelines should be taken into account.
Type of monitoring equipment:	N/A
Is accuracy of the monitoring equipment as stated in the monitoring plan? If the monitoring plan does not specify the accuracy of the monitoring equipment, does the accuracy of the monitoring equipment comply with local/national standards, or as per the manufacturer's specification?	N/A
Is the accuracy valid for the entire measuring range or do different accuracy levels apply to different	N/A

	measuring ranges?	
	Calibration frequency /interval:	N/A
	Is the calibration interval in line with the monitoring plan and/or methodology? If the monitoring plan does not specify the frequency of calibration, is the selected frequency in accordance with the local/national standards, or as per the manufacturer's specifications (if local/national standards or the manufacturer's specifications are not available, international standards may be used)?	N/A
	Is the calibration of measuring equipment carried out by an accredited person or institution?	N/A
	Did calibration confirm proper functioning of monitoring equipment? (Yes / No):	N/A
	Is(are) calibration(s) valid for the whole reporting period?	N/A
	If applicable, has the reported data been cross-checked with other available data?	N/A
	Is the calibration carried out for a measuring range comparable with the range for which measurements have been carried out?	N/A
	How were the values in the monitoring report verified?	Data in the monitoring report was cross checked against 2006 IPCC Guidelines on National GHG Inventories. Value at the upper limit of the uncertainty at a 95% confidence interval /35/.
	Does the data management ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?	Yes. Data management was found to be reliable and appropriate.
In case project participants have temporarily not monitored the parameter, has either i) a deviation been approved by the CDM EB or ii) has the parameter been estimated as stipulated by Appendix 1 to the CDM Project Standard?	N/A	
		<b>Assessment/ Observation</b>
Data / Parameter: (as in monitoring plan):	EF <sub>CO<sub>2</sub>,NG,y</sub> – weighted average CO <sub>2</sub> emission factor of fuel type i in year y (i = natural gas)	
Measured / calculated / default:	Default value.	
Value(s) of monitored parameter:	58.3 tCO <sub>2</sub> /TJ	
Measuring / Reading / Recording frequency:	Continuously.	
Is measuring and reporting frequency in accordance with the monitoring plan and monitoring	Any future revisions of the IPCC Guidelines should be taken into account.	

	methodology? (Yes / No)	
	Type of monitoring equipment:	N/A
	Is accuracy of the monitoring equipment as stated in the monitoring plan? If the monitoring plan does not specify the accuracy of the monitoring equipment, does the accuracy of the monitoring equipment comply with local/national standards, or as per the manufacturer's specification?	N/A
	Is the accuracy valid for the entire measuring range or do different accuracy levels apply to different measuring ranges?	N/A
	Calibration frequency /interval:	N/A
	Is the calibration interval in line with the monitoring plan and/or methodology? If the monitoring plan does not specify the frequency of calibration, is the selected frequency in accordance with the local/national standards, or as per the manufacturer's specifications (if local/national standards or the manufacturer's specifications are not available, international standards may be used)?	N/A
	Is the calibration of measuring equipment carried out by an accredited person or institution?	N/A
	Did calibration confirm proper functioning of monitoring equipment? (Yes / No):	N/A
	Is(are) calibration(s) valid for the whole reporting period?	N/A
	If applicable, has the reported data been cross-checked with other available data?	N/A
	Is the calibration carried out for a measuring range comparable with the range for which measurements have been carried out?	N/A
	How were the values in the monitoring report verified?	Data in the monitoring report was cross checked against 2006 IPCC Guidelines on National GHG Inventories. Value at the upper limit of the uncertainty at a 95% confidence interval /35/.
	Does the data management ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?	Yes. Data management was found to be reliable and appropriate.
	In case project participants have temporarily not monitored the parameter, has either i) a deviation been approved by the CDM EB or ii) has the parameter been estimated as stipulated by	N/A

	Appendix 1 to the CDM Project Standard?
	It was verified during the remote site visit, that for this monitoring period, there were several events due to maintenance which not necessarily interrupted the operation of the project activity /49/.
<b>Findings</b>	CAR 04, CAR 05, CAR 06, CAR 07, CAR 08, CAR 09, CAR 10, CAR 11 and CL 02 were raised and successfully closed. Refer to Appendix 4 for further details.
<b>Conclusion</b>	As per para 360 to 361 of CDM VVS for project activity version 02.0 /9/. The assessment team concludes that the monitoring of the project activity is being carried out in accordance with the registered monitoring plan and meets the requirements of the applied monitoring methodology /13/. The adequacy and compliance of the registered monitoring plan in the MR can be concluded to be conforming. The flow of the information from the point of generation up to reporting has been reviewed and found to be correct and appropriate meeting the requirements of the applied methodology.

**E.6.3. Implementation of sampling plan**

<b>Means of verification</b>	No sampling plan applied for the project activity. Therefore, this section is not applicable.
<b>Findings</b>	-
<b>Conclusion</b>	Not applicable.

**E.7. Compliance with the calibration frequency requirements for measuring instruments**

<b>Means of verification</b>	<p>The calibration certificates were checked in order to verify the compliance and the calibration frequency of each measuring equipment.</p> <ul style="list-style-type: none"> <li>Flow meter # V14224-002961 (FIT 215) calibrated on 05/12/2017 by ABB Automation Products GmbH and valid until 04/12/2020 /31/;</li> <li>Flow meter # V14224-002969 (FIT 206) calibrated on 05/12/2017 by ABB Automation Products GmbH and valid until 04/12/2020 /31/;</li> <li>Flow meter # V14224-002962 (FIT 510) calibrated on 05/12/2017 by ABB Automation Products GmbH and valid until 04/12/2020 /31/;</li> <li>Gas analyser # T170268182 calibrated on 10/11/2017 during the commissioning by ABB Ltda and valid until 09/11/2018, on 23/10/2018 by Delmar Analytical do Brasil and valid until 22/10/2019, on 07/05/2019 by Delmar Analytical do Brasil and valid until 06/11/2019, on 06/02/2020 by Delmar Analytical do Brasil and valid until 05/08/2020, on 11/08/2020 by Delmar Analytical do Brasil and valid until 10/02/2021 and on 14/10/2020 by Delmar Analytical do Brasil and valid until 13/04/2021 /32/. It was verified a delayed calibration for the period from 06/08/2020 to 10/08/2020. Since the error showed in the calibration certificate (0.09%) /32/ was lower than the maximum permissible error of the gas analyser (<math>\pm 1\%</math> full scale) /39/, the maximum permissible error of the gas analyser was discounted from all values of methane fraction in the landfill gas for the period from 06/08/2020 to 10/08/2020. For the period with delay in the calibration, an error has been applied in the calculations in accordance with paragraph 366 (a) of VVS for project activities /9/;</li> <li>Temperature meter # TI.3243 (TE 210) calibrated on 14/07/2017 by Escala Produtos e Serviços de Calibração Ltda and valid until 13/07/2020 and on 11/11/2020 by M&amp;M Instrumentação and valid until 10/11/2023 /33/. It was verified a delayed calibration for the period from 14/07/2020 to 23/09/2020. Since the error showed in the calibration certificate (0.52 %) /33/ was greater than the maximum permissible error of the temperature meter (0.1 °C + 0.05%) /38/, the error showed in the calibration certificate was discounted from all values of temperature from 14/07/2020 to 23/09/2020. For the period with delay in the calibration, an error has been applied in the calculations in accordance with paragraph 366 (a) of VVS for project activities /9/;</li> <li>Pressure meter # 2593164 (PIT 210) calibrated on 06/09/2017 by Elmec Capristano and valid until 05/09/2020 and on 04/11/2020 by M&amp;M Instrumentação and valid until 03/11/2023 /34/. It was verified a delayed calibration for the period from 06/09/2020 to 23/09/2020. Since the error</li> </ul>
------------------------------	--

	showed in the calibration certificate (0.08%) /34/ was greater than the maximum permissible error of the pressure meter (0.04%) /50/, the error showed in the calibration certificate was discounted from all values of pressure of the gaseous stream from 06/09/2020 to 23/09/2020. For the period with delay in the calibration, an error has been applied in the calculations in accordance with paragraph 366 (b) of VVS for project activities /9/.
<b>Findings</b>	Refers to CAR 06, CAR 07, CAR 08, CAR 09, CAR 10 and CAR 11 raised and successfully closed in section E.6.4.
<b>Conclusion</b>	As per para 365 to 370 of CDM VVS for project activity version 02.0 /9/, the Verification team confirms that the calibration frequency is in line with the monitoring plan mentioned in the registered PDD /6/.

**E.8. Assessment of data and calculation of emission reductions or net removals**

**E.8.1. Calculation of baseline GHG emissions or baseline net GHG removals by sinks**

<b>Means of verification</b>	<p><u>Baseline emissions:</u>                  Baseline emissions was calculated in accordance with the applied methodology ACM0001 /13/ and the revised monitoring plan /6/.</p> <p>Baseline emissions was calculated as the amount of methane that would have been destroyed/combusted during the year in project scenario (<math>BE_{CH4,y}</math>) and the amount of methane in the LFG which is sent to the natural gas distribution network times average CO<sub>2</sub> emissions factor of natural gas in the natural gas network (<math>BE_{NG,y}</math>). No thermal energy is produced and no electricity is generated.</p> <p>The methane from the Oeste de Caucaia landfill (<math>BE_{CH4,y}</math>) baseline emissions was calculated by the formula:</p> $BE_{CH4,y} = ((1 - OX_{top\_layer}) \times F_{CH4,PJ,y} - F_{CH4,BL,y}) \times GWP_{CH4}$ <p>The fraction of methane that would be oxidized in the top layer of the SWDS in the baseline (<math>OX_{top\_layer}</math>) of 0.1 is according to the ACM0001 recommendations /13/.</p> <p>For the ex-post determination, the amount of methane in the LFG which is flared and/or used in the project activity in year y (<math>F_{CH4,PJ,y}</math>) is determined by monitoring the quantity of methane actually flared and gas sent to the natural gas distribution network. No thermal energy is produced and no methane is used for electricity generation.</p> <p>The amount of methane in the LFG which is sent to the natural gas distribution network in year y (<math>F_{CH4,NG,y}</math>) is determined using the “Tool to determine the mass flow of a greenhouse gas in a gaseous stream”, version 02.0 /20/. For this monitoring period, Option A (volume flow and volumetric fraction measured in dry basis) and Option B (volume flow measured in wet basis and volumetric fraction measured in dry basis) are selected for the calculation depending on the temperature of the gaseous stream.</p> <p>Option A: Flow measurement on a dry basis is not doable for a wet gaseous stream. Hence, it is necessary to demonstrate that the gaseous stream is dry to use this option. The demonstration was made as following:</p> <ul style="list-style-type: none"> <li>• Demonstrate that the temperature of the gaseous stream (<math>T_t</math>) is less than 60°C (333.15 K) at the flow measurement point.</li> </ul> <p>The mass flow of greenhouse gas i (<math>F_{i,t}</math>) is determined as follows:</p> $F_{i,t} = V_{t,db} * v_{i,t,db} * \rho_{i,t}$ <p>With</p> $\rho_{i,t} = \frac{P_t * MM_i}{R_u * T_t}$ <p>Where:</p> <p><math>F_{i,t}</math> = Mass flow of greenhouse gas i in the gaseous stream in time interval t (kg gas/h);  <math>V_{t,db}</math> = Volumetric flow of the gaseous stream in time interval t on a dry basis (m<sup>3</sup> dry gas/h);  <math>v_{i,t,db}</math> = Volumetric fraction of greenhouse gas i in the gaseous stream in a time interval t on a dry basis (m<sup>3</sup> gas i/m<sup>3</sup> dry gas);  <math>\rho_{i,t}</math> = Density of greenhouse gas i in the gaseous stream in time interval t (kg gas i/m<sup>3</sup> gas i);  <math>P_t</math> = Absolute pressure of the gaseous stream in time interval t (Pa);</p>
------------------------------	---

MM<sub>i</sub> = Molecular mass of greenhouse gas i (kg/kmol);  
 R<sub>u</sub> = Universal ideal gases constant (8,314 Pa.m<sup>3</sup>/kmol.K);  
 T<sub>t</sub> = Temperature of the gaseous stream in time interval t (K).

Option B: The mass flow of greenhouse gas *i* (F<sub>i,t</sub>) is determined using equations above used in Option A. The volumetric flow of the gaseous stream in time interval *t* on a dry basis (V<sub>t,db</sub>) is determined by converting the measured volumetric flow from wet basis to dry basis as follows:

$$V_{t,db} = V_{t,wb} / (1 + v_{H_2O,t,db})$$

Where:

V<sub>t,db</sub> = Volumetric flow of the gaseous stream in a time interval *t* on a dry basis (m<sup>3</sup> dry gas);  
 V<sub>t,wb</sub> = Volumetric flow of the gaseous stream in a time interval *t* on a wet basis (m<sup>3</sup> wet gas);  
 v<sub>H<sub>2</sub>O,t,db</sub> = Volumetric fraction of H<sub>2</sub>O in the gaseous stream in a time interval *t* on a dry basis (m<sup>3</sup> H<sub>2</sub>O/m<sup>3</sup> dry gas);

The volumetric fraction of H<sub>2</sub>O in time interval *t* on a dry basis (v<sub>H<sub>2</sub>O,t,db</sub>) is estimated according to following equation.

$$v_{H_2O,t,db} = \frac{m_{H_2O,t,db} * MM_{t,db}}{MM_{H_2O}}$$

Where:

v<sub>H<sub>2</sub>O,t,db</sub> = Volumetric fraction of H<sub>2</sub>O in the gaseous stream in a time interval *t* on a dry basis (m<sup>3</sup> H<sub>2</sub>O/m<sup>3</sup> dry gas);  
 m<sub>H<sub>2</sub>O,t,db</sub> = Absolute humidity in the gaseous stream in time interval *t* on a dry basis (kg H<sub>2</sub>O/kg dry gas);  
 MM<sub>t,db</sub> = Molecular mass of the gaseous stream in time interval *t* on a dry basis (kg dry gas/kmol dry gas);  
 MM<sub>H<sub>2</sub>O</sub> = Molecular mass of H<sub>2</sub>O (kg H<sub>2</sub>O /kmol H<sub>2</sub>O).

The absolute humidity of the gaseous stream (m<sub>H<sub>2</sub>O,t,db</sub>) will be determined using Option 2 (simplified calculation without measurement of the moisture content):

Option 2: Simplified calculation without measurement of the moisture content

This option provides a simple and conservative approach to determine the absolute humidity by assuming the gaseous stream is dry or saturated depending on which is the conservative situation.

Concerning the project activity, the conservative situation will be to assume that the gaseous stream is saturated, then m<sub>H<sub>2</sub>O,t,db</sub> is assumed to equal the saturation absolute humidity (m<sub>H<sub>2</sub>O,t,db,sat</sub>) and calculated using the following equation.

$$m_{H_2O,t,db,Sat} = \frac{P_{H_2O,t,Sat} * MM_{H_2O}}{(P_t - P_{H_2O,t,Sat}) * MM_{t,db}}$$

Where:

m<sub>H<sub>2</sub>O,t,db,Sat</sub> = Saturation absolute humidity in time interval *t* on a dry basis (kg H<sub>2</sub>O/kg dry gas);  
 p<sub>H<sub>2</sub>O,t,Sat</sub> = Saturation pressure of H<sub>2</sub>O at temperature T<sub>t</sub> in time interval *t* (Pa);  
 P<sub>t</sub> = Absolute pressure of the gaseous stream in time interval *t* (Pa);  
 T<sub>t</sub> = Temperature of the gaseous stream in time interval *t* (K);  
 MM<sub>t,db</sub> = Molecular mass of the gaseous stream in time interval *t* on a dry basis (kg dry gas/kmol dry gas);  
 MM<sub>H<sub>2</sub>O</sub> = Molecular mass of H<sub>2</sub>O (kg H<sub>2</sub>O/kmol H<sub>2</sub>O).

Parameter MM<sub>t,db</sub> is estimated using the following equation.

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

	<p>Where:  <math>MM_{t,db}</math> = Molecular mass of the gaseous stream in time interval t on a dry basis (kg dry gas/kmol dry gas);  <math>V_{k,t,db}</math> = Volumetric fraction of gas k in the gaseous stream in time interval t on a dry basis (<math>m^3</math> gas k/<math>m^3</math> dry gas);  <math>MM_k</math> = Molecular mass of gas k (kg/kmol);  k = All gases except H<sub>2</sub>O, contained in the gaseous stream.</p> <p>All flow meters used in the project activity during the monitored period measures stream flows at normal condition automatically according to meters specification /37/. However, the parameter Volumetric flow of greenhouse gas (<math>V_{t,db}</math>) presented in the “Tool to determine the mass flow of a greenhouse gas in a gaseous stream - Version 02.0.0” is not under normal conditions, neither the Density of greenhouse gas. So, considering the normalized flow meters installed at the project plant, the calculation of the density of greenhouse gas should be under normal conditions as well.  Thus, density of greenhouse gas was calculated as follows:</p> $\rho_{i,n} = \frac{P_n * MM_i}{R_u * T_n}$ <p>Where:  <math>\rho_{i,n}</math> = Density of greenhouse gas i in the gaseous stream at normal conditions (kg gas i/wet <math>m^3</math> gas i);  <math>P_n</math> = Absolute pressure at normal conditions (Pa);  <math>MM_i</math> = Molecular mass of greenhouse gas i (kg/kmol);  <math>R_u</math> = Universal ideal gases constant (8,314 Pa.<math>m^3</math>/kmol.K);  <math>T_n</math> = Temperature at normal conditions (K).</p> <p>The determination of the molecular mass of the gaseous stream (<math>MM_{t,db}</math>) requires measuring the volumetric fraction of all gases (k) in the gaseous stream. However, as a simplification, in the case of the project activity, the volumetric fraction of the methane that is a greenhouse gas and 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.  The amount of methane in the LFG which is destroyed by flaring in year y (<math>F_{CH4,flared,y}</math>) is determined based on quantity of landfill gas sent to the flare (<math>F_{CH4,sent\_flare,y}</math>) and the project emissions from flaring of the residual gas stream (<math>PE_{flare,y}</math>), calculated according to the “Project emissions from flaring”, version 02.0 /18/. The amount of methane in the LFG which is sent to the flare in year y (<math>F_{CH4,sent\_flare,y}</math>) is determined using the “Tool to determine the mass flow of a greenhouse gas in a gaseous stream”, version 02.0 /20/. For this monitoring period, Option A (volume flow and volumetric fraction measured in dry basis) and Option B (volume flow measured in wet basis and volumetric fraction measured in dry basis) are selected for the calculation depending on the temperature of the gaseous stream.  The flare efficiency of the open flare was determined as 50% when the flame is detected in minute m (Flame<sub>m</sub>), otherwise <math>\eta_{flare,m}</math> is 0% as per tool “Project emissions from flaring”, version 02.0 /18/.  The baseline emissions associated with natural gas use (<math>BE_{NG,y}</math>) is calculated as amount of methane in the LFG which is sent to the natural gas distribution network times average CO<sub>2</sub> emissions factor of natural gas in the natural gas network which is determined as per the tool “Tool to calculate project or leakage CO<sub>2</sub> emissions from fossil fuel combustion”.  KBS verified that the total baseline emissions in the monitoring period is equal to 1,095,505 tCO<sub>2e</sub>.</p>
<b>Findings</b>	CL 03 and CAR 12 were raised and successfully closed. Refer to Appendix 4 for further details.
<b>Conclusion</b>	As per para 372 and 373 of CDM VVS for project activity version 02.0 /9/, Verification team concludes that the calculation provided in the monitoring report /2/, and emission reduction spreadsheet /4/ are complete and reflect all the

	<p>requirements of the monitoring plan /6/ and:</p> <p>a) All the monitored data pertaining to baseline calculation as required by the registered monitoring plan was available to PP, the same has been verified by the verification team.</p> <p>b) All the formula used for the baseline, was in line to the revised monitored plan /6/.</p>
--	---

### E.8.2. Calculation of project GHG emissions or actual net anthropogenic GHG removals by sinks

<b>Means of verification</b>	<p><u>Project emissions:</u></p> <p>Project emissions are estimated as the sum of emissions from consumption of electricity from the grid due to the project activity in year y (<math>PE_{EC,y}</math>) and emissions from consumption of fossil fuels for purpose other than electricity generation in year y (<math>PE_{FC,y}</math>). Emissions from consumption of electricity (<math>PE_{EC,y}</math>) are calculated following the “Baseline, project and/or leakage emissions from electricity consumption and monitoring of electricity generation” version 01.0 /17/. Emissions from consumption of fossil fuels for purpose other than electricity generation (<math>PE_{FC,y}</math>) are calculated following the “Tool to calculate project and leakage emissions from fossil fuel combustion”.</p> <p>The emissions from electricity consumption are estimated based on the amount of electricity consumed by the project activity <math>EC_{PJ,y}</math> times the emission factor of the grid. A value for <math>TDL_y</math> based on the most recent information provided by ANEEL (of 13.95% for 2017, 14.44% for 2018 and 16.02% for 2019) /29/ is considered as per the “Baseline, project and/or leakage emissions from electricity consumption and monitoring of electricity generation” version 01.0 /17/.</p> <p>KBS verified that the grid emission factor is in accordance with data available by the Brazilian DNA /28/.</p> <p>The emission factor of Brazilian grid is calculated and provided by the Brazilian DNA /28/.</p> <p>During this monitoring period it was consumed 38441,88 MWh as verified through the electricity invoices /41/ /42/ and CCEE reports /44/.</p> <p>The emissions from fossil fuel consumption are estimated based on the amount of LPG consumed by the pilot flame of the flare <math>FC_{i,j,y}</math> times the <math>CO_2</math> emission coefficient of LPG. The <math>CO_2</math> emission coefficient of LPG are calculated based on the weighted average net calorific value of LPG times the weighted average emission factor of LPG.</p> <p>In this monitoring period, it was consumed 225 kg of LPG as verified through invoices /53/.</p> <p>KBS verified that in the monitoring period, the total project emissions is equal to 14,374 tCO<sub>2e</sub>.</p>
<b>Findings</b>	No findings have been raised.
<b>Conclusion</b>	<p>As per para 372 and 373 of CDM VVS for project activity version 02.0 /9/, Verification team concludes that the calculation provided in the monitoring report /2/, and emission reduction spreadsheet /4/ are complete and reflect all the requirements of the monitoring plan /6/ and:</p> <p>a) All the monitored data pertaining to project calculation as required by the registered monitoring plan was available to PP, the same has been verified by the verification team.</p> <p>b) All the formula used for the project, was in line to the revised monitored plan /6/.</p>

### E.8.3. Calculation of leakage GHG emissions

<b>Means of verification</b>	In accordance with the methodology /13/ and registered PDD /5/, leakage is not applicable.
<b>Findings</b>	-
<b>Conclusion</b>	Not applicable.

### E.8.4. Summary calculation of GHG emission reductions or net anthropogenic GHG removals by sinks

<b>Means of verification</b>	According to the applied methodology ACM0001 /13/, the emission reductions have been calculated based on the following formula:
------------------------------	---

	$ER_y = BE_y - PE_y$ Where, $ER_y$ – Emission reductions in year y (tCO <sub>2e</sub> /y); $BE_y$ – Baseline emissions in year y (tCO <sub>2e</sub> /y); $PE_y$ – Project emissions in year y (tCO <sub>2e</sub> /y); The emission reductions from the project for the monitoring period is equivalent to 1,081,131 tCO <sub>2e</sub> considering. The CERs calculation is based only on data available. KBS has cross checked the CERs spreadsheets /4/ against raw data downloaded during the remote site visit /30/. As the monitoring period starts on 22/12/2017, the pro-rata approach is applicable. It is KBS's opinion that appropriate methods and formulae for calculating emission reductions have been followed in accordance with the requirements of the monitoring methodology and tools as described above.
<b>Findings</b>	CAR 13 was raised and successfully closed. Refer to Appendix 4 for further details.
<b>Conclusion</b>	As per para 372 and 373 of CDM VVS for project activity version 02.0 /9/, Verification team concludes that the calculation provided in the monitoring report /2/, and emission reduction spreadsheet /4/ are complete and reflect all the requirements of the monitoring plan/4/ and: <ol style="list-style-type: none"> <li>1. All the monitored data as required by the registered monitoring plan was available to PP, the same has been verified by the verification team.</li> <li>2. All the formula used for the baseline, leakage and project emissions were in line to the revised monitored plan /6/.</li> </ol>

#### E.8.5. Comparison of actual GHG emission reductions or net anthropogenic GHG removals by sinks with estimates in registered PDD

<b>Means of verification</b>	The MR includes a comparison of the calculated actual emission reductions with the ex-ante calculated values in the revised PDD /6/. <table border="1" data-bbox="470 1059 1455 1155"> <tr> <td>Estimated emission reduction as per registered / approved PDD:</td> <td>1,431,429 tCO<sub>2e</sub></td> </tr> <tr> <td>Actual emission reduction for the monitoring period:</td> <td>1,081,131 tCO<sub>2e</sub></td> </tr> </table> In summary, verification team confirms that the actual emission reduction is lower than the estimate of the revised PDD /6/ for the current monitoring period.	Estimated emission reduction as per registered / approved PDD:	1,431,429 tCO <sub>2e</sub>	Actual emission reduction for the monitoring period:	1,081,131 tCO <sub>2e</sub>
Estimated emission reduction as per registered / approved PDD:	1,431,429 tCO <sub>2e</sub>				
Actual emission reduction for the monitoring period:	1,081,131 tCO <sub>2e</sub>				
<b>Findings</b>	No findings have been raised.				
<b>Conclusion</b>	Verification team confirms that the comparison for the estimated and actual emission reduction for the 2 <sup>nd</sup> monitoring period is correctly calculated and reported.				

#### E.8.6. Remarks on difference from estimated value in registered PDD

<b>Means of verification</b>	Not applicable as the actual ERs are less than the estimated ERs.
<b>Findings</b>	Nil.
<b>Conclusion</b>	The actual ERs are less than the estimated ERs.

#### E.8.7. Actual GHG emission reductions or net anthropogenic GHG removals by sinks during the first commitment period and the period from 1 January 2013 onwards

<b>Means of verification</b>	The complete monitoring period falls after 01/01/2013 and therefore the total ERs during the period pertains to the 2 <sup>nd</sup> commitment period. The 1,081,131 tCO <sub>2e</sub> CERs verified during this monitoring period.
<b>Findings</b>	Nil.
<b>Conclusion</b>	The 1,081,131 tCO <sub>2e</sub> CERs verified pertains to the period after 31/12/2012.

#### E.9. Assessment of reported sustainable development co-benefits

<b>Means of verification</b>	Not reported by PP.
<b>Findings</b>	Refer above.
<b>Conclusion</b>	Refer above.

#### E.10. Global stakeholder consultation

<b>Means of verification</b>	The monitoring report has been made public available at UNFCCC website on
------------------------------	---

	30/11/2020. No comments have been received.
<b>Findings</b>	Nil.
<b>Conclusion</b>	No comments were received after the publication of the monitoring report for global stakeholder consultation.

## SECTION F. Internal quality control

The draft verification report prepared by team leader is reviewed by an independent technical reviewer (having competence of relevant technical area himself/herself or through an independent technical area expert) to confirm the internal procedures established by KBS are duly followed and the verification report/opinion is reached in an objective manner and complies with the applicable CDM requirements.

The independent technical reviewer may approve or reject the draft verification report. The findings may be identified even at this stage, which needs to be satisfactorily resolved, before the request for issuance is submitted to UNFCCC. The final decision is taken by the Manager Technical and Certification. The technical reviewer and Manager (Technical & Certification) can be same person.

The final decision is authorized by Managing Director, KBS once the report is approved by the Manager (Technical & Certification).

## SECTION G. Verification opinion

The verification team confirms that the evidence is of sufficient quantity, appropriate quality and reliable. The reported values, notation, units and sources in the monitoring report for all the monitoring parameters have been cross checked with the emission reduction sheet and monitoring report. During the course of verification and remote site visit, the data submitted by PP was cross verified with the values mentioned in the emission reduction sheet and monitoring report. The procedure for data monitoring, recording, transfer and compilation was also verified and found in compliance with the monitoring plan as mentioned in the revised PDD.

It is confirmed by the assessment team that the reported emission reductions have been conservatively calculated. A list of referred documents for verification is also included in Appendix 3 of this report.

Based on the information seen and evaluated we confirm that the implementation of the project activity has resulted in 1,081,131 tCO<sub>2e</sub> emission reductions during monitoring period 22/12/2017 to 23/09/2020 (first and last days are included).

## SECTION H. Certification statement

KBS Certification Services Pvt. Ltd. has been contracted by GNR Fortaleza Valorização de Biogás Ltda to undertake independent verification and certification for the greenhouse gas (GHG) emission reductions reported from the "Oeste de Caucaia Landfill Project Activity" and UNFCCC Reference Number 10261 for the monitoring period 22/12/2017 to 23/09/2020 (including both dates) in the Monitoring Report Version 1 (first version) dated 27/11/2020.

The verification is based on the approved revised PDD and the monitoring report for this project. Our verification approach was based on the requirements as defined under the Kyoto Protocol, as well as those defined by the CDM Executive Board.

The management of the GNR Fortaleza Valorização de Biogás Ltda is responsible for the preparation of the GHG emissions data and the reported GHG emissions reductions on the basis set out within the project Final Monitoring Report, version 3 dated 19/05/2021. The calculation and determination of GHG emission reductions from the project is the responsibility of the management of the GNR Fortaleza Valorização de Biogás Ltda. The development and maintenance of records and reporting procedures are in accordance with the Monitoring Report Version 3 dated 19/05/2021.

It is our responsibility to express an independent GHG verification opinion on the GHG emissions and on the calculation of GHG emission reductions from the project for the period 22/12/2017 up to 23/09/2020 (including both dates) based on the reported emission reductions in the Final Monitoring Report Version 3 dated 19/05/2021 for the same period.

Based on an understanding of the risks associated with reporting GHG emissions data and the controls in place to mitigate these, KBS planned and performed our work to obtain the information and explanations that we considered necessary to provide sufficient evidence for us to give reasonable assurance that this reported amount of GHG emission reductions for the period is fairly stated.

KBS confirms the following;

**Reporting period:** 22/12/2017 up to 23/09/2020 (including both dates)

**Verified and certified emission in the above reporting period:**

Baseline emissions	Project emissions	Leakage emissions (LE)	Certified emission reductions (CERs)
--------------------	-------------------	------------------------	--------------------------------------

<b>(BE) (tCO<sub>2</sub>e)</b>	<b>(PE) (tCO<sub>2</sub>e)</b>	<b>(tCO<sub>2</sub>e)</b>	<b>(tCO<sub>2</sub>e)</b>
1,095,505	14,374	0	1,081,131

## Appendix 1. Abbreviations

Abbreviations	Full texts
ANEEL	Brazilian Electricity Energy Agency
BE	Baseline Emissions
BM	Build Margin
CAR	Corrective Action Request
CCEE	Chamber of Electric Energy Commercialization
CDM	Clean Development Mechanism
CDM EB	CDM Executive Board
CER(s)	Certified Emission Reduction(s)
CH <sub>4</sub>	Methane
CL	Clarification Request
CO <sub>2</sub>	Carbon Dioxide
CO <sub>2</sub> e	Carbon Dioxide Equivalent
DNA	Designated national Authority
DOE	Designated Operational Entity
EF	Emission Factor
ER	Emission Reductions
FAR	Forward Action Request
GHG(s)	Greenhouse Gas(es)
GWP	Global Warming Potential
IPCC	Intergovernmental Panel on Climate Change
LFG	Landfill Gas
MR	Monitoring Report
OM	Operating Margin
PDD	Project Design Document
PE	Project Emissions
PP	Project Participant
QA/QC	Quality Assurance/Quality Control
tCO <sub>2</sub> e	Tonnes of Carbon Dioxide Equivalent
UNFCCC	United Nations Framework Convention on Climate Change
VVS	Validation and Verification Standard

## Appendix 2. Competence of team members and technical reviewers

Personnel Name:		Andrea Leiroz	
<b>Qualified to work as:</b>			
Team Leader	<input checked="" type="checkbox"/>	Technical Expert	<input checked="" type="checkbox"/>
Validator/Verifier	<input checked="" type="checkbox"/>	Financial Expert	<input type="checkbox"/>
Technical Reviewer	<input type="checkbox"/>	Local Expert (India)	<input checked="" type="checkbox"/>
<b>Area(s) of Technical Expertise</b>			
<b>Sectoral Scope</b>	<b>Technical Area</b>		
Energy industries (renewable/non-renewable sources)	TA 1.1: Thermal energy generation from fossil fuels and biomass including thermal electricity from solar		
	TA 1.2: Energy generation from renewable energy sources		
Waste handling and disposal	TA 13.1. Solid waste and wastewater		
	TA 13.2. Manure		

Approved by (Manager C & T)	Sanjay Kandari
Approval date:	17/12/2018

<b>Personnel Name:</b>		<b>Sanjay Kandari</b>	
<b>Qualified to work as:</b>			
Team Leader	<input checked="" type="checkbox"/>	Technical Expert	<input checked="" type="checkbox"/>
Validator/Verifier	<input checked="" type="checkbox"/>	Financial Expert	<input checked="" type="checkbox"/>
Technical Reviewer	<input checked="" type="checkbox"/>	Local Expert (India)	<input checked="" type="checkbox"/>
<b>Area(s) of Technical Expertise</b>			
<b>Sectoral Scope</b>		<b>Technical Area</b>	
Energy Industries (renewable/non-renewable sources)		TA 1.1: Thermal energy generation from fossil fuels and biomass including thermal electricity from solar	
Energy industries (renewable/non-renewable sources)		TA 1.2: Energy generation from renewable energy sources	
Energy demand		TA 3.1. Energy Demand	
Waste Handling and Disposal		TA 13.1 Waste Handling and Disposal TA 13.2 Manure	
Approved by (Manager C & T)		Akhilesh Joshi	
Approval date:		11/12/2015	

### Appendix 3. Documents reviewed or referenced

No.	Author	Title	References to the document	Provider
/1/	GNR Fortaleza Valorização de Biogás Ltda.	Monitoring report.	Version 1 of 27/11/2020	Project participant
/2/	GNR Fortaleza Valorização de Biogás Ltda.	Final Monitoring Report	Version 3 of 19/05/2021	Project participant
/3/	GNR Fortaleza Valorização de Biogás Ltda.	ER calculation sheet corresponding to MR version 1.	Corresponding to MR version 1	Project participant
/4/	GNR Fortaleza Valorização de Biogás Ltda.	Final ER calculation sheet corresponding to Final MR.	Corresponding to MR version 3	Project participant
/5/	GNR Fortaleza Valorização de Biogás Ltda.	Registered PDD.	Version 4 of 03/09/2015	UNFCCC website
/6/	GNR Fortaleza Valorização de Biogás Ltda.	Revised PDD.	Version 5 of 15/02/2021	Project participant
/7/	RINA Services S.p.A.	Validation report.	Version 1.5Aa of 13/04/2016	UNFCCC website
/8/	KBS	Validation report on PRC	Submitted with this report.	Project participant
/9/	CDM Executive Board	Clean Development Mechanism Validation and Verification Standard	Version 02.0 of 29/11/2018	UNFCCC website

		for project activities.		
/10/	CDM Executive Board	Clean Development Mechanism Project Standard for project activities.	Version 02.0 of 29/11/2018	UNFCCC website
/11/	CDM Executive Board	Clean Development Mechanism Project Cycle Procedure for project activities.	Version 02.0 of 29/11/2018	UNFCCC website
/12/	CDM Executive Board	CDM-MR-FORM: Monitoring report form.	Version 07.0 of 31/05/2019	UNFCCC website
/13/	CDM Executive Board	Large-scale Consolidated Methodology ACM0001: Flaring or use of landfill gas.	Version 15.0 of 08/11/2013	UNFCCC website
/14/	CDM Executive Board	TOOL02: Methodological tool: Combined tool to identify the baseline scenario and demonstrate additionality.	Version 0.5.0.0 of 23/11/2012	UNFCCC website
/15/	CDM Executive Board	TOOL03: Methodological tool: Tool to calculate project or leakage CO <sub>2</sub> emissions from fossil fuel combustion.	Version 02.0 of 02/08/2008	UNFCCC website
/16/	CDM Executive Board	TOOL04: Methodological tool: Emissions from solid waste disposal sites.	Version 07.0 of 16/04/2015	UNFCCC website
/17/	CDM Executive Board	TOOL05: Methodological tool: Baseline, project and/or leakage emissions from electricity consumption and monitoring of electricity generation.	Version 01.0 of 16/05/2008	UNFCCC website
/18/	CDM Executive Board	TOOL06: Methodological tool: Project emissions from flaring.	Version 02.0 of 20/07/2012	UNFCCC website
/19/	CDM Executive Board	TOOL07: Methodological tool: Tool to calculate the emission factor for an electricity system.	Version 04.0 of 04/10/2013	UNFCCC website
/20/	CDM Executive Board	TOOL08: Methodological tool: Tool to determine the mass flow of a greenhouse gas in a gaseous stream.	Version 02.0 of 03/06/2011	UNFCCC website
/21/	CDM Executive Board	TOOL09: Methodological tool: Determining the baseline efficiency of thermal or electric energy generation systems.	Version 01.0 of 28/07/2009	UNFCCC website
/22/	CDM Executive Board	TOOL10: Methodological tool: Tool to determine the remaining lifetime of equipment.	Version 01 of 16/10/2009	UNFCCC website
/23/	CDM Executive Board	TOOL11: Methodological tool: Assessment of the validity of the original/current baseline and update of the baseline at the renewal of the crediting period.	Version 03.0.1 of 02/03/2012	UNFCCC website
/24/	CDM Executive Board	TOOL12: Methodological tool: Project and leakage emissions from transportation of freight.	Version 01.1.0 of 23/11/2012	UNFCCC website
/25/	CDM Executive Board	Guideline: Application of materiality in verifications.	Version 2 of 20/02/2015	UNFCCC website
/26/	CDM Executive Board	Standard for application of the global warming potentials to clean development mechanism project activities and programmes of activities for the second commitment period of the Kyoto protocol.	Version 01.0, EB69, annex 3	UNFCCC website
/27/	Intergovernmental Panel on Climate Change (IPCC)	Fourth Assessment Report: Climate Change 2007. Available at: <a href="https://www.ipcc.ch/site/assets/uploa">https://www.ipcc.ch/site/assets/uploa</a>	Assessed on 17/12/2020	Web link

		<a href="https://www.mctic.gov.br/mctic/opencms/ciencia/SEPED/clima/textogeral/missao_despacho.html">ds/2018/02/ar4-wg1-chapter2-1.pdf</a> .		
/28/	Interministerial Commission in Global Climate Change (DNA of Brazil)	Carbon Emission Factor for the National Grid. Available at: <a href="https://www.mctic.gov.br/mctic/opencms/ciencia/SEPED/clima/textogeral/missao_despacho.html">https://www.mctic.gov.br/mctic/opencms/ciencia/SEPED/clima/textogeral/missao_despacho.html</a> .	Assessed on 17/12/2020	Web link
/29/	ANEEL	ANEEL technical transmission and distribution losses report (2008 – 2019). Available at: <a href="https://www.aneel.gov.br/metodologia-distribuicao/-/asset_publisher/e2INtBH4EC4e/content/perdas/654800?inheritRedirect=false&amp;redirect=http%3A%2F%2Fwww.aneel.gov.br%2Fmetodologia-distribuicao%3Fp_p_id%3D101_IINSTANCE_e2INtBH4EC4e%26p_p_lifecycle%3D0%26p_p_state%3Dnormal%26p_p_mode%3Dview%26p_p_col_id%3Dcolumn-2%26p_p_col_pos%3D3%26p_p_col_count%3D4">https://www.aneel.gov.br/metodologia-distribuicao/-/asset_publisher/e2INtBH4EC4e/content/perdas/654800?inheritRedirect=false&amp;redirect=http%3A%2F%2Fwww.aneel.gov.br%2Fmetodologia-distribuicao%3Fp_p_id%3D101_IINSTANCE_e2INtBH4EC4e%26p_p_lifecycle%3D0%26p_p_state%3Dnormal%26p_p_mode%3Dview%26p_p_col_id%3Dcolumn-2%26p_p_col_pos%3D3%26p_p_col_count%3D4</a> .	06/2020	Project participant
/30/	GNR Fortaleza Valorização de Biogás Ltda	Daily raw data spreadsheet downloaded from the supervisory system.	Assessed on 22/12/2020	Project participant
/31/	ABB Automation Products GmbH	Flow meters calibration certificates: <ul style="list-style-type: none"> <li>Serial number # V14224-002961 (FIT215) – Calibration certificate 244100803XX001;</li> <li>Serial number # V14224-002969 (FIT206) – Calibration certificate 244100803XX003;</li> <li>Serial number # V14224-002962 (FIT510)– Calibration certificate 244100803XX002.</li> </ul>	05/12/2017 valid until 04/12/2020 05/12/2017 valid until 04/12/2020 05/12/2017 valid until 04/12/2020	Project participant
/32/	ABB Ltda Delmar Analytical do Brasil	Gas analyser (PGC-1000) calibration certificates. Serial number # T170268182. Calibration during the commissioning; Calibration certificate 027/2018; Calibration certificate 026/2019; Calibration certificate 010/2020; Calibration certificate 053/2020; Calibration certificate 065/2020.	10/11/2017 valid until 09/11/2018 23/10/2018 valid until 22/10/2019 07/05/2019 valid until 06/11/2019 06/02/2020 valid until 05/08/2020 11/08/2020 valid until 10/02/2021 14/10/2020 valid until 13/04/2021	Project participant
/33/	Escala Produtos e Serviços de Calibração Ltda M&M Instrumentação	Temperature meter calibration certificate. <ul style="list-style-type: none"> <li>Serial number # TI.3243 (TE 210)– Calibration certificate 178659;</li> <li>Serial number # TI.3243 (TE 210)– Calibration certificate 15397/20.</li> </ul>	14/07/2017 valid until 13/07/2020 11/11/2020 valid until 10/11/2023	Project participant

CDM-VCR-FORM

/34/	Elmec Capristano M&M Instrumentação	Pressure meter calibration certificate. <ul style="list-style-type: none"> <li>Serial number # 2593164 (PIT 210) - Calibration certificate PR-0333;</li> <li>Serial number # 2593164 (PIT 210) - Calibration certificate 15395/20.</li> </ul>	06/09/2017 valid until 05/09/2020  04/11/2020 valid until 03/11/2023	Project participant
/35/	Intergovernmental Panel on Climate Change (IPCC)	CO <sub>2</sub> emission factor. Available at: <a href="https://www.ipcc-nggip.iges.or.jp/public/2006gl/pdf/2_Volume2/V2_1_Ch1_Introduction.pdf">https://www.ipcc-nggip.iges.or.jp/public/2006gl/pdf/2_Volume2/V2_1_Ch1_Introduction.pdf</a>	-	Web link
/36/	3C Services	Electricity meter calibration certificate. Serial number # MW-1709A919-02 - Calibration certificate 11321/Z-18.	18/02/2018	Project participant
/37/	ABB Measurement & Analytics	Data sheet of flow meter model FMT500-IG: ABB FMT500-IG.pdf.	-	Project participant
/38/	Wärme	Manufacture's specifications for temperature meter: WATT-2100 – CAT. LOGO.pdf. E-mail from manufacturer about calibration frequency.	-  08/02/2021	Project participant
/39/	ABB Measurement & Analytics	Manufacture's specifications: Manual of gas analyser PGC1000: PGC1000.pdf. E-mail from manufacturer regarding to calibration frequency.	-  26/01/2021	Project participant
/40/	Schneider	Technical description of electricity meter: Catálogo ION8650.pdf.	-	Project participant
/41/	Enel – Companhia Energética do Ceará	Electricity invoices.	01/2018 – 12/2019	Project participant
/42/	Thera Trading Comercializadora de Energia Ltda	Electricity invoices.	03/2020, 04/2020, 06/2020 – 08/2020	Project participant
/43/	Electra Comercializadora de Energia Ltda	Electricity invoices.	01/2020 – 09/2020	Project participant
/44/	Chamber of Electric Energy Commercialization (CCEE)	CCEE reports with electricity consumption.	01/2020 – 09/2020	Project participant
/45/	KBS Certification Services Pvt.	Verification contract between KBS Certification Services Pvt. and GNR Fortaleza Valorização de Biogás Ltda.	27/08/2020	KBS Certification Services Pvt.
/46/	CDM Executive Board	CDM Executive Board agrees to relax mandatory site visits by DOEs for a period of three months (23 March to 23 June 2020) because of COVID-19.	-	Other
/47/	Brazilian Energy Balance	Net calorific value. <a href="https://www.epe.gov.br/sites-pt/publicacoes-dados-abertos/publicacoes/PublicacoesArquivos/publicacao-479/topico-528/BEN2020_sp.pdf">https://www.epe.gov.br/sites-pt/publicacoes-dados-abertos/publicacoes/PublicacoesArquivos/publicacao-479/topico-528/BEN2020_sp.pdf</a> .	2020	Web link
/48/	Ceará state Environmental Superintendence	Environmental licenses: No. 70/2015 valid until 09/12/2016; No. 1081/2016 valid until 06/12/2019;	10/12/2015 06/12/2016	Project participant

	(SEMACE)	No. 76/2020 valid until 14/09/2026. Environmental license for the landfill expansion No. 122/2019 valid until 21/07/2023.	15/09/2020 22/07/2019	
/49/	GNR Fortaleza Valorização de Biogás Ltda	Log diaries with information about incidents that occurred during the monitoring period.	12/2017 – 09/2020	Project participant
/50/	Rosemount	Manufacture's specifications of the pressure meter: ficha-de-dados-do-produto-rosemount-3051-transmissor-de-pressão-pt-76818.pdf	-	Project participant
/51/	GNR Fortaleza Valorização de Biogás Ltda	Sales invoices of Biomethane issued by GNR to CEGAS Gás Natural.	01/2018 – 07/2020	Project participant
/52/	John Zink	Flare technical proposal and technical description.	29/04/2014	Project participant
/53/	-	Invoices for GLP consumption: Cacaugás Ltda; Cezár Cacau Comércio de GLP Ltda No. 72366; Cezár Cacau Comércio de GLP Ltda No. 72367; Cezár Cacau Comércio de GLP Ltda No. 000.004.169; Cezár Cacau Comércio de GLP Ltda No. 000.004.353.	26/07/2018 31/05/2019 31/05/2019 11/06/2020 07/07/2020	Project participant
/54/	INMETRO	Resolution regarding to volumetric measurement of natural gas. RESOLUÇÃO CONJUNTA ANP/INMETRO No 1 DE 10/06/2013 <a href="http://www.inmetro.gov.br/legislacao/rtac/pdf/RTAC001995.pdf">http://www.inmetro.gov.br/legislacao/rtac/pdf/RTAC001995.pdf</a> .	10/06/2013	Web link
/55/	Ceará state Environmental Superintendence (SEMACE)	Environmental license for the upgrading plant No. 2/2018 valid until 01/01/2021.	02/01/2018	Project participant
/56/	CEGAS Gás Natural	CEGAS report.	12/2017	Project participant
/57/	CEGAS Gás Natural	E-mail with the amount of biomethane sold to CEGAS from 05/01/2019 to 23/09/2020.	21/10/2020	Project participant
/58/	ECOSAM	Environmental Impact Assessment of the landfill expansion.	06/2011	Project participant
/59/	GNR Fortaleza Valorização de Biogás Ltda	E-mail with the amount of waste deposited at the project site.	28/12/2020	Project participant
/60/	ONS	Grid Procedures: Module 12. Procedure for energy meter class: Sub-module 12.2 v2019.08. Available at: <a href="http://www.ons.org.br/%2FProcedimentosDeRede%2FMódulo%2012%2FSubmódulo%2012.2%2FSubmódulo%2012.2%202019.08.pdf">http://www.ons.org.br/%2FProcedimentosDeRede%2FMódulo%2012%2FSubmódulo%2012.2%2FSubmódulo%2012.2%202019.08.pdf</a> . Procedure for calibration: Sub-module 12.3 v2016.12. Available at: <a href="http://www.ons.org.br/%2FProcedimentosDeRede%2FMódulo%2012%2FSubmódulo%2012.3%2FSubmódulo%2012.3%202016.12.pdf">http://www.ons.org.br/%2FProcedimentosDeRede%2FMódulo%2012%2FSubmódulo%2012.3%2FSubmódulo%2012.3%202016.12.pdf</a> .	04/09/2019          16/12/2016	Publicly available
/61/	GNR Fortaleza	Statistical analysis for deviation 1:	13/05/2021	Project

	Valorização de Biogás Ltda.	Análise histórica estatística CH4 MR.xlsx		participant
/62/	GNR Fortaleza Valorização de Biogás Ltda.	Maximum temperature during the monitoring period (deviation 3): Maximum LFG temp v2.xlsx	03/05/2021	Project participant
/63/	GNR Fortaleza Valorização de Biogás Ltda	Daily raw data spreadsheet downloaded from the supervisory system for the period from 22/12/2017 (15h:24m) to 21/09/2018 (10h:51m) and from 22/10/2020 (08h:21m) to 01/05/2021 (00h:00m).	Assessed on 14/05/2020	Project participant

## Appendix 4. Clarification requests, corrective action requests and forward action requests

**Table 1. Remaining FAR from validation and/or previous verifications**

No FAR raised from validation and/or previous verification.

<b>FAR ID</b>	xx	<b>Section no.</b>	E.2	<b>Date:</b> DD/MM/YYYY
<b>Description of FAR</b>				
<b>Project participant response</b>				<b>Date:</b> DD/MM/YYYY
<b>Documentation provided by project participant</b>				
<b>DOE assessment</b>				<b>Date:</b> DD/MM/YYYY

**Table 2. CL from this verification**

<b>CL ID</b>	01	<b>Section no.</b>	E.6.1	<b>Date:</b> 25/01/2021
<b>Description of CL</b>				
Section D.1 of MR - PP is requested to clarify in section D.1 of the Monitoring Report the parameters that have not been used during the current monitoring period.				
<b>Project participant response</b>				<b>Date:</b> 08/02/2021
A list of the parameters that were not used to calculate the emission reductions by the project activity during the monitored period was included in section D.1 of the revised version of the Monitoring Report. The tables describing the parameters were excluded accordingly.				
<b>Documentation provided by project participant</b>				
Revised version of the Monitoring Report (Version 2, dated 03/02/2021).				
<b>DOE assessment</b>				<b>Date:</b> 09/02/2021
KBS verified that PP has updated section D.1 of the MR and information regarding to parameters that have not been used during the current monitoring period is now clearly described. Thus, this CL is closed.				

<b>CL ID</b>	02	<b>Section no.</b>	E.6.2	<b>Date:</b> 25/01/2021
<b>Description of CL</b>				
Section D.2 of MR - PP is requested to inform the year of the Brazilian Energy Balance used as source for the weighted average net calorific value of LPG.				
<b>Project participant response</b>				<b>Date:</b> 08/02/2021
The appropriateness of the value was checked against the most recent version of the Brazilian Energy Balance 2020, Year 2019. The information was included in the revised version of the Monitoring Report.				
<b>Documentation provided by project participant</b>				
Revised version of the Monitoring Report (Version 2, dated 03/02/2021).				
<b>DOE assessment</b>				<b>Date:</b> 09/02/2021
Information of the year of the Brazilian Energy Balance used as source for the weighted average net calorific value of LPG was included in the revised MR. This CL is closed.				

<b>CL ID</b>	03 (opened during the 2 <sup>nd</sup> round)	<b>Section no.</b>	E.8.1	<b>Date:</b> 11/02/2021
<b>Description of CL</b>				
Section E.1 of MR - PP is requested to clarify the options used during the monitoring period to determine the mass flow of gases containing methane.				
<b>Project participant response</b>				<b>Date:</b> 15/02/2021
Options A and B were used during the monitoring period to determine the mass flow of gases containing methane. The Monitoring Report was revised accordingly.				
<b>Documentation provided by project participant</b>				
Revised version of the Monitoring Report (version 3)				
<b>DOE assessment</b>				<b>Date:</b> 15/02/2021
KBS verified the revised MR and it is now clearly described that options A and B are used during the monitoring period. This CL is closed.				

**Table 3. CAR from this verification**

<b>CAR ID</b>	01	<b>Section no.</b>	E.1	<b>Date:</b> 25/01/2021
<b>Description of CAR</b>				
Section C of MR - From the review of the hosted MR, Verification team has found that PP has used futuristic language in section C of the Monitoring report. The verification is for the monitoring period for which monitoring is already done.				
<b>Project participant response</b>				<b>Date:</b> 08/02/2021
Monitoring Report was revised to adjust the language used to describe the monitoring procedures. Please refer to the second version of the document.				
<b>Documentation provided by project participant</b>				
Revised version of the Monitoring Report (Version 2, dated 03/02/2021).				
<b>DOE assessment</b>				<b>Date:</b> 09/02/2021
KBS verified the revised MR and confirmed that language used in the document is appropriate. This CAR is closed.				

<b>CAR ID</b>	02	<b>Section no.</b>	E.4.1	<b>Date:</b> 25/01/2021
<b>Description of CAR</b>				
Section B.2.1 of MR - Regarding the measurement of the volumetric fraction of CH <sub>4</sub> in the LFG, the following should be clarified:				
<ul style="list-style-type: none"> <li>• Explain how the volumetric fraction of CH<sub>4</sub> in the biomethane was determined since the gas analyser was not operational.</li> <li>• Clarify the position of the flow meters in Figure 4 of the Monitoring Report. It is not clear if the flow meter located in position A is the same located in position E.</li> <li>• It is stated in the MR that the fraction of CH<sub>4</sub> in the biomethane is described in the invoices. However, in the invoices presented during the remote audit there are no information about fraction of CH<sub>4</sub>.</li> </ul>				
<b>Project participant response</b>				<b>Date:</b> 08/02/2021
Section B.2.1 was revised to clarify that the gas analyser is composed by two sensors measuring the methane fraction in both the LFG and biomethane, and that during the period when the deviation applies only the sensor measuring the methane fraction in the biomethane was operational. Figure 4 of the monitoring report was revised since the equipment location indicated in position A and E is the same. The source of data used related to the parameter fraction of methane was revised in section B.2.1. of the Monitoring Report.				
<b>Documentation provided by project participant</b>				
Revised version of the Monitoring Report (Version 2, dated 03/02/2021).				
<b>DOE assessment</b>				<b>Date:</b> 09/02/2021
KBS verified the revised MR and confirmed that information regarding to measurement of the volumetric fraction of CH <sub>4</sub> in the LFG was clearly described in section B.2.1. Thus, this CAR is closed.				

<b>CAR ID</b>	03	<b>Section no.</b>	E.4.1	<b>Date:</b> 25/01/2021
<b>Description of CAR</b>				
<p>Section B.2.1 of MR - Further clarification should be provided regarding the selection of Option B of the “Tool to determine the mass flow of a greenhouse gas in a gaseous stream” to calculate project and baseline emissions. According to the revised PDD, Option C is applied to calculate <math>F_{CH_4, sent\_flare, y}</math> (LFG flared) and Option A is applied to calculate <math>F_{CH_4, NG}</math> and <math>F_{CH_4, sent\_flare, y}</math> (upgraded gas that does not reach specifications to be sent to the natural gas pipeline).</p> <p>In addition, PP is requested to demonstrate that the value adopted of 70°C is conservative.</p>				
<b>Project participant response</b>				<b>Date:</b> 08/02/2021
<p>The PDD was revised to include other options for determining the mass flow of gas containing methane since during monitoring period it was identified that there were times when other options not listed in the PDD should be used.</p> <p>Calculations and documents were reviewed to consider as 78°C as the maximum temperature of the LFG from historical monitored data. For the months where deviation 3 was applied, in the absence of LFG temperature data, the maximum LFG temperature, as per historical record, was adopted.</p>				
<b>Documentation provided by project participant</b>				
<p>Revised version of the registered PDD (version 5)  Revised version of the Monitoring Report (version 2, dated 03/02/2021)  Revised monthly and aggregated CERs calculation spreadsheets  Excel spreadsheet with the historical records of LFG temperature analysis</p>				
<b>DOE assessment</b>				<b>Date:</b> 09/02/2021
<p>KBS verified the revised MR and PDD and confirmed that the options described for determining the mass flow of gas containing methane are correct. As a consequence of the revision in the PDD, a permanent change to the registered monitoring plan was included in the validation opinion to be submitted with this verification report.</p> <p>However, it is wrongly stated in the MR and PDD that option C was included as an option to determine the mass flow of gases containing methane since this option was included in the registered PDD.</p> <p>In addition, KBS verified the raw data downloaded from the supervisory during the remote audit and confirmed that 78°C was the highest temperature during the monitoring period and consider conservative to adopt this value for the months which the temperature was not monitored.</p> <p>This CAR is open.</p>				
<b>Project participant response</b>				<b>Date:</b> 15/02/2021
<p>The registered version of the PDD indicated that Option A would be applicable to <math>F_{CH_4, NG, y}</math> and Option C to <math>F_{CH_4, sent\_flare, y}</math>. The PDD was revised to clearly indicate that the three options may be applicable to both gases streams monitored by the project depending on the operational conditions. As a consequence Option B and C were listed as additional options to determine <math>F_{CH_4, NG, y}</math>, and Option A and B as additional options to determine <math>F_{CH_4, sent\_flare, y}</math>.</p> <p>The Monitoring Report was revised to indicate that Options A and B were indeed used during the monitored period. In addition, section B.2.5 of the MR and Appendix 7 of the revised PDD were amended to increase clarity.</p>				
<b>Documentation provided by project participant</b>				
-				
<b>DOE assessment</b>				<b>Date:</b> 15/02/2021
<p>KBS confirmed that the information regarding the determination of the mass flow of gases containing methane was correctly revised in the MR and PDD.</p> <p>This CAR is closed.</p>				

<b>CAR ID</b>	04	<b>Section no.</b>	E.6.2	<b>Date:</b> 25/01/2021
<b>Description of CAR</b>				
<p>Section D.2 of MR - PP is requested to detail in the monitoring report the source of data used to monitor the management of SWDS.</p>				
<b>Project participant response</b>				<b>Date:</b> 08/02/2021
<p>Ecofor is the company responsible for the management of the landfill. There has been no modification in the type of residues deposited at the landfill. In addition, there has not been any alteration in the management practices implemented at the site, i.e. disposing, compacting and covering the residues as well as implementing a leachate and gas capture system. The environmental impact assessment describes the practices adopted by the landfill and is referenced in the recently issued environmental permit (Operation Permit N° 76/2020, issued on 15/09/2020, valid through 14/06/2026).</p>				
<b>Documentation provided by project participant</b>				

Revised version of the Monitoring Report (version 2, dated 03/02/2021) Environmental Impact Assessment Environmental Permits: LO N°081/2016 and its renewal request, LO N° 76/2020, and Operation Permit N° 76/2020.	
<b>DOE assessment</b>	<b>Date:</b> 10/02/2021
KBS verified the operational license and confirmed that there is no modification in the management of the landfill. However, the information regarding source of data was not revised in the MR. This CAR is open.	
<b>Project participant response</b>	<b>Date:</b> 15/02/2021
Information was included in the revised version of the Monitoring Report.	
<b>Documentation provided by project participant</b>	
Revised version of the Monitoring Report (version 3)	
<b>DOE assessment</b>	<b>Date:</b> 15/02/2021
The information was correctly included in the revised MR. This CAR is closed.	

<b>CAR ID</b>	05	<b>Section no.</b>	E.6.2	<b>Date:</b> 25/01/2021
<b>Description of CAR</b>				
Section D.2 of MR - Regarding to the parameter operation of the equipment that consumes the LFG, the following issues were identified: <ul style="list-style-type: none"> <li>• Products generated: It was verified during the remote audit that the information about upgraded LFG which is sold to the consumer was not cross-checked against invoices.</li> <li>• The monitoring equipment listed for the LFG upgrading facility is not correct since there is a valve and not a flow meter.</li> </ul>				
<b>Project participant response</b>				<b>Date:</b> 08/02/2021
Regarding the parameter $Op_{j,h}$ , "Products generated" referring to the LFG sold to consumer, information was updated to consider information raw data from the supervisory system of the plant. The monitoring equipment was also updated.				
<b>Documentation provided by project participant</b>				
Revised version of the Monitoring Report (Version 2, dated 03/02/2021).				
<b>DOE assessment</b>				<b>Date:</b> 10/02/2021
KBS verified the revised MR and confirmed that information regarding to the parameter operation of the equipment that consumes the LFG was correctly updated. This CAR is closed.				

<b>CAR ID</b>	06	<b>Section no.</b>	E.6.2	<b>Date:</b> 25/01/2021
<b>Description of CAR</b>				
Section D.2 of MR - Regarding the volumetric flow of the gaseous stream in time interval t on a dry basis, the following issues were identified: <ul style="list-style-type: none"> <li>• Information included under "Additional comments" is not correct and should be revised.</li> <li>• Evidence should be provided in order to demonstrate the calibration frequency of the flow meters.</li> </ul>				
<b>Project participant response</b>				<b>Date:</b> 08/02/2021
Additional comments referring to the mentioned parameter was revised. Regarding the calibration frequency of the equipment, the manufacturer representative indicated that the calibration frequency can be extended up to three years, in accordance with what was established by the project.				
<b>Documentation provided by project participant</b>				
Revised version of the Monitoring Report (version 2, dated 03/02/2021) Statement from the manufacturer				
<b>DOE assessment</b>				<b>Date:</b> 10/02/2021
KBS verified that information included in "Additional comments" was correctly revised. In addition, the statement provided by the manufacturer was checked and the calibration frequency of 3 years was confirmed. This CAR is closed.				

<b>CAR ID</b>	07	<b>Section no.</b>	E.6.2	<b>Date:</b> 25/01/2021
<b>Description of CAR</b>				
Section D.2 of MR - Regarding the volumetric flow of the gaseous stream in time interval t on a wet basis, the following issues were identified: <ul style="list-style-type: none"> <li>• Information included under "Additional comments" is not correct and should be revised.</li> <li>• Evidence should be provided in order to demonstrate the calibration frequency of the flow meters.</li> </ul>				
<b>Project participant response</b>				<b>Date:</b> 08/02/2021

Additional comments referring to the mentioned parameter was revised. Regarding the calibration frequency of the equipment, the manufacturer representative indicated that the calibration frequency can be extended up to three years, in accordance with what was established by the project.	
<b>Documentation provided by project participant</b>	
Revised version of the Monitoring Report (version 2, dated 03/02/2021) Statement from the manufacturer	
<b>DOE assessment</b>	<b>Date:</b> 10/02/2021
KBS verified that information included in "Additional comments" was correctly revised. In addition, the statement provided by the manufacturer was checked and the calibration frequency of 3 years was confirmed. This CAR is closed.	

<b>CAR ID</b>	08	<b>Section no.</b>	E.6.2	<b>Date:</b> 25/01/2021
<b>Description of CAR</b>				
Section C and D.2 of MR - Regarding the gas analyser, the following issues were identified: <ul style="list-style-type: none"> <li>Evidence should be provided in order to demonstrate the calibration frequency.</li> <li>Evidence should be provided in order to confirm the calibration dated 10/11/2017.</li> </ul>				
<b>Project participant response</b>				<b>Date:</b> 08/02/2021
Regarding the calibration frequency of the equipment, the manufacturer representative indicated that the ideal calibration frequency is six months, but can be extended depending on project owner requirements and experience. Until 2020, the frequency adopted by PP was one year. No calibration certificate related to this period presented errors above the accuracy defined by the manufacturer. From February, 2020 on the calibration frequency adopted is six months. The calibration certificate from the manufacturer, dated 16/01/2017 is attached.				
<b>Documentation provided by project participant</b>				
Revised version of the Monitoring Report (version 2, dated 03/02/2021) Statement from the equipment manufacturer Calibration certificate from the equipment manufacturer				
<b>DOE assessment</b>				<b>Date:</b> 10/02/2021
The statement provided by the manufacturer was checked by KBS and the calibration frequency was confirmed. However, the date of the first calibration included in the MR is not according to the evidence provided. This CAR is open.				
<b>Project participant response</b>				<b>Date:</b> 15/02/2021
The ABB report, dated 10/11/2017, confirming the periodic calibration of the equipment is attached.				
<b>Documentation provided by project participant</b>				
Please refer to the PDF file named "Relatório de comissionamento Cromatógrafo - Novembro 2017".				
<b>DOE assessment</b>				<b>Date:</b> 15/02/2021
KBS checked the evidence of the calibration provided by PP. This CAR is closed.				

<b>CAR ID</b>	09	<b>Section no.</b>	E.6.2	<b>Date:</b> 25/01/2021
<b>Description of CAR</b>				
Section D.2 of MR - Regarding the temperature meter, the following issues were identified: <ul style="list-style-type: none"> <li>Evidence should be provided in order to demonstrate the calibration frequency.</li> <li>Evidence should be provided in order to demonstrate the accuracy of the monitoring equipment.</li> </ul>				
<b>Project participant response</b>				<b>Date:</b> 08/02/2021
Regarding the calibration frequency, the manufacturer representative indicated that the equipment is stable and that the project owner, based on its own requirements and experience, can establish the periodicity of recalibration. Although the equipment's range is -200 up to 1350°C, the higher temperature at the measurement point is 78°C. In this sense, project owner adopted three years as a reasonable periodicity for recalibration considering the equipment is exposed to lower temperatures and consequently lower wear and tear. The result of the latest calibration, which resulted in errors within the maximum permissible error of the equipment corroborates with the periodicity adopted.				
<b>Documentation provided by project participant</b>				
Revised version of the Monitoring Report (version 2, dated 03/02/2021) Statement from the manufacturer				
<b>DOE assessment</b>				<b>Date:</b> 10/02/2021

<p>The statement provided by the manufacturer was checked and the calibration frequency of 3 years was confirmed. In addition, the data sheet provided by the manufacturer was checked and the accuracy was confirmed.                  PP is requested to correct the serial number of the temperature meter in the MR.                  This CAR is open.</p>	
<b>Project participant response</b>	<b>Date:</b> 15/02/2021
<p>The serial number of the equipment was amended in the revised version of the Monitoring Report.</p>	
<b>Documentation provided by project participant</b>	
<p>Revised version of the Monitoring Report (version 3)</p>	
<b>DOE assessment</b>	<b>Date:</b> 15/02/2021
<p>KBS confirmed that the serial number is correct in the whole document.                  This CAR is closed.</p>	

<b>CAR ID</b>	10	<b>Section no.</b>	E.6.2	<b>Date:</b> 25/01/2021
<b>Description of CAR</b>				
<p>Section D.2 of MR - Regarding the pressure meter, the following issues were identified:</p> <ul style="list-style-type: none"> <li>Evidence should be provided in order to demonstrate the calibration frequency.</li> </ul>				
<b>Project participant response</b>				<b>Date:</b> 08/02/2021
<p>Information from the manufacturer confirm the stability of the equipment and that the calibration can be performed every five years (<a href="http://emersonautomationexperts.com">emersonautomationexperts.com</a>). Project Participants established that the calibration of the equipment will be conducted every three years.</p>				
<b>Documentation provided by project participant</b>				
<p>Product data sheet</p>				
<b>DOE assessment</b>				<b>Date:</b> 10/02/2021
<p>KBS verified the information provided by the manufacturer and confirmed that the calibration recommended is every five years. Thus, the calibration frequency adopted by PP of three years is correct. However, the verification team observed that the error used in data discount is not correct in table 4 of MR. In addition, PP is requested to correct the serial number of the pressure meter in the MR.                  This CAR is open.</p>				
<b>Project participant response</b>				<b>Date:</b> 15/02/2021
<p>Table 4 and serial number of the equipment were amended in the revised version of the Monitoring Report.</p>				
<b>Documentation provided by project participant</b>				
<p>Revised version of the Monitoring Report (version 3)</p>				
<b>DOE assessment</b>				<b>Date:</b> 15/02/2021
<p>KBS confirmed that the serial number is correct in the whole document and the error used in data discount was corrected in table 4 of MR.                  This CAR is closed.</p>				

<b>CAR ID</b>	11	<b>Section no.</b>	E.6.2	<b>Date:</b> 25/01/2021
<b>Description of CAR</b>				
<p>Section D.2 of MR - Regarding the electricity consumption from the grid, the following issues were identified:</p> <ul style="list-style-type: none"> <li>Evidence should be provided in order to confirm the calibration for the period before 18/02/2018.</li> <li>During the remote audit it was verified that the consumption of electricity from the grid for the period from 01/01/2020 to 23/09/2020 was provided from three different sources (PROINFA and two electricity trading companies). PP is requested to provide evidence in order to demonstrate the consumption related to PROINFA.</li> </ul>				
<b>Project participant response</b>				<b>Date:</b> 08/02/2021

<p>The electricity consumed by the project activity until January 2018 was obtained from the measuring point owned by Ecofor, which is the landfill operator. This electricity meter is the responsibility of Enel - the local electricity distribution company, and no calibration certificate has been made available. However, besides the project activity being responsible for only a fraction of the electricity consumed in December and the monitoring period having started on 22/12/2017, the total electricity consumed during December 2017 (including Ecofor's consumption) was conservatively considered when determining the emissions of the project activity.</p> <p>The dedicated electricity meter delivering electricity from the grid to the project activity was installed in January 2018. The meter is owned by the local electricity distribution company and the only calibration certificate made available is dated February 2018. There was no substitution of the meter. This is evidenced by the electricity invoices which refers to the same serial number. In this sense, the maximum permissible error between the manufacturer (Meter class D, as specified in the calibration certificate and error equal 0,2% as established in the INMETRO resolution available at <a href="http://www.inmetro.gov.br/legislacao/rtac/pdf/RTAC001929.pdf">http://www.inmetro.gov.br/legislacao/rtac/pdf/RTAC001929.pdf</a>) and the results of the calibration was applied to the electricity consumed by the project during January and February 2018. Please refer to the revised version of the consolidated CERs spreadsheet.</p> <p>The amount of electricity consumed from PROINFA projects is demonstrated by the Chamber of Electric Energy Commercialization (CCEE) reports.</p>	
<b>Documentation provided by project participant</b>	
INMETRO ordinance regarding the maximum permissible error for class D electricity meters CCEE reports Revised version of the Monitoring Report (version 2, dated 03/02/2021) Revised version of the consolidated CERs spreadsheet	
<b>DOE assessment</b>	<b>Date:</b> 10/02/2021
KBS verified the CCEE report and confirmed the consumption of electricity from the grid related to PROINFA. In addition, the revised CERs spreadsheet and MR were verified and the discount was correctly applied. This CAR is closed.	

<b>CAR ID</b>	12	<b>Section no.</b>	E.8.1	<b>Date:</b> 25/01/2021
<b>Description of CAR</b>				
Section E.1 of MR and ER spreadsheet- From the review of the ER calculation sheet and raw data downloaded from the supervisory system, Verification team has found that the values mentioned under the ER calculation sheet are not consistent with raw data downloaded from the supervisory system for the following days: 01/08/2018, 14/08/2018, 15/08/2018, 16/08/2018, 26/08/2018, 27/08/2018, 25/11/2018, 02/12/2018, 03/12/2018, 09/12/2018, 30/12/2018, 10/01/2019, 27/01/2019, 22/06/2019, 23/06/2019, 03/08/2019, 04/08/2019, 25/08/2019, 26/08/2019, 18/03/2020, 04/04/2020, 23/09/2020.				
Information about FIT-500 and FIT-CEGAS was wrongly included in the CERs spreadsheet since they are not used in the calculation.				
<b>Project participant response</b>				<b>Date:</b> 08/02/2021
The spreadsheets were revised according to the raw data evidence presented during the remote visit.				
<b>Documentation provided by project participant</b>				
Revised monthly CERs calculation spreadsheets.				
<b>DOE assessment</b>				<b>Date:</b> 11/02/2021
KBS verified the revised spreadsheets against the raw data downloaded from the supervisory system. This CAR is closed.				

<b>CAR ID</b>	13	<b>Section no.</b>	E.8.4	<b>Date:</b> 25/01/2021
<b>Description of CAR</b>				
Section E of MR - Verification team has found that the values mentioned under the ER calculation sheet are not consistent with the values mentioned in the MR.				
<b>Project participant response</b>				<b>Date:</b> 08/02/2021
The monitoring report was revised in accordance with the revised versions of the monthly CERs calculation spreadsheets.				
<b>Documentation provided by project participant</b>				
Revised version of the Monitoring Report (Version 2, dated 03/02/2021).				
<b>DOE assessment</b>				<b>Date:</b> 10/02/2021
KBS verified the revised MR and confirmed that section E was correctly updated. This CAR is closed.				

Table 4. FAR from this verification

<b>FAR ID</b>	xx	<b>Section No.</b>		<b>Date:</b> DD/MM/YYYY
<b>Description of FAR</b>				
<b>Project participant response</b>				<b>Date:</b> DD/MM/YYYY
<b>Documentation provided by project participant</b>				
<b>DOE assessment</b>				<b>Date:</b> DD/MM/YYYY