Verification and certification report form for CDM project activities

(Version 02.1)

BASIC INFORMATION	
Title and UNFCCC reference number of the project activity	Caieiras landfill gas emission reduction
Version number of the verification and certification report	1.0
Completion date of the verification and certification report	25/10/2018
Monitoring period number and duration of this monitoring period	17th monitoring period 01/01/2018 - 30/06/2018
Version number of the monitoring report to which this report applies	2.0, dated 19/10/2018
Crediting period of the project activity corresponding to this monitoring period	2nd 7-year renewable crediting period (period from 13/12/2013 to 30/03/2020)
Project participants	Essencis Soluções Ambientais S.A. Nordic Environment Finance Corporation
Host Party	Brazil
Applied methodologies and standardized baselines	ACM0001 - “Flaring or use of landfill gas” (version 13.0.0)
Mandatory sectoral scopes linked to the applied methodologies	Sectoral scope 13 - Waste handling and disposal
Conditional sectoral scope(s) linked to the applied methodologies	-
Estimated amount of GHG emission reductions or GHG removals for this monitoring duration in the registered PDD	641,934 tCO_2e
Certified amount of GHG emission reductions or GHG removals for this monitoring period	482,388 tCO_2e
Name and UNFCCC reference number of the DOE	EPIC Sustainability Services Pvt. Ltd. (EPIC);
Name, position and signature of the approver of the verification and certification report	Mr. Marco Ratton Lead Auditor 

	Mr. K Sudheendra (Director & Head - Operations) 

SECTION A. Executive summary

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Brief summary of the project activity and performed verification assessment:

EPIC Sustainability Services Pvt. Ltd. (EPIC) has performed the 17th periodic verification assessment (9th periodic verification within the 2nd 7-year crediting period) for the registered CDM project activity titled "Caieiras landfill gas emission reduction". The project activity was registered by the UNFCCC on 09/03/2006 as CDM project activity with registration no. 0171 and it is currently under its 2nd 7-year renewable crediting period (period from 13/12/2013 to 30/03/2020).

The performed verification assessment encompassed the monitoring period from 01/01/2018 to 30/06/2018 (including both days) and it was performed on the basis of (i) document comprehensive review of the Monitoring Report, registered Project Design Document (PDD) + supporting documents; (ii) performed on-site assessment; (iii) conducted interviews with representatives of the host-country project participant and project owner/operator Essencis Soluções Ambientais S.A.; (iv) resolution of all identified outstanding issues (corrective and clarification action requests) and finally (v) issuance of the Verification Report.

The project design encompasses destruction of methane through combustion of collected LFG as in the following methane (CH_4) destruction devices:

- Set of 4 high temperature enclosed flares
- Set of 21 identical internal combustion gas engines (which since July/2016 represents, at the same time, (i) additional/alternative methane destruction devices for the project activity and (ii) the major components for a grid-connected electricity generation infrastructure fuelled uniquely by LFG and under operation within the geographical limits of the UVS – Caieiras landfill since July/2016).

Despite of destruction of methane also occurring through combustion of collected LFG in the set of 21 internal combustion gas engines (that are part of a grid-connected electricity generation infrastructure fuelled by LFG also located within the limits of the UVS – Caieiras landfill), the project activity encompasses methane destruction as its unique GHG abatement/mitigation measure. Under conformance with the registered PDD, no emission reductions associated to generation of electricity by such the grid-connected electricity generation infrastructure is accounted and/or claimed as part of the project activity.

LFG (which is rich in CH_4) has been historically generated at the UVS - Caieiras landfill as result of the anaerobic decomposition of municipal solid waste (MSW) disposed in the site using appropriate MSW landfilling techniques and procedures.

Also in accordance to the project design, during the considered monitoring, the project's electricity demand has been entirely met by consumption of grid-sourced electricity[1], with no amount of electricity sourced by installed backup captive off-grid electricity generator (fuelled by diesel) being consumed during the period. Furthermore, also under conformance with the project design description included in the registered PDD, consumption of the fossil-fuel Liquefied Petroleum Gas (LPG) occurred during the considered monitoring period. LPG has been used as a start-up fuel to ignite the high temperature enclosed flares whenever it is required (e.g. after maintenance/repair events, after temporary interruptions in grid electricity supply to the project activity, etc.).

[1] As confirmed by the EPIC verification team, as established in the registered PDD all occurred consumption by the project activity of electricity sourced by the grid-connected electricity generation infrastructure fuelled by LFG (for which the set 21 internal combustion gas engines consuming LFG represents major components) is regarded as consumption of grid-sourced electricity, with related project emissions being accounted accordingly for the considered monitoring period.

The UVS - Caieiras landfill is located in the extreme Northeast region of Caieiras municipality at the Bandeirantes highway, km 33. Caieiras is one of the municipalities which encompass the Metropolitan Region of São Paulo (RMSP) that is located in São Paulo State in the South-East region of Brazil. The geographical coordinates of the project site are as follows:

- 23°20'40" S (-23.3444)
- 46°46'20" W (-46.7722)

Scope of the verification:

The verification assessment shall ensure that reported GHG emission reductions are deemed complete and sufficiently accurate in order to be certified. The verification, as an independent and objective review, shall assess and verify that the implementation of the project activity and the measures taken to monitor and report emission reductions for a considered monitoring period comply with the CDM criteria and relevant guidance provided by the CMP and the CDM Executive Board (CDM-EB). The verification assessment of the registered CDM project activity is based on comprehensive and detailed review of information made available in (i) the registered PDD (PDD version 9.0, dated 20/07/2018 /2/), (ii) the Monitoring Report /3/ (incl. emission reduction calculation spreadsheets /5/ that are enclosed to the Monitoring Report) and (iii) all other supporting documents made available to the EPIC verification team + review of information collected through performance of interviews and/or collected as part of the performed on-site visit.
Furthermore, as part of the verification assessment, publicly available information is considered and reviewed as far as available and required.

The verification assessment was carried out on the basis of the following rules and requirements that are applicable for the CDM project activity:

- Article 12 of the Kyoto Protocol /9/,
- Guidelines for the implementation of Article 12 of the Kyoto Protocol as presented in the Marrakech Accords under decision 3/CMP.1 /9/ and subsequent decisions made by the
- Executive Board and COP/MOP,
- Other relevant rules, including applicable and valid host country legislation/regulations,
- The CDM validation and verification standard for project activities (CDM-VVS-PA) version 01.0 /1/,
- The monitoring plan of the registered PDD applicable for the 2nd 7-year renewable crediting period (PDD version 9.0, dated 20/07/2018 /2/).
- The CDM baseline and monitoring methodology ACM0001 "Flaring or use of landfill gas" (version 13.0.0) /7/,
- Monitoring Report (all versions) /3/ /4/,
- The following methodological tools, which are referred in the Monitoring Report /3/:
    - "Tool to calculate baseline, project and/or leakage emissions from electricity consumption" (version 01) /13/
    - "Tool to calculate project or leakage CO_2 emissions from fossil fuel combustion" (version 02) /15/
    - "Tool to calculate the emission factor for an electricity system" (versions 04.0 /16/)
    - "Project emissions from flaring" (version 02.0.0) /12/
    - "Tool to determine the mass flow of a greenhouse gas in a gaseous stream" (version 02.0.0) /14/

Verification process:
The verification process is based on applicable verification guidelines described in the latest version of the CDM validation and verification standard for project activities (CDM-VVS-PA) /1/. In addition to that, standard auditing techniques have been applied by the EPIC verification team. As part of the verification assessment, the EPIC verification team initially performed a desk review on all verification related documents, followed by an on-site visit to the project site in order to review the project implementation and its operation. For all identified inconsistencies and lack of clarity, related findings (list of outstanding issues) are raised. The next steps are, to close out the findings through direct communication with the project participants and receipt of updated version of the Monitoring Report /3/ and/or supporting documents and finally preparing the Verification Report. The draft version of the Verification Report undergoes a technical review by EPIC prior to its submission to the CDM-EB.

Verification assessment conclusion and summary of the verification opinion:
As part of the conducted verification assessment, the EPIC verification team identified outstanding issues that were appropriately/sufficiently addressed and resolved by the host-country project participant Essencis Soluções Ambientais S.A. (*inter alia* through revision of the Monitoring Report and supporting documents) as part of the performed verification assessment.

As an outcome of the performed assessment, the EPIC verification team was able to confirm that GHG emission reductions achieved by the project activity during the considered monitoring period are correctly calculated and reported in the latest version of the Monitoring Report (version 2.0, dated 19/10/2018). Reported emission reductions are correctly determined and in accordance with applicable monitoring requirements and GHG calculation approaches as per the registered PDD /2/ and applied CDM baseline and monitoring methodology and methodological tools /7/ /12/ /13/ 14/ /15/ /16/. Therefore, EPIC certifies the emission reductions for the monitoring period from 01/01/2018 to 30/06/2018 (including both days) are correctly determined and reported as 482,388 tCO_2e. EPIC thus requests the CDM Executive Board (CDM-EB) to issue equivalent amount of CERs for the project activity.

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	EI	Ratton	Marco	EPIC- Central Office	X	X	X	X

EI: External individual

Demonstration how the appointed verification team meets the competence required for the performance of the verification assessment is included in Appendix 2.

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	Radhamadhavan	Vijayaraghavan	EPIC - Central office
2.	Approver	IR	Krishnachar	Sudheendra	EPIC -Central office

IR: Internal resource

Demonstration how the appointed technical reviewer and approver of the Verification Report meet the competence required for the performance of the verification assessment is included in Appendix 2.

SECTION C. Application of materiality

C.1. Consideration of materiality in planning the verification

By acknowledging that individual or aggregate undetected error(s), omission(s) and misinterpretation(s) could potentially undermine the possibility of achieving a verification opinion under a reasonable and fair assurance level as an outcome of the verification assessment; aspects of the concept of materiality were thus considered in the context of the verification assessment in line with the requirements of both the "Guideline - Application of materiality in verification" (version 02.0) /97/ and the CDM-VVS-PA (version 01.0) /1/.

In the context of the verification planning, while aiming to minimize the risk that material discrepancies not being detected (detection risk) in the course of the performed verification assessment, EPIC performed an identification of risks that could lead to quantitative material errors, omissions and misstatements in its verification opinion.

Furthermore, the identification of actions to be performed by the appointed EPIC verification team during the verification assessment as responses to such identified risks were also included/considered in both the verification planning and later performed in the subsequent phases of the verification assessment (document desk review, on-site visit, identification/addressing of findings and reporting).

In order to ensure a deemed complete, transparent and timely execution of the verification assessment, the appointed EPIC verification team (that holds sufficient experience and expertise in CDM verification assessments for project activities encompassing LFG collection and destruction/utilization) planned a complete sequence of assessment events regarded as necessary to detect potentially existent major potential material errors, omissions and discrepancies and, upon addressing of such outstanding issues, arrive at a substantiated and reasonable final verification opinion (with the risks that could lead to quantitative material errors, omissions and misstatements in its verification opinion being thus sufficiently identified and addressed).

By taking into account applicable guidance from both the "Guideline - Application of materiality in verification" (version 02.0) /97/ and the CDM-VVS-PA version 01.0 /1/, the threshold of materiality for the performed verification assessment was evaluated.

It was concluded that the materiality threshold applicable to the project activity (based on actual emission reductions reported as achieved during the considered monitoring period as per the initial version of the Monitoring Report and the length of the considered monitoring period) is 0.5%[2].

As part of the verification planning, no sampling approach was considered as required for monitoring and cross-checking of data against primary data source (no sampling based-monitoring or no data cross-checking based on sampling)[3].

While it was later considered that no sampling approach was required in the context of assessment of monitoring data, risks related to sampling for these particular aspects were thus not identified and, therefore no design of sampling plan for addressing such aspects was considered in the context of the verification planning.

The table below summarizes the following elements of the verification planning:

- Identified risks that could lead to material errors, omissions or misstatements (including their assessment details)

- Summary of the responses/actions to such identified risks that were later considered during the performance of the verification assessment.

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.	Inadequate installation/configuration or malfunction in measuring instrument(s)/equipment (e.g. insufficient accuracy or inappropriateness of installed equipment/instrument(s))	High	Potential generation of measurement and data error(s)/inconsistency(ies) due to inappropriate installation/configuration or malfunction in related measuring instrument(s)/equipment. This risk might lead to material error(s) in calculation and reporting of achieved emission reductions.	The EPIC verification team shall confirm whether modern/state-of-the art and/or best-practice monitoring instruments/equipment are appropriately installed/configured as part of the implementation and operation of the project activity. By taking into account the significant rate of monitoring data being recorded (LFG collection and combustion related measurements being recorded/reported with an

[2] By considering actual emission reductions reported as achieved during the considered monitoring period (as per the initial version of the Monitoring Report) and the length of the considered monitoring period (181 days), a materiality threshold of 0.5% was selected by EPIC (since emission reductions achieved by the project activity, when converted to an annual basis/equivalence, are higher than 500,000 tCO_2e per year (482,388 tCO_2e * 365 days / 181 days = 972,771 tCO_2e).

[3] The EPIC verification team was also able to confirm that no sampling approach for monitoring and cross-checking of data against primary data source was applicable/required for the verification assessment covered by this Verification Report since:

- as per the monitoring and GHG calculation approaches applied for the project activity (as established in the PDD and applied CDM baseline and monitoring methodology + applicable methodological tools) no sampling procedure and no sampling-based monitoring are valid/required for the determination of emission reductions achieved by the project activity during a given monitoring period;
- there is a possibility for cross-checking/reproducing all reported LFG collection and combustion measurement records valid for the considered monitoring period against the related primary data sources (with all reported related monitoring data being cross-checked/reproduced instead of having selected samples of data being cross-checked/reproduced). Further related assessment details valid for the performed verification assessment encompassed by this Verification Report are included in Section E.6.2, under *Data authenticity checking*.

				every-minute frequency), ideally, it is expected that a reliable process control automation is in place for typical CDM project activities encompassing LFG collection and destruction/utilization. Moreover, it should be confirmed whether trained personnel staff are in charge of operation of the project's monitoring system and that there are related QA/QC procedures in place. Moreover, for minimizing the risk of having incorrect monitoring data (measurement records) being considered in the context of the calculation and reporting of achieved emission reductions (in a way that calculated emission reductions are overestimated), the verification assessment ideally shall encompass a comprehensive and deemed sufficient checking of all reported data (e.g. checking of authenticity of monitoring data). Finally, it shall also be ensured that, in case of identification of uncertainties related to correctness/reasonability of reported monitoring data for a particular time period (e.g. measurements of LFG or flaring related monitoring for a particular minute), no emission reductions for such particular time period are accounted/claimed under such circumstances (thus minimizing risks of overestimations of claimed GHG emission reductions).
2.	Inadequate accuracy and lack of correctness of monitoring data and or evaluations supplied by independent 3rd parties (e.g. measurements of residual outgoing methane in the flares for the determination of project emissions of methane through the flares; evaluation of the compliance of management practices of the landfill as per previously established design and operation requirements for	High	Potential generation of measurement and data errors/inconsistencies due to inappropriate installation / configuration or malfunction in related measuring instruments and/or inappropriate evaluation procedures being applied by company(ies) in charge of related measurements and evaluations to be performed by independent 3rd party inspection service company(ies).	The EPIC verification team shall confirm whether all measurements performed by independent 3rd parties are performed by company(ies) with required accreditation. It shall also be confirmed whether modern/state-of-the art and/or best-practice equipment/instruments and/or procedures are appropriately applied for related 3rd party measurements and/or evaluations. Moreover, it should be

	the landfill)		These risks might lead to material error in calculation/determination and reporting of baseline emissions.	confirmed whether there are related QA/QC procedures in place. Finally, it shall also be ensured that, in case of identification of uncertainties related to correctness/reasonability of reported monitoring data for a particular time period (e.g. measurements of residual outgoing methane in the flares for the determination of project emissions of methane through the flares valid for a particular time period); no emission reductions for such particular time period are accounted/claimed under such circumstances (thus minimizing risks of overestimations of claimed GHG emission reductions).
3.	Inadequate installation/configuration or malfunction in installation/configuration of data processing/management equipment such as programmable logic controller unit (PLC unit) and/or data storage infrastructure (database for monitoring records).	High	Potential recording and reporting of monitoring data with errors and/or inconsistencies due to inappropriate installation/configuration or malfunction in related data management/processing equipment (PLC unit and/or database for monitoring records). This risk might lead to material error(s) in calculation and reporting of achieved emission reductions.	The EPIC verification team shall confirm whether modern, state-of-the art and best practice data management/processing infrastructure (PLC unit and database for monitoring records) is appropriately installed/configured as part of the project activity implementation and operation. By taking into account the significantly rate of monitoring data being recorded (LFG collection and combustion related measurements being recorded/reported with an every-minute frequency), ideally, the risk response details included under item 1 above (risk of "*Inadequate installation/configuration or malfunction in measuring instrument(s)/equipment*") related to process control automation, training of personnel staff in charge of operation of the project's monitoring system and related QA/QC procedures are all also applicable. Moreover, for minimizing the risk of having incorrect monitoring data (measurement records) being considered in the context of the calculation and reporting of achieved

				emission reductions (in a way that calculated emission reductions are overestimated), the risk response details included under item 1 above (risk of "*Inadequate installation/configuration or malfunction in measuring instrument(s)/equipment*") related to comprehensive and deemed sufficient checking of all reported data (e.g. checking of authenticity of monitoring data) are also applicable. Finally, it shall also be ensured that, in case of identification of uncertainties related to correctness/reasonability of reported monitoring data for a particular time period (e.g. measurements of LFG or flaring related monitoring for a particular minute), no emission reductions for such particular time period are accounted/claimed under such circumstances (thus minimizing risks of overestimations of claimed GHG emission reductions).
4.	Error(s) and inconsistency(ies) in the procedure(s) of transferring of monitoring data to monthly and summarized aggregated reporting forms/spreadsheets used for the determination of emission reductions.	High	Potential recording and reporting of monitoring data with error(s) and/or inconsistency(ies) due to occurrence of error(s) and/or inconsistency(ies) in the procedure(s) of transferring of monitoring data to monthly and summarized aggregated reporting forms/spreadsheets used for the determination of emission reductions. This risk might lead to material error in calculation and reporting of achieved emission reductions.	The EPIC verification team shall confirm whether appropriate and reliable procedure(s) of transferring of monitoring data to monthly and summarized aggregated reporting forms/spreadsheets are in place. By taking into account the significantly rate of monitoring data being recorded (LFG collection and combustion related measurements being recorded/reported with an every-minute frequency), ideally, it is expected that a reliable process control automation (or at least a semi-automated procedure(s)) are in place for transferring of monitoring data to monthly and summarized aggregated reporting forms/spreadsheets used for the determination of emission reductions. Moreover, it should be confirmed whether trained personnel staff are in charge of transferring of monitoring data to monthly and summarized

				aggregated reporting forms/spreadsheets and that there are related QA/QC procedures in place. Moreover, for minimizing the risk of having incorrect monitoring data (measurement records) being considered in the context of the calculation and reporting of achieved emission reductions (in a way that calculated emission reductions are overestimated), the risk response details included under item 1 above (risk of "*Inadequate installation/configuration or malfunction in measuring instruments/equipment*") related to comprehensive and deemed sufficient checking of all reported data (e.g. checking of authenticity of monitoring data) are also applicable. Finally, it shall also be ensured that, in case of identification of uncertainties related to correctness/reasonability of reported monitoring data for a particular time period (e.g. measurements of LFG or flaring related monitoring for a particular minute), no emission reductions for such particular time period are accounted/claimed under such circumstances (thus minimizing risks of overestimations of claimed GHG emission reductions).
5.	Error(s) and/or inconsistency(ies) (e.g. human mistakes) in the procedure(s) for entering the values of ex-ante determined parameter(s) and entering/applying calculation formula(s) to monthly and summarized aggregated reporting forms/spreadsheets used for the determination of emission reductions + reporting of such information in the Monitoring Report.	High	Potential reporting of monitoring data and GHG calculations with error(s) and/or inconsistency(ies) due to occurrence of errors and/or inconsistencies (e.g. human mistakes) in the procedure(s) for entering the values of ex-ante determined parameters and entering/applying calculation formulas to monthly and summarized aggregated reporting forms/spreadsheets used for the determination of emission reductions + reporting of such information in the Monitoring Report. This risk	The EPIC verification team shall confirm whether appropriate and reliable procedure(s) for entering the values of ex-ante determined parameters and entering/applying calculation formulas to monthly and summarized aggregated reporting forms/spreadsheets used for the determination of emission reductions are in place. The EPIC verification team shall also confirm whether appropriate and reliable procedure(s) for checking the correctness of such data entries and /or application of

			might lead to material error in calculation and reporting of achieved emission reductions.	calculation formulas are in place. This may be checked through evaluation of the project's related working/operational procedures (incl. QA/QC procedures) and through performance of recalculations and detailed inspection in such forms/spreadsheets by the verification team. Moreover, it should be confirmed whether trained personnel staff are in charge of entering the values of ex-ante determined parameters and entering/applying calculation formulas to such monthly and summarized aggregated reporting forms/spreadsheets.

C.2. Consideration of materiality in conducting the verification

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By taking into account applicable guidance from the "Guideline - Application of materiality in verifications" (version 02.0) /97/, materiality was considered in conducting the verification.

As part of the performance of the verification assessment, the previously elaborated verification plan was applied without being revised for having potentially detected errors, omissions or misstatements being addressed through additional (and not previously planned) audit/verification procedures during the sub-sequential phases of the performance of verification assessment (e.g. document desk review, on-site visit, identification and resolution of outstanding issues (CARs and CLs), etc.).

As per the monitoring and QA/QC procedures applied as part of operation of the project activity, as confirmed by the EPIC verification team, emission reductions are per se accounted only for monitoring data that is deemed correct, authentic and reliable (based proof of measurements performed by calibrated and well maintained monitoring equipment/instruments, checking of correctness and reasonability in recorded/reported monitoring data (e.g. data values within an acceptable/plausible range)).

In this context it is also crucial to note that, as also confirmed by the EPIC verification team, in case of identification of uncertainties related to correctness/reasonability of reported monitoring data for a particular time period (e.g. continuous measurements related monitoring for a particular minute) as part of the monitoring of the project activity, the monitoring procedure applied by the project participant Essencis Soluções Ambientais S.A. ensures that no emission reductions for such particular time period are claimed/accounted under such circumstances (thus minimizing risks of overestimations of claimed GHG emission reductions).

Furthermore, it is also crucial to note that as per the monitoring and GHG calculation approaches that are valid for the project activity (as established in the registered PDD /2/ and applied CDM baseline and monitoring methodology + applicable methodological tools /13/ /15/ /12/ /14/ /16/), no sampling procedure and no sampling-based monitoring are valid/required for the determination of achieved emission reductions.

Finally, it is also relevant to note that, as a response to risks identified during the planning phase of the verification, for minimizing the risks of having incorrect monitoring data (measurement records) being considered in the context of the calculation and reporting of achieved emission reductions (in a way that calculated emission reductions are overestimated), the verification assessment encompassed the performance of a checking of authenticity of all LFG and LFG flaring/utilization related monitoring data.

Data authentic check: As part of the performed verification assessment, the EPIC verification team was able to confirm that the 6 monthly emission reduction calculation spreadsheets valid for the considered monitoring period /5/ completed by the host country project participant Essencis Soluções Ambientais S.A. are basically MS-Excel spreadsheets that, in theory, could have recorded data being easily edited/modified (intentionally or unintentionally). Thus, these spreadsheets, if inappropriately edited, could potentially tamper reported monitoring records, thus resulting in unreal and incorrect calculation and reporting of emission reductions achieved by the project activity during the considered monitoring period. In order to ensure that all emission reductions calculations are entirely and correctly based on authentic and real monitoring records valid for the considered monitoring period, a *data authenticity checking* was performed as part of the verification assessment. Such checking aimed to ensure that only authentic and unmodified monitoring data records were used by the project participant for performing the emission reduction calculation for the considered monitoring period (thus ensuring that measurement records made available in the MS-Excel format "raw data" input files /6/ and measurement records reported in the 6 monthly emission reduction spreadsheets were not intentionally or unintentionally edited/modified during the generation or handling of these files). Assessment details for the performed data authenticity checking are included in Section E.6.2, under *Data authenticity checking.*

SECTION D. Means of verification

D.1. Desk/document review

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The EPIC verification team conducted a comprehensive and detailed desk review of all documents initially provided by Essencis Soluções Ambientais S.A. + other publicly available documents that are relevant for the verification assessment. The main assessed documents are listed below:

- The registered PDD /2/ for the 2nd 7-year renewable crediting period of the CDM project activity "Caieiras landfill gas emission reduction", including the corresponding Validation Report for the Renewal of crediting period /10/ and latest approved Validation Opinion Report for the occurred and planned Post-Registration Changes for the project activity (version 04.0 dated 25/07/2018) /40/;

- The initial version of the Monitoring Report for the 17th verification of the project activity /4/;

- The applied CDM baseline and monitoring methodology ACM0001 "Flaring or use of landfill gas" (version 13.0.0) /7/ + the following methodological tools:

    - "Tool to calculate baseline, project and/or leakage emissions from electricity consumption" (version 01) /13/

    - "Tool to calculate project or leakage CO_2 emissions from fossil fuel combustion" (version 02) /15/

    - "Tool to calculate the emission factor for an electricity system" (version 04.0 /16/)

    - "Project emissions from flaring" (version 02.0.0) /12/

    - "Tool to determine the mass flow of a greenhouse gas in a gaseous stream" (version 02.0.0) /14/

- The findings from the 9th, 10th, 11th, 12th, 13th, 14th and 15th verifications /31/ /32/ /42/ /49/ /104/ /55/ for the project activity (which are the previously performed verification assessments valid for the project activity under its 2nd 7-year crediting period).

- Relevant decisions, clarifications and guidance from the CMP of the Kyoto Protocol and the CDM Executive Board;

- Any other information and references relevant to the project activity's resulting emission reductions (e.g. IPCC reports, data on electricity generation in the national grid or laboratory analysis and national regulations).

Besides the above-mentioned documents, the EPIC verification team also assessed other additional documents that were required to assess the accuracy of the emission reduction calculations presented in the Monitoring Report /3/.

A detailed list of all assessed documents is included in Appendix 3 (Documents reviewed or referenced) of this Verification Report.

The desk review for the initial version of the Monitoring Report for the 17th verification of the project activity /4/ and the registered PDD /2/ included the following assessments:

- a review of data and information presented in the Monitoring Report to verify their completeness;
- a review of the monitoring plan from the registered PDD /2/ and applied CDM baseline and monitoring methodology (ACM0001 (version 13.0.0) /7/), paying particular attention to the required frequency for measuring, recording and reporting of monitoring data. Requirements related to the quality of monitoring instruments/equipment (including calibration requirements, and the QA/QC procedures) were also observed;
- an evaluation of data management and the QA/QC system in the context of their influence on the generation and reporting of ERs.

Through the process of the verification, the latest version of the Monitoring Report /3/ + registered PDD /2/ + supporting documents were evaluated to confirm the actions taken by the project participants to address the raised Corrective Action Requests (CARs)..

D.2. On-site inspection

Duration of on-site inspection: 15/10/2018 to 16/10/2018				
No.	**Activity performed on-site**	**Site location**	**Date**	**Team member**
1.	Opening meeting for the on-site visit. During such initial meeting the verification team was introduced, it was confirmed/outlined the objectives and scope of the on-site visit and it was confirmed the previously planned agenda for the on-site visit. The representatives of the project participants also introduced themselves and completed/signed the EPIC list of participants form for the on-site visit.	Project's data storage and control room	15/10/2018	Marco A. Ratton
2.	Visual inspection of the project's LFG collection system (installed LFG collecting wells and high density polyethylene pipeline network) and confirmation of correctness of related information included in the Monitoring Report and registered PDD regarding the implementation (project design) and operation of the project activity.	Landfill cells	15/10/2018	Marco A. Ratton
3.	Visual inspection of the flaring station (set of instruments/equipment comprising high temperature enclosed flares, centrifugal blowers and all LFG / flaring monitoring instruments/equipment) and confirmation of correctness of related information presented in the Monitoring Report and registered PDD regarding the implementation (project design) and operation of the project activity.	LFG flaring station	15/10/2018	Marco A. Ratton
4.	Visual inspection of related monitoring equipment (Programmable Logic Controller unit (PLC unit), data acquisition and storage infrastructure (database) and monitoring instruments); and checking/confirmation of correctness and appropriateness of data processing and data recording by the project's monitoring infrastructure as well as correctness of related information included in the Monitoring Report and registered PDD.	LFG flaring station / project's data storage and control room	15/10/2018	Marco A. Ratton
5.	Visual inspection and checking/confirmation of the correctness and appropriateness of the data acquisition process and procedures (including the process for retrieval of new set of raw data monthly files that are used as input data (raw data) for the calculation of emission reductions) as well as correctness of related information included in the Monitoring Report and registered PDD. In the context of the performed checking, measurement figures of selected LFG and LFG collection and combustion	LFG flaring station / project's data storage and control room	15/10/2018	Marco A. Ratton

	related monitoring parameter as visualized by the EPIC verification team in the screen of the project's data supervisory system (in the project activity's control room) were compared with figures displayed in displays existent in selected monitoring equipment/instruments (for the same time instant) at the time of the on-site visit. Such data checking/comparison confirmed correct data processing and recording by the project's PLC unit and monitoring equipment respectively (at the time of the performed on-site visit to the project site). Further assessment details are included in Section E.6.2.			

6.	Visual inspection to the set of 21 internal combustion gas engines and confirmation of correctness of related information presented in the Monitoring Report and registered PDD regarding the implementation (project design) and operation of the project activity.	Project's new electricity generation infrastructure	16/10/2018	Marco A. Ratton
7.	Checking of the documented evidences provided by the host-country project participant (original documents that are kept stored in the project site + additional documentation used for cross-checking of calculation and information) and confirmation of correctness of related information presented in the Monitoring Report. Such checking also encompassed assessment related to performance of calibration events in monitoring instruments/equipment and overall QA/QC practices as part of the operation of the project activity (incl. assessment of authorities and responsibilities of project management and training related issues).	LFG flaring station / project's data storage and control room	16/10/2018	Marco A. Ratton
8.	Performance of the *data authenticity checking* for LFG collection and combustion related monitoring data. A *data authenticity checking* was performed for all every minute basis measurement records for selected LFG and LFG collection and combustion related monitoring parameters (incl. sub-parameters) in order to demonstrate and ensure that only authentic/not modified monitoring data was used as input data for the emission reduction calculations for the considered monitoring period. The performed checking aimed to ensure that monitoring data were not intentionally or unintentionally edited/modified by anyone prior of being used as primary data input for the processing of emission reduction calculations. The performed checking also aimed to ensure that the emission reduction calculation spreadsheets /5/ include only authentic monitoring records. Details about the performed *data authenticity checking* related monitoring data) are included in the end of this Section E.6.2.	Project's data storage and control room	16/10/2018	Marco A. Ratton
9.	Closure meeting for the on-site visit. During such closure meeting the verification team summarized the main observations and finding from the performed on-site visit and indicated the next steps for the verification assessment.	Project's data storage and control room	16/10/2018	Marco A. Ratton

D.3. Interviews

No.	Interviewee			Date	Subject	Team member
	Last name	First name	Affiliation			
1.	Silva	Leandro, (Mr.)	Essencis Soluções Ambientais S.A.	16/10/2018	In-person interviews performed during the conducted on-site visit encompassing the following topics: - General implementation and operational aspects of the project activity; - Technical equipment and operational issues for installed equipment; - Changes in the project activity since CDM validation and commissioning dates - Specifications and operation of monitoring and measurement equipment/instruments; - Remaining issues from the previously performed validation and verifications assessments; - Calibration procedures for installed monitoring instruments/equipment; - Quality management system and related compliance with valid QA/QC procedures; - Involved operational and management personnel and responsibilities;	Marco A. Ratton
2.	Echeverria	Nicolas, (Mr.)	Essencis Soluções Ambientais S.A.	16/10/2018		
3.	Barbosa	Nuno, (Mr.)	UniCarbo - Energia e Biogás Ltda. [4]	16/10/2018		

[4] As emphasized to the EPIC verification team, UniCarbo Energia e Biogás Ltda. is a CDM consulting and advisory service company that has supported the host-country project participant Essencis Soluções Ambientais S.A. with CDM related issues (inter alia completion of the Monitoring Report). This CDM consulting and advisory service company is also confirmed by the EPIC verification team as not being a project participant.

					- Training and practice of the operational and management personnel; - Implementation and operation of the project's monitoring plan; - Monitoring data handling and management (incl. data gathering, recording and reporting); - Data uncertainty and residual risks; - Performance of emission reduction calculations; - Procedural aspects of the verification; - Performance of related maintenance and repair events; - Compilation of CDM documentation (incl. the Monitoring Report).	

D.4. Sampling approach

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Not applicable. No sampling approach was applied for the verification assessment[5].

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	-	-	
Compliance of the project implementation and operation with the registered PDD	-	-	
Post-registration changes	-	-	
Compliance of the registered monitoring plan with the methodologies including applicable tools and standardized	-	-	

[5] As confirmed by the EPIC verification team, as per the monitoring and GHG calculation approaches that are valid for the project activity (as established in the PDD and applied CDM baseline and monitoring methodology + applicable methodological tools) no sampling procedure and no sampling-based monitoring are valid/required for the determination of achieved emission reductions.
Moreover, as assessed in Section E.6.2 (under *Data authenticity checking*), cross-checking/reproducing for all reported LFG combustion measurement records valid for the considered monitoring period against primary data sources was performed (with all reported related monitoring data being cross-checked/reproduced instead of having selected samples of data being cross-checked/reproduced).

baselines			
Compliance of monitoring activities with the registered monitoring plan	-	CAR 1 CAR 2 CAR 3	
Compliance with the calibration frequency requirements for measuring instruments	-	CAR 4	
Assessment of data and calculation of emission reductions or net removals	-	-	
Assessment of reported sustainable development co-benefits	-	-	
Global stakeholder consultation	-	-	
Others (please specify)	-	-	
Total	-	4	-

SECTION E. Verification findings

E.1. Compliance of the monitoring report with the monitoring report form

Means of verification	The EPIC verification team has assessed whether the latest and valid version of the Monitoring Report Form (CDM-MR-FORM, version 06.0) /89/ was applied and was correctly completed for the elaboration of the Monitoring Report /3/. The EPIC assessment included checking whether the form was not changed in its formatting.
Findings	No findings (CARs or CLs) were raised regarding the compliance of the of the Monitoring Report with the CDM Monitoring Report form (incl. compliance with guidelines/instructions for the completion of the Monitoring Report form).
Conclusion	As a conclusion of its assessment, the EPIC verification team confirmed that the latest version of the Monitoring Report /3/ was correctly completed by applying the latest and valid version of the Monitoring Report Form /89/ and by also sufficiently taking into consideration all applicable requirements and guidance for its completion.

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

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By assessing the previously issued report "*Validation of the Renewal of Crediting Period of an Existing CDM-Project: Caieiras landfill gas emission reduction*" /10/ that was issued by the DOE responsible for the validation assessment for renewal of crediting period of the project activity (Validation Report for renewal of crediting period), the EPIC verification team identified no missing steps or open issues from the validation phases (including validation assessment for renewal of the crediting period for the project activity) that would need to be addressed in the context of the verification assessments within the 2nd 7-year renewable crediting period for the project activity.

Furthermore, through review of the Verification Reports for the previous 1st to the 16th periodic verifications for the project activity /33/ /29/ /30/ /90/ /91/ /92/ /93/ /94/ /31/ /32/ /42/ /38/ /55/; the EPIC verification team identified no FARs to be considered/addressed in the context of the 17th verification assessment.

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

Means of verification	During the performed document desk review and on-site visit, the EPIC verification team assessed whether all physical features of the project activity (including, technology, project equipment and monitoring and metering equipment) as described in the registered PDD /2/ were in place and that project activity has been operated by Essencis Soluções Ambientais S.A. during the considered monitoring period under conformance with its technical design description as outlined in the registered PDD.
Findings	No findings (CARs or CLs) were raised regarding the compliance of the project implementation and operation with the registered project design document
Conclusion	Based on the performed document desk review and performed on-site visit, the EPIC verification team confirms that the project implementation was under full conformance with provisions of the registered PDD /2/ during the considered monitoring period.

E.4. Post-registration changes

E.4.1. Temporary deviations from the registered monitoring plan, applied methodologies or applied standardized baselines

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The EPIC verification team has confirmed that, as correctly outlined in Section B.2.1. of the Monitoring Report /3/, there are no temporary deviations from the registered monitoring plan and/or applied CDM baseline and monitoring methodology applicable for the considered monitoring period.

EPIC has confirmed that, as established by the Attachment Instructions for completing the Monitoring Report of the latest and valid version of the Monitoring Report Form (CDM-MR-FORM, version 06.0) /75/, the Monitoring Report /3/ correctly refers to previously approved temporary deviations from monitoring plan that are applicable/valid for previous monitoring periods for the project activity (including indication of PRC references and related approval dates).

E.4.2. Corrections

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The EPIC verification team has confirmed that, as correctly outlined in Section B.2.2. of the Monitoring Report /3/, there are no Corrections (in information that do not affect the project design) applicable specifically for the considered monitoring period. A revised version of the PDD (version 9.0, dated 20/07/2018) was approved on 28/08/2018 under the PRC reference number PRC-0171-005. The occurred changes which were addressed in this revised PDD are applicable for monitoring periods from 01/07/2016 onwards (including the considered monitoring period).

EPIC has confirmed that, as established by the Attachment Instructions for completing the Monitoring Report of the latest and valid version of the Monitoring Report Form (CDM-MR-FORM, version 06.0) /75/, the Monitoring Report /3/ correctly refers to previously approved Corrections (in information that do not affect the project design) that are applicable/valid for previous monitoring periods of the project activity (including indication of PRC references and related approval dates).

Furthermore, as also confirmed by EPIC and as also established by the Attachment Instructions for completing the Monitoring Report of the latest and valid version of the Monitoring Report Form (CDM-MR-FORM, version 06.0) /75/, the Monitoring Report /3/ correctly refers to more recently approved corrections (in information that do not affect the project design) applicable/valid for monitoring periods from 01/07/2016 onwards (including the considered monitoring period) of which addressing as per applicable CDM rules was made through an independent validation opinion assessment (thus not in not in the context of the verification assessment for the considered monitoring period) (including indication of PRC reference and related approval date).

E.4.3. Change to the start date of the crediting period of the project activity

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The EPIC verification team has confirmed that, as correctly outlined in Section B.2.3. of the Monitoring Report /3/, there are no changes to the start date of the crediting period of the project activity.

E.4.4. Inclusion of a monitoring plan

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The EPIC verification team has confirmed that, as correctly outlined in Section B.2.4. of the Monitoring Report /3/, there is no inclusion of a monitoring plan applicable for the project activity.

E.4.5. Permanent changes from registered monitoring plan, or permanent deviation of monitoring from the applied methodologies, standardized baselines or other applied standards or tools

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The EPIC verification team has confirmed that, as correctly outlined in Section B.2.5. of the Monitoring Report /3/, there are no permanent changes from the registered monitoring plan and/or from the applied methodology applicable specifically for the considered monitoring period. A revised version of the PDD (version 9.0, dated 20/07/2018) was approved on 28/08/2018 under the PRC reference number PRC-0171-005. The occurred changes which were addressed in this revised PDD are applicable for monitoring periods from 01/07/2016 onwards (including the considered monitoring period).

E.4.6. Changes to the project design

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The EPIC verification team has confirmed that, as correctly outlined in Section B.2.6. of the Monitoring Report /3/, there are no changes to the project design applicable specifically for the considered monitoring period. A revised version of the PDD (version 9.0, dated 20/07/2018) was

approved on 28/08/2018 under the PRC reference number PRC-0171-005. The occurred changes which were addressed in this revised PDD are applicable for monitoring periods from 01/07/2016 onwards (including the considered monitoring period).

EPIC has confirmed that, as established by the Attachment Instructions for completing the Monitoring Report of the latest and valid version of the Monitoring Report Form (CDM-MR-FORM, version 06.0) /75/, the Monitoring Report correctly refers to previously approved changes to the project design that are applicable/valid for previous monitoring periods (including indication of PRC reference and related approval date).

Furthermore, as also confirmed by EPIC and as also established by the Attachment Instructions for completing the Monitoring Report of the latest and valid version of the Monitoring Report Form (CDM-MR-FORM, version 06.0) /75/, the Monitoring Report /3/ correctly refers to more recently approved changes to the project design that are valid applicable/valid for monitoring periods from 01/07/2016 onwards (including the considered monitoring period) of which addressing as per applicable CDM rules was made through an independent validation opinion assessment (thus not in not in the context of the verification assessment for the considered monitoring period) (including indication of PRC reference and related approval date).

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

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Not applicable.

E.5. Compliance of the registered monitoring plan with the methodology including applicable tools and standardized baselines

Means of verification	As part of the performed document review and on-site visit, the EPIC verification team has reviewed the application of the implemented monitoring plan along the monitoring period from 01/01/2018 to 30/06/2018 vis-à-vis the monitoring requirements of the registered PDD /2/. The application of the monitoring plan during the considered monitoring period was also verified against all applicable requirements of the monitoring methodology ACM0001 (version 13.0.0) /7/ and applied methodological tools /12/ /13/ /14/ /15/ in order to confirm compliance.
Findings	As part of its verification assessment, the EPIC verification team was able to confirm that the monitoring plan of the project activity was correctly implemented and was operationalized during the considered monitoring period under full compliance with applicable requirements of the monitoring methodology ACM0001 (version 13.0.0) /7/ and applied methodological tools /12/ /13/ /14/ /15/. Thus, no CARs and CLs were raised regarding the compliance of the monitoring plan with applied monitoring methodology and methodological tools.
Conclusion	Based on the performed document desk review and performed on-site visit, the EPIC verification team confirms that the monitoring plan was applied during the period from 01/01/2018 to 30/06/2018 in conformance with the provisions of the registered PDD /2/. Moreover, the applied monitoring plan also sufficiently meets all applicable requirements of the baseline and monitoring methodology ACM0001 (version 13.0.0) /7/ and applicable methodological tools /12/ /13/ /14/ /15/.

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

Means of verification	The EPIC verification team assessed the Monitoring Report /3/ and emission reduction calculation spreadsheets /5/ in order to inter alia confirm whether all ex-

ante determined parameters (that are applicable for the calculations of achieved emission reductions by the project activity) were correctly reported in the latest version of the Monitoring Report /3/ and correctly applied/considered (as per the provisions of the registered PDD) in related emission reduction calculations.

The following ex-ante determined parameters were correctly applied/considered in the context of emission reduction calculations for the considered monitoring period:

Parameter	Applied value
Fraction of methane that would be oxidized in the top layer of the SWDS in the baseline ($OX_{top\ layer}$)	0.1
Global Warming Potential of CH_4 (GWP_{CH4})	25 tCO_2e/tCH_4
Universal ideal gases constant (R_u)	8,314 $Pa.m^3/kmol.K$
Molecular mass of gas *k* (MM_k) (For the particular case of the project activity, $k = N_2$)	28.01 kg/kmol
Molecular mass of greenhouse gas *I* (MM_i) (For the particular case of the project activity, $i = CH_4$)	16.04 kg/kmol
Total pressure at normal conditions (P_n)	101,325 Pa
Temperature at normal conditions (T_n)	273.15 K
Molecular mass of water (MM_{H2O})	18.0152 kg/kmol
Weighting of build margin emissions factor (w_{BM})	75%
Weighting of operating margin emissions factor (w_{OM})	25%
Build margin CO_2 emission factor in year *y* ($EF_{grid,BM,y}$)	0.2010 tCO_2/MWh
Manufacturer's flare specifications for temperature, flow rate and maintenance schedule interval ($SPEC_{flare}$)	$SPEC_{flare,\ Flare\ 1}$ $SPEC_{flare,\ Flare\ 2}$ $SPEC_{flare,\ Flare\ 3}$ $SPEC_{flare,\ Flare\ 4}$ — Min. — Max. Operational LFG flow for each flare (for continuous operation) — 650 Nm^3/h — 7,500 Nm^3/h

Required temperature of the exhaust gas of the flare (to ensure LFG destruction (combustion) under high CH_4 destruction efficiency):	500 °C	1,200 °C
Required minimum frequency for inspection and maintenance service in each flare (incl. inspection in the conditions of the flare isolation ceramics revetment material):	Min. every 6 months	
Required/ recommended minimum frequency for replacement of the flare isolation ceramics revetment material in each flare:	After 10 years of regular and appropriate operation	
CO_2 emission factor for electricity sourced by the captive off-grid electricity generator in year *y* ($EF_{EL,captive,y}$)	1.3 tCO_2/MWh	
CO_2 emission factor for grid-sourced electricity in year *y* ($EF_{EL,grid,y}$)	1.3 tCO_2/MWh	

Moreover, EPIC verification team has also assessed that the following ex-ante determined parameters (which are also included/listed in the registered PDD) were not considered/used for the purpose of ex-post determination of baseline emissions and/or project emissions achieved by the project activity during the considered monitoring period:

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

	(DOC_j) - Decay rate for the waste type *j* (k_j) - Weight fraction of the waste type *j* (W_j) As also outlined in the Monitoring Report /3/ and the registered PDD /2/, the above-listed parameters are only used in the context of ex-ante estimation of emission reductions to be achieved by the project activity during the 2nd 7-year renewable crediting period.
Findings	All parameters fixed ex ante (which are applicable for the calculations of achieved emission reductions by the project activity) were correctly applied as per the registered PDD. No related findings (CARs and CLs) were raised.
Conclusion	The EPIC verification tem has confirmed, that all parameters fixed ex-ante (which are applicable for the calculations of achieved emission reductions by the project activity) were correctly applied as per the revised PDD /2/ during the monitoring period from 01/01/2018 to 30/06/2018.

E.6.2. Data and parameters monitored

Means of verification

The EPIC verification team has assessed that all monitoring parameters of which monitoring is required as per the monitoring plan from the registered PDD /2/ and by considering the applied calculation options for the determination of baseline and project emissions achieved during the monitoring period from 01/01/2018 to 30/06/2018.

The following tables include assessment details for parameters monitored ex post during the considered monitoring period:

Assessment details for the monitoring parameter "Management of the SWDS" (Management of SWDS):

Data / Parameter: (as per the monitoring plan from the registered PDD):	Management of the SWDS (Management of SWDS)
Measuring, recording and reporting frequencies:	The ex-post determination of the monitoring parameter "Management of the SWDS" is not based on measurements. As correctly outlined in the Monitoring Report /3/, management aspects of the UVS - Caieiras landfill are annually compared against defined landfill management practices as per the previously conceived original construction and operational design of the landfill. This comparison aims to confirm that management and operation of the UVS - Caieiras landfill (including relevant aspects related to landfilling practice) were not intentionally modified with the unique aim of increasing generation of methane on site.
Are measuring, recording and reporting frequencies in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Yes. As per the monitoring plan from the registered PDD /2/, monitoring for the parameter "Management of the SWDS" is confirmed as being performed on the basis of a technical evaluation assessment of the overall management and operation of the UVS - Caieiras with at least an every year frequency. The evaluation assessments performed by the independent 3rd party engineering company "Cepollina Engenheiros Consultores Ltda." on 03/01/2018 and 06/07/2018 as the applicable

		monitoring procedure for the parameter Management of the SWDS valid for the considered monitoring period are of deemed reasonable and acceptable frequency. That sufficiently confirms that the applied monitoring frequency is in accordance with both the monitoring plan from the registered PDD /2/ and ACM0001 (version 13.0.0) /77/. While the registered PDD establishes monitoring frequency for the parameter "Management of the SWDS" of every one-year (12 months), evaluation assessments valid for considered monitoring period were performed under a higher frequency. By taking into account the required monitoring frequency as per the monitoring plan from the registered PDD /2/, the performed technical assessments which are referred to in the Monitoring Report are thus correctly assumed as being valid until 06/07/2018.	
	Type of monitoring equipment/instrument:	Not applicable. While monitoring of the parameter "Management of the SWDS" is not performed based on measurements, there are no monitoring equipment/instruments utilized.	
	Is the accuracy of the monitoring equipment/instrument as stated in the PDD? If the PDD does not specify the accuracy of the monitoring equipment/instrument, does the utilization of the monitoring equipment/instrument represents good monitoring practice?	Not applicable. While monitoring of the parameter "Management of the SWDS" is not performed based on measurements, there are no monitoring equipment/instruments utilized.	
	If applicable, has the reported monitoring data been cross-checked with other available data or source?	The outcomes of the technical evaluations that were performed by the independent 3rd party engineering company "Cepollina Engenheiros Consultores Ltda." are reported in technical evaluation/declaration reports /78/ issued this company that are dated 03/01/2018 and 06/07/2018. These documents were made available and were assessed by the EPIC verification team. As appropriately outlined in the latest version of the Monitoring Report /3/: *"(...) As part of the performed technical evaluations, the current configuration and operational conditions of the UVS - Caieiras landfill were compared against the previously conceived design and operational conditions of the landfill prior to the implementation of the project activity on the basis of different sources, including inter alia:*	

		- *Original design documents of the landfill (as described in the documentation required for all phases of the environmental licensing for the UVS - Caieiras landfill);* - *Applicable local or national regulations* - *Expertise and experience of "Cepollina Engenheiros Consultores Ltda." with the UVS - Caieiras landfill.* *Since January 2007 "Cepollina Engenheiros Consultores Ltda." has performed regular technical inspections at the UVS - Caieiras landfill (as part of the continuously performed assessment/control of geotechnical stability monitoring for the landfill cells). As required by the competent environmental authority from São Paulo State (Companhia de Tecnologia de Saneamento Ambiental - CETESB), such particular assessments/controls performed by 2007 "Cepollina Engenheiros Consultores Ltda." are performed on monthly basis as a prerequisite for the compliance with environmental monitoring and maintenance of the validity of the environmental and safety permit/licensing for the UVS - Caieiras landfill. (…)"* The EPIC verification team has verified that the both issued technical evaluation/declaration reports /78/ sufficiently confirms that the original conceived design of the UVS - Caieiras landfill has so far not been modified. No changes in the aspects, conditions and circumstances related to management of the landfill (e.g. operations related to waste disposal, waste covering, waste compacting, management of leachate, draining of rainwater, etc.) were promoted with an aim to increase methane generation on the project site.	
	How were the values in the Monitoring Report (and/or supporting documents, i.e emission reduction calculation spreadsheet) verified and/or compared?	The EPIC verification team was able to verify that related information included in the Monitoring Report /3/ is fully in accordance with the content of the evaluation/declaration reports issued by Cepollina Engenheiros Consultores Ltda. dated 03/01/2018 and 06/07/2018 /78/. These technical reports were made available and were assessed by the EPIC verification team.	
	Does the applied monitoring data management process (from monitoring equipment/instrument to emission reduction calculation) ensure correct	Yes. Details for data transfer and reporting of emission reductions (incl. relevant QA/QC process) are further assessed in the end of this Section. In the particular case of the monitoring parameter "Management of the SWDS", there are no monitoring records (figures) to be considered/accounted in the context of emission	

recording, transfer and reporting of data to be used for the emission reductions calculations? Are necessary/applicable QA/QC processes in place?	reduction calculations for the considered monitoring period. However, the annual comparison of applied management aspects of the UVS - Caieiras landfill against the defined landfill management practices as per the previously conceived original construction and operational design of the landfill; in order to confirm that management and operation of the UVS - Caieiras landfill (including relevant aspects related to landfilling practice) were not intentionally modified with the unique aim of increasing generation of methane on site; is a monitoring requisite. As required by ACM0001 (version 13.0.0) /7/, any change in the management of the landfill after the implementation of the project activity is to be justified by referring to technical or regulatory specifications and related impacts of such eventual changes should be addressed in the determination of baseline emissions. In summary, monitoring information for the parameter "Management of the SWDS" is used for the determination/confirmation of baseline emissions and/or confirmation of the project's implementation as per project design descriptions included in the PDD (in terms of operation and management conditions of the landfill from which LFG is combusted).

Assessment details for the monitoring parameter "Volumetric flow of LFG stream in time interval t on a wet basis for j (where j is the LFG delivery pipeline to each internal combustion gas engine and LFG delivery pipeline to each flare)" ($V_{t,wb,j}$):

Data / Parameter: (as per the monitoring plan from the registered PDD):	Volumetric flow of LFG stream in time interval *t* on a wet basis for *j* (where *j* is the LFG delivery pipeline to each internal combustion gas engine and LFG delivery pipeline to each flare) ($V_{t,wb,j}$) (monitored as per Option C of the methodological tool "Tool to determine the mass flow of a greenhouse gas in a gaseous stream" (version 02.0.0) /14/).
Measuring, recording and reporting frequencies:	During the considered monitoring period, continuously measurements of the monitoring parameter $V_{t,wb,j}$ were recorded/reported with an every minute frequency. As correctly outlined in the latest version of the Monitoring Report /3/, while measurements for $V_{t,wb}$ are performed by the installed 4 LFG flow meters (one flow meter for each individual installed flare), the monitoring parameter is thus measured, recorded and reported on the basis of the following sub-parameters: - $V_{t,wb,flare-1}$: Volumetric flow of LFG to Flare 1 - $V_{t,wb,flare-2}$: Volumetric flow of LFG to Flare 2 - $V_{t,wb,flare-3}$: Volumetric flow of LFG to Flare 3 - $V_{t,wb,flare-4}$: Volumetric flow of LFG to Flare 4 - $V_{t,wb,engine-1}$: Volumetric flow of LFG to the

			internal combustion gas engine 1 - $V_{t,wb,engine-2}$: Volumetric flow of LFG to the internal combustion gas engine 2 - $V_{t,wb,engine-3}$: Volumetric flow of LFG to the internal combustion gas engine 3 - $V_{t,wb,engine-4}$: Volumetric flow of LFG to the internal combustion gas engine 4 - $V_{t,wb,engine-5}$: Volumetric flow of LFG to the internal combustion gas engine 5 - $V_{t,wb,engine-6}$: Volumetric flow of LFG to the internal combustion gas engine 6 - $V_{t,wb,engine-7}$: Volumetric flow of LFG to the internal combustion gas engine 7 - $V_{t,wb,engine-8}$: Volumetric flow of LFG to the internal combustion gas engine 8 - $V_{t,wb,engine-9}$: Volumetric flow of LFG to the internal combustion gas engine 9 - $V_{t,wb,engine-10}$: Volumetric flow of LFG to the internal combustion gas engine 10 - $V_{t,wb,engine-11}$: Volumetric flow of LFG to the internal combustion gas engine 11 - $V_{t,wb,engine-12}$: Volumetric flow of LFG to the internal combustion gas engine 12 - $V_{t,wb,engine-13}$: Volumetric flow of LFG to the internal combustion gas engine 13 - $V_{t,wb,engine-14}$: Volumetric flow of LFG to the internal combustion gas engine 14 - $V_{t,wb,engine-15}$: Volumetric flow of LFG to the internal combustion gas engine 15 - $V_{t,wb,engine-16}$: Volumetric flow of LFG to the internal combustion gas engine 16 - $V_{t,wb,engine-17}$: Volumetric flow of LFG to the internal combustion gas engine 17 - $V_{t,wb,engine-18}$: Volumetric flow of LFG to the internal combustion gas engine 18 - $V_{t,wb,engine-19}$: Volumetric flow of LFG to the internal combustion gas engine 19 - $V_{t,wb,engine-20}$: Volumetric flow of LFG to the internal combustion gas engine 20 - $V_{t,wb,engine-21:}$ Volumetric flow of LFG to the internal combustion gas engine 21 This is deemed correct, acceptable and under conformance with the requirements of ACM0001 (version 13.0.0) /7/ and the applicable methodological tool “Tool to determine the mass flow of a greenhouse gas in a gaseous stream” /14/. It is important to note that, as further assessed in Section E.8.1., for the particular case of LFG sent to each one of the 4 high temperature enclosed flares, all measurements for $V_{t,wb}$ (on the basis of measurement for the sub-parameters $V_{t,wb,flare-1}$, $V_{t,wb,flare-2}$, $V_{t,wb,flare-3}$ and $V_{t,wb,flare-4}$) are all performed in Nm^3/h (normalized flow measurements). Thus, such measurements are correctly regarded as equivalent to the calculation sub-parameters $V_{t,wb,n,flare-1}$, $V_{t,wb,n,flare-2}$, $V_{t,wb,n,flare-3}$ and $V_{t,wb,n,flare-4}$ as appropriately indicated in the Monitoring Report /3/.	

		As also further assessed in Section E.8.1., for the particular case of LFG sent to each one of the 21 internal combustion gas engines, measurements for $V_{t,wb}$ (on the basis of measurement for the sub-parameters $V_{t,wb,engine-1}$, $V_{t,wb,engine-2}$, (…), $V_{t,wb,engine-21}$) are performed in m^3/h (non-normalized flow measurements). Thus, appropriate conversion of measurement values of $V_{t,wb,engine-1}$, $V_{t,wb,engine-2}$, (…), $V_{t,wb,engine-21}$ into normalized flow (calculation sub-parameters $V_{t,wb,n,engine-1}$, $V_{t,wb,n,engine-2}$, (…), $V_{t,wb,n,engine-21}$) as per applicable guidance of the methodological tool "Tool to determine the mass flow of a greenhouse gas in a gaseous stream" (version 02.0.0) /14/ as also appropriately indicated in the Monitoring Report /3/.
	Are measuring, recording and reporting frequencies in accordance with the monitoring plan and monitoring methodology? (Yes / No)	As per the registered PDD /2/, continuous measurements of $V_{t,wb,j}$ are to be recorded and reported every minute. Moreover, as per the applicable guidance of the methodological tool "Tool to determine the mass flow of a greenhouse gas in a gaseous stream" (version 02.0.0) /14/ (which is confirmed as being applied in accordance to ACM0001 (version 13.0.0) /7/), monitoring of $V_{t,wb,j}$ (on a wet basis) should be performed continuously if not specified in the underlying methodology. While, by referring to the above-mentioned methodological tool, ACM0001 (version 13.0.0) /7/ per se does not specify any monitoring frequency for $V_{t,wb,j}$, the applied measuring, recording and reporting frequency for the parameter are thus in accordance with both ACM0001 (version 13.0.0) /7/ and the registered PDD /2/.
	Type of monitoring equipment/instrument:	For the particular case of LFG sent to the flares, measurements of volumetric flow of LFG stream in time interval *t* (on a wet basis) for each flare are performed by installed 4 identical LFG flow meters (one for each installed high temperature enclosed flare) on the basis of the sub-parameters $V_{t,wb,flare-1}$, $V_{t,wb,flare-2}$, $V_{t,wb,flare-3}$ and $V_{t,wb,flare-4}$. For the particular case of LFG sent to the internal combustion gas engines, measurements of volumetric flow of LFG stream in time interval *t* (on a wet basis) for each gas engine are performed by installed 21 identical LFG flow meters (one for each installed internal combustion gas engine) on the basis of the sub-parameters $V_{t,wb,engine-1}$, $V_{t,wb,engine-2}$, (…), $V_{t,wb,engine-21}$). In the case of the LFG flow meters used for measuring amount of LFG sent to the flares, instruments with the following specifications were applied for performing measurements of $V_{t,wb,j}$ (on the basis of measurements of the above-referred sub-parameters applicable for

the flares) during the considered monitoring period:

Flow meter used for measuring the sub-parameter $V_{t,wb,flare-1}$:

Specifications of the flow meter used for measuring the sub-parameter $V_{t,wb,flare-1}$	
Manufacturer	Contech Indústria e Comércio de Equipamentos Eletrônicos Ltda.
Model	FT-2
Serial Number	1412000235
Accuracy:	±1.0%

Source: [63]

Flow meter used for measuring the sub-parameter $V_{t,wb,flare-2}$:

Specifications of the flow meter used for measuring the sub-parameter $V_{t,wb,flare-2}$	
Manufacturer	Contech Indústria e Comércio de Equipamentos Eletrônicos Ltda.
Model	FT-2
Serial Number	1412000236
Accuracy:	±1.0%

Source: [63]

Flow meter used for measuring the sub-parameter $V_{t,wb,flare-3}$:

Specifications of the flow meter used for measuring the sub-parameter $V_{t,wb,flare-3}$	
Manufacturer	Contech Indústria e Comércio de Equipamentos Eletrônicos Ltda.
Model	FT-2
Serial Number	1412000237
Accuracy:	±1.0%

Source: [63]

Flow meter used for measuring the sub-parameter $V_{t,wb,flare-4}$:

Specifications of the flow meter used for measuring the sub-parameter $V_{t,wb,flare-4}$	
Manufacturer	Contech Indústria e Comércio de Equipamentos Eletrônicos Ltda.
Model	FT-2
Serial Number	1412000238
Accuracy:	±1.0%

Source: [63]

In the case of the LFG flow meters used for

measuring amount of LFG sent to the engines, instruments with the following specifications are installed and were applied during the considered monitoring period for performing measurements of $V_{t,wb,j}$ (on the basis of measurements of the above-referred sub-parameters applicable for the gas engines):

Flow meter used for measuring the sub-parameter $V_{t,wb,engine-1}$:
For measuring $V_{t,wb,engine-1}$, a LFG flow meter including a measurement element (annubar) + a pressure signal processing & data transmission unit with the following specifications is installed and was under operation during the considered monitoring period:

Specifications of the measurement element (annubar) which is part of the flow meter used for measuring the sub-parameter $V_{t,wb,engine-1}$	
Manufacturer	Emerson Electric Co. (former Rosemount Inc.)
Model	485 Annubar Primary Element
Serial Number	153225
Accuracy:	±1.0%

Source: /47/ /48/

Specifications of the pressure signal processing + data transmission unit which is part of the flow meter used for measuring the sub-parameter $V_{t,wb,engine-1}$	
Manufacturer	ABB S.p.A.
Model	2600T
Serial Number	3K646614034712
Accuracy:	±0.075%

Source: /44/

Flow meter used for measuring the sub-parameter $V_{t,wb,engine-2}$:
For measuring $V_{t,wb,engine-2}$, a LFG flow meter including a measurement element (annubar) + a pressure signal processing & data transmission unit with the following specifications is installed and was under operation during the considered monitoring period:

Specifications of the measurement element (annubar) which is part of the flow meter used for measuring the sub-parameter $V_{t,wb,engine-2}$	
Manufacturer	Emerson Electric Co. (former Rosemount Inc.)
Model	485 Annubar Primary Element
Serial Number	153224
Accuracy:	

	±1.0%

Source: /47/ /48/

Specifications of the pressure signal processing + data transmission unit which is part of the flow meter used for measuring the sub-parameter $V_{t,wb,engine-2}$	
Manufacturer	ABB S.p.A.
Model	2600T
Serial Number	3K646614034710
Accuracy:	±0.075%

Source: /44/

Flow meter used for measuring the sub-parameter $V_{t,wb,engine-3}$:
For measuring $V_{t,wb,engine-3,}$ a LFG flow meter including a measurement element (annubar) + a pressure signal processing & data transmission unit with the following specifications is installed and was under operation during the considered monitoring period:

Specifications of the measurement element (annubar) which is part of the flow meter used for measuring the sub-parameter $V_{t,wb,engine-3}$	
Manufacturer	Emerson Electric Co. (former Rosemount Inc.)
Model	485 Annubar Primary Element
Serial Number	153217
Accuracy:	±1.0%

Source: /47/ /48/

Specifications of the pressure signal processing + data transmission unit which is part of the flow meter used for measuring the sub-parameter $V_{t,wb,engine-3}$	
Manufacturer	ABB S.p.A.
Model	2600T
Serial Number	3K646614034700
Accuracy:	±0.075%

Source: /44/

Flow meter used for measuring the sub-parameter $V_{t,wb,engine-4}$:
For measuring $V_{t,wb,engine-4,}$ a LFG flow meter including a measurement element (annubar) + a pressure signal processing & data transmission unit with the following specifications is installed and was under operation during the considered monitoring period:

Specifications of the measurement element (annubar) which is part of the flow meter used

for measuring the sub-parameter $V_{t,wb,engine-4}$	
Manufacturer	Emerson Electric Co. (former Rosemount Inc.)
Model	485 Annubar Primary Element
Serial Number	153222
Accuracy:	±1.0%

Source: /47/ /48/

Specifications of the pressure signal processing + data transmission unit which is part of the flow meter used for measuring the sub-parameter $V_{t,wb,engine-4}$	
Manufacturer	ABB S.p.A.
Model	2600T
Serial Number	3K646614034706
Accuracy:	±0.075%

Source: /44/

Flow meter used for measuring the sub-parameter $V_{t,wb,engine-5}$:
For measuring $V_{t,wb,engine-5,}$ a LFG flow meter including a measurement element (annubar) + a pressure signal processing & data transmission unit with the following specifications is installed and was under operation during the considered monitoring period:

Specifications of the measurement element (annubar) which is part of the flow meter used for measuring the sub-parameter $V_{t,wb,engine-5}$	
Manufacturer	Emerson Electric Co. (former Rosemount Inc.)
Model	485 Annubar Primary Element
Serial Number	153221
Accuracy:	±1.0%

Source: /47/ /48/

Specifications of the pressure signal processing + data transmission unit which is part of the flow meter used for measuring the sub-parameter $V_{t,wb,engine-5}$	
Manufacturer	ABB S.p.A.
Model	2600T
Serial Number	3K646614034704
Accuracy:	±0.075%

Source: /44/

Flow meter used for measuring the sub-parameter $V_{t,wb,engine-6}$:

For measuring $V_{t,wb,engine-6}$, a LFG flow meter including a measurement element (annubar) + a pressure signal processing & data transmission unit with the following specifications is installed and was under operation during the considered monitoring period:

Specifications of the measurement element (annubar) which is part of the flow meter used for measuring the sub-parameter $V_{t,wb,engine-6}$	
Manufacturer	Emerson Electric Co. (former Rosemount Inc.)
Model	485 Annubar Primary Element
Serial Number	153228
Accuracy:	±1.0%

Source: /47/ /48/

Specifications of the pressure signal processing + data transmission unit which is part of the flow meter used for measuring the sub-parameter $V_{t,wb,engine-6}$	
Manufacturer	ABB S.p.A.
Model	2600T
Serial Number	3K646614034698
Accuracy:	±0.075%

Source: /44/

Flow meter used for measuring the sub-parameter $V_{t,wb,engine-7}$:
For measuring $V_{t,wb,engine-7}$, a LFG flow meter including a measurement element (annubar) + a pressure signal processing & data transmission unit with the following specifications is installed and was under operation during the considered monitoring period:

Specifications of the measurement element (annubar) which is part of the flow meter used for measuring the sub-parameter $V_{t,wb,engine-7}$	
Manufacturer	Emerson Electric Co. (former Rosemount Inc.)
Model	485 Annubar Primary Element
Serial Number	153223
Accuracy:	±1.0%

Source: /47/ /48/

Specifications of the pressure signal processing + data transmission unit which is part of the flow meter used for measuring the sub-parameter $V_{t,wb,engine-7}$	
Manufacturer	ABB S.p.A.

Model	2600T
Serial Number	3K646614034708
Accuracy:	±0.075%

Source: [44]

Flow meter used for measuring the sub-parameter $V_{t,wb,engine-8}$:
For measuring $V_{t,wb,engine-8,}$ a LFG flow meter including a measurement element (annubar) + a pressure signal processing & data transmission unit with the following specifications is installed and was under operation during the considered monitoring period:

Specifications of the measurement element (annubar) which is part of the flow meter used for measuring the sub-parameter $V_{t,wb,engine-8}$	
Manufacturer	Emerson Electric Co. (former Rosemount Inc.)
Model	485 Annubar Primary Element
Serial Number	153220
Accuracy:	±1.0%

Source: [47] [48]

Specifications of the pressure signal processing + data transmission unit which is part of the flow meter used for measuring the sub-parameter $V_{t,wb,engine-8}$	
Manufacturer	ABB S.p.A.
Model	2600T
Serial Number	3K646614034702
Accuracy:	±0.075%

Source: [44]

Flow meter used for measuring the sub-parameter $V_{t,wb,engine-9}$:
For measuring $V_{t,wb,engine-9,}$ a LFG flow meter including a measurement element (annubar) + a pressure signal processing & data transmission unit with the following specifications is installed and was under operation during the considered monitoring period:

Specifications of the measurement element (annubar) which is part of the flow meter used for measuring the sub-parameter $V_{t,wb,engine-9}$	
Manufacturer	Emerson Electric Co. (former Rosemount Inc.)
Model	485 Annubar Primary Element
Serial Number	153212
Accuracy:	±1.0%

Source: /47/ /48/

Specifications of the pressure signal processing + data transmission unit which is part of the flow meter used for measuring the sub-parameter $V_{t,wb,engine-9}$	
Manufacturer	ABB S.p.A.
Model	2600T
Serial Number	3K646614034726
Accuracy:	±0.075%

Source: /44/

Flow meter used for measuring the sub-parameter $V_{t,wb,engine-10}$:
For measuring $V_{t,wb,engine-10,}$ a LFG flow meter including a measurement element (annubar) + a pressure signal processing & data transmission unit with the following specifications is installed and was under operation during the considered monitoring period:

Specifications of the measurement element (annubar) which is part of the flow meter used for measuring the sub-parameter $V_{t,wb,engine-10}$	
Manufacturer	Emerson Electric Co. (former Rosemount Inc.)
Model	485 Annubar Primary Element
Serial Number	153218
Accuracy:	±1.0%

Source: /47/ /48/

Specifications of the pressure signal processing + data transmission unit which is part of the flow meter used for measuring the sub-parameter $V_{t,wb,engine-10}$	
Manufacturer	ABB S.p.A.
Model	2600T
Serial Number	3K646614034738
Accuracy:	±0.075%

Source: /44/

Flow meter used for measuring the sub-parameter $V_{t,wb,engine-11}$:
For measuring $V_{t,wb,engine-11,}$ a LFG flow meter including a measurement element (annubar) + a pressure signal processing & data transmission unit with the following specifications is installed and was under operation during the considered monitoring period:

Specifications of the measurement element (annubar) which is part of the flow meter used for measuring the sub-parameter $V_{t,wb,engine-11}$

Manufacturer	Emerson Electric Co. (former Rosemount Inc.)
Model	485 Annubar Primary Element
Serial Number	153214
Accuracy:	±1.0%

Source: [47] [48]

Specifications of the pressure signal processing + data transmission unit which is part of the flow meter used for measuring the sub-parameter $V_{t,wb,engine-11}$	
Manufacturer	ABB S.p.A.
Model	2600T
Serial Number	3K646614034714
Accuracy:	±0.075%

Source: [44]

Flow meter used for measuring the sub-parameter $V_{t,wb,engine-12}$:
For measuring $V_{t,wb,engine-12,}$ a LFG flow meter including a measurement element (annubar) + a pressure signal processing & data transmission unit with the following specifications is installed and was under operation during the considered monitoring period:

Specifications of the measurement element (annubar) which is part of the flow meter used for measuring the sub-parameter $V_{t,wb,engine-12}$	
Manufacturer	Emerson Electric Co. (former Rosemount Inc.)
Model	485 Annubar Primary Element
Serial Number	153209
Accuracy:	±1.0%

Source: [47] [48]

Specifications of the pressure signal processing + data transmission unit which is part of the flow meter used for measuring the sub-parameter $V_{t,wb,engine-12}$	
Manufacturer	ABB S.p.A.
Model	2600T
Serial Number	3K646614034720
Accuracy:	±0.075%

Source: [44]

Flow meter used for measuring the sub-parameter $V_{t,wb,engine-13}$:
For measuring $V_{t,wb,engine-13,}$ a LFG flow meter including a measurement element (annubar) + a

pressure signal processing & data transmission unit with the following specifications is installed and was under operation during the considered monitoring period:

Specifications of the measurement element (annubar) which is part of the flow meter used for measuring the sub-parameter $V_{t,wb,engine-13}$	
Manufacturer	Emerson Electric Co. (former Rosemount Inc.)
Model	485 Annubar Primary Element
Serial Number	153211
Accuracy:	±1.0%

Source: /47/ /48/

Specifications of the pressure signal processing + data transmission unit which is part of the flow meter used for measuring the sub-parameter $V_{t,wb,engine-13}$	
Manufacturer	ABB S.p.A.
Model	2600T
Serial Number	3K646614034724
Accuracy:	±0.075%

Source: /44/

Flow meter used for measuring the sub-parameter $V_{t,wb,engine-14}$:
For measuring $V_{t,wb,engine-14,}$ a LFG flow meter including a measurement element (annubar) + a pressure signal processing & data transmission unit with the following specifications is installed and was under operation during the considered monitoring period:

Specifications of the measurement element (annubar) which is part of the flow meter used for measuring the sub-parameter $V_{t,wb,engine-14}$	
Manufacturer	Emerson Electric Co. (former Rosemount Inc.)
Model	485 Annubar Primary Element
Serial Number	153227
Accuracy:	±1.0%

Source: /47/ /48/

Specifications of the pressure signal processing + data transmission unit which is part of the flow meter used for measuring the sub-parameter $V_{t,wb,engine-14}$	
Manufacturer	ABB S.p.A.
Model	2600T
Serial Number	3K646614034716
Accuracy:	

	±0.075%

Source: /44/

Flow meter used for measuring the sub-parameter $V_{t,wb,engine-15}$:
For measuring $V_{t,wb,engine-15,}$ a LFG flow meter including a measurement element (annubar) + a pressure signal processing & data transmission unit with the following specifications is installed and was under operation during the considered monitoring period:

Specifications of the measurement element (annubar) which is part of the flow meter used for measuring the sub-parameter $V_{t,wb,engine-15}$	
Manufacturer	Emerson Electric Co. (former Rosemount Inc.)
Model	485 Annubar Primary Element
Serial Number	153226
Accuracy:	±1.0%

Source: /47/ /48/

Specifications of the pressure signal processing + data transmission unit which is part of the flow meter used for measuring the sub-parameter $V_{t,wb,engine-15}$	
Manufacturer	ABB S.p.A.
Model	2600T
Serial Number	3K646614034718
Accuracy:	±0.075%

Source: /44/

Flow meter used for measuring the sub-parameter $V_{t,wb,engine-16}$:
For measuring $V_{t,wb,engine-16,}$ a LFG flow meter including a measurement element (annubar) + a pressure signal processing & data transmission unit with the following specifications is installed and was under operation during the considered monitoring period:

Specifications of the measurement element (annubar) which is part of the flow meter used for measuring the sub-parameter $V_{t,wb,engine-16}$	
Manufacturer	Emerson Electric Co. (former Rosemount Inc.)
Model	485 Annubar Primary Element
Serial Number	153210
Accuracy:	±1.0%

Source: /47/ /48/

Specifications of the pressure signal processing + data transmission unit which is part of the flow meter used for measuring the sub-parameter $V_{t,wb,engine-16}$	
Manufacturer	ABB S.p.A.
Model	2600T
Serial Number	3K646614034722
Accuracy:	±0.075%

Source: /44/

Flow meter used for measuring the sub-parameter $V_{t,wb,engine-17}$:
For measuring $V_{t,wb,engine-17,}$ a LFG flow meter including a measurement element (annubar) + a pressure signal processing & data transmission unit with the following specifications is installed and was under operation during the considered monitoring period:

Specifications of the measurement element (annubar) which is part of the flow meter used for measuring the sub-parameter $V_{t,wb,engine-17}$	
Manufacturer	Emerson Electric Co. (former Rosemount Inc.)
Model	485 Annubar Primary Element
Serial Number	153219
Accuracy:	±1.0%

Source: /47/ /48/

Specifications of the pressure signal processing + data transmission unit which is part of the flow meter used for measuring the sub-parameter $V_{t,wb,engine-17}$	
Manufacturer	ABB S.p.A.
Model	2600T
Serial Number	3K646614034742
Accuracy:	±0.075%

Source: /44/

Flow meter used for measuring the sub-parameter $V_{t,wb,engine-18}$:
For measuring $V_{t,wb,engine-18,}$ a LFG flow meter including a measurement element (annubar) + a pressure signal processing & data transmission unit with the following specifications is installed and was under operation during the considered monitoring period:

Specifications of the measurement element (annubar) which is part of the flow meter used for measuring the sub-parameter $V_{t,wb,engine-18}$	
Manufacturer	Emerson Electric Co. (former Rosemount Inc.)

Model	485 Annubar Primary Element
Serial Number	153229
Accuracy:	±1.0%

Source: [47] [48]

Specifications of the pressure signal processing + data transmission unit which is part of the flow meter used for measuring the sub-parameter $V_{t,wb,engine-18}$	
Manufacturer	ABB S.p.A.
Model	2600T
Serial Number	3K646614034730
Accuracy:	±0.075%

Source: [44]

Flow meter used for measuring the sub-parameter $V_{t,wb,engine-19}$:
For measuring $V_{t,wb,engine-1,}$ a LFG flow meter including a measurement element (annubar) + a pressure signal processing & data transmission unit with the following specifications is installed and was under operation during the considered monitoring period:

Specifications of the measurement element (annubar) which is part of the flow meter used for measuring the sub-parameter $V_{t,wb,engine-19}$	
Manufacturer	Emerson Electric Co. (former Rosemount Inc.)
Model	485 Annubar Primary Element
Serial Number	153213
Accuracy:	±1.0%

Source: [47] [48]

Specifications of the pressure signal processing + data transmission unit which is part of the flow meter used for measuring the sub-parameter $V_{t,wb,engine-19}$	
Manufacturer	ABB S.p.A.
Model	2600T
Serial Number	3K646614034728
Accuracy:	±0.075%

Source: [44]

Flow meter used for measuring the sub-parameter $V_{t,wb,engine-20}$:
For measuring $V_{t,wb,engine-20,}$ a LFG flow meter including a measurement element (annubar) + a pressure signal processing & data transmission unit with the following specifications is installed and was under operation during the considered

monitoring period:

Specifications of the measurement element (annubar) which is part of the flow meter used for measuring the sub-parameter $V_{t,wb,engine-20}$	
Manufacturer	Emerson Electric Co. (former Rosemount Inc.)
Model	485 Annubar Primary Element
Serial Number	153216
Accuracy:	±1.0%

Source: /47/ /48/

Specifications of the pressure signal processing + data transmission unit which is part of the flow meter used for measuring the sub-parameter $V_{t,wb,engine-20}$	
Manufacturer	ABB S.p.A.
Model	2600T
Serial Number	3K646614034734
Accuracy:	±0.075%

Source: /44/

Flow meter used for measuring the sub-parameter $V_{t,wb,engine-21}$:
For measuring $V_{t,wb,engine-21,}$ a LFG flow meter including a measurement element (annubar) + a pressure signal processing & data transmission unit with the following specifications is installed and was under operation during the considered monitoring period:

Specifications of the measurement element (annubar) which is part of the flow meter used for measuring the sub-parameter $V_{t,wb,engine-21}$	
Manufacturer	Emerson Electric Co. (former Rosemount Inc.)
Model	485 Annubar Primary Element
Serial Number	153215
Accuracy:	±1.0%

Source: /47/ /48/

Specifications of the pressure signal processing + data transmission unit which is part of the flow meter used for measuring the sub-parameter $V_{t,wb,engine-21}$	
Manufacturer	ABB S.p.A.
Model	2600T
Serial Number	3K646614034740
Accuracy:	±0.075%

Source: /44/

	Is the accuracy of the monitoring equipment/instrument as stated in the PDD? If the PDD does not specify the accuracy of the monitoring equipment/instrument, does the utilization of the monitoring equipment/instrument represents good monitoring practice?	The registered PDD [12] and ACM0001 (version 13.0.0) [7] do not specify any accuracy requirement for the LFG flow meters installed at the project site. The accuracy range for both the installed set of 4 identical LFG flow meters and installed set of identical 21 LFG flow meters is ±1.0%. Based on its sectoral expertise and experience with other similar project based initiative under the CDM promoting collection and destruction and/or utilization of LFG, it is EPIC opinion that the use of the installed differential pressure type flow meters represents good practice for monitoring of LFG flow.
	If applicable, has the reported monitoring data been cross-checked with other available data or source?	Not applicable.
	How were the values in the Monitoring Report (and/or supporting documents, i.e emission reduction calculation spreadsheet) verified and/or compared?	Figures of LFG flow sent to each flare (sub-parameters $V_{t,wb,flare-1}$, $V_{t,wb,flare-2}$, $V_{t,wb,flare-3}$ and $V_{t,wb,flare-4}$) as visualized by the EPIC verification team in the screen of the project's data supervisory system (in the project activity's control room) were compared with figures displayed by each one of the installed 4 LFG flow meters (for the same time instant) at the time of the on-site visit. It is the opinion of the EPIC verification team that such data checking/comparison sufficiently confirmed correct measurement, data processing and recording for the amount of LFG sent to the 4 flares by the LFG flow meters, project's PLC unit and project's monitoring database respectively (at the time of the performed on-site visit to the project site). Further assessment details about recording of values measured at the project site are included in the end of this Section. While the 21 LFG flow meters used for measuring LFG sent to the 21 internal combustion gas engines do not have a display in the instrument showing measurements, figures of LFG flow sent to each internal combustion gas engine (sub-parameters $V_{t,wb,engine-1}$, $V_{t,wb,engine-2}$, (…), $V_{t,wb,engine-21}$) as visualized by the EPIC verification team in the screen of the project's data supervisory system (in the project activity's control room) were compared against figures of power generation by each one of the engine-generator sets of which the installed gas engines are part (for the same time instant) as also visualized in the screen of the project's data supervisory system at the time of the on-site visit. It is the opinion of the EPIC verification team that such data checking/comparison sufficiently confirmed correct measurement, data processing and data recording for the amount of LFG sent to the 21 gas engines by the LFG flow meters, project's PLC unit and project's monitoring database respectively (at the time of the performed on-site visit to the project site).

Further assessment details about recording of values measured at the project site are included in the end of this Section.

Furthermore, a *data authenticity checking* was performed for all every minute basis measurement records of the following LFG collection and combustion related monitoring parameters (incl. sub-parameters) in order to sufficiently demonstrate and ensure that only authentic (not intentionally or not unintentionally modified) monitoring data was effectively used as input data for the emission reduction calculations for the considered monitoring period:

- Volumetric flow of LFG stream in time interval *t* on a wet basis for j for *j* (where *j* is the LFG delivery pipeline to each internal combustion gas engine and LFG delivery pipeline to each flare) ($V_{t,wb,j}$) (sub-parameters $V_{t,wb,flare-1}$, $V_{t,wb,flare-2}$, $V_{t,wb,flare-3}$ and $V_{t,wb,flare-4}$ + sub-parameters $V_{t,wb,engine-1}$, $V_{t,wb,engine-2}$, (…),$V_{t,wb,engine-21}$)

- Volumetric fraction of CH_4 in the collected LFG in time interval *t* on a wet basis ($v_{CH4,t,wb}$)

- Temperature of the LFG stream in time interval *t* (T_t) (sub-parameters $T_{t,flares}$, $T_{t,engine-1}$, $T_{t,engine-2}$, (…), $T_{t,engine-21}$)

- Pressure of the LFG stream in time interval *t* (P_t) (sub-parameters $P_{t,flares}$, $P_{t,engine-1}$, $P_{t,engine-2}$, (…), $P_{t,engine-21}$)

- Temperature in the exhaust gas of the enclosed flare in minute *m* ($T_{EG,m}$) (sub-parameters $T_{EG,m,flare-1}$, $T_{EG,m,flare-2}$, $T_{EG,m,flare-3}$ and $T_{EG,m,flare-4}$)

- Flame detection of flare in the minute *m* ($Flame_m$) (sub-parameters $Flame_{m,flare-1}$, $Flame_{m,flare-2,}$ $Flame_{m,flare-3}$ and $Flame_{m,flare-4}$)

- Operation of the equipment that consumes LFG (sub-parameters $Op_{engine-1,h}$, $Op_{engine-2,h}$, (…), $Op_{engine-21,h}$)

The performed checking aimed to ensure that monitoring data were not intentionally or unintentionally edited/modified by anyone prior of being used as primary data input for the processing of emission reduction calculations. The performed checking also aimed to ensure that the emission reduction calculation spreadsheets /5/ include only authentic monitoring records. Details about the performed *data authenticity checking* (which is valid for above-listed LFG collection and combustion related monitoring data) are included in the end of this Section.

Does the applied monitoring data management process (from monitoring equipment/instrument to emission reduction calculation) ensure correct recording, transfer and reporting of data to be used for the emission reductions calculations? Are necessary/applicable QA/QC processes in place?	Yes. Details for data transfer and reporting of emission reductions (incl. relevant QA/QC process) are further assessed in the end of this Section. Further details for monitoring management and quality assurance related aspects for the project activity are also included in the end of this Section.

Assessment details for the monitoring parameter "Volumetric fraction of CH_4 in the collected LFG in time interval t on a wet basis" ($v_{CH4,t,wb}$):

Data / Parameter: (as per the monitoring plan from the registered PDD):	Volumetric fraction of CH_4 in the collected LFG in time interval *t* on a wet basis ($v_{CH4,t,wb}$) (monitored as per Option C of the methodological tool "Tool to determine the mass flow of a greenhouse gas in a gaseous stream" (version 02.0.0) /14/)
Measuring, recording and reporting frequencies:	During the considered monitoring period, continuously measurements for the monitoring parameter $v_{CH4,t,wb}$ were recorded/reported with an every minute frequency. As part of performed continuous measurements, samples of collected LFG continuously pass through the infrared cell of the installed continuous CH_4 content gas analyzer unit as a gas stream. Each every-minute reported value of $v_{CH4,t,wb}$ corresponds to a measurement actually performed at the last time instant the minute in question. While it takes about 5 seconds for the collected gas to go through the filtering/cooling process prior of reaching the infra-red cell (according to information provided by the equipment manufacturer), each individual every-minute measurement that is recorded/reported for a specific time instant (for example, 12:03:00) actually represents the concentration of the gas that entered the gas analyzer pump five seconds before (e.g. 12:02:55). This is deemed reasonable and acceptable.
Are measuring, recording and reporting frequencies in accordance with the monitoring plan and monitoring methodology? (Yes / No)	As per the registered PDD /2/, continuous measurements of $v_{CH4,t,wb}$ are to be recorded and reported every minute. Moreover, as per the applicable guidance of the methodological tool "Tool to determine the mass flow of a greenhouse gas in a gaseous stream" (version 02.0.0) /14/ (which is applied in accordance to ACM0001 (version 13.0.0) /7/), monitoring of $v_{CH4,t,wb}$ should be performed continuously if not

		specified in the underlying methodology. While ACM0001 (version 13.0.0) [7] does not specify any monitoring frequency for $v_{CH4,t,wb}$, the applied measuring, recording and reporting frequencies for $v_{CH4,t,wb}$ are thus regarded as being in accordance with both ACM0001 (version 13.0.0) [7] and the registered PDD [2].
	Type of monitoring equipment/instrument:	During the considered monitoring period, continuously measurements of the monitoring parameter $v_{CH4,t,wb}$ were performed by an installed continuous CH_4 content gas analyzer unit for which main specifications are summarized below: Specifications of installed continuous CH_4 content gas analyzer unit Manufacturer: BGM Instrumentação Controle e Automação Ltda. Model: CENTRUM AG 4000 Serial Number: NS 53159 Accuracy: ±2.0% Source: [7] It is important to note that EPIC was able to confirm during the performed on-site visit that the implemented LFG collection process ensures that LFG passing through the installed flow meters and through the installed continuous CH_4 content gas analyzer unit are measured on the same basis/conditions (wet basis). The installed CH_4 content gas analyzer unit is installed in the main LFG collection pipeline that supplies LFG to all the project's methane destruction devices (set of 4 flares and set of 21 internal combustion gas engines) and it is positioned right before it splits to the 4 high temperature flares and to the set of 21 internal combustion gas engines.
	Is the accuracy of the monitoring equipment/instrument as stated in the PDD? If the PDD does not specify the accuracy of the monitoring equipment/instrument, does the utilization of the monitoring equipment/instrument represents good monitoring practice?	The PDD [2] and ACM0001 (version 13.0.0) [7] do not specify any accuracy requirement for the CH_4 content gas analyzer unit installed at the project site. The accuracy range for the installed instrument is ±2.0%. Based on its sectoral expertise and experience with other similar project based initiative under the CDM promoting collection and destruction and/or utilization of LFG, it is EPIC opinion that the use of the installed instrument represents good practice for monitoring of CH_4 content of LFG.
	If applicable, has the reported monitoring data been cross-checked with other available data or source?	Not applicable.
	How were the values in the Monitoring Report (and/or supporting documents, i.e emission reduction calculation spreadsheet)	Figures of CH_4 content in the collected LFG as visualized by the EPIC verification team in the screen of the project's data supervisory system (in the project activity's control room) were compared against figures displayed in the

	verified and/or compared?	display of the installed CH_4 content gas analyzer unit (for the same time instant) at the time of the on-site visit. It is the opinion of the EPIC verification team that such data checking/comparison sufficiently confirmed correct measurement, data processing and data recording for the CH_4 content in collected LFG by the installed CH_4 content gas analyzer unit, project's PLC unit and project's monitoring database respectively (at the time of the performed on-site visit to the project site). Further assessment details about recording of values measured at the project site are included in the end of this Section. Furthermore, a *data authenticity checking* was performed for all every minute basis measurement records of the following LFG collection and combustion related monitoring parameters (incl. sub-parameters) in order to sufficiently demonstrate and ensure that only authentic (not intentionally or not unintentionally modified) monitoring data was effectively used as input data for the emission reduction calculations for the considered monitoring period: - Volumetric flow of LFG stream in time interval *t* on a wet basis for j for *j* (where *j* is the LFG delivery pipeline to each internal combustion gas engine and LFG delivery pipeline to each flare) ($V_{t,wb,j}$) (sub-parameters $V_{t,wb,flare-1}$, $V_{t,wb,flare-2}$, $V_{t,wb,flare-3}$ and $V_{t,wb,flare-4}$ + sub-parameters $V_{t,wb,engine-1}$, $V_{t,wb,engine-2}$, (…),$V_{t,wb,engine-21}$) - Volumetric fraction of CH_4 in the collected LFG in time interval *t* on a wet basis ($v_{CH4,t,wb}$) - Temperature of the LFG stream in time interval *t* (T_t) (sub-parameters $T_{t,flares}$, $T_{t,engine-1}$, $T_{t,engine-2}$, (…), $T_{t,engine-21}$) - Pressure of the LFG stream in time interval *t* (P_t) (sub-parameters $P_{t,flares}$, $P_{t,engine-1}$, $P_{t,engine-2}$, (…), $P_{t,engine-21}$) - Temperature in the exhaust gas of the enclosed flare in minute *m* ($T_{EG,m}$) (sub-parameters $T_{EG,m,flare-1}$, $T_{EG,m,flare-2}$, $T_{EG,m,flare-3}$ and $T_{EG,m,flare-4}$) - Flame detection of flare in the minute *m* ($Flame_m$) (sub-parameters $Flame_{m,flare-1}$, $Flame_{m,flare-2,}$ $Flame_{m,flare-3}$ and $Flame_{m,flare-4}$) - Operation of the equipment that consumes LFG (sub-parameters $Op_{engine-1,h}$, $Op_{engine-2,h}$, (…), $Op_{engine-21,h}$) The performed checking aimed to ensure that monitoring data were not intentionally or	

	unintentionally edited/modified by anyone prior of being used as primary data input for the processing of emission reduction calculations. The performed checking also aimed to ensure that the emission reduction calculation spreadsheets /5/ include only authentic monitoring records. Details about the performed *data authenticity checking* (which is valid for above-listed LFG collection and combustion related monitoring data) are included in the end of this Section.
Does the applied monitoring data management process (from monitoring equipment/instrument to emission reduction calculation) ensure correct recording, transfer and reporting of data to be used for the emission reductions calculations? Are necessary/applicable QA/QC processes in place?	Yes. Details for data transfer and reporting of emission reductions (incl. relevant QA/QC process) are assessed in the end of this Section. Further details for monitoring management and quality assurance related aspects for the project activity are also included in the end of this Section.

Assessment details for the monitoring parameter "Temperature of the LFG stream in time interval t" (T_t):

Data / Parameter: (as per the monitoring plan from the registered PDD):	Temperature of the LFG stream in time interval *t* (T_t)
Measuring, recording and reporting frequencies:	During the considered monitoring period, continuously measurements of the monitoring parameter T_t were recorded/reported with an every-minute frequency. As correctly outlined in the latest version of the Monitoring Report /3/, while measurements for T_t are performed by the installed set of 22 LFG temperature sensors located within the project's LFG pipeline (1 temperature sensor positioned close to the deviations of the LFG pipeline to the set of 4 flares and 21 temperature sensors positioned closed to each one of the 21 internal combustion gas engines), the monitoring parameter is thus measured, recorded and reported on the basis of the following sub-parameters: - $T_{t,flares}$: Temperature of LFG sent to the flares - $T_{t,engine-1}$: Temperature of LFG sent to the internal combustion gas engine-1 - $T_{t,engine-2}$: Temperature of LFG sent to the internal combustion gas engine-2 - $T_{t,engine-3}$: Temperature of LFG sent to the internal combustion gas engine-3 - $T_{t,engine-4}$: Temperature of LFG sent to the internal combustion gas engine-4 - $T_{t,engine-5}$: Temperature of LFG sent to the internal combustion gas engine-5 - $T_{t,engine-6}$: Temperature of LFG sent to the internal combustion gas engine-6

		- $T_{t,engine-7}$: Temperature of LFG sent to the internal combustion gas engine-7 - $T_{t,engine-8}$: Temperature of LFG sent to the internal combustion gas engine-8 - $T_{t,engine-9}$: Temperature of LFG sent to the internal combustion gas engine-9 - $T_{t,engine-10}$: Temperature of LFG sent to the internal combustion gas engine-10 - $T_{t,engine-11}$: Temperature of LFG sent to the internal combustion gas engine-11 - $T_{t,engine-12}$: Temperature of LFG sent to the internal combustion gas engine-12 - $T_{t,engine-13}$: Temperature of LFG sent to the internal combustion gas engine-13 - $T_{t,engine-14}$: Temperature of LFG sent to the internal combustion gas engine-14 - $T_{t,engine-15}$: Temperature of LFG sent to the internal combustion gas engine-15 - $T_{t,engine-16}$: Temperature of LFG sent to the internal combustion gas engine-16 - $T_{t,engine-17}$: Temperature of LFG sent to the internal combustion gas engine-17 - $T_{t,engine-18}$: Temperature of LFG sent to the internal combustion gas engine-18 - $T_{t,engine-19}$: Temperature of LFG sent to the internal combustion gas engine-19 - $T_{t,engine-20}$: Temperature of LFG sent to the internal combustion gas engine-20 - $T_{t,engine-21}$: Temperature of LFG sent to the internal combustion gas engine-21 This is deemed correct, acceptable and under conformance with the requirements of ACM0001 (version 13.0.0) /7/ and the applicable methodological tool “Tool to determine the mass flow of a greenhouse gas in a gaseous stream” /14/. It is noteworthy that, while for the particular case of the 4 LFG flow meters measuring the amount of LFG sent to the 4 flares, such instruments automatically convert and report values of LFG flow in normalized cubic meters (Nm^3) by considering standard temperature and pressure (STP) conditions. Thus, monitoring of the sub-parameter $T_{t,flares}$ is thus not required as per the monitoring plan from the registered PDD /2/. Nonetheless, continuously measurements of $T_{t,flares}$ were recorded/reported for the considered monitoring period for sake of completeness. However, while for the particular case of the 21 LFG flow meters measuring the amount of LFG sent to the 21 gas engines, such instruments do not automatically convert and report values of LFG flow in normalized cubic meters per hour (Nm^3/h) by considering standard temperature and pressure (STP) conditions. Thus, monitoring of the sub-parameters $T_{t,engine-1}$, $T_{t,engine-2}$, (…), $T_{t,engine-21}$ are required as per the monitoring plan from the registered PDD /2/ for converting related measurements of LFG flow into normalized cubic meters per hour.	

	Are measuring, recording and reporting frequencies in accordance with the monitoring plan and monitoring methodology? (Yes / No)	As per the PDD [/2/], continuous measurements of T_T (sub-parameters $T_{t,flares}$ + $T_{t,engine-1}$, $T_{t,engine-2}$, (…), $T_{t,engine-21}$) are to be recorded and reported every minute. Moreover, as per the applicable guidance of the methodological tool "Tool to determine the mass flow of a greenhouse gas in a gaseous stream" (version 02.0.0) [/14/] (which is applied in accordance to ACM0001 (version 13.0.0) [/7/]), monitoring of T_t (sub-parameters of the sub-parameters $T_{t,flares}$ + $T_{t,engine-1}$, $T_{t,engine-2}$, (…), $T_{t,engine-21}$ in the particular case of the project activity) should be performed continuously if not specified in the underlying methodology. While ACM0001 (version 13.0.0) [/7/] does not specify any monitoring frequency for T_t, the applied measuring, recording and reporting frequencies for T_t (sub-parameters of the sub-parameters $T_{t,flares}$ + $T_{t,engine-1}$, $T_{t,engine-2}$, (…), $T_{t,engine-21}$) are thus in accordance with both ACM0001 (version 13.0.0) [/7/] and the PDD [/2/].
	Type of monitoring equipment/instrument:	During the considered monitoring period, continuously measurements of T_t (sub-parameters $T_{t,flares}$ + $T_{t,engine-1}$, $T_{t,engine-2}$, (…), $T_{t,engine-21}$) were performed by 1 + 21 LFG temperature sensors. The main specification details for such instruments are summarized below: Specifications of installed LFG temperature sensor for measuring the sub-parameter $T_{t,flares}$ during the considered monitoring period: Manufacturer: Pressgage instrumentos de Medição e Controle Ltda. Model: STP-100 Serial Number: 161054 Accuracy: ±1.0% Source: [/69/] Specifications of installed LFG temperature sensor for measuring the sub-parameter $T_{t,engine-1}$ Manufacturer: Elsi s.r.l. Model: Y1-SEM203/P Serial Number: E15PT0009 Accuracy: ± 0.5 °C Source: [/43/] Specifications of installed LFG temperature sensor for measuring the sub-parameter $T_{t,engine-2}$ Manufacturer: Elsi s.r.l. Model: Y1-SEM203/P Serial Number: E15PT0008 Accuracy: ± 0.5 °C Source: [/43/] Specifications of installed LFG temperature sensor for measuring the sub-parameter $T_{t,engine-3}$ Manufacturer: Elsi s.r.l.

Model	Y1-SEM203/P
Serial Number	E15PT0003
Accuracy	± 0.5 °C

Source: /43/

Specifications of installed LFG temperature sensor for measuring the sub-parameter $T_{t,engine-4}$	
Manufacturer	Elsi s.r.l.
Model	Y1-SEM203/P
Serial Number	E15PT0006
Accuracy	± 0.5 °C

Source: /43/

Specifications of installed LFG temperature sensor for measuring the sub-parameter $T_{t,engine-5}$	
Manufacturer	Elsi s.r.l.
Model	Y1-SEM203/P
Serial Number	E15PT0005
Accuracy	± 0.5 °C

Source: /43/

Specifications of installed LFG temperature sensor for measuring the sub-parameter $T_{t,engine-6}$	
Manufacturer	Elsi s.r.l.
Model	Y1-SEM203/P
Serial Number	E15PT0002
Accuracy	± 0.5 °C

Source: /43/

Specifications of installed LFG temperature sensor for measuring the sub-parameter $T_{t,engine-7}$	
Manufacturer	Elsi s.r.l.
Model	Y1-SEM203/P
Serial Number	E15PT0015
Accuracy	± 0.5 °C

Source: /43/

Specifications of installed LFG temperature sensor for measuring the sub-parameter $T_{t,engine-8}$	
Manufacturer	Elsi s.r.l.
Model	Y1-SEM203/P
Serial Number	E15PT0004
Accuracy	± 0.5 °C

Source: /43/

Specifications of installed LFG temperature sensor for measuring the sub-parameter $T_{t,engine-9}$	
Manufacturer	Elsi s.r.l.
Model	Y1-SEM203/P
Serial Number	E15PT0016
Accuracy	± 0.5 °C

Source: /43/

Specifications of installed LFG temperature

sensor for measuring the sub-parameter $T_{t,engine-10}$	
Manufacturer	Elsi s.r.l.
Model	Y1-SEM203/P
Serial Number	E15PT0021
Accuracy	± 0.5 °C

Source: /43/

Specifications of installed LFG temperature sensor for measuring the sub-parameter $T_{t,engine-11}$	
Manufacturer	Elsi s.r.l.
Model	Y1-SEM203/P
Serial Number	E15PT0007
Accuracy	± 0.5 °C

Source: /43/

Specifications of installed LFG temperature sensor for measuring the sub-parameter $T_{t,engine-12}$	
Manufacturer	Elsi s.r.l.
Model	Y1-SEM203/P
Serial Number	E15PT0013
Accuracy	± 0.5 °C

Source: /43/

Specifications of installed LFG temperature sensor for measuring the sub-parameter $T_{t,engine-13}$	
Manufacturer	Elsi s.r.l.
Model	Y1-SEM203/P
Serial Number	E15PT0024
Accuracy	± 0.5 °C

Source: /43/

Specifications of installed LFG temperature sensor for measuring the sub-parameter $T_{t,engine-14}$	
Manufacturer	Elsi s.r.l.
Model	Y1-SEM203/P
Serial Number	E15PT0011
Accuracy	± 0.5 °C

Source: /43/

Specifications of installed LFG temperature sensor for measuring the sub-parameter $T_{t,engine-15}$	
Manufacturer	Elsi s.r.l.
Model	Y1-SEM203/P
Serial Number	E15PT0012
Accuracy	± 0.5 °C

Source: /43/

Specifications of installed LFG temperature sensor for measuring the sub-parameter $T_{t,engine-16}$	
Manufacturer	Elsi s.r.l.
Model	Y1-SEM203/P

		Serial Number: E15PT0014 Accuracy: ± 0.5 °C Source: [43] Specifications of installed LFG temperature sensor for measuring the sub-parameter $T_{t,engine-17}$ Manufacturer: Elsi s.r.l. Model: Y1-SEM203/P Serial Number: E15PT0016 Accuracy: ± 0.5 °C Source: [43] Specifications of installed LFG temperature sensor for measuring the sub-parameter $T_{t,engine-18}$ Manufacturer: Elsi s.r.l. Model: Y1-SEM203/P Serial Number: E15PT0018 Accuracy: ± 0.5 °C Source: [43] Specifications of installed LFG temperature sensor for measuring the sub-parameter $T_{t,engine-19}$ Manufacturer: Elsi s.r.l. Model: Y1-SEM203/P Serial Number: E15PT0017 Accuracy: ± 0.5 °C Source: [43] Specifications of installed LFG temperature sensor for measuring the sub-parameter $T_{t,engine-20}$ Manufacturer: Elsi s.r.l. Model: Y1-SEM203/P Serial Number: E15PT0023 Accuracy: ± 0.5 °C Source: [43] Specifications of installed LFG temperature sensor for measuring the sub-parameter $T_{t,engine-21}$ Manufacturer: Elsi s.r.l. Model: Y1-SEM203/P Serial Number: E15PT0019 Accuracy: ± 0.5 °C Source: [43]
	Is the accuracy of the monitoring equipment/instrument as stated in the PDD? If the PDD does not specify the accuracy of the monitoring equipment/instrument, does the utilization of the monitoring equipment/instrument represents good monitoring	The PDD [12] and ACM0001 (version 13.0.0) [17] do not specify any accuracy requirement for the LFG temperature sensors installed at the project site. The accuracy range for the installed instrument for measuring the sub-parameter $T_{t,flares}$ is ±1.0%. The accuracy range for the installed instruments for measuring the sub-parameters $T_{t,engine-1}$, $T_{t,engine-2}$, (…), $T_{t,engine-21}$ is ±0.5 °C. Based on its sectoral expertise and experience

	practice?	with other similar project based initiative under the CDM promoting collection and destruction and/or utilization of LFG, it is EPIC opinion that the use of the installed instrument represents good practice for monitoring of temperature of LFG.
	If applicable, has the reported monitoring data been cross-checked with other available data or source?	Not applicable.
	How were the values in the Monitoring Report (and/or supporting documents, i.e emission reduction calculation spreadsheet) verified and/or compared?	For the particular case of the instrument used for measuring the sub-parameter $T_{t,flares}$, figures of LFG temperature as visualized by the EPIC verification team in the screen of the project's data supervisory system (in the project activity's control room) were compared against figures displayed by the temperature indicator (which is located next to the LFG temperature sensor) (for the same time instant) at the time of the on-site visit. It is the opinion of the EPIC verification team that such data checking/comparison sufficiently confirmed correct measurement, data processing and data recording for the temperature of LFG by the installed LFG temperature sensor used for the sub-parameter $T_{t,flares}$, project's PLC unit and project's monitoring database respectively (at the time of the performed on-site visit to the project site). Further assessment details about recording of values measured at the project site are included in the end of this Section. While the 21 LFG temperature sensors used for measuring LFG temperature in different sections of the project's LFG pipeline close to each 21 internal combustion gas engines do not have a display in the instrument showing measurements, figures of LFG temperature (sub-parameters $T_{t,engine-1}$, $T_{t,engine-2}$, (…), $T_{t,engine-21}$) as visualized by the EPIC verification team in the screen of the project's data supervisory system (in the project activity's control room) were compared against each other (for the same time instant) as also visualized in the screen of the project's data supervisory system at the time of the on-site visit. While all measurement values were confirmed as being very similar, it is the opinion of the EPIC verification team that such data checking/comparison sufficiently confirmed correct measurement, data processing and data recording for temperature of LFG by the 21 LFG temperature sensors, project's PLC unit and project's monitoring database respectively (at the time of the performed on-site visit to the project site). Further assessment details about recording of values measured at the project site are included in the end of this Section.

		Furthermore, a *data authenticity checking* was performed for all every minute basis measurement records of the following LFG collection and combustion related monitoring parameters (incl. sub-parameters) in order to sufficiently demonstrate and ensure that only authentic (not intentionally or not unintentionally modified) monitoring data was effectively used as input data for the emission reduction calculations for the considered monitoring period: - Volumetric flow of LFG stream in time interval *t* on a wet basis for j for *j* (where *j* is the LFG delivery pipeline to each internal combustion gas engine and LFG delivery pipeline to each flare) ($V_{t,wb,j}$) (sub-parameters $V_{t,wb,flare-1}$, $V_{t,wb,flare-2}$, $V_{t,wb,flare-3}$ and $V_{t,wb,flare-4}$ + sub-parameters $V_{t,wb,engine-1}$, $V_{t,wb,engine-2}$, (…),$V_{t,wb,engine-21}$) - Volumetric fraction of CH_4 in the collected LFG in time interval *t* on a wet basis ($v_{CH4,t,wb}$) - Temperature of the LFG stream in time interval *t* (T_t) (sub-parameters $T_{t,flares}$, $T_{t,engine-1}$, $T_{t,engine-2}$, (…), $T_{t,engine-21}$) - Pressure of the LFG stream in time interval *t* (P_t) (sub-parameters $P_{t,flares}$, $P_{t,engine-1}$, $P_{t,engine-2}$, (…), $P_{t,engine-21}$) - Temperature in the exhaust gas of the enclosed flare in minute *m* ($T_{EG,m}$) (sub-parameters $T_{EG,m,flare-1}$, $T_{EG,m,flare-2}$, $T_{EG,m,flare-3}$ and $T_{EG,m,flare-4}$) - Flame detection of flare in the minute *m* ($Flame_m$) (sub-parameters $Flame_{m,flare-1}$, $Flame_{m,flare-2}$, $Flame_{m,flare-3}$ and $Flame_{m,flare-4}$) - Operation of the equipment that consumes LFG (sub-parameters $Op_{engine-1,h}$, $Op_{engine-2,h}$, (…), $Op_{engine-21,h}$) The performed checking aimed to ensure that monitoring data were not intentionally or unintentionally edited/modified by anyone prior of being used as primary data input for the processing of emission reduction calculations. The performed checking also aimed to ensure that the emission reduction calculation spreadsheets /5/ include only authentic monitoring records. Details about the performed *data authenticity checking* (which is valid for above-listed LFG collection and combustion related monitoring data) are included in the end of this Section.
	Does the applied monitoring data management process	Yes. Details for data transfer and reporting of emission reductions (incl. relevant QA/QC process) are assessed in the end of this Section.

(from monitoring equipment/instrument to emission reduction calculation) ensure correct recording, transfer and reporting of data to be used for the emission reductions calculations? Are necessary/applicable QA/QC processes in place?	Further details for monitoring management and quality assurance related aspects for the project activity are also included in the end of this Section.

Assessment details for the monitoring parameter "Pressure of the LFG stream in time interval t" (P_t):

Data / Parameter: (as per the monitoring plan from the registered PDD):	Pressure of the LFG stream in time interval *t* (P_t)
Measuring, recording and reporting frequencies:	During the considered monitoring period, continuously measurements of the monitoring parameter P_t were recorded/reported with an every-minute frequency. As correctly outlined in the latest version of the Monitoring Report /3/, while measurements for P_t are performed by the installed set of 22 LFG temperature sensors located within the project's LFG pipeline (1 pressure sensor positioned close to the deviations of the LFG pipeline to the set of 4 flares and 21 pressure sensors positioned closed to each one of the 21 internal combustion gas engines), the monitoring parameter is thus measured, recorded and reported on the basis of the following sub-parameters: - $P_{t,flares}$: Pressure of LFG sent to the flares - $P_{t,engine-1}$: Pressure of LFG sent to the internal combustion gas engine-1 - $P_{t,engine-2}$: Pressure of LFG sent to the internal combustion gas engine-2 - $P_{t,engine-3}$: Pressure of LFG sent to the internal combustion gas engine-3 - $P_{t,engine-4}$: Pressure of LFG sent to the internal combustion gas engine-4 - $P_{t,engine-5}$: Pressure of LFG sent to the internal combustion gas engine-5 - $P_{t,engine-6}$: Pressure of LFG sent to the internal combustion gas engine-6 - $P_{t,engine-7}$: Pressure of LFG sent to the internal combustion gas engine-7 - $P_{t,engine-8}$: Pressure of LFG sent to the internal combustion gas engine-8 - $P_{t,engine-9}$: Pressure of LFG sent to the internal combustion gas engine-9 - $P_{t,engine-10}$: Pressure of LFG sent to the internal combustion gas engine-10 - $P_{t,engine-11}$: Pressure of LFG sent to the internal combustion gas engine-11 - $P_{t,engine-12}$: Pressure of LFG sent to the internal combustion gas engine-12 - $P_{t,engine-13}$: Pressure of LFG sent to the internal combustion gas engine-13 - $P_{t,engine-14}$: Pressure of LFG sent to the internal combustion gas engine-14

		- $P_{t,engine-15}$: Pressure of LFG sent to the internal combustion gas engine-15 - $P_{t,engine-16}$: Pressure of LFG sent to the internal combustion gas engine-16 - $P_{t,engine-17}$: Pressure of LFG sent to the internal combustion gas engine-17 - $P_{t,engine-18}$: Pressure of LFG sent to the internal combustion gas engine-18 - $P_{t,engine-19}$: Pressure of LFG sent to the internal combustion gas engine-19 - $P_{t,engine-20}$: Pressure of LFG sent to the internal combustion gas engine-20 - $P_{t,engine-21}$: Pressure of LFG sent to the internal combustion gas engine-21 This is deemed correct, acceptable and under conformance with the requirements of ACM0001 (version 13.0.0) /7/ and the applicable methodological tool "Tool to determine the mass flow of a greenhouse gas in a gaseous stream" /14/. It is noteworthy that, while for the particular case of the 4 LFG flow meters measuring the amount of LFG sent to the 4 flares, such instruments automatically convert and report values of LFG flow in normalized cubic meters (Nm^3) by considering standard temperature and pressure (STP) conditions. Thus, monitoring of the sub-parameter $P_{t,flares}$ is thus not required as per the monitoring plan from the registered PDD /2/. Nonetheless, continuously measurements of $P_{t,flares}$ were recorded/reported for the considered monitoring period for sake of completeness. However, while for the particular case of the 21 LFG flow meters measuring the amount of LFG sent to the 21 gas engines, such instruments do not automatically convert and report values of LFG flow in normalized cubic meters per hour (Nm^3/h) by considering standard temperature and pressure (STP) conditions. Thus, monitoring of the sub-parameters $P_{t,engine-1}$, $P_{t,engine-2}$, (…), $P_{t,engine-21}$ are required as per the monitoring plan from the registered PDD /2/ for converting related measurements of LFG flow into normalized cubic meters per hour.
	Are measuring, recording and reporting frequencies in accordance with the monitoring plan and monitoring methodology? (Yes / No)	As per the PDD /2/, continuous measurements of P_T (sub-parameters $P_{t,flares}$ + $P_{t,engine-1}$, $P_{t,engine-2}$, (…), $P_{t,engine-21}$) are to be recorded and reported every minute. Moreover, as per the applicable guidance of the methodological tool "Tool to determine the mass flow of a greenhouse gas in a gaseous stream" (version 02.0.0) /14/ (which is applied in accordance to ACM0001 (version 13.0.0) /7/), monitoring of P_t (sub-parameters of the sub-parameters $P_{t,flares}$ + $P_{t,engine-1}$, $P_{t,engine-2}$, (…), $P_{t,engine-21}$ in the particular case of the project activity) should be performed continuously if not specified in the underlying methodology. While ACM0001 (version 13.0.0) /7/ does not

		specify any monitoring frequency for P_t, the applied measuring, recording and reporting frequencies for P_t (sub-parameters of the sub-parameters $P_{t,flares}$ + $P_{t,engine-1}$, $P_{t,engine-2}$, (…), $P_{t,engine-21}$) are thus in accordance with both ACM0001 (version 13.0.0) /7/ and the PDD /2/.
	Type of monitoring equipment/instrument:	During the considered monitoring period, continuously measurements of P_t (sub-parameters $P_{t,flares}$ + $P_{t,engine-1}$, $P_{t,engine-2}$, (…), $P_{t,engine-21}$) were performed by 1 + 21 LFG pressure sensors. The main specification details for such instruments are summarized below:

Specifications of installed LFG pressure sensor used for measuring the sub-parameter $P_{t,flare}$:	
Manufacturer	Pressgage instrumentos de Medição e Controle Ltda.
Model	TPI-PRESS
Serial Number	185053
Accuracy	±1.5%

Source: /68/

Specifications of installed LFG pressure sensor for measuring the sub-parameter $P_{t,engine-1}$	
Manufacturer	ABB S.p.A.
Model	2600T
Serial Number / period in use within the considered monitoring period	3K646614034761
Accuracy	± 1%

Source: /44/

Specifications of installed LFG pressure sensor for measuring the sub-parameter $P_{t,engine-2}$	
Manufacturer	ABB S.p.A.
Model	2600T
Serial Number / period in use within the considered monitoring period	3K646614034760
Accuracy	± 1%

Source: /44/

Specifications of installed LFG pressure sensor for measuring the sub-parameter $P_{t,engine-3}$	
Manufacturer	ABB S.p.A.
Model	2600T
Serial Number / period in use within the considered monitoring period	3K646614034755
Accuracy	± 1%

Source: /44/

Specifications of installed LFG pressure sensor for measuring the sub-parameter $P_{t,engine-4}$	
Manufacturer	ABB S.p.A.
Model	2600T
Serial Number / period in use within the considered monitoring period	3K646614034758
Accuracy	± 1%

Source: /44/

Specifications of installed LFG pressure sensor for measuring the sub-parameter $P_{t,engine-5}$	
Manufacturer	ABB S.p.A.
Model	2600T
Serial Number / period in use within the considered monitoring period	3K646614034757
Accuracy	± 1%

Source: /44/

Specifications of installed LFG pressure sensor for measuring the sub-parameter $P_{t,engine-6}$	
Manufacturer	ABB S.p.A.
Model	2600T
Serial Number / period in use within the considered monitoring period	3K646614034754
Accuracy	± 1%

Source: /44/

Specifications of installed LFG pressure sensor for measuring the sub-parameter $P_{t,engine-7}$	
Manufacturer	ABB S.p.A.
Model	2600T
Serial Number / period in use within the considered monitoring period	3K646614034759
Accuracy	± 1%

Source: /44/

Specifications of installed LFG pressure sensor for measuring the sub-parameter $P_{t,engine-8}$	
Manufacturer	ABB S.p.A.
Model	2600T
Serial Number / period in use within the considered monitoring period	3K646614034756

Accuracy	± 1%

Source: /44/

Specifications of installed LFG pressure sensor for measuring the sub-parameter $P_{t,engine-9}$	
Manufacturer	ABB S.p.A.
Model	2600T
Serial Number / period in use within the considered monitoring period	3K646614034768
Accuracy	± 1%

Source: /44/

Specifications of installed LFG pressure sensor for measuring the sub-parameter $P_{t,engine-10}$	
Manufacturer	ABB S.p.A.
Model	2600T
Serial Number / period in use within the considered monitoring period	3K646614034773
Accuracy	± 1%

Source: /44/

Specifications of installed LFG pressure sensor for measuring the sub-parameter $P_{t,engine-11}$	
Manufacturer	ABB S.p.A.
Model	2600T
Serial Number / period in use within the considered monitoring period	3K646614034762
Accuracy	± 1%

Source: /44/

Specifications of installed LFG pressure sensor for measuring the sub-parameter $P_{t,engine-12}$	
Manufacturer	ABB S.p.A.
Model	2600T
Serial Number / period in use within the considered monitoring period	3K646614034765
Accuracy	± 1%

Source: /44/

Specifications of installed LFG pressure sensor for measuring the sub-parameter $P_{t,engine-13}$	
Manufacturer	ABB S.p.A.
Model	2600T
Serial Number / period in use within the considered monitoring	3K646614034767

period	
Accuracy	± 1%

Source: [44]

Specifications of installed LFG pressure sensor for measuring the sub-parameter $P_{t,engine-14}$	
Manufacturer	ABB S.p.A.
Model	2600T
Serial Number / period in use within the considered monitoring period	3K646614034763
Accuracy	± 1%

Source: [44]

Specifications of installed LFG pressure sensor for measuring the sub-parameter $P_{t,engine-15}$	
Manufacturer	ABB S.p.A.
Model	2600T
Serial Number / period in use within the considered monitoring period	3K646614034764
Accuracy	± 1%

Source: [44]

Specifications of installed LFG pressure sensor for measuring the sub-parameter $P_{t,engine-16}$	
Manufacturer	ABB S.p.A.
Model	2600T
Serial Number / period in use within the considered monitoring period	3K646614034766
Accuracy	± 1%

Source: [44]

Specifications of installed LFG pressure sensor for measuring the sub-parameter $P_{t,engine-17}$	
Manufacturer	ABB S.p.A.
Model	2600T
Serial Number / period in use within the considered monitoring period	3K646614034774
Accuracy	± 1%

Source: [44]

Specifications of installed LFG pressure sensor for measuring the sub-parameter $P_{t,engine-18}$	
Manufacturer	ABB S.p.A.
Model	2600T
Serial Number / period in use within the considered	3K646614034770

		monitoring period | Accuracy | ± 1% Source: [44] Specifications of installed LFG pressure sensor for measuring the sub-parameter $P_{t,engine-19}$ Manufacturer | ABB S.p.A. Model | 2600T Serial Number / period in use within the considered monitoring period | 3K646614034769 Accuracy | ± 1% Source: [44] Specifications of installed LFG pressure sensor for measuring the sub-parameter $P_{t,engine-20}$ Manufacturer | ABB S.p.A. Model | 2600T Serial Number / period in use within the considered monitoring period | 3K646614034772 Accuracy | ± 1% Source: [44] Specifications of installed LFG pressure sensor for measuring the sub-parameter $P_{t,engine-21}$ Manufacturer | ABB S.p.A. Model | 2600T Serial Number / period in use within the considered monitoring period | 3K646614034771 Accuracy | ± 1% Source: [44]
	Is the accuracy of the monitoring equipment/instrument as stated in the PDD? If the PDD does not specify the accuracy of the monitoring equipment/instrument, does the utilization of the monitoring equipment/instrument represents good monitoring practice?	The PDD [72] and ACM0001 (version 13.0.0) [77] do not specify any accuracy requirement for the LFG pressure sensors installed at the project site. The accuracy range for the installed instrument for measuring the sub-parameter $P_{t.flares}$ is ±1.5%. The accuracy range for the installed instruments for measuring the sub-parameters $P_{t,engine-1}$, $P_{t,engine-2}$, (…), $P_{t,engine-21}$ is ±1.0%. Based on its sectoral expertise and experience with other similar project based initiative under the CDM promoting collection and destruction and/or utilization of LFG, it is EPIC opinion that the use of the installed instrument represents good practice for monitoring of pressure of LFG.
	If applicable, has the reported monitoring data been cross-checked with	Not applicable.

	other available data or source?		
	How were the values in the Monitoring Report (and/or supporting documents, i.e emission reduction calculation spreadsheet) verified and/or compared?	For the particular case of the instrument used for measuring the sub-parameter $P_{t,flares}$, figures of LFG pressure as visualized by the EPIC verification team in the screen of the project's data supervisory system (in the project activity's control room) were compared against figures displayed by the pressure indicator (which is located next to the LFG pressure sensor) (for the same time instant) at the time of the on-site visit. It is the opinion of the EPIC verification team that such data checking/comparison sufficiently confirmed correct measurement, data processing and data recording for the pressure of LFG by the installed LFG pressure sensor used for the sub-parameter $P_{t,flares}$, project's PLC unit and project's monitoring database respectively (at the time of the performed on-site visit to the project site). Further assessment details about recording of values measured at the project site are included in the end of this Section. While the 21 LFG pressure sensors used for measuring LFG pressure in different sections of the project's LFG pipeline close to each 21 internal combustion gas engines do not have a display in the instrument showing measurements, figures of LFG pressure (sub-parameters $P_{t,engine-1}$, $P_{t,engine-2}$, (…), $P_{t,engine-21}$) as visualized by the EPIC verification team in the screen of the project's data supervisory system (in the project activity's control room) were compared against each other (for the same time instant) as also visualized in the screen of the project's data supervisory system at the time of the on-site visit. While all measurement values were confirmed as being very similar, it is the opinion of the EPIC verification team that such data checking/comparison sufficiently confirmed correct measurement, data processing and data recording for pressure of LFG by the 21 LFG pressure sensors, project's PLC unit and project's monitoring database respectively (at the time of the performed on-site visit to the project site). Further assessment details about recording of values measured at the project site are included in the end of this Section. Furthermore, a *data authenticity checking* was performed for all every minute basis measurement records of the following LFG collection and combustion related monitoring parameters (incl. sub-parameters) in order to sufficiently demonstrate and ensure that only authentic (not intentionally or not unintentionally modified) monitoring data was effectively used as input data for the emission reduction calculations for the considered monitoring period:

		- Volumetric flow of LFG stream in time interval *t* on a wet basis for j for *j* (where *j* is the LFG delivery pipeline to each internal combustion gas engine and LFG delivery pipeline to each flare) ($V_{t,wb,j}$) (sub-parameters $V_{t,wb,flare-1}$, $V_{t,wb,flare-2}$, $V_{t,wb,flare-3}$ and $V_{t,wb,flare-4}$ + sub-parameters $V_{t,wb,engine-1}$, $V_{t,wb,engine-2}$, (…),$V_{t,wb,engine-21}$) - Volumetric fraction of CH_4 in the collected LFG in time interval *t* on a wet basis ($v_{CH4,t,wb}$) - Temperature of the LFG stream in time interval *t* (T_t) (sub-parameters $T_{t,flares}$, $T_{t,engine-1}$, $T_{t,engine-2}$, (…), $T_{t,engine-21}$) - Pressure of the LFG stream in time interval *t* (P_t) (sub-parameters $P_{t,flares}$, $P_{t,engine-1}$, $P_{t,engine-2}$, (…), $P_{t,engine-21}$) - Temperature in the exhaust gas of the enclosed flare in minute *m* ($T_{EG,m}$) (sub-parameters $T_{EG,m,flare-1}$, $T_{EG,m,flare-2}$, $T_{EG,m,flare-3}$ and $T_{EG,m,flare-4}$) - Flame detection of flare in the minute *m* ($Flame_m$) (sub-parameters $Flame_{m,flare-1}$, $Flame_{m,flare-2,}$ $Flame_{m,flare-3}$ and $Flame_{m,flare-4}$) - Operation of the equipment that consumes LFG (sub-parameters $Op_{engine-1,h}$, $Op_{engine-2,h}$, (…), $Op_{engine-21,h}$) The performed checking aimed to ensure that monitoring data were not intentionally or unintentionally edited/modified by anyone prior of being used as primary data input for the processing of emission reduction calculations. The performed checking also aimed to ensure that the emission reduction calculation spreadsheets /5/ include only authentic monitoring records. Details about the performed *data authenticity checking* (which is valid for above-listed LFG collection and combustion related monitoring data) are included in the end of this Section.
	Does the applied monitoring data management process (from monitoring equipment/instrument to emission reduction calculation) ensure correct recording, transfer and reporting of data to be used for the emission reductions calculations? Are necessary/applicable QA/QC processes in place?	Yes. Details for data transfer and reporting of emission reductions (incl. relevant QA/QC process) are assessed in the end of this Section. Further details for monitoring management and quality assurance related aspects for the project activity are also included in the end of this Section.

Assessment details for the monitoring parameter "Amount of grid electricity consumed by the project activity during the year y" ($EC_{PJ,grid,y}$):

Data / Parameter: (as per the monitoring plan from the registered PDD):	Amount of grid electricity consumed by the project activity during the year *y* ($EC_{PJ,grid,y}$)
Measuring, recording and reporting frequencies:	During the considered monitoring period, accumulated values of continuously measurements of the monitoring parameter $EC_{PJ,grid,y}$ were aggregated and recorded/reported monthly by the staff of Essencis Soluções Ambientais S.A.
Are measuring, recording and reporting frequencies in accordance with the monitoring plan and monitoring methodology? (Yes / No)	As per the PDD /2/, continuous measurements of $EC_{PJ,grid,y}$ are to be recorded and reported at least with an every month frequency. The "Tool to calculate baseline, project and/or leakage emissions from electricity consumption" /13/, and ACM0001 (version 13.0.0) /7/ do not clearly indicate recording and reporting frequencies for continuous measurements for the parameter $EC_{PJ,grid,y}$. Thus, the adopted measuring, recording and reporting frequencies are assumed as in accordance with the monitoring plan from the registered PDD /2/, the "Tool to calculate baseline, project and/or leakage emissions from electricity consumption" /13/ and ACM0001 (version 13.0.0) /7/.
Type of monitoring equipment/instrument:	During the considered monitoring period, continuously measurements of the monitoring parameter $EC_{PJ,grid,y}$ were performed by an installed electricity meter of which main specifications are presented below: Specifications of installed electricity meter Manufacturer: KRON Instrumentos Elétricos Ltda. Model: MULT-K Serial Number: GK090P Accuracy: ±0.2% Source: /61/
Is the accuracy of the monitoring equipment/instrument as stated in the PDD? If the PDD does not specify the accuracy of the monitoring equipment/instrument, does the utilization of the monitoring equipment/instrument represents good monitoring practice?	The PDD /2/, the "Tool to calculate baseline, project and/or leakage emissions from electricity consumption" /13/ and ACM0001 (version 13.0.0) /7/ do not specify any accuracy requirement for the electricity meter installed at the project site. The accuracy range for the installed instrument is ±0.2%. Based on its sectoral expertise and experience with other similar project based initiative under the CDM promoting collection and destruction and/or utilization of LFG, it is EPIC opinion that the use of the installed instrument represents good practice for monitoring consumption of grid-sourced electricity by the project activity.
If applicable, has the reported monitoring data	Not applicable.

been cross-checked with other available data or source?	
How were the values in the Monitoring Report (and/or supporting documents, i.e emission reduction calculation spreadsheet) verified and/or compared?	The EPIC verification team has confirmed that values for the monitoring parameter $EC_{PJ,grid,y}$ as reported in the summarized emission reduction calculation spreadsheet /5/ and Monitoring Report /3/ are as per the primary monitoring records.
Does the applied monitoring data management process (from monitoring equipment/instrument to emission reduction calculation) ensure correct recording, transfer and reporting of data to be used for the emission reductions calculations? Are necessary/applicable QA/QC processes in place?	Details for monitoring management and quality assurance related aspects for the project activity are also included in the end of this Section.

Assessment details for the monitoring parameter "Operation of the equipment that consumes LFG (i.e. internal combustion gas engines (as additional/alternative methane destruction devices))" ($Op_{j,h}$):

Data / Parameter: (as per the monitoring plan from the registered PDD):	Operation of the equipment that consumes LFG (i.e. internal combustion gas engines (as additional/alternative methane destruction devices)) ($Op_{j,h}$)
Measuring, recording and reporting frequencies:	During the considered monitoring period, the operational status of each one of the 21 internal combustion gas engines combusting LFG were recorded and reported every-minute on the basis of continuous measurements of the operational status of each gas engine (on the basis of the 21 sub parameters $Op_{engine-1,h}$, $Op_{engine-2,h}$, (…), $Op_{engine-21,h}$. As confirmed by the EPIC verification team through assessment of the 6 monthly emission reduction calculation spreadsheets valid for the considered monitoring period, for every minute *m* that a particular gas engine was operational, the operational status for this particular minute is set as 1 (1 = "*on*") for the gas engine in question, otherwise the operational status is set to 0 (0 = "*off*").
Are measuring, recording and reporting frequencies in accordance with the monitoring plan and monitoring methodology? (Yes / No)	As per both The registered PDD /2/ and ACM0001 (version 13.0.0) /7/), the operational status of each internal combustion gas engine shall be recorded once per minute. Thus, the applied measuring, recording and reporting frequencies for $O_{pj,h}$ are thus in accordance with both ACM0001 (version 13.0.0) /7/ and the registered PDD /2/.
Type of monitoring equipment/instrument:	Not applicable. The operational status the 21 internal combustion gas engines, as automatically detected by the electronic control

		system for each gas engine based on functional parameters, is sent to the project's control system infrastructure and recorded as monitoring data.
	Is the accuracy of the monitoring equipment/instrument as stated in the PDD? If the PDD does not specify the accuracy of the monitoring equipment/instrument, does the utilization of the monitoring equipment/instrument represents good monitoring practice?	Not applicable. There are no measurements for operation status of set of 21 internal combustion gas engines consuming LFG. While the detection of the operational status of the equipment is not based on performance of measurements, no monitoring equipment/instrument is utilized.
	If applicable, has the reported monitoring data been cross-checked with other available data or source?	Not applicable.
	How were the values in the Monitoring Report (and/or supporting documents, i.e emission reduction calculation spreadsheet) verified and/or compared?	A *data authenticity checking* was performed for all every minute basis measurement records of the following LFG collection and combustion related monitoring parameters (incl. sub-parameters) in order to sufficiently demonstrate and ensure that only authentic (not intentionally or not unintentionally modified) monitoring data was effectively used as input data for the emission reduction calculations for the considered monitoring period: - Volumetric flow of LFG stream in time interval *t* on a wet basis for j for *j* (where *j* is the LFG delivery pipeline to each internal combustion gas engine and LFG delivery pipeline to each flare) ($V_{t,wb,j}$) (sub-parameters $V_{t,wb,flare-1}$, $V_{t,wb,flare-2}$, $V_{t,wb,flare-3}$ and $V_{t,wb,flare-4}$ + sub-parameters $V_{t,wb,engine-1}$, $V_{t,wb,engine-2}$, (…),$V_{t,wb,engine-21}$) - Volumetric fraction of CH_4 in the collected LFG in time interval *t* on a wet basis ($v_{CH4,t,wb}$) - Temperature of the LFG stream in time interval *t* (T_t) (sub-parameters $T_{t,flares}$, $T_{t,engine-1}$, $T_{t,engine-2}$, (…), $T_{t,engine-21}$) - Pressure of the LFG stream in time interval *t* (P_t) (sub-parameters $P_{t,flares}$, $P_{t,engine-1}$, $P_{t,engine-2}$, (…), $P_{t,engine-21}$) - Temperature in the exhaust gas of the enclosed flare in minute *m* ($T_{EG,m}$) (sub-parameters $T_{EG,m,flare-1}$, $T_{EG,m,flare-2}$, $T_{EG,m,flare-3}$ and $T_{EG,m,flare-4}$) - Flame detection of flare in the minute *m* ($Flame_m$) (sub-parameters $Flame_{m,flare-1}$,

	$Flame_{m,flare-2}$, $Flame_{m,flare-3}$ and $Flame_{m,flare-4}$) - Operation of the equipment that consumes LFG (sub-parameters $Op_{engine-1,h}$, $Op_{engine-2,h}$, (…), $Op_{engine-21,h}$) The performed checking aimed to ensure that monitoring data were not intentionally or unintentionally edited/modified by anyone prior of being used as primary data input for the processing of emission reduction calculations. The performed checking also aimed to ensure that the emission reduction calculation spreadsheets /5/ include only authentic monitoring records. Details about the performed *data authenticity checking* (which is valid for above-listed LFG collection and combustion related monitoring data) are included in the end of this Section.
Does the applied monitoring data management process (from monitoring equipment/instrument to emission reduction calculation) ensure correct recording, transfer and reporting of data to be used for the emission reductions calculations? Are necessary/applicable QA/QC processes in place?	Yes. Details for data transfer and reporting of emission reductions (incl. relevant QA/QC process) are assessed in the end of this Section. Further details for monitoring management and quality assurance related aspects for the project activity are also included in the end of this Section.

Assessment details for the monitoring parameter "Operation margin CO_2 emission factor in year = Dispatch data analysis operating margin CO_2 emission factor in year y" ($EF_{grid,OM,y} = EF_{grid,OM-DD,y}$)

Data / Parameter: (as per the monitoring plan from the registered PDD):	Operation margin CO_2 emission factor in year *y* = Dispatch data analysis operating margin CO_2 emission factor in year *y* ($EF_{grid,OM,y}$ = $EF_{grid,OM-DD,y}$)
Measuring, recording and reporting frequencies:	Not applicable. The selected values for $EF_{grid,OM,y}$ = $EF_{grid,OM-DD,y}$ are the calculated average monthly values valid for January/2018, February/2018, March/2018, April/2018, May/2018 and June/2018 as officially published by the DNA of Brazil /73/.
Are measuring, recording and reporting frequencies in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Not applicable. There are no measurements or measurement instruments/equipment involved for the definition of $EF_{grid,OM,y}$ = $EF_{grid,OM-DD,y}$. As established in the PDD /2/, the annual ex-post determined value for $EF_{grid,OM,y}$ = $EF_{grid,OM-DD,y}$ is considered.
Type of monitoring	Not applicable. There are no measurements or

	equipment/instrument:	measurement instruments/equipment involved for the definition of $EF_{grid,OM,y} = EF_{grid,OM-DD,y}$.
	Is the accuracy of the monitoring equipment/instrument as stated in the PDD? If the PDD does not specify the accuracy of the monitoring equipment/instrument, does the utilization of the monitoring equipment/instrument represents good monitoring practice?	Not applicable. There are no measurements or measurement instruments/equipment involved for the definition of $EF_{grid,OM,y} = EF_{grid,OM-DD,y}$.
	If applicable, has the reported monitoring data been cross-checked with other available data or source?	Not applicable. The selected values are the calculated average monthly values valid for January, February, March, April and May 2018 as officially published by the DNA of Brazil /73/.
	How were the values in the Monitoring Report (and/or supporting documents, i.e emission reduction calculation spreadsheet) verified and/or compared?	As confirmed by the EPIC verification team, the DNA of Brazil has regularly calculated values of $EF_{grid,OM,y}$ for the National Electricity Grid of Brazil by applying classified information and data on dispatch of electricity by grid-connected power plants within the National Electricity Grid of Brazil and by following calculation guidance applicable for "Dispatch data analysis operating margin CO_2 emission factor" ($EF_{grid,OM-DD,y}$) (based on dispatch merit order data for grid-connected power plants) as established by the methodological tool "Tool to calculate the emission factor for an electricity system" (version 04.0 /16/ as per the PDD). Related clarifications and details for the determination of $EF_{grid,OM,y} = EF_{grid,OM-DD,y}$ by the DNA of Brazil are made available at a specific section of the website of the DNA of Brazil /73/. Information made available in the website of the DNA of Brazil /73/ confirms the correctness of the selected value for $EF_{grid,OM,y} = EF_{grid,OM-DD,y}$. The EPIC verification team also confirmed as part of its performed assessment that *ex-post* determined values for both $EF_{grid,OM,y} = EF_{grid,OM-DD,y}$ and Build margin CO_2 emission factor ($EF_{grid,BM,y}$) on the basis of information published by the DNA of Brazil /73/ have been selected and applied for the determination of both baseline and project emissions related to electricity generation and consumption respectively in CDM projects hosted in Brazil with full acceptance both from the DOEs involved in the assessments and from the CDM-EB. The selected monthly average values for the monitoring parameter $EF_{grid,OM,y} = EF_{grid,OM-DD,y}$ applicable for the months of January/2018, February/2018, March/2018, April/2018, May/2018 and June/2018 were confirmed by the EPIC verification team to correctly represent the calculated and published values which are

	officially published by the DNA of Brazil [73] (0.5622 tCO_2/MWh, 0.5599 tCO_2/MWh, 0.5750 tCO_2/MWh, 0.5058 tCO_2/MWh, 0.5461 tCO_2/MWh and 0.6691 tCO_2/MWh respectively). In summary, it is EPIC opinion that the selection and reporting of values for the monitoring parameter $EF_{grid,OM,y}$ = $EF_{grid,OM-DD,y}$ are deemed correct and acceptable.
Does the applied monitoring data management process (from monitoring equipment/instrument to emission reduction calculation) ensure correct recording, transfer and reporting of data to be used for the emission reductions calculations? Are necessary/applicable QA/QC processes in place?	Not applicable. There are no measurements or measurement instruments/equipment involved for the definition of $EF_{grid,OM,y}$ = $EF_{grid,OM-DD,y}$.

Assessment details for the monitoring parameter "Mass flow of methane in the exhaust gas of the flare on a dry basis at reference conditions in the time period t" ($F_{CH4,EG,t}$):

Data / Parameter: (as per the monitoring plan from the registered PDD):	Mass flow of methane in the exhaust gas of the flare on a dry basis at reference conditions in the time period t ($F_{CH4,EG,t}$)
Measuring, recording and reporting frequencies:	For the considered monitoring period and for each individual flare, two valid measurements for the monitoring parameter $F_{CH4,EG,t}$ were performed by a third party accredited entity. The independent 3rd party inspection service company Merieux NutriSciences / Bioagri Ambiental Ltda. was selected by Essencis Soluções Ambientais S.A. for performing all measurements related to the determination of the set of biannual values for $F_{CH4,EG,t}$ for each individual flare. As outlined in the test/evaluation technical reports issued by Merieux NutriSciences / Bioagri Ambiental Ltda. [56] [57], performance of measurements for the determination of the set of values for $F_{CH4,EG,t}$ for each flare (calculation sub-parameters $F_{CH4,EG,t,flare-1}$, $F_{CH4,EG,t,flare-2}$, $F_{CH4,EG,t,flare-3}$ and $F_{CH4,EG,t,flare-4}$) valid for the considered monitoring period occurred in the following dates: - Flare 1: 23/06/2017 and 08/02/2018 - Flare 2: 22/06/2017 and 14/02/2018 - Flare 3: 22/06/2017 and 14/02/2018 - Flare 4: 22/06/2017 and 14/02/2018
Are measuring, recording and reporting frequencies	As per the PDD [12], measurements and calculations for the determination of values for

	in accordance with the monitoring plan and monitoring methodology? (Yes / No)	the monitoring parameter $F_{CH4,EG,t}$ for each individual flare are to be performed biannually. As per the applicable guidance of the methodological tool "Project emissions from flaring" (version 02.0.0) /12/, "*(…) The two time periods in year y during which the flare efficiency is measured, each a minimum of one hour and separated by at least six months* ". While the considered monitoring period encompasses 181 days, the performed measurements events as indicated above are deemed correct and the most representatives available.	
	Type of monitoring equipment/instrument:	As outlined in the Monitoring Report /3/ and in the test/evaluation reports /56/ /57/ issued for the valid performed measurements and calculations for the regular determination of the values of $F_{CH4,EG,t}$, for performing the measurements of amount of residual methane in the exhaust gas of the flares, the following measuring instruments were used: - For performing the measurements of amount of residual methane in the exhaust gas of the flare a chromatographer was utilized by the independent 3rd party inspection service company BIOAGRI Ambiental Ltda. / Mérieux NutriSciences Brasil. - For determining the speed of exhaust gas in the flare (in order to calculate the flow of exhaust gas of the flare), an appropriated Pitot tube was used by BIOAGRI Ambiental Ltda. / Mérieux NutriSciences Brasil as part of the measurements. As per information made available in the technical evaluation/testing report issued by Merieux NutriSciences / Bioagri Ambiental Ltda., applicable measurement and test methodologies of U.S.A. Environmental Protection Agency (US-EPA) and CETESB (Companhia Ambiental do Estado de São Paulo (Environmental Agency for São Paulo State in Brazil)) were applied as follows: • US-EPA Method 18 – "Measurement of Gaseous Organic Compound Emission by Gas Chromatography" • CETESB L9.221 - "Pipelines and chimneys in stationary emission sources - Sampling points determination procedure" • CETESB L9.222 - "Pipeline and chimneys in stationary emission sources – Determination of speed and outflow of gases" • CETESB L9.223 – "Pipeline and	

		chimneys in stationary emission sources – Determination of dry molecular mass and the excess of the air flow gas" • CETESB L9.224 - "Pipeline and chimneys in stationary emission sources – "Determination of humidity of effluents"
	Is the accuracy of the monitoring equipment/instrument as stated in the PDD? If the PDD does not specify the accuracy of the monitoring equipment/instrument, does the utilization of the monitoring equipment/instrument represents good monitoring practice?	The PDD [/2/] and ACM0001 (version 13.0.0) [/7/] do not specify any equipment or procedural requirement for performing the related measurements and calculations for the determination of values for $F_{CH4,EG,t}$. The methodological tool "Project emissions from flaring" (version 02.0.0) [/12/] establishes that *"(…) under Option B.1 the measurement is conducted by an accredited entity on a biannual basis".* The following disclaimer about the entity that performed the set of measurements for $F_{CH4,EG,t}$ that are valid for the considered monitoring period is appropriately included in Section D.2. of the Monitoring Report [/3/]: *"BIOAGRI Ambiental Ltda / Mérieux NutriSciences Brasil is an independent third party inspections services company specialized in inspections and testing of air emissions from stationary sources accredited by the Instituto Nacional de Metrologia, Qualidade e Tecnologia (INMETRO) (the Brazilian national authority for metrology and certification affairs), which is responsible for the regulation of operation of inspection entities and labs."* In summary, it is the opinion of EPIC that Merieux NutriSciences / Bioagri Ambiental Ltda. performing related measurements with the measurement instruments indicates above and following the applicable measurement and test methodologies of the US-EPA and CETESB represent a good practice for the determination of $F_{CH4,EG,t}$. The accreditation certificate for BIOAGRI Ambiental Ltda. / Mérieux NutriSciences Brasil from INMETRO was made available and was assessed by the EPIC verification team [/72/].
	If applicable, has the reported monitoring data been cross-checked with other available data or source?	The related technical test/evaluation reports [/56/] [/57/] for the performed measurements of $F_{CH4,EG,t}$ issued by the inspection service company Merieux NutriSciences / Bioagri Ambiental Ltda. were made available and assessed by the EPIC verification team. Information made available in the Monitoring Report [/3/] are in line with measurement details outlined in these technical

		reports. As confirmed by the EPIC verification team through review of the technical test/evaluation reports issued by BIOAGRI Ambiental Ltda. / Mérieux NutriSciences Brasil, guidance and requirements from the US-EPA Method 18 – Measurement of Gaseous Organic Compound Emission by Gas Chromatography were followed and met as part of performed biannual determination of $F_{CH4,EG,t}$ for the installed flares within the considered monitoring period. Based on its sectoral expertise, the EPIC verification team acknowledges that, as appropriately outlined in the Monitoring Report /3/, such method has been widely internationally recognized and/or accepted by different national and international organizations as a standard/method for performance of emission measurements from stationary emission sources in a wide range of industries. The EPIC verification team also confirmed that, as also outlined in the Monitoring Report /3/, different agencies in the United States (USA) and in other countries require or recommend that determination of concentration of VOC portion in landfill gas is to be performed by applying US-EPA Method 18. The US-EPA Method 18 was also confirmed by the EPIC verification team as being refereed in the most popular and acknowledged pollution control handbooks and guides (i.e. Pollution Control Handbook for Oil and Gas Engineering, 2016, published by John Wiley & Sons, Inc. – USA, US-EPA Guidance for evaluating landfill gas emissions from closed or abandoned facilities, SEPA Guidance for monitoring landfill gas engine emissions, Pollution Prevention and Abatement Handbook 1998 – The World Bank Group, etc.) as also claimed in the Monitoring Report /3/. The EPIC verification team also confirmed that technical test/evaluation reports issued by BIOAGRI Ambiental Ltda. / Mérieux NutriSciences Brasil for the performed biannual determination of $F_{CH4,EG,t}$ for the installed flares within the considered monitoring period also refers to methods recommended by the environmental authority of São Paulo State in Brazil. In summary, the EPIC verification team confirmed that $F_{CH4,EG,t}$ is measured according to an appropriate national or international standard as required by the methodological tool “Project emissions from flaring” (version 02.0.0) /12/ for the application of its Option B.1. It is also important to note that, as outlined in the latest version of the Monitoring Report /3/, the flare efficiency calculation spreadsheet /5/ also includes determination of the average flow of LFG sent to each individual flare within a 6-	

		month period prior to each one of evaluation assessments performed by the independent 3rd party inspection service company BIOAGRI Ambiental Ltda. / Mérieux NutriSciences Brasil. The EPIC verification team has confirmed that, as required by the methodological tool "Project emissions from flaring", such calculated average values of LFG flow sent to the flares 1, 2 and 3 within the 6-month period prior to the performance of measurements related to the determination of the biannual values for $F_{CH4,EG,t}$ are lower than the average values of flow of LFG sent to these flares during each 1-hour periods for which the measurements of mass flow of methane in the exhaust gas of the flare were performed as part of the determination of the biannual values for $F_{CH4,EG,t}$. As also indicated in the Monitoring Report, in the particular case of the Flare 4, EPIC has confirmed that the calculated average value of LFG flow sent to the flare 4 within the 6-month period prior to the performance of measurements related to the determination of the biannual values for $F_{CH4,EG,t}$ are lower than the average value of flow of LFG sent to this flare during each 1-hour periods for which the measurements of mass flow of methane in the exhaust gas of the flare were performed. Thus, as a conservative approach, for the particular case of the Flare 4, the conservative default value for flare efficiency was selected as per Option A of the methodological tool "Project emissions from flaring".
	How were the values in the Monitoring Report (and/or supporting documents, i.e emission reduction calculation spreadsheet) verified and/or compared?	The EPIC verification team compared the results of all measurements and calculations as outlined in the test/evaluation technical reports issued by Merieux NutriSciences / Bioagri Ambiental Ltda. against description of measurements and calculations as presented in the latest version of the Monitoring Report /3/ and spreadsheet including the calculation of flare efficiency values valid for the considered monitoring period /5/.
	Does the applied monitoring data management process (from monitoring equipment/instrument to emission reduction calculation) ensure correct recording, transfer and reporting of data to be used for the emission reductions calculations? Are necessary/applicable QA/QC processes in place?	Details for monitoring management and quality assurance related aspects for the project activity are also included in the end of this Section.
	Assessment details for the monitoring parameter "Temperature in the exhaust gas of the enclosed flare in minute m" ($T_{EG,m}$):	

	Data / Parameter: (as per the monitoring plan from the registered PDD):	Temperature in the exhaust gas of the enclosed flare in minute m ($T_{EG,m}$)
	Measuring, recording and reporting frequencies:	During the considered monitoring period, continuous measurements of the monitoring parameter $T_{EG,m}$ were recorded/reported with an every minute frequency. As correctly outlined in the latest version of the Monitoring Report /3/, while measurements for the monitoring parameter $T_{EG,m}$ are performed by the installed 4 thermocouples (one thermocouple for each individual installed flare), this monitoring parameter is thus measured, recorded and reported on the basis of the following sub-parameters: $T_{EG,m,flare-1}$: Temperature of exhaust gas in Flare 1 $T_{EG,m,flare-2}$: Temperature of exhaust gas in Flare 2 $T_{EG,m,flare-3}$: Temperature of exhaust gas in Flare 3 $T_{EG,m,flare-4}$: Temperature of exhaust gas in Flare 4 This is deemed correct, acceptable and under conformance with requirements of ACM0001 (version 13.0.0) /7/ and applicable methodological tools.
	Are measuring, recording and reporting frequencies in accordance with the monitoring plan and monitoring methodology? (Yes / No)	As per the PDD /2/, continuous measurements of the monitoring parameter $T_{EG,m}$ are to be recorded and reported every minute. Moreover, as per the applicable guidance of the methodological tool "Project emissions from flaring" (version 02.0.0) /12/, (which is applied in accordance ACM0001 (version 13.0.0) /7/), values of $T_{EG,m}$ shall be recorded once per minute. Thus, the applied measuring, recording and reporting frequencies for $T_{EG,m}$ are thus in accordance with both ACM0001 (version 13.0.0) /7/ and the PDD /2/.
	Type of monitoring equipment/instrument:	Measurements of $T_{EG,m,flare-1}$, $T_{EG,m,flare-2}$, $T_{EG,m,flare-3}$ and $T_{EG,m,flare-4}$ are continuously performed by 4 installed thermocouples (one for each installed high temperature enclosed flare). *Thermocouple used for measuring the sub-parameter $T_{EG,m,flare-1}$*: Specifications of the thermocouple installed on Flare 1 (measurements for the sub-parameter $T_{EG,m,flare-1}$) Manufacturer: Iope Instrumentos de Precisão Ltda. Model: IEC 584-2/1982, type N Serial Number: 95719/1/1 Accuracy: ±2.2ºC Source: /34/ *Thermocouple used for measuring the sub-parameter $T_{EG,m,flare-2}$*: Specifications of the thermocouple installed on

		Flare 2 (measurements for the sub-parameter $T_{EG,m,flare-2}$)
		Manufacturer: Iope Instrumentos de Precisão Ltda.
		Model: IEC 584-2/1982, type N
		Serial Number: 95719/1/2
		Accuracy: ±2.2ºC
		Source: [34]
		Thermocouple used for measuring the sub-parameter $T_{EG,m,flare-3}$:
		Specifications of the thermocouple installed on Flare 3 (measurements for the sub-parameter $T_{EG,m,flare-3}$)
		Manufacturer: Iope Instrumentos de Precisão Ltda.
		Model: IEC 584-2/1982, type N
		Serial Number: 95719/1/3
		Accuracy: ±2.2ºC
		Source: [34]
		Thermocouple used for measuring the sub-parameter $T_{EG,m,flare-4}$:
		Specifications of the thermocouple installed on Flare 4 (measurements for the sub-parameter $T_{EG,m,flare-4}$)
		Manufacturer: Iope Instrumentos de Precisão Ltda.
		Model: IEC 584-2/1982, type N
		Serial Number: 95719/1/4
		Accuracy: ±2.2ºC
		Source: [34]
	Is the accuracy of the monitoring equipment/instrument as stated in the PDD? If the PDD does not specify the accuracy of the monitoring equipment/instrument, does the utilization of the monitoring equipment/instrument represents good monitoring practice?	The PDD [2] and ACM0001 (version 13.0.0) [7] do not specify any accuracy requirement for the thermocouples installed at the project site. The accuracy range for the installed instruments is ±2.2ºC. Based on its sectoral expertise and experience with other similar project-based initiative under the CDM promoting collection and destruction and/or utilization of LFG, it is EPIC opinion that the use of the installed instrument represents good practice for monitoring of temperature in the exhaust gas of the flares.
	If applicable, has the reported monitoring data been cross-checked with other available data or source?	Not applicable.
	How were the values in the Monitoring Report (and/or supporting documents, i.e emission reduction calculation spreadsheet) verified and/or compared?	A *data authenticity checking* was performed for all every minute basis measurement records of the following LFG collection and combustion related monitoring parameters (incl. sub-parameters) in order to sufficiently demonstrate and ensure that only authentic (not intentionally or not unintentionally modified) monitoring data

		was effectively used as input data for the emission reduction calculations for the considered monitoring period: - Volumetric flow of LFG stream in time interval *t* on a wet basis for j for *j* (where *j* is the LFG delivery pipeline to each internal combustion gas engine and LFG delivery pipeline to each flare) ($V_{t,wb,j}$) (sub-parameters $V_{t,wb,flare-1}$, $V_{t,wb,flare-2}$, $V_{t,wb,flare-3}$ and $V_{t,wb,flare-4}$ + sub-parameters $V_{t,wb,engine-1}$, $V_{t,wb,engine-2}$, (…),$V_{t,wb,engine-21}$) - Volumetric fraction of CH_4 in the collected LFG in time interval *t* on a wet basis ($v_{CH4,t,wb}$) - Temperature of the LFG stream in time interval *t* (T_t) (sub-parameters $T_{t,flares}$, $T_{t,engine-1}$, $T_{t,engine-2}$, (…), $T_{t,engine-21}$) - Pressure of the LFG stream in time interval *t* (P_t) (sub-parameters $P_{t,flares}$, $P_{t,engine-1}$, $P_{t,engine-2}$, (…), $P_{t,engine-21}$) - Temperature in the exhaust gas of the enclosed flare in minute *m* ($T_{EG,m}$) (sub-parameters $T_{EG,m,flare-1}$, $T_{EG,m,flare-2}$, $T_{EG,m,flare-3}$ and $T_{EG,m,flare-4}$) - Flame detection of flare in the minute *m* ($Flame_m$) (sub-parameters $Flame_{m,flare-1}$, $Flame_{m,flare-2,}$ $Flame_{m,flare-3}$ and $Flame_{m,flare-4}$) - Operation of the equipment that consumes LFG (sub-parameters $Op_{engine-1,h}$, $Op_{engine-2,h}$, (…), $Op_{engine-21,h}$) The performed checking aimed to ensure that monitoring data were not intentionally or unintentionally edited/modified by anyone prior of being used as primary data input for the processing of emission reduction calculations. The performed checking also aimed to ensure that the emission reduction calculation spreadsheets /5/ include only authentic monitoring records. Details about the performed *data authenticity checking* (which is valid for above-listed LFG collection and combustion related monitoring data) are included in the end of this Section.	
	Does the applied monitoring data management process (from monitoring equipment/instrument to emission reduction calculation) ensure correct recording, transfer and reporting of data to be used for the emission reductions calculations?	Yes. Details for data transfer and reporting of emission reductions (incl. relevant QA/QC process) are assessed in the end of this Section. Further details for monitoring management and quality assurance related aspects for the project activity are also included in the end of this Section.	

Are necessary/applicable QA/QC processes in place?	

Assessment details for the monitoring parameter "Flame detection of flare in the minute m" ($Flame_m$):

Data / Parameter: (as per the monitoring plan from the registered PDD):	Flame detection of flare in the minute *m* ($Flame_m$)
Measuring, recording and reporting frequencies:	During the considered monitoring period, the operational status of the 4 installed high temperature flares was recorded and reported every-minute on the basis of continuous measurements/detection of the status of flame in each one of the flares. As correctly outlined in the latest version of the Monitoring Report /3/, while measurements/detection for $Flame_m$ are performed by installed 4 UV flame detectors (one flame detector for each individual installed flare), this monitoring parameter is thus measured, recorded and reported on the basis of the following sub-parameters: $Flame_{m,flare-1}$: Flame detection status for Flare 1 $Flame_{m,flare-2}$: Flame detection status for Flare 2 $Flame_{m,flare-3}$: Flame detection status for Flare 3 $Flame_{m,flare-4}$: Flame detection status for Flare 4 This is deemed correct, acceptable and under conformance with requirements of ACM0001 (version 13.0.0) /7/ and applicable methodological tools. As also confirmed by the EPIC verification team through assessment of the 6 monthly emission reduction calculation spreadsheets valid for the considered monitoring period /5/, for every minute *m* during which flame was detected in the flare *n* (where n = 1, 2, 3 and 4), the flame status of the measured flare for each minute is set as 1 (1 = Flame "*on*"), otherwise the flame status of this flare for the given minute is set to 0 (0 = Flame "*off*").
Are measuring, recording and reporting frequencies in accordance with the monitoring plan and monitoring methodology? (Yes / No)	As per both the registered PDD /2/ and the methodological tool "Project emissions from flaring" (version 02.0.0) /12/, (which is applied in accordance to ACM0001 (version 13.0.0) /7/), the operational status of each flare (calculation sub-parameters $Flame_{m,flare-1}$, $Flame_{m,flare-2}$, $Flame_{m,flare-3}$ and $Flame_{m,flare-4}$) shall be recorded once per minute. Thus, the applied measuring, recording and reporting frequencies for $Flame_m$ are thus in accordance with both ACM0001 (version 13.0.0) /7/ and the registered PDD /2/.
Type of monitoring equipment/instrument:	Monitoring of the operational status of each flare (calculation sub-parameters $Flame_{m,flare-1}$, $Flame_{m,flare-2}$, $Flame_{m,flare-3}$ and $Flame_{m,flare-4}$) is performed by 4 installed UV flame detectors

(one for each installed high temperature enclosed flare).

UV Flame detector used for monitoring $Flame_{m,flare-1}$:

Specifications of the UV Flame detector installed on Flare 1	
Manufacturer	SELCON Sistemas Eletrônicos de Controle Ltda.
Model	SEL-SV-UL-K4
Serial Number	323730808
Working hours (lifetime)	50,000 h

Source: /50/

UV Flame detector used for monitoring $Flame_{m,flare-2}$:

Specifications of the UV Flame detector installed on Flare 2	
Manufacturer	SELCON Sistemas Eletrônicos de Controle Ltda.
Model	SEL-SV-UL-K4
Serial Number	55600905
Working hours (lifetime)	50,000 h

Source: /50/

UV Flame detector used for monitoring $Flame_{m,flare-3}$:

Specifications of the UV Flame detector installed on Flare 3	
Manufacturer	Honeywell Analytics Ltd
Model	C7061
Serial Number	R7861
Working hours (lifetime)	40,000 h

Source: /52/

UV Flame detector used for monitoring $Flame_{m,flare-4}$:

Specifications of the UV Flame detector installed on Flare 4	
Manufacturer	SELCON Sistemas Eletrônicos de Controle Ltda.
Model	SEL-SV-210230-K6
Serial Number	565400312
Working hours (lifetime)	50,000 h

Source: /51/

Is the accuracy of the monitoring equipment/instrument as stated in the PDD? If the PDD does not specify the accuracy of the monitoring equipment/instrument, does the utilization of the monitoring equipment/instrument represents good monitoring	Not applicable. There are no measured values for Flame detection of flare in the minute *m*. Flame is detected by the flame detectors. Based on its sectoral expertise and experience with other similar project based initiative under the CDM promoting collection and destruction and/or utilization of LFG, it is EPIC opinion that the use of the installed instrument represents good practice for monitoring of flame detection in high temperature enclosed flares.

	practice?	
	If applicable, has the reported monitoring data been cross-checked with other available data or source?	Not applicable.
	How were the values in the Monitoring Report (and/or supporting documents, i.e emission reduction calculation spreadsheet) verified and/or compared?	A *data authenticity checking* was performed for all every minute basis measurement records of the following LFG collection and combustion related monitoring parameters (incl. sub-parameters) in order to sufficiently demonstrate and ensure that only authentic (not intentionally or not unintentionally modified) monitoring data was effectively used as input data for the emission reduction calculations for the considered monitoring period: - Volumetric flow of LFG stream in time interval *t* on a wet basis for j for *j* (where *j* is the LFG delivery pipeline to each internal combustion gas engine and LFG delivery pipeline to each flare) ($V_{t,wb,j}$) (sub-parameters $V_{t,wb,flare-1}$, $V_{t,wb,flare-2}$, $V_{t,wb,flare-3}$ and $V_{t,wb,flare-4}$ + sub-parameters $V_{t,wb,engine-1}$, $V_{t,wb,engine-2}$, (…),$V_{t,wb,engine-21}$) - Volumetric fraction of CH_4 in the collected LFG in time interval *t* on a wet basis ($v_{CH4,t,wb}$) - Temperature of the LFG stream in time interval *t* (T_t) (sub-parameters $T_{t,flares}$, $T_{t,engine-1}$, $T_{t,engine-2}$, (…), $T_{t,engine-21}$) - Pressure of the LFG stream in time interval *t* (P_t) (sub-parameters $P_{t,flares}$, $P_{t,engine-1}$, $P_{t,engine-2}$, (…), $P_{t,engine-21}$) - Temperature in the exhaust gas of the enclosed flare in minute *m* ($T_{EG,m}$) (sub-parameters $T_{EG,m,flare-1}$, $T_{EG,m,flare-2}$, $T_{EG,m,flare-3}$ and $T_{EG,m,flare-4}$) - Flame detection of flare in the minute *m* ($Flame_m$) (sub-parameters $Flame_{m,flare-1}$, $Flame_{m,flare-2,}$ $Flame_{m,flare-3}$ and $Flame_{m,flare-4}$) - Operation of the equipment that consumes LFG (sub-parameters $Op_{engine-1,h}$, $Op_{engine-2,h}$, (…), $Op_{engine-21,h}$) The performed checking aimed to ensure that monitoring data were not intentionally or unintentionally edited/modified by anyone prior of being used as primary data input for the processing of emission reduction calculations. The performed checking also aimed to ensure that the emission reduction calculation spreadsheets /5/ include only authentic monitoring records. Details about the performed *data authenticity checking* (which is valid for above-listed LFG collection and combustion

	related monitoring data) are included in the end of this Section.
Does the applied monitoring data management process (from monitoring equipment/instrument to emission reduction calculation) ensure correct recording, transfer and reporting of data to be used for the emission reductions calculations? Are necessary/applicable QA/QC processes in place?	Yes. Details for data transfer and reporting of emission reductions (incl. relevant QA/QC process) are assessed in the end of this Section. Further details for monitoring management and quality assurance related aspects for the project activity are also included in the end of this Section.

Assessment details for the monitoring parameter "Maintenance events completed in year y as monitored by the project participants" ($Maintenance_y$):

Data / Parameter: (as per the monitoring plan from the registered PDD):	Maintenance events completed in year *y* as monitored by the project participants ($Maintenance_y$)
Measuring, recording and reporting frequencies:	As per the implemented monitoring procedure adopted at Essencis Soluções Ambientais S.A., all the maintenance events performed at the project site are by the staff of the project participant and project operator Essencis Soluções Ambientais S.A. in a customized maintenance log book (with details about historical of performed interventions (repair, maintenance and calibration services) /24/. As established in the PDD /2/, the latest version of the Monitoring Report /3/ summarizes the maintenance events (inspection and maintenance services) that were performed in the 4 installed flares during the considered monitoring period. The listed events (dated 02/12/2017) encompass general inspection/maintenance services (incl. inspection of the condition of the flare isolation ceramics revetment material, checking of conditions of the LPG supply valve for pilot flame, checking of condition/function of the air inlet dumpers, checking of the conditions of the thermocouples, checking of the condition of the UV flame detector, checking of the condition of the flame arrester valve, checking of the conditions of the LFG injectors, checking of painting conditions). As also appropriately outlined in the Monitoring Report /3/, general inspection/maintenance services on the flares are opportunely performed during planned or unplanned interruptions of operation of the flares. Moreover, as also highlighted in the Monitoring Report /3/, the isolation ceramics revetment material of the Flare 1 and Flare 2 were replaced once in February 2009 and February

		2012 respectively. For the Flare 3 and Flare 4 (which were installed in July 2011 and February 2012 respectively), the isolation ceramics revetment material was not yet replaced. As indicated in the PDD /2/, the expected lifetime for the isolation ceramics revetment material for the flares is of at least 10 years (as established in details for the ex-ante determined parameter "Manufacturer's flare specifications for temperature, flow rate and maintenance schedule interval" ($SPEC_{flare}$)).
	Are measuring, recording and reporting frequencies in accordance with the monitoring plan and monitoring methodology? (Yes / No)	As per both the PDD /2/ and the methodological tool "Project emissions from flaring" (version 02.0.0) /12/, (which is applied in accordance to ACM0001 (version 13.0.0) /7/), monitoring of the parameter $Maintenance_y$ is to be performed annually. Thus, the applied monitoring frequency for the parameter (with maintenance events being registered at the date when the event is performed) is thus in accordance with both ACM0001 (version 13.0.0) /7/ and the PDD /2/.
	Type of monitoring equipment/instrument:	Not applicable. There are no measurements involved in the monitoring of $Maintenance_y$.
	Is the accuracy of the monitoring equipment/instrument as stated in the PDD? If the PDD does not specify the accuracy of the monitoring equipment/instrument, does the utilization of the monitoring equipment/instrument represents good monitoring practice?	Not applicable. There are no measurements involved in the monitoring of $Maintenance_y$.
	If applicable, has the reported monitoring data been cross-checked with other available data or source?	Yes. The EPIC verification team compared details included in the Monitoring Report /3/ for the monitoring parameter $Maintenance_y$ against all available documented evidences for performed maintenance services at the flares installed as part of the project activity (incl. log book with details about historical of performed interventions (repair, maintenance and calibration services) at the flares /24/).
	How were the values in the Monitoring Report (and/or supporting documents, i.e emission reduction calculation spreadsheet) verified and/or compared?	Not applicable. While all performed maintenance events in the installed flares (including inspection and/or replacement of flare revetment material) were performed in accordance with requirements established in details for the ex-ante determined parameter "Manufacturer's flare specifications for temperature, flow rate and maintenance schedule interval" ($SPEC_{flare}$), the determination of emission reductions achieved by the project activity during the considered monitoring period are thus not negatively impacted by the records for the monitoring parameter $Maintenance_y$.
	Does the applied	Not applicable.

monitoring data management process (from monitoring equipment/instrument to emission reduction calculation) ensure correct recording, transfer and reporting of data to be used for the emission reductions calculations? Are necessary/applicable QA/QC processes in place?	

Assessment details for the monitoring parameter "Quantity of LPG consumed by the project activity in year y" ($FC_{LPG,y}$):

Data / Parameter: (as per the monitoring plan from the registered PDD):	Quantity of LPG consumed by the project activity in year *y* ($FC_{LPG,y}$)
Measuring, recording and reporting frequencies:	During the considered monitoring period, measurements of $FC_{LPG,y}$ were performed by the local LPG distribution company Cia Ultragas S.A. as part of each LPG delivery event.
Are measuring, recording and reporting frequencies in accordance with the monitoring plan and monitoring methodology? (Yes / No)	As per the PDD [12], measurements of $FC_{LPG,y}$ are to be monitored with a frequency not lower than once a month.
Type of monitoring equipment/instrument:	Monitoring records for $FC_{LPG,y}$ were measured by a weight scale with the specifications provided below. Specifications of the weight scale used for measuring LPG mass Manufacturer: Mettler-Toledo Inc. Model: 2180 Serial Number: 10423008 Capacity: Max. 250 kg Accuracy: ± 50 grams Source: [62]
Is the accuracy of the monitoring equipment/instrument as stated in the PDD? If the PDD does not specify the accuracy of the monitoring equipment/instrument, does the utilization of the monitoring equipment/instrument represents good monitoring practice?	The PDD [12] and ACM0001 (version 13.0.0) [17] do not specify any measurement requirement for monitoring consumption of LPG. The accuracy for the installed scale is ± 50 grams. It is EPIC opinion that the use of this kind of weight scale represents good practice for measuring consumption of LPG by the project activity.
If applicable, has the	EPIC verification team has compared the

reported monitoring data been cross-checked with other available data or source?	records of LPG delivered to the UVS - Caieiras landfill as reported in the summarized emission reduction calculation spreadsheet /5/ and Monitoring Report /3/ with declaration/communication /60/ issued by the local LPG distribution company Cia. Ultragaz S.A. confirming the quantities of LPG supplied to Essencis Soluções Ambientais S.A. during the period from January/2018 to June/2018. Declared values valid for the monitoring period from 01/01/2018 to 30/06/2018 were compared against values for LPG cost expenditures and notes of delivery events of LPG in the project site as per available records in the financial/accounting management system of Essencis Soluções Ambientais S.A. /76/.
How were the values in the Monitoring Report (and/or supporting documents, i.e emission reduction calculation spreadsheet) verified and/or compared?	EPIC verification team has confirmed that values for $FC_{LPG,y}$ as reported in the summarized emission reduction calculation spreadsheet /5/ and Monitoring Report /3/ are in accordance with provided evidences of primary records /60/ /76/.
Does the applied monitoring data management process (from monitoring equipment/instrument to emission reduction calculation) ensure correct recording, transfer and reporting of data to be used for the emission reductions calculations? Are necessary/applicable QA/QC processes in place?	Details for monitoring management and quality assurance related aspects for the project activity are also included in the end of this Section.

Assessment details for the monitoring parameter "Net calorific value of the fuel LPG" ($NCV_{LPG,y}$):

Data / Parameter: (as per the monitoring plan from the registered PDD):	Net calorific value of the fuel LPG ($NCV_{LPG,y}$)
Measuring, recording and reporting frequencies:	Not applicable. The selected value for $NCV_{LPG,y}$ (46.5 GJ/ton_{LPG}) corresponds to the National default value as per the Brazilian National Energetic Balance Report for year 2017 (Balanço Energético Nacional (BEN) – 2017) / Table VIII.9 – Specific Mass and Heating Values (Higher Heating Value) /77/. The determination of $NCV_{LPG,y}$ is also in accordance with applicable guidance of the "Tool to calculate project or leakage CO_2 emissions from fossil fuel combustion" /15/. No measurement or calculation was performed in the context of the determination of the parameter and no monitoring equipment/instrument was used either.
Are measuring, recording	As per the PDD /2/, "*(…) In case regional or*

and reporting frequencies in accordance with the monitoring plan and monitoring methodology? (Yes / No)	*national default values or IPCC default values are considered an every year monitoring frequency is applied."*. The adopted monitoring frequency (annual national default value) is thus in accordance with the registered PDD /2/.
Type of monitoring equipment/instrument:	Not applicable. No measuring instrument was used for determining the value of the parameter during the considered monitoring period.
Is the accuracy of the monitoring equipment/instrument as stated in the PDD? If the PDD does not specify the accuracy of the monitoring equipment/instrument, does the utilization of the monitoring equipment/instrument represents good monitoring practice?	Not applicable. No measuring instrument was used for determining the value of the parameter during the considered monitoring period.
If applicable, has the reported monitoring data been cross-checked with other available data or source?	In order to confirm that the selected value for $NCV_{LPG,y}$ indeed corresponds to the value as per the default values published in the Brazilian Energetic Balance Report 2017 /77/, EPIC verification team assessed this report. Moreover, as part of its verification assessment, the EPIC verification team also confirms that the determination of $NCV_{LPG,y}$ is indeed in accordance with applicable guidance of the "Tool to calculate project or leakage CO_2 emissions from fossil fuel combustion" /15/. Moreover, EPIC has also confirmed that the reported value is within the uncertainty range of the IPCC default value (as provided in Table 1.2, Vol. 2 of the 2006 IPCC Guidelines /11/).
How were the values in the Monitoring Report (and/or supporting documents, i.e emission reduction calculation spreadsheet) verified and/or compared?	See above.
Does the applied monitoring data management process (from monitoring equipment/instrument to emission reduction calculation) ensure correct recording, transfer and reporting of data to be used for the emission reductions calculations? Are necessary/applicable QA/QC processes in place?	Not applicable.

Assessment details for the monitoring parameter "CO_2 emission factor of fuel LPG in year y" ($EF_{CO2,LPG,y}$):

	Data / Parameter: (as per the monitoring plan from the registered PDD):	CO_2 emission factor of fuel LPG in year *y* ($EF_{CO2,LPG,y}$)
	Measuring, recording and reporting frequencies:	Not applicable. The value for the monitoring parameter $EF_{CO2,LPG,y}$ is selected as 0.0656 tCO_2/GJ which corresponds to the default value as per the IPCC Guidelines for National Greenhouse Gas Inventories, 2006 (IPCC, 2006), Chapter 1, Volume 2, Table 1.4 (value at the upper limit of the uncertainty at 95% confidence interval) /11/. The determination of $EF_{CO2,LPG,y}$ is in accordance with applicable guidance of the Tool to calculate project or leakage CO_2 emissions from fossil fuel combustion" /15/. No measurement or calculation was performed in the context of the determination of the parameter $EF_{CO2,LPG,y}$ and no monitoring equipment/instrument was used either.
	Are measuring, recording and reporting frequencies in accordance with the monitoring plan and monitoring methodology? (Yes / No)	As per the registered PDD /2/, "*(…) In case regional or national default values or IPCC default values are considered an every year monitoring frequency is applied."*. The adopted monitoring frequency (annual IPCC default value) is thus in accordance with the registered PDD /2/.
	Type of monitoring equipment/instrument:	Not applicable. No measuring instrument was used for determining the value of the parameter during the considered monitoring period.
	Is the accuracy of the monitoring equipment/instrument as stated in the PDD? If the PDD does not specify the accuracy of the monitoring equipment/instrument, does the utilization of the monitoring equipment/instrument represents good monitoring practice?	Not applicable. No measuring instrument was used for determining the value of the parameter during the considered monitoring period.
	If applicable, has the reported monitoring data been cross-checked with other available data or source?	In order to confirm that the selected value for $EF_{CO2,LPG,y}$ indeed corresponds to the default value as per the IPCC Guidelines for National Greenhouse Gas Inventories, 2006, Volume 2, Chapter 1, Table 1.4 /11/ (value at the upper limit of the uncertainty at 95% confidence interval), the EPIC Assessment Team assessed these IPCC guidelines. Moreover, as part of its verification assessment, the EPIC verification team also confirms that the determination of $EF_{CO2,LPG,y}$ is indeed in accordance with applicable guidance of the "Tool to calculate project or leakage CO_2 emissions from fossil fuel combustion" /15/.
	How were the values in the Monitoring Report (and/or supporting documents, i.e emission reduction	See above.

calculation spreadsheet) verified and/or compared?	
Does the applied monitoring data management process (from monitoring equipment/instrument to emission reduction calculation) ensure correct recording, transfer and reporting of data to be used for the emission reductions calculations? Are necessary/applicable QA/QC processes in place?	Not applicable.

Assessment details for the monitoring parameter "Quantity of electricity generated in captive diesel backup generator during the year y" ($EC_{PJ,captive,y}$) = "Quantity of electricity generated in captive diesel backup generator during the year y CO_2 emission factor of fuel LPG in year y" ($EG_{Diesel\text{-}Generator,y}$)

Data / Parameter: (as per the monitoring plan from the registered PDD):	Quantity of electricity generated in captive diesel backup generator during the year y" ($EC_{PJ,captive,y}$) = Quantity of electricity generated in captive diesel backup generator during the year y CO_2 emission factor of fuel LPG in year y ($EG_{Diesel\text{-}Generator,y}$)
Measuring, recording and reporting frequencies:	During the considered monitoring period, accumulated values of measurements of the monitoring parameter $EC_{PJ,captive,y}$ = $EG_{Diesel\text{-}Generator,y}$ were aggregated and recorded/reported monthly by the staff of Essencis Soluções Ambientais S.A.
Are measuring, recording and reporting frequencies in accordance with the monitoring plan and monitoring methodology? (Yes / No)	As per the PDD /2/, measurements of $EC_{PJ,captive,y}$ = $EG_{Diesel\text{-}Generator,y}$ are to be recorded and reported at least with an every month frequency. The "Tool to calculate baseline, project and/or leakage emissions from electricity consumption" /13/, and ACM0001 (version 13.0.0) /7/ do not clearly indicate recording and reporting frequencies for continuous measurements for the parameter $EC_{PJ,captive,y}$ = $EG_{Diesel\text{-}Generator,y}$. Thus, the adopted measuring, recording and reporting frequencies are assumed as in accordance with the monitoring plan from the registered PDD /2/, the "Tool to calculate baseline, project and/or leakage emissions from electricity consumption" /13/ and ACM0001 (version 13.0.0) /7/.
Type of monitoring equipment/instrument:	During the considered monitoring period, continuously measurements of the monitoring parameter $EC_{PJ,captive,y}$ = $EG_{Diesel\text{-}Generator,y}$ were performed by an installed electricity meter of which main specifications are presented below: Specifications of installed electricity meter used for measuring the amount of electricity generated by installed backup electricity

	generator and consumed by the project activity Manufacturer: Schneider Eletric Model: OM820MG Serial Number (S/N): 26207716 Accuracy: ±0.2% Source: /101/
Is the accuracy of the monitoring equipment/instrument as stated in the PDD? If the PDD does not specify the accuracy of the monitoring equipment/instrument, does the utilization of the monitoring equipment/instrument represents good monitoring practice?	The PDD /2/, the "Tool to calculate baseline, project and/or leakage emissions from electricity consumption" /13/ and ACM0001 (version 13.0.0) /7/ do not specify any accuracy requirement for the electricity meter installed at the project site. The accuracy range for the installed instrument is ±0.2%. Based on its sectoral expertise and experience with other similar project based initiative under the CDM promoting collection and destruction and/or utilization of LFG, it is EPIC opinion that the use of the installed instrument represents good practice for monitoring consumption by the project activity of electricity sourced by backup captive off-grid electricity generator (fuelled by diesel).
If applicable, has the reported monitoring data been cross-checked with other available data or source?	EPIC verification team has compared the records of consumption of diesel fuel by the installed backup captive off-grid electricity generator as reported in the summarized emission reduction calculation spreadsheet /5/ and Monitoring Report /3/ against records of the amount of electricity generated by such generator during the considered monitoring period. By taking into consideration the typical specific consumption of diesel per generated kWh by such generator (as informed in the specification sheet document for the generator), the EPIC verification team was able to confirm that reported values for $EC_{PJ,captive,y}$ = $EG_{Diesel-Generator,y}$ are deemed reasonable and correct.
How were the values in the Monitoring Report (and/or supporting documents, i.e emission reduction calculation spreadsheet) verified and/or compared?	The EPIC verification team has confirmed that values for the monitoring parameter $EC_{PJ,captive,y}$ = $EG_{Diesel-Generator,y}$ as reported in the summarized emission reduction calculation spreadsheet /5/ and Monitoring Report /3/ are as per the primary monitoring records.
Does the applied monitoring data management process (from monitoring equipment/instrument to emission reduction calculation) ensure correct recording, transfer and reporting of data to be used for the emission reductions calculations? Are necessary/applicable QA/QC processes in place?	Details for monitoring management and quality assurance related aspects for the project activity are also included in the end of this Section.

Assessment details for the monitoring parameter "Saturation pressure of H_2O at temperature T_t in time interval t" ($p_{H2O,t,sat}$):

Data / Parameter: (as per the monitoring plan from the registered PDD):	Saturation pressure of H_2O at temperature T_t in time interval *t* ($p_{H2O,t,sat}$)
Measuring, recording and reporting frequencies:	The determination of applicable value for the monitoring parameter $p_{H2O,t,sat}$ is not based on measurements. As correctly indicated in the Monitoring Report /3/, $p_{H2O,t,Sat}$ is determined as a function of the LFG temperature (T_t) and it is only used in the context of the determination of the methane mass flow in the residual gas (in a dry basis) for each minute *m* of the two time periods in year *y* during which the flare efficiency is measured (parameter $F_{CH4,RG,t}$).
Are measuring, recording and reporting frequencies in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Not applicable. The determination of applicable value for the monitoring parameter $p_{H2O,t,sat}$ is not based on measurements.
Type of monitoring equipment/instrument:	Not applicable. The determination of applicable value for the monitoring parameter $p_{H2O,t,sat}$ is not based on measurements.
Is the accuracy of the monitoring equipment/instrument as stated in the PDD? If the PDD does not specify the accuracy of the monitoring equipment/instrument, does the utilization of the monitoring equipment/instrument represents good monitoring practice?	Not applicable. The determination of applicable value for the monitoring parameter $p_{H2O,t,sat}$ is not based on measurements.
If applicable, has the reported monitoring data been cross-checked with other available data or source?	Not applicable.
How were the values in the Monitoring Report (and/or supporting documents, i.e emission reduction calculation spreadsheet) verified and/or compared?	EPIC verification team has confirmed that the values of $p_{H2O,t,sat}$ as reported in the FE calculation spreadsheet /5/ and Monitoring Report /3/ were indeed calculated as per the applicable guidance of the methodological tool "Tool to determine the mass flow of a greenhouse gas in a gaseous stream" (version 02.0.0) /14/, which refers to the literature "Fundamentals of Classical Thermodynamics" /87/.
Does the applied monitoring data management process (from monitoring equipment/instrument to emission reduction	Not applicable.

calculation) ensure correct recording, transfer and reporting of data to be used for the emission reductions calculations? Are necessary/applicable QA/QC processes in place?	

*Assessment details for the monitoring parameter "*Quantity of fuel diesel combusted by the captive off-grid electricity generator*" ($FC_{Diesel,y}$):*

Data / Parameter: (as per the monitoring plan from the registered PDD):	Quantity of fuel diesel combusted by the captive off-grid electricity generator ($FC_{Diesel,y}$)
Measuring, recording and reporting frequencies:	During the considered monitoring period, accumulated values of measurements of the monitoring parameter $FC_{Diesel,y}$ were aggregated and recorded/reported monthly by the staff of Essencis Soluções Ambientais S.A.
Are measuring, recording and reporting frequencies in accordance with the monitoring plan and monitoring methodology? (Yes / No)	As per the PDD [12], measurements of $FC_{Diesel,y}$ are to be monitored with a frequency not lower than once a month.
Type of monitoring equipment/instrument:	Monitoring records for $FC_{Diesel,y}$ are based on measurements made by a fuel meter with the specifications provided below. Specifications of the fuel meter used for measuring quantity of fuel diesel combusted by the captive off-grid electricity generator Manufacturer: Macnaught Pty Ltd. Model: DM100 Serial Number: N/A Accuracy: ±1% Source: [17]
Is the accuracy of the monitoring equipment/instrument as stated in the PDD? If the PDD does not specify the accuracy of the monitoring equipment/instrument, does the utilization of the monitoring equipment/instrument represents good monitoring practice?	The PDD [12] and ACM0001 (version 13.0.0) [7] do not specify any measurement requirement for monitoring consumption of fuel diesel. The accuracy for the installed scale is ±1%. Based on its sectoral expertise and experience with other similar project based initiative under the CDM promoting collection and destruction and/or utilization of LFG, it is EPIC opinion that the use of the installed instrument represents good practice for monitoring consumption by the project activity of electricity sourced by backup captive off-grid electricity generator (fuelled by diesel).
If applicable, has the reported monitoring data been cross-checked with other available data or	EPIC verification team has compared the records of consumption of diesel fuel by the installed backup captive off-grid electricity generator as reported in the summarized

source?	emission reduction calculation spreadsheet [5] and Monitoring Report [3] against records of the amount of electricity generated by such generator during the considered monitoring period. By taking into consideration the typical specific consumption of diesel per generated kWh by such generator (as informed in the specification sheet document for the generator), the EPIC verification team was able to confirm that reported values for $FC_{Diesel,y}$ are deemed reasonable and correct.
How were the values in the Monitoring Report (and/or supporting documents, i.e emission reduction calculation spreadsheet) verified and/or compared?	EPIC verification team has confirmed that values for $FC_{Diesel,y}$ as reported in the summarized emission reduction calculation spreadsheet [5] and Monitoring Report [3] are in accordance with provided evidences of primary records [60] [76].
Does the applied monitoring data management process (from monitoring equipment/instrument to emission reduction calculation) ensure correct recording, transfer and reporting of data to be used for the emission reductions calculations? Are necessary/applicable QA/QC processes in place?	Details for monitoring management and quality assurance related aspects for the project activity are also included in the end of this Section.

Assessment details for the monitoring parameter "Net calorific value of the fuel Diesel in year y" ($NCV_{Diesel,y}$):

Data / Parameter: (as per the monitoring plan from the registered PDD):	Net calorific value of the fuel Diesel in year y ($NCV_{Diesel,y}$)
Measuring, recording and reporting frequencies:	Not applicable. The selected value for $NCV_{Diesel,y}$ (43.3 TJ/ton_{Diesel}) corresponds to the default value as per the IPCC Guidelines for National Greenhouse Gas Inventories, 2006 (IPCC, 2006), Chapter 1, Volume 2, Table 1.2 (value at the upper limit of the uncertainty at 95% confidence interval) [11]. The determination of $NCV_{Diesel,y}$ is in accordance with applicable guidance of the methodological tool "Tool to calculate project or leakage CO_2 emissions from fossil fuel combustion" [15]. No measurement or calculation was performed in the context of the determination of the parameter $NCV_{Diesel,y}$ and no monitoring equipment/instrument was used either.
Are measuring, recording and reporting frequencies in accordance with the monitoring plan and monitoring methodology? (Yes / No)	As per the PDD [2], "*(…) In case regional or national default values or IPCC default values are considered an every year monitoring frequency is applied."* The adopted monitoring frequency (annual national default value) is thus in accordance with the registered PDD [2].
Type of monitoring	Not applicable. No measuring instrument was

equipment/instrument:	used for determining the value of the parameter during the considered monitoring period.
Is the accuracy of the monitoring equipment/instrument as stated in the PDD? If the PDD does not specify the accuracy of the monitoring equipment/instrument, does the utilization of the monitoring equipment/instrument represents good monitoring practice?	Not applicable. No measuring instrument was used for determining the value of the parameter during the considered monitoring period.
If applicable, has the reported monitoring data been cross-checked with other available data or source?	In order to confirm that the selected value for $NCV_{Diesel,y}$ indeed corresponds to the default value as per the IPCC Guidelines for National Greenhouse Gas Inventories, 2006, Volume 2, Chapter 1, Table 1.2 /11/ (value at the upper limit of the uncertainty at 95% confidence interval), the EPIC Assessment Team assessed these IPCC guidelines. Moreover, as part of its verification assessment, the EPIC verification team also confirms that the determination of $NCV_{Diesel,y}$ is indeed in accordance with applicable guidance of the methodological tool "Tool to calculate project or leakage CO_2 emissions from fossil fuel combustion" /15/.
How were the values in the Monitoring Report (and/or supporting documents, i.e emission reduction calculation spreadsheet) verified and/or compared?	See above.
Does the applied monitoring data management process (from monitoring equipment/instrument to emission reduction calculation) ensure correct recording, transfer and reporting of data to be used for the emission reductions calculations? Are necessary/applicable QA/QC processes in place?	Not applicable.

Assessment details for the monitoring parameter "CO_2 emission factor of fuel diesel in year y" ($EF_{CO2,Diesel,y}$):

Data / Parameter: (as per the monitoring plan from the registered PDD):	CO_2 emission factor of fuel diesel in year *y* ($EF_{CO2,Diesel,y}$)
Measuring, recording and reporting frequencies:	Not applicable. The value for the monitoring parameter $EF_{CO2,Diesel,y}$ is selected as 74,800 tCO_2/GJ which corresponds to the default value as per the IPCC Guidelines for National Greenhouse Gas Inventories, 2006 (IPCC,

		2006), Chapter 1, Volume 2, Table 1.4 (value at the upper limit of the uncertainty at 95% confidence interval) /11/. The determination of $EF_{CO2,Diesel,y}$ is in accordance with applicable guidance of the methodological tool "Tool to calculate project or leakage CO_2 emissions from fossil fuel combustion" /15/. No measurement or calculation was performed in the context of the determination of the parameter $EF_{CO2,Diesel,y}$ and no monitoring equipment/instrument was used either.
	Are measuring, recording and reporting frequencies in accordance with the monitoring plan and monitoring methodology? (Yes / No)	As per the registered PDD /2/, "*(…) In case regional or national default values or IPCC default values are considered an every year monitoring frequency is applied.*". The adopted monitoring frequency (annual IPCC default value) is thus in accordance with the registered PDD /2/.
	Type of monitoring equipment/instrument:	Not applicable. No measuring instrument was used for determining the value of the parameter during the considered monitoring period.
	Is the accuracy of the monitoring equipment/instrument as stated in the PDD? If the PDD does not specify the accuracy of the monitoring equipment/instrument, does the utilization of the monitoring equipment/instrument represents good monitoring practice?	Not applicable. No measuring instrument was used for determining the value of the parameter during the considered monitoring period.
	If applicable, has the reported monitoring data been cross-checked with other available data or source?	In order to confirm that the selected value for $EF_{CO2,Diesel,y}$ indeed corresponds to the default value as per the IPCC Guidelines for National Greenhouse Gas Inventories, 2006, Volume 2, Chapter 1, Table 1.4 /11/ (value at the upper limit of the uncertainty at 95% confidence interval), the EPIC Assessment Team assessed these IPCC guidelines. Moreover, as part of its verification assessment, the EPIC verification team also confirms that the determination of $EF_{CO2,Diesel,y}$ is indeed in accordance with applicable guidance of the methodological tool "Tool to calculate project or leakage CO_2 emissions from fossil fuel combustion" /15/.
	How were the values in the Monitoring Report (and/or supporting documents, i.e emission reduction calculation spreadsheet) verified and/or compared?	See above.
	Does the applied monitoring data management process (from monitoring equipment/instrument to emission reduction	Not applicable.

calculation) ensure correct recording, transfer and reporting of data to be used for the emission reductions calculations? Are necessary/applicable QA/QC processes in place?	

Assessment details for the monitoring parameter "Average technical transmission and distribution losses for providing electricity to the grid and/or for grid sourced electricity consumed by the project activity" ($TDL_{grid,y}$):

Data / Parameter: (as per the monitoring plan from the registered PDD):	Average technical transmission and distribution losses for providing electricity to the grid and/or for grid sourced electricity consumed by the project activity ($TDL_{grid,y}$)
Measuring, recording and reporting frequencies:	Not applicable. The value for the monitoring parameter $TDL_{grid,y}$ is selected as 20% which corresponds to the applicable default value as per Option C.III of the methodological tool "Tool to calculate baseline, project and/or leakage emissions from electricity consumption" (version 01) /13/. The determination of $TDL_{grid,y}$ is confirmed as being under conformance with applicable guidance of the methodological tool "Tool to calculate baseline, project and/or leakage emissions from electricity consumption" (version 01) /13/. No measurement was performed in the context of the determination of the parameter $TDL_{grid,y}$ and no monitoring equipment/instrument was used either.
Are measuring, recording and reporting frequencies in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Default value as per Option C.III of the methodological tool "Tool to calculate baseline, project and/or leakage emissions from electricity consumption" (version 01) /13/ is considered, an every year monitoring frequency is thus assumed as being applied. This is confirmed as being under conformance with the registered PDD /2/.
Type of monitoring equipment/instrument:	Not applicable. No measuring instrument was used for determining the value of the parameter during the considered monitoring period.
Is the accuracy of the monitoring equipment/instrument as stated in the PDD? If the PDD does not specify the accuracy of the monitoring equipment/instrument, does the utilization of the monitoring equipment/instrument represents good monitoring practice?	Not applicable. No measuring instrument was used for determining the value of the parameter during the considered monitoring period.
If applicable, has the reported monitoring data been cross-checked with other available data or	In order to confirm that the selected value for $TDL_{grid,y}$ indeed corresponds to the default value as per Option C.III of the "Tool to calculate baseline, project and/or leakage emissions from

source?	electricity consumption" (version 01) /13/, the EPIC verification team reviewed the provisions of such methodological tool.
How were the values in the Monitoring Report (and/or supporting documents, i.e emission reduction calculation spreadsheet) verified and/or compared?	See above.
Does the applied monitoring data management process (from monitoring equipment/instrument to emission reduction calculation) ensure correct recording, transfer and reporting of data to be used for the emission reductions calculations? Are necessary/applicable QA/QC processes in place?	Not applicable.

Assessment details for the monitoring parameter "Average technical transmission and distribution losses for electricity sourced by the captive electricity generator " ($TDL_{captive,y}$):

Data / Parameter: (as per the monitoring plan from the registered PDD):	Average technical transmission and distribution losses for electricity sourced by the captive electricity generator ($TDL_{captive,y}$)
Measuring, recording and reporting frequencies:	Not applicable. The value for the monitoring parameter $TDL_{captive,y}$ is selected as 20% which corresponds to the applicable default value as per Option C.III of the methodological tool "Tool to calculate baseline, project and/or leakage emissions from electricity consumption" (version 01) /13/. The determination of $TDL_{captive,y}$ is confirmed as being under conformance with applicable guidance of the methodological tool "Tool to calculate baseline, project and/or leakage emissions from electricity consumption" (version 01) /13/. No measurement was performed in the context of the determination of the parameter $TDL_{captive,y}$ and no monitoring equipment/instrument was used either.
Are measuring, recording and reporting frequencies in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Default value as per Option C.III of the methodological tool "Tool to calculate baseline, project and/or leakage emissions from electricity consumption" (version 01) /13/ is considered, an every year monitoring frequency is thus assumed as being applied. This is confirmed as being under conformance with the registered PDD /2/.
Type of monitoring equipment/instrument:	Not applicable. No measuring instrument was used for determining the value of the parameter during the considered monitoring period.
Is the accuracy of the	Not applicable. No measuring instrument was

	monitoring equipment/instrument as stated in the PDD? If the PDD does not specify the accuracy of the monitoring equipment/instrument, does the utilization of the monitoring equipment/instrument represents good monitoring practice?	used for determining the value of the parameter during the considered monitoring period.
	If applicable, has the reported monitoring data been cross-checked with other available data or source?	In order to confirm that the selected value for $TDL_{captive,y}$ indeed corresponds to the default value as per Option C.III of the "Tool to calculate baseline, project and/or leakage emissions from electricity consumption" (version 01) /13/, the EPIC verification team reviewed the provisions of such methodological tool.
	How were the values in the Monitoring Report (and/or supporting documents, i.e emission reduction calculation spreadsheet) verified and/or compared?	See above.
	Does the applied monitoring data management process (from monitoring equipment/instrument to emission reduction calculation) ensure correct recording, transfer and reporting of data to be used for the emission reductions calculations? Are necessary/applicable QA/QC processes in place?	Not applicable.

It is important to note that the monitoring plan from the registered PDD /2/ also includes the following monitoring parameters of which monitoring was not required during the considered monitoring period since the methodological options for which they are applicable were not selected during the considered monitoring period[6].

[6] While, as reported in the Monitoring Report /3/, Option C of the methodological tool "Tool to determine the mass flow of a greenhouse gas in a gaseous stream" (version 02.0.0) was selected for the determination of both "Amount of methane which is destroyed through combustion of collected LFG in the flares" ($F_{CH4,flared,y}$) and "Amount of methane which is destroyed through combustion of collected LFG in the internal combustion gas engines" ($F_{CH4,EL,y}$) during the considered monitoring period, it is important to note the following:

- $V_{t,db}$ was not monitored as Option A of the methodological tool "Tool to determine the mass flow of a greenhouse gas in a gaseous stream" (version 02.0.0) was not selected.
- $v_{CH4,t,db}$ was not monitored as Options A and D of the methodological tool "Tool to determine the mass flow of a greenhouse gas in a gaseous stream" (version 02.0.0) was not selected.
- $M_{t,db}$ was not monitored as Option D of the methodological tool "Tool to determine the mass flow of a greenhouse gas in a gaseous stream" (version 02.0.0) was not selected.

Moreover, as also reported in the Monitoring Report /3/, the determination of values for flare efficiency ($\eta_{flare,m} = \eta_{flare,calc,y}$) for the considered monitoring period was based on calculated based on the application of default values as per Option A (application of default value for flare efficiency) of the methodological tool "Project emissions from flaring" (version 02.0.0). Thus, no monitoring records for the parameter $F_{CH4,EG,t}$ re considered during the considered monitoring period.

Parameter not monitored during the considered monitoring period
Volumetric flow of LFG stream in time interval *t* on a dry basis ($V_{t,db}$)
Volumetric fraction of CH_4 in the collected LFG in time interval *t* on a dry basis ($v_{CH4,t,db}$)
Mass flow of the LFG stream in time interval *t* on dry basis ($M_{t,db}$)

Assessment of handling of records for both parameters monitored ex-post and ex-ante determined parameters in the context of determination of achieved emission reductions:

As part of the applied monitoring procedure, measurements for the following LFG related monitoring parameters were automatically processed by the project's Programmable Logic Controller (PLC) units and recorded in a customized database with a data recording/reporting frequency of every one minute:

- Volumetric flow of LFG stream in time interval *t* on a wet basis ($V_{t,wb}$) (sub-parameters $V_{t,wb,flare-1}$, $V_{t,wb,flare-2}$, $V_{t,wb,flare-3}$ and $V_{t,wb,flare-4}$ + $V_{t,wb,engine-1}$, $V_{t,wb,engine-2}$, (…), $V_{t,wb,engine-21}$)
- Volumetric fraction of CH_4 in the collected LFG in time interval *t* on a wet basis ($v_{CH4,t,wb}$),
- Temperature of the LFG stream in time interval *t* (T_t) (sub-parameters $T_{t,flares}$, $T_{t,engine-1}$, $T_{t,engine-2}$, (…), $T_{t,engine-21}$)
- Pressure of the LFG stream in time interval *t* (P_t) (sub-parameters $P_{t,flares}$, $P_{t,engine-1}$, $P_{t,engine-2}$, (…), $P_{t,engine-21}$)
- Temperature in the exhaust gas of the enclosed flare in minute *m* ($T_{EG,m}$) (sub-parameters $T_{EG,m,flare-1}$, $T_{EG,m,flare-2}$, $T_{EG,m,flare-3}$ and $T_{EG,m,flare-4}$)
- Flame detection of flare in the minute *m* ($Flame_m$) (sub-parameters $Flame_{m,flare-1}$, $Flame_{m,flare-2,}$ $Flame_{m,flare-3}$ and $Flame_{m,flare-4}$)
- Operation of the equipment that consumes LFG (i.e. internal combustion gas engines ($Op_{j,h}$) (sub-parameters $Op_{engine-1,h}$, $Op_{engine-2,h}$, (…),$Op_{engine-21,h}$)

As confirmed by the EPIC verification team, the project's customized database for project monitoring records is directly connected to the project's data supervisor system. As per the operational of the customized project's data supervisor platform, data files are generated every week (with summarized files being registered in the end of each month) as follows:

- a MS-Excel format spreadsheet file /6/ with every one-minute values for the following monitoring parameters:
- $V_{t,wb}$ (sub-parameters $V_{t,wb,flare-1}$, $V_{t,wb,flare-2}$, $V_{t,wb,flare-3}$ and $V_{t,wb,flare-4}$, + + $V_{t,wb,engine-1}$, $V_{t,wb,engine-2}$, (…), $V_{t,wb,engine-21}$));
- $v_{CH4,t,wb}$;
- T_t (sub-parameters $T_{t,flares}$, $T_{t,engine-1}$, $T_{t,engine-2}$, (…), $T_{t,engine-21}$);
- P_t (sub-parameters $P_{t,flares}$, $P_{t,engine-1}$, $P_{t,engine-2}$, (…), $P_{t,engine-21}$),
- $T_{EG,m}$ (sub- parameters $T_{EG,m,flare-1}$, $T_{EG,m,flare-2}$, $T_{EG,m,flare-3}$ and $T_{EG,m,flare-4}$)
- $Flame_m$ (sub-parameters $Flame_{m,flare-1}$, $Flame_{m,flare-2}$, $Flame_{m,flare-3}$ and $Flame_{m,flare-4}$);
- $Op_{j,h}$ (sub-parameters $Op_{engine-1,h}$, $Op_{engine-2,h}$, (…), $Op_{engine-21,h}$)

It is EPIC opinion that the construction and design of the project's data supervisor system and the project's database for monitoring records represent good practice in terms of data acquisition and data archiving solutions. EPIC was also able to verify that a reliable and robust monitoring mechanism was established, implemented and has been systematically followed by Essencis Soluções Ambientais S.A.

Data transmission, data export/conversion and creation of "raw data" input files for the emission reduction calculations:

As a result of the performed assessment by the EPIC verification team of the applicable working procedures implemented and documented by the project participant Essencis Soluções Ambientais S.A., datasets with values of the measured records for all above-summarized monitoring parameters are regularly retrieved from the project's database storing monitoring records through the available user interface of the project's data supervisor system.

At regular time intervals, the monitoring manager for the project activity exports/converts data retrieved from the project's database for monitoring records into MS-Excel-format (thus generating ".xls" files) by applying data retrieval/export functionality of the project's data supervisor system.

As also confirmed by the EPIC verification team, through direct application of the implemented project's monitoring procedure, 6 monthly generated MS-Excel format "raw-data" files /6/ (resulted from regular data exports) were thus generated for the considered monitoring period encompassing 6 months and were used as primary monitoring input data (raw data) for performing all emission reduction calculations for such period.

As confirmed by the EPIC verification team, as per the adopted work procedures, a set of 6 monthly "raw-data" MS-Excel-format files were thus generated for the considered monitoring period. For the particular case of the considered monitoring period, the set of 6 MS-Excel "raw-data" files /6/ were used as primary data input for the compilation of 6 calculation spreadsheets with flow of LFG sent to each gas engine in normalized values + 6 monthly emission reduction calculation spreadsheets valid for the considered monitoring period as follows:

Period	File Names
January/2018	*"jan-18.xls"*
February/2018	*"feb-18.xls"*
March/2018	*"mar-18.xls"*
April/2018	*"apr-18.xls"*
May/2018	*"may-18.xls"*
June/2018	*"jun-18.xls"*

The set of 6 generated MS-Excel-format "raw-data" files /6/ were made available and assessed by EPIC verification team.

All 6 monthly raw data files contains, for each minute of the considered monitoring period, historical monitoring records for LFG flow sent to each one of the 4 installed flares, LFG flow to each one of the installed 21 internal combustion gas engines, pressure of LFG sent to the flares, pressure of LFG sent to each one of the 21 gas engines, temperature of LFG to the flares, temperature of LFG sent to each one of the 21 gas engines, CH_4 content of LFG sent to the flares and gas engines, temperature of the exhaust gas of the flares, flame status of each flare and operational status of each gas engine.

As verified by EPIC, while for each individual MS-Excel format "raw-data" spreadsheet file /6/, the number of records exceeds 42,000 rows for a full month period. It is crucial to note that when generating such files in MS-Excel format, data could be eventually intentionally or unintentionally edited/modified. Thus, in order to ensure that only authentic (not edited /not modified) "raw data" were used as a basis for the emission reduction calculations, a systematic *data authenticity*

checking was performed by the EPIC verification team for all the monitored data as described and assessed below under the sub-section "*Data authenticity checking".*

As assessed by the EPIC verification team, as part of the applied project's monitoring procedure, every-minute measurement records of the above-summarized monitoring parameters parameter, as presented in the raw-data files, were appropriately used as input data for the compilation of the 6 calculation spreadsheets with flow of LFG sent to each gas engine in normalized values + 6 monthly emission reduction calculation spreadsheets valid for the considered monitoring period.

As per the applied monitoring procedure and in accordance with the requirements of ACM0001 (version 13.0.0) [7] and related provisions of the registered PDD, GHG emission reductions are calculated based on measurement records and selected default values of the *ex-post* monitored parameters (of which monitoring details are presented in the tables above) and also using the values for the ex-ante determined parameter as presented below:

Parameter	Value		
Fraction of methane that would be oxidized in the top layer of the SWDS in the baseline ($OX_{top\ layer}$)	0.1		
Global Warming Potential of CH_4 (GWP_{CH4})	25 tCO_2e/tCH_4		
Universal ideal gases constant (R_u)	8,314 $Pa.m^3/kmol.K$		
Molecular mass of gas *k* (MM_k) (For the particular case of the project activity, $k = N_2$)	28.01 kg/kmol		
Molecular mass of greenhouse gas *I* (MM_i) (For the particular case of the project activity, $i = CH_4$)	16.04 kg/kmol		
Total pressure at normal conditions (P_n)	101,325 Pa		
Temperature at normal conditions (T_n)	273.15 K		
Molecular mass of water (MM_{H2O})	18.0152 kg/kmol		
Average technical transmission and distribution losses for grid sourced electricity consumed by the project activity ($TDL_{grid,y}$)	20%		
Weighting of build margin emissions factor (w_{BM})	75%		
Weighting of operating margin emissions factor (w_{OM})	25%		
Build margin CO2 emission factor in year *y* ($EF_{grid,BM,y}$)	0.2010 tCO_2/MWh		
Manufacturer's flare specifications for temperature, flow rate and maintenance schedule interval ($SPEC_{flare}$)	$SPEC_{flare,\ Flare\ 1}$ $SPEC_{flare,\ Flare\ 2}$ $SPEC_{flare,\ Flare\ 3}$ $SPEC_{flare,\ Flare\ 4}$	Min.	Max.

Operational LFG flow for each flare (for continuous operation)	650 Nm^3/h	7,500 Nm^3/h
Required temperature of the exhaust gas of the flare (to ensure LFG destruction (combustion) under high CH_4 destruction efficiency):	500 °C	1,200 °C
Required minimum frequency for inspection and maintenance service in each flare (incl. inspection in the conditions of the flare isolation ceramics revetment material):	Min. every 6 months	
Required/recommended minimum frequency for replacement of the flare isolation ceramics revetment material in each flare:	after 10 years of regular and appropriate operation	

It is noteworthy that values of the fixed parameters indicated in the table above were selected ex-ante in the registered PDD [/2/].

As appropriately outlined in the Monitoring Report [/2/] and confirmed by the EPIC verification team, while for the particular case of the set of 21 identical LFG flow meters (used for continuously measuring the flow of LFG sent to each one of the 21 internal combustion gas engines), the design and functioning of such instruments do not allow measurements being automatically converted into normal cubic meter per hour (Nm^3/h), Thus, measurements of LFG pressure and LFG temperature (monitoring parameters "Temperature of the LFG stream in time interval *t*" (T_t) and "Pressure of the LFG stream in time interval t" (P_t) respectively) are thus considered for converting measurements of $V_{t,wb,engine-n}$ (where engine-n = engine-1, engine-2, (…), engine-21) into normalized values. For the considered monitoring period, such calculations are made in a set of 6 calculation spreadsheets.

Baseline emissions for each one of the 6 months of the monitoring period were partially calculated through application of the *blank* version of the spreadsheet template that is developed by the project participant Essencis Soluções Ambientais S.A. and termed "monthly emission reduction calculation spreadsheet template" [/23/]. This calculation spreadsheet template uses the following data/information as input data for the determination of every-minute and accumulated monthly values for the calculation parameters "Amount of methane in the LFG which is flared and/or used in the project activity" ($F_{CH4,PJ,y}$) and "Amount of methane in the LFG that would be flared in the baseline scenario (absence of project activity)" ($F_{CH4,BL,y}$):

- Monitoring records included in the 6 MS-Excel format "raw-data" spreadsheet files [/6/] valid for the monitoring period
- Calculated values for flow of LFG sent to each one of the 21 internal combustion gas engines (in normalized/standard conditions for pressure and temperature)
- the *ex-ante* determined parameters presented in the table above

- the calculated values of Flare efficiency (parameter $\eta_{flare,calc,m}$)

It is noteworthy that the calculations for the determination of the applicable values for the monitoring parameter Flare efficiency ($\eta_{flare,calc,y}$) are performed in a separate calculation spreadsheet termed "*FE calculation spreadsheet*" (file name "*MR 17 - Caieiras - V.2 - FE.xls*" /5/). Further assessment for the determination of $\eta_{flare,calc,m}$ is presented on Section E.8.1.

For the monitoring period from 01/01/2018 to 30/06/2018 encompassing 6 months of year 2017, 6 monthly calculation spreadsheets /5/ were thus generated as a result of the use of the spreadsheet template for each individual month encompassed by the considered monitoring period. Each one of the elaborated 6 monthly emission reduction calculation spreadsheet files /5/ aggregates (reports) the following recorded/calculated monitoring data on an every-minute recording/reporting frequency (folder "Output"):

- Volumetric flow of LFG stream in time interval *t* on a wet basis ($V_{t,wb}$) (sub-parameters $V_{t,wb,flare-1}$, $V_{t,wb,flare-2}$, $V_{t,wb,flare-3}$ + $V_{t,wb,flare-4}$) + calculated normalized values for flow of LFG sent to the gas engines (i.e. $V_{t,wb,n,engine-1}$, $V_{t,wb,n,engine-2}$, (…), $V_{t,wb,n,engine-21}$)

- Methane fraction in the LFG (monitoring parameter "Volumetric fraction of CH_4 in the collected LFG in time interval *t* on a wet basis" ($v_{CH4,t,wb}$))

- Temperature of the LFG stream in time interval *t* (T_t) (sub-parameters $T_{t,flares}$, $T_{t,engine-1}$, $T_{t,engine-2}$, (…), $T_{t,engine-21}$)

- Pressure of the LFG stream in time interval *t* (P_t) (sub-parameters $P_{t,flares}$, $P_{t,engine-1}$, $P_{t,engine-2}$, (…), $P_{t,engine-21}$)

- Temperature in the exhaust gas of the enclosed flare in minute *m* ($T_{EG,m}$) (sub-parameters $T_{EG,m,flare-1}$, $T_{EG,m,flare-2}$, $T_{EG,m,flare-3}$ and $T_{EG,m,flare-4}$)

- Flame detection of flare in the minute *m* ($Flame_m$) (sub-parameters $Flame_{m,flare-1}$, $Flame_{m,flare-2,}$ $Flame_{m,flare-3}$ and $Flame_{m,flare-4}$)

- Operation of the equipment that consumes LFG (i.e. internal combustion gas engines ($Op_{j,h}$) (sub-parameters $Op_{engine-1,h}$, $Op_{engine-2,h}$, (…), $Op_{engine-21,h}$)

An additional calculation spreadsheet (termed "Summarized emission reduction calculation spreadsheet") (file name "*MR 17 - Caieiras - V.2.xls*") /5/ correctly summarizes the achieved baseline emissions due to destruction of methane by the project activity during the considered monitoring period (by summing the accumulated monthly values for the calculation parameters $F_{CH4,PJ,y}$ and also summing the accumulated monthly values for the calculation parameters $F_{CH4,BL,y}$ from each one of the monthly emission reduction calculation spreadsheets valid for the considered monitoring period /5/). Further assessment details about the calculation of baseline emissions are included in Section E.8.1.

Project emissions due to consumption of both LPG and grid-sourced electricity by the project activity are also calculated in the summarized emission reduction calculation spreadsheet /5/ on the basis of monitoring records (input data) for (i) monitoring parameters that are not automatically recorded/reported by the project's PLC unit (Amount of grid electricity consumed by the project activity in the year *y* ($EC_{PJ,grid,y}$), Operation margin CO_2 emission factor in year *y* = Dispatch data analysis operating margin CO_2 emission factor in year *y* ($EF_{grid,OM,y}$ = $EF_{grid,OM-DD,y}$), Quantity of LPG consumed by the project activity in year *y* ($FC_{LPG,y}$), Net calorific value of the fuel LPG ($NCV_{LPG,y}$) and CO_2 emission factor of fuel LPG in year *y* ($EF_{CO2,LPG,y}$)) and (ii) related *ex-ante* determined parameters (Average technical transmission and distribution losses for grid sourced electricity consumed by the project activity ($TDL_{grid,y}$), Weighting of build margin emissions factor (w_{BM}), Weighting of operating margin emissions factor (w_{OM}) and Build margin CO_2 emission factor in year *y* ($EF_{grid,BM,y}$)). Further assessment details about the

calculation of project emissions are included in Section E.8.2.

The sets of 6 MS-Excel-format monthly calculation spreadsheet for normalized values of flow of LFG sent to the gas engines + 6 MS-Excel-format monthly emission reduction calculation spreadsheets files /5/ and the summarized emission reduction calculation spreadsheet /5/ were all made available and assessed by the EPIC verification team.

The EPIC verification team was able to confirm that 6 MS-Excel-format monthly calculation spreadsheet for normalized values of flow of LFG sent to the gas engines /5/ correctly convert measurement records of $V_{t,wb,engine-n}$ (where engine-n = engine-1, engine-2, (…), engine-21) into normalized values by correctly considering monitoring records for the sub-parameters $T_{t,engine-1}$, $T_{t,engine-2}$, (…),$T_{t,engine-21}$ and $P_{t,engine-1}$, $P_{t,engine-2}$, (…), $P_{t,engine-21}$ and by applying applicable methodological guidance for performing such calculations as further assessed in Section E.8.

While the EPIC verification team was able to confirm that such 6 monthly emission reduction spreadsheets /5/ correctly calculate and report the accumulated values of the calculation parameters "Amount of methane in the LFG which is flared and/or used in the project activity" ($F_{CH4,PJ,y}$) and "Amount of methane in the LFG that would be flared in the baseline scenario (absence of project activity)" ($F_{CH4,BL,y}$) for each individual month encompassed by the considered monitoring period, the summarized emission reduction calculation spreadsheet /5/ correctly summarizes the emission reductions for the whole monitoring period (by correctly considering selected accumulated values of $F_{CH4,PJ,y}$ and $F_{CH4,BL,y}$ from the 6 monthly emission reduction spreadsheets /5/ + *ex-ante* determined parameters as input data + monitoring records for the monitoring parameters which are not automatically recorded/reported by the project's PLC unit).

In summary, the EPIC verification team was able to confirm that calculations of baseline emissions and project emissions were correctly performed as per the formulae and methods stated in the registered PDD /2/, monitoring methodology and applicable tools /12/ /13/ /14/ /15/ as described and assessed in Section E.8.

All calculations are thus confirmed by the EPIC verification team to be under conformance with applicable requirements from:

- CDM baseline and monitoring methodology ACM0001 – "Flaring or use of landfill gas" (version 13.0.0) /7/,
- "Tool to calculate baseline, project and/or leakage CO_2 emissions from fossil fuel combustion" (version 02) /15/,
- "Tool to calculate baseline, project and/or leakage emissions from electricity consumption" (version 01) /13/,
- "Tool to calculate the emission factor for an electricity system" (versions 04.0 /16/),
- "Project emissions from flaring" (version 02.0.0) /12/,
- "Tool to determine the mass flow of a greenhouse gas in a gaseous stream" (version 02.0.0) /14/,
- Monitoring plan of from the registered PDD /2/.

The table below presents the reported results of the generated 6 monthly emission reduction spreadsheets and the summarized emission reduction calculation spreadsheet:

File name for the monthly emission reduction calculation spreadsheets	Period	Reported amount of methane flared ($F_{CH4,PJ,y}$)

"012018.xlsb"	01/01/2018 - 31/01/2018	5,393 tCH_4
"022018.xlsb"	01/02/2018 - 28/02/2018	4,660 tCH_4
"032018.xlsb"	01/03/2018 - 31/03/2018	4,952 tCH_4
"042018.xlsb"	01/04/2018 - 30/04/2018	4,397 tCH_4
"052018.xlsb"	01/05/2018 - 31/05/2018	3,967 tCH_4
"062018.xlsb"	01/06/2018 - 30/06/2018	3,573 tCH_4
"MR 17 - Caieiras - V.2.xls" (Summarized emission reduction calculation spreadsheet for the whole monitoring period)	From 01/01/2018 to 30/06/2018	26,942 tCH_4

As verified by the EPIC verification team, while the number of records exceeds 42,000 rows in for each one of MS-Excel format monthly emission reduction calculation spreadsheets valid for the considered monitoring period /5/, it is crucial to note that, as earlier highlighted in this section, when generating the "raw-data" spreadsheet files (which are used as primary input data for each one of the 6 monthly emission reduction spreadsheets /5/), data could be eventually intentionally or unintentionally edited/modified (by using MS-Excel application). Thus, in order to ensure that only authentic (not edited /not modified) data were used as a basis for the emission reduction calculations, a systematic *data authenticity checking* was performed by the EPIC verification team for all the monitored data as detailed below under the sub-section "*Data authenticity checking".*

Monitoring Management and Quality Assurance:
The EPIC verification team was able to confirm that quality control and quality assurance (QA/QC) procedures are implemented by the project participant and project operator Essencis Soluções Ambientais S.A. for preventing or identifying and correct eventual errors or omissions in the reported monitoring parameters.

As verified by the EPIC verification team, competent and sufficiently trained staff are recruited for operating the project activity and handling related monitoring data. Such employees are found with knowledge not only about the operation of the project activity, but also with sufficient knowledge and competence to ensure the application of all related QA/QC procedures for data recording and storage.

Furthermore, for the 17th periodic verification, the host-country project participant and project operator Essencis Soluções Ambientais S.A. was also supported with consultancy and advisory services in CDM and LFG management related issues by the consultancy service company named UniCarbo Energia e Biogás Ltda. As confirmed by the EPIC verification team, the technical team from UniCarbo Energia e Biogás Ltda. has contributed for the development of related documentation (e.g. Monitoring Report /3/ and emission reduction calculation spreadsheets /5/) and also supported Essencis Soluções Ambientais for addressing all raised outstanding issues (raised CARs).

As also assessed by the EPIC verification team, the project activity has been operated by sufficiently trained staff by correctly following guidance and instructions of internal documented working procedures and with high quality technical support from external CDM and LFG management consultants.

As confirmed by the EPIC verification team, the applied procedures for data collection, data reporting, performance of calibration events and other aspects related to the applied procedures for determining the emission reductions are systematically implemented and have been appropriately followed by the host-country project participant and project operator Essencis Soluções Ambientais S.A. During the conducted on-site visit to the project site, the EPIC verification team was

also able to verify that the operational structure of the project activity is also in line with the information made available in the registered PDD /2/ and in the Monitoring Report /3/. In summary, EPIC was also able to verify that detailed management and operational work procedures are in place and confirmed that an operational structure for the project activity is established with responsibilities clearly identified. Moreover trained staff is employed to ensure data quality.

Data authenticity checking:
As part of the performed verification assessment, the EPIC verification team was able to confirm that the 6 MS-Excel-format monthly calculation spreadsheet for normalized values of flow of LFG sent to the gas engines /5/ as well as the 6 monthly emission reduction calculation spreadsheets /5/ completed by Essencis Soluções Ambientais S.A. are all basically MS-Excel spreadsheets that, in theory, could have recorded data being easily edited/modified (intentionally or unintentionally). Thus, these spreadsheets, if inappropriately edited, could potentially tamper reported monitoring records, thus resulting in unreal and incorrect calculation and reporting of emission reductions achieved by the project activity during the considered monitoring period. In order to ensure that all emission reductions calculations are entirely and correctly based on authentic and real monitoring records valid for the considered monitoring period, a *data authentic check* was performed as part of the verification assessment.

Such checking aimed to ensure that only authentic and unmodified monitoring data records were used by the host-country project participant Essencis Soluções Ambientais S.A. for performing the emission reduction calculation for the considered monitoring period (thus ensuring that measurement records made available in the MS-Excel format "raw data" input files /6/ , in the 6 MS-Excel-format monthly calculation spreadsheet for normalized values of flow of LFG sent to the gas engines /5/ and measurement records reported in the 6 monthly emission reduction spreadsheets /5/ were not intentionally or unintentionally edited/modified during the generation or handling of these files).

The performed *data authenticity checking* involved the following steps:

STEP 1: Assessment and handling of the measurement data:
While each monthly MS-Excel format raw data contains identical every-minute LFG related monitoring records for the whole month period encompassed by the considered monitoring period, the EPIC verification team has retrieved from the project's data supervisor system a set of comparative files in MS-Excel format (with primary data inputs from the project's data supervisor system). These comparative files were termed by the EPIC verification team as "*raw-data for checking*" files /22/.

STEP 2: Re-calculation of emission reductions:
By using the set of 6 MS-Excel format "*raw-data for checking*" comparative files /22/ (that were generated under STEP 1) as input data, the procedure for emission reductions calculation for the whole monitoring period was reproduced by the EPIC verification team for all 6 months encompassed by the considered monitoring period. The content of the "*raw-data for checking*" comparative files /22/ was used as input data for the compilation of the set of the 6 comparative monthly calculation spreadsheet for normalized values of flow of LFG sent to the gas engines /5/ + 6 comparative monthly emission reduction calculation spreadsheets /21/ by applying a *blank* versions of both the calculation spreadsheet for normalized LFG flow values and the emission reduction calculation spreadsheet that were both made available by the project participant. Moreover, correct values for the applicable *ex-ante* determined parameters were also inserted in the *blank* version of the emission reduction calculation spreadsheet /5/ as input data. As a result of this step, a set of 6 comparative monthly emission reduction spreadsheets /21/ was thus created.

	STEP 3 – Comparison of emission reduction calculation spreadsheets developed by the project participant Essencis Soluções Ambientais S.A. against the created comparative monthly emission reduction spreadsheets and analysis of the results: The calculated accumulated monthly values of the parameter $F_{CH4,PJ,y}$ in each one of the comparative 6 monthly emission reduction spreadsheets /21/ (files generated under STEP 2) were compared against the corresponding accumulated values for the parameter $F_{CH4,PJ,y}$ in each one of the emission reduction spreadsheets /5/ previously created by the project participants as part of the monitoring/reporting process. As a result of STEP 3, by comparing files previously generated by the project participants against the files generated under STEP 2, the EPIC verification team was able to confirm that the generated set of 6 comparative monthly checking spreadsheets /21/ are identical to the 6 monthly emission reduction calculation spreadsheets /5/ previously created by the project participants. While no quantitative deviations or differences were identified when comparing the accumulated values for the calculation parameters presented in these files, and by assuming that all encrypted data stored in the project's data supervisor system represent credible and authentic monitoring data, the performed *data authenticity checking* thus successfully and sufficiently confirmed that only authentic and not-modified monitored measurement data (from the project's data supervisor system) were previously used by the project participant Essencis Soluções Ambientais S.A. for the calculation of emission reductions as reported in the Monitoring Report /3/.
Findings	Two CARs were raised regarding the compliance of monitoring activities valid for the considered monitoring period with monitoring requirements as per the monitoring plan from the registered PDD: **CAR 1:** The list of maintenance events performed in the flares (monitoring parameter $Maintenance_y$) which are referred in the initial version of the Monitoring Report do not completely cover the considered monitoring period. **CAR 2:** Information details about the instruments used for monitoring the "Pressure of the LFG stream in time interval t" (P_t) and "Temperature in the exhaust gas of the enclosed flare in minute m" ($T_{EG,m}$) during the considered monitoring period are not in accordance with provided evidences. **CAR 3:** Reported values and vintage for the monitoring parameter "Operation margin CO_2 emission factor in year *y* = Dispatch data analysis operating margin CO_2 emission factor in year *y*" ($EF_{grid,OM,y} = EF_{grid,OM-DD,y}$) are not under full conformance with applicable methodological requirements.
Conclusion	In summary, upon closure of the raised related CARs, the EPIC verification team was able to confirm that monitoring plan has been implemented in accordance with the monitoring plan. The monitoring mechanism is effective and reliable. The EPIC verification team sufficiently confirmed that: - - The monitoring plan and the applied methodology had been properly implemented and related monitoring activities have been correctly performed. - The responsibilities and authorities for monitoring and reporting were in accordance with the general responsibilities and authorities for the monitoring plan as outlined in the latest version of the Monitoring Report /3/. - QA/QC procedures are implemented for preventing or identifying and correct eventual errors or omissions in the reported monitoring parameters. - All parameters for which monitoring were required (by taking into account the monitoring approaches and calculation options selected for the considered monitoring period) were sufficiently and appropriately monitored during the

	considered monitoring period. For each monitored parameter, sufficient details about data generation, aggregation, recording and reporting are included in the latest version of the Monitoring Report /3/.

E.6.3. Implementation of sampling plan

Means of verification	Not applicable[7].
Findings	Not applicable.
Conclusion	Not applicable.

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

Means of verification	The EPIC verification team has assessed whether all monitoring instruments/equipment installed at the project site have operated during the monitoring period from 01/01/2018 to 30/06/2018 under full compliance with calibration requirements as per both related provisions from the registered PDD /2/ and recommendations/guidance from the instrument/equipment manufacturers. The following tables include assessment details for calibration events performed on the monitoring instruments/equipment used for performance of measurements monitoring the ex-post determined parameters during the considered monitoring period: *Assessment of performed calibration events for equipment/instruments used for monitoring the parameter "Management of the SWDS":*

Data / Parameter: (as per the monitoring plan from the registered PDD):	Management of the SWDS (Management of SWDS)
Calibration frequency /interval for the monitoring equipment/instrument:	Not applicable. While monitoring of the parameter "Management of the SWDS" is not performed based on measurements, there are no monitoring equipment/instruments utilized. Thus, there are no compliance with applicable calibration frequency/intervals of monitoring equipment/instruments to be assessed.
Is the calibration interval in line with the monitoring plan from the registered PDD? If the PDD does not specify the frequency of calibration, does the selected frequency represent good monitoring practice?	Not applicable. While monitoring of the parameter Management of the SWDS is not performed based on measurements, there are no monitoring equipment/instruments utilized. Thus, there are no compliance with applicable calibration frequency/intervals of monitoring equipment/instruments to be assessed.
Did the performed calibration(s) confirm proper functioning of monitoring equipment/instrument?	Not applicable. While monitoring of the parameter Management of the SWDS is not performed based on measurements, there are no monitoring equipment/instruments utilized. Thus, there are no compliance with applicable

[7] As per the monitoring and GHG calculation approaches that are valid for the project activity (as established in the registered PDD and applied CDM baseline and monitoring methodology + applicable methodological tools) no sampling procedure and no sampling-based monitoring are valid/required for the determination of achieved emission reductions. Moreover, as further assessed in Section E.6.2, under *Data authenticity checking*, data cross-checking/reproducing was performed for ALL measurement records valid for the considered monitoring period (as made available in the project's database for monitoring records) against related primary data sources (with ALL reported related monitoring data being cross-checked/reproduced instead of having selected samples of data being cross-checked/reproduced). Thus, no sampling method was applied in the context of performed verification assessment either.

(Yes / No):	calibration frequency/intervals of monitoring equipment/instruments to be assessed.
Is(are) the performed calibration(s) valid for the whole reporting period?	Not applicable. While monitoring of the parameter Management of the SWDS is not performed based on measurements, there are no monitoring equipment/instruments utilized. Thus, there are no compliance with applicable calibration frequency/intervals of monitoring equipment/instruments to be assessed.

Assessment of performed calibration events for equipment/instruments used for monitoring the parameter "Volumetric flow of LFG stream in time interval t on a wet basis" ($V_{t,wb}$):

Data / Parameter: (as per the monitoring plan from the registered PDD):	Volumetric flow of LFG stream in time interval *t* on a wet basis ($V_{t,wb}$) (monitored as per Option C of the methodological tool "Tool to determine the mass flow of a greenhouse gas in a gaseous stream" (version 02.0.0) /14/).
Calibration frequency /interval for the monitoring equipment/instrument:	As per the implemented monitoring procedure at Essencis Soluções Ambientais S.A. and recommendations from the equipment's manufacturer, the installed 4 LFG flow meters used for measuring LFG flow sent to the flares (sub-parameters $V_{t,wb,flare-1}$, $V_{t,wb,flare-2}$, $V_{t,wb,flare-3}$ and $V_{t,wb,flare-4}$) are calibrated every 2 years by a third party independent accredited calibration laboratory. The pressure signal + data transmission units of the installed LFG flow meter sets used for measuring LFG flow sent to each internal combustion gas engine ((sub-parameters $V_{t,wb,engine-1}$, $V_{t,wb,engine-2}$, (…), $V_{t,wb,engine-21}$)) are calibrated every 2 years. The EPIC verification team was able to confirm that no regular calibration is required for the annubar element of the installed LFG flow meter sets used for measuring LFG flow sent to each internal combustion gas engine (sub-parameters $V_{t,wb,engine-1}$, $V_{t,wb,engine-2}$, (…), $V_{t,wb,engine-21}$) as per the equipment manufacturer. Anyhow, as confirmed by the EPIC verification team through assessment of specification sheet for the annubar element /47/ /48/, it is recommended a dimensional checking (metrology analysis) in the element every 5 years in order to confirm the dimensional integrity of the instrument (which is an instrumental condition for its proper functioning and accuracy of measurements). *Calibration details for the flow meter used for measuring the sub-parameter $V_{t,wb,flare-1}$:* Initial calibration event performed on 15/07/2016 as indicated in the Certificate of Calibration 1412000235 0716 C7 /84/, issued by Contech Indústria e Comércio de Equipamentos Eletrônicos Ltda. Sequential calibration event performed on 14/05/2018 as indicated in the

			Certificate of Calibration 1412000235 0318 M7 /110/, also issued by Contech Indústria e Comércio de Equipamentos Eletrônicos Ltda. *Calibration details for the flow meter used for measuring the sub-parameter $V_{t,wb,flare-2}$:* Initial calibration event performed on 25/05/2016 as indicated in the Certificate of Calibration 1412000236 0516 C7 /88/ issued by Contech Indústria e Comércio de Equipamentos Eletrônicos Ltda. Sequential calibration event performed on 26/03/2018 as indicated in the Certificate of Calibration 1412000236 0318 M7 /88/, also issued by Contech Indústria e Comércio de Equipamentos Eletrônicos Ltda. *Calibration details for the flow meter used for measuring the sub-parameter $V_{t,wb,flare-3}$:* Initial calibration event performed on 15/06/2016 as indicated in the Certificate of Calibration 1412000237 0616 C7 /95/ issued by Contech Indústria e Comércio de Equipamentos Eletrônicos Ltda. Sequential calibration event performed on 15/05/2018 as indicated in the Certificate of Calibration 1412000237 0518 M7 /95/, also issued by Contech Indústria e Comércio de Equipamentos Eletrônicos Ltda. *Calibration details for the flow meter used for measuring the sub-parameter $V_{t,wb,flare-4}$:* Calibration event performed on 08/04/2016 as indicated in the Certificate of Calibration 1412000238 0915 C7 /17/ issued by Contech Indústria e Comércio de Equipamentos Eletrônicos Ltda. Sequential calibration event performed on 27/03/2018 as indicated in the Certificate of Calibration 1412000238 0518 M7 /17/, also issued by Contech Indústria e Comércio de Equipamentos Eletrônicos Ltda. *Calibration details for the pressure signal + data transmission unit of the LFG flow meter set used for measuring the sub-parameter $V_{t,wb,engine-1}$:* Calibration event performed on 19/10/2016 as indicated in the Certificate of Calibration 3K64661403471263885/16 /35/ issued by CEIME Calibração e Comércio de Instrumentos Ltda. Sequential calibration event performed on 21/02/2018 as indicated in the Certificate of Calibration 3K64661403471275048/18 /28/ also issued by CEIME Calibração e Comércio de Instrumentos Ltda. *Calibration details for the pressure signal + data transmission unit of the LFG flow meter set used for measuring the sub-parameter $V_{t,wb,engine-2}$:* Calibration event performed on 19/10/2016 as indicated in the Certificate of Calibration 3K64661403471064885/16 /35/ issued by CEIME Calibração e Comércio de Instrumentos Ltda. Sequential calibration event performed on 21/02/2018 as indicated in the Certificate of	

			Calibration 3K64661403471075048/18 /28/ also issued by CEIME Calibração e Comércio de Instrumentos Ltda. *Calibration details for the pressure signal + data transmission unit of the LFG flow meter set used for measuring the sub-parameter $V_{t,wb,engine-3}$:* Calibration event performed on 19/10/2016 as indicated in the Certificate of Calibration 3K64661403470064885/16 /35/ issued by CEIME Calibração e Comércio de Instrumentos Ltda. Sequential calibration event performed on 21/02/2018 as indicated in the Certificate of Calibration 3K64661403470075048/18 /28/ also issued by CEIME Calibração e Comércio de Instrumentos Ltda. *Calibration details for the pressure signal + data transmission unit of the LFG flow meter set used for measuring the sub-parameter $V_{t,wb,engine-4}$:* Calibration event performed on 19/10/2016 as indicated in the Certificate of Calibration 3K64661403470664885/16 /35/ issued by CEIME Calibração e Comércio de Instrumentos Ltda. Sequential calibration event performed on 21/02/2018 as indicated in the Certificate of Calibration 3K64661403470675048/18 /28/ also issued by CEIME Calibração e Comércio de Instrumentos Ltda. *Calibration details for the pressure signal + data transmission unit of the LFG flow meter set used for measuring the sub-parameter $V_{t,wb,engine-5}$:* Calibration event performed on 19/10/2016 as indicated in the Certificate of Calibration 3K64661403470464885/16 /35/ issued by CEIME Calibração e Comércio de Instrumentos Ltda. Sequential calibration event performed on 21/02/2018 as indicated in the Certificate of Calibration 3K64661403470475048/18 /28/ also issued by CEIME Calibração e Comércio de Instrumentos Ltda. *Calibration details for the pressure signal + data transmission unit of the LFG flow meter set used for measuring the sub-parameter $V_{t,wb,engine-6}$:* Calibration event performed on 19/10/2016 as indicated in the Certificate of Calibration 3K64661403469864885/16 /35/ issued by CEIME Calibração e Comércio de Instrumentos Ltda. Sequential calibration event performed on 21/02/2018 as indicated in the Certificate of Calibration 3K64661403469875048/18 /28/ also issued by CEIME Calibração e Comércio de Instrumentos Ltda. *Calibration details for the pressure signal + data transmission unit of the LFG flow meter set used for measuring the sub-parameter $V_{t,wb,engine-7}$:* Calibration event performed on 19/10/2016 as indicated in the Certificate of Calibration 3K64661403470864885/16 /35/ issued by CEIME Calibração e Comércio de Instrumentos Ltda.	

			Sequential calibration event performed on 21/02/2018 as indicated in the Certificate of Calibration 3K64661403470875048/18 /28/ also issued by CEIME Calibração e Comércio de Instrumentos Ltda. *Calibration details for the pressure signal + data transmission unit of the LFG flow meter set used for measuring the sub-parameter $V_{t,wb,engine-8}$:* Calibration event performed on 19/10/2016 as indicated in the Certificate of Calibration 3K64661403470264885/16 /35/ issued by CEIME Calibração e Comércio de Instrumentos Ltda. Sequential calibration event performed on 21/02/2018 as indicated in the Certificate of Calibration 3K64661403470275048/18 /28/ also issued by CEIME Calibração e Comércio de Instrumentos Ltda. *Calibration details for the pressure signal + data transmission unit of the LFG flow meter set used for measuring the sub-parameter $V_{t,wb,engine-9}$:* Calibration event performed on 19/10/2016 as indicated in the Certificate of Calibration 3K64661403472664885/16 /35/ issued by CEIME Calibração e Comércio de Instrumentos Ltda. Sequential calibration event performed on 21/02/2018 as indicated in the Certificate of Calibration 3K64661403472675048/18 /28/ also issued by CEIME Calibração e Comércio de Instrumentos Ltda. *Calibration details for the pressure signal + data transmission unit of the LFG flow meter set used for measuring the sub-parameter $V_{t,wb,engine-10}$:* Calibration event performed on 19/10/2016 as indicated in the Certificate of Calibration 3K64661403473864885/16 /35/ issued by CEIME Calibração e Comércio de Instrumentos Ltda. Sequential calibration event performed on 21/02/2018 as indicated in the Certificate of Calibration 3K64661403473875048/18 /28/ also issued by CEIME Calibração e Comércio de Instrumentos Ltda. *Calibration details for the pressure signal + data transmission unit of the LFG flow meter set used for measuring the sub-parameter $V_{t,wb,engine-11}$:* Calibration event performed on 19/10/2016 as indicated in the Certificate of Calibration 3K64661403471466992/16 /35/ issued by CEIME Calibração e Comércio de Instrumentos Ltda. Sequential calibration event performed on 21/02/2018 as indicated in the Certificate of Calibration 3K64661403471475048/18 /28/ also issued by CEIME Calibração e Comércio de Instrumentos Ltda. *Calibration details for the pressure signal + data transmission unit of the LFG flow meter set used for measuring the sub-parameter $V_{t,wb,engine-12}$:* Calibration event performed on 19/10/2016 as indicated in the Certificate of Calibration	

			3K64661403472064885/16 [35] issued by CEIME Calibração e Comércio de Instrumentos Ltda. Sequential calibration event performed on 21/02/2018 as indicated in the Certificate of Calibration 3K64661403472075048/18 [28] also issued by CEIME Calibração e Comércio de Instrumentos Ltda. *Calibration details for the pressure signal + data transmission unit of the LFG flow meter set used for measuring the sub-parameter $V_{t,wb,engine-13}$:* Calibration event performed on 19/10/2016 as indicated in the Certificate of Calibration 3K64661403472464885/16 [35] issued by CEIME Calibração e Comércio de Instrumentos Ltda. Sequential calibration event performed on 21/02/2018 as indicated in the Certificate of Calibration 3K64661403472475048/18 [28] also issued by CEIME Calibração e Comércio de Instrumentos Ltda. *Calibration details for the pressure signal + data transmission unit of the LFG flow meter set used for measuring the sub-parameter $V_{t,wb,engine-14}$:* Calibration event performed on 19/10/2016 as indicated in the Certificate of Calibration 3K64661403471664885/16 [35] issued by CEIME Calibração e Comércio de Instrumentos Ltda. Sequential calibration event performed on 21/02/2018 as indicated in the Certificate of Calibration 3K64661403471675048/18 [28] also issued by CEIME Calibração e Comércio de Instrumentos Ltda. *Calibration details for the pressure signal + data transmission unit of the LFG flow meter set used for measuring the sub-parameter $V_{t,wb,engine-15}$:* Calibration event performed on 19/10/2016 as indicated in the Certificate of Calibration 3K64661403471866992/16 [35] issued by CEIME Calibração e Comércio de Instrumentos Ltda. Sequential calibration event performed on 21/02/2018 as indicated in the Certificate of Calibration 3K64661403471875048/18 [28] also issued by CEIME Calibração e Comércio de Instrumentos Ltda. *Calibration details for the pressure signal + data transmission unit of the LFG flow meter set used for measuring the sub-parameter $V_{t,wb,engine-16}$:* Calibration event performed on 19/10/2016 as indicated in the Certificate of Calibration 3K64661403472264885/16 [35] issued by CEIME Calibração e Comércio de Instrumentos Ltda. Sequential calibration event performed on 21/02/2018 as indicated in the Certificate of Calibration 3K64661403472275048/18 [28] also issued by CEIME Calibração e Comércio de Instrumentos Ltda. *Calibration details for the pressure signal + data transmission unit of the LFG flow meter set used for measuring the sub-parameter $V_{t,wb,engine-17}$:*	

		Calibration event performed on 19/10/2016 as indicated in the Certificate of Calibration 3K64661403474266992/16 /35/ issued by CEIME Calibração e Comércio de Instrumentos Ltda. Sequential calibration event performed on 21/02/2018 as indicated in the Certificate of Calibration 3K64661403474275048/18 /28/ also issued by CEIME Calibração e Comércio de Instrumentos Ltda. *Calibration details for the pressure signal + data transmission unit of the LFG flow meter set used for measuring the sub-parameter $V_{t,wb,engine-18}$:* Calibration event performed on 19/10/2016 as indicated in the Certificate of Calibration 3K64661403473064885/16 /35/ issued by CEIME Calibração e Comércio de Instrumentos Ltda. Sequential calibration event performed on 21/02/2018 as indicated in the Certificate of Calibration 3K64661403473075048/18 /28/ also issued by CEIME Calibração e Comércio de Instrumentos Ltda. *Calibration details for the pressure signal + data transmission unit of the LFG flow meter set used for measuring the sub-parameter $V_{t,wb,engine-19}$:* Calibration event performed on 19/10/2016 as indicated in the Certificate of Calibration 3K64661403472864885/16 /35/ issued by CEIME Calibração e Comércio de Instrumentos Ltda. Sequential calibration event performed on 21/02/2018 as indicated in the Certificate of Calibration 3K64661403472875048/18 /28/ also issued by CEIME Calibração e Comércio de Instrumentos Ltda. *Calibration details for the pressure signal + data transmission unit of the LFG flow meter set used for measuring the sub-parameter $V_{t,wb,engine-20}$:* Calibration event performed on 19/10/2016 as indicated in the Certificate of Calibration 3K64661403473464885/16 /35/ issued by CEIME Calibração e Comércio de Instrumentos Ltda. Sequential calibration event performed on 21/02/2018 as indicated in the Certificate of Calibration 3K64661403473475048/18 /28/ also issued by CEIME Calibração e Comércio de Instrumentos Ltda. *Calibration details for the pressure signal + data transmission unit of the LFG flow meter set used for measuring the sub-parameter $V_{t,wb,engine-21}$:* Calibration event performed on 19/10/2016 as indicated in the Certificate of Calibration 3K64661403474064885/16 /35/ issued by CEIME Calibração e Comércio de Instrumentos Ltda. Sequential calibration event performed on 21/02/2018 as indicated in the Certificate of Calibration 3K64661403474075048/18 /28/ also issued by CEIME Calibração e Comércio de Instrumentos Ltda.
	Is the calibration interval in	As per both the registered PDD /2/ and ACM0001

	line with the monitoring plan from the registered PDD? If the PDD does not specify the frequency of calibration, does the selected frequency represent good monitoring practice?	(version 13.0.0) [7], the installed LFG flow meters are to be calibrated in a frequency as per the instrument's specifications and/or instrument manufacturer's recommendations. Thus, the applied calibration frequencies (every 2 years, as per recommendations from the equipment's manufacturers) are under full conformance with both the monitoring plan from the registered PDD [2] and ACM0001 (version 13.0.0) [7].	
	Did the performed calibration(s) confirm proper functioning of monitoring equipment/instrument? (Yes / No):	Yes. The performed calibration events for the installed LFG flow meters confirm proper functioning of these monitoring instruments.	
	Is(are) the performed calibration(s) valid for the whole reporting period?	Yes. The performed calibration events for the installed LFG flow meters that are referred in the Monitoring Report [3] are valid for the whole monitoring period from 01/01/2018 to 30/06/2018. EPIC was able to confirm the validity of the performed calibration events for the installed LFG flow meters as follows: *LFG flow meter used for measuring the sub-parameter $V_{t,wb,flare-1}$:* - Calibration event performed on 15/07/2016, valid until 14/07/2018 (2 years) - Calibration event performed on 14/05/2018, valid until 13/05/2020 (2 years) *LFG flow meter used for measuring the sub-parameter $V_{t,wb,flare-2}$:* - Calibration event performed on 25/05/2016, valid until 24/05/2018 (2 years) - Calibration event performed on 26/03/2018, valid until 25/03/2020 (2 years) *LFG flow meter used for measuring the sub-parameter $V_{t,wb,flare-4}$:* - Calibration event performed on 15/06/2016, valid until 14/06/2018 (2 years) - Calibration event performed on 15/05/2018, valid until 14/05/2020 (2 years) *LFG flow meter used for measuring the sub-parameter $V_{t,wb,flare-4}$:* - Calibration event performed on 08/04/2016, valid until 07/04/2018 (2	

			years) - Calibration event performed on 27/03/2018, valid until 26/03/2020 (2 years) *Pressure signal + data transmission unit of the LFG flow meter set used for measuring the sub-parameter $V_{t,wb,engine-1}$:* - Calibration event performed on 19/10/2016, valid until 18/10/2018 (2 years) - Calibration event performed on 21/02/2018, valid until 20/02/2020 (2 years) *Pressure signal + data transmission unit of the LFG flow meter set used for measuring the sub-parameter $V_{t,wb,engine-2}$:* - Calibration event performed on 19/10/2016, valid until 18/10/2018 (2 years) - Calibration event performed on 21/02/2018, valid until 20/02/2020 (2 years) *Pressure signal + data transmission unit of the LFG flow meter set used for measuring the sub-parameter $V_{t,wb,engine-3}$:* - Calibration event performed on 19/10/2016, valid until 18/10/2018 (2 years) - Calibration event performed on 21/02/2018, valid until 20/02/2020 (2 years) *Pressure signal + data transmission unit of the LFG flow meter set used for measuring the sub-parameter $V_{t,wb,engine-4}$:* - Calibration event performed on 19/10/2016, valid until 18/10/2018 (2 years) - Calibration event performed on 21/02/2018, valid until 20/02/2020 (2 years) *Pressure signal + data transmission unit of the LFG flow meter set used for measuring the sub-parameter $V_{t,wb,engine-5}$:* - Calibration event performed on 19/10/2016, valid until 18/10/2018 (2 years) - Calibration event performed on 21/02/2018, valid until 20/02/2020 (2 years) *Pressure signal + data transmission unit of the LFG flow meter set used for measuring the sub-parameter $V_{t,wb,engine-6}$:* - Calibration event performed on 19/10/2016, valid until 18/10/2018 (2 years) - Calibration event performed on 21/02/2018, valid until 20/02/2020 (2	

			years) *Pressure signal + data transmission unit of the LFG flow meter set used for measuring the sub-parameter $V_{t,wb,engine-7}$:* - Calibration event performed on 19/10/2016, valid until 18/10/2018 (2 years) - Calibration event performed on 21/02/2018, valid until 20/02/2020 (2 years) *Pressure signal + data transmission unit of the LFG flow meter set used for measuring the sub-parameter $V_{t,wb,engine-8}$:* - Calibration event performed on 19/10/2016, valid until 18/10/2018 (2 years) - Calibration event performed on 21/02/2018, valid until 20/02/2020 (2 years) *Pressure signal + data transmission unit of the LFG flow meter set used for measuring the sub-parameter $V_{t,wb,engine-9}$:* - Calibration event performed on 19/10/2016, valid until 18/10/2018 (2 years) - Calibration event performed on 21/02/2018, valid until 20/02/2020 (2 years) *Pressure signal + data transmission unit of the LFG flow meter set used for measuring the sub-parameter $V_{t,wb,engine-10}$:* - Calibration event performed on 19/10/2016, valid until 18/10/2018 (2 years) - Calibration event performed on 21/02/2018, valid until 20/02/2020 (2 years) *Pressure signal + data transmission unit of the LFG flow meter set used for measuring the sub-parameter $V_{t,wb,engine-11}$:* - Calibration event performed on 19/10/2016, valid until 18/10/2018 (2 years) - Calibration event performed on 21/02/2018, valid until 20/02/2020 (2 years) *Pressure signal + data transmission unit of the LFG flow meter set used for measuring the sub-parameter $V_{t,wb,engine-12}$:* - Calibration event performed on 19/10/2016, valid until 18/10/2018 (2 years) - Calibration event performed on 21/02/2018, valid until 20/02/2020 (2 years) *Pressure signal + data transmission unit of the*	

			LFG flow meter set used for measuring the sub-parameter $V_{t,wb,engine-13}$: - Calibration event performed on 19/10/2016, valid until 18/10/2018 (2 years) - Calibration event performed on 21/02/2018, valid until 20/02/2020 (2 years) *Pressure signal + data transmission unit of the LFG flow meter set used for measuring the sub-parameter $V_{t,wb,engine-14}$:* - Calibration event performed on 19/10/2016, valid until 18/10/2018 (2 years) - Calibration event performed on 21/02/2018, valid until 20/02/2020 (2 years) *Pressure signal + data transmission unit of the LFG flow meter set used for measuring the sub-parameter $V_{t,wb,engine-15}$:* - Calibration event performed on 19/10/2016, valid until 18/10/2018 (2 years) - Calibration event performed on 21/02/2018, valid until 20/02/2020 (2 years) *Pressure signal + data transmission unit of the LFG flow meter set used for measuring the sub-parameter $V_{t,wb,engine-16}$:* - Calibration event performed on 19/10/2016, valid until 18/10/2018 (2 years) - Calibration event performed on 21/02/2018, valid until 20/02/2020 (2 years) *Pressure signal + data transmission unit of the LFG flow meter set used for measuring the sub-parameter $V_{t,wb,engine-17}$:* - Calibration event performed on 19/10/2016, valid until 18/10/2018 (2 years) - Calibration event performed on 21/02/2018, valid until 20/02/2020 (2 years) *Pressure signal + data transmission unit of the LFG flow meter set used for measuring the sub-parameter $V_{t,wb,engine-18}$:* - Calibration event performed on 19/10/2016, valid until 18/10/2018 (2 years) - Calibration event performed on 21/02/2018, valid until 20/02/2020 (2 years) *Pressure signal + data transmission unit of the LFG flow meter set used for measuring the sub-parameter $V_{t,wb,engine-19}$:* - Calibration event performed on	

	19/10/2016, valid until 18/10/2018 (2 years) - Calibration event performed on 21/02/2018, valid until 20/02/2020 (2 years) *Pressure signal + data transmission unit of the LFG flow meter set used for measuring the sub-parameter $V_{t,wb,engine-20}$:* - Calibration event performed on 19/10/2016, valid until 18/10/2018 (2 years) - Calibration event performed on 21/02/2018, valid until 20/02/2020 (2 years) *Pressure signal + data transmission unit of the LFG flow meter set used for measuring the sub-parameter $V_{t,wb,engine-21}$:* - Calibration event performed on 19/10/2016, valid until 18/10/2018 (2 years) - Calibration event performed on 21/02/2018, valid until 20/02/2020 (2 years)

Assessment of performed calibration events for equipment/instruments used for monitoring the parameter "Volumetric fraction of CH_4 in the collected LFG in time interval t on a wet basis" ($v_{CH4,t,wb}$):

Data / Parameter: (as per the monitoring plan from the registered PDD):	Volumetric fraction of CH_4 in the collected LFG in time interval *t* on a wet basis ($v_{CH4,t,wb}$)
Calibration frequency /interval for the monitoring equipment/instrument:	As per the implemented monitoring procedure at Essencis Soluções Ambientais S.A., the installed CH_4 content gas analyzer unit is to be calibrated every 3 months by trained project activity's operational staff. This is confirmed by the EPIC verification team to be in accordance with recommendations from the equipment's manufacturer. Related Certificates of staff training /79/ were made available to the EPIC verification team. The performed calibration events which are valid for the monitoring period from 01/01/2018 to 30/06/2018 were correctly performed by comparison with canisters of calibrated span gases purchased from a certified gas supplier. The certified span gases utilized for the calibration events of the CH_4 gas analyzer unit are summarized below: Set of certificates for the cylinder of span gases used for the calibration of the CH_4 content gas analyzer unit: - Gas cylinders with 5.00% O_2 span gas: cylinder n° 4094023 /37/ (supplied by IBG – Indústria Brasileira de Gases Ltda.) - Gas cylinders with 59.99% CO_2 span gas:

cylinder n° 4849789 /58/ (supplied by IBG – Indústria Brasileira de Gases Ltda.)

- Gas cylinders with 60.01% CH_4 span gas: cylinder n° 027113 /59/ (supplied by IBG – Indústria Brasileira de Gases Ltda.)

As part of the performed calibration events, the relationship (measurement deviation/error) between the measurements of CH_4 content performed in the utilized span standard with known/certified CH_4 content is established. Through this procedure, the potential measurement error/deviation for CH_4 content of collected LFG is identified and expressed as a percentage. Such measurement deviation/errors are indicated in the calibration notes. Information available in the calibration notes /53/ were assessed by EPIC. As outlined in the calibration notes /53/, the calibration events were performed in the dates indicated in the table below. Moreover, for each individual calibration event, measurement deviation/error for CH_4 content was identified as also indicated below:

CH_4 content gas analyzer unit	
Calibration Results/findings:	
Date of performed calibration events	Identified measurement deviation/error for CH_4 content measurements- Span - %)
06/11/2017	-0.27%
01/01/2018	-0.30%
12/02/2018	-0.02%
19/03/2018	+0.22%
07/05/2018	+0.11%
25/06/2018	+0.32%

Source: /53/

The EPIC verification team has assessed the certificates /58/ /59/ /37/ of the utilized span gas cylinders and calibration notes /53/ in order to confirm the correctness of information provided above. Moreover, by assessing the reported details for the valid calibration events, the EPIC verification team was able to confirm that the composition of the utilized span gases were properly considered in the context of the determination of the measurement deviations/errors for CH_4 content measurements (Span).

Is the calibration interval in line with the monitoring plan from the registered PDD? If the PDD does not specify the frequency of calibration, does the selected frequency represent good monitoring practice?	As per the registered PDD /2/, ACM0001 (version 13.0.0) /7/ and the "Tool to determine the mass flow of a greenhouse gas in a gaseous stream" (version 02.0.0) /14/, the installed continuous CH_4 content gas analyzer unit is to be calibrated in a frequency to be established under conformance with instrument's specifications and/or instrument manufacturer's recommendations. Thus, the adopted calibration frequency (every 3 months, as per recommendations from the equipment's manufacturer) is in line with the monitoring plan from the registered PDD /2/, ACM0001 (version 13.0.0) /7/ and the "Tool to determine the mass flow

		of a greenhouse gas in a gaseous stream" (version 02.0.0) /14/. A communication issued by the service representative of the equipment manufacturer in Brazil confirms their approval for the internal working procedure CA.BG.01.05 of Essencis Soluções Ambientais S.A. As assessed by the EPIC verification team, the latest version of the internal working procedure "*CA.BG.01.05-Rev 09 – Calibração Analisador de Gases"* (Gas analyzer calibration) /81/ details the procedure for performing calibration events the installed CH_4 content gas analyzer unit and specifies a calibration frequency of every 3 months. It is the opinion of the EPIC verification team that the adopted calibration frequency represents good practice.
	Did the performed calibration(s) confirm proper functioning of monitoring equipment/instrument? (Yes / No):	Yes. The performed calibration events for the CH_4 content gas analyzer unit confirmed proper functioning of this equipment. All calibration events valid for the monitoring period from 01/01/2018 to 30/06/2018 were performed by the own staff of Essencis Soluções Ambientais S.A. The staff responsible for the calibrations received previous training following the applicable procedure "*CA.BG.01.05-Rev 08 - Calibração Analisador de Gases"* (Gas analyzer calibration) /81/. Moreover, related Certificates of training /79/ were made available to the EPIC verification team. Moreover, the EPIC verification team was also able to verify that the work procedure CA.BG.01.05 was approved by equipment manufacturer and that it is available in the project site. As informed by the project participants, the main reason for performing the calibrations internally is the relatively remote location of the project site and difficulties on scheduling a 3rd party for performing such relatively easy calibration events.
	Is(are) the performed calibration(s) valid for the whole reporting period?	Yes. The performed calibration events for the installed CH_4 content gas analyzer unit that are referred in the Monitoring Report /3/ are valid for the whole monitoring period from 01/01/2018 to 30/06/2018. EPIC was able to confirm the validity of the performed calibration events for the installed CH_4 gas analyzer unit as follows: - 06/11/2017 (valid until 05/02/2018) - 01/01/2018 (valid until 31/03/2018) - 12/02/2018 (valid until 11/05/2018) - 19/03/2018 (valid until 18/06/2018) - 07/05/2018 (valid until 06/08/2018) - 25/06/2018 (valid until 24/09/2018)

Assessment of performed calibration events for equipment/instruments used for monitoring the parameter "Temperature of the LFG stream in time interval t" (T_t):

	Data / Parameter: (as per the monitoring plan from the registered PDD):	Temperature of the LFG stream in time interval *t* (T_t)
	Calibration frequency /interval for the monitoring equipment/instrument:	As per the implemented monitoring procedure at Essencis Soluções Ambientais S.A. and recommendations from the equipment's manufacturer, the installed LFG temperature sensor used for measuring temperature of the LFG which is sent to the flare (sub-parameter $T_{t,flares}$) is to be calibrated every year and the installed LFG temperature sensors used for measuring temperature of the LFG which is sent to each internal combustion gas engine (sub-parameters $T_{t,engine-1}$, $T_{t,engine-2}$, (…), $T_{t,engine-21}$) are to be calibrated every 2 years. As confirmed by the EPIC verification team through assessment of the specification sheets for the installed LFG temperature sensors, the selected calibration frequencies are as per the recommendations of the instrument manufacturer. *Calibration details for the LFG temperature sensor used for measuring the sub-parameter $T_{t,flares}$:* Initial calibration event performed on 03/01/2017 as indicated in the Certificate No. 16105471257/17 /99/, issued by CEIME Calibração e Comércio de Instrumentos Ltda.) and sequential calibration event performed on 11/01/2018 as indicated in the Certificate No. 19323875048/18 /100/, issued by CEIME Calibração e Comércio de Instrumentos Ltda.) *Calibration details for the LFG temperature sensor used for measuring the sub-parameter $T_{t,engine-1}$:* Calibration event performed on 19/10/2016 as indicated in the Certificate of Calibration E15PT000964885/16 /36/ issued by CEIME Calibração e Comércio de Instrumentos Ltda. Sequential calibration event performed on 21/02/2018 as indicated in the Certificate of Calibration E15PT000975048/18 /41/ issued by CEIME Calibração e Comércio de Instrumentos Ltda. *Calibration details for the LFG temperature sensor used for measuring the sub-parameter $T_{t,engine-2}$:* Calibration event performed on 19/10/2016 as indicated in the Certificate of Calibration E15PT000864885/16 /36/ issued by CEIME Calibração e Comércio de Instrumentos Ltda. Sequential calibration event performed on 21/02/2018 as indicated in the Certificate of Calibration E15PT000875048/18 /41/ issued by CEIME Calibração e Comércio de Instrumentos Ltda. *Calibration details for the LFG temperature sensor used for measuring the sub-parameter*

			$T_{t,engine-3}$: Calibration event performed on 19/10/2016 as indicated in the Certificate of Calibration E15PT000364885/16 /36/ issued by CEIME Calibração e Comércio de Instrumentos Ltda. Sequential calibration event performed on 26/02/2018 as indicated in the Certificate of Calibration E15PT000375048/18 /41/ issued by CEIME Calibração e Comércio de Instrumentos Ltda. *Calibration details for the LFG temperature sensor used for measuring the sub-parameter* $T_{t,engine-4}$: Calibration event performed on 19/10/2016 as indicated in the Certificate of Calibration E15PT000664885/16 /36/ issued by CEIME Calibração e Comércio de Instrumentos Ltda. Sequential calibration event performed on 22/02/2018 as indicated in the Certificate of Calibration E15PT000675048/18 /41/ issued by CEIME Calibração e Comércio de Instrumentos Ltda. *Calibration details for the LFG temperature sensor used for measuring the sub-parameter* $T_{t,engine-5}$: Calibration event performed on 19/10/2016 as indicated in the Certificate of Calibration E15PT000564885/16 /36/ issued by CEIME Calibração e Comércio de Instrumentos Ltda. Sequential calibration event performed on 21/02/2018 as indicated in the Certificate of Calibration E15PT000575048/18 /41/ issued by CEIME Calibração e Comércio de Instrumentos Ltda. *Calibration details for the LFG temperature sensor used for measuring the sub-parameter* $T_{t,engine-6}$: Calibration event performed on 19/10/2016 as indicated in the Certificate of Calibration E15PT000264885/16 /36/ issued by CEIME Calibração e Comércio de Instrumentos Ltda. Sequential calibration event performed on 21/02/2018 as indicated in the Certificate of Calibration E15PT000275048/18 /41/ issued by CEIME Calibração e Comércio de Instrumentos Ltda. *Calibration details for the LFG temperature sensor used for measuring the sub-parameter* $T_{t,engine-7}$: Calibration event performed on 19/10/2016 as indicated in the Certificate of Calibration E15PT001564885/16 /36/ issued by CEIME Calibração e Comércio de Instrumentos Ltda. Sequential calibration event performed on 26/02/2018 as indicated in the Certificate of Calibration E15PT001575048/18 /41/ issued by CEIME Calibração e Comércio de Instrumentos Ltda.	

			Calibration details for the LFG temperature sensor used for measuring the sub-parameter $T_{t,engine-8}$*:* Calibration event performed on 19/10/2016 as indicated in the Certificate of Calibration E15PT000464885/16 /36/ issued by CEIME Calibração e Comércio de Instrumentos Ltda. Sequential calibration event performed on 22/02/2018 as indicated in the Certificate of Calibration E15PT000475048/18 /41/ issued by CEIME Calibração e Comércio de Instrumentos Ltda. *Calibration details for the LFG temperature sensor used for measuring the sub-parameter* $T_{t,engine-9}$*:* Calibration event performed on 19/10/2016 as indicated in the Certificate of Calibration E15PT001664885/16 /36/ issued by CEIME Calibração e Comércio de Instrumentos Ltda. Sequential calibration event performed on 26/02/2018 as indicated in the Certificate of Calibration E15PT001675048/18 /41/ issued by CEIME Calibração e Comércio de Instrumentos Ltda. *Calibration details for the LFG temperature sensor used for measuring the sub-parameter* $T_{t,engine-10}$*:* Calibration event performed on 19/10/2016 as indicated in the Certificate of Calibration E15PT002164885/16 /36/ issued by CEIME Calibração e Comércio de Instrumentos Ltda. Sequential calibration event performed on 22/02/2018 as indicated in the Certificate of Calibration E15PT002175048/18 /41/ issued by CEIME Calibração e Comércio de Instrumentos Ltda. *Calibration details for the LFG temperature sensor used for measuring the sub-parameter* $T_{t,engine-11}$*:* Calibration event performed on 19/10/2016 as indicated in the Certificate of Calibration E15PT000764885/16 /36/ issued by CEIME Calibração e Comércio de Instrumentos Ltda. Sequential calibration event performed on 26/02/2018 as indicated in the Certificate of Calibration E15PT000775048/18 /41/ issued by CEIME Calibração e Comércio de Instrumentos Ltda. *Calibration details for the LFG temperature sensor used for measuring the sub-parameter* $T_{t,engine-12}$*:* Calibration event performed on 19/10/2016 as indicated in the Certificate of Calibration E15PT001364885/16 /36/ issued by CEIME Calibração e Comércio de Instrumentos Ltda. Sequential calibration event performed on 23/02/2018 as indicated in the Certificate of Calibration E15PT001375048/18 /41/ issued by CEIME Calibração e Comércio de Instrumentos	

			Ltda. *Calibration details for the LFG temperature sensor used for measuring the sub-parameter $T_{t,engine-13}$:* Calibration event performed on 19/10/2016 as indicated in the Certificate of Calibration E15PT002464885/16 /36/ issued by CEIME Calibração e Comércio de Instrumentos Ltda. Sequential calibration event performed on 21/02/2018 as indicated in the Certificate of Calibration E15PT001475048/18 /41/ issued by CEIME Calibração e Comércio de Instrumentos Ltda. *Calibration details for the LFG temperature sensor used for measuring the sub-parameter $T_{t,engine-14}$:* Calibration event performed on 19/10/2016 as indicated in the Certificate of Calibration E15PT001164885/16 /36/ issued by CEIME Calibração e Comércio de Instrumentos Ltda. Sequential calibration event performed on 22/02/2018 as indicated in the Certificate of Calibration E15PT001175048/18 /41/ issued by CEIME Calibração e Comércio de Instrumentos Ltda. *Calibration details for the LFG temperature sensor used for measuring the sub-parameter $T_{t,engine-15}$:* Calibration event performed on 19/10/2016 as indicated in the Certificate of Calibration E15PT001264885/16 /36/ issued by CEIME Calibração e Comércio de Instrumentos Ltda. Sequential calibration event performed on 26/02/2018 as indicated in the Certificate of Calibration E15PT001275048/18 /41/ issued by CEIME Calibração e Comércio de Instrumentos Ltda. *Calibration details for the LFG temperature sensor used for measuring the sub-parameter $T_{t,engine-16}$:* Calibration event performed on 19/10/2016 as indicated in the Certificate of Calibration E15PT001464885/16 /36/ issued by CEIME Calibração e Comércio de Instrumentos Ltda. Sequential calibration event performed on 22/02/2018 as indicated in the Certificate of Calibration E15PT001475048/18 /41/ issued by CEIME Calibração e Comércio de Instrumentos Ltda. *Calibration details for the LFG temperature sensor used for measuring the sub-parameter $T_{t,engine-17}$:* Calibration event performed on 19/10/2016 as indicated in the Certificate of Calibration E15PT001664885/16 /36/ issued by CEIME Calibração e Comércio de Instrumentos Ltda. Sequential calibration event performed on 23/02/2018 as indicated in the Certificate of	

		Calibration E15PT001675048/18 /41/ issued by CEIME Calibração e Comércio de Instrumentos Ltda. *Calibration details for the LFG temperature sensor used for measuring the sub-parameter $T_{t,engine-18}$:* Calibration event performed on 19/10/2016 as indicated in the Certificate of Calibration E15PT001864885/16 /36/ issued by CEIME Calibração e Comércio de Instrumentos Ltda. Sequential calibration event performed on 26/02/2018 as indicated in the Certificate of Calibration E15PT001875048/18 /41/ issued by CEIME Calibração e Comércio de Instrumentos Ltda. *Calibration details for the LFG temperature sensor used for measuring the sub-parameter $T_{t,engine-19}$:* Calibration event performed on 19/10/2016 as indicated in the Certificate of Calibration E15PT001764885/16 /36/ issued by CEIME Calibração e Comércio de Instrumentos Ltda. Sequential calibration event performed on 23/02/2018 as indicated in the Certificate of Calibration E15PT001775048/18 /41/ issued by CEIME Calibração e Comércio de Instrumentos Ltda. *Calibration details for the LFG temperature sensor used for measuring the sub-parameter $T_{t,engine-20}$:* Calibration event performed on 19/10/2016 as indicated in the Certificate of Calibration E15PT002364885/16 /36/ issued by CEIME Calibração e Comércio de Instrumentos Ltda. Sequential calibration event performed on 23/02/2018 as indicated in the Certificate of Calibration E15PT002375048/18 xtemp/ issued by CEIME Calibração e Comércio de Instrumentos Ltda. *Calibration details for the LFG temperature sensor used for measuring the sub-parameter $T_{t,engine-21}$:* Calibration event performed on 19/10/2016 as indicated in the Certificate of Calibration E15PT001964885/16 /36/ issued by CEIME Calibração e Comércio de Instrumentos Ltda. Sequential calibration event performed on 23/02/2018 as indicated in the Certificate of Calibration E15PT001975048/18 /41/ issued by CEIME Calibração e Comércio de Instrumentos Ltda.
	Is the calibration interval in line with the monitoring plan from the registered PDD? If the PDD does not specify the frequency of calibration, does the selected frequency	As per both the registered PDD /2/ and ACM0001 (version 13.0.0) /7/, the installed LFG temperature sensors are to be calibrated in a frequency as per the instrument's specifications and/or instrument manufacturer's recommendations. Thus, the adopted calibration frequencies (every year for the LFG temperature

	represent good monitoring practice?	sensor used for measuring $T_{t,flares}$ and every 2 years for the LFG temperature sensors used for measuring $T_{t,engine-1}$, $T_{t,engine-2}$, (…), $T_{t,engine-21}$, as per recommendations from the equipment's manufacturers) are in line with the both the monitoring plan of the registered PDD /2/ and ACM0001 (version 13.0.0) /7/.
	Did the performed calibration(s) confirm proper functioning of monitoring equipment/instrument? (Yes / No):	Yes. The performed calibration events for the LFG temperature sensors confirm proper functioning of the measurement instruments.
	Is(are) the performed calibration(s) valid for the whole reporting period?	Not completely. As outlined in the Monitoring Report /3/ a relative delay on performing the calibration events for the installed temperature sensor used for measuring temperature of LFG which is sent to the flares ($T_{t,flares}$) has occurred: - While a calibration event was performed on 03/01/2017, the next sequential calibration event was supposed to be performed on 02/01/2018. Since such sequential calibration event was performed on 11/01/2018, a non-compliance with the applicable every year calibration frequency thus occurred. By following applicable guidance of CDM-VVS, conservative correction factors were applied to every-minute measurement values of the monitoring parameter $T_{t,flares}$ for selected periods as assessed below: Application of conservative correction factor in selected every-minute measured values for the monitoring parameter $T_{t,flares}$ Value | Period -1.0% | 03/01/2018 to 11/01/2018 The value of the conservative correction factor for the occurred relative delay in performing calibration event was determined as the higher value between the measurement deviation/error (which was identified during for the performance of the delayed calibration event in question (only for cases a positive measurement deviation/error was identified)) and the accuracy (assumed as maximum permissible measurement error) of the equipment. As a conclusion, the EPIC verification team confirmed that the conservative correction factor was consistently and systematically applied and in accordance with the CDM-VVS. EPIC was able to confirm the validity of the performed calibration events for the installed LFG temperature sensor as follows: *LFG temperature sensor used for measuring the sub-parameter $T_{t,flares}$:*

			- Calibration event performed on 03/01/2017 - valid until 02/01/2018 (1 year) - Calibration event performed on 11/01/2018 - valid until 10/01/2019 (1 year) *LFG temperature sensor used for measuring the sub-parameter $T_{t,engine-1}$:* - Calibration event performed on 19/10/2016 valid until 18/10/2018 (2 years) - Calibration event performed on 21/02/2018 valid until 20/02/2020 (2 years) *LFG temperature sensor used for measuring the sub-parameter $T_{t,engine-2}$:* - Calibration event performed on 19/10/2016 valid until 18/10/2018 (2 years) - Calibration event performed on 21/02/2018 valid until 20/02/2020 (2 years) *LFG temperature sensor used for measuring the sub-parameter $T_{t,engine-3}$:* - Calibration event performed on 19/10/2016 valid until 18/10/2018 (2 years) - Calibration event performed on 26/02/2018 valid until 25/02/2020 (2 years) *LFG temperature sensor used for measuring the sub-parameter $T_{t,engine-4}$:* - Calibration event performed on 19/10/2016 valid until 18/10/2018 (2 years) - Calibration event performed on 22/02/2018 valid until 21/02/2020 (2 years) *LFG temperature sensor used for measuring the sub-parameter $T_{t,engine-5}$:* - Calibration event performed on 19/10/2016 valid until 18/10/2018 (2 years) - Calibration event performed on 21/02/2018 valid until 20/02/2020 (2 years) *LFG temperature sensor used for measuring the sub-parameter $T_{t,engine-6}$:* - Calibration event performed on 19/10/2016 valid until 18/10/2018 (2 years) - Calibration event performed on 22/02/2018 valid until 21/02/2020 (2 years) *LFG temperature sensor used for measuring the sub-parameter $T_{t,engine-7}$:*	

			- Calibration event performed on 19/10/2016 valid until 18/10/2018 (2 years) - Calibration event performed on 26/02/2018 valid until 25/02/2020 (2 years) *LFG temperature sensor used for measuring the sub-parameter $T_{t,engine-8}$:* - Calibration event performed on 19/10/2016 valid until 18/10/2018 (2 years) - Calibration event performed on 22/02/2018 valid until 21/02/2020 (2 years) *LFG temperature sensor used for measuring the sub-parameter $T_{t,engine-9}$:* - Calibration event performed on 19/10/2016 valid until 18/10/2018 (2 years) - Calibration event performed on 26/02/2018 valid until 25/02/2020 (2 years) *LFG temperature sensor used for measuring the sub-parameter $T_{t,engine-10}$:* - Calibration event performed on 19/10/2016 valid until 18/10/2018 (2 years) - Calibration event performed on 22/02/2018 valid until 21/02/2020 (2 years) *LFG temperature sensor used for measuring the sub-parameter $T_{t,engine-11}$:* - Calibration event performed on 19/10/2016 valid until 18/10/2018 (2 years) - Calibration event performed on 26/02/2018 valid until 25/02/2020 (2 years) *LFG temperature sensor used for measuring the sub-parameter $T_{t,engine-12}$:* - Calibration event performed on 19/10/2016 valid until 18/10/2018 (2 years) - Calibration event performed on 23/02/2018 valid until 22/02/2020 (2 years) *LFG temperature sensor used for measuring the sub-parameter $T_{t,engine-13}$:* - Calibration event performed on 19/10/2016 valid until 18/10/2018 (2 years) - Calibration event performed on 26/02/2018 valid until 25/02/2020 (2 years) *LFG temperature sensor used for measuring the sub-parameter $T_{t,engine-14}$:*	

			- Calibration event performed on 19/10/2016 valid until 18/10/2018 (2 years) - Calibration event performed on 22/02/2018 valid until 21/02/2020 (2 years) *LFG temperature sensor used for measuring the sub-parameter $T_{t,engine-15}$:* - Calibration event performed on 19/10/2016 valid until 18/10/2018 (2 years) - Calibration event performed on 26/02/2018 valid until 25/02/2020 (2 years) *LFG temperature sensor used for measuring the sub-parameter $T_{t,engine-16}$:* - Calibration event performed on 19/10/2016 valid until 18/10/2018 (2 years) - Calibration event performed on 22/02/2018 valid until 21/02/2020 (2 years) *LFG temperature sensor used for measuring the sub-parameter $T_{t,engine-17}$:* - Calibration event performed on 19/10/2016 valid until 18/10/2018 (2 years) - Calibration event performed on 23/02/2018 valid until 22/02/2020 (2 years) *LFG temperature sensor used for measuring the sub-parameter $T_{t,engine-18}$:* - Calibration event performed on 19/10/2016 valid until 18/10/2018 (2 years) - Calibration event performed on 26/02/2018 valid until 25/02/2020 (2 years) *LFG temperature sensor used for measuring the sub-parameter $T_{t,engine-19}$:* - Calibration event performed on 19/10/2016 valid until 18/10/2018 (2 years) - Calibration event performed on 23/02/2018 valid until 22/02/2020 (2 years) *LFG temperature sensor used for measuring the sub-parameter $T_{t,engine-20}$:* - Calibration event performed on 19/10/2016 valid until 18/10/2018 (2 years) - Calibration event performed on 23/02/2018 valid until 22/02/2020 (2 years) *LFG temperature sensor used for measuring the sub-parameter $T_{t,engine-21}$:*	

		- Calibration event performed on 19/10/2016 valid until 18/10/2018 (2 years) - Calibration event performed on 23/02/2018 valid until 22/02/2020 (2 years)

Assessment of performed calibration events for equipment/instruments used for monitoring the parameter "Pressure of the LFG stream in time interval t" (P_t):

Data / Parameter: (as per the monitoring plan from the registered PDD):	Pressure of the LFG stream in time interval *t* (P_t)
Calibration frequency /interval for the monitoring equipment/instrument:	As per the implemented monitoring procedure at Essencis Soluções Ambientais S.A. and recommendations from the equipment's manufacturer, the installed LFG pressure sensor used for measuring pressure of the LFG which is sent to the flare (sub-parameter $P_{t,flares}$) is to be calibrated every year and the installed LFG pressure sensors used for measuring pressure of the LFG which is sent to each internal combustion gas engine (sub-parameters $P_{t,engine-1}$, $P_{t,engine-2}$, (…), $P_{t,engine-21}$) are to be calibrated every 2 years. As confirmed by the EPIC verification team through assessment of the specification sheets for the installed LFG pressure sensors, the selected calibration frequencies are as per the recommendations of the instrument manufacturer. *Calibration details for the LFG pressure sensor used for measuring the sub-parameter P_{tflare}:* Calibration event performed on 03/01/2017 as indicated in the Certificate No. 18505371257/17 /103/, issued by CEIME Calibração e Comércio de Instrumentos Ltda. Sequential calibration event performed on 11/01/2018 as indicated in the Calibration Certificate No. 18505375048/18 /98/, issued by CEIME Calibração e Comércio de Instrumentos Ltda. *Calibration details for the LFG pressure sensor used for measuring the sub-parameter $P_{t,engine-1}$:* Calibration event performed on 19/10/2016 as indicated in the Calibration Certificate No. 3K64661403476164885/16 /39/, issued by CEIME Calibração e Comércio de Instrumentos Ltda. Sequential calibration event performed on 21/02/2018 as indicated in the Calibration Certificate No. 3K64661403476175048/18 /45/, issued by CEIME Calibração e Comércio de Instrumentos Ltda. *Calibration details for the LFG pressure sensor used for measuring the sub-parameter $P_{t,engine-2}$:* Calibration event performed on 19/10/2016 as indicated in the Calibration Certificate No. 3K64661403476064885/16 /39/, issued by CEIME Calibração e Comércio de Instrumentos

			Ltda. Sequential calibration event performed on 21/02/2018 as indicated in the Calibration Certificate No. 3K64661403476075048/18 /45/, issued by CEIME Calibração e Comércio de Instrumentos Ltda. *Calibration details for the LFG pressure sensor used for measuring the sub-parameter $P_{t,engine-3}$:* Calibration event performed on 19/10/2016 as indicated in the Calibration Certificate No. 3K64661403475564885/16 /39/, issued by CEIME Calibração e Comércio de Instrumentos Ltda. Sequential calibration event performed on 26/02/2018 as indicated in the Calibration Certificate No. 3K64661403475575048/18 /45/, issued by CEIME Calibração e Comércio de Instrumentos Ltda. *Calibration details for the LFG pressure sensor used for measuring the sub-parameter $P_{t,engine-4}$:* Calibration event performed on 19/10/2016 as indicated in the Calibration Certificate No. 3K64661403475864885/16 /39/, issued by CEIME Calibração e Comércio de Instrumentos Ltda. Sequential calibration event performed on 22/02/2018 as indicated in the Calibration Certificate No. 3K64661403475875048/18 /45/, issued by CEIME Calibração e Comércio de Instrumentos Ltda. *Calibration details for the LFG pressure sensor used for measuring the sub-parameter $P_{t,engine-5}$:* Calibration event performed on 19/10/2016 as indicated in the Calibration Certificate No. 3K64661403475764885/16 /39/, issued by CEIME Calibração e Comércio de Instrumentos Ltda. Sequential calibration event performed on 21/02/2018 as indicated in the Calibration Certificate No. 3K64661403475775048/18 /45/, issued by CEIME Calibração e Comércio de Instrumentos Ltda. *Calibration details for the LFG pressure sensor used for measuring the sub-parameter $P_{t,engine-6}$:* Calibration event performed on 19/10/2016 as indicated in the Calibration Certificate No. 3K64661403475464885/16 /39/, issued by CEIME Calibração e Comércio de Instrumentos Ltda. Sequential calibration event performed on 22/02/2018 as indicated in the Calibration Certificate No. 3K64661403475475048/18 /45/, issued by CEIME Calibração e Comércio de Instrumentos Ltda. *Calibration details for the LFG pressure sensor used for measuring the sub-parameter $P_{t,engine-7}$:* Calibration event performed on 19/10/2016 as indicated in the Calibration Certificate No. 3K64661403475964885/16 /39/, issued by CEIME Calibração e Comércio de Instrumentos Ltda. Sequential calibration event performed on 26/02/2018 as indicated in the Calibration Certificate No. 3K64661403475975048/18 /45/,	

			issued by CEIME Calibração e Comércio de Instrumentos Ltda. *Calibration details for the LFG pressure sensor used for measuring the sub-parameter $P_{t,engine-8}$:* Calibration event performed on 19/10/2016 as indicated in the Calibration Certificate No. 3K64661403475664885/16 /39/, issued by CEIME Calibração e Comércio de Instrumentos Ltda. Sequential calibration event performed on 22/02/2018 as indicated in the Calibration Certificate No. 3K64661403475675048/18 /45/, issued by CEIME Calibração e Comércio de Instrumentos Ltda. *Calibration details for the LFG pressure sensor used for measuring the sub-parameter $P_{t,engine-9}$:* Calibration event performed on 19/10/2016 as indicated in the Calibration Certificate No. 3K64661403476864885/16 /39/, issued by CEIME Calibração e Comércio de Instrumentos Ltda. Sequential calibration event performed on 26/02/2018 as indicated in the Calibration Certificate No. 3K64661403476875048/18 /45/, issued by CEIME Calibração e Comércio de Instrumentos Ltda. *Calibration details for the LFG pressure sensor used for measuring the sub-parameter $P_{t,engine-10}$:* Calibration event performed on 19/10/2016 as indicated in the Calibration Certificate No. 3K64661403477364885/16 /39/, issued by CEIME Calibração e Comércio de Instrumentos Ltda. Sequential calibration event performed on 22/02/2018 as indicated in the Calibration Certificate No. 3K64661403477375048/18 /45/, issued by CEIME Calibração e Comércio de Instrumentos Ltda. *Calibration details for the LFG pressure sensor used for measuring the sub-parameter $P_{t,engine-11}$:* Calibration event performed on 19/10/2016 as indicated in the Calibration Certificate No. 3K64661403476266992/16 /39/, issued by CEIME Calibração e Comércio de Instrumentos Ltda. Sequential calibration event performed on 26/02/2018 as indicated in the Calibration Certificate No. 3K64661403476275048/18 /45/, issued by CEIME Calibração e Comércio de Instrumentos Ltda. *Calibration details for the LFG pressure sensor used for measuring the sub-parameter $P_{t,engine-12}$:* Calibration event performed on 19/10/2016 as indicated in the Calibration Certificate No. 3K64661403476564885/16 /39/, issued by CEIME Calibração e Comércio de Instrumentos Ltda. Sequential calibration event performed on 23/02/2018 as indicated in the Calibration Certificate No. 3K64661403476575048/18 /45/, issued by CEIME Calibração e Comércio de Instrumentos Ltda.	

			Calibration details for the LFG pressure sensor used for measuring the sub-parameter $P_{t,engine-13}$: Calibration event performed on 19/10/2016 as indicated in the Calibration Certificate No. 3K64661403476764885/16 /39/, issued by CEIME Calibração e Comércio de Instrumentos Ltda. Sequential calibration event performed on 26/02/2018 as indicated in the Calibration Certificate No. 3K64661403476775048/18 /45/, issued by CEIME Calibração e Comércio de Instrumentos Ltda. *Calibration details for the LFG pressure sensor used for measuring the sub-parameter $P_{t,engine-14}$:* Calibration event performed on 19/10/2016 as indicated in the Calibration Certificate No. 3K64661403476364885/16 /39/, issued by CEIME Calibração e Comércio de Instrumentos Ltda. Sequential calibration event performed on 22/02/2018 as indicated in the Calibration Certificate No. 3K64661403476375048/18 /45/, issued by CEIME Calibração e Comércio de Instrumentos Ltda. *Calibration details for the LFG pressure sensor used for measuring the sub-parameter $P_{t,engine-15}$:* Calibration event performed on 19/10/2016 as indicated in the Calibration Certificate No. 3K64661403476464885/16 /39/, issued by CEIME Calibração e Comércio de Instrumentos Ltda. Sequential calibration event performed on 26/02/2018 as indicated in the Calibration Certificate No. 3K64661403476475048/18 /45/, issued by CEIME Calibração e Comércio de Instrumentos Ltda. *Calibration details for the LFG pressure sensor used for measuring the sub-parameter $P_{t,engine-16}$:* Calibration event performed on 19/10/2016 as indicated in the Calibration Certificate No. 3K64661403476664885/16 /39/, issued by CEIME Calibração e Comércio de Instrumentos Ltda. Sequential calibration event performed on 22/02/2018 as indicated in the Calibration Certificate No. 3K64661403476675048/18 /45/, issued by CEIME Calibração e Comércio de Instrumentos Ltda. *Calibration details for the LFG pressure sensor used for measuring the sub-parameter $P_{t,engine-17}$:* Calibration event performed on 19/10/2016 as indicated in the Calibration Certificate No. 3K64661403477466992/16 /39/, issued by CEIME Calibração e Comércio de Instrumentos Ltda. Sequential calibration event performed on 23/02/2018 as indicated in the Calibration Certificate No. 3K64661403477475048/18 /45/, issued by CEIME Calibração e Comércio de Instrumentos Ltda. *Calibration details for the LFG pressure sensor used for measuring the sub-parameter $P_{t,engine-18}$:* Calibration event performed on 19/10/2016 as	

		indicated in the Calibration Certificate No. 3K64661403477064885/16 /39/, issued by CEIME Calibração e Comércio de Instrumentos Ltda. Sequential calibration event performed on 22/02/2018 as indicated in the Calibration Certificate No. 3K64661403477075048/18 /45/, issued by CEIME Calibração e Comércio de Instrumentos Ltda. *Calibration details for the LFG pressure sensor used for measuring the sub-parameter $P_{t,engine-19}$:* Calibration event performed on 19/10/2016 as indicated in the Calibration Certificate No. 3K64661403476964885/16 /39/, issued by CEIME Calibração e Comércio de Instrumentos Ltda. Sequential calibration event performed on 2302/2018 as indicated in the Calibration Certificate No. 3K64661403476975048/18 /45/, issued by CEIME Calibração e Comércio de Instrumentos Ltda. *Calibration details for the LFG pressure sensor used for measuring the sub-parameter $P_{t,engine-20}$:* Calibration event performed on 19/10/2016 as indicated in the Calibration Certificate No. 3K64661403477264885/16 /39/, issued by CEIME Calibração e Comércio de Instrumentos Ltda. Sequential calibration event performed on 23/02/2018 as indicated in the Calibration Certificate No. 3K64661403477275048/18 /45/, issued by CEIME Calibração e Comércio de Instrumentos Ltda. *Calibration details for the LFG pressure sensor used for measuring the sub-parameter $P_{t,engine-21}$:* Calibration event performed on 19/10/2016 as indicated in the Calibration Certificate No. 3K64661403477164885/16 /39/, issued by CEIME Calibração e Comércio de Instrumentos Ltda. Sequential calibration event performed on 22/02/2018 as indicated in the Calibration Certificate No. 3K64661403477175048/18 /45/, issued by CEIME Calibração e Comércio de Instrumentos Ltda.
	Is the calibration interval in line with the monitoring plan from the registered PDD? If the PDD does not specify the frequency of calibration, does the selected frequency represent good monitoring practice?	As per both the registered PDD /2/ and ACM0001 (version 13.0.0) /7/, the installed LFG pressure sensors are to be calibrated in a frequency as per the instrument's specifications and/or instrument manufacturer's recommendations. Thus, the adopted calibration frequencies every year for the LFG pressure sensor used for measuring $P_{t,flares}$ and every 2 years for the LFG pressure sensors used for measuring $P_{t,engine-1}$, $P_{t,engine-2}$, (…), $P_{t,engine-21}$, as per recommendations from the equipment's manufacturers) are in line with the both the monitoring plan of the registered PDD /2/ and ACM0001 (version 13.0.0) /7/.
	Did the performed calibration(s) confirm proper functioning of	Yes. The performed calibration events for the LFG pressure sensors confirm proper functioning of the measurement instruments.

	monitoring equipment/instrument? (Yes / No):	
	Is(are) the performed calibration(s) valid for the whole reporting period?	Not completely. As outlined in the Monitoring Report /3/ a relative delay on performing the calibration events for the installed pressure sensor used for measuring pressure of LFG which is sent to the flares ($P_{t,flares}$) has occurred: - While a calibration event was performed on 03/01/2017, the next sequential calibration event was supposed to be performed on 02/01/2018. Since such sequential calibration event was performed on 11/01/2018, a non-compliance with the applicable every year calibration frequency thus occurred. By following applicable guidance of CDM-VVS, conservative correction factors were applied to every-minute measurement values of the monitoring parameter $P_{t,flares}$ for selected periods as assessed below: Application of conservative correction factor in selected every-minute measured values for the monitoring parameter $P_{t,flares}$ Value: -1.5% — Period: 03/01/2018 to 11/01/2018 The value of the conservative correction factor for the occurred relative delay in performing calibration event was determined as the higher value between the measurement deviation/error (which was identified during for the performance of the delayed calibration event in question (only for cases a positive measurement deviation/error was identified)) and the accuracy (assumed as maximum permissible measurement error) of the equipment. As a conclusion, the EPIC verification team confirmed that the conservative correction factor was consistently and systematically applied and in accordance with the CDM-VVS. EPIC was able to confirm the validity of the performed calibration events for the installed LFG pressure sensor as follows: *LFG pressure sensor used for measuring the sub-parameter $P_{t,flares}$:* - Calibration event performed on 03/01/2017, valid until 02/01/2018 (1 year) - Calibration event performed on 11/01/2018, valid until 10/01/2019 (1 year) *LFG pressure sensor used for measuring the sub-parameter $P_{t,engine-1}$:* - Calibration event performed on 19/10/2016, valid until 18/10/2018 (2

			years) - Calibration event performed on 21/02/2018, valid until 20/02/2020 (2 years) *LFG pressure sensor used for measuring the sub-parameter $P_{t,engine-2}$:* - Calibration event performed on 19/10/2016, valid until 18/10/2018 (2 years) - Calibration event performed on 21/02/2018, valid until 20/02/2020 (2 years) *LFG pressure sensor used for measuring the sub-parameter $P_{t,engine-3}$:* - Calibration event performed on 19/10/2016, valid until 18/10/2018 (2 years) - Calibration event performed on 26/02/2018, valid until 25/02/2020 (2 years) *LFG pressure sensor used for measuring the sub-parameter $P_{t,engine-4}$:* - Calibration event performed on 19/10/2016, valid until 18/10/2018 (2 years) - Calibration event performed on 22/02/2018, valid until 21/02/2020 (2 years) *LFG pressure sensor used for measuring the sub-parameter $P_{t,engine-5}$:* - Calibration event performed on 19/10/2016, valid until 18/10/2018 (2 years) - Calibration event performed on 21/02/2018, valid until 20/02/2020 (2 years) *LFG pressure sensor used for measuring the sub-parameter $P_{t,engine-6}$:* - Calibration event performed on 19/10/2016, valid until 18/10/2018 (2 years) - Calibration event performed on 22/02/2018, valid until 21/02/2020 (2 years) *LFG pressure sensor used for measuring the sub-parameter $P_{t,engine-7}$:* - Calibration event performed on 19/10/2016, valid until 18/10/2018 (2 years) - Calibration event performed on 26/02/2018, valid until 25/02/2020 (2 years) *LFG pressure sensor used for measuring the sub-parameter $P_{t,engine-8}$:* - Calibration event performed on 19/10/2016, valid until 18/10/2018 (2	

			years) - Calibration event performed on 22/02/2018, valid until 21/02/2020 (2 years) *LFG pressure sensor used for measuring the sub-parameter $P_{t,engine-9}$:* - Calibration event performed on 19/10/2016, valid until 18/10/2018 (2 years) - Calibration event performed on 26/02/2018, valid until 25/02/2020 (2 years) *LFG pressure sensor used for measuring the sub-parameter $P_{t,engine-10}$:* - Calibration event performed on 19/10/2016, valid until 18/10/2018 (2 years) - Calibration event performed on 22/02/2018, valid until 21/02/2020 (2 years) *LFG pressure sensor used for measuring the sub-parameter $P_{t,engine-11}$:* - Calibration event performed on 19/10/2016, valid until 18/10/2018 (2 years) - Calibration event performed on 26/02/2018, valid until 25/02/2020 (2 years) *LFG pressure sensor used for measuring the sub-parameter $P_{t,engine-12}$:* - Calibration event performed on 19/10/2016, valid until 18/10/2018 (2 years) - Calibration event performed on 23/02/2018, valid until 22/02/2020 (2 years) *LFG pressure sensor used for measuring the sub-parameter $P_{t,engine-13}$:* - Calibration event performed on 19/10/2016, valid until 18/10/2018 (2 years) - Calibration event performed on 26/02/2018, valid until 25/02/2020 (2 years) *LFG pressure sensor used for measuring the sub-parameter $P_{t,engine-14}$:* - Calibration event performed on 19/10/2016, valid until 18/10/2018 (2 years) - Calibration event performed on 22/02/2018, valid until 21/02/2020 (2 years) *LFG pressure sensor used for measuring the sub-parameter $P_{t,engine-15}$:* - Calibration event performed on 19/10/2016, valid until 18/10/2018 (2	

			years) - Calibration event performed on 26/02/2018, valid until 25/02/2020 (2 years) *LFG pressure sensor used for measuring the sub-parameter $P_{t,engine-16}$:* - Calibration event performed on 19/10/2016, valid until 18/10/2018 (2 years) - Calibration event performed on 22/02/2018, valid until 21/02/2020 (2 years) *LFG pressure sensor used for measuring the sub-parameter $P_{t,engine-17}$:* - Calibration event performed on 19/10/2016, valid until 18/10/2018 (2 years) - Calibration event performed on 23/02/2018, valid until 22/02/2020 (2 years) *LFG pressure sensor used for measuring the sub-parameter $P_{t,engine-18}$:* - Calibration event performed on 19/10/2016, valid until 18/10/2018 (2 years) - Calibration event performed on 22/02/2018, valid until 21/02/2020 (2 years) *LFG pressure sensor used for measuring the sub-parameter $P_{t,engine-19}$:* - Calibration event performed on 19/10/2016, valid until 18/10/2018 (2 years) - Calibration event performed on 23/02/2018, valid until 22/02/2020 (2 years) *LFG pressure sensor used for measuring the sub-parameter $P_{t,engine-20}$:* - Calibration event performed on 19/10/2016, valid until 18/10/2018 (2 years) - Calibration event performed on 23/02/2018, valid until 22/02/2020 (2 years) *LFG pressure sensor used for measuring the sub-parameter $P_{t,engine-21}$:* - Calibration event performed on 19/10/2016, valid until 18/10/2018 (2 years) - Calibration event performed on 23/02/2018, valid until 22/02/2020 (2 years)
	Assessment of performed calibration events for equipment/instruments used for monitoring the parameter "Amount of grid electricity consumed by the project		

activity during the year y" ($EC_{PJ,grid,y}$):

Data / Parameter: (as per the monitoring plan from the registered PDD):	Amount of grid electricity consumed by the project activity during the year *y* ($EC_{PJ,grid,y}$)
Calibration frequency /interval for the monitoring equipment/instrument:	As per the implemented monitoring procedure at Essencis Soluções Ambientais S.A. and recommendations from the equipment's manufacturer, the installed electricity meters are to be calibrated every 5 years. As confirmed by the EPIC verification team through assessment of the specification sheet for the installed electricity meters /61/, the selected calibration frequency is as per the recommendations of the instrument manufacturer. For the electricity meter with Serial Number GK090P, a valid calibration event was performed on 23/11/2016 (Calibration Certificate 141819-101 /46/, issued by KRON Instrumentos Elétricos Ltda.).
Is the calibration interval in line with the monitoring plan from the registered PDD? If the PDD does not specify the frequency of calibration, does the selected frequency represent good monitoring practice?	Both the monitoring plan from the registered PDD /2/ and ACM0001 (version 13.0.0) /7/ do not specify any calibration frequency requirements for the electricity meters. The registered PDD /2/ states the following: *"Instrument will be subject to a regular maintenance and testing regime in accordance to appropriate national / international standards/requirements and/or best practice."* As per the "Tool to calculate baseline, project and/or leakage emissions from electricity consumption" /13/, the following requirement is established regarding maintenance and calibration for electricity meters: *"(...) meters should be installed, maintained and calibrated according to equipment manufacturer instructions and be in line with national standards, or, if these are not available, international standards (e.g. IEC, ISO)".* It is important to note that the installed electricity meter is approved/certified by the Brazilian national authority for metrology and standardization affairs (INMETRO). The meters are thus in conformance with INMETRO's requirements for maintenance and testing of electricity meters. Furthermore, the adopted calibration frequency is confirmed to be in accordance with related requirements/recommendations as established by the meter manufacturer. While, as confirmed by the EPIC verification team, as per the instrument manufacturer, the meters are to be calibrated every 5 years, a calibration frequency of 5 years is applied for the installed electricity meters.

Did the performed calibration(s) confirm proper functioning of monitoring equipment/instrument? (Yes / No):	Yes. The performed calibration events confirm proper functioning of the electricity meters (at the time the calibration events were performed).
Is(are) the performed calibration(s) valid for the whole reporting period?	Yes. The performed calibration events are valid for the whole considered monitoring period. EPIC was able to confirm the validity of the performed calibration events for the installed electricity meters as follows: - Electricity meter with Serial Number GK090P, calibration event performed on 23/11/2016, valid until 22/11/2021 (5 years)

Assessment of performed calibration events for equipment/instruments used for monitoring the parameter "Operation margin CO_2 emission factor in year y = Dispatch data analysis operating margin CO_2 emission factor in year y" ($EF_{grid,OM,y} = EF_{grid,OM-DD,y}$):

Data / Parameter: (as per the monitoring plan from the registered PDD):	Operation margin CO_2 emission factor in year *y* = Dispatch data analysis operating margin CO_2 emission factor in year *y* ($EF_{grid,OM,y} = EF_{grid,OM-DD,y}$)
Calibration frequency /interval for the monitoring equipment/instrument:	Not applicable. There are no measurements or measurement instruments/equipment involved for the definition of $EF_{grid,OM,y} = EF_{grid,OM-DD,y}$.
Is the calibration interval in line with the monitoring plan from the registered PDD? If the PDD does not specify the frequency of calibration, does the selected frequency represent good monitoring practice?	Not applicable. There are no measurements or measurement instruments/equipment involved for the definition of $EF_{grid,OM,y} = EF_{grid,OM-DD,y}$.
Did the performed calibration(s) confirm proper functioning of monitoring equipment/instrument? (Yes / No):	Not applicable. There are no measurements or measurement instruments/equipment involved for the definition of $EF_{grid,OM,y} = EF_{grid,OM-DD,y}$.
Is(are) the performed calibration(s) valid for the whole reporting period?	Not applicable. There are no measurements or measurement instruments/equipment involved for the definition of $EF_{grid,OM,y} = EF_{grid,OM-DD,y}$.

Assessment of performed calibration events for equipment/instruments used for monitoring the parameter "Operation of the equipment that consumes LFG (i.e. internal combustion gas engines (as additional/alternative methane destruction devices))" ($Op_{j,h}$):

Data / Parameter:	Operation of the equipment that consumes LFG

(as per the monitoring plan from the registered PDD):	(i.e. internal combustion gas engines (as additional/alternative methane destruction devices)) ($Op_{j,h}$)
Calibration frequency /interval for the monitoring equipment/instrument:	Not applicable. The operational status of the engine-generator sets is automatically registered by the electronic control system for each engine-generator set of the project's electricity generation component.
Is the calibration interval in line with the monitoring plan from the registered PDD? If the PDD does not specify the frequency of calibration, does the selected frequency represent good monitoring practice?	Not applicable.
Did the performed calibration(s) confirm proper functioning of monitoring equipment/instrument? (Yes / No):	Not applicable.
Is(are) the performed calibration(s) valid for the whole reporting period?	Not applicable.

Assessment of performed calibration events for equipment/instruments used for monitoring the parameter "Mass flow of methane in the exhaust gas of the flare on a dry basis at reference conditions in the time period t" ($F_{CH4,EG,t}$):

Data / Parameter: (as per the monitoring plan of the PDD):	Mass flow of methane in the exhaust gas of the flare on a dry basis at reference conditions in the time period *t* ($F_{CH4,EG,t}$)
Calibration frequency /interval for the monitoring equipment/instrument:	The technical test/evaluation reports issued by the third party independent inspection service company Merieux NutriSciences / Bioagri Ambiental Ltda. highlight that the utilized chromatographers and Pitot tubes were in full conformance with calibration requirements applicable for these instruments/equipment.
Is the calibration interval in line with the monitoring plan of the PDD? If the PDD does not specify the frequency of calibration, does the selected frequency represent good monitoring practice?	The registered PDD /2/ and ACM0001 (version 13.0.0) /7/ do not specify any equipment or procedural requirement for performing the related measurements and calculations for the determination of values for $F_{CH4,EG,t}$. The methodological tool "Project emissions from flaring" (version 02.0.0) /12/ establishes that *"(…) under Option B.1 the measurement is conducted by an accredited entity on a biannual basis".* Thus, no calibration frequency requirement for related instruments/equipment is specified by

	such methodological tool either. As indicated in the technical valid test/evaluation reports issued by the third party independent inspection service company BIOAGRI Ambiental Ltda. / Mérieux NutriSciences Brasil, the performed calibration events for both the utilized chromatographer and the Pitot tube were in conformance with calibration requirements applicable for these instruments.
Did the performed calibration(s) confirm proper functioning of monitoring equipment/instrument? (Yes / No):	No information, evidences/proof for performed calibration events in equipment/instruments utilized by the inspection service company Merieux NutriSciences / Bioagri Ambiental Ltda. were made available to the EPIC verification team.
Is(are) the performed calibration(s) valid for the whole reporting period?	No information, evidences/proof for performed calibration events in equipment/instruments utilized by the inspection service company Merieux NutriSciences / Bioagri Ambiental Ltda. were made available to the EPIC verification team.

Assessment of performed calibration events for equipment/instruments used for monitoring the parameter "Temperature in the exhaust gas of the enclosed flare in minute m" ($T_{EG,m}$):

Data / Parameter: (as per the monitoring plan from the registered PDD):	Temperature in the exhaust gas of the enclosed flare in minute *m* ($T_{EG,m}$)
Calibration frequency /interval for the monitoring equipment/instrument:	As per the implemented monitoring procedure at Essencis Soluções Ambientais S.A. and recommendations from the equipment's manufacturer, the installed thermocouples are to be calibrated every year. As confirmed by the EPIC verification team through assessment of the specification sheet for the installed thermocouples /74/, the selected calibration frequency is as per the recommendations of the instrument manufacturer. *Calibration details for the thermocouples used for measuring the sub-parameter $T_{EG,m,flare-1}$:* A valid calibration event performed on 07/08/2017 (Certificate of Calibration No. 95719/1/571351/17 /105/ issued by CEIME Calibração e Comércio de Instrumentos Ltda. *Calibration details for the thermocouples used for measuring the sub-parameter $T_{EG,m,flare-2}$:* A valid calibration event performed on 07/08/2017 (Certificate of Calibration No. 95719/1/771351/17 /106/ issued by CEIME Calibração e Comércio de Instrumentos Ltda. *Calibration details for the thermocouples used for measuring the sub-parameter $T_{EG,m,flare-3}$:* A valid calibration event performed on 07/08/2017 (Certificate of Calibration No. 95719/1/871351/17 /107/ issued by CEIME

		Calibração e Comércio de Instrumentos Ltda. *Calibration details for the thermocouples used for measuring the sub-parameter $T_{EG,m,flare-4}$:* A valid calibration event performed on 07/08/2017 (Certificate of Calibration No. 95719/1/971351/17 /108/ issued by CEIME Calibração e Comércio de Instrumentos Ltda.
	Is the calibration interval in line with the monitoring plan from the registered PDD? If the PDD does not specify the frequency of calibration, does the selected frequency represent good monitoring practice?	As per both the registered PDD /2/ and the methodological tool "Project emissions from flaring" (version 02.0.0) /12/, the installed thermocouples are to be replaced or calibrated in a frequency as per the instrument's specifications and/or instrument manufacturer's recommendations. Thus, the adopted calibration frequency (every year, as per recommendations from the equipment's manufacturer) is in line with the both the monitoring plan from the registered PDD /2/ and ACM0001 (version 13.0.0) /7/.
	Did the performed calibration(s) confirm proper functioning of monitoring equipment/instrument? (Yes / No):	Yes. The performed calibration events for the installed thermocouples confirm proper functioning of these measurement instruments.
	Is(are) the performed calibration(s) valid for the whole reporting period?	Yes. The performed calibration events referred in the Monitoring Report /3/ are valid for the whole monitoring period from 01/01/2018 to 30/06/2018. EPIC was able to confirm the validity of the performed calibration events for the installed thermocouples as follows: *Thermocouples used for measuring the sub-parameter $T_{EG,m,flare-1}$:* - Calibration event performed on 07/08/2017, valid until 06/08/2018 (1 year) *Thermocouples used for measuring the sub-parameter $T_{EG,m,flare-2}$:* - Calibration event performed on 07/08/2017, valid until 06/08/2018 (1 year) *Thermocouples used for measuring the sub-parameter $T_{EG,m,flare-3}$:* - Calibration event performed on 07/08/2017, valid until 06/08/2018 (1 year) *Thermocouples used for measuring the sub-parameter $T_{EG,m,flare-4}$:* - Calibration event performed on 07/08/2017, valid until 06/08/2018 (1 year)

Assessment of performed calibration events for equipment/instruments used for monitoring the parameter "Flame detection of flare in the minute m" ($Flame_m$):

Data / Parameter: (as per the monitoring plan from the registered PDD):	Flame detection of flare in the minute *m* ($Flame_m$)
Calibration frequency /interval for the monitoring equipment/instrument:	Not applicable. As confirmed by the EPIC verification team through assessment of the specification sheets for the UV Flame detectors installed at the project site /50/ /51/ /52/, the installed UV Flame detectors have a self-checking function and thus do not require any calibration.
Is the calibration interval in line with the monitoring plan from the registered PDD? If the PDD does not specify the frequency of calibration, does the selected frequency represent good monitoring practice?	Not applicable.
Did the performed calibration(s) confirm proper functioning of monitoring equipment/instrument? (Yes / No):	Not applicable.
Is(are) the performed calibration(s) valid for the whole reporting period?	Not applicable.

Assessment of performed calibration events for equipment/instruments used for monitoring the parameter "Maintenance events completed in year y as monitored by the project participants" ($Maintenance_y$):

Data / Parameter: (as per the monitoring plan from the registered PDD):	Maintenance events completed in year *y* as monitored by the project participants ($Maintenance_y$)
Calibration frequency /interval for the monitoring equipment/instrument:	Not applicable. There are no measurements involved in the monitoring of the parameter $Maintenance_y$.
Is the calibration interval in line with the monitoring plan from the registered PDD? If the PDD does not specify the frequency of calibration, does the selected frequency represent good monitoring practice?	Not applicable. There are no measurements involved in the monitoring of the parameter $Maintenance_y$.

Did the performed calibration(s) confirm proper functioning of monitoring equipment/instrument? (Yes / No):	Not applicable. There are no measurements involved in the monitoring of the parameter $Maintenance_{y.}$
Is(are) the performed calibration(s) valid for the whole reporting period?	Not applicable. There are no measurements involved in the monitoring of the parameter $Maintenance_{y.}$

Assessment of performed calibration events for equipment/instruments used for monitoring the parameter "Quantity of LPG consumed by the project activity in year y" ($FC_{LPG,y}$):

Data / Parameter: (as per the monitoring plan from the registered PDD):	Quantity of LPG consumed by the project activity in year *y* ($FC_{LPG,y}$)
Calibration frequency /interval for the monitoring equipment/instrument:	The EPIC verification team was able to confirm that the Brazilian National Agency of Petroleum, Natural Gas and Biofuels (*Agência Nacional do Petróleo, Gás Natural e Biocombustíveis - ANP*), as the federal government agency responsible for the regulation of the oil sector (including production and distribution of petroleum fuels) defines in its Resolution 15 (dated 18/05/2005) /80/ that any LPG distributor operating in Brazil should have a functioning weight scale for checking the weight of LPG commercialized in 45 kg cylinders. As also established by the Resolution 15, related weight scales should be regularly calibrated by a certification/calibration company with accreditation from the Brazilian national authority for metrology and standardization issues (INMETRO). Moreover, it was made available to the EPIC verification team a declaration/communication issued by the local LPG distribution company Cia Ultragaz S.A. (dated 26/07/2018) /60/ confirming that: - Cia Ultragaz S.A. has historically calibrated weight scales as per the Internal working procedure "Monitoramento dos equipamentos de envazamento e controle" (*Monitoring of measurement/control and bottling equipment*). Doc. Code: IT-CO-61.0008; Rev. 4 /94/. - The weight scale Mettler-Toledo - model 2180 – S/N 10423008 has been regularly calibrated as per internal working procedure IT-CO-61.0008 /94/. A copy of the working procedure IT-CO-61.0008 /85/ was also made available and was assessed by the EPIC verification team. Moreover, Certificates of Calibration /83/ for the pattern standard weights internally used by Cia Ultragaz

	S.A. (used for the performance of regular calibration events of weight scales) and a Calibration Certificate for the weight scale 10423008 (calibration event performed on 29/03/2017, Certificate No. 1573/17 /83/, issued by Grupo Caieiras Balanças) were also made available and assessed by the verification team.
Is the calibration interval in line with the monitoring plan from the registered PDD? If the PDD does not specify the frequency of calibration, does the selected frequency represent good monitoring practice?	As per the registered PDD /2/ *"(…) Periodic calibration events will be performed in the mass meters by a third party independent accredited calibration laboratory in a frequency as per instrument specifications and/or instrument manufacturer's recommendations.*" As per Resolution 15 /80/ of ANP, any LPG distributor operating in Brazil should have a functioning weight scale for checking the weight of LPG commercialized in 45 kg cylinders. As also established by the Resolution 15, related weight scales should be regularly calibrated by a certification/calibration company with accreditation from the Brazilian national authority for metrology and standardization issues (INMETRO). The adopted calibration frequency is in accordance with national requirements and also with related requirements/recommendations as established by the weight scale manufacturer.
Did the performed calibration(s) confirm proper functioning of monitoring equipment/instrument? (Yes / No):	Yes. The performed calibration event for the weight scale confirm proper functioning of the measurement instrument.
Is(are) the performed calibration(s) valid for the whole reporting period?	Yes. The performed calibration event referred in the Monitoring Report /3/ is valid for the whole monitoring period from 01/01/2018 to 30/06/2018. EPIC was able to confirm the validity of the performed calibration event for the installed weight scale as follows: - Calibration event performed on 29/03/2017, valid until 28/03/2020 (3 years)

Assessment of performed calibration events for equipment/instruments used for monitoring the parameter "Net calorific value of the fuel LPG" ($NCV_{LPG,y}$):

Data / Parameter: (as per the monitoring plan from the registered PDD):	Net calorific value of the fuel LPG ($NCV_{LPG,y}$)
Calibration frequency /interval for the monitoring equipment/instrument:	Not applicable. No measuring instrument was used for determining the value of the parameter during the considered monitoring period.
Is the calibration interval in line with the monitoring	Not applicable. No measuring instrument was used for determining the value of the parameter

plan from the registered PDD? If the PDD does not specify the frequency of calibration, does the selected frequency represent good monitoring practice?	during the considered monitoring period.
Did the performed calibration(s) confirm proper functioning of monitoring equipment/instrument? (Yes / No):	Not applicable. No measuring instrument was used for determining the value of the parameter during the considered monitoring period.
Is(are) the performed calibration(s) valid for the whole reporting period?	Not applicable. No measuring instrument was used for determining the value of the parameter during the considered monitoring period.

Assessment of performed calibration events for equipment/instruments used for monitoring the parameter "CO_2 emission factor of fuel LPG in year y" ($EF_{CO2,LPG,y}$):

Data / Parameter: (as per the monitoring plan from the registered PDD):	CO_2 emission factor of fuel LPG in year *y* ($EF_{CO2,LPG,y}$)
Calibration frequency /interval for the monitoring equipment/instrument:	Not applicable. No measuring instrument was used for determining the value of the parameter during the considered monitoring period.
Is the calibration interval in line with the monitoring plan from the registered PDD? If the PDD does not specify the frequency of calibration, does the selected frequency represent good monitoring practice?	Not applicable. No measuring instrument was used for determining the value of the parameter during the considered monitoring period.
Did the performed calibration(s) confirm proper functioning of monitoring equipment/instrument? (Yes / No):	Not applicable. No measuring instrument was used for determining the value of the parameter during the considered monitoring period.
Is(are) the performed calibration(s) valid for the whole reporting period?	Not applicable. No measuring instrument was used for determining the value of the parameter during the considered monitoring period.

Assessment of performed calibration events for equipment/instruments used for monitoring the parameter "Quantity of electricity generated in captive diesel backup generator during the year y = Quantity of electricity generated in captive diesel backup generator during the year y" ($EC_{PJ,captive,y} = EG_{Diesel\text{-}Generator,y}$):

Data / Parameter: (as per the monitoring plan from the registered PDD):	Quantity of electricity generated in captive diesel backup generator during the year y = Quantity of electricity generated in captive diesel backup generator during the year y ($EC_{PJ,captive,y} = EG_{Diesel\text{-}Generator,y}$)
Calibration frequency	As per the implemented monitoring procedure at

	/interval for the monitoring equipment/instrument:	Essencis Soluções Ambientais S.A. and recommendations from the equipment's manufacturer, the installed electricity meter is to be calibrated every 2 years. As confirmed by the EPIC verification team through assessment of the specification sheet for the installed electricity meters /101/, the selected calibration frequency is as per the recommendations of the instrument manufacturer. A valid calibration event was performed on 11/05/2017 (Calibration Certificate KD201705000018 /102/, issued by Schneider Eletric).
	Is the calibration interval in line with the monitoring plan from the registered PDD? If the PDD does not specify the frequency of calibration, does the selected frequency represent good monitoring practice?	Both the monitoring plan from the registered PDD /2/ and ACM0001 (version 13.0.0) /7/ do not specify any calibration frequency requirements for the electricity meters. As per the "Tool to calculate baseline, project and/or leakage emissions from electricity consumption" /13/, the following requirement is established regarding maintenance and calibration for electricity meters: *"(...) meters should be installed, maintained and calibrated according to equipment manufacturer instructions and be in line with national standards, or, if these are not available, international standards (e.g. IEC, ISO)".* It is important to note that the installed electricity meter is approved/certified by the Brazilian national authority for metrology and standardization affairs (INMETRO). The meters are thus in conformance with INMETRO's requirements for maintenance and testing of electricity meters. Furthermore, the adopted calibration frequency is confirmed to be in accordance with related requirements/recommendations as established by the meter manufacturer. While, as confirmed by the EPIC verification team, as per the instrument manufacturer, the meters are to be calibrated every 2 years, a calibration frequency of 2 years is applied for the installed electricity meters.
	Did the performed calibration(s) confirm proper functioning of monitoring equipment/instrument? (Yes / No):	Yes. The performed calibration events confirm proper functioning of the electricity meters (at the time the calibration events were performed).
	Is(are) the performed calibration(s) valid for the whole reporting period?	Yes. The performed calibration events are valid for the whole considered monitoring period. EPIC was able to confirm the validity of the performed calibration events for the installed electricity meters as follows:

	- Calibration event performed on 11/05/2017, valid until 10/05/2019 (2 years)

Assessment of performed calibration events for equipment/instruments used for monitoring the parameter "Saturation pressure of H_2O at temperature T_t in time interval t" ($p_{H2O,t,sat}$):

Data / Parameter: (as per the monitoring plan from the registered PDD):	Saturation pressure of H_2O at temperature T_t in time interval *t* ($p_{H2O,t,sat}$)
Calibration frequency /interval for the monitoring equipment/instrument:	Not applicable. The determination of applicable value for the monitoring parameter $p_{H2O,t,sat}$ is not based on measurements.
Is the calibration interval in line with the monitoring plan from the registered PDD? If the PDD does not specify the frequency of calibration, does the selected frequency represent good monitoring practice?	Not applicable. The determination of applicable value for the monitoring parameter $p_{H2O,t,sat}$ is not based on measurements.
Did the performed calibration(s) confirm proper functioning of monitoring equipment/instrument? (Yes / No):	Not applicable. The determination of applicable value for the monitoring parameter $p_{H2O,t,sat}$ is not based on measurements.
Is(are) the performed calibration(s) valid for the whole reporting period?	Not applicable. The determination of applicable value for the monitoring parameter $p_{H2O,t,sat}$ is not based on measurements.

Assessment of performed calibration events for equipment/instruments used for monitoring the parameter "Quantity of fuel diesel combusted by the captive off-grid electricity generator" ($FC_{Diesel,y}$):

Data / Parameter: (as per the monitoring plan from the registered PDD):	Quantity of fuel diesel combusted by the captive off-grid electricity generator ($FC_{Diesel,y}$)
Calibration frequency /interval for the monitoring equipment/instrument:	The EPIC verification team was able to confirm that for the particular case of the installed fuel meter (positioned in the fuel supply hose of the backup captive off-grid electricity generator (fuelled by diesel)), there are no regular calibration to be performed as per applicable national/international standards/requirements and/or as per recommendations from instrument manufacturer. Moreover, since the installed fuel meter is confirmed as being tested/calibrated as part of its manufacturing and delivery processes (with no further calibration being required by its manufacturer) and by also taking into account the not-frequent use of the installed backup electricity generator fuelled by diesel, it is the opinion of the EPIC verification team the assumption based on good practice that further

		testing/calibration events in the installed fuel meter are only to be performed in the instrument with at least an every 3 years frequency is deemed appropriate.
	Is the calibration interval in line with the monitoring plan from the registered PDD? If the PDD does not specify the frequency of calibration, does the selected frequency represent good monitoring practice?	As per the PDD, periodic calibration events are to be performed in a frequency as per instrument specifications and/or instrument manufacturer's recommendations. Also as per the PDD, the instrument is to be subject to a regular maintenance and testing regime in accordance to appropriate national /international standards/requirements and/or best practice. Based on its sectoral expertise and experience with assessment of similar CDM project activities, it is the opinion of the EPIC verification team that the selected calibration frequency for the instrument (at least every 3 years) does represent good practice.
	Did the performed calibration(s) confirm proper functioning of monitoring equipment/instrument? (Yes / No):	Not applicable. While the installed fuel meter is confirmed as being tested/calibrated as part of its manufacturing and delivery processes and by also taking into account that further testing/calibration events in meter are only to be performed with at least an every 3 years frequency, no additional calibration events was thus yet performed in the instrument by a third party independent accredited calibration laboratory after its installation in July/2016.
	Is(are) the performed calibration(s) valid for the whole reporting period?	Yes. While the installed fuel meter is confirmed as being tested/calibrated as part of its manufacturing and delivery processes and further testing/calibration events in meter are only to be performed with at least an every 3 years frequency, it is thus assumed that testing occurred as part of the manufacturing and delivery processes for the instrument yet ensures proper functioning of the meter.

Assessment of performed calibration events for equipment/instruments used for monitoring the parameter "Net calorific value of the fuel diesel in year y" ($NCV_{Diesel,y}$):

Data / Parameter: (as per the monitoring plan from the registered PDD):	Net calorific value of the fuel diesel in year y $NCV_{Diesel,y}$
Calibration frequency /interval for the monitoring equipment/instrument:	Not applicable. The determination of applicable value for the monitoring parameter $NCV_{Diesel,y}$ is not based on measurements.
Is the calibration interval in line with the monitoring plan from the registered PDD? If the PDD does not specify the frequency of calibration, does the selected frequency	Not applicable. The determination of applicable value for the monitoring parameter $NCV_{Diesel,y}$ is not based on measurements.

represent good monitoring practice?	
Did the performed calibration(s) confirm proper functioning of monitoring equipment/instrument? (Yes / No):	Not applicable. The determination of applicable value for the monitoring parameter $NCV_{Diesel,y}$ is not based on measurements.
Is(are) the performed calibration(s) valid for the whole reporting period?	Not applicable. The determination of applicable value for the monitoring parameter $NCV_{Diesel,y}$ is not based on measurements.

Assessment of performed calibration events for equipment/instruments used for monitoring the parameter "CO_2 emission factor of fuel diesel in year y" ($EF_{CO2,Diesel,y}$):

Data / Parameter: (as per the monitoring plan from the registered PDD):	CO_2 emission factor of fuel diesel in year y ($EF_{CO2,Diesel,y}$)
Calibration frequency /interval for the monitoring equipment/instrument:	Not applicable. The determination of applicable value for the monitoring parameter $EF_{CO2,Diesel,y}$ is not based on measurements.
Is the calibration interval in line with the monitoring plan from the registered PDD? If the PDD does not specify the frequency of calibration, does the selected frequency represent good monitoring practice?	Not applicable. The determination of applicable value for the monitoring parameter $EF_{CO2,Diesel,y}$ is not based on measurements.
Did the performed calibration(s) confirm proper functioning of monitoring equipment/instrument? (Yes / No):	Not applicable. The determination of applicable value for the monitoring parameter $EF_{CO2,Diesel,y}$ is not based on measurements.
Is(are) the performed calibration(s) valid for the whole reporting period?	Not applicable. The determination of applicable value for the monitoring parameter $EF_{CO2,Diesel,y}$ is not based on measurements.

Assessment of performed calibration events for equipment/instruments used for monitoring the parameter "Average transmission and distribution losses for providing electricity to the grid and/or for grid sourced electricity consumed by the project activity" ($TDL_{grid,y}$):

Data / Parameter: (as per the monitoring plan from the registered PDD):	Average transmission and distribution losses for providing electricity to the grid and/or for grid sourced electricity consumed by the project activity $TDL_{grid,y}$
Calibration frequency /interval for the monitoring equipment/instrument:	Not applicable. The determination of applicable value for the monitoring parameter $TDL_{grid,y}$ is not based on measurements.

Is the calibration interval in line with the monitoring plan from the registered PDD? If the PDD does not specify the frequency of calibration, does the selected frequency represent good monitoring practice?	Not applicable. The determination of applicable value for the monitoring parameter $TDL_{grid,y}$ is not based on measurements.
Did the performed calibration(s) confirm proper functioning of monitoring equipment/instrument? (Yes / No):	Not applicable. The determination of applicable value for the monitoring parameter $TDL_{grid,y}$ is not based on measurements.
Is(are) the performed calibration(s) valid for the whole reporting period?	Not applicable. The determination of applicable value for the monitoring parameter $TDL_{grid,y}$ is not based on measurements.

Assessment of performed calibration events for equipment/instruments used for monitoring the parameter "Average technical transmission and distribution losses for electricity sourced by the captive electricity generator" ($TDL_{captive,y}$):

Data / Parameter: (as per the monitoring plan from the registered PDD):	Average technical transmission and distribution losses for electricity sourced by the captive electricity generator $TDL_{captive,y}$
Calibration frequency /interval for the monitoring equipment/instrument:	Not applicable. The determination of applicable value for the monitoring parameter $TDL_{captive,y}$ is not based on measurements.
Is the calibration interval in line with the monitoring plan from the registered PDD? If the PDD does not specify the frequency of calibration, does the selected frequency represent good monitoring practice?	Not applicable. The determination of applicable value for the monitoring parameter $TDL_{captive,y}$ is not based on measurements.
Did the performed calibration(s) confirm proper functioning of monitoring equipment/instrument? (Yes / No):	Not applicable. The determination of applicable value for the monitoring parameter $TDL_{captive,y}$ is not based on measurements.
Is(are) the performed calibration(s) valid for the whole reporting period?	Not applicable. The determination of applicable value for the monitoring parameter $TDL_{captive,y}$ is not based on measurements.

It is important to note that, as further assessed in Section E.6.2., the monitoring plan from the registered PDD /2/ also includes the following monitoring parameters of which monitoring was not required during the considered monitoring period (since the methodological calculation and/or monitoring options for which they are applicable were not selected):

	Parameter not monitored during the considered monitoring period Volumetric flow of LFG stream in time interval *t* on a dry basis ($V_{t,db}$) Volumetric fraction of CH_4 in the collected LFG in time interval *t* on a dry basis ($v_{CH4,t,db}$) Mass flow of the LFG stream in time interval *t* on dry basis ($M_{t,db}$) No assessment details are thus included for the parameters listed above.
Findings	A CAR was raised regarding compliance with the calibration frequency requirements for measuring instruments/equipment: **CAR 4:** Description of performed calibration events valid for instruments used for monitoring the parameters "Temperature of the LFG stream in time interval t" (T_t), "Pressure of the LFG stream in time interval t" (P_t), "Temperature in the exhaust gas of the enclosed flare in minute m" ($T_{EG,m}$), "Quantity of electricity generated in captive diesel backup generator during the year y = Quantity of electricity generated in captive diesel backup generator during the year y" ($EC_{PJ,captive,y}$ = $EG_{Diesel-Generator,y}$) and "Quantity of LPG consumed by the project activity in year *y"* ($FC_{LPG,y}$) are not complete.
Conclusion	As a conclusion, upon closure of the raised CAR, the EPIC verification team was able to confirm that the calibration events performed for all monitoring instruments of the project activity were conducted in accordance with the monitoring plan from the registered PDD /2/, ACM0001 (version 13.0.0) /7/) and applicable tools during the monitoring period from 01/01/2018 to 30/06/2018. Documented evidences for performed calibration events allowed the EPIC verification team to confirm that applied monitoring instruments/equipped operated under appropriate manner during the considered monitoring period. Moreover, the EPIC verification team has also confirmed that no calibration event valid for the monitoring period from 01/01/2018 to 30/06/2018 has identified an error beyond the maximum permissible error of the respective measuring instrument. In summary, compliance with applicable calibration frequency requirements was confirmed for all monitoring instruments/equipment.

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

Means of verification	The EPIC verification team assessed whether the methods and formulae used to determine baseline emissions for the considered monitoring period are appropriate. The performed assessment encompassed checking whether applied methods and formulae (as described in the monitoring plan from the registered PDD and applicable methodology + methodological tools) were correctly applied, including confirmation whether the Monitoring Report /3/ includes all parameters and monitored data at the intervals as required by the applied methodology + methodological tools as per the registered PDD /2/. The correct application of emission factor and default values (ex-ante determined/fixed parameters as per the registered PDD) /2/ was also verified. Through assessment of the latest version of the Monitoring Report /3/, the EPIC verification team was able to verity that as correctly indicated in this report, and also as established by ACM0001 (version 13.0.0) /7/, applied methodological tools and the registered PDD /2/; baseline emissions (BE_y) for the considered monitoring period are calculated as follows: $BE_y = BE_{CH4,y}$ Where:

$BE_{CH4,y}$ Baseline emissions of methane from the SWDS. $BE_{CH4,y}$ is determined as follows:

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

Where:

OX_{top_layer} Fraction of methane in the LFG that would be oxidized in the top layer of the SWDS in the baseline scenario. As indicated in the registered PDD /2/, OX_{top_layer} is *ex-ante* determined as 10%.

$GWP_{CH4,y}$ Global warming potential of CH_4. As indicated in the registered PDD /2/, $GWP_{CH4,y}$ is *ex-ante* determined as 25.

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

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

Where:

$F_{CH4,PJ,capt,y}$ Amount of methane collected by the project activity. In the particular case of the project activity, $F_{CH4,PJ,capt,y}$ is determined as follows:

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

Where:

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

$F_{CH4,EL,y}$ Amount of methane which is destroyed through combustion of collected LFG in the internal combustion gas engines. Details for the determination of every-minute values for $F_{CH4,EL,y}$ are presented below (under "*Assessment details for the determination of every-minute values for the calculation parameter $F_{CH4,EL,y}$*"). As correctly outlined in the latest version of the Monitoring Report /3/, for the particular context of determination of $F_{CH4,BL,y}$, the working hours and/or other status/conditions of which each device and status of the internal combustion gas engines are not accounted, thus potentially maximizing the determined value for $F_{CH4,BL,y}$ as a conservative approach.

As confirmed by the EPIC verification team, the calculated

accumulated value for $F_{CH4,BL,y}$ for the considered monitoring period is correctly determined as 5,415 tCH_4.

$F_{CH4,PJ,y}$ Amount of methane which is destroyed by the project activity through combustion of collected LFG in project's methane destruction devices. As outlined in the latest version of the Monitoring Report /3/ and in accordance with the registered PDD /2/, $F_{CH4,PJ,y}$ is correctly determined as follows:

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

Where:

$F_{CH4,EL,y}$ Amount of methane which is destroyed through combustion of collected LFG in the internal combustion gas engines. Details for the determination of every-minute values for $F_{CH4,EL,y}$ for each individual internal combustion gas engine during the are presented below (under "*Assessment details for the determination of every-minute values for the calculation parameter $F_{CH4,EL,y}$*").

$F_{CH4,flared,y}$ Amount of methane which is destroyed through combustion of LFG in the flares. In accordance with requirements from the registered PDD /2/ and by correctly following the applicable guidance of the "Tool to determine the mass flow of a greenhouse gas in a gaseous stream" /14/, every-minute values of $F_{CH4,flared,y}$ are determined for each individual flare within the considered monitoring period as the difference between the amount of methane supplied to the particular flare and residual methane project emissions from combustion of LFG for each corresponding flare as follows:

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

Where:

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

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

Assessment details for the determination of every-minute values for the calculation

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

In accordance with ACM0001 version 13.0.0) [7], the amount of methane in the LFG which is sent to the flares ($F_{CH4,sent,flare,y}$) is confirmed by the EPIC verification team as being determined for each individual flare (calculation sub-parameters $F_{CH4,sent\_flare,y,flare-1}$, $F_{CH4,sent\_flare,y,flare-2}$, $F_{CH4,sent\_flare,y,flare-3}$ and $F_{CH4,sent\_flare,y,flare-4}$) by following the applicable guidance of the methodological tool "Tool to determine the mass flow of a greenhouse gas in a gaseous stream" [14]. For the considered monitoring period, Option 2 / C (Simplified calculation without measurement of the moisture content / volume flow of LFG and volumetric fraction of CH_4 in collected LFG being measured in wet basis) of this methodological tool is selected[8]. The EPIC verification team confirmed that, as per Option C of this methodological tool, the amount of methane in the LFG which is sent to each installed flare is correctly determined as follows for each minute *m* of the considered monitoring period:

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

Where:

Sulfix "*Flare-n*" represents the flare number: Flare 1, Flare 2, Flare 3 and Flare 4

$V_{t,wb,n,flare-n}$ Volumetric flow of the gaseous stream (LFG) in time interval *t* on a wet basis at normal conditions. As confirmed by the EPIC verification team, while the sub-parameters for the monitoring parameter $V_{t,wb,flare-n}$ are already measured in normal conditions, there are no need to calculate every-minute values of the calculation parameter $V_{t,wb,n,flare-n}$ valid for each flare (calculation sub-parameters $V_{t,wb,n,flare-1}$, $V_{t,wb,n,flare-2}$, $V_{t,wb,n,flare-3}$ and $V_{t,wb,n,flare-4}$) by using LFG pressure and LFG temperature data.
As correctly outlined in the Monitoring Report [3], while the installed LFG flow meters already measure volumetric flow of LFG in Nm³ wet gas/h (normal conditions), the following assumption is thus correctly regarded as valid:

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

Where:

$V_{t,wb,flare-n}$ Volumetric flow of the gaseous stream (LFG) in time interval *t* on a wet basis for flare *n* (n = 1, 2, 3 and 4)[9]. As previously described in Section E.6.2. and correctly indicated in the Monitoring Report [3], as the installed LFG flow meters already measure volumetric flow of LFG in Nm³ wet gas/h (normal conditions), no measurements of "Temperature of the LFG stream in time interval *t*" (T_t) (sub-parameter $T_{t,flares}$), "Pressure of the LFG stream in

[8] As confirmed by the EPIC verification team, the registered PDD [2] states the following regarding the determination of values for $F_{CH4,sent\_flare,y}$:

> *"(…) Applicable guidance of the "Tool to determine the mass flow of a greenhouse gas in a gaseous stream" will be applied to determine $F_{CH4,sent\_flare,y}$ by using Option 2: Simplified calculation without measurement of the moisture content, and one of the options A, C or D. The selection of the determination option will depend on project conditions and equipment to be installed.",*

The applied calculation approach for determination of every-minute values for the calculation parameter $F_{CH4,sent\_flare,y}$ during the considered monitoring period is thus confirmed as being under conformance with provisions of both ACM0001 (version 13.0.0) and the PDD.

[9] As correctly outlined in the latest version of the Monitoring Report [3], while measurements for $V_{t,wb}$ are performed by the installed 4 LFG flow meters in Nm^3/h (one flow meter for each individual installed flare), the monitoring parameter $V_{t,wb}$ is thus measured, recorded and reported on the basis of the sub-parameters $V_{t,wb,flare-1}$, $V_{t,wb,flare-2}$ $V_{t,wb,flare-3}$ and $V_{t,wb,flare-4}$ with such sub-parameters being equivalent to the calculation sub-parameters $V_{t,wb,n,flare-1}$, $V_{t,wb,n,flare-2}$, $V_{t,wb,n,flare-3}$ and $V_{t,wb,n,flare-4}$.

time interval *t*" (P_t) (sub-parameter $P_{t,flares}$) are required for the determination of every-minute values of $V_{t,wb,n,flare-n}$. Further assessment details for the monitoring parameter $V_{t,wb,j}$ (sub-parameters $V_{t,wb,flare-1}$, $V_{t,wb,flare-2}$, $V_{t,wb,flare-3}$ and $V_{t,wb,flare-4}$) are included in Section E.6.2 and E.7.

$v_{CH4,t,wb}$ Volumetric fraction of CH_4 in the gaseous stream in time interval *t* on a wet basis. Further assessment details for the monitoring parameter $v_{CH4,t,wb}$ are included in Section E.6.2 and E.7.

$\rho_{CH4,n}$ Density of CH_4 in the gaseous stream (LFG) at normal conditions. As per the selected determination procedure of the "Tool to determine the mass flow of a greenhouse gas in a gaseous stream" /14/, $\rho_{CH4,n}$ is correctly calculated as follows:

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

Where:

P_n Absolute pressure at normal conditions. As further assessed in Section E.6.1, P_n is *ex-ante* determined as 101,325 Pa.

T_n Temperature at normal conditions. As further assessed in Section E.6.1, T_n is *ex-ante* determined as 273.15 Kelvin.

MM_i Molecular mass of greenhouse gas *i* (*i* = CH_4). As further assessed in Section E.6.1, MM_i is *ex-ante* determined as 16.04 kg/mol.

R_u Universal ideal gases constant. As further assessed in Section E.6.1, R_u is *ex-ante* determined as 8,314 $Pa.m^3/kmol.K$.

The EPIC verification team was able to verify that the value of the calculation parameter $\rho_{CH4,n}$ was correctly calculated and reported in the monthly emission reduction calculation spreadsheets /5/ as 0.7156650 $kgCH_4/m^3CH_4$.

Assessment details for determination of every-minute values for $PE_{flare,y}$:

In accordance with applicable guidance from both the methodological tool "Project emissions from flaring" /12/ and from the registered PDD /2/, every-minute values of $PE_{flare,y}$ for each of the installed flares (calculation sub-parameters $PE_{flare,y,flare-1}$, $PE_{flare,y,flare-2}$, $PE_{flare,y,flare-3}$ and $PE_{flare,y,flare-4}$) are determined as a function of every-minute records of mass flow of methane sent to the flare in question (for each flare n, $F_{CH4,RG,m,flare-n} = F_{CH4,sent\_flare,y,flare-n}$, where *n* = 1, 2, 3 and 4) as well as based on *ex-post* calculated values for flare efficiency for the flare *n* ($\eta_{flare,m}$). As assessed by the EPIC verification team, values of $PE_{flare,y}$ are correctly calculated for the considered monitoring period as follows:

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

Where:

$F_{CH4,RG,m}$ Methane mass flow in the residual gas for the considered flare. For each minute *m* of the considered monitoring period and for each individual flare *n*, values for $F_{CH4,RG,m}$ are equal to the measured and reported every-minute values of the monitoring parameter "Amount of methane in the LFG which is sent to the flares" ($F_{CH4,sent\_flare,y}$) for the flare in question (calculation sub-parameters $F_{CH4,sent\_flare,y,flare-1}$, $F_{CH4,sent\_flare,y,flare-2}$,

$F_{CH4,sent\_flare,y,flare-3}$ and $F_{CH4,sent\_flare,y,flare-4}$)). As per the applicable guidance of the methodological tool "Project emissions from flaring" and also as per the PDD, the methane mass flow in the residual gas (in a dry basis) for each minute *m* of the two time periods in year *y* during which the flare efficiency is measured shall be calculated by following the applicable guidance of the methodological tool "Tool to determine the mass flow of a greenhouse gas in a gaseous stream".

Assessment details for the determination of $F_{CH4,RG,t}$:
As per the applicable guidance of the methodological tool "Project emissions from flaring" /12/ and also as per the registered PDD /2/, values of $F_{CH4,RG,t}$ shall be calculated by following the applicable guidance of the "Tool to determine the mass flow of a greenhouse gas in a gaseous stream" /14/. Values for the parameter $F_{CH4,RG,t}$ valid for each flare (calculation sub-parameters $F_{CH4,RG,t,flare-1}$, $F_{CH4,RG,t,flare-2}$, $F_{CH4,RG,t,flare-3}$ and $F_{CH4,RG,t,flare-4}$) are thus calculated as follows:

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

Where:

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

$v_{CH4,t,db}$ Volumetric fraction of greenhouse gas *i* (*i* = CH_4) in the gaseous stream in a time interval *t* on a dry basis. As confirmed by the EPIC verification team, Footnote 3 of the methodological tool "Tool to determine the mass flow of a greenhouse gas in a gaseous stream" /14/: states the following:

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

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

$V_{t,db,n,flare-n}$ Volumetric flow of the gaseous stream (LFG) in time interval *t* on a dry basis for flare *n* (n = 1, 2, 3 and 4). As per Option B of the applicable methodological "Tool to determine the mass flow of a greenhouse gas in a gaseous stream" /14/, the volumetric flow of the gaseous stream on a dry basis for each flare (calculation sub-parameters $V_{t,db,n,flare-1}$, $V_{t,db,n,flare-2}$, $V_{t,db,n,flare-3}$ and $V_{t,db,n,flare-4}$) is correctly determined by converting the measured volumetric flow from wet basis to dry basis as follows:

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

Where:

$V_{t,wb,n,flare-n}$ Volumetric flow of the gaseous stream (LFG) in time interval *t* on a wet basis at normal conditions. Further details of $V_{t,wb,n,flare-n}$ are presented above

under the sub-section "*Determination of every-minute values for the calculation parameter $F_{CH4,sent\_flare,y}$*".

$v_{H2O,t,db}$ Volumetric fraction of H_2O in the gaseous stream in time interval *t* on a dry basis. As per applicable guidance of the methodological "Tool to determine the mass flow of a greenhouse gas in a gaseous stream" /14/, $v_{H2O,t,db}$ is calculated as follows:

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

Where:

MM_{H2O} Molecular mass of H_2O. *Ex-ante* determined as 18.0152 kg/kmol.

$MM_{t,db}$ Molecular mass of the gaseous stream in time interval *t* on a dry basis. As per applicable guidance of the methodological "Tool to determine the mass flow of a greenhouse gas in a gaseous stream" /14/, $MM_{t,db}$ is calculated as follows:

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

Where:

k All gases, except H_2O, contained in the gaseous stream (e.g. N_2, CO_2, O_2, CO, H_2, CH_4, N_2O, NO, NO_2, SO_2, SF_6 and PFCs). See simplification below.

$V_{k,t,db}$ Volumetric fraction of gas *k* in the gaseous stream in time interval *t* on a dry basis. As confirmed by the EPIC verification team, applicable guidance of the methodological "Tool to determine the mass flow of a greenhouse gas in a gaseous stream" /14/ established the following:

> "*(…) The determination of the molecular mass of the gaseous stream ($MM_{t,db}$) requires measuring the volumetric fraction of all gases (k) in the gaseous stream. However, as a simplification, the volumetric fraction of only the gases k that are greenhouse gases and are considered in the emission reduction*

			calculation in the underlying methodology must be monitored and the difference to 100% may be considered as pure nitrogen." As also confirmed by the EPIC verification team, ACM0001 (version 13.0.0) /7/ does not include any restriction to such simplification. Thus, only the volumetric fraction of gases that are greenhouse gases and are correctly considered in related calculations (CH_4 in the particular case of the project activity) should be measured and the difference to 100% is just considered as pure nitrogen. Further details for the determination of the volumetric fraction of CH_4 in the gaseous stream ($V_{k,t,db}$ = $v_{CH4,t,db}$) are presented above under the calculation parameter $v_{CH4,t,db}$.
		MM_k	Molecular mass of gas *k* (*k* = CH_4 and N_2). Under conformance with the PDD /2/, ex-ante determined values of the molecular mass of CH_4 and N_2 of 16.04 and 28.01 respectively are correctly considered.
		$m_{H2O,t,db}$	Absolute humidity in the gaseous stream in time interval *t* n a dry basis. As per Option 2 of the methodological "Tool to determine the mass flow of a greenhouse gas in a gaseous stream" /14/, by conservatively assuming that the gaseous stream is saturated ($m_{H2O,t,db}$ = $m_{H2O,t,db,Sat}$), $m_{H2O,t,db}$ is correctly calculated as follows [10]:

[10] It is important to note that the simplified calculation for the absolute humidity of the gaseous stream ($m_{H2O,t,db}$) presented in Option 2 of the methodological "Tool to determine the mass flow of a greenhouse gas in a gaseous stream" shall be applied by assuming the gaseous stream is dry or saturated depending on which is the conservative situation.

As confirmed by the EPIC verification team, footnote 4 of the "Tool to determine the mass flow of a greenhouse gas in a gaseous stream" states the following:

> "*An assumption that the gaseous stream is saturated is conservative for the situation that the mass flow of greenhouse gas I is underestimated (applicable for calculating baseline emissions). Conversely, an assumption that the gas stream is dry is conservative for the situation that the greenhouse gas t is overestimated (applicable for calculating project emissions).*"

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

Where:

MM_{H2O}	Molecular mass of H_2O. As further assessed in Section E.6.1, the ex-ante selected value of 18.0152 (as indicated in the registered PDD [2]) is correctly applied.
P_t	Absolute pressure of the gaseous stream in time interval *t*. Further assessment details for the monitoring parameter P_t (sub-parameter $P_{t,flares}$) are included in Section E.6.2.
$MM_{t,db}$	Molecular mass of the gaseous stream in a time interval *t* on a dry basis. Further assessment details for the determination of $MM_{t,db}$ are presented above.
$p_{H2O,t,Sat}$	Saturation pressure of H_2O at temperature T in time *t*, Further assessment details for the monitoring parameter $p_{H2O,t,Sat}$ are included in Section E.6.2.

$\eta_{flare,m}$ Flare efficiency in minute *m*. As confirmed by the EPIC verification team, for the considered monitoring period, two different approaches from the methodological tool "Project emissions from flaring" ere applied for the determination of $\eta_{flare,m}$ for the installed 4 high temperature enclosed flares as follows:

Assessment details for determination of every-minute values of $\eta_{flare,m,flare-1}$, $\eta_{flare,m,flare-2}$ and $\eta_{flare,m,flare-3}$ (Flare 1, Flare 2 and Flare 3):

For the considered monitoring period, as confirmed by the EPIC verification team, every-minute values of $\eta_{flare,m}$ for the installed flares 1, 2 and 3 (based on the sub-parameters $\eta_{flare,m,flare-1}$, $\eta_{flare,m,flare-2}$ and $\eta_{flare,m,flare-3}$) are determined based on performed measurements by following applicable guidance of Option B.1 of the methodological tool Project emissions from flaring" [12]. As required by this determination option, related measurements to determine the efficiency of each one of the flares (measurements for the monitoring parameter $F_{CH4,EG,t}$) were performed by an accredited independent third party entity (e.g. an independent inspection/analysis service company) on a biannual basis. The calculated flare efficiency ($\eta_{flare,calc,m}$) for each flare is determined as the average of two performed measurements within the year encompassed by the considered monitoring period as follows:

In this particular case, $m_{H2O,t,db}$ is calculated for the determination of the mass flow of methane in the residual gas on a dry basis during the time period *t* ($F_{CH4,RG,t}$). While $F_{CH4,RG,t}$ is used for the determination of the parameter $PE_{flare,y}$ (project emissions from flaring the residual gas), the assumption that the gaseous stream is dry (conservatively applicable for calculating project emissions) would not be conservative in this case as an overestimation of the amount of methane in the residual gas would actually increase the calculated efficiency of the flares, thus resulting in a reduction of $PE_{flare,y}$ and consequent increment of emission reductions.

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

Where:

$F_{CH4,EG,t}$ Mass flow of methane in the exhaust gas of the flare on a dry basis at reference conditions in the time period *t*. For determining $F_{CH4,EG,t}$, biannual measurements of residual methane in the exhaust gas of the flares during a considered time and measurements of speed of exhaust gas of the flares were performed by the third party inspection service company Merieux NutriSciences / Bioagri Ambiental Ltda. This inspection service company is specialized in measurements of air emissions and inspections for air pollutants. Further assessment details for the ex-post determination of values for $F_{CH4,EG,t}$ are included in Section E.6.2.

t The two time periods in year *y* during which the flare efficiency is measured. Each measurement event takes a minimum duration of one hour. The time interval between the measurement events is at least six months. Further assessment details are included in Section E.6.2.

$F_{CH4,RG,t}$ Mass flow of methane in the residual gas on a dry basis at reference conditions in the time period *t.*

Assessment details for the determination of $F_{CH4,RG,t}$:
As per the applicable guidance of the methodological tool "Project emissions from flaring" /12/ and also as per the PDD /2/, values of $F_{CH4,RG,t}$ shall be calculated by following the applicable guidance of the "Tool to determine the mass flow of a greenhouse gas in a gaseous stream" /14/. Values for the parameter $F_{CH4,RG,t}$ valid for each flare (calculation sub-parameters $F_{CH4,RG,t,flare-1}$, $F_{CH4,RG,t,flare-2}$, $F_{CH4,RG,t,flare-3}$ and $F_{CH4,RG,t,flare-4}$) are thus calculated as follows:

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

Where:

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

$v_{CH4,t,db}$ Volumetric fraction of greenhouse gas *i* (*i* = CH_4) in the gaseous stream in a time interval *t* on a dry basis. As confirmed by the EPIC verification team, Footnote 3 of the methodological tool "Tool to determine the mass flow of a greenhouse gas in a gaseous stream" /14/: states the following:

"*(…) Flow measurement on a dry basis is not feasible at reasonable costs for a wet gaseous stream, so there will be no difference in the readings for volumetric fraction in wet basis analyzers and dry basis analyzers and both types can be used indistinctly for calculation Options A and D*."

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

minute values for the calculation parameter $F_{CH4,sent\_flare,y}$").

$V_{t,db,n,flare-n}$ Volumetric flow of the gaseous stream (LFG) in time interval *t* on a dry basis for flare *n* (n = 1, 2, 3 and 4). As per Option B of the applicable methodological "Tool to determine the mass flow of a greenhouse gas in a gaseous stream" /14/, the volumetric flow of the gaseous stream on a dry basis for each flare (calculation sub-parameters $V_{t,db,n,flare-1}$, $V_{t,db,n,flare-2}$, $V_{t,db,n,flare-3}$ and $V_{t,db,n,flare-4}$) is determined by converting the measured volumetric flow from wet basis to dry basis as follows:

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

Where:

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

$v_{H2O,t,db}$ Volumetric fraction of H_2O in the gaseous stream in time interval *t* on a dry basis. As per applicable guidance of the methodological "Tool to determine the mass flow of a greenhouse gas in a gaseous stream" /14/, $v_{H2O,t,db}$ is calculated as follows:

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

Where:

MM_{H2O} Molecular mass of H_2O. *Ex-ante* determined as 18.0152 kg/kmol.

$MM_{t,db}$ Molecular mass of the gaseous stream in time interval *t* on a dry basis. As per applicable guidance of the methodological "Tool to determine the mass flow of a greenhouse gas in a gaseous stream" /14/, $MM_{t,db}$ is calculated as follows:

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

Where:

k All gases, except H_2O, contained in the gaseous stream (e.g. N_2, CO_2, O_2, CO, H_2, CH_4, N_2O, NO, NO_2, SO_2, SF_6 and PFCs). See simplification below.

$V_{k,t,db}$ Volumetric fraction of gas *k* in the gaseous stream in time interval *t* on a dry basis. As confirmed by the EPIC verification team, applicable guidance of the methodological "Tool to determine the mass flow of a greenhouse gas in a gaseous stream" /14/ established the following:

			"*(…) The determination of the molecular mass of the gaseous stream ($MM_{t,db}$) requires measuring the volumetric fraction of all gases (k) in the gaseous stream. However, as a simplification, the volumetric fraction of only the gases k that are greenhouse gases and are considered in the emission reduction calculation in the underlying methodology must be monitored and the difference to 100% may be considered as pure nitrogen."* As also confirmed by the EPIC verification team, ACM0001 (version 13.0.0) /7/ does not include any restriction to such simplification. Thus, only the volumetric fraction of gases that are greenhouse gases and are correctly considered in related calculations (CH_4 in the particular case of the project activity) should be measured and the difference to 100% is just considered as pure nitrogen. Further details for the determination of the volumetric fraction of CH_4 in the gaseous stream ($V_{k,t,db}$ = $v_{CH4,t,db}$) are presented above under the calculation parameter $v_{CH4,t,db}$.
		MM_k	Molecular mass of gas *k* (*k* = CH_4 and N_2). As indicated in the PDD /2/, the molecular mass of CH_4 and N_2 are ex-ante determined as 16.04 and 28.01 respectively.
		$m_{H2O,t,db}$	Absolute humidity in the gaseous stream in time interval *t* n a dry basis. As per Option 2 of the methodological "Tool to determine the mass flow of a greenhouse gas in a gaseous stream" /14/, by conservatively assuming that the gaseous stream is saturated ($m_{H2O,t,db}$ = $m_{H2O,t,db,Sat}$), $m_{H2O,t,db}$ is calculated as follows [11]:

[11] It is important to note that the simplified calculation for the absolute humidity of the gaseous stream ($m_{H2O,t,db}$) presented in Option 2 of the methodological "Tool to determine the mass flow of a greenhouse gas in a gaseous stream" shall be applied by assuming the gaseous stream is dry or saturated depending on which is the conservative situation.

As confirmed by the EPIC verification team, Footnote 4 of the "Tool to determine the mass flow of a greenhouse gas in a gaseous stream" states the following:

> "*An assumption that the gaseous stream is saturated is conservative for the situation that the mass flow of greenhouse gas I is underestimated (applicable for calculating baseline emissions). Conversely, an assumption that the gas stream is dry is conservative for the situation that the greenhouse gas t is overestimated (applicable for calculating project emissions).*"

In this particular case, $m_{H2O,t,db}$ is calculated for the determination of the mass flow of methane in the residual gas on a dry basis during the time period *t* ($F_{CH4,RG,t}$). While $F_{CH4,RG,t}$ is used for the determination of the parameter $PE_{flare,y}$ (project emissions from flaring the residual gas), the assumption that the gaseous stream is dry (conservatively applicable for calculating project emissions) would not be conservative in this case as an overestimation of the amount of methane in the residual gas would actually increase the calculated efficiency of the flares, thus resulting in a reduction of $PE_{flare,y}$ and consequent increment of emission reductions.

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

Where:

MM_{H2O} Molecular mass of H_2O. As indicated in the PDD [2], MM_{H2O} is *ex-ante* determined as 18.0152.

P_t Absolute pressure of the gaseous stream in time interval *t*. Further assessment details for the monitoring parameter P_t are included in Section E.6.2.

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

$p_{H2O,t,Sat}$ Saturation pressure of H_2O at temperature T in time *t*, Further assessment details for the monitoring parameter $p_{H2O,t,Sat}$ are included in Section E.6.2.

As correctly outlined in the latest version of the Monitoring Report [3], calculated values for $\eta_{flare,calc,y}$ for the installed high temperature enclosed flares 1, 2 and 3 valid for the considered monitoring period are summarized in the table below:

Calculated values of $\eta_{flare,calc,y}$ for the flares 1,2 and 3 valid for the considered monitoring period	Flare 1 ($\eta_{flare,calc,y,flare-1}$)	Flare 2 ($\eta_{flare,calc,y,flare-2}$)	Flare 3 ($\eta_{flare,calc,y,flare-3}$)
	0.9999724	0.9999647	0.9993877

Assessment details for determination of every-minute values of $\eta_{flare,m,flare-4}$:

The EPIC verification team has confirmed that, as highlighted in the Monitoring Report, for the particular case of the flare 4, the requirement for the application of Option B.1 of the methodological tool "Project emissions from flaring" which states that "*The average flow rate to the flare during the time period t must be greater than the average flow rate observed for the previous six months"* was not met for the biannual measurements of $\eta_{flare,m}$. Thus, as a conservative approach, for the particular case of flare 4, $\eta_{flare,m}$ is determined based on the selection of default value by following applicable guidance of Option A (application of default value for flare efficiency) of the methodological tool "Project emissions from flaring" [12]. from which the following related guidance of the registered PDD is confirmed as being consistently applied for every minute *m* of the considered monitoring period:

> *"(…)*
> *Option A: Default value*
> *For each one of the high temperature enclosed flares installed as part of the project activity, the flare efficiency for each minute m ($\eta_{flare,m}$) is 90% when the following two operational*

conditions/requirements are simultaneously met (in order to demonstrate that the flare is operating as per the recommendations and requirements set by the equipment manufacturer for the minute m in question):

(1) The temperature of the exhaust gases o the flare (monitoring parameter $T_{EG,m}$) and the flow rate of LFG to the flare (monitoring parameter $F_{RG,m}$) is within the manufacturer's specification/requirements for the flare (monitoring parameter $SPEC_{flare}$) in minute m;

(2) Flame is detected in the flare in minute m (monitoring parameter $Flame_m$).

If for the minute m, conditions (1) and/or (2) are not met, $\eta_{flare,m}$ is set as 0% for the minute in question.
(…)"

As confirmed by the EPIC verification team, for every minute *m* within the considered monitoring period, $\eta_{flare,m,flare\text{-}4}$ = 0.90 (90%) (upon effective demonstration of full compliance with operational and maintenance requirements for the flare) or 0% (in case full compliance with operational and maintenance requirements for the flare is not demonstrated).

Assessment details for (i) compliance with operational and maintenance requirements for the flares (as established by the ex-ante determined parameter "Manufacturer's flare specifications for temperature, flow rate and maintenance schedule interval" ($SPEC_{flare}$)) and (ii) consideration of data records for the monitoring parameter "Flame detection of flare in the minute m" ($Flame_m$) for the calculation of every-minute values:

As also confirmed by the EPIC verification team by assessing the 6 monthly emission reduction spreadsheets /5/, in accordance with the applied monitoring procedure for the project activity, compliance with operational and maintenance requirements for the flares, as established by the *ex-ante* determined parameter "Manufacturer's flare specifications for temperature, flow rate and maintenance schedule interval" ($SPEC_{flare}$), was correctly considered for the determination and application of values of $\eta_{flare,m}$ for calculating every-minute values of $F_{CH4,flared,y}$ along the considered monitoring period[12].

As also confirmed by the EPIC verification team through assessment of the 6 monthly emission reduction calculation spreadsheets /5/, data records for the monitoring parameter "Flame detection of flare in the minute *m*" ($Flame_m$) are also effectively considered for the determination and application of the values of $\eta_{flare,m}$ along the considered monitoring period. For each installed flare, the time the flare has operated is monitored through every-minute monitoring the flame combustion status/condition by using an UV flame detector (of which status signal (flame status "*on*" or

[12] While all performed maintenance events in the installed flares (including inspection and/or replacement of flare revetment material) were performed in accordance with requirements established in details for the ex-ante determined parameter "Manufacturer's flare specifications for temperature, flow rate and maintenance schedule interval" ($SPEC_{flare}$)), the determination of emission reductions achieved by the project activity during the considered monitoring period are thus not negatively impacted by the records for the monitoring parameter $Maintenance_y$.

	"*off*") is recorded and reported in the 6 monthly emission reduction calculation spreadsheets valid for the considered monitoring period /5/. As also assessed by the EPIC verification team, monitoring requirements related to operational requirements/conditions for the flare (as provided by the manufacturer's specifications for operating conditions as per the *ex-ante* determined parameter $SPEC_{flare}$ (min. and max. flow of LFG to the set of flares + temperature of exhaust gas of the flares + meeting of maintenance requirements)) are also effectively correctly considered in the context of the determination and application of values for $\eta_{flare,m}$ for calculating every-minute values of $F_{CH4,flared,y}$ along the considered monitoring period. As also confirmed through assessment of the 6 monthly emission reduction calculation spreadsheets /5/, for each minute *m* within the considered monitoring period when the flare have combusted LFG by not operating in accordance with the operational criteria as established by the *ex-ante* estimated parameter $SPEC_{flare}$ (in terms of LFG flow, temperature of exhaust gas or maintenance practice), no destruction of methane is accounted for the flare as part of the calculation of every-minute values $F_{CH4,flared,y}$. This is under full compliance with related requirements from the registered PDD /2/. *Assessment details for the determination of every-minute values for the calculation parameter $F_{CH4,EL,y}$:* In accordance with ACM0001 version 13.0.0) /7/, the amount of methane in the LFG which is destroyed through combustion of collected LFG in the internal combustion gas engines ($F_{CH4,EL,y}$) is confirmed by the EPIC verification team as being determined for each one of the installed 21 gas engines (calculation sub-parameters $F_{CH4,EL,engine-1}$, $F_{CH4,EL,engine-2}$, (…), $F_{CH4,\ EL,engine-21}$) by also following the applicable guidance of the methodological tool "Tool to determine the mass flow of a greenhouse gas in a gaseous stream" /14/. For the considered monitoring period, Option 2 / C (Simplified calculation without measurement of the moisture content / volume flow of LFG and volumetric fraction of CH_4 in collected LFG being measured in wet basis) of this methodological tool is selected [13]. The EPIC verification team confirmed that, as per Option C of this methodological tool, the amount of methane which is destroyed through combustion of LFG in each one of the installed 21 gas engines is correctly determined for each minute *m* of the considered monitoring period as follows: $F_{CH4,EL,engine-n,y} = V_{t,n,wb,engine-n} * v_{CH4,t,wb} * \rho_{CH4,n}$ Where: *n* — Number of the installed internal combustion gas engines *n* (additional/alternative methane destruction devices for the project activity). *n* = 1, 2, (…), 21. $V_{t,n,wb,engine-n}$ — Volumetric flow of the gaseous stream (LFG) to the internal combustion gas engine *n* in time interval *t* on a wet basis at normal conditions. As confirmed by the EPIC verification team, every-minute values of $V_{t,wb,n.engine-n}$ (calculation sub-parameters

[13] As confirmed by the EPIC verification team, the registered PDD /2/ states the following regarding the determination of values for $F_{CH4,EL,y}$:

> *"(…) Applicable guidance of the "Tool to determine the mass flow of a greenhouse gas in a gaseous stream" will be applied to determine $F_{CH4,sent\_flare,y}$ by using Option 2: Simplified calculation without measurement of the moisture content, and one of the options A, C or D. The selection of the determination option will depend on project conditions and equipment to be installed.",*

The applied calculation approach for determination of every-minute values for the calculation parameter $F_{CH4,EL,y}$ during the considered monitoring period is thus confirmed as being under conformance with provisions of both ACM0001 (version 13.0.0) and the PDD.

$V_{t,n,wb,engine-1}$, $V_{t,n,wb,engine-2}$, (…), $V_{t,n,wb,engine-21}$) are effectively reported (in Nm³ wet gas/h) in the monthly emission reduction calculation spreadsheets valid for the considered monitoring period (and enclosed to the Monitoring Report). While, as also confirmed by the EPIC verification team, measurements of volumetric flow of the gaseous stream (LFG) sent to each one of the 21 engines are not processed and recorded in Nm³ of wet gas/h (normal conditions), values of values of $V_{t,n,wb,engine-n}$ (calculation sub-parameters $V_{t,n,wb,engine-1}$, $V_{t,n,wb,engine-2}$, (…), $V_{t,n,wb,engine-21}$) valid for each minute encompassed by the considered monitoring period are thus calculated in a separated spreadsheet[14] /5/ (that is also enclosed to the Monitoring Report /3/) with the following equation being correctly applied (to convert every-minute records of measurements of volumetric flow of LFG sent to each one of the 21 internal combustion gas engines from actual conditions into normalized conditions of temperature and pressure):

$$V_{t,n,wb,engine-n} = V_{t,wb,engine-n} * (T_n / T_{t,engine-n}) * (P_{t,engine-n} * P_n)$$

Where:

$V_{t,wb,engine-n}$	Volumetric flow of the gaseous stream (LFG) to the engine *n* in time interval *t* on a wet basis at actual conditions. The EPIC verification team confirmed that every-minute measurement records of $V_{t,wb,engine-n}$ for each engine *n* (where *n* = 1, 2, (…), 21) valid for the whole considered monitoring period are effectively and correctly reported (in m³ wet gas/h) in the separated reduction calculation spreadsheet which is enclosed to the Monitoring Report /3/. Measurement records are appropriately presented as sub-parameters $V_{t,wb,engine-1}$, $V_{t,wb,engine-2}$, $V_{t,wb,engine-3}$, (…), $V_{t,wb,engine-21}$. Further assessment details for the sub-parameters $V_{t,wb,engine-n}$ (*n* = 1, 2, 3, (…), 21) are included in Section E.6.1 and E.7 under monitoring parameter $V_{t,wb,j}$.
$T_{t,engine-n}$	Temperature of the gaseous stream in time interval *t*. The EPIC verification team confirmed that every-minute measurement records are appropriately presented as sub-parameters $T_{t,engine-1}$, $T_{t,engine-2}$, (…),$T_{t,engine-21}$ and are reported (in both Kelvin (k) and ^{o}C) in the monthly emission reduction calculation spreadsheets valid for the considered monitoring period enclosed to the Monitoring Report /3/. Further monitoring details about the sub-parameters $T_{tengine-n}$ are included under details for the monitoring parameter T_t in Section E.6.1 and E.7.

[14] The following disclaimer is appropriately added in the Monitoring Report /3/ and, in the opinion of the EPIC verification team, sufficiently justifies the use of a separated calculation spreadsheet for converting figures of flow of LFG sent to each one of the 21 internal combustion gas engines from actual conditions into normalized conditions (standard conditions of temperature and pressure):

> *"In order to avoid having each one of the 6 MS-Excel monthly emission reduction spreadsheets with very high file size (i.e. exceeding 150 MB), the calculation of every-minute value of $V_{t,n,wb,engine-n}$ (under normalized (standard) conditions of temperature and pressure) valid for the whole considered monitoring period is made in a separated calculation spreadsheet. As part of the monitoring and emission reduction calculation procedure applied for the project activity, calculated values for $V_{t,n,wb,engine-n}$ (where n = 1, 2, (…), 21) (as reported in the separated calculation spreadsheet) are thus considered in the monthly emission reduction calculation spreadsheet."*

	T_n Temperature at normal conditions. T_n is ex-ante determined as 273.15 Kelvin. Further details about the ex-ante determined parameter T_n are included in Section D.1 and in the PDD. $P_{t,engine-n}$ Pressure of the gaseous stream in time interval *t*. Every-minute values of $P_{t,engine-n}$ for each engine *n* are reported (in Pa) in the monthly emission reduction calculation spreadsheets enclosed to the Monitoring Report /3/. Further monitoring details about the sub-parameters $P_{tengine-n}$ are included under details for the monitoring parameter P_t in Section D.2. P_n Absolute pressure at normal conditions. P_n is ex-ante determined as 101,325 Pa. Further details about the ex-ante determined parameter P_n are included in Section D.1 and in the PDD. *n* Number of the installed internal combustion gas engines *n* (additional/alternative methane destruction devices for the project activity) = 1, 2, (…), 21. $v_{CH4,t,wb}$ Volumetric fraction of CH_4 in the gaseous stream in time interval *t* on a wet basis. Further monitoring details about the monitoring parameter $v_{CH4,t,wb}$ are included above and in Section D.2. $\rho_{CH4,n}$ Density of CH_4 in the gaseous stream (LFG) at normal conditions. $\rho_{CH4,n}$ is calculated as 0.7156650 $kgCH_4$ / m^3CH_4 as reported in the monthly emission reduction calculation spreadsheet valid for the considered monitoring period. Details about the determination of $\rho_{CH4,n}$ are presented above. As also confirmed by the EPIC verification team, as established in the registered PDD and presented in the monthly emission reduction calculation spreadsheets, for each one of the 21 internal combustion gas engine, the amount of methane destroyed for minute *m* for a particular gas engine ($F_{CH4,EL,engine-n}$) is directly accounted as 0 (zero) in case such methane destruction device is monitored as "*not working*" in such minute *m* (on the basis of available every-minute records for the parameter $Op_{j,h}$ (sub-parameters $Op_{engine-1,h}$, $Op_{engine-2,h}$, (…), $Op_{engine-21,h}$). All related calculation are presented in the monthly emission reduction calculation spreadsheets that are enclosed to the Monitoring Report /3/. By correctly taking into account determined values for $F_{CH4,flared,y}$, $F_{CH4,EL,y}$ and $F_{CH4,BL,y}$ for the considered monitoring period, the calculated value for BE_y is correctly determined as 484,358 tCO_2e for the monitoring period from 01/01/2018 to 30/06/2018.
Findings	No findings (CARs, CLs) were raised regarding the calculation of baseline GHG emissions.
Conclusion	The EPIC verification team was able to confirm, upon closure of the raised CAR, that all related calculations for the determination of baseline emissions are provided in the 6 monthly emission reduction calculation spreadsheets files /5/ as well as the additional calculation spreadsheet for converting measurement records of LFG flow to the set of 21 gas engines from actual values into normalized values /5/ and the summarized emission reduction calculation spreadsheet /5/ in a deemed correct and transparent manner.

	All performed calculations for baseline emissions, as reported in the latest version of the Monitoring Report /3/ and emission reduction calculation spreadsheets /5/, were verified by EPIC as being performed under full conformance with applicable requirements of the registered PDD /2/, ACM0001 (version 13.0.0) /7/ and applicable methodological tools /12/ /13/ /14/ /15/. Applied methods and formulae, as described in the monitoring plan from the registered PDD /2/ and applicable methodology + methodological tools, were correctly applied. The calculated value for BE_y for the monitoring period from 01/01/2018 to 30/06/2018 is correctly determined as 484,358 tCO_2e. Determined value for BE_y is also confirmed as being correctly accounted in the context of determination of emission reductions achieved by the project activity during the considered monitoring period.

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

Means of verification	The EPIC verification team assessed whether the methods and formulae used for determining project emissions for the considered monitoring period are appropriate. The performed assessment encompassed checking whether applied related methods and formulae, as described in the monitoring plan from the registered PDD and applicable methodology + methodological tools were correctly and effectively applied, including confirmation whether the Monitoring Report /3/ includes correct and complete references to all parameters and monitored data at the intervals required by the applied methodology + methodological tools as per the registered PDD /2/. The correct application of emission factor and default values (ex-ante determined/fixed parameters as per the registered PDD /2/) was also verified. Through assessment of information made available the Monitoring Report /3/ and in the summarized emission reduction calculation spreadsheet /5/, the EPIC verification team was able to verity that as correctly indicated in the Monitoring Report /3/, project emissions for the whole monitoring period due to the operation of the project activity are determined as follows: $PE_y = PE_{EC,y} + PE_{LPG,y}$ Where: $PE_{LPG,y}$ Project emissions due to the consumption of LPG by the project activity $PE_{EC,y}$ Project emissions due to the consumption of electricity by the project activity. As confirmed by the EPIC verification team, during the considered monitoring period the project activity consumed only electricity which is regarded as grid-sourced electricity (with no amount of electricity sourced by backup captive off-grid electricity generator being consumed). By taking into account the 2 different sources of electricity consumed by the project activity during the period, $PE_{EC,y}$ is thus correctly determined as follows: $PE_{EC,y} = PE_{EC,grid,y} + PE_{EC,captive,y}$ Where: $PE_{EC,grid,y}$ Project emissions from consumption of grid-sourced electricity by the project activity. As verified by the EPIC verification team, as correctly outlined in the Monitoring Report /3/, during the considered monitoring period, the project activity consumed mostly electricity sourced by

		the grid-connected electricity generation infrastructure fuelled by LFG (of which the set of 21 internal combustion engines (project's methane destruction devices) represents major components) and grid-sourced electricity (during periods when the grid-connected electricity generation was not under operation, but supply of grid-sourced electricity was normal). As per its construction, under normal circumstances, minor share electricity generated by such infrastructure passes through a power transformer and is supplied to the project activity. As defined in the registered PDD, since emission reductions due to displacement of a more-GHG-intensive service (due to generation of electricity using collected LFG as fuel) are not eligible and/or claimable for the project activity, the registered PDD /2/ includes the assumption that all consumption by the project activity of electricity generated by the grid-connected electricity generation infrastructure fuelled by LFG (located within the geographical limits of the UVS – Caieiras landfill) is to be regarded and accounted as consumption of grid-sourced electricity (with related project emissions being determined ex-post) as a conservative approach. As assessed below, this assumption is thus taken into account in the context of determination of project emissions for the considered monitoring period.
	$PE_{EC,captive,y}$	Project emissions from consumption of electricity generated by a captive off-grid electricity generator fuelled by fossil fuel (diesel). As part of its assessment, the EPIC verification team confirmed that there is a backup captive off-grid generator installed within the limits of the UVS – Caieiras landfill. However, it was confirmed as not being used during the considered monitoring period. Thus, project emissions associated with the operation this backup power generation source is directly and correctly assumed as null (zero).
	Assessment of the determination of project emissions due to the consumption of grid-sourced electricity by the project activity:	
	As correctly outlined in the latest version of the Monitoring Report /3/, for the whole considered monitoring period, project emissions due to the consumption of grid-sourced electricity by the project activity ($PE_{EC,grid,y}$) are correctly determined by following applicable guidance of the methodological tool "Tool to calculate baseline, project and/or leakage emissions from electricity consumption" (version 01) /13/ as follows:	
	$PE_{EC,grid,y} = EC_{PJ,grid,y} * EF_{EL,grid,y} * (1 + TDL_{grid,y})$	
	Where:	
	$TDL_{grid,y}$	Average technical transmission and distribution losses for grid-sourced electricity consumed by the project activity in year *y.* As per applied monitoring procedure, the value for $TDL_{grid,y}$ is determined as 20%. The selected value represents the applicable default value as per the methodological tool "Tool to calculate baseline, project and/or leakage emissions from electricity consumption" (version 01) /13/. Further assessment details are included in Sections E.6.2 and E.7.
	$EC_{PJ,grid,y}$	Quantity of grid-sourced electricity consumed by the project activity in

year *y*. For the considered monitoring period, the following monthly values for $EC_{PJ,grid,y}$ are determined based on measurements:

- January/2018: 223 MWh
- February/2018: 220 MWh
- March/2018: 198 MWh
- April/2018: 198 MWh
- May/2018: 229 MWh
- June/2018: 193 MWh

Assessment details for the monitoring parameter $EC_{PJ,grid,y}$ valid for the considered monitoring period are included in Section E.6.2 and E.7.

$EF_{EL,grid,y}$ Emission factor for grid sourced electricity in year *y.* By following the approach referred in the registered PDD /2/, the following guidances of both the methodological tool "Tool to calculate baseline, project and/or leakage emissions from electricity consumption" (version 01) /13/ and registered PDD are considered for the determination of $EF_{EL,grid}$:

> *"Where case C.III has been identified, as a conservative simple approach, the emission factor for electricity generation should be the more conservative value between the emission factor determined as per guidance for scenario A and B respectively. This means that the more conservative value should be chosen between a) the result of applying either option A1 or A2 and b) the result of applying either option B1 or B2."*

As confirmed by the EPIC verification team, the registered PDD /2/ also includes the following disclaimer:

> *"(…) Within a specific monitoring period along the 2nd 7-year crediting period, in case it is confirmed that the installed backup captive off-grid electricity generator (fuelled by diesel) was not used during the period in question, project emissions due to the consumption of electricity from such backup captive generator will thus directly be determined as null/zero and, under this circumstance, Case C.I (Grid Electricity) may be considered as an alternative for the ex-post determination of project emissions due to consumption of grid-sourced electricity by the project activity within such period under Scenario C (with direct application of option A1 or A2 of the methodological tool "Tool to calculate baseline, project and/or leakage emissions from electricity consumption" (version 1) for the ex-post determination of $EF_{EL,grid,y}$ as established by guidance of tool for Case C.I)."*

While the installed backup captive off-grid electricity generator (fuelled by diesel) was confirmed by the EPIC verification team as not used during the considered monitoring period, the above-quoted guidance is thus correctly regarded as applicable and Option A1 and Option A2 are thus appropriately selected and applied for the determination of $EF_{EL,grid,y}$ as follows with the most conservative (higher) value being chosen:

Option A1: Under Option A1, $EF_{EL,grid,y}$ is determined as the combined margin (CM) emission factor ($EF_{grid,CM,y}$) for year 2017 which is correctly determined as per applicable guidance of the methodological tool "Tool to calculate the emission factor for an electricity system" (version 04.0) as the weighted average of the operating margin and build margin emission factors as follows:

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

Where:

w_{OM} Weighting of operating margin emissions factor. The value for w_{OM} is ex-ante selected in the registered PDD as being 25% and it is correctly applied in related calculations. Further assessment details about the ex-ante selected parameter w_{OM} are included in Section E.6.1.

w_{BM} Weighting of operating margin emissions factor. The value for w_{BM} is ex-ante selected as in the registered PDD /2/ as 75% and it is correctly applied in related calculations. Further assessment details about the ex-ante selected parameter w_{BM} are included in Section E.6.1.

$EF_{grid,OM}$ Operating margin CO_2 emission factor in year *y*. As confirmed by the EPIC verification team, the values selected for the monitoring parameter $EF_{grid,OM,y}$ = $EF_{grid,OM\text{-}DD,y}$ correctly represent the official average monthly values for January, February, March, April, May and June as calculated and made public available by the DNA of Brazil. Values are summarized below:

Period within the considered monitoring period	Applied value for $EF_{grid,OM,y}$ (tCO_2/MWh)
From 01/01/2018 to 31/01/2018	0.5622
From 01/02/2018 to 28/02/2018	0.5559
From 01/03/2018 to 31/03/2018	0.5750
From 01/04/2018 to 30/04/2018	0.5058
From 01/05/2018 to 31/05/2018	0.5461
From 01/06/2018 to 30/06/2018	0.6691

Further assessment details about the monitoring parameter $EF_{grid,OM}$ are included in Section E.6.2 and E.7.

$EF_{grid,BM}$ Build margin CO_2 emission factor in year *y*. The value for $EF_{grid,BM}$ is ex-ante selected in the registered PDD /2/ as 0.2010 tCO_2/MWh and it is correctly applied in related calculations. Further assessment details about the ex-ante determined parameter $EF_{grid,BM}$ are included in Section E.6.1.

As presented in the summarized emission reduction calculation spreadsheet /5/ which is also enclosed to the Monitoring Report /3/, $EF_{grid,CM,y}$ is correctly calculated for the months of 2018 encompassed by the considered monitoring period as follows:

Month monitoring period	Applied value for $EF_{grid,OM,y}$ (tCO_2/MWh)
Jan. 2018	0.2921
Feb. 2018	0.2897

Mar. 2018	0.2945
Apr. 2018	0.2772
May 2018	0.2873
Jun. 2018	0.3180

Option A2: Under Option A2, $EF_{EL,grid,y}$ is correctly determined as 1.3 tCO2/MWh which represents the applicable conservative default value of the methodological tool "Tool to calculate baseline, project and/or leakage emissions from electricity consumption" (version 1) /13/.

While the most conservative value (highest value) between Options A1 and A2 is correctly confirmed as being 1.3 tCO_2/MWh (when comparing 1.3 tCO_2/MWh to each individually calculated monthly value of $EF_{grid,CM,y}$ as per option A1), this value is thus applied in the particular context of the determination of $EF_{EL,grid,y}$.

In summary, the calculated accumulated value for $PE_{EC,grid,y}$ for the considered monitoring period is correctly determined as 1,967 tCO_2. As confirmed by the EPIC verification team, the summarized emission reduction calculation spreadsheet /5/ (that is enclosed to the Monitoring Report /3/) correctly and sufficiently includes all calculations related to the determination of the accumulated value of $PE_{EC,grid,y}$ for the considered monitoring period.

As confirmed by the EPIC verification team, the summarized emission reduction calculation spreadsheet /5/ (that is enclosed to the Monitoring Report /3/) correctly and sufficiently includes all calculations related to the determination of the accumulated values of $PE_{EC,grid,y}$ and $PE_{EC,captive,y}$ for the considered monitoring period. Total project emissions due to the consumption of electricity by the project activity ($PE_{EC,y}$) for the considered monitoring period are correctly reported as 1,967 tCO_2 (rounded value).

Assessment of the determination of project emissions due to the consumption of LPG by the project activity:

As assessed by the EPIC verification team, project emissions due to the consumption of LPG by the project activity ($PE_{LPG,y}$) are correctly determined by following the applicable guidance of the "Tool to calculate project or leakage CO_2 emissions from fossil fuel combustion" (version 02) /15/ as follows:

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

Where:

$FC_{LPG,y}$ Quantity of LPG consumed by the project activity in year *y*. $FC_{LPG,y}$ is correctly reported as 810 kg (0.810 ton). Detailed assessment for monitoring of $FC_{LPG,y}$ is presented in Section E.6.2 and E.7.

$COEF_{LPG,y}$ CO_2 emission coefficient for LPG. $COEF_{LPG,y}$ is correctly calculated as follows:

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

Where:

$EF_{CO2,LPG,y}$ CO2 emission factor of fuel LPG (in energy basis). A default value of 0.0656 tCO_2/GJ is selected for the considered monitoring period (value sourced by IPCC Guidelines for National Greenhouse Gas Inventories, 2006 /11/, Chapter 1, Volume 2, Table 1.4). Further details about

	the monitoring parameter $EF_{CO2,LPG,y}$ are included in Section E.6.2 and E.7. $NCV_{LPG,y}$ Net calorific value of the fuel LPG. A default value of 46.5 GJ/ton is selected for the considered monitoring period (value sourced by the Brazilian Energetic Balance Report, year 2017 /77/). Further details about the monitoring parameter $EF_{CO2,LPG,y}$ are included in Section E.6.2 and E.7. The calculated value for $PE_{LPG,y}$ for the monitoring period from 01/01/2018 to 30/06/2018 is correctly determined as 3 tCO_2 (rounded value). By correctly taking into account determined values for $PE_{EC,y}$ and $PE_{LPG,y}$ for the considered monitoring period, the calculated value for PE_y is correctly determined as 1,970 tCO_2 for the monitoring period from 01/01/2018 to 30/06/2018. Determined value for PE_y is are confirmed as being correctly accounted in the context of determination of emission reductions achieved by the project activity during the considered monitoring period.
Findings	No findings (CARs, CLs) were raised regarding the calculation of project GHG emissions.
Conclusion	The EPIC verification team was able to confirm that all related calculations for the determination of project emissions are provided in the summarized emission reduction calculation spreadsheet /5/ in a deemed correct and transparent manner. All performed calculations for project emissions, as reported in the latest version of the Monitoring Report /3/ and summarized emission reduction calculation spreadsheet /5/, were verified to be performed under full conformance with applicable requirements of the registered PDD /2/, ACM0001 (version 13.0.0) /7/ and applicable methodological tools /13/ /15/ /16/ /17/. Applied methods and formulae, as described in the monitoring plan from the registered PDD /2/ and applicable methodology + methodological tools, were correctly applied. The calculated value for PE_y for the monitoring period from 01/01/2018 to 30/06/2018 is correctly determined as 1,970 tCO_2 (rounded value).

E.8.3. Calculation of leakage GHG emissions

Means of verification	Not applicable. In accordance with the applied CDM baseline and monitoring methodology ACM0001 (version 13.0.0) /7/, the registered PDD /2/ indicates that no leakage emissions are to be considered in the context of emission reduction calculations.
Findings	Not applicable.
Conclusion	Not applicable.

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

Means of verification	The EPIC verification team assessed whether calculation and reporting of achieved GHG emission reductions for the monitoring period from 01/01/2018 to 30/06/2018 are correct. As a result of the performed verification assessment, the EPIC verification team

	was able to confirm that the determination of achieved GHG emission reductions for the considered monitoring period are performed and reported in a correct, objective and transparent manner. As confirmed by the EPIC verification team, determination of baseline and project emissions are in accordance with the applicable requirements from the following reference and methodological documents: - Monitoring plan and other related provisions of the registered PDD /2/. - CDM baseline and monitoring methodology ACM0001 - 'Flaring or use of landfill gas" (version 13.0.0) /7/, - Tool to calculate baseline, project and/or leakage emissions from electricity consumption (version 01) /13/. - Tool to calculate project or leakage CO_2 emissions from fossil fuel combustion" (version 02) /15/ - "Tool to calculate the emission factor for an electricity system" (versions 04.0 /16/) - "Project emissions from flaring" (version 02.0.0) /12/ - "Tool to determine the mass flow of a greenhouse gas in a gaseous stream" (version 02.0.0) /14/ All figures and input data as well as all performed calculations were checked by the EPIC verification team and were found to be reported in a deemed correct, appropriate and transparent manner in the latest versions of the Monitoring Report /3/ and emission reduction calculation spreadsheets /5/. EPIC was thus able to confirm that the emission reductions reported for the monitoring period from 01/01/2018 to 30/06/2018 are based on authentic measurements of LFG related monitoring data and are also based on the application of a semi-automatic and systematic data monitoring procedure for LFG related monitoring data as well as data related to the consumption of both LPG and grid–sourced electricity by the project activity. Moreover, as also assessed by the EPIC verification team, monitoring data records were correctly retrieved and utilized in the emission reduction calculation spreadsheets /5/ for performing related calculation and reporting of achieved emission reductions for the considered monitoring period. EPIC was thus able to verify that, in general, all calculation and reporting procedures were adopted in a deemed transparent, correct and reliable manner.
Findings	No findings (CARs, CLs) were raised regarding reporting and calculations of summary of calculation of GHG emission reductions.
Conclusion	The EPIC verification team was able to confirm that reported achieved emission reductions for monitoring period from 01/01/2018 to 30/06/2018 are correctly calculated and reported as the difference between determined accumulated values for baseline emissions and project emissions for the period. Reported achieved emission reductions are in accordance with all applicable measurement, reporting and calculation requirements as per the monitoring plan of the registered PDD /2/, monitoring and baseline methodology ACM0001 - 'Flaring or use of landfill gas" (version 13.0.0) /7/ and applicable methodological tools /13/ /14/ /15/ /16/ /17/.

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

Means of verification	The EPIC verification team assessed the comparison of achieved GHG emission reductions with related estimates as per the registered PDD /2/. As part of the performed verification assessment, reported and verified emission reductions achieved by the project activity during the monitoring period

encompassing 6 months (181 days) within year 2017 were compared against the related *ex-ante* estimation of emission reductions for year 2017 as per the registered PDD [2]. The results of such comparisons are summarized and assessed below:

Period	Ex-ante estimation of emission reductions as per the registered PDD (in tCO_2e)	Achieved emission reductions (in tCO_2e)
Period from 01/01/2018 to 30/06/2018 (considered monitoring period)	641,934 (share of ex-ante estimation of emission reductions within year 2018 valid/equivalent for the 181-day period length considered) monitoring period)	482,388

Findings	No findings (CARs, CLs) were raised regarding the comparison of achieved emission reductions against related *ex-ante* estimation of emission reductions as per the registered PDD.
Conclusion	As confirmed by the EPIC verification team, for the 181-day length monitoring period from 01/01/2018 to 30/06/2018, achieved emission reductions are correctly indicated as about ~25% lower than the comparable value of *ex-ante* estimation of emission reductions as per the registered PDD [2] valid for such period (641,934 tCO_2e). As further assessed in Section E.8.6., the Monitoring Report [3] presents a main factor/aspect that sufficiently explains the occurred difference between achieved/verified emission reductions during the considered monitoring period and the comparable value for *ex-ante* estimation of emission reductions as per the registered PDD [2] for the same time period. This is deemed correct and in accordance with applicable verification requirements.

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

Means of verification	The EPIC verification team assessed the remarks on the difference between achieved GHG emission reductions and applicable estimated value in PDD [2]. As appropriately indicated in Section E.6 of the latest version of the Monitoring Report [3], a main factor/aspect is presented as sufficiently justifying the occurred difference between verified emission reductions achieved during the considered monitoring period and the comparable value for *ex-ante* estimation of emission reductions as per the registered PDD [2] for the same time period. Assessment for such factor/aspect is summarized below: *Aspects/conditions that represent a decrease factor of reported emission reductions for the considered monitoring period when compared against the ex-ante estimation of emission reduction for the same period in the registered PDD:* *1. Uncertainties associated with the application of First Order Decay (FOD) multi-phased model for estimating the emission reductions in the*

[15] The 641.944 tCO2e value is appropriately calculated as 1,294,507 tCO_2e * 181/365, where 1,294,507 tCO_2e is ex-ante estimated GHG emissions to be achieved in year 2018 as per the PDD.

	PDD: Like any other CDM project activity encompassing LFG collection and destruction/utilization, all potential uncertainties associated with the application of the First Order Decay (FOD) multi-phased model in the context of the *ex-ante* estimation of emission reductions in the registered PDD [/2/] are applicable for the *ex-ante* estimation of emission reductions for the "Caieiras landfill gas emission reduction". The EPIC verification team acknowledges that the LFG collection efficiency in a LFG collection and destruction initiative such as project activity plays an important role in differences between the achieved emission reductions and related ex-ante estimations of emission reductions as per the registered PDD [/2/]. Recently published literature on the topic [/65/ /66/ /67/] has shown that LFG collection efficiency for well-engineered landfills with forced LFG extracting systems ranges from 50% up to 90% (depending on the design and operation of the LFG collection system). While the EPIC verification team also acknowledges that there are indeed several operational and performance aspects for a typical LFG collection and destruction project activity that negatively influence the potentially achieved average LFG collection and destruction efficiency, in the particular context of the operation of the CDM project activity "Caieiras landfill gas emission reduction", it is reasonable to assume that achieved average LFG collection efficiency for the project activity during the considered monitoring period was significantly lower than the one earlier assumed in the context of the ex-ante estimation of emission reductions (92.80%).
Findings	No CARs and CLs were raised regarding remarks on difference from estimated value from registered PDD.
Conclusion	As a conclusion, by taking into account all the factors/aspects listed above, it is the opinion of the EPIC verification team that the occurred relative difference between achieved emission reductions during the considered monitoring period and calculated comparable PDD's ex-ante estimation of emission reductions for the same period is deemed acceptable, plausible and reasonable.

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

Means of verification	As the monitoring period covered by this Verification Report (01/01/2018 to 30/06/2018) started after 01/01/2013, this verification does not include assessment of GHG emission reductions occurred during the first commitment period. Achieved emission GHG emission reductions as reported in the Monitoring Report [/3/] occurred after 01/01/2013.
Findings	No findings (CARs, CLs) were raised regarding reporting and calculations of GHG emission reductions during the first commitment period and the period from 01/01/2013 onwards.
Conclusion	As a conclusion, EPIC thus confirms that the reported achieved emission reductions for monitoring period from 01/01/2018 to 30/06/2018 are in accordance with all measurement, reporting and calculation requirements of the monitoring plan of the registered PDD [/2/], monitoring and baseline methodology ACM0001 - 'Flaring or use of landfill gas" (version 13.0.0) [/7/] and applicable methodological tools [/13/ /14/ /15/ /16/]. No emission reductions occurred prior 01/01/2013 were considered in the current verification.

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

Means of verification	Not applicable. The project participants have monitored sustainable development co-benefits of the registered CDM project activity. Thus, EPIC has not

	requested/commissioned for assessing reported sustainable development co-benefits.
Findings	Not applicable.
Conclusion	Not applicable.

E.10. Global stakeholder consultation

Means of verification	Not applicable. In the particular case of the project activity, as indicated in the registered PDD for the currently expired 1st 7-year crediting period, the Global Stakeholder Consultation (GSC) was conducted and comments were received prior to the registration of the project activity under the CDM. Moreover, no further stakeholder consultation was performed after the publication of the first Monitoring Report for the project activity.
Findings	Not applicable.
Conclusion	Not applicable.

SECTION F. Internal quality control

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As part of EPIC internal quality control system, after the completion of assessment by the verification team, all the relevant documentation is submitted to a qualified, independent technical review team. The technical review team (with at least one member) is appointed to review the draft final verification report (Draft FVR). The technical review team assesses whether all the reporting requirements have been fulfilled and whether all the issues raised were satisfactorily addressed. The technical reviewer team either accepts or rejects element of the Draft FVR included by the verification team. The comments made by the technical review team are taken into consideration and incorporated in the final FVR. The final report (after resolutions of all findings) is then submitted to the head of operations for review and approval.

SECTION G. Verification opinion

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It is the opinion of EPIC that reported GHG emission reductions for the CDM project activity "Caieiras landfill gas emission reduction" for the monitoring period from 01/01/2018 to 30/06/2018, as reported in the latest version of the Monitoring Report /3/ issued on 19/10/2018 (version 2.0), are calculated and reported without material misstatements and in a correct manner.

Moreover, EPIC has confirmed that all information presented in the latest version of the Monitoring Report /3/ and all applied calculations for the determination of emission reductions achieved during the considered monitoring period are under full conformance with provisions and requirements of the registered PDD /2/, monitoring and baseline methodology ACM0001 - 'Flaring or use of landfill gas" (version 13.0.0) /7/ and applicable methodological tools /13/ /14/ /15/ /16/ /17/.

EPIC thus confirms the following regarding verified emission reductions:

Project title:	Caieiras landfill gas emission reduction
UNFCCC ref no:	0171
PDD	Version 9.0, dated 20/07/2018
Monitoring Report	Version 2.0, dated 19/10/2018
Methodology used for verification:	ACM0001 (version 13.0.0)
Applicable monitoring period:	01/01/2018 to 30/06/2018 (first and last day included)
Achieved emission reductions:	482,388 tCO_2e

SECTION H. Certification statement

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EPIC Sustainability Services Pvt. Ltd. (EPIC) has performed the 17th periodic verification assessment of the registered CDM project activity titled "Caieiras landfill gas emission reduction". The project activity was registered by the UNFCCC on 09/03/2006 as CDM project activity with registration no. 0171 and it is currently under its 2nd 7-year renewable crediting period (period from 13/12/2013 to 30/03/2020). The performed CDM verification assessment covered the monitoring period from 01/01/2018 to 30/06/2018 (including both days) and represents the 9th periodic verification within the 2nd 7-year crediting period for the project activity.

It is EPIC responsibility to express an independent verification statement and opinion on the reported GHG emission reductions from the project activity during the covered monitoring period.

The project activity is implemented and has operated at the UVS - Caieiras landfill. In accordance with related project design information made available in the registered Project Design Document (PDD) for the 2nd 7-year crediting period, the operation of the project activity resulted in permanent and real mitigation of methane (CH_4) emissions during the considered monitoring period through collection and combustion of landfill gas (LFG) (rich in CH_4) under controlled conditions in a set of four high temperature enclosed flares and in a set of 21 internal combustion gas engines (which represents the major component of a grid-connected electricity generation infrastructure also located within the geographical limits of the UVS – Caieiras landfill. Under conformance with the PDD, no emission reductions associated to generation of electricity by such the grid-connected electricity generation infrastructure (entirely fuelled by LFG) is accounted and/or claimed as part of the project activity. The project activity thus encompasses CH_4 destruction as its unique GHG abatement/mitigation measure. While LFG is rich in CH_4, in the absence of the project activity (baseline scenario) it is assumed that the largest share of LFG collected and destroyed by the project activity would be directly emitted into the atmosphere, thus directly emitting CH_4 in the atmosphere.

The host-country project participant and project operator Essencis Soluções Ambientais S.A. has been responsible for gathering of monitoring data in accordance with the monitoring plan of the registered PDD. While supported by hired external CDM consultants, Essencis Soluções Ambientais S.A. has been responsible for calculating and reporting GHG emissions reductions achieved by the project activity during the considered monitoring period.

The EPIC verification team performed the verification assessment and provided its verification opinion on the basis of the provisions and requirements of the CDM baseline and monitoring methodology ACM0001 - "Flaring or use of landfill gas" (version 13.0.0), the monitoring plan included in the registered PDD /2/ for the 2nd 7-year crediting period of the project activity (version 9.0, dated 20/07/2018) and also as per the latest version of Monitoring Report for the considered monitoring period (version 2.0, dated 19/10/2018). The verification assessment performed by EPIC included:

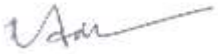
i) checking whether the project activity was implemented and has operated in accordance with related project design details as described in the Project Design Document (PDD) for the project activity;
ii) checking whether the provisions of both the applied CDM baseline and monitoring methodology and the monitoring plan from the registered PDD were both consistently and appropriately applied;
iii) assessment of all documented evidences which supports the reported data and claimed emission reductions during the considered monitoring period;
iv) checking whether the installed monitoring equipment/instrument required for measuring *ex-post* determined parameters required for calculating emission reductions were calibrated and have operated appropriately.

The EPIC verification approach draws on an understanding of the risks associated with reporting of GHG emission data and the controls in place to mitigate these. EPIC planned and performed the verification assessment by sufficiently obtaining evidence, information and explanations that were considered necessary for providing, under reasonable level of assurance, that reported GHG emission reductions for the project activity during the considered monitoring period are fairly stated. All Corrective Action Requests (CARs) and/or Clarification Actions (CL) raised by EPIC as part of the performed verification assessment were confirmed to be adequately resolved.

In summary, it is the opinion of EPIC that reported GHG emission reductions for the CDM project activity "Caieiras landfill gas emission reduction" for the monitoring period from 01/01/2018 to 30/06/2018, as reported in the latest version of the Monitoring Report issued on 19/10/2018 (version 2.0), are calculated and reported without material misstatements and in a correct manner. Moreover, EPIC has confirmed that all information presented in the latest version of the Monitoring Report and all applied calculations for the determination of emission reductions achieved during the considered monitoring period are under full conformance with provisions and requirements of the registered PDD, monitoring and baseline methodology ACM0001 - 'Flaring or use of landfill gas" (version 13.0.0) and applicable methodological tools.

EPIC Sustainability Services Pvt. Ltd. (EPIC) herewith confirms that GHG emission reductions were achieved by the CDM project activity "Caieiras landfill gas emission reduction" during the monitoring period from 01/01/2018 to 30/06/2018 as follows:

Emission reductions for the monitoring period from 01/01/2018 to 30/06/2018:	482,388 tCO_2e

Prepared by	Approved by :
 (Marco A. Ratton) Verification Team Leader	 (Krishnachar Sudheendra) Director & Head-Operations

Appendix 1. Abbreviations

Abbreviations	Full texts
ACM	Approved Consolidated Methodology (CDM baseline and monitoring methodology)
ANP	Brazilian National Agency of Petroleum, Natural Gas and Biofuels (*Agência Nacional do Petróleo, Gás Natural e Biocombustíveis)*
CAR	Corrective Action Request
CDM	Clean Development Mechanism
CDM-EB	Clean Development Mechanism Executive Board
CDM-M&P	Modalities and Procedures for Clean Development Mechanism
CDM-PCP	Clean Development Mechanism Project Cycle Procedures
CDM-PS	Clean Development Mechanism Project Standard
CDM-VVS	Clean Development Mechanism Validation and Verification Standard
CER	Certified Emission Reduction
CETESB	Companhia Ambiental do Estado de São Paulo (Environmental Agency/Authority for São Paulo State in Brazil)
CH_4	Methane
CL	Clarification Request
CMP	Meeting of Parties to the Kyoto Protocol
CO_2	Carbon dioxide
CO_2e	Carbon dioxide equivalent
COP/MOP	The Conference of the Parties to the United Nations Framework Convention on Climate Change serving as the Meeting of the Parties to the Kyoto Protocol
CTR	*Central de Tratamento de Resíduos* ("Waste Treatment Facility" when translated into English language)
DNA	Designated National Authority
DOE	Designated Operational Entity
ER	Emission Reduction
FAR	Forward Action Request
GHG	Greenhouse Gas
HDPE	High Density Polyethylene
INMETRO	*Instituto Nacional de Metrologia, Normalização e Qualidade Industrial* (Brazilian "Institute for Metrology, Standardization and Industrial quality" when translated into English language). INMETRO is the Brazilian official agency for metrology and certification affairs
LFG	Landfill gas
LPG	Liquefied petroleum gas
IPCC	Intergovernmental Panel on Climate Change
MP	Monitoring Plan
MR	Monitoring Report
MSW	Municipals solid waste
ONS	*Operador Nacional do Sistema* (Brazilian entity responsible for the coordination of the dispatch of power plants connected to the National Electricity Grid of Brazil)
PDD	Project Design Document
PLC	Programmable logic controller
PNRS	Política Nacional de Resíduos Sólidos (Brazilian National Policy on Waste Management as established by Federal Law No. 12,305/10 (the LPNRS).
PP	Project Participant
QA/QC	Quality Assurance / Quality Control
RMSP	Região Metropolitana de São Paulo (São Paulo's Metropolitan Region)
UNFCCC	United Nations Framework Convention for Climate Change
UV	Ultra violet

Appendix 2. Competence of team members and technical reviewers

All personnel being engaged in CDM verification assessments performed by EPIC are qualified based on the established procedures of EPIC to assure the resource requirements that satisfy all the requirements of competence criteria of the CDM Accreditation Standard for operational entities. EPIC is accredited as a DOE and holds the full responsibility on decision-making regarding the verification in accordance with the accreditation requirements of the CDM-EB.

The following verification team has been assigned to carry out the verification of the project.

Name	**Mr Marco A. Ratton**	**Dr G. Vishnu**	**Mr. R. Vijayaraghavan**
Role	Lead Auditor	Auditor	Technical Reviewer
Competence in relevant sectoral scope(s):	Sectoral scope 13	N/A	Sectoral scope 13
Responsibility	Performance of document review, performance of on-site visit, preparation of initial list of findings, assessment of responses from the project participants for all list of findings and assessment of updated/corrected documents, preparation of the and draft Verification Report, addressing comments from the performed technical review and preparation of final Verification Report.	Review of documents, assistance in report preparation	Performance of Technical review

Mr. Marco A. Ratton is based in Brazil and has acted as a CDM auditor/assessor since 2007. He holds vast experience with independent assessments of CDM project activities within the area of solid waste management and effluent treatment in Latin America and other regions. He also has previous working experience with planning of municipal waste management as well as educational background in mechanical fabrication & manufacturing technologies, economics and environmental management & policy. He has undergone extensive training on CDM validation and verification and is a qualified Lead Auditor for Sectoral Scope 13. He also has experience on conducting ISO 9001/14001 assessments.

Dr. G. Vishnu holds a Masters and Doctorate in Environmental Science. He has around 8 years of experience in the field of research and consultancy related to water, wastewater, solid waste management systems, implementation of new, Cleaner Production technologies and biomass assessment studies. He has more than four years' experience in validation verification of more than thirty CDM, projects and has undergone extensive training on GHG validation and verification. He is a Lead Auditor for various technical areas. He is also an ISO 26000 lead auditor and ISO 50001 auditor certified by Professional Evaluation and Certification Board (PECB). He is a Certified

Sustainability Assurance Practitioner (CSAP) from AccountAbility, UK. He is qualified as Lead Auditor based on EPICs CDM accreditation procedures.

Mr. R. Vijayaraghavan holds BE in Mechanical Engineering, M.Tech in Energy Conservation and Management and MBA in Technology Management. He is certified as Energy Auditor by Bureau of Energy Efficiency (BEE), Government of India. He has 10 years of working experience in energy sector including validation / verification of fifty CDM and VCS/GS projects and has undergone extensive training on CDM validation and verification and has been qualified as Lead Auditor and Technical Reviewer with Sectoral Scope 1 and 13. He is also an ISO 26000 lead auditor certified by Professional Evaluation and Certification Board (PECB).

Appendix 3. Documents reviewed or referenced

No.	Author	Title	References to the document	Provider
/1/	UNFCCC/CDM-EB	CDM Validation and Verification Standard for Project Activities (CDM-VVS-PA), version 01.0	Dated 03/03/2017. Available online: https://cdm.unfccc.int/filestorage/e/x/t/extfile-20170307130848253-reg_stan04.pdf/reg_stan04.pdf?t=T1p8cGV0OXZ3fDBEeObq133hkb-5SQE6aPoO	Others
/2/	Essencis Soluções Ambientais S.A.	Registered Project Design Document (PDD) for the 2nd 7-year renewable crediting period for the CDM project activity: "Caieiras landfill gas emission reduction", version 9.0 -	Dated 20/07/2018 Available online: http://cdm.unfccc.int/Projects/DB/DNV-CUK1134509951.62/view	Project Participants [16]
/3/	Essencis Soluções Ambientais S.A.	Monitoring Report for the CDM project activity "Caieiras landfill gas emission reduction" - monitoring period from 01/01/2018 to 30/06/2018, version 2.0.	Dated 19/10/2018.	Project Participants
/4/	Essencis Soluções Ambientais S.A.	Monitoring Report for the CDM project activity "Caieiras landfill gas emission reduction" - monitoring period from 01/01/2018 to 30/06/2018, version 1.	Dated 15/09/2018. Available online: https://cdm.unfccc.int/Projects/DB/DNV-CUK1134509951.62/view	Project Participants
/5/	Essencis Soluções Ambientais S.A.	Emission reduction calculation spreadsheet for the CDM project activity "Caieiras landfill gas emission reduction" - monitoring period from 01/01/2018 to 30/06/2018. Set of 6 monthly emission reduction spreadsheets (one for each month of the monitoring period) + calculation spreadsheet for normalized LFG flow measurements + summarized emission reduction spreadsheet. File names: *"012018.xls"* *"012018 – Flow.xls"* *"022018.xls"*	Dated 19/10/2018.	Project Participants

[16] All document with provider indicated as "Project Participants" were sourced by the host-country project participant and project owner Essencis Soluções Ambientais S.A.

		"022018 – Flow.xls" *"032018.xls"* *"032018 – Flow.xls"* *"042018.xls"* *"0402018 – Flow.xls"* *"052018.xls"* *"052018 – Flow.xls"* *"062018.xls"* *"062018 – Flow.xls"* *"MR 17 - Caieiras - V.2.xls"* *"MR 17 - Caieiras - V.2 - FE.xls"*		
/6/	Essencis Soluções Ambientais S.A.	Input data for the emission reduction calculation spreadsheets for the project activity "Caieiras landfill gas emission reduction" - monitoring period from 01/01/2018 to 30/06/2018. File names: *"jan-18.xls"* *"feb-18.xls"* *"mar-18.xls"* *"apr-18.xls"* *"may-18.xls"* *"jun-18.xls"*	Dated 15/09/2018.	Project Participants
/7/	UNFCCC/CDM-EB	Consolidated baseline and monitoring methodology ACM0001 - "Flaring or use of landfill gas¨, version 13.0.0	Dated 11/05/2012. Available online: http://cdm.unfccc.int/methodologies/DB/D44X8FH8SFCXREE6037AXJSBGGFVDO	Others
/8/	UNFCCC	Kyoto Protocol to the United Nations Framework Convention on Climate Change	Dated 1998. Available online: http://unfccc.int/resource/docs/convkp/kpeng.pdf	Others
/9/	UNFCCC	Decision 3/CMP. 1 (Marrakesh – Accords)	Dated 30/03/2006. Available online: https://cdm.unfccc.int/Reference/COPMOP/08a01.pdf	Others
/10/	TÜV SÜD South Asia Pvt. Ltd.	"Validation of the Renewal of Crediting Period of an Existing CDM-Project: Caieiras landfill gas emission reduction", Report No. 600501161, Revision No. 03.	Dated 24/09/2013. Available online: http://cdm.unfccc.int/Projects/DB/DNV-CUK1134509951.62/view	Others
/11/	IPCC	1996 IPCC Guidelines for National Greenhouse Gas Inventories: work book; 2006 IPCC Guidelines for National Greenhouse Gas Inventories: work book.	Available online: http://www.ipcc-nggip.iges.or.jp/public/gl/invs5.html http://www.ipcc-nggip.iges.or.jp/public/2006gl/vol5.html	Others
/12/	UNFCCC/CDM-EB	"Project emissions from flaring", version 02.0.0	Dated 20/07/2012. Available online:	Others

			https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-06-v2.0.pdf/history_view	
/13/	UNFCCC/CDM-EB	"Tool to calculate baseline, project and/or leakage emissions from electricity consumption", version 01	Dated 16/05/2008. Available online: https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-05-v1.pdf/history_view	Others
/14/	UNFCCC/CDM-EB	¨Tool to determine the mass flow of a greenhouse gas in a gaseous stream¨, version 02.0.0	Dated 03/06/2011. Available online: https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-08-v2.0.0.pdf/history_view	Others
/15/	UNFCCC/CDM-EB	"Tool to calculate project or leakage CO_2 emissions from fossil fuel combustion", version 02.	Dated 02/08/2008. Available online: https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-03-v2.pdf/history_view	Others
/16/	UNFCCC/CDM-EB	"Tool to calculate the emission factor for an electricity system", version 04.0	Dated 04/10/2013. Available online: https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-07-v4.0.pdf	Others
/17/	Contech Indústria e Comércio de Equipamentos Eletrônicos Ltda.	Certificate of Calibration for the installed LFG flow meter with S/N 1412000238 - calibration event performed on 08/04/2016. Certificate No. 1412000238 0915 C7.	Certificate issuance date: 08/04/2016.	Others
/18/	UNFCCC/CDM-EB	CDM Project Standard for Project Activities (CDM-PS-PA), version 01.0	Dated 03/03/2017. Available online: https://cdm.unfccc.int/filestorage/e/x/t/extfile-20170307130848253-reg_stan04.pdf/reg_stan04.pdf?t=dUl8cGV0YWJvfDA1ELde1A5vshvOm2R9kGh8	Others
/19/	UNFCCC/CDM-EB	CDM Mechanism Project Cycle Procedure for Project Activities (CDM-PCP-PA), version 01.0	Dated 03/03/2017. Available online: https://cdm.unfccc.int/filestorage/e/x/t/extfile-20170307130803944-pc_proc03.pdf/pc_proc03.pdf?t=c3J8cGV0YWdwfDCWVLVUXmXb-RYxXu-wjz7_	Others
/20/	Essencis Soluções Ambientais S.A.	Emission reduction calculation spreadsheet for the CDM project activity "Caieiras landfill gas emission reduction" - monitoring	Dated 15/09/2018.	Project Participants

		period from 01/01/2018 to 30/06/2018. Set of 6 monthly emission reduction spreadsheets (one for each month of the monitoring period) + calculation spreadsheet for LFG flow in normalized values + summarized emission reduction spreadsheet. File names: *"012018.xls"* *"012018 – Flow.xls"* *"022018.xls"* *"022018 – Flow.xls"* *"032018.xls"* *"032018 – Flow.xls"* *"042018.xls"* *"0402018 – Flow.xls"* *"052018.xls"* *"052018 – Flow.xls"* *"062018.xls"* *"062018 – Flow.xls"* *"MR 17 - Caieiras - V.1.xls"* *"MR 17 - Caieiras - V.1 - FE.xls"*		
/21/	EPIC / Essencis Soluções Ambientais S.A.	Comparative emission reduction calculation spreadsheets for the project activity "Caieiras landfill gas emission reduction" - monitoring period from 01/01/2018 to 30/06/2018. Created as part of the *Data authenticity checking* procedure performed during the verification. File names: *"012018 - for checking.xls"* *"012018 – Flow - for checking.xls"* *"022018 - for checking.xls"* *"022018 – Flow - for checking.xls"* *"032018 - for checking.xls"* *"032018 – Flow - for checking.xls"* *"042018 - for checking.xls"* *"0402018 – Flow - for checking.xls"* *"052018 - for checking.xls"* *"052018 – Flow - for checking.xls"* *"062018 - for checking.xls"* *"062018 – Flow - for checking.xls"* *"MR 17 - Caieiras - V.2 - for checking.xls"* *"MR 17 - Caieiras - V.2 – FE - for checking.xls"*	Dated 16/10/2018.	Project Participants
/22/	EPIC / Essencis	Comparative spreadsheets with	Dated 16/10/2018.	Project

	Soluções Ambientais S.A.	monitoring records for the project activity "Caieiras landfill gas emission reduction" – monitoring period from 01/01/2018 to 30/06/2018. Created as part of the *Data authenticity checking* procedure performed during the on-site visit. File names: *"jan-18 – for checking.xls"* *"feb-18 – for checking.xls"* *"mar-18 – for checking.xls"* *"apr-18 – for checking.xls"* *"may-18 – for checking.xls"* *"jun-18 – for checking.xls"*		Participants
/23/	Essencis Soluções Ambientais S.A.	Blank version of the emission reduction calculation spreadsheets applied for the project activity "Caieiras landfill gas emission reduction" - monitoring period from 01/01/2018 to 30/06/2018. File names: "*MMYYYY - blank.xls* " *"MMYYYY – Flow.xls"* *"MR 17 - Caieiras - V.1 - blank.xls"* *"MR 17 - Caieiras - V.1 - FE - blank.xls*	Dated 15/09/2018.	Project Participants
/24/	Essencis Soluções Ambientais S.A.	Internal service and maintenance log book (with details about historical of interventions, service and instrument/equipment calibration and replacement in the project activity "Caieiras landfill gas emission reduction").	Available at the project's data control room.	Project Participants
/25/	Essencis Soluções Ambientais S.A.	Completed Modalities of Communication (MoC) form for the CDM project activity "Caieiras landfill gas emission reduction"	Latest version dated 29/10/2014. Available online: http://cdm.unfccc.int/Projects/DB/DNV-CUK1134509951.62/view?cp=1	Project Participants
/26/	EPIC	EPIC: Working procedures for performance of CDM verification assessments, Issue No. 2, Rev No. 1.	Dated 01/08/2014.	Others
/27/	EPIC	List of Findings for the 17th verification of the CDM project activity "Caieiras landfill gas emission reduction".	Dated 16/10/2018.	Others
/28/	CEIME Calibração e Comércio de	Certificate of Calibration for the pressure signal + data	Certificate issuance dates:	Others

	Instrumentos Ltda.	transmission units of the LFG flow meter sets used for measuring flow of LFG which is sent to each of the 21 internal combustion gas engines: *Internal combustion gas engine 1:* Calibration event dated 21/02/2018, Calibration Certificate Number 3K64661403471275048/18. *Internal combustion gas engine 2:* Calibration event dated 21/02/2018, Calibration Certificate Number 3K64661403471075048/18. *Internal combustion gas engine 3:* Calibration event dated 21/02/2018, Calibration Certificate Number 3K64661403470075048/18. *Internal combustion gas engine 4:* Calibration event dated 21/02/2018, Calibration Certificate Number 3K64661403470675048/18. *Internal combustion gas engine 5:* Calibration event dated 21/02/2018, Calibration Certificate Number 3K64661403470475048/18. *Internal combustion gas engine 6:* Calibration event dated 21/02/2018, Calibration Certificate Number 3K64661403469875048/18. *Internal combustion gas engine 7:* Calibration event dated 21/02/2018, Calibration Certificate Number 3K64661403470875048/18. *Internal combustion gas engine 8:* Calibration event dated 21/02/2018, Calibration Certificate Number 3K64661403470275048/18. *Internal combustion gas engine*	21/02/2018 21/02/2018 21/02/2018 21/02/2018 21/02/2018 21/02/2018 21/02/2018 21/02/2018	

		9: Calibration event dated 21/02/2018, Calibration Certificate Number 3K64661403472675048/18. *Internal combustion gas engine 10:* Calibration event dated 21/02/2018, Calibration Certificate Number 3K64661403473875048/18. *Internal combustion gas engine 11:* Calibration event dated 21/02/2018, Calibration Certificate Number 3K64661403471475048/18. *Internal combustion gas engine 12:* Calibration event dated 21/02/2018, Calibration Certificate Number 3K64661403472075048/18 *Internal combustion gas engine 13:* Calibration event dated 21/02/2018, Calibration Certificate Number 3K64661403472475048/18. *Internal combustion gas engine 14:* Calibration event dated 21/02/2018, Calibration Certificate Number 3K64661403471675048/18. *Internal combustion gas engine 15:* Calibration event dated 21/02/2018, Calibration Certificate Number 3K64661403471875048/18. *Internal combustion gas engine 16:* Calibration event dated 21/02/2018, Calibration Certificate Number 3K64661403472275048/18. *Internal combustion gas engine 17:* Calibration event dated 21/02/2018, Calibration Certificate Number 3K64661403474275048/18. *Internal combustion gas engine*	21/02/2018 21/02/2018 21/02/2018 21/02/2018 21/02/2018 21/02/2018 21/02/2018 21/02/2018	

		18: Calibration event dated 21/02/2018, Calibration Certificate Number 3K64661403473075048/18. *Internal combustion gas engine 19:* Calibration event dated 21/02/2018, Calibration Certificate Number 3K64661403472875048/18. *Internal combustion gas engine 20:* Calibration event dated 21/02/2018, Calibration Certificate Number 3K64661403473475048/18. *Internal combustion gas engine 21:* Calibration event dated 21/02/2018, Calibration Certificate Number 3K64661403474075048/18.	21/02/2018 21/02/2018 21/02/2018 21/02/2018	
/29/	Germanischer Lloyd Certification GmbH	CDM Verification and Certification Report for the CDM project activity "Caieiras landfill gas emission reduction". 2nd periodic verifications (monitoring period from 01/11/2007 to 30/06/2008). GLC Report No. 081, Rev 15.	Dated 10/07/2012. Available online: http://cdm.unfccc.int/Projects/DB/DNV-CUK1134509951.62/iProcess/Germanischer1286456614.85/view	Others
/30/	EPIC	CDM Verification and Certification Report for the CDM project activity "Caieiras landfill gas emission reduction". 8th verification (monitoring period from 01/10/2012 to 30/03/2013, draft/working version.	-	Others
/31/	EPIC	CDM Verification and Certification Report for the CDM project activity "Caieiras landfill gas emission reduction". 9th verification (monitoring period from 13/12/2013 to 12/06/2014, Report No. : ESSPL/CDM/2015/021, version 01.	Dated 14/05/2015.	Others
/32/	EPIC	CDM Verification and Certification Report for the CDM project activity "Caieiras landfill gas emission reduction". 10th verification (monitoring period from 13/06/2014 to 31/12/2014, Report No.: ESSPL/CDM/2015/023, version	Dated 28/03/2015. Available online: http://cdm.unfccc.int/Projects/DB/DNV-CUK1134509951.62/CP/KLUXCAFK29DIMF605IHFIWIHE49O30/iProcess/EPIC_Sust1423574478.26/view	Others

		01.		
/33/	SGS United Kingdom Ltd	CDM Verification and Certification Report for the CDM project activity "Caieiras landfill gas emission reduction". 1st verification (verification period from 2006-03-31 to 2007-10-31. Issue 3 CDM.VER0241.	Dated 18/01/2011. Available online: http://cdm.unfccc.int/Projects/DB/DNV-CUK1134509951.62/iProcess/SGS-UKL1195228146.42/view	Others
/34/	Iope Instrumentos de Precisão	Specification sheet for the thermocouple IEC 584-2/1982.	Available online: http://www.iopeservice.iope.com.br/iopeservice/p_temp_termop_b.php	Others
/35/	CEIME Calibração e Comércio de Instrumentos Ltda.	Certificate of Calibration for the pressure signal + data transmission units of the LFG flow meter sets used for measuring flow of LFG which is sent to each of the 21 internal combustion gas engines: *Internal combustion gas engine 1:* Calibration event dated 19/10/2016, Calibration Certificate Number 3K64661403471263885/16. *Internal combustion gas engine 2:* Calibration event dated 19/10/2016, Calibration Certificate Number 3K64661403471063885/16. *Internal combustion gas engine 3:* Calibration event dated 19/10/2016, Calibration Certificate Number 3K64661403470063885/16. *Internal combustion gas engine 4:* Calibration event dated 19/10/2016, Calibration Certificate Number 3K64661403470663885/16. *Internal combustion gas engine 5:* Calibration event dated 19/10/2016, Calibration Certificate Number 3K64661403470463885/16. *Internal combustion gas engine 6:* Calibration event dated 19/10/2016, Calibration Certificate Number	Certificate issuance dates: 19/10/2016 19/10/2016 19/10/2016 19/10/2016 19/10/2016 19/10/2016	Others

		3K64661403469863885/16. *Internal combustion gas engine 7:* Calibration event dated 19/10/2016, Calibration Certificate Number 3K64661403470863885/16. *Internal combustion gas engine 8:* Calibration event dated 19/10/2016, Calibration Certificate Number 3K64661403470263885/16. *Internal combustion gas engine 9:* Calibration event dated 19/10/2016, Calibration Certificate Number 3K64661403472663885/16. *Internal combustion gas engine 10:* Calibration event dated 19/10/2016, Calibration Certificate Number 3K64661403473863885/16. *Internal combustion gas engine 11:* Calibration event dated 19/10/2016, Calibration Certificate Number 3K64661403471463885/16. *Internal combustion gas engine 12:* Calibration event dated 19/10/2016, Calibration Certificate Number 3K64661403472063885/16. *Internal combustion gas engine 13:* Calibration event dated 19/10/2016, Calibration Certificate Number 3K64661403472463885/16. *Internal combustion gas engine 14:* Calibration event dated 19/10/2016, Calibration Certificate Number 3K64661403471663885/16. *Internal combustion gas engine 15:* Calibration event dated 19/10/2016, Calibration Certificate Number	19/10/2016 19/10/2016 19/10/2016 19/10/2016 19/10/2016 19/10/2016 19/10/2016 19/10/2016	

		3K64661403471863885/16. *Internal combustion gas engine 16:* Calibration event dated 19/10/2016, Calibration Certificate Number 3K64661403472263885/16. *Internal combustion gas engine 17:* Calibration event dated 19/10/2016, Calibration Certificate Number 3K64661403474263885/16. *Internal combustion gas engine 18:* Calibration event dated 19/10/2016, Calibration Certificate Number 3K64661403473063885/16. *Internal combustion gas engine 19:* Calibration event dated 19/10/2016, Calibration Certificate Number 3K64661403472863885/16. *Internal combustion gas engine 20:* Calibration event dated 19/10/2016, Calibration Certificate Number 3K64661403473463885/16. *Internal combustion gas engine 21:* Calibration event dated 19/10/2016, Calibration Certificate Number 3K64661403474063885/16.	19/10/2016 19/10/2016 19/10/2016 19/10/2016 19/10/2016 19/10/2016	
/36/	CEIME Calibração e Comércio de Instrumentos Ltda.	Certificates of Calibration for the installed temperature sensors used for measuring LFG temperature which is sent to each of the 21 internal combustion gas engines: Temperature sensor with Serial Number E15PT0009, calibration event dated 19/10/2016, Calibration Certificate Number E15PT000964885/16. Temperature sensor with Serial Number E15PT0008, calibration event dated 19/10/2016, Calibration Certificate Number E15PT000864885/16.	Certificate issuance dates: 19/10/2016 19/10/2016	Others

		Temperature sensor with Serial Number E15PT0003, calibration event dated 19/10/2016, Calibration Certificate Number E15PT000364885/16.	19/10/2016	
		Temperature sensor with Serial Number E15PT0006, calibration event dated 19/10/2016, Calibration Certificate Number E15PT000664885/16.	19/10/2016	
		Temperature sensor with Serial Number E15PT0005, calibration event dated 19/10/2016, Calibration Certificate Number E15PT000564885/16.	19/10/2016	
		Temperature sensor with Serial Number E15PT0002, calibration event dated 19/10/2016, Calibration Certificate Number E15PT000264885/16.	19/10/2016	
		Temperature sensor with Serial Number E15PT0015, calibration event dated 19/10/2016, Calibration Certificate Number E15PT001564885/16.	19/10/2016	
		Temperature sensor with Serial Number E15PT0004, calibration event dated 19/10/2016, Calibration Certificate Number E15PT000464885/16.	19/10/2016	
		Temperature sensor with Serial Number E15PT0016, calibration event dated 19/10/2016, Calibration Certificate Number E15PT001664885/16.	19/10/2016	
		Temperature sensor with Serial Number E15PT0021, calibration event dated 19/10/2016, Calibration Certificate Number E15PT002164885/16.	19/10/2016	
		Temperature sensor with Serial Number E15PT0007, calibration event dated 19/10/2016, Calibration Certificate Number E15PT000764885/16.	19/10/2016	
		Temperature sensor with Serial Number E15PT0013, calibration event dated 19/10/2016, Calibration Certificate Number E15PT001364885/16.	19/10/2016	
		Temperature sensor with Serial Number E15PT0024, calibration event dated 19/10/2016,	19/10/2016	

		Calibration Certificate Number E15PT002464885/16. Temperature sensor with Serial Number E15PT0011, calibration event dated 19/10/2016, Calibration Certificate Number E15PT001164885/16. Temperature sensor with Serial Number E15PT0012, calibration event dated 19/10/2016, Calibration Certificate Number E15PT001264885/16. Temperature sensor with Serial Number E15PT0014, calibration event dated 19/10/2016, Calibration Certificate Number E15PT001464885/16. Temperature sensor with Serial Number E15PT0016, calibration event dated 19/10/2016, Calibration Certificate Number E15PT001664885/16. Temperature sensor with Serial Number E15PT0018, calibration event dated 19/10/2016, Calibration Certificate Number E15PT001864885/16. Temperature sensor with Serial Number E15PT0017, calibration event dated 19/10/2016, Calibration Certificate Number E15PT001764885/16. Temperature sensor with Serial Number E15PT0023, calibration event dated 19/10/2016, Calibration Certificate Number E15PT002364885/16. Temperature sensor with Serial Number E15PT0019, calibration event dated 19/10/2016, Calibration Certificate Number E15PT001964885/16.	19/10/2016 19/10/2016 19/10/2016 19/10/2016 19/10/2016 19/10/2016 19/10/2016	
/37/	IBG – Indústria Brasileira de Gases Ltda.	Certificate for the cylinder of pattern gases used for the calibration of the CH_4 content gas analyzer unit: - Gas cylinders with 5.00% O_2 pattern gas: cylinder n° 4094023 (supplied by IBG – Indústria Brasileira de Gases Ltda.). Certificate Number IBG0430417.	Certificate issuance date: 07/04/2017.	Others

/38/	EPIC	CDM Verification and Certification Report for the CDM project activity "Caieiras landfill gas emission reduction". 12th verification (monitoring period from 16/05/2015 to 31/12/2015, Report version 1.0.	Dated 10/06/2016. Available online: https://cdm.unfccc.int/Projects/DB/DNV-CUK1134509951.62/CP/KLUXCAFK29DIMF605IHFIWIHE49O30/iProcess/EPIC_Sust1455790522.85/view	Others
/39/	CEIME Calibração e Comércio de Instrumentos Ltda.	Certificates of Calibration for the pressure sensors used for measuring pressure of LFG which is sent to each of the 21 internal combustion gas engines: *Internal combustion gas engine 1:* Calibration event dated 19/10/2016, Calibration Certificate Number 3K64661403476164885/16. *Internal combustion gas engine 2:* Calibration event dated 19/10/2016, Calibration Certificate Number 3K64661403476064885/16. *Internal combustion gas engine 3:* Calibration event dated 19/10/2016, Calibration Certificate Number 3K64661403475564885/16. *Internal combustion gas engine 4:* Calibration event dated 19/10/2016, Calibration Certificate Number 3K64661403475864885/16. *Internal combustion gas engine 5:* Calibration event dated 19/10/2016, Calibration Certificate Number 3K64661403475764885/16. *Internal combustion gas engine 6:* Calibration event dated 19/10/2016, Calibration Certificate Number 3K64661403475464885/16. . *Internal combustion gas engine 7:* Calibration event dated 19/10/2016, Calibration	Certificate issuance dates: 19/10/2016 19/10/2016 19/10/2016 19/10/2016 19/10/2016 19/10/2016 19/10/2016	Others

		Certificate Number 3K64661403475964885/16. *Internal combustion gas engine 8:* Calibration event dated 19/10/2016, Calibration Certificate Number 3K64661403475664885/16. *Internal combustion gas engine 9:* Calibration event dated 19/10/2016, Calibration Certificate Number 3K64661403476864885/16. *Internal combustion gas engine 10:* Calibration event dated 19/10/2016, Calibration Certificate Number 3K64661403477364885/16. *Internal combustion gas engine 11:* Calibration event dated 19/10/2016, Calibration Certificate Number 3K64661403476264885/16. *Internal combustion gas engine 12:* Calibration event dated 19/10/2016, Calibration Certificate Number 3K64661403476564885/16. *Internal combustion gas engine 13:* Calibration event dated 19/10/2016, Calibration Certificate Number 3K64661403476764885/16. *Internal combustion gas engine 14:* Calibration event dated 19/10/2016, Calibration Certificate Number 3K64661403476364885/16. *Internal combustion gas engine 15:* Calibration event dated 19/10/2016, Calibration Certificate Number 3K64661403476464885/16. *Internal combustion gas engine 16:* Calibration event dated 19/10/2016, Calibration	19/10/2016 19/10/2016 19/10/2016 19/10/2016 19/10/2016 19/10/2016 19/10/2016 19/10/2016	

		Certificate Number 3K64661403476664885/16. *Internal combustion gas engine 17:* Calibration event dated 19/10/2016, Calibration Certificate Number 3K64661403477464885/16. *Internal combustion gas engine 18:* Calibration event dated 19/10/2016, Calibration Certificate Number 3K64661403477064885/16. *Internal combustion gas engine 19:* Calibration event dated 19/10/2016, Calibration Certificate Number 3K64661403476964885/16. *Internal combustion gas engine 20:* Calibration event dated 19/10/2016, Calibration Certificate Number 3K64661403477264885/16. *Internal combustion gas engine 21:* Calibration event dated 19/10/2016, Calibration Certificate Number 3K64661403477164885/16.	19/10/2016 19/10/2016 19/10/2016 19/10/2016 19/10/2016	
/40/	EPIC	Validation Opinion Report on Post-registration changes for the CDM project activity: "Caieiras landfill gas emission reduction", version 04.0	Dated 25/07/2018. Available online: https://cdm.unfccc.int/filestorage/3/2/L/32LFJCTD9SEYPHXMIURA8NGW5Q6470/27%20July%202018_%20FVR%20Caeiras%20LFG%20Project%20-%20version%204-%2025.07.2018.pdf?t=SGl8cGVwcGowfDBSwaNBU3hEkCVJEVvJpUpE	Others
/41/	CEIME Calibração e Comércio de Instrumentos Ltda.	Certificates of Calibration for the installed temperature sensors used for measuring LFG temperature which is sent to each of the 21 internal combustion gas engines: Temperature sensor with Serial Number E15PT0009, calibration event dated 21/02/2018, Calibration Certificate Number E15PT000975048/18.	Certificate issuance dates: 21/02/2018	Others

		Temperature sensor with Serial Number E15PT0008, calibration event dated 21/02/2018, Calibration Certificate Number E15PT000875048/18.	21/02/2018	
		Temperature sensor with Serial Number E15PT0003, calibration event dated 21/02/2018, Calibration Certificate Number E15PT000375048/18.	21/02/2018	
		Temperature sensor with Serial Number E15PT0006, calibration event dated 21/02/2018, Calibration Certificate Number E15PT000675048/18.	21/02/2018	
		Temperature sensor with Serial Number E15PT0005, calibration event dated 21/02/2018, Calibration Certificate Number E15PT000575048/18.	21/02/2018	
		Temperature sensor with Serial Number E15PT0002, calibration event dated 21/02/2018, Calibration Certificate Number E15PT000275048/18.	21/02/2018	
		Temperature sensor with Serial Number E15PT0015, calibration event dated 21/02/2018, Calibration Certificate Number E15PT001575048/18.	21/02/2018	
		Temperature sensor with Serial Number E15PT0004, calibration event dated 21/02/2018, Calibration Certificate Number E15PT000475048/18.	21/02/2018	
		Temperature sensor with Serial Number E15PT0016, calibration event dated 21/02/2018, Calibration Certificate Number E15PT001675048/18.	21/02/2018	
		Temperature sensor with Serial Number E15PT0021, calibration event dated 21/02/2018, Calibration Certificate Number E15PT002175048/18.	21/02/2018	
		Temperature sensor with Serial Number E15PT0007, calibration event dated 21/02/2018, Calibration Certificate Number E15PT000775048/18.	21/02/2018	
		Temperature sensor with Serial Number E15PT0013, calibration event dated 21/02/2018,	21/02/2018	

		Calibration Certificate Number E15PT001375048/18. Temperature sensor with Serial Number E15PT0024, calibration event dated 21/02/2018, Calibration Certificate Number E15PT001475048/18. Temperature sensor with Serial Number E15PT0011, calibration event dated 21/02/2018, Calibration Certificate Number E15PT001175048/18. Temperature sensor with Serial Number E15PT0012, calibration event dated 21/02/2018, Calibration Certificate Number E15PT001275048/18. Temperature sensor with Serial Number E15PT0014, calibration event dated 21/02/2018, Calibration Certificate Number E15PT001475048/18. Temperature sensor with Serial Number E15PT0016, calibration event dated 21/02/2018, Calibration Certificate Number E15PT001675048/18. Temperature sensor with Serial Number E15PT0018, calibration event dated 21/02/2018, Calibration Certificate Number E15PT001875048/18. Temperature sensor with Serial Number E15PT0017, calibration event dated 21/02/2018, Calibration Certificate Number E15PT001775048/18. Temperature sensor with Serial Number E15PT0023, calibration event dated 21/02/2018, Calibration Certificate Number E15PT002375048/18. Temperature sensor with Serial Number E15PT0019, calibration event dated 21/02/2018, Calibration Certificate Number E15PT001975048/18.	21/02/2018 21/02/2018 21/02/2018 21/02/2018 21/02/2018 21/02/2018 21/02/2018 21/02/2018 21/02/2018	
/42/	EPIC	CDM Verification and Certification Report for the CDM project activity “Caieiras landfill gas emission reduction”. 11th verification (monitoring period from 01/01/2015 to 15/05/2015,	Dated 08/08/2015. Available online: http://cdm.unfccc.int/Projects/DB/DNV-CUK1134509951.62/CP/KLUXCAFK29DIMF605IHFIWIHE	Others

		Report No.: ESSPL/CDM/2015/040, version 2.0.	49O30/iProcess/EPIC_Sust1432980064.86/view	
/43/	Elsi s.r.l.	Data Sheet, Temperature transmitters – SEM203 P.	Dated: 2013 Available online: https://library.e.abb.com/public/a63ec826a1a0400fc1257b87003f76d6/SS_267CR_269CR_EN_02.pdf	Others
/44/	ABB S.p.a.	Data Sheet, 2600T Series Pressure Transmitters	Dated: 2013 Available online: https://library.e.abb.com/public/a63ec826a1a0400fc1257b87003f76d6/SS_267CR_269CR_EN_02.pdf	Others
/45/	CEIME Calibração e Comércio de Instrumentos Ltda.	Certificates of Calibration for the pressure sensors used for measuring pressure of LFG which is sent to each of the 21 internal combustion gas engines: *Internal combustion gas engine 1:* Calibration event dated 21/02/2018, Calibration Certificate Number 3K64661403476175048/18. *Internal combustion gas engine 2:* Calibration event dated 21/02/2018, Calibration Certificate Number 3K64661403476075048/18. *Internal combustion gas engine 3:* Calibration event dated 21/02/2018, Calibration Certificate Number 3K64661403475575048/18. *Internal combustion gas engine 4:* Calibration event dated 21/02/2018, Calibration Certificate Number 3K64661403475775048/18. *Internal combustion gas engine 5:* Calibration event dated 21/02/2018, Calibration Certificate Number 3K64661403475475048/18. *Internal combustion gas engine 6:* Calibration event dated 21/02/2018, Calibration Certificate Number	Certificate issuance dates: 21/02/2018 21/02/2018 21/02/2018 21/02/2018 21/02/2018 21/02/2018	Others

		3K64661403475464885/16. . *Internal combustion gas engine 7:* Calibration event dated 21/02/2018, Calibration Certificate Number 3K64661403475964885/16. *Internal combustion gas engine 8:* Calibration event dated 21/02/2018, Calibration Certificate Number 3K64661403475664885/16. *Internal combustion gas engine 9:* Calibration event dated 21/02/2018, Calibration Certificate Number 3K64661403476864885/16. *Internal combustion gas engine 10:* Calibration event dated 21/02/2018, Calibration Certificate Number 3K64661403477364885/16. *Internal combustion gas engine 11:* Calibration event dated 21/02/2018, Calibration Certificate Number 3K64661403476264885/16. *Internal combustion gas engine 12:* Calibration event dated 21/02/2018, Calibration Certificate Number 3K64661403476564885/16. *Internal combustion gas engine 13:* Calibration event dated 21/02/2018, Calibration Certificate Number 3K64661403476764885/16. *Internal combustion gas engine 14:* Calibration event dated 21/02/2018, Calibration Certificate Number 3K64661403476364885/16. *Internal combustion gas engine 15:* Calibration event dated 21/02/2018, Calibration	21/02/2018 21/02/2018 21/02/2018 21/02/2018 21/02/2018 21/02/2018 21/02/2018 21/02/2018	

		Certificate Number 3K64661403476464885/16. *Internal combustion gas engine 16:* Calibration event dated 21/02/2018, Calibration Certificate Number 3K64661403476664885/16. *Internal combustion gas engine 17:* Calibration event dated 21/02/2018, Calibration Certificate Number 3K64661403477464885/16. *Internal combustion gas engine 18:* Calibration event dated 21/02/2018, Calibration Certificate Number 3K64661403477064885/16. *Internal combustion gas engine 19:* Calibration event dated 21/02/2018, Calibration Certificate Number 3K64661403476964885/16. *Internal combustion gas engine 20:* Calibration event dated 21/02/2018, Calibration Certificate Number 3K64661403477264885/16. *Internal combustion gas engine 21:* Calibration event dated 21/02/2018, Calibration Certificate Number 3K64661403477164885/16.	21/02/2018 21/02/2018 21/02/2018 21/02/2018 21/02/2018 21/02/2018	
/46/	KRON Instrumentos Elétricos Ltda.	Calibration certificate for electricity meter model MULT K (Serial No. GK090P), manufactured by KRON Instrumentos Elétricos Ltda. Certificate No. 141819-101. Calibration event date: 23/11/2016.	Certificate issuance date: 23/11/2016.	Others
/47/	Emerson Electric Co.	Reference Manual / The Rosemount Annubar Flowmeter Series. 00809-0100-4809, Rev DA	Dated: September/2015 Available online: https://www.emerson.com/documents/automation/manual-rosemount-annubar-flowmeter-series-en-76094.pdf	Others
/48/	Emerson Electric Co.	Reference Manual / Rosemount Annubar Primary Flow Element	Dated: July/2009 Available online:	Others

		Flow Test Data Book. 00821-0100-4809, Rev BA	https://www.emerson.com/documents/automation/manual-rosemount-annubar-primary-flow-element-flow-test-data-book-en-74372.pdf	
/49/	EPIC	CDM Verification and Certification Report for the CDM project activity "Caieiras landfill gas emission reduction". 13th verification (monitoring period from 01/01/2016 to 30/06/2016, Report version 02.0.	Dated 27/10/2016. Available online: https://cdm.unfccc.int/filestorage/1/8/9/189PI76KTDJORLZGVMEQYSC4FH0U2N/CR_0171_13th.pdf?t=Rzl8cGVwcHlufDDS37Y1gfQTYA4fNrt4OsLu	Others
/50/	SELCON Sistemas Eletrônicos de Controle Ltda.	Specification sheet for the UV Flame detector SEL-SV-UL-K4.	Available online: http://www.selcon.com.br/produtos/sensores/SELUO2K4.pdf	Others
/51/	SELCON Sistemas Eletrônicos de Controle Ltda.	Specification sheet for the UV Flame detector SEL-SV-210230-K6.	Available online: http://www.selcon.com.br/produtos/sensores/SEL-SV.....K6_ft.pdf	Others
/52/	Honeywell Analytics Ltd.	Specification sheet for the UV Flame detector C7061.	Available online: https://eccap.honeywell.cn/CatalogDocuments/Combu%20C7061-65-0223.pdf	Others
/53/	Essencis Soluções Ambientais S.A.	Set of internal calibration notes for the Infrared CH_4 content gas analyzer unit CENTRUM AG 4000 with serial number NS 53159. Dates of the performed calibration events: - 19/12/2016 - 02/01/2017 - 20/02/2017 - 10/04/2017 - 05/06/2017 - 03/07/2017	-	Project Participants
/54/	CEIME Calibração e Comércio de Instrumentos Ltda.	Calibration certificate for Pressgage pressure sensor (Serial No. 683612). Certificate No. 68361260976/16. Calibration event date: 17/01/2016.	Certificate issuance date: 17/01/2016.	Others
/55/	EPIC	CDM Verification and Certification Report for the CDM project activity "Caieiras landfill gas emission reduction". 15th verification (monitoring period from 01/01/2017 to 30/06/2017, Report version 1.0, draft version.	Dated 24/09/2018.	Others
/56/	Merieux	Technical Reports for the	Reports dated 10/07/2017.	Others

	NutriSciences / Bioagri Ambiental Ltda.	determination of methane destruction efficiency in the flares of the project activity "Caieiras landfill gas emission reduction". Report titles: *"Teste de eficiência jun 17 (flare 1).pdf".* *"Teste de eficiência jun 17 (flare 2).pdf".* *"Teste de eficiência jun 17 (flare 4).pdf".* *"Teste de eficiência jun 17 (flare 4).pdf".*		
/57/	Merieux NutriSciences / Bioagri Ambiental Ltda.	Technical Reports for the determination of methane destruction efficiency in the flares of the project activity "Caieiras landfill gas emission reduction". Report titles: *"Teste de eficiência feb 18 (flare 1).pdf".* *"Teste de eficiência feb 18 (flare 2).pdf".* *"Teste de eficiência feb 18 (flare 4).pdf".* *"Teste de eficiência feb 18 (flare 4).pdf".*	Reports dated 22/02/2018.	Others
/58/	IBG – Indústria Brasileira de Gases Ltda.	Certificate for the cylinder of pattern gases used for the calibration of the CH_4 content gas analyzer unit: - Gas cylinders with 60.14% CO_2 pattern gas: cylinder n° 4849752 (supplied by IBG – Indústria Brasileira de Gases Ltda.). Certificate Number IBG04170814.	Certificate issuance date: 04/08/2014.	Others
/59/	IBG – Indústria Brasileira de Gases Ltda.	Certificate for the cylinder of pattern gases used for the calibration of the CH_4 content gas analyzer unit: - Gas cylinders with 60.01% CH_4 pattern gas: cylinder n° 35112 (supplied by IBG - Indústria Brasileira de Gases Ltda.). Certificate Number IBG3151015.	Certificate issuance date: 22/10/2015.	Others
/60/	Cia. Ultragaz S.A.	Communication explaining the adopted procedure at Cia Ultragaz S.A. for measuring quantity of LPG regularly delivered to Essencis Soluções Ambientais S.A. including confirmation of supplied amount	Dated 26/07/2018.	Others

		of LPG during the period from January 2018 to June 2018.		
/61/	KRON Instrumentos Elétricos Ltda.	Technical Specification sheet for the electricity meters MULT K. "Multimedidor Mult-K / Ficha técnica – K0001", rev. 6.	Dated 17/02/2009. Available online: http://www.bagarel.com.br/coel/boletins%20tecnicos/Boletim_MICO.pdf	Others
/62/	Mettler-Toledo Inc.	User manual for the weight scale 2180.	Available online: http://www.toledobrasil.com.br/files/manuais/MU_2180_Portatil.pdf	Others
/63/	Contech Indústria e Comércio de Equipamentos Eletrônicos Ltda.	Operation and maintenance instruction / manual for the FT-2 flow meter.	Available online: http://www.contechind.com.br/catalogos/medidor-de-vazao-tipo-thermal.pdf	Others
/64/	Essencis Soluções Ambientais S.A.	Monthly records of grid-sourced electricity consumed by the project activity.	-	Project Participants
/65/	Intermountain CHP Application Center	Designing a Landfill Gas to Energy Project: Rules of Thumb and Questions to Ask. Intermountain Workshop. CHP Bioenergy for Landfills and for and Wastewater Treatment Plants. SCS Engineers.	Dated 11/08/2005.	Others
/66/	Solid Waste Association of North America (SWANA)	Landfill Gas Collection System Efficiencies (2007).	Report dated 2007.	Others
/67/	California Environmental Protection Agency	Evaluation of Landfill Gas Collection Efficiency. Appendix D.	Dated year 2009. Available online: http://www.arb.ca.gov/regact/2009/landfills09/appd.pdf	Others
/68/	Pressgage instrumentos de Medição e Controle	Specification details for the pressure sensor model TPI-PRESS.	Available online: http://www.pressgage.com.br/wp-content/uploads/2015/02/transmissor-de-press%C3%A3o.pdf	Others
/69/	Pressgage instrumentos de Medição e Controle Ltda.	Specification details for the temperature sensor model STP-100.	Available online: http://www.pressgage.com.br/wp-content/uploads/2015/01/Sensor-de-temperatura.pdf	Others
/70/	BGM Instrumentação Controle e Automação Ltda.	Gas Analyzer CENTRUM AG 4000, User Manual 1st edition.	Dated March 2012. Available online: http://www.bgm.com.br/?r=produtos/view&id=4	Others
/71/	Macnaught Pty Ltd.	Instruction manual and specification sheet for the fuel meter model DM100	Dated year 2014 Available online: http://www.redashe.com/sites/default/files/Data_Sheets/Ins	Others

			truction-Manuals/Macnaught/Macnaught-DM100-Instruction-Manual.pdf https://www.omniprocess.se/fileadmin/user_upload/omniprocess/pdf/datasheets/dm100.pdf	
/72/	INMETRO	Accreditation scopes of the inspection service company BIOAGRI Ambiental Ltda. / Mérieux NutriSciences Brasil vis-a-vis accreditation requirements from INMETRO.	Available online: http://inmetro.gov.br/laboratorios/rble/docs/CRL0172.pdf	Others
/73/	Brazil's Interministerial Commission on Global Climate Change (DNA of Brazil)	CO_2 emission factors for electricity generation in Brazil National Interconnected System – Base year 2016.	Available online: http://www.mctic.gov.br/mctic/opencms/ciencia/SEPED/clima/textogeral/emissao_despacho.html	Others
/74/	Naka Comércio e Indústria de Instrumentação Industrial Ltda.	Specification sheet for the thermocouple NKTC-3000.	Available online: http://nakainstrumentacao.com.br/docs/8001395759135termopar_nktc.pdf	Others
/75/	UNFCCC / CDM-EB	Monitoring Report Form (CDM-MR-FORM). Version 06.0.	Dated 07/06/2017. Available online: https://cdm.unfccc.int/filestorage/e/x/t/extfile-20170607143601085-ISS_form07v6.pdf/ISS_form07v6.pdf?t=NUp8cGVwcncyfDCfo3htaXQ3tVNsJqGcZScQ	Others
/76/	Essencis Soluções Ambientais S.A.	Internal records of expenditures with fuel type LPG during the period from January 2017 to Jnue 2017 + dates of delivery of fuel LPG at the project site.	Data retrieved from the financial/accounting management financial system of Essencis Soluções Ambientais S.A on 14/03/2018.	Project Participants
/77/	Empresa Brasileira de Pesquisa Energética (EPE)	Balanço Energético Nacional 2017. Brazilian Energetic Balance Report year 2017.	Available online: https://ben.epe.gov.br/default.aspx?anoColeta=2017	Others
/78/	Cepollina Engenheiros Consultores Ltda.	Declaration documents reporting the outcome of the technical evaluation performed at the UVS - Caieiras landfill comparing the management practices at the UVS - Caieiras landfill vis-a-vis the previously conceived design of the landfill.	Document dated 03/01/2018 and 06/07/2018.	Others
/79/	Essencis Soluções Ambientais S.A.	Internal Certificates of Training for performance of calibration events in the CH_4 content gas analyzer CENTRUM AG 4000	Dated January 2014.	Project Participants

		manufactured by BGM Instrumentação Controle e Automação Ltda.		
/80/	Brazilian National Agency of Petroleum, Natural Gas and Biofuels (*Agência Nacional do Petróleo, Gás Natural e Biocombustíveis - ANP*)	Resolution 15.	Dated 18/05/2005. Available online: http://nxt.anp.gov.br/nxt/gateway.dll/leg/resolucoes_anp/2005/maio/ranp%2015%20-%202005.xml	Others
/81/	BGM Instrumentação Controle e Automação Ltda.	Communication with ref.: "*CA.BG.01.05-Rev 09 – Calibração Analisador de Gases*" Submitted to Essencis Soluções Ambientais S.A..	Dated 08/07/2014.	Others
/82/	Mayer-Brown / Tauil & Chequer	Legal update / interpretation: Regulation of Brazil's National Policy on Waste Management	Available online: http://www.tauilchequer.com.br/publications/article.asp?id=10261&nid=13012	Others
/83/	Grupo Caieiras Balanças	Certificate of Calibration No. 5778/14 valid for weight scale used by Cia Ultragaz S.A. for measuring mass of delivered LPG cylinders in years 2015 and 2016 (as per communication/clarification issued by Cia Ultragaz S.A.).	Dated 28/11/2014.	Others
/84/	Contech Indústria e Comércio de Equipamentos Eletrônicos Ltda.	Certificate of Calibration for the installed LFG flow meter with S/N 1412000235 - calibration event performed on 15/07/2016. Certificate No. 1412000235 0716 C7.	Certificate issuance date: 15/07/2016.	Others
/85/	Cia Ultragaz S.A.	Internal working procedure "Monitoramento dos equipamentos de envazamento e controle" (*Monitoring of measurement/control and bottleing equipment*). Doc. Code: IT-CO-61.0008; Rev. 4.	-	Others
/86/	Chapple, Mike.	SQL Fundamentals.	-	Others
/87/	Gordon J. Van Wylen, Richard E. Sonntag and Borgnakke:	Fundamentals of Classical Thermodynamics; 4th Edition, John Wiley & Sons, Inc. Table A-4: Saturated Water-Temperature.	Dated 1994.	Others
/88/	Contech Indústria e Comércio de Equipamentos Eletrônicos Ltda.	Certificate of Calibration for the installed LFG flow meter with S/N 1412000236 - calibration event performed on 25/05/2016. Certificate No. 1412000236 0516 C7.	Certificate issuance date: 25/05/2016.	Others

/89/	UNFCCC / CDM-EB	Monitoring Report Form (CDM-MR-FORM). Version 06.0.	Dated 07/06/2017. Available online: https://cdm.unfccc.int/filestorage/e/x/t/extfile-20170607143601085-ISS_form07v6.pdf/ISS_form07v6.pdf?t=NUp8cGVwcncyfDCfo3htaXQ3tVNsJqGcZScQ	Others
/90/	Germanischer Lloyd Certification GmbH	CDM Verification and Certification Report for the CDM project activity "Caieiras landfill gas emission reduction". 3rd periodic verification (monitoring period from 01/07/2008 to 31/12/2009). GLC Report No. 066, Rev 10.	Dated 10/07/2012. Available online: http://cdm.unfccc.int/Projects/DB/DNV-CUK1134509951.62/iProcess/Germanischer1263394812.51/view	Others
/91/	Germanischer Lloyd Certification GmbH	CDM Verification and Certification Report for the CDM project activity "Caieiras landfill gas emission reduction". 4th periodic verification (monitoring period from 01/01/2010 to 30/09/2010). GLC Report No. 071, Rev 12.	Dated 10/07/2012. Available online: http://cdm.unfccc.int/Projects/DB/DNV-CUK1134509951.62/iProcess/Germanischer1290670603.74/view	Others
/92/	Germanischer Lloyd Certification GmbH	CDM Verification and Certification Report for the CDM project activity "Caieiras landfill gas emission reduction". 5th periodic verification (monitoring period from 01/10/2010 to 31/08/2011). GLC Report No. 253, Rev 05.	Dated 18/03/2013. Available online: http://cdm.unfccc.int/Projects/DB/DNV-CUK1134509951.62/iProcess/Germanischer1337093851.53/view	Others
/93/	Germanischer Lloyd Certification GmbH	CDM Verification and Certification Report for the CDM project activity "Caieiras landfill gas emission reduction". 6th periodic verification (monitoring period from 01/09/2011 to 31/03/2012). GLC Report No. 258, Rev 10.	Dated 19/01/2015. Available online: http://cdm.unfccc.int/Projects/DB/DNV-CUK1134509951.62/iProcess/Germanischer1337095440.2/view	Others
/94/	Germanischer Lloyd Certification GmbH	CDM Verification and Certification Reports for the CDM project activity "Caieiras landfill gas emission reduction". 7th periodic verification (monitoring period from 01/04/2012 to 30/09/2012). GLC Report No. 303, Rev 03.	Dated 11/04/2013. Available online: http://cdm.unfccc.int/Projects/DB/DNV-CUK1134509951.62/iProcess/Germanischer1358348284.53/view	Others
/95/	Contech Indústria e Comércio de Equipamentos Eletrônicos Ltda.	Certificate of Calibration for the installed LFG flow meter with S/N 1412000237 - calibration event performed on 15/06/2016. Certificate No. 1412000237 0616 C7.	Certificate issuance date: 15/06/2016.	Others

/96/	Arquipélago Engenharia Ambiental	Commissioning Report for the project activity's flaring station.	Dated December 2007.	Others
/97/	UNFCCC/CDM-EB	"Guideline – Application of materiality in verifications", version 02.0	Dated 20/02/2015.	Others
/98/	CEIME Calibração e Comércio de Instrumentos Ltda.	Calibration certificate for Pressgage pressure sensor. Certificate No. 18505375048/18. Calibration event date: 11/01/2018.	Certificate issuance date: 11/01/2018.	Others
/99/	CEIME Calibração e Comércio de Instrumentos Ltda.	Calibration certificate for the installed LFG temperature sensor. Calibration event performed on 03/01/2017 as indicated in the Certificate No. 16105471257/17	Dated 03/01/2017.	Others
/100/	CEIME Calibração e Comércio de Instrumentos Ltda.	Calibration certificate for the installed LFG temperature sensor. Calibration event performed on 11/01/2018 as indicated in the Certificate No. 19323875048/18.	Dated 11/01/2018.	Others
/101/	Schneider Eletric	Instruction manual and specification sheet for the Schneider electricity meter model PM820MG.	Available online: https://www.schneider-electric.com/en/product/PM820MG/power-meter-pm820---with-display---80-kb-logging/	Others
/102/	Schneider Eletric	Calibration certificate for the installed electricity meter used for measuring electricity generated in captive diesel backup generator. Calibration Certificate Number KD201705000018. Calibration event date 11/05/2017.	Dated 11/05/2017.	Others
/103/	CEIME Calibração e Comércio de Instrumentos Ltda.	Calibration certificate for Pressgage pressure sensor (Serial No. 683612). Certificate No. 18505371257/17. Calibration event date: 03/01/2017.	Certificate issuance date: 03/01/2017.	Others
/104/	EPIC	CDM Verification and Certification Report for the CDM project activity "Caieiras landfill gas emission reduction". 14th verification (monitoring period from 01/07/2016 to 31/12/2016, Report version 02.0.	Dated 22/09/2018.	Others
/105/	CEIME Calibração e Comércio de Instrumentos Ltda.	Calibration certificate for the installed thermocouple with S/N 95719/1/1 (installed on Flare 1). Calibration Certificate No. 95719/1/171257/17. Calibration event date: 03/01/2017.	Dated 03/01/2017.	Others

/106/	CEIME Calibração e Comércio de Instrumentos Ltda.	Calibration certificate for the installed thermocouple with S/N 95719/1/2 (installed on Flare 2). Calibration Certificate No. 95719/1/271257/17. Calibration event date: 03/01/2017.	Dated 03/01/2017.	Others
/107/	CEIME Calibração e Comércio de Instrumentos Ltda.	Calibration certificate for the installed thermocouple with S/N 95719/1/3 (installed on Flare 3). Calibration Certificate No. 95719/1/371257/17. Calibration event date: 03/01/2017.	Dated 03/01/2017.	Others
/108/	CEIME Calibração e Comércio de Instrumentos Ltda.	Calibration certificate for the installed thermocouple with S/N 95719/1/4 (installed on Flare 4). Calibration Certificate No. 95719/1/471257/17. Calibration event date: 03/01/2017.	Dated 03/01/2017.	Others
/109/	Naka Comércio e Indústria de Instrumentação Industrial Ltda.	Specification sheet for the installed Pt-100 temperature sensor.	Available online: http://nakainstrumentacao.com.br/produtos.php	
/110/	Contech Indústria e Comércio de Equipamentos Eletrônicos Ltda.	Certificate of Calibration for the installed LFG flow meter with S/N 1412000235 - calibration event performed on 14/05/2018. Certificate No. 1412000235 0318 M7.	Certificate issuance date: 14/05/2018.	Others

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

Table 1. Remaining FAR from validation and/or previous verification

FAR ID		**Section no.**		**Date:**
Description of FAR				
No FARs were identified from the validation phase nor from previous verifications for the project activity.				
Project participant response				**Date:**
-				
Documentation provided by project participant				
-				
DOE assessment				**Date:**
-				

Table 2. CL from this verification

CL ID		**Section no.**		**Date:**
Description of CL				

No CLs were raised during this verification.
Project participant response **Date:**
Documentation provided by project participant
DOE assessment **Date:**

Table 3. CAR from this verification

CAR ID	1	**Section no.**	E.6.2.	**Date:** 16/10/2018
Description of CAR				
The list of maintenance events performed in the flares (monitoring parameter $Maintenance_y$) which are referred in the initial version of the Monitoring Report do not completely cover the considered monitoring period.				
Project participant response				**Date:** 19/10/2018
As a response to the raised CAR, information about further performed maintenance events of the flares valid for the considered monitoring period was included in the revised version of the Monitoring Report.				
Documentation provided by project participant				
No additional documentation was provided.				
DOE assessment				**Date:** 22/10/2018
The EPIC verification team confirmed that related corrections and improvements made in the revised version of the Monitoring Report sufficiently address the raised CAR. This CAR is thus closed.				

Table 4. CAR from this verification

CAR ID	2	**Section no.**	E.6.2.	**Date:** 16/10/2018
Description of CAR				
Information details about the instruments used for monitoring the "Pressure of the LFG stream in time interval t" (P_t) and "Temperature in the exhaust gas of the enclosed flare in minute m" ($T_{EG,m}$) during the considered monitoring period are not in accordance with provided evidences.				
Project participant response				**Date:** 19/10/2018
As a response to the raised CAR, details about the instruments used for monitoring the "Pressure of the LFG stream in time interval t" (P_t) and "Temperature in the exhaust gas of the enclosed flare in minute m" ($T_{EG,m}$) during the considered monitoring period were corrected in the revised version of the Monitoring Report.				
Documentation provided by project participant				
No additional documentation was provided.				
DOE assessment				**Date:** 22/10/2018
The EPIC verification team confirmed that related corrections and improvements made in the revised version of the Monitoring Report sufficiently address the raised CAR. This CAR is thus closed.				

Table 5. CAR from this verification

CAR ID	3	**Section no.**	E.6.2.	**Date:** 16/10/2018
Description of CAR				
Reported values and vintage for the monitoring parameter "Operation margin CO_2 emission factor in year *y* = Dispatch data analysis operating margin CO_2 emission factor in year *y*" ($EF_{grid,OM,y} = EF_{grid,OM\text{-}DD,y}$) are not under full conformance with applicable methodological requirements.				
Project participant response				**Date:** 19/10/2018
As a response to the raised CAR, values and vintage for the monitoring parameter "Operation margin CO_2 emission factor in year *y* = Dispatch data analysis operating margin CO_2 emission factor in year *y*" ($EF_{grid,OM,y} = EF_{grid,OM\text{-}DD,y}$) were revised in the emission reductions calculation spreadsheet and in the revised version of the Monitoring Report in accordance with applicable methodological requirements.				

Documentation provided by project participant	
No additional documentation was provided.	
DOE assessment	**Date:** 22/10/2018
The EPIC verification team confirmed that performed related amendments in the Monitoring Report and emission reductions calculation spreadsheets are deemed reasonable, correct and sufficiently address the raised CAR. This CAR is thus successfully closed.	

Table 6. CAR from this verification

CAR ID	4	**Section no.**	E.7	**Date:** 16/10/2018
Description of CAR				
Description of performed calibration events valid for instruments used for monitoring the parameters "Temperature of the LFG stream in time interval t" (T_t), "Pressure of the LFG stream in time interval t" (P_t), "Temperature in the exhaust gas of the enclosed flare in minute m" ($T_{EG,m}$), "Quantity of electricity generated in captive diesel backup generator during the year y = Quantity of electricity generated in captive diesel backup generator during the year y" ($EC_{PJ,captive,y} = EG_{Diesel\text{-}Generator,y}$) and "Quantity of LPG consumed by the project activity in year *y"* ($FC_{LPG,y}$) are not complete.				
Project participant response				**Date:** 19/10/2018
As a response to the raised CAR, information about performed calibration events valid for all instruments used for monitoring the parameters T_t, P_t, $EC_{PG,grid,y}$, $T_{EG,m}$ and $FC_{LPG,y}$ were added in the revised version of the Monitoring Report.				
Documentation provided by project participant				
No additional documentation was provided.				
DOE assessment				**Date:** 22/10/2018
The EPIC verification team confirmed that related corrections and improvements made in the revised version of the Monitoring Report sufficiently address the raised CAR. This CAR is thus closed.				

Table 7. FAR from this verification

FAR ID		**Section No.**		**Date:**
Description of FAR				
No FARs were raised during this verification.				
Project participant response				**Date:**
Documentation provided by project participant				
DOE assessment				**Date:**

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Document information

Version	*Date*	*Description*
02.1	11 January 2018	Editorial revision to correct the numbering of appendices in the instructions.
02.0	31 October 2017	Revision to align with the requirements of the "CDM validation and verification standard for project activities" (version 01.0).
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