**Verification and certification report form for CDM project activities**

**(Version 02.1)**

| BASIC INFORMATION | |
|---|---|
| **Title and UNFCCC reference number of the project activity** | Loma Los Colorados Landfill Gas Project (UNFCCC reference number 0822) |
| **Version number of the verification and certification report** | 1.0 |
| **Completion date of the verification and certification report** | 19/02/2018 |
| **Monitoring period number and duration of this monitoring period** | 13th monitoring period<br>01/01/2017 - 31/12/2017 |
| **Version number of the monitoring report to which this report applies** | 2.0; dated 18/02/2018 |
| **Crediting period of the project activity corresponding to this monitoring period** | 2nd 7-year renewable crediting period (period from 17/03/2014 to 16/03/2021) |
| **Project participants** | KDM S.A.<br>The Kansai Electric Power Co., Inc.<br>Urbaser S.A.<br>ALLCOT A.G. |
| **Host Party** | Chile |
| **Applied methodologies and standardized baselines** | ACM0001 - “Flaring or use of landfill gas” (version 15.0) |
| **Mandatory sectoral scopes linked to the applied methodologies** | 13 - Waste handling and disposal |
| **Conditional sectoral scope(s) linked to the applied methodologies** | 1 - Energy industries (renewable - / non-renewable sources) (project’s electricity generation component) |
| **Estimated amount of GHG emission reductions or GHG removals for this monitoring duration in the registered PDD** | 1,306,501 $tCO_2e$ |
| **Certified amount of GHG emission reductions or GHG removals for this monitoring period** | 714,067 $tCO_2e$ |
| **Name and UNFCCC reference number of the DOE** | EPIC Sustainability Services Pvt. Ltd. (EPIC)<br>UNFCCC reference number E-0062<br>Report no. ESSPL/CDM/207/178 |

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| **Name, position and signature of the approver of the verification and certification report** | Mr. Marco Ratton (Lead Auditor)<br>  <br>Mr. K Sudheendra (Director & Head - Operations)<br>  |

## 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 13th periodic verification assessment (4th periodic verification within the project's 2nd 7-year renewable crediting period) for the registered CDM project activity titled "Loma Los Colorados Landfill Gas Project".

The project activity was previously registered by the UNFCCC on 17/03/2007 as CDM project activity with registration no. 0822 and it is currently under its 2nd 7-year renewable crediting period (period from 17/03/2014 to 16/03/2021). The performed verification assessment encompassed the monitoring period from 01/01/2017 to 31/12/2017 (including both days) and it was performed on the basis of (i) document comprehensive review of the Monitoring Report + the latest registered version of the Project Design Document (PDD) valid for the 2nd 7-year renewable crediting period of the project activity (PDD version 1.6 dated 24/06/2017) /2/ + supporting documents; (ii) performed on-site assessment; (iii) conducted interviews with representatives of the host-country project participant and project owner/operator KDM S.A.; (iv) resolution of all identified outstanding issues (Corrective Action Requests (CARs) and Clarification Requests (CLs)) and finally (v) issuance of the Verification Report.

The project design encompasses (i) collection and destruction of landfill gas (LFG) at the Loma Los Colorados landfill through combustion under efficient and controlled conditions landfill in the 3 installed high temperature enclosed flares[1] and (ii) utilization of collected LFG as gaseous fuel for electricity generation in the installed electricity generation infrastructure (2 existing electricity generation facilities: the CLLC-1 and CLLC-2 electricity generation facilities). LFG (which is rich in $CH_4$) has been historically generated at the Loma Los Colorados landfill as result of the anaerobic decomposition of municipal solid waste (MSW) disposed in the site using appropriate MSW landfilling techniques and procedures.

During the whole considered monitoring period, by combusting LFG, the project activity thus promoted reduction of emissions of methane ($CH_4$) into the atmosphere (that would occur in the absence of the project activity (baseline scenario)). $CH_4$ is a powerful greenhouse gas (GHG). Furthermore, the project activity also promoted carbon dioxide ($CO_2$) emission reductions resulting from the displacement of $CO_2$ intensive electricity (under an equivalent amount to the amount of electricity generated by the project activity's CLLC-1 and CLLC-2 facilities) which would otherwise be generated by existing grid-connected power plants, including fossil-fuel fired power plants (and addition of new power generation units) within the CDEC-SIC electricity grid of Chile in the absence of the project activity (baseline scenario).

[1] As further assessed in Section E.3., none of the installed 3 high temperature enclosed flares operated during the considered monitoring period.

Under conformance with the project design, during the monitoring period from 01/01/2017 to 31/12/2017, the electricity demand of the project activity was met by one of the following sources:

- Small share of electricity generated by the project's electricity generation infrastructure (with total combined installed capacity of 24.6 MW[2]);
- imports of grid electricity sourced by the CDEC-SIC electricity grid;
- electricity generated by the backup captive off-grid electricity generators (fuelled by diesel) which are installed at the project site[3].

The Loma Los Colorados landfill is located in the administrative district of Til-Til, 63.5 km North of Santiago. The geographical coordinates of the project site are as follows:

- 32°57'23" S (-32.9564)
- 70°48'04" W (-70.8013)

*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 assessment, as an independent and objective review, shall assess and verify whether the implementation of the project activity and the measures taken to monitor and report emission reductions achieved during a considered monitoring period fully 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 and data made available in (i) the registered PDD /2/, (ii) the Monitoring Report /3/ (incl. emission reduction calculation spreadsheets that are enclosed to the Monitoring Report) /5/ 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/,

[2] As indicated in the Monitoring Report, until 07/01/2017, the total installed electricity generation capacity of the project activity was 21.8 MW. On 07/01/2016, 2 additional GE Jenbacher J420 engine-generator sets (with nameplate installed capacity of 1.4 MW each) started continuously operating as part of the previously forecasted gradual implementation of the project's CLLC-2 electricity generation facility. EPIC has confirmed that occurred installation and starting of operations of the 15th and 16th engine-generator sets reflects the previously forecasted gradual/phased implementation of CLLC-2 electricity generation facility (as per the registered PDD). It is relevant to note that, as also confirmed by the EPIC verification team, a relative delay in the installation and starting of operations for the 15th engine-generator set of CLLC-2 facility occurred (vis-à-vis implementation forecast available in the registered PDD). The following related statements are appropriately added in the Monitoring Report /3/:

> *"Due to procurement reasons and operational issues with contractors hired for the installation and commissioning of the 15th engine-generator set for CLLC-2 facility, the installation and starting of operations for this particular engine-generator set occurred with a delay of about 1 year (as per the previously* elaborated gradual implementation forecast for the whole CLLC-2 electricity generation facility). This relative delay anyway does not represent an occurred post-registration change (PRC) in the design of the project activity to be addressed as per applicable CDM rules and procedures for PRCs.
>
> *(…)*
>
> Due to the occurred relative delay in the installation and starting of operations of the 15th engine-generator set for the CLLC-2 facility (it was forecasted to be installed by 2015 and it started operating on 07/01/2017); less electricity was potentially generated, thus negatively affecting the overall project's economical and financial attractiveness when compared to assumption considered in the context of the previously demonstrated and assessed additionality of the project activity (under its revised design configuration)."

[3] As appropriately and correctly indicated in the Monitoring Report, the installed backup captive off grid electricity generators were utilized only during temporary interruptions of supply of grid-sourced electricity to the project activity.

- 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 and latest version of the PDD applicable for the 2nd 7-year renewable crediting period (PDD version 1.6) /2//,

- The CDM baseline and monitoring methodology ACM0001 "Flaring or use of landfill gas" (version 15.0) /7/,

- The Monitoring Report for the considered monitoring period (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" (version 04.0 /17/)

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

    - "Tool to determine the mass flow of a greenhouse gas in a gaseous stream" (version 03.0) /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 appointed 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 (4 Correction Action Requests (CARs)) that were appropriately/sufficiently addressed and resolved by the host-country PP KDM 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 18/02/2018) /3/.
Reported emission reductions are correctly determined and are in accordance with applicable monitoring requirements and GHG calculation approaches as per both the registered PDD and applied CDM baseline and monitoring methodology + applicable methodological tools.

Therefore, EPIC confirms and certifies that achieved GHG emission reductions for the monitoring period from 01/01/2017 to 31/12/2017 (including both days) are correctly determined and reported as 714,067 $tCO_2e$.

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 |
| 2. | Auditor | IR | Vishnu | Govindarao | EPIC- Central Office | X | - | - | X |

EI: External individual
IR: Internal Resource

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 |

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 an individual or an aggregation of undetected errors, omissions and misinterpretations may potentially undermine the possibility of achieving a verification opinion under reasonable and fair level assurance (as an outcome of the verification assessment), aspects of the concept of materiality were thus considered in the context of the performed verification assessment in line with the applicable requirements of both the "Guideline - Application of materiality in verification" (version 02.0) /44/ and the CDM validation and verification standard for project activities (CDM-VVS-PA) version 01.0 /1/.

In the context of the verification planning, while aiming to minimize the risk of having material discrepancies not being detected (detection risk) in the course of the verification assessment, EPIC performed an identification of risks that could potentially 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 that were regarded as necessary to detect potentially existent major 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) /44/ and the CDM-VVS-PA version 01.0 /1/, the threshold of materiality for the performed verification assessment was evaluated and 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 %[4].

[4] As indicated in the registered PDD, emission reductions to be achieved by the project activity within the whole year of 2017 were previously ex-ante estimated as being 1,306,501 $tCO_2e$. Such annual emission reduction estimates result in a threshold of materiality of 0.5 %. This assumption is in accordance with applicable guidance of the CDM-VVS.

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)[5].

While it was later confirmed 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 instruments/equipment (e.g. insufficient accuracy or inappropriateness of installed equipment/instruments) | High | Potential generation of measurement and data errors/inconstancies due to inappropriate installation/configuration or malfunction in related measuring instruments/equipment. This risk might lead to material error 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 significantly rate of monitoring data being recorded (LFG and LFG utilization related measurements being recorded/reported with an 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 |

[5] 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:

- (i) as per the monitoring and GHG calculation approaches applied 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 emission reductions achieved by the project activity during a given monitoring period;
- (ii) there is a possibility for cross-checking/reproducing all reported continuous 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*.

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| | | | | operation of the project's monitoring system and that there are related QA/QC procedures in place.<br>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).<br>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 LFG utilization 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 flare for the determination of project emissions of methane through the flare; evaluation of the compliance of management practices of the landfill as per previously established design and operation requirements for the landfill) | 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). These risks might lead to material error in calculation/determination and reporting of baseline emissions. | 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 confirmed whether there are related QA/QC procedures in place.<br><br>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 flare for the determination of project |

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| | | | | emissions of methane through the flare 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 the project's PLC infrastructure and Win CC data management platform and 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 infrastructure and Win CC data management platform). This risk might lead to material error 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 infrastructure and Win CC data management platform) is appropriately installed/configured as part of the project activity implementation and operation.<br><br>By taking into account the significantly rate of monitoring data being recorded (LFG and LFG utilization 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 instruments/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.<br><br>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 |

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| | | | | of authenticity of monitoring data) are also applicable.<br><br>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 LFG utilization 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. | Errors and inconsistencies in the procedure(s) of transferring of monitoring data to a main aggregated reporting form/spreadsheet used for the determination of emission reductions. | High | Potential recording and reporting of monitoring data with errors and/or inconsistencies due to occurrence of errors and inconsistencies in the procedure(s) of transferring of monitoring data to a main aggregated reporting form/spreadsheet 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 a main aggregated reporting form/spreadsheet are in place.<br><br>By taking into account the significantly rate of monitoring data being recorded (LFG and LFG utilization 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 a main aggregated reporting form/spreadsheet 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 a main aggregated reporting form/spreadsheet and that there are related QA/QC procedures in place.<br><br>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 |

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| | | | | 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.<br><br>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 LFG utilization 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. | 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 a main aggregated reporting form/spreadsheet 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 errors and/or inconsistencies 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 a main aggregated reporting form/spreadsheet used for the determination of emission reductions + reporting of such information in the Monitoring Report. 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) for entering the values of ex-ante determined parameters and entering/applying calculation formulas to a main aggregated reporting form/spreadsheet used for the determination of emission reductions are in place.<br><br>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 calculation formulas are in place.<br><br>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.<br>Moreover, it should be confirmed whether trained personnel staff are in charge of entering the values of ex-ante |

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| | | | | determined parameters and entering/applying calculation formulas to such main aggregated reporting form/spreadsheet. |

## 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) /44/, 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 adopted 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 KDM 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/ /17/ /12/ /14/) 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 utilization related monitoring data.

*Data authenticity check:* As part of the performed verification assessment, the EPIC verification team was able to confirm that the main emission reduction calculation spreadsheets /5/ completed by the host country project participant KDM S.A. are basically a MS-Excel spreadsheet 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 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 project participant for performing the emission reduction calculation for the considered

monitoring period (thus ensuring that measurement records made available in the MS-Excel "raw data" input file /6/ and measurement records reported in the main 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 check 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 representatives of KDM S.A. + other publicly available documents that are relevant for the verification assessment. The main assessed documents are listed below:

- The registered and latest version of the PDD (version 1.6, dated 24/06/2017) /2/ valid for the 2nd 7-year renewable crediting period of the project activity (from now on referred as "PDD") for which assessment is available in the Validation Opinion Report for Post-Registration Changes for the project activity (version 1.0 dated 25/06/2017) /37/).

- The initial version of the Monitoring Report for the 13th verification of the project activity /4/;

- The applied CDM baseline and monitoring methodology ACM0001 "Flaring or use of landfill gas" (version 15.0) /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 /17/)

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

    - "Tool to determine the mass flow of a greenhouse gas in a gaseous stream" (version 03.0) /14/

- The findings from the previous period verifications for the project activity /33/ /29/ /53/ /51/ /49/ /48/ /16/ /28/ /30/ /47/ /64/ /65/;

- 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 performed desk review for the initial version of the Monitoring Report for the 13th verification of the project activity /4/ 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 of the registered PDD /2/ and applied CDM baseline and monitoring methodology (ACM0001 (version 15.0) /7/) + applicable methodological tools /13/ /15/ /17/ /12/ /14/, 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 Monitoring Report /3/ + supporting documents were evaluated to confirm the actions taken by the project participants to address the raised CARs and CLs. EPIC also reviewed the latest version of the Monitoring Report /3/ (version 2.0 dated 18/02/2018) to confirm that all required corrections and reporting improvements were appropriately incorporated.

## D.2. On-site inspection

| **Duration of on-site inspection:** 15/02/2018 to 16/02/2018 | | | | |
|---|---|---|---|---|
| **No.** | **Activity performed on-site** | **Site location** | **Date** | **Team member** |
| 1. | Opening meeting for the on-site visit. During such initial meeting the EPIC 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 | 15/02/2018 | 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 PDD regarding the implementation (project design) and operation of the project activity. | Landfill cells | 15/02/2018 | Marco A. Ratton |
| 3. | Visual inspection of the project's LFG flaring facility (set of instruments/equipment comprising 3 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 PDD regarding the implementation (project design) and operation of the project activity. | LFG flaring facility | 15/02/2018 | Marco A. Ratton |
| 4. | Visual inspection of the project's electricity generation infrastructure (set of instruments/equipment comprising LFG cooling and treatment facility, 2 engine-generator sets of the CLLC-1 facility, 16 engine-generators set of the CLLC-2 facility) , centrifugal blowers and all LFG utilization monitoring instruments/equipment) and confirmation of correctness of related information presented in the Monitoring Report and PDD regarding the implementation (project design) and operation of the project activity. | CLLC-1 and CLLC-2 electricity generation facilities / power substation | 15/02/2018 | Marco A. Ratton |
| 5. | Visual inspection of related monitoring equipment (PLC infrastructure and Win CC data management platform 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 /3/ and registered PDD. | Project's data storage and control room | 15/02/2018 | Marco A. Ratton |

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| 6. | Visual inspection and checking/confirmation of the correctness and appropriateness of the data acquisition process and procedures (including the process for retrieval of new raw data file that is 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 PDD.<br>In the context of the performed checking, measurement figures of selected LFG and LFG utilization 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 Win CC data management platform and monitoring equipment respectively (at the time of the performed on-site visit to the project site).<br>Further assessment details are included in Section E.6.2. | LFG flaring facility / CLLC-1 and CLLC-2 electricity generation facilities / project's data storage and control room | 15/02/2018 | 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.<br>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 facility / project's data storage and control room | 16/02/2018 | Marco A. Ratton |
| 8. | Performance of the *data authenticity checking* for LFG and LFG utilization related monitoring data. A *data authenticity checking* was performed for all every minute basis measurement records for selected LFG and LFG utilization 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 | Project's data storage and control room | 16/02/2018 | Marco A. Ratton |

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| | 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. | | | |
| 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 | 16/02/2018 | Marco A. Ratton |

## D.3. Interviews

| No. | Interviewee | | | Date | Subject | Team member |
|---|---|---|---|---|---|---|
| | Last name | First name | Affiliation | | | |
| 1. | Zuniga | Jose, (Mr.) | KDM S.A. | 16/02/2018 | In-person interviews performed during the conducted on-site visit encompassing the following topics:<br>- General implementation and operational aspects of the project activity;<br>- Technical equipment and operational issues for installed equipment;<br>- Changes in the project activity since CDM validation and commissioning dates;<br>- Specifications and operation of monitoring and measurement equipment/instruments;<br>- Remaining issues from the | Marco A. Ratton |
| 2. | Barbosa | Nuno, (Mr.) | UniCarbo Energia e Biogás Ltda. [6] | 16/02/2018 | | |
| 3. | Keller | Alejandro, (Mr.) | KDM S.A. | 16/02/2018 | | |
| 4, | Arriagada | Pablo, (Mr.) | KDM S.A. | 16/02/2018 | | |

[6] As appropriately outlined in the latest version of the Monitoring Report, UniCarbo Energia e Biogás Ltda. is a CDM consulting and advisory service company that has supported the host-country project participant KDM S.A. with CDM related issues (inter alia completion of the Monitoring Report). This CDM consulting and advisory service company is not a project participant.

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| | | | | | previously performed validation and verifications assessments;<br>- Calibration procedures for installed monitoring instruments/equipment;<br>- Quality management system and related compliance with valid QA/QC procedures;<br>- Involved operational and management personnel and responsibilities;<br>- Training and practice of the operational and management personnel;<br>- Implementation and operation of the project's monitoring plan;<br>- Monitoring data handling and management (incl. data gathering, recording and reporting);<br>- Data uncertainty and residual risks;<br>- Performance of emission reduction calculations;<br>- Procedural aspects of the verification;<br>- Performance of related maintenance and repair events;<br>- Compilation of CDM documentation (incl. the Monitoring Report). | |

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| 5. | Barbosa | Nuno, (Mr.) | UniCarbo - Energia e Biogás Ltda | 19/02/2018 | Phone call to discuss the performed corrections in the Monitoring Report in order to address Corrective Action Requests (CARs) raised as outcome of the verification assessment. | Marco A. Ratton |

### D.4. Sampling approach

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Not applicable. No sampling approach was applied for the verification assessment[7].

### 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 | - | CAR 6 | - |
| 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 baselines | - | - | - |
| Compliance of monitoring activities with the registered monitoring plan | - | CAR 1 | - |
| Compliance with the calibration frequency requirements for measuring instruments | - | CAR 2 | - |
| Assessment of data and calculation of emission reductions or net removals | - | CAR 3<br>CAR 4<br>CAR 5 | - |
| Assessment of reported sustainable development co-benefits | - | - | - |
| Global stakeholder consultation | - | - | - |
| Others (please specify) | - | - | - |
| **Total** | 0 | 6 | 0 |

## 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) /57/ was applied and was correctly completed for the elaboration of the Monitoring Report /3/.<br>The EPIC assessment included checking whether the form was not changed in its |

[7] 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 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 assessed in Section E.6.2 (under *Data authenticity checking*), cross-checking/reproducing for all reported LFG and LFG utilization 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).

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| | formatting. |
| **Findings** | A CAR was raised regarding the compliance of the initial version of the Monitoring Report with the Monitoring Report form (incl. compliance with guidelines/instructions for the completion of the Monitoring Report form):<br><br>**CAR 6:**<br>The name of the Chilean electricity dispatch coordinating entity is wrongly indicated in the initial version of the Monitoring Report. |
| **Conclusion** | As a conclusion of its assessment, upon closure of the raised CAR, 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 (CDM-MR-FORM, version 06.0) /57/ and by also sufficiently taking into consideration all applicable requirements and guidance for its completion, including deemed complete and correct description of the project activity and its monitoring aspects. |

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

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By assessing the previously issued "*Validation Report for Renewal of Crediting Period (RCP)*" for the project activity /10/, the EPIC verification team identified no missing steps or open issues from the validation phase that would need to be addressed in the context of the performed verification assessments within the 2nd 7-year renewable crediting period for the project activity.

Furthermore, through review of the Verification Reports for the previously concluded 1st to the 12th periodic verifications for the project activity /33/ /29/ /53/ /51/ /49/ /48/ /28/ /30/ /16/ /47/ /64/ /65/; the EPIC verification team identified no FARs to be considered/addressed in the context of the 13th and/or future periodic verification assessments.

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

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|---|---|
| **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 instruments/equipment) as described in the registered PDD /2/ were in place and functional. Moreover, during the performed document desk review and on-site visit, the EPIC verification team also assessed whether the project activity has been operated by KDM S.A. during the considered monitoring period under conformance with its technical design description as outlined in the registered PDD.<br><br>As outlined in Box 1 of the Monitoring Report, while during the considered monitoring period there was no excess of collected LFG (all collected LFG was directed to the project's electricity generation component for its utilization as gaseous fuel), the shut-off valves of the flares were all temporarily manually selected under "closed" position on 10/03/2014, thus ensuring that no collected LFG was directed to the high temperature enclosed flares. The EPIC assessment team has confirmed, through assessment of historical monitoring data for the project activity, that the status of such valves has been continuously electronically monitored and recorded with an every-minute basis. EPIC has also confirmed that the status of the valves has remained under "closed" position for all the three high temperature enclosed flares during the whole considered monitoring period. |
| **Findings** | No related findings were raised. No CARs and CLs were raised regarding the compliance of the occurred project implementation with project design details as per the registered PDD /2/. |
| **Conclusion** | As a result of the performed document desk review and on-site visit, the EPIC verification team was able to confirm that all physical features of the project activity (including, technology, project equipment and monitoring and metering |

| | |
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| | instruments/equipment) as described in the registered PDD [2] were in place and that the project activity has been operated by KDM S.A. during the considered monitoring period under full conformance with its technical design description as outlined in the registered PDD.<br><br>As indicated in the Monitoring Report, until 07/01/2017, the total installed electricity generation capacity of the project activity was 21.8 MW. On 07/01/2016, 2 additional GE Jenbacher J420 engine-generator sets (with nameplate installed capacity of 1.4 MW each) started continuously operating as part of the previously forecasted gradual implementation of the project's CLLC-2 electricity generation facility. EPIC has confirmed that occurred installation and starting of operations of the 15th and 16th engine-generator sets reflects the previously forecasted gradual/phased implementation of CLLC-2 electricity generation facility (as per the registered PDD).<br><br>It is relevant to note that, as also confirmed by the EPIC verification team, a relative delay in the installation and starting of operations for the 15th engine-generator set of CLLC-2 facility occurred (vis-à-vis implementation forecast available in the registered PDD). The following related statements are appropriately added in the Monitoring Report [3]:<br><br>*"Due to procurement reasons and operational issues with contractors hired for the installation and commissioning of the 15th engine-generator set for CLLC-2 facility, the installation and starting of operations for this particular engine-generator set occurred with a delay of about 1 year (as per the previously elaborated gradual implementation forecast for the whole CLLC-2 electricity generation facility). This relative delay anyway does not represent an occurred post-registration change (PRC) in the design of the project activity to be addressed as per applicable CDM rules and procedures for PRCs.*<br>*(…)*<br>*Due to the occurred relative delay in the installation and starting of operations of the 15th engine-generator set for the CLLC-2 facility (it was forecasted to be installed by 2015 and it started operating on 07/01/2017); less electricity was potentially generated, thus negatively affecting the overall project's economical and financial attractiveness when compared to assumption considered in the context of the previously demonstrated and assessed additionality of the project activity (under its revised design configuration)."*<br><br>Moreover, the EPIC verification team was also informed in further details about the overall operational performance of the project activity during the latest 10 years (with detailed assessment being performed regarding the project's operational performance during the considered monitoring period).<br><br>In summary, the EPIC verification team was able to confirm that the project activity was implemented and has operated during the considered monitoring period under conformance with project design details as per the registered PDD [2]. |

## E.4. Post-registration changes

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

>>

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 methodology applicable for the considered monitoring period. Moreover, also confirmed by EPIC, no temporary deviations from the registered monitoring plan and/or applied methodology were ever addressed in the context of previous periodic verifications for the project activity.

### E.4.2. Corrections

>>
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.

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) /57/, the Monitoring Report correctly refers to Corrections (in information that do not affect the project design) that are applicable/valid for previous monitoring periods (including indication of PRC references and related approval dates).

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

>>
There are no changes to the start date of the crediting period of the project activity.

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

>>
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

>>
The EPIC verification team has confirmed that, as correctly outlined in Section B.2.2. 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.

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) /57/, the Monitoring Report correctly refers to permanent changes to the registered monitoring plan (revision of the monitoring plan) that are applicable/valid for previous monitoring periods (including indication of PRC references and related approval dates).

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

>>
The EPIC verification team has confirmed that, as correctly outlined in Section B.2.2. of the Monitoring Report /3/, there are no changes to the project design applicable specifically 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) /57/, the Monitoring Report correctly refers to changes to the project design that are applicable/valid for previous monitoring periods (including indication of PRC references and related approval dates).

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

>>
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 both the performed document review and the on-site visit, the EPIC verification team has reviewed the application of the implemented monitoring plan along the monitoring period from 01/01/2017 to 31/12/2017 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 15.0) /7/ and applied methodological tools /12/ /13/ /14/ /15/ in order to confirm its compliance. |
| **Findings** | As part of its verification assessment, the EPIC verification team was able to confirm that the monitoring plan was correctly implemented and was operationalized during the monitoring period from 01/01/2017 to 31/12/2017 under full compliance with applicable requirements of the monitoring methodology ACM0001 (version 15.0) /7/ and applied methodological tools /12/ /13/ /14/ /15/.<br><br>Thus, no CARs and CLs were raised regarding the compliance of the monitoring plan with applied monitoring methodology and applied 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 01/01/2017 to 31/12/2017 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 15.0) /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/ and verified whether all ex-ante determined parameters that are applicable for the performed calculations of achieved emission reductions by the project activity were correctly reported in the latest version of the Monitoring Report /3/ and correctly applied (as per the valid provisions of the registered PDD) in the context of 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 |
| Historical amount of methane in the LFG which is captured and destroyed in the year prior to the implementation of the project activity (2006) ($F_{CH4,BL,x-1}$) | 516.16 $tCH_4/yr$ |
| 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* ($MM_k$)<br>(For the particular case of the project activity, $k = N_2$) | 28.01 kg/kmol |
| Molecular mass of greenhouse gas *I* ($MM_i$)<br>(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 providing electricity to the grid and for grid sourced electricity consumed by the project activity ($TDL_{grid,y}$) | 20% (for grid-sourced electricity consumed by the project activity) and 3% (for electricity generated by the project activity and provided to the grid) | |
| Manufacturer's flare specifications for temperature, flow rate and maintenance schedule interval ($SPEC_{flare}$) | $SPEC_{flare,Flare-1}$ $SPEC_{flare,Flare-2}$ | Min. / Max. |
| | Operational LFG flow for each flare (for continuous operation): | 850 $Nm^3/h$ / 5,097 $Nm^3/h$ |
| | Required temperature of the exhaust gas of the flare (to ensure LFG destruction (combustion) under high $CH_4$ destruction efficiency): | 760 $^oC$ / 1,093 $^oC$ |
| | 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 year |
| | Required/ recommended minimum frequency for replacement of the flare isolation ceramics revetment material in each flare: | After 10 years of regular and appropriate operation |

| | |
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| | <table><tr><th>$SPEC_{flare,Flare-3}$</th><th>Min.</th><th>Max.</th></tr><tr><td>Operational LFG flow for each flare (for continuous operation):</td><td>510 $Nm^3/h$</td><td>5,097 $Nm^3/h$</td></tr><tr><td>Required temperature of the exhaust gas of the flare (to ensure LFG destruction (combustion) under high $CH_4$ destruction efficiency):</td><td>760 °C</td><td>1,093 °C</td></tr><tr><td>Required minimum frequency for inspection and maintenance service in each flare (incl. inspection in the conditions of the flare isolation ceramics revetment material):</td><td colspan="2">Min. every year</td></tr><tr><td>Required/ recommended minimum frequency for replacement of the flare isolation ceramics revetment material in each flare:</td><td colspan="2">After 10 years of regular and appropriate operation</td></tr></table> |
| Build margin $CO_2$ emission factor in year *y* ($EF_{grid,BM,y}$) | 0.7046 $tCO_2/MWh$ |
| Operating margin $CO_2$ emission factor in year *y* ($EF_{grid,OM,y}$) | 0.7479 $tCO_2/MWh$ |
| Weighting of build margin emissions factor ($w_{BM}$) | 75% |
| Weighting of operating margin emissions factor ($w_{OM}$) | 25% |
| Rated capacity of the installed captive backup electricity generators fuelled by diesel ($PP_{CP,Diesel-generator}$) | <table><tr><th>Equipment id/tag</th><th>Power (MW)</th></tr><tr><td>Diesel Backup Generator I</td><td>0.276</td></tr><tr><td>Diesel Backup Generator II</td><td>0.352</td></tr><tr><td>Diesel Backup Generator III</td><td>0.080</td></tr></table> |

| | |
|---|---|
| | Average technical transmission and distribution losses for electricity sourced by the captive electricity generator ($TDL_{captive,y}$) \| 0 |
| | $CO_2$ emission factor for electricity sourced by the captive off-grid electricity generators ($EF_{EL,captive,y}$) \| 1.3 $tCO_2$/MWh |

Moreover, EPIC verification tem has also assessed that the following ex-ante determined parameters (which are also included/listed in the registered PDD) were correctly 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 ($\eta_{PJ}$)
- Default value for model correction factor to account for model uncertainties ($\varphi_{default}$)
- Oxidation factor (reflecting the amount of methane from the considered SWDS that is oxidized in the soil (or other material covering the waste)) (OX)
- Fraction of methane in the SWDS gas (volume fraction) (F)
- Fraction of degradable organic carbon (DOC) in MSW that decomposes in the considered SWDS ($DOC_{f,default}$)
- Methane correction factor ($MCF_{default}$)
- Fraction of degradable organic carbon in the waste type j (weight fraction) ($DOC_j$)
- Decay rate for the waste type *j* ($k_j$)
- Weight fraction of the waste type *j* ($W_j$)

As also outlined in the 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.

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| **Findings** | No CARs and CLs were raised by the EPIC verification team regarding the parameters fixed ex-ante: |
| **Conclusion** | The EPIC verification team 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 registered PDD during the monitoring period from 01/01/2017 to 31/12/2017. |

### E.6.2. Data and parameters monitored

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| **Means of verification** | The EPIC verification team has assessed whether all monitoring parameters of which monitoring is required as per the monitoring plan of the registered PDD were correctly monitored during the considered monitoring period.<br><br>The following tables include assessment details for parameters monitored ex post during the monitoring period from 01/01/2017 to 31/12/2017:<br><br>*Assessment details for the monitoring parameter "Management of the SWDS" (Management of SWDS):* |

| | |
|---|---|
| Data / Parameter:<br>(as per the monitoring plan of the 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 Loma los Colorados landfill are annually verified and compared against defined landfill management practices as per the previously conceived original construction and operational design of the underlying landfill. This comparison aims to confirm that management and operation of the Loma los Colordados 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 of the registered PDD /2/, monitoring for the parameter "Management of the SWDS" is to be performed on the basis of the performance of a technical evaluation assessment of the overall management and operation of the Loma los Colorados with an every-year frequency. The performance of three evaluation assessments (valid for the considered monitoring period) by the independent 3rd party engineering company "Emerge Ingenieria Ltda." is reported on the technical reports dated 05/10/2016, 21/02/2017 and 05/01/2018 /60/ . These 3rd party independent assessments were performed as per the applicable monitoring procedure for the parameter "Management of the SWDS". Performed assessments sufficiently confirms that applied monitoring frequency for the parameter "Management of SWDS" is in accordance with both the monitoring plan from the registered PDD /2/ and ACM0001 (version 15.0) /7/. |
| 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 | The outcome of the latest technical evaluation assessments performed by the independent 3rd party engineering company "Emerge Ingenieria |

| | | | |
|---|---|---|---|
| | other available data or source? | Ltda." that are valid for the considered monitoring period are reported in 3 technical evaluation/declaration reports /60/ dated 05/10/2016, 21/02/2017 and 05/01/2018. These 3 documents were made available and were assessed by the EPIC verification team.<br><br>The following is appropriately outlined in the latest version of the Monitoring Report /3/:<br><br>"*(...)As part of the performed annual technical evaluation, the current configuration and operational conditions of the Loma Los Colorados landfill were compared against the previously conceived design and operational conditions of the landfill prior of the occurred implementation of the project activity on the basis of different sources and assessments including inter alia:*<br><br>- *The original design documents of the landfill (as described in the documentation required for all phases of the environmental licensing and operational permitting for the Loma Los Colorados landfill);*<br><br>- *Applicable local or national regulations;*<br>*(…)"*<br><br>The EPIC verification team has verified that the issued technical evaluation/declaration reports /60/ sufficiently confirm that the original conceived design of the Loma los Colorados landfill has so far not been modified.<br>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 3 evaluation/declaration reports issued by Emerge Ingenieria Ltda. dated 05/10/2016, 21/02/2017 and 05/01/2018 /60/. These 3 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 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 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 reduction calculations for the considered monitoring period.<br><br>However, the annual comparison of applied |

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| Are necessary/applicable QA/QC processes in place? | management aspects of the Loma los Colorados landfill against the defined landfill management practices (as per the previously conceived original construction and operational design of the landfill) is required in order to confirm that management and operation of the Loma los Colorados landfill (including relevant aspects related to landfilling practice) were not intentionally modified with the unique aim of increasing generation of methane on site; thus artificially changing baseline emissions for the project site.<br><br>As required by ACM0001 (version 15,0) /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 registered 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" ($V_{t,wb}$):*

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| Data / Parameter:<br>(as per the monitoring plan of the PDD): | Volumetric flow of LFG stream in time interval *t* on a wet basis ($V_{t,wb}$)<br>(monitored as per Option C of the methodological tool "Tool to determine the mass flow of a greenhouse gas in a gaseous stream" (version 03.0) /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. |
| 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 $V_{t,wb,j}$ are to be recorded and reported under an every-minute frequency. 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 03.0) /14/ (which is applied in accordance to ACM0001 (version 15.0) /7/), monitoring of $V_{t,wb,j}$ should be performed continuously if not specified in the underlying methodology.<br><br>While ACM0001 (version 15.0) /7/ does not explicitly specify any monitoring frequency for $V_{t,wb,j}$, the applied measuring, recording and reporting frequencies for this particular monitoring parameter (continuous measurements being recorded/reported under |

<table>
<tr><td></td><td></td><td>an every-minute frequency) are thus in accordance with both ACM0001 (version 15.0) [7] and the registered PDD [2].</td></tr>
<tr><td></td><td>Type of monitoring equipment/instrument:</td><td>During the considered monitoring period, two LFG flow meters of the same model were used alternately to perform measurements of flow of collected LFG which is sent to the project's electricity generation infrastructure (CLLC-1 and CLLC-2 electricity generation facilities). The specifications of LFG flow meters alternatively used during the considered monitoring period are as follows:<br><br>
<table>
<tr><td colspan="2">Specifications of the flow meters used for measuring the parameter $V_{t,wb}$</td></tr>
<tr><td>Manufacturer</td><td>Fluid Components International (FCI)</td></tr>
<tr><td>Model</td><td>ST98</td></tr>
<tr><td>Serial Number / period in use of the instrument within the considered monitoring period</td><td>437121-A (instrument under operation during the period from 01/01/2017 to 04/08/2017)<br><br>633755 (instrument under operation during the period from 04/08/2017 to 31/12/2017)</td></tr>
<tr><td>Accuracy:</td><td>±1.0%</td></tr>
</table>
Source: [52]</td></tr>
<tr><td></td><td>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?</td><td>The registered PDD [2] and ACM0001 (version 15.0) [7] do not specify any accuracy requirement for the LFG flow meters installed at the project site. The accuracy ranges for the LFG flow meters alternatively used during the considered monitoring period are ±1.0%.<br>It is EPIC contention that the use of the installed instruments represents good practice for monitoring of LFG flow.</td></tr>
<tr><td></td><td>If applicable, has the reported monitoring data been cross-checked with other available data or source?</td><td>Not applicable.</td></tr>
<tr><td></td><td>How were the values in the Monitoring Report (and/or supporting documents, i.e emission reduction calculation spreadsheet) verified and/or compared?</td><td>Figures of LFG flow sent to the engine-generator sets of both CLLC-1 and CLLC-2 electricity generation facilities 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 the display of the installed LFG flow meter (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 Win CC data management platform and monitoring equipment 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</td></tr>
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| | | are included in the end of this Section.<br><br>Furthermore, a *data authenticity checking* was performed for all every minute basis measurement records of the following monitoring 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:<br><br>- Volumetric flow of LFG stream in time interval *t* on a wet basis ($V_{t,wb,j}$)<br><br>- Volumetric fraction of $CH_4$ in the collected LFG in time interval *t* on a wet basis ($v_{CH4,t,wb}$)<br><br>- Flame detection of flare in the minute *m* ($Flame_m$) (sub-parameters $Flame_{m,flare-1}$, $Flame_{m,flare-2}$, $Flame_{m,flare-3}$)<br><br>- Status of biogas destruction device (engine-generator sets of both CLLC-1 and CLLC-2 electricity generation facilities) (Operational status of biogas destruction devices) (sub-parameters $Status_{genset-north}$, $Status_{genset-south}$, $Status_{genset-1}$, $Status_{genset-2}$, $Status_{genset-3}$, $Status_{genset-4}$, $Status_{genset-5}$, $Status_{genset-6}$, $Status_{genset-7}$, $Status_{genset-8}$, $Status_{genset-9}$, $Status_{genset-10}$, $Status_{genset-11}$, $Status_{genset-12}$, $Status_{genset-13}$, $Status_{genset-14}$, $Status_{genset-15}$, $Status_{genset-16}$)<br><br>- Operation of the equipment that consumes LFG (engine-generator sets of both CLLC-1 and CLLC-2 electricity generation facilities) ($Op_{j,h}$) (sub-parameters $Op_{genset-1,h,y}$, $Op_{genset-2,h,y}$, $Op_{genset-3,h,y}$, $Op_{genset-4,h,y}$, $Op_{genset-5,h,y}$, $Op_{genset-6,h,y}$, $Op_{genset-7,h,y}$, $Op_{genset-8,h,y}$, $Op_{genset-9,h,y}$, $Op_{genset-10,h,y}$, $Op_{genset-11,h,y}$, $Op_{genset-12,h,y}$, $Op_{genset-13,h,y}$, $Op_{genset-14,h,y}$, $Op_{genset-15,h,y}$, $Op_{genset-16,h,y}$, $Op_{genset-north,h,y}$, $Op_{genset-south,h,y}$)<br><br>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 and LFG utilization related monitoring data) are included in the end of this Section. |
| | Does the applied monitoring data | Yes. Details for data transfer and reporting of emission reductions (incl. relevant QA/QC |

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| 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? | 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" ($v_{CH4,t,wb}$):*

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| Data / Parameter: (as per the monitoring plan of the 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 3.00) /14/). |
| Measuring, recording and reporting frequencies: | During the monitoring period from 01/01/2017 to 31/12/2017, 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 $CH_4/O_2$ 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 stream 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 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 03.0) /14/ (which is applied in accordance to ACM0001 (version 15.0) /7/), monitoring of $v_{CH4,t,wb,j}$ should be performed continuously if not specified in the underlying methodology.<br>While ACM0001 (version 15.0) /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 in accordance with both ACM0001 (version 15.0) /7/ and the |

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| | | registered PDD [72]. |
| | Type of monitoring equipment/instrument: | During the monitoring period from 01/01/2017 to 31/12/2017, continuously measurements of the monitoring parameter $v_{CH4,t,wb}$ were performed by a continuous $CH_4/O_2$ content gas analyzer unit for which main specifications are summarized below:<br><br>Specifications of installed continuous $CH_4/O_2$ content gas analyzer unit<br>Manufacturer: Siemens AG<br>Model: Ultramat 23<br>Serial Number: N1-W2-678<br>Accuracy: ±1.0%<br>Source: [59]<br><br>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 meter and through the installed continuous $CH_4/O_2$ content gas analyzer unit are measured on the same basis/conditions. |
| | 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 [72] and ACM0001 (version 15.0) [7] do not specify any accuracy requirement for the $CH_4/O_2$ content gas analyzer unit installed at the project site. The accuracy range for the installed equipment is ±1.0%. It is EPIC contention that the use of the installed equipment 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) verified and/or compared? | 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 with figures displayed in the display of the installed $CH_4/O_2$ content gas analyzer unit (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 Win CC data management platform and monitoring equipment 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.<br><br>Furthermore, a *data authenticity checking* was performed for all every minute basis measurement records of the following LFG and LFG utilization related monitoring parameters |

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| | | (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:<br><br>- Volumetric flow of LFG stream in time interval *t* on a wet basis ($V_{t,wb,j}$)<br><br>- Volumetric fraction of $CH_4$ in the collected LFG in time interval *t* on a wet basis ($v_{CH4,t,wb}$)<br><br>- Flame detection of flare in the minute *m* ($Flame_m$) (sub-parameters $Flame_{m,flare-1}$, $Flame_{m,flare-2}$, $Flame_{m,flare-3}$)<br><br>- Status of biogas destruction device (engine-generator sets of both CLLC-1 and CLLC-2 electricity generation facilities) (Operational status of biogas destruction devices) (sub-parameters $Status_{genset-north}$, $Status_{genset-south}$, $Status_{genset-1}$, $Status_{genset-2}$, $Status_{genset-3}$, $Status_{genset-4}$, $Status_{genset-5}$, $Status_{genset-6}$, $Status_{genset-7}$, $Status_{genset-8}$, $Status_{genset-9}$, $Status_{genset-10}$, $Status_{genset-11}$, $Status_{genset-12}$, $Status_{genset-13}$, $Status_{genset-14}$, $Status_{genset-15}$, $Status_{genset-16}$)<br><br>- Operation of the equipment that consumes LFG (engine-generator sets of both CLLC-1 and CLLC-2 electricity generation facilities) ($Op_{j,h}$) (sub-parameters $Op_{genset-1,h,y}$, $Op_{genset-2,h,y}$, $Op_{genset-3,h,y}$, $Op_{genset-4,h,y}$, $Op_{genset-5,h,y}$, $Op_{genset-6,h,y}$, $Op_{genset-7,h,y}$, $Op_{genset-8,h,y}$, $Op_{genset-9,h,y}$, $Op_{genset-10,h,y}$, $Op_{genset-11,h,y}$, $Op_{genset-12,h,y}$, $Op_{genset-13,h,y}$, $Op_{genset-14,h,y}$, $Op_{genset-15,h,y}$, $Op_{genset-16,h,y}$, $Op_{genset-north,h,y}$, $Op_{genset-south,h,y}$)<br><br>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.<br>Details about the performed *data authenticity checking* (which is valid for above-listed LFG and LFG utilization 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 | 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. |

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| 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 "Operational status of biogas destruction devices" (Status of biogas destruction device):*

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| Data / Parameter: (as per the monitoring plan of the PDD): | Operational status of biogas destruction devices (Status of biogas destruction device) |
| Measuring, recording and reporting frequencies: | The operational status of each one of the 18 engine-generator sets is recorded and reported every-minute on the basis of continuous measurements of the operational status of each engine-generator set (on the basis of the sub parameters $Status_{genset-north}$, $Status_{genset-south}$, $Status_{genset-1}$, $Status_{genset-2}$, $Status_{genset-3}$, $Status_{genset-4}$, $Status_{genset-5}$, $Status_{genset-6}$, $Status_{genset-7}$, $Status_{genset-8}$, $Status_{genset-9}$, $Status_{genset-10}$, $Status_{genset-11}$, $Status_{genset-12}$, $Status_{genset-13}$, $Status_{genset-14}$, $Status_{genset-15}$, $Status_{genset-16}$).<br><br>Despite of no LFG was sent for destruction in the project's flares during the considered monitoring period, the operational status of each one of the 3 high temperature enclosed flares is anyway also recorded and reported with an every-minute frequency on the basis of continuous monitoring of the signal of the UV flame detectors installed in each one of the flares (sub-parameters $Flame_{m,flare-1}$, $Flame_{m,flare-2}$, $Flame_{m,flare-3}$). |
| 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 15.0) [7], the operational status of each biogas destruction device shall be recorded once per minute. Thus, the applied measuring, recording and reporting frequencies for Status of biogas destruction device are thus in accordance with both ACM0001 (version 15.0) [7] and the registered PDD [2]. |
| Type of monitoring equipment/instrument: | Not applicable. The operational status of each one of the engine-generator sets, as automatically detected by the electronic control system for each engine-generator set based on functional parameters, is processed by the project's control system infrastructure (Win CC data management platform) and recorded as monitoring data. |

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| | 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 monitoring equipment/instrument applicable for measuring the monitoring parameter "Operational status of biogas destruction devices". 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 and LFG utilization 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:<br>- Volumetric flow of LFG stream in time interval *t* on a wet basis ($V_{t,wb,j}$)<br>- Volumetric fraction of $CH_4$ in the collected LFG in time interval *t* on a wet basis ($v_{CH4,t,wb}$)<br>- Flame detection of flare in the minute *m* ($Flame_m$) (sub-parameters $Flame_{m,flare-1}$, $Flame_{m,flare-2}$, $Flame_{m,flare-3}$)<br>- Status of biogas destruction device (engine-generator sets of both CLLC-1 and CLLC-2 electricity generation facilities) (Operational status of biogas destruction devices) (sub-parameters $Status_{genset-north}$, $Status_{genset-south}$, $Status_{genset-1}$, $Status_{genset-2}$, $Status_{genset-3}$, $Status_{genset-4}$, $Status_{genset-5}$, $Status_{genset-6}$, $Status_{genset-7}$, $Status_{genset-8}$, $Status_{genset-9}$, $Status_{genset-10}$, $Status_{genset-11}$, $Status_{genset-12}$, $Status_{genset-13}$, $Status_{genset-14}$, $Status_{genset-15}$, $Status_{genset-16}$)<br>- Operation of the equipment that consumes LFG (engine-generator sets of both CLLC-1 and CLLC-2 electricity generation facilities) ($Op_{j,h}$) (sub-parameters $Op_{genset-1,h,y}$, $Op_{genset-2,h,y}$, $Op_{genset-3,h,y}$, $Op_{genset-4,h,y}$, $Op_{genset-5,h,y}$, $Op_{genset-6,h,y}$, $Op_{genset-7,h,y}$, $Op_{genset-8,h,y}$, $Op_{genset-9,h,y}$, $Op_{genset-10,h,y}$, $Op_{genset-11,h,y}$, $Op_{genset-12,h,y}$, $Op_{genset-13,h,y}$, $Op_{genset-14,h,y}$, $Op_{genset-15,h,y}$, $Op_{genset-16,h,y}$, $Op_{genset-north,h,y}$, |

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| | $Op_{genset\text{-}south,h,y}$)<br><br>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 and LFG utilization 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" ($EC_{PJ,grid,y}$):*

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| Data / Parameter:<br>(as per the monitoring plan of the 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 every hour by KDM S.A. |
| 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 $EC_{PJ,grid,y}$ are to be recorded and reported at least at least once a week. The "Tool to calculate baseline, project and/or leakage emissions from electricity consumption" /13/, and ACM0001 (version 15.0) /7/ do not clearly indicate recording and reporting frequencies for continuous measurements for the parameter $EC_{PJ,grid,y}$.<br>Thus, the adopted measuring, recording and reporting frequencies are assumed as in accordance with the monitoring plan of the registered PDD /2/, the "Tool to calculate baseline, project and/or leakage emissions from electricity consumption" /13/ and ACM0001 (version 15.0) /7/. |

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| Type of monitoring equipment/instrument: | Amount of grid-sourced electricity consumed by the project activity during the considered monitoring period was continuously measured by an electricity meter for which main specifications are as follows:<br><br>Specifications of the installed electricity meter<br>Manufacturer: Schneider Electric<br>Model: ION 8600 (bi-directional meter)<br>Serial Number: PT-1011A447-01<br>Accuracy: ±0.2%<br>Source: /50/ |
| 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 /72/, the "Tool to calculate baseline, project and/or leakage emissions from electricity consumption" /13/ and ACM0001 (version 15.0) /7/ do not specify any accuracy requirement for the electricity meter installed at the project site.<br>The accuracy range for the installed instrument is ±0.2%. It is EPIC contention that the use of the installed instrument represents good practice for monitoring of consumption of grid-sourced electricity by the project activity. |
| If applicable, has the reported monitoring data been cross-checked with other available data or source? | Records of grid-sourced electricity consumed by the project activity during the considered monitoring period, as reported in the summarized emission reduction calculation spreadsheet /5/ and Monitoring Report /3/ were cross-checked with monthly reports issued by CDEC-SIC /61/ which were made available and assessed by the EPIC verification team during the performed on-site visit. Such cross-checking confirmed correctness of reported data for $EC_{PJ,y}$ during the considered monitoring period. |
| 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 "Amount of electricity generated using LFG by the project activity in year y" ($EC_{BLy}$)*

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| Data / Parameter:<br>(as per the monitoring plan of the PDD): | Amount of electricity generated using LFG by the project activity in year y" ($EC_{BLy}$) |
| Measuring, recording and reporting frequencies: | During the considered monitoring period, accumulated values of continuously measurements of the monitoring parameter $EC_{BL,y}$ were aggregated and recorded/reported every hour by KDM S.A. |
| Are measuring, recording and reporting frequencies in accordance with the monitoring plan and monitoring methodology?<br>(Yes / No) | As per the registered PDD /2/, continuous measurements of $EC_{Bl,y}$ are to be recorded and reported at least once a week. The "Tool to calculate baseline, project and/or leakage emissions from electricity consumption" /13/, and ACM0001 (version 15.0) /7/ do not clearly indicate recording and reporting frequencies for continuous measurements for the parameter $EC_{BL,y}$. Thus, the adopted measuring, recording and reporting frequencies are assumed as in accordance with the monitoring plan of the registered PDD /2/, the "Tool to calculate baseline, project and/or leakage emissions from electricity consumption" /13/ and ACM0001 (version 15.0) /7/. |
| Type of monitoring equipment/instrument: | Net electricity generated by the project activity during the considered monitoring period was measured by the same bi-directional electricity meter also used to measure grid-sourced electricity consumed by the project activity. The main specifications of the electricity meter are as follows:<br><br>Specifications of the installed electricity meter<br>Manufacturer: Schneider Electric<br>Model: ION 8600 (bi-directional meter)<br>Serial Number: PT-1011A447-01<br>Accuracy: ±0.2%<br>Source: /50/ |
| 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 /2/, the "Tool to calculate baseline, project and/or leakage emissions from electricity consumption" /13/ and ACM0001 (version 15.0) /7/ do not specify any accuracy requirement for the electricity meter installed. The accuracy range for the installed instruments is ±0.2%.<br>It is EPIC contention that the use of the installed instrument represents good practice for monitoring of consumption of grid-sourced electricity by the project activity. |
| If applicable, has the reported monitoring data been cross-checked with other available data or source? | Records of net electricity generated by the project activity and exported to the CDEC-SIC grid during the considered monitoring period, as reported in the summarized emission reduction calculation spreadsheet /5/ and Monitoring Report /3/ were cross-checked with the monthly reports |

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| | issued by CDEC-SIC [61] which were made available and assessed by the EPIC verification team during the performed on-site visit. Such cross-checking confirmed correctness of reported data for $EC_{BL,y}$ during the considered monitoring period. |
| 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 $EC_{BL,y}$ 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 (engine-generator sets of both CLLC-1 and CLLC-2 electricity generation facilities)" ($Op_{j,h}$)*

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| Data / Parameter:<br>(as per the monitoring plan of the PDD): | Operation of the equipment that consumes LFG (engine-generator sets of both CLLC-1 and CLLC-2 electricity generation facilities) ($Op_{j,h}$). |
| Measuring, recording and reporting frequencies: | During the considered monitoring period, the operational status of each one of the 18 engine-generator sets (2 sets of CLLC-1 electricity generation facility + 16 sets of CLLC-2 electricity generation facility) were automatically recorded and reported with an every-minute frequency on the basis of continuous measurements of the actual operational status of each engine-generator set for the minute in question. Measurements are reported on the basis of the following sub parameters: $Op_{genset-1,h,y}$, $Op_{genset-2,h,y}$, $Op_{genset-3,h,y}$, $Op_{genset-4,h,y}$, $Op_{genset-5,h,y}$, $Op_{genset-6,h,y}$, $Op_{genset-7,h,y}$, $Op_{genset-8,h,y}$, $Op_{genset-9,h,y}$, $Op_{genset-10,h,y}$, $Op_{genset-11,h,y}$, $Op_{genset-12,h,y}$, $Op_{genset-13,h,y}$, $Op_{genset-14,h,y}$, $Op_{genset-15,h,y}$, $Op_{genset-16,h,y}$, $Op_{genset-north,h,y}$, $Op_{genset-south,h,y}$.<br><br>As confirmed by the EPIC verification team through assessment of the 2 main emission reduction calculation spreadsheets [5] valid for the considered monitoring period, for every minute *m* that a particular engine-generator set was operational, the operational status valid for this particular minute is set as 1 (1 = "*on*") for the engine-generator set in question, otherwise the |

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| | | 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 PDD [2] and ACM0001 (version 15.0) [7]), the operational status of each one of the engine-generator sets shall be recorded once per minute. Thus, the applied measuring, recording and reporting frequencies for $Op_{j,h}$ are thus in accordance with both ACM0001 (version 15.0) [7] and the registered PDD [2]. |
| | Type of monitoring equipment/instrument: | Not applicable. There are no monitoring equipment/instrument applicable for measuring the monitoring parameter $Op_{j,h}$. The operational status of each one of the engine-generator sets, as automatically detected by the electronic control system for each engine-generator set (based on functional/operational parameters), is processed by the project's control system infrastructure (Win CC data management platform) 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 monitoring equipment/instrument applicable for measuring the monitoring parameter $Op_{j,h}$. 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 and LFG utilization 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:<br>- Volumetric flow of LFG stream in time interval *t* on a wet basis ($V_{t,wb,j}$)<br>- Volumetric fraction of $CH_4$ in the collected LFG in time interval *t* on a wet basis ($v_{CH4,t,wb}$)<br>- Flame detection of flare in the minute *m* ($Flame_m$) (sub-parameters $Flame_{m,flare-1}$, $Flame_{m,flare-2}$, $Flame_{m,flare-3}$)<br>- Status of biogas destruction device (engine-generator sets of both CLLC-1 |

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| | and CLLC-2 electricity generation facilities) (Operational status of biogas destruction devices) (sub-parameters $Status_{genset-north}$, $Status_{genset-south}$, $Status_{genset-1}$, $Status_{genset-2}$, $Status_{genset-3}$, $Status_{genset-4}$, $Status_{genset-5}$, $Status_{genset-6}$, $Status_{genset-7}$, $Status_{genset-8}$, $Status_{genset-9}$, $Status_{genset-10}$, $Status_{genset-11}$, $Status_{genset-12}$, $Status_{genset-13}$, $Status_{genset-14}$, $Status_{genset-15}$, $Status_{genset-16}$)<br><br>- Operation of the equipment that consumes LFG (engine-generator sets of both CLLC-1 and CLLC-2 electricity generation facilities) ($Op_{j,h}$) (sub-parameters $Op_{genset-1,h,y}$, $Op_{genset-2,h,y}$, $Op_{genset-3,h,y}$, $Op_{genset-4,h,y}$, $Op_{genset-5,h,y}$, $Op_{genset-6,h,y}$, $Op_{genset-7,h,y}$, $Op_{genset-8,h,y}$, $Op_{genset-9,h,y}$, $Op_{genset-10,h,y}$, $Op_{genset-11,h,y}$, $Op_{genset-12,h,y}$, $Op_{genset-13,h,y}$, $Op_{genset-14,h,y}$, $Op_{genset-15,h,y}$, $Op_{genset-16,h,y}$, $Op_{genset-north,h,y}$, $Op_{genset-south,h,y}$)<br><br>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 and LFG utilization 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 "Flame detection of flare in the minute m" ($Flame_m$):*

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|---|---|
| Data / Parameter:<br>(as per the monitoring plan of the PDD): | Flame detection of flare in the minute *m* ($Flame_m$) |
| Measuring, recording and reporting frequencies: | Despite no LFG was sent for destruction in any one of the project's 3 high temperature enclosed flares during the considered monitoring period, the operational status of the flares was anyway |

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| | | recorded and reported every-minute on the basis of continuous measurements of the status of flame in the flares during such period.<br><br>As confirmed by the EPIC verification team through assessment of the main emission reduction calculation spreadsheets [/5/], for every minute *m* during which flame was detected in a given flare, the flame status of the flare in question for each minute is set as 1 (1 = Flame "*on*"), otherwise the flame status of the flare for the given minute is set to 0 (0 = Flame "*off*").<br>As further explained in Section E.3., while no collected LFG was directed to the enclosed flares during the considered monitoring period, the flame status for the 3 flares was set as "off" during the entire monitoring period. |
| | 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 15.0) [/7/]), the operational status of the flares is to be recorded once per minute.<br>Thus, the applied measuring, recording and reporting frequencies for $Flame_m$ are thus in accordance with both ACM0001 (version 15.0) [/7/] and the registered PDD [/2/]. |
| | Type of monitoring equipment/instrument: | Monitoring of the operational status of each flare (calculation sub-parameters $Flame_{m,flare-1}$, $Flame_{m,flare-2}$ and $Flame_{m,flare-3}$) is performed by 3 installed UV flame detectors (one for each installed high temperature enclosed flare).<br><br>*UV Flame detector used for monitoring $Flame_{m,flare-1}$*:<br>Specifications of the UV Flame detector installed on Flare 1<br>Manufacturer: Honeywell Analytics Ltd.<br>Model: C7035A 1031<br>Serial Number: No Serial Number is indicated in the monitoring instrument<br>Source: [/41/]<br><br>*UV Flame detector used for monitoring $Flame_{m,flare-2}$*:<br>Specifications of the UV Flame detector installed on Flare 2<br>Manufacturer: Honeywell Analytics Ltd.<br>Model: C7035A 1031<br>Serial Number: No Serial Number is indicated in the monitoring instrument<br>Source: [/41/]<br><br>*UV Flame detector used for monitoring $Flame_{m,flare-3}$*:<br>Specifications of the UV Flame detector installed on Flare 3<br>Manufacturer: Honeywell Analytics Ltd.<br>Model: C7035A 1031<br>Serial Number: No Serial Number is indicated in the monitoring instrument |

| | | |
|---|---|---|
| | | Source: [41] |
| | 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 measured values for Flame detection of flare in the minute *m*. |
| | 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 and LFG utilization 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:<br><br>- Volumetric flow of LFG stream in time interval *t* on a wet basis ($V_{t,wb,j}$)<br><br>- Volumetric fraction of $CH_4$ in the collected LFG in time interval *t* on a wet basis ($v_{CH4,t,wb}$)<br><br>- Flame detection of flare in the minute *m* ($Flame_m$) (sub-parameters $Flame_{m,flare-1}$, $Flame_{m,flare-2}$, $Flame_{m,flare-3}$)<br><br>- Status of biogas destruction device (engine-generator sets of both CLLC-1 and CLLC-2 electricity generation facilities) (Operational status of biogas destruction devices) (sub-parameters $Status_{genset-north}$, $Status_{genset-south}$, $Status_{genset-1}$, $Status_{genset-2}$, $Status_{genset-3}$, $Status_{genset-4}$, $Status_{genset-5}$, $Status_{genset-6}$, $Status_{genset-7}$, $Status_{genset-8}$, $Status_{genset-9}$, $Status_{genset-10}$, $Status_{genset-11}$, $Status_{genset-12}$, $Status_{genset-13}$, $Status_{genset-14}$, $Status_{genset-15}$, $Status_{genset-16}$)<br><br>- Operation of the equipment that consumes LFG (engine-generator sets of both CLLC-1 and CLLC-2 electricity generation facilities) ($Op_{j,h}$) (sub-parameters $Op_{genset-1,h,y}$, $Op_{genset-2,h,y}$, $Op_{genset-3,h,y}$, $Op_{genset-4,h,y}$, $Op_{genset-5,h,y}$, $Op_{genset-6,h,y}$, $Op_{genset-7,h,y}$, $Op_{genset-8,h,y}$, $Op_{genset-9,h,y}$, $Op_{genset-10,h,y}$, $Op_{genset-11,h,y}$, $Op_{genset-12,h,y}$, $Op_{genset-13,h,y}$, $Op_{genset-14,h,y}$, |

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|---|---|
| | $Op_{genset-15,h,y}$, $Op_{genset-16,h,y}$, $Op_{genset-north,h,y}$, $Op_{genset-south,h,y}$)<br><br>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 and LFG utilization 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 "Quantity of electricity generated in captive diesel backup generator during the year y" ($EC_{PJ,captive,y}$):*

| | |
|---|---|
| Data / Parameter:<br>(as per the monitoring plan of the PDD): | Quantity of electricity generated in captive diesel backup generator during the year *y* ($EC_{PJ,captive,y}$) |
| Measuring, recording and reporting frequencies: | Measurements of electricity generated by the backup off-grid electricity generators (fuelled by Diesel) have been continuously measured by electricity meters, with continuous measurements recorded and reported with an hourly frequency. |
| 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 $EC_{PJ,captive,y}$ 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 15.0) /7/ do not clearly indicate recording and reporting frequencies for continuous measurements for the parameter $EC_{PJ,captive,y}$. Thus, the adopted measuring, recording and reporting frequencies are assumed as in accordance with the monitoring plan of the registered PDD /2/, the "Tool to calculate baseline, project and/or leakage emissions from electricity consumption" /13/ and ACM0001 (version 15.0) /7/. |

| | | |
|---|---|---|
| | Type of monitoring equipment/instrument: | *Specifications of the electricity meter utilized for measuring electricity generated by the Diesel Backup Generator I ($EC_{PJ,captive,y,1}$):*<br><br>Specifications of the installed electricity meter utilized for measuring electricity generated by the Diesel Backup Generator I ($EC_{PJ,captive,y,1}$)<br>Manufacturer: Schneider Electric<br>Model: PM820MG<br>Serial Number: 26207716<br>Accuracy: ±0.5%<br>Source: /38/<br><br>*Specifications of the electricity meter utilized for measuring electricity generated by the Diesel Backup Generator II ($EC_{PJ,captive,y,2}$):*<br><br>Specifications of the installed electricity meter utilized for measuring electricity generated by the Diesel Backup Generator II ($EC_{PJ,captive,y,2}$)<br>Manufacturer: Schneider Electric<br>Model: PM820MG<br>Serial Number: 26204495<br>Accuracy: ±0.5%<br>Source: /38/<br><br>*Specifications of the electricity meter utilized for measuring electricity generated by the Diesel Backup Generator III ($EC_{PJ,captive,y,3}$):*<br><br>Specifications of the installed electricity meter utilized for measuring electricity generated by the Diesel Backup Generator I ($EC_{PJ,captive,y,3}$)<br>Manufacturer: Schneider Electric<br>Model: PM820MG<br>Serial Number: 26205401<br>Accuracy: ±0.5%<br>Source: /38/ |
| | 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 /2/ and ACM0001 (version 15.0) /7/ do not specify any accuracy requirement for the electricity meters installed at the project site. The accuracy range for the installed instruments is ±0.5%. It is EPIC contention that the use of the installed instruments represents good practice for monitoring of temperature in the exhaust gas of the flare. |
| | 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 | The EPIC verification team has confirmed that values for the monitoring parameter $EC_{PJ,captive,y}$ as reported in the summarized emission reduction calculation spreadsheet /5/ and |

| | |
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| calculation spreadsheet) verified and/or compared? | 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. |

It is important to note that the monitoring plan of 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.

| Parameter not monitored during the considered monitoring period |
|---|
| Volumetric flow of LFG stream in time interval *t* on a dry basis on a dry basis ($V_{t,db}$) [8] |
| 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 ($M_{t,db}$) |
| Temperature of the LFG stream in time interval *t* ($T_t$) |
| Pressure of the LFG stream in time interval *t* ($P_t$) |
| Quantity of fuel Diesel combusted by the captive off-grid electricity generator ($FC_{Diesel,y}$) |
| Net calorific value of the fuel Diesel in year *y* ($NCV_{Diesel,y}$) |
| $CO_2$ emission factor of fuel Diesel in year *y* ($EF_{CO2,Diesel,y}$) |
| Quantity of electricity generated in captive diesel backup generator during the year *y* ($EG_{Diesel\text{-}Generator,y}$) |

The following monitoring parameters were not monitored either (as no collected LFG was sent for combustion in the flares during the considered monitoring period):

[8] While Option C of the methodological tool "Tool to determine the mass flow of a greenhouse gas in a gaseous stream" (version 03.0) was selected for the determination of $F_{CH4,flared,y}$ 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 03.0) 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 03.0) 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 03.0) was not selected.

| Parameters not monitored during the considered monitoring period |
|---|
| Mass flow of methane in the exhaust gas of the flare on a dry basis at reference conditions in the time period *t* ($F_{CH4,EG,t}$) |
| Temperature in the exhaust gas of the enclosed flare in minute *m* ($T_{EG,m}$) |
| Maintenance events completed in year *y* as monitored by the project participants ($Maintenance_y$) |
| Quantity of LPG consumed by the project activity in year *y* ($FC_{LPG,y}$) |
| Net calorific value of the fuel LPG ($NCV_{LPG,y}$) |
| $CO_2$ emission factor of fuel LPG in year *y* ($EF_{CO2,LPG,y}$) |
| Saturation pressure of $H_2O$ at temperature $T_t$ in time interval *t* ($p_{H2O,t,Sat}$) |

*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, measurement signals for the following monitoring parameters have been automatically processed by the project's Win CC data management platform and with related measurement values being recorded (with data recording/reporting frequency of every minute) in an encrypted binary data format in the project's data supervisory/controlling system (supervisory control and data acquisition system (Win CC platform) with embedded database. (with reporting frequency of 1 minute):

- Volumetric flow of LFG stream in time interval *t* on a wet basis ($V_{t,wb}$)
- Volumetric fraction of $CH_4$ in the collected LFG in time interval *t* on a wet basis ($v_{CH4,t,wb}$),
- Flame detection of flare in the minute *m* ($Flame_m$)
- Operation of the equipment that consumes LFG (engine-generator sets of both CLLC-1 and CLLC-2 electricity generation facilities) ($Op_{j,h}$)
- Operational status of biogas destruction devices (Status of biogas destruction device)

Data records for measurements of the amount of electricity generated and exported by the project's electricity generation infrastructure as well as consumption of grid-sourced electricity by the project activity are also regularly archived by the project's Win CC data management platform.

*Win CC data management platform (installed data supervisory control and data acquisition system):*
The Win CC data management platform is the SCADA platform installed as part of the project activity. The installed Win CC data management platform is used for control and monitoring the operation of the whole project activity.
Win CC data is a SCADA derived platform solution developed and supplied by Siemens AG. The installed Win CC platform is deemed customized for the project activity and includes an embedded database for all gathered monitoring data. As per the design of this data supervisory control and data management system, all handled/supported data is archived in the database in encrypted and un-editable format. Thus, all recorded monitoring data handled by the Win CC platform is effectively protected from data loss and/or data tampering. As confirmed by the EPIC assessment team, the installed Win CC platform includes reliable data logging and archiving strategies/solutions that protect monitoring data and ensure all required data integrity. All monitoring data recorded in the project's Win CC platform can be assessed (visualized) and be retrieved through any PC client connected to the local area network (LAN) of KDM S.A. and with access to the installed Win CC platform.

It is EPIC opinion that the use of the available PLC infrastructure and Win CC platform for recording and archiving monitoring details for the project activity represents good practice in terms of data acquisition, data recording and data archiving. EPIC was also able to verify that reliable and robust monitoring procedures were established, implemented and have been effectively and systematically followed by appointed staff of KDM S.A.

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

While all monitoring data recorded in the project's Win CC platform can be visualized but cannot be edited/modified, as part of the application of the project's monitoring system, related data is retrieved and exported/converted into MS-Excel spreadsheet format (data saved in "xlsm" file format)[9]. As confirmed by the EPIC verification team, as part of the data reporting and emission reduction calculation procedure adopted by the project's monitoring team at KDM S.A., monitoring data recorded at project's Win CC platform is regularly retrieved and exported/converted in order to be appropriately used for the determination of emission reductions achieved by the project activity.

For the considered monitoring period, the EPIC verification team was able to confirm that all monitoring data recorded at the project's Win CC data management platform which are applicable for the considered monitoring were retrieved and converted/exported in order to be used for the determination/calculation of emission reductions. As a result of the performed data export/conversion process, a MS-Excel format spreadsheet file with all records for the parameters indicated above in this Section was generated. This spreadsheet file is termed as "raw-data" file and it was used as the major primary monitoring input data for the elaboration of the main emission reduction calculation spreadsheet.

The generated "MS-Excel-format "raw data" file was made available and assessed by the EPIC verification team. This raw data file contains a date and time stamp for every minute, and the related monitoring records for LFG flow, flame detection of the flare, operational status of the engine-generator sets and $CH_4$ content of LFG, which are used for the calculation of GHG emission reductions. It is crucial to note that when generating such file 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 in the sub-section "*Data authenticity checking*".

As per the applied monitoring procedure and in accordance with the requirements of ACM0001 (version 15.0) [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 | Applied value |
|---|---|
| Fraction of methane that would be oxidized in the top layer of the SWDS in the baseline ($OX_{top\_layer}$) | 0.1 |
| Historical amount of methane in the LFG which is captured and destroyed in the year prior to the implementation of the project activity (2006).( $F_{CH4,BL,x-1}$) | 516.16 |

[9] The XLSM file type is primarily associated with the software application Excel version 2007 (and more recent versions) from Microsoft Corporation.

| | |
|---|---|
| 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* ($MM_k$)<br>(For the particular case of the project activity, *k* = $N_2$) | 28.01 kg/kmol |
| Molecular mass of greenhouse gas *I* ($MM_i$)<br>(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 providing electricity to the grid and/or for grid sourced electricity consumed by the project activity ($TDL_{grid,y}$) | 20% (for grid-sourced electricity consumed by the project activity) and<br>3% (for electricity generated by the project activity and provided to the grid) |
| 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* ($EF_{grid,BM,y}$) | 0.7046 $tCO_2/MWh$ |
| Operating margin CO2 emission factor in year *y* | 0.7479 $tCO_2/MWh$ |
| Manufacturer's flare specifications for temperature, flow rate and maintenance schedule interval ($SPEC_{flare}$) | |

| $SPEC_{flare,flare-1}$<br>$SPEC_{flare,flare-2}$ | Min. | Max. |
|---|---|---|
| Operational LFG flow for each flare (for continuous operation): | 850 $Nm^3/h$ | 5,097 $Nm^3/h$ |
| Required temperature of the exhaust gas of the flare (to ensure LFG destruction (combustion) under high $CH_4$ destruction efficiency): | 760 °C | 1,093 °C |
| Required minimum frequency for inspection and maintenance service in each | Min. every year | |

| | |
|---|---|
| flare (incl. inspection in the conditions of the flare isolation ceramics revetment material): | |
| Required/ recommended minimum frequency for replacement of the flare isolation ceramics revetment material in each flare: | After 10 years of regular and appropriate operation |

| $SPEC_{flare,flare-3}$ | Min. | Max. |
|---|---|---|
| Operational LFG flow for each flare (for continuous operation): | 510 $Nm^3/h$ | 5,097 $Nm^3/h$ |
| Required temperature of the exhaust gas of the flare (to ensure LFG destruction (combustion) under high $CH_4$ destruction efficiency): | 760 °C | 1,093 °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 year | |
| Required/ recommended minimum frequency for replacement of the flare isolation ceramics revetment material in each flare: | After 10 years of regular and appropriate operation | |

| | |
|---|---|
| Rated capacity of the installed captive backup electricity generators fuelled by diesel ($PP_{CP,Diesel\text{-}generator}$) | <table><tr><th>Equipment id/tag</th><th>Power (MW)</th></tr><tr><td>Diesel Backup Generator I</td><td>0.276</td></tr><tr><td>Diesel Backup Generator II</td><td>0.352</td></tr><tr><td>Diesel Backup Generator III</td><td>0.080</td></tr></table> |
| Average technical transmission and distribution losses for electricity sourced by the captive electricity generator ($TDL_{captive,y}$) | 0 |
| $CO_2$ emission factor for electricity sourced by the captive off-grid electricity generators ($EF_{EL,captive,y}$) | 1.3 $tCO_2/MWh$ |

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

Baseline emissions for the whole monitoring period were partially calculated through application of the *blank* version of the spreadsheet template that is developed by the project participant KDM S.A. and termed "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 annual 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 MS-Excel format "raw-data" spreadsheet file /6/ valid for the monitoring period
- the *ex-ante* determined parameters presented in the table above

The elaborated emission reduction calculation spreadsheet files /5/ aggregate (report) the following recorded monitoring data on an every-minute recording/reporting frequency (folder "Output"):

- Volumetric flow of collected LFG sent to combustion/utilization (monitoring parameter "Volumetric flow of LFG stream in time interval *t* on a wet basis" ($V_{t,wb}$)
- Methane fraction in the LFG (monitoring parameter "Volumetric fraction of $CH_4$ in the collected LFG in time interval *t* on a wet basis" ($v_{CH4,t,wb}$))
- "Operational status of biogas destruction devices" (Status of biogas destruction device)
- Flame status of the flare (monitoring parameter "Flame detection of flare in the minute *m*" ($Flame_m$)
- Operation of the equipment that consumes LFG (engine-generator sets of both CLLC-1 and CLLC-2 electricity generation facilities) ($Op_{j,h}$)

The table below presents the reported results of the generated 2 emission reduction spreadsheet files /5/ and the summarized emission reduction calculation spreadsheet:

| File name for the emission reduction calculation spreadsheets | Period | Reported amount of methane flared ($F_{CH4,PJ,y}$) |
|---|---|---|
| *"MR13 LLC - V.2 – Annual I.xls"* | 01/01/2017 - 30/06/2017 | 14,419 $tCH_4$ |
| *"MR13 LLC - V.2 – Annual II.xls"* | 01/07/2017 - 31/12/2017 | 13,138 $tCH_4$ |
| *"MR13 summarized - LLC - V.2.xls"* (Summarized emission reduction calculation spreadsheet for the whole monitoring period) | From 01/01/2017 to 31/12/2017 | 27,557 $tCH_4$ |

The summarized emission reduction calculation spreadsheet (file name "*MR13 Summarized - LLC - V.2.xls*") /5/ correctly summarizes the achieved baseline emissions due to destruction of methane by the project activity during the considered monitoring period. Moreover, such summarized spreadsheet /5/ also calculates baseline emissions from the displacement of the equivalent amount of electricity generated by the project activity which would otherwise be generated by existing grid-connected power plants, including fossil-fuel fired power plants (and addition of new power generation units) within the CDEC-SIC electricity grid of Chile). Further assessment details about the calculation of baseline emissions are included in Section E.8.1.

Project emissions due to consumption of grid-sourced electricity and electricity generated by the installed backup off-grid electricity generators (fuelled by diesel) 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 Win CC data management platform and (ii) related *ex-ante* determined parameters. Further assessment details about the calculation of project emissions are included in Section E.8.2.

The MS-Excel-format emission reduction calculation spreadsheet files /5/ and the summarized emission reduction calculation spreadsheet /5/ were made available and assessed by the EPIC verification team.

While the EPIC verification team was able to confirm that such emission reduction spreadsheets /5/ correctly calculate and report the accumulated value 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 the entire considered monitoring period, the summarized emission reduction calculation spreadsheet /5/ correctly summarizes the emission reductions for the whole monitoring period (by correctly considering accumulated values of $F_{CH4,PJ,y}$ and $F_{CH4,BL,y}$ from the 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 15.0) /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" (version 04.0) /17/,

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

- "Tool to determine the mass flow of a greenhouse gas in a gaseous stream" (version 03.0) /14/,

- Monitoring plan of the registered PDD /2/.

It is crucial to note that, as earlier highlighted in this section, when generating the "raw-data" spreadsheet file (which is used as primary input data for the 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 KDM 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 13th periodic verification, the host-country project participant and project operator KDM 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 KDM S.A. 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 KDM 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 emission reduction calculation spreadsheets /5/ completed by KDM 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 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 KDM 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 file /6/ and measurement records reported in the emission reduction spreadsheets were not intentionally or unintentionally edited/modified during the generation or handling of these files).

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

*STEP 1: Reproduction of the procedure of retrieving/exporting measurement data records from the project's Win CC SCADA platform to MS-Excel format:* A new round of data retrieval/exports for historical monitoring records stored in the project's Win CC SCADA platform to MS-Excel format ("raw data" input file) was performed for all data records valid for the whole considered monitoring period. Such data retrieval/exporting was performed by the EPIC verification team during the performed on-site visit to the project site by reproducing the procedure normally applied by the project's monitoring team as part of the application of the monitoring system. This procedure is summarized above. As an outcome of STEP 1, a new comparative file with primary data inputs from the project's Win CC SCADA system valid for the whole monitoring period was generated. This comparative file is MS-Excel format named by the EPIC verification team as "*raw-data for checking*" file /22/.

*STEP 2: Re-calculation of emission reductions:*
By using the MS-Excel format "*raw-data for checking*" comparative file /22/ (that was 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 the entire considered monitoring period. The content of the "*raw-data for checking*" comparative file /22/ was used as input data for the compilation of the 2 comparative emission reduction calculation spreadsheets /21/ by applying a *blank* version of the emission reduction calculation spreadsheet /23/ that was made available by the project participant and was assessed by the EPIC verification team. 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 comparative set of 2 emission reduction spreadsheets /21/ was thus created.

*STEP 3 – Comparison of the 2 emission reduction calculation spreadsheets developed by the project participant KDM S.A. against the created comparative 2 emission reduction spreadsheets and analysis of the results:*
The calculated accumulated values of the parameter $F_{CH4,PJ,y}$ in the

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| | comparative 2 emission reduction spreadsheets /21/ (files generated under STEP 2) were compared against the corresponding accumulated values for the parameter $F_{CH4,PJ,y}$ in the 2 emission reduction spreadsheets /5/ previously created by the project participants as part of the project's monitoring/reporting process.<br><br>As a result of STEP 3, by comparing the 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 comparative checking spreadsheets /21/ are identical to the emission reduction calculation spreadsheets /5/ previously created by the project participants.<br>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 Win CC data management platform represent credible and authentic monitoring data, the performed *data authenticity check* thus successfully and sufficiently confirmed that only authentic and not-modified monitored measurement data were previously used by the project participants for the calculation of emission reductions as reported in the Monitoring Report /3/. |
| **Findings** | A CAR was 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:<br><br>**CAR 1:**<br>Details presented in Section D.2. of the initial version of the Monitoring Report about the LFG flow meters installed and utilized during the considered monitoring are incomplete.<br><br>The representatives of the project participant KDM S.A. were requested to address the above-summarized raised CAR by providing to the EPIC verification team sufficient evidences to determine that the applicable CDM requirements have been met and/or through performance sufficient modification (corrections/improvements) in the initial version of the Monitoring Report and/or enclosed calculation spreadsheets if applicable. |
| **Conclusion** | In summary, upon closure of the raised related CAR, the EPIC verification team was able to confirm that the 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:<br>The monitoring plan and the applied methodology had been properly implemented and related monitoring activities have been correctly performed.<br>- 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/.<br>- QA/QC procedures are implemented for preventing or identifying and correct eventual errors or omissions in the reported monitoring parameters.<br>- 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

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| **Means of verification** | Not applicable[10]. |
| **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 01/01/2017 to 31/12/2017 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 of the 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 of the 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? (Yes / No): | 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(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 |

[10] 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*, cross-checking/reproducing all reported LFG and LFG utilization measurement records valid for the considered monitoring period against the related primary data sources were performed (with all reported related monitoring data being cross-checked/reproduced instead of having selected samples of data being cross-checked/reproduced).

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| | 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:<br>(as per the monitoring plan of the PDD): | Volumetric flow of LFG stream in time interval *t* on a wet basis ($V_{t,wb}$) |
| Calibration frequency /interval for the monitoring equipment/instrument: | As per the implemented monitoring procedure at KDM S.A. and recommendations from the equipment's manufacturer, the installed LFG flow meter used for measuring LFG flow sent to the project's biogas destruction/utilization devices under operational status is calibrated at least once every 18 months by a third party independent accredited calibration laboratory.<br><br>*Calibration details for the LFG flow meters used for measuring $V_{t,wb}$:*<br><br>For the flow meter with S/N 437121-A (instrument under operation during the period from 01/01/2017 to 04/08/2017 within the considered monitoring period), a valid calibration event was performed on 12/02/2016, as indicated in the Certificate of Calibration No. RA378038 /35/ issued by FCI Fluid Components International LLC.<br><br>For the flow meter with S/N 633755 (instrument under operation during the period from 04/08/2017 to 31/12/2017 within the considered monitoring period), a valid calibration event was performed on 24/07/2017, as indicated in the Certificate of Calibration No. C086339 /34/ issued by FCI Fluid Components International LLC. |
| 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? | As per both the registered PDD /2/ and ACM0001 (version 15.0) /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.<br><br>Thus, the applied calibration frequencies (every 18 months as per recommendations from the equipment's manufacturer) are under full conformance with both the monitoring plan of the registered PDD /2/ and ACM0001 (version 15.0) /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 measurement instruments. |

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| Is(are) the performed calibration(s) valid for the whole reporting period? | Yes. The performed calibration events for the installed LFG flow meters are valid for the whole considered monitoring period from 01/01/2017 to 31/12/2017.<br><br>EPIC was able to confirm the validity of the performed calibration events for the installed LFG flow meters as follows:<br><br>LFG flow meter with S/N 437121-A<br>- Calibration event performed on 12/02/2016, valid until 11/08/2017 (18 months)<br><br>LFG flow meter with S/N 633755:<br>- Calibration event performed on 24/07/2017, valid until 23/01/2019 (18 months) |

*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:<br>(as per the monitoring plan of the 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 KDM S.A., the installed $CH_4/O_2$ content gas analyzer unit is to be calibrated every year by a third party independent accredited calibration laboratory.<br><br>For the gas analyser unit with S/N N1-W2-678, the following calibration events valid for the considered monitoring period were performed:<br><br>- Calibration event performed on 19/08/2016, as indicated in the Certificate of Calibration No. 1102-16 /42/.<br><br>- Calibration event performed on 15/06/2017, as indicated in the Certificate of Calibration No. 1307-17 /43/.<br><br>Both calibration events were performed by TAG Instrumentación y Automatización de Processos Industriales, a SIEMENS Solution Partner in Chile.<br><br>The Calibration Certificates were made available and were assessed by the EPIC verification team. |
| 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? | As per the registered PDD /2/, ACM0001 (version 15.0) /7/ and the "Tool to determine the mass flow of a greenhouse gas in a gaseous stream" (version 03.0) /14/, the installed continuous $CH_4/O_2$ 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 year, as per recommendations from the equipment's |

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| | manufacturer) is in line with the monitoring plan of the registered PDD [2], ACM0001 (version 15.0) [7] and the "Tool to determine the mass flow of a greenhouse gas in a gaseous stream" (version 03.0) [14]. |
| Did the performed calibration(s) confirm proper functioning of monitoring equipment/instrument? (Yes / No): | Yes. The performed calibration events for the $CH_4/O_2$ content gas analyzer units confirmed proper functioning of these measurement instruments. |
| Is(are) the performed calibration(s) valid for the whole reporting period? | Yes. The performed calibration events for the installed $CH_4/O_2$ content gas analyzer unit that are referred in the Monitoring Report [3] are valid for the whole monitoring period from 01/01/2017 to 31/12/2017.<br><br>EPIC was able to confirm the validity of the performed calibration events for the installed $CH_4$ gas analyzer units as follows:<br><br>- Calibration event performed on 19/08/2016, valid until 18/08/2017 (1 year)<br>- Calibration event performed on 15/06/2017, valid until 14/06/2018 (1 year) |

*Assessment of performed calibration events for equipment/instruments used for monitoring the parameter "Operational status of biogas destruction devices" (Status of biogas destruction device):*

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| Data / Parameter: (as per the monitoring plan of the PDD): | Operational status of biogas destruction devices (Status of biogas destruction device) |
| Calibration frequency /interval for the monitoring equipment/instrument: | Not applicable. There are no measurements or measurement instruments/equipment involved for the definition of Status of biogas destruction device. |
| 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? | Not applicable. There are no measurements or measurement instruments/equipment involved for the definition of Status of biogas destruction device. |
| Company which has performed the applicable calibration events: | Not applicable. There are no measurements or measurement instruments/equipment involved for the definition of Status of biogas destruction device. |
| 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 Status of biogas destruction device. |
| Is(are) the performed calibration(s) valid for the whole reporting | Not applicable. There are no measurements or measurement instruments/equipment involved for the definition of Status of biogas destruction device. |

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| period? | |

*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" ($EC_{PJ,y}$):*

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| Data / Parameter:<br>(as per the monitoring plan of the PDD): | Amount of grid electricity consumed by the project activity during the year *y* ($EC_{PJ,y}$) |
| Calibration frequency /interval for the monitoring equipment/instrument: | As per the implemented monitoring procedure at KDM S.A. and recommendations from the equipment's manufacturer, the installed electricity meter is to be calibrated every 2 years.<br><br>For the electricity meter with S/N PT-1011A447-01, an initial calibration event was performed on 12/05/2015 (Calibration Certificate KD201505000002 /46/, issued by CAM Chile S.A.).<br>A second calibration event was performed on 06/07/2017 (Calibration Certificate KD201707001 /45/, also issued by CAM Chile S.A.). |
| 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? | Both the monitoring plan of the registered PDD /2/ and ACM0001 (version 15.0) /7/ do not specify any calibration frequency requirements for the electricity meters. The registered PDD /2/ states the following:<br><br>*"Instrument will be subject to a regular maintenance and testing regime in accordance to appropriate national / international standards/requirements and/or best practice."*<br><br>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:<br><br>*"(...) Instrument will be subject to a regular maintenance and testing regime in accordance to appropriate national / international standards/requirements and/or best practice."*<br><br>The calibration frequency adopted for the electricity meter is as per recommendations from the instrument manufacturer. It is the opinion of the EPIC assessment team that the adopted calibration frequency for the installed electricity meter represent good practice. |
| 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). |

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| Is(are) the performed calibration(s) valid for the whole reporting period? | No. As outlined in the Monitoring Report [73] a relative delay on performing the calibration events for the electricity meter occurred.<br>- While a calibration event was performed on 12/05/2015, the next sequential calibration event was supposed to be performed on 11/05/2017. Since such sequential calibration event was performed on 06/07/2017, a non-compliance with the applicable every year calibration frequency thus occurred.<br><br>By following applicable guidance of CDM-VVS, conservative correction factors were applied to every-minute measurement values of the monitoring parameter $EC_{PJ,y}$ for selected periods as assessed below:<br><br>Application of conservative correction factor in selected every-minute measured values for the monitoring parameter $EC_{PJ1,y}$<br>Value: +0.2% — Period: 11/05/2017 to 06/07/2017<br><br>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.<br><br>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.<br><br>EPIC was able to confirm the validity of the performed calibration events for the installed electricity meter as follows:<br><br>- calibration event performed on 12/05/2015, valid until 11/05/2017 (2 years)<br>- calibration event performed on 06/07/2017, valid until 05/07/2019 (2 years) |

*Assessment of performed calibration events for equipment/instruments used for monitoring the parameter "Amount of electricity generated using LFG by the project activity in year y" ($EC_{BL,y}$):*

| | |
|---|---|
| Data / Parameter:<br>(as per the monitoring plan of the PDD): | Amount of electricity generated using LFG by the project activity in year *y* ($EC_{Bl,y}$) |
| Calibration frequency /interval for the monitoring | While monitoring for the parameter $EC_{BL,y}$ is performed on the basis of electricity export |

| | | |
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| | equipment/instrument: | measurements performed by the same instrument for which measurements of imports of grid-sourced electricity are made as part of monitoring of the parameter "Amount of grid electricity consumed by the project activity during the year y" ($EC_{PJ,grid,y}$), details about calibration events performed on the installed electricity meter are presented above in the table with details for the monitoring parameter $EC_{PJ,grid,y}$. |
| | 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? | Both the monitoring plan of the registered PDD [/2/] and ACM0001 (version 15.0) [/7/] do not specify any calibration frequency requirements for the electricity meters. The registered PDD [/2/] states the following:<br><br>*"Instrument will be subject to a regular maintenance and testing regime in accordance to appropriate national / international standards/requirements and/or best practice."*<br><br>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:<br><br>*"(...) Instrument will be subject to a regular maintenance and testing regime in accordance to appropriate national / international standards/requirements and/or best practice."*<br><br>The calibration frequency adopted for the electricity meter is as per recommendations from the instrument manufacturer. It is the opinion of the EPIC assessment team that the adopted calibration frequency for the installed electricity meter represent good practice. |
| | 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? | No. As outlined in the Monitoring Report [/3/] a relative delay on performing the calibration events for the electricity meter occurred.<br>- While a calibration event was performed on 12/05/2015, the next sequential calibration event was supposed to be performed on 11/05/2017. Since such sequential calibration event was performed on 06/07/2017, a non-compliance with the applicable every year calibration frequency thus occurred.<br><br>By following applicable guidance of CDM-VVS, conservative correction factors were applied to |

every-minute measurement values of the monitoring parameter $EC_{BI,y}$ for selected periods as assessed below:

| Application of conservative correction factor in selected every-minute measured values for the monitoring parameter $EC_{BI,y}$ | |
|---|---|
| Value | Period |
| -0.2% | 11/05/2017 to 06/07/2017 |

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 electricity meter as follows:

- calibration event performed on 12/05/2015, valid until 11/05/2017 (2 years)
- calibration event performed on 06/07/2017, valid until 05/07/2019 (2 years)

*Assessment of performed calibration events for equipment/instruments used for monitoring the parameter "Operation of the equipment that consumes LFG (engine-generator sets of both CLLC-1 and CLLC-2 electricity generation facilities)" ($Op_{j,h}$):*

| | |
|---|---|
| Data / Parameter:<br>(as per the monitoring plan of the PDD): | Operation of the equipment that consumes LFG (engine-generator sets of both CLLC-1 and CLLC-2 electricity generation facilities) ($Op_{j,h}$) |
| 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 of the 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 "Flame detection of flare in the minute m" ($Flame_m$):*

| | |
|---|---|
| Data / Parameter: (as per the monitoring plan of the 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 sheet for the UV Flame detectors installed at the project site [41], 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 of the 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 "Quantity of electricity generated in captive diesel backup generator during the year y" ($EC_{PJ,captive,y}$):*

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| Data / Parameter: (as per the monitoring plan of the PDD): | Quantity of electricity generated in captive diesel backup generator during the year *y* ($EC_{PJ,captive,y}$) |
| Calibration frequency /interval for the monitoring equipment/instrument: | As per the implemented monitoring procedure at KDM S.A. and recommendations from the equipment's manufacturer, the installed electricity meters are to be calibrated at least every 2 years. As confirmed by the EPIC verification team through assessment of the service and operation manual for the installed electricity meters, the applied calibration frequency is as per the recommendations of the instrument manufacturer.<br><br>For the electricity meter with S/N 26207716 |

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| | | | utilized for measuring electricity generated by the Diesel Backup Generator I ($EC_{PJ,captive,y,1}$), an initial calibration event was performed on 13/05/2015 (Calibration Certificate KD201505000002 /39/, issued by CAM Chile S.A.). A second valid calibration event was later performed on 05/07/2017 (Calibration Certificate KD201707003 /66/, also issued by CAM Chile S.A.).<br><br>For the electricity meter with S/N 26204495 utilized for measuring electricity generated by the Diesel Backup Generator III ($EC_{PJ,captive,y,3}$), an initial calibration event was performed on 13/05/2015 (Calibration Certificate KD201505000003 /68/, issued by CAM Chile S.A.). A second valid calibration event was later performed on 25/07/2017 (Calibration Certificate KD201707004 /69/, also issued by CAM Chile S.A.).<br><br>For the electricity meter with S/N 26205401 utilized for measuring electricity generated by the Diesel Backup Generator III ($EC_{PJ,captive,y,3}$), an initial calibration event was performed on 11/05/2015 (Calibration Certificate KD201505000001 /40/, issued by CAM Chile S.A.). A second valid calibration event was later performed on 05/07/2017 (Calibration Certificate KD201707005 /67/, also issued by CAM Chile S.A.). | |
| | | 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? | Both the monitoring plan of the PDD /2/ and ACM0001 (version 15.0) /7/ do not specify any calibration frequency requirements for the electricity meters. The PDD /2/ states the following:<br><br>*"Periodic calibration events will be performed in a frequency as per instrument specifications and/or instrument manufacturer's recommendations. Instrument will be subject to a regular maintenance and testing regime in accordance to appropriate national / international standards/requirements and/or best practice."*<br><br>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:<br><br>*"(...) 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)".*<br><br>Therefore, the calibration frequency considered for these electricity meters was as per | |

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| | | recommendations from the instrument manufacturer. It is the opinion of the EPIC verification team that the adopted calibration frequency for electricity meter represents good monitoring practice. |
| | 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? | No. As outlined in the Monitoring Report [73] relative delays on performing the calibration events for all the electricity meters occurred.<br>- For the electricity meter with S/N 26207716 utilized for measuring electricity generated by the Diesel Backup Generator I ($EC_{PJ,captive,y,1}$), while a calibration event was performed on 13/05/2015, the next sequential calibration event was supposed to be performed on 12/05/2017. Since such sequential calibration event was performed on 05/07/2017, a non-compliance with the applicable every year calibration frequency thus occurred.<br>- For the electricity meter with S/N 26204495 utilized for measuring electricity generated by the Diesel Backup Generator II ($EC_{PJ,captive,y,2}$), while a calibration event was performed on 13/05/2015, the next sequential calibration event was supposed to be performed on 12/05/2017. Since such sequential calibration event was performed on 25/07/2017, a non-compliance with the applicable every year calibration frequency thus occurred.<br>- For the electricity meter with S/N 26205401 utilized for measuring electricity generated by the Diesel Backup Generator III ($EC_{PJ,captive,y,3}$), while a calibration event was performed on 11/05/2015, the next sequential calibration event was supposed to be performed on 10/05/2017. Since such sequential calibration event was performed on 05/07/2017, a non-compliance with the applicable every year calibration frequency thus occurred.<br><br>By following applicable guidance of CDM-VVS, conservative correction factors were applied to every-minute measurement values of the monitoring sub-parameters $EC_{PJ,captive,y,1}$, $EC_{PJ,captive,y,2}$ and $EC_{PJ,captive,y,3}$ for selected periods as assessed below: |

| Electricity meter's Serial Number | Application of conservative correction factor in selected every-minute measured values for the monitoring sub-parameters $EC_{PJ,captive,y,1}$, $EC_{PJ,captive,y,2}$ and $EC_{PJ,captive,y,3}$ | |
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| | Value | Period |
| 26207716 | +0.5% | 12/05/2017 to 05/07/2017 |
| 26204495 | +0.5% | 12/05/2017 to 25/07/2017 |
| 26205401 | +0.5% | 10/05/2017 to 05/07/2017 |

The values of the conservative correction factors for the occurred relative delays in performing calibration events were determined as the higher value between the measurement deviation/errors (which was identified during the performance of the delayed calibration events 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 factors were 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 electricity meter as follows:

Electricity meter with Serial Number 26207716:
- calibration event performed on 13/05/2015, valid until 12/05/2017 (2 years)
- calibration event performed on 05/07/2017, valid until 04/07/2019 (2 years)

Electricity meter with Serial Number 26204495:
- calibration event performed on 13/05/2015, valid until 12/05/2017 (2 years)
- calibration event performed on 25/07/2017, valid until 24/07/2019 (2 years)

Electricity meter with Serial Number 26205401::
- calibration event performed on 11/05/2015, valid until 10/05/2017 (2 years)
- calibration event performed on 05/07/2017, valid until 04/07/2019 (2 years)

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| | It is important to note that, as further assessed in Section E.6.2., the monitoring plan of the registered PDD [/2/] also includes the following monitoring parameters of which monitoring was not required during the considered monitoring period:<br><br>Parameter not monitored during the considered monitoring period<br>Volumetric flow of LFG stream in time interval *t* on a dry basis on a dry basis ($V_{t,db}$)<br>Volumetric fraction of $CH_4$ in the collected LFG in time interval *t* on a dry basis ($v_{CH4,t,db}$)<br>Mass flow of the LFG stream in time interval *t* on dry basis ($M_{t,db,j}$)<br>Quantity of fuel Diesel combusted by the captive off-grid electricity generator ($FC_{Diesel,y}$)<br>Net calorific value of the fuel Diesel in year *y* ($NCV_{Diesel,y}$)<br>$CO_2$ emission factor of fuel Diesel in year *y* ($EF_{CO2,Diesel,y}$)<br>Quantity of electricity generated in captive diesel backup generator during the year *y* ($EG_{Diesel-Generator,y}$)<br>Mass flow of methane in the exhaust gas of the flare on a dry basis at reference conditions in the time period *t* ($F_{CH4,EG,t}$)<br>Temperature in the exhaust gas of the enclosed flare in minute *m* ($T_{EG,m}$)<br>Maintenance events completed in year *y* as monitored by the project participants ($Maintenance_y$)<br>Quantity of LPG consumed by the project activity in year *y* ($FC_{LPG,y}$)<br>Net calorific value of the fuel LPG ($NCV_{LPG,y}$)<br>$CO_2$ emission factor of fuel LPG in year *y* ($EF_{CO2,LPG,y}$)<br>Saturation pressure of $H_2O$ at temperature $T_t$ in time interval *t* ($p_{H2O,t,Sat}$)<br><br>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:<br><br>**CAR 2:**<br>While relative delays in the performance of calibration events for selected monitoring instruments/equipment occurred vis-à-vis recommended calibration frequencies for these instruments (installed electricity meters used for measuring electricity generated by the backup captive diesel generators and consumed by the project activity and electricity meter used for measuring electricity generated by the project activity and grid electricity consumed by the project activity), no conservative deductions were applied in project emissions calculations for addressing such delays as required by applicable provisions of the CDM-VVS-PA. |
| **Conclusion** | As a conclusion, the EPIC verification team was able to confirm that, with exception of the installed electricity meters used for measuring electricity generated by the backup captive diesel generators, the calibration events performed for all other monitoring instruments of the project activity were conducted in accordance with the monitoring plan of the registered PDD [/2/], ACM0001 (version 15.0) [/7/]) and applicable tools during the monitoring period from 01/01/2017 to 31/12/2017.<br><br>EPIC has confirmed that conservative deductions were systematically applied by the project participants in the calculations of project emissions in order to address the acknowledged delays in the performance of calibration events for the installed electricity meters used for measuring electricity generated by the backup captive diesel generators.<br><br>Documented evidences for performed calibration events allowed the EPIC verification team to confirm that applied monitoring instruments/equipped operated |

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| | 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 01/01/2017 to 31/12/2017 has identified an error beyond the maximum permissible error of the respective measuring instrument. |

## 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

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| **Means of verification** | The EPIC verification team assessed whether the methods and formulae used to determine baseline emissions for the considered monitoring period are correct and appropriate. The performed assessment encompassed checking whether applied methods and formulae as described in the registered monitoring plan and applicable methodology + methodological tools were correctly applied, including confirmation whether the Monitoring Report includes all parameters and monitored data at the intervals required by the applied methodology + methodological tools as per the registered PDD /2/). The correctness of application of emission factors and default values (ex-ante determined/fixed parameters as per the registered PDD) /2/ was also verified.<br><br>Through assessment of the Monitoring Report, the EPIC verification team was able to verity that, as correctly indicated in the Monitoring Report /3/ and also as established by ACM0001 (version 15.0) /7/, applied methodological tools and the registered PDD /2/, baseline emissions ($BE_y$) for the considered monitoring period are correctly calculated as follows:<br><br>$BE_y = BE_{CH4,y} + BE_{EC,y}$<br><br>Where:<br><br>$BE_{EC,y}$ Baseline emissions associated with electricity generation in year *y*. As correctly outlined in the Monitoring Report /3/, $BE_{EC,y}$ is determined as follows:<br><br>$BE_{EC,y} = EC_{BL,y} * EF_{EL,grid,y} * (1 + TDL_{grid,y})$<br><br>Where:<br><br>$EC_{BL,y}$ Net amount of electricity generated using LFG in year y (in MWh). Total net electricity generated by the project activity during the considered monitoring period is reported as 139,606.839 MWh.<br><br>$TDL_{grid,y}$ Average technical transmission and distribution losses for providing electricity to the grid and/or for grid sourced electricity consumed by the project activity. As indicated in the registered PDD /2/, in the particular case of the determination of $BE_{EC,y}$, $TDL_{grid,y}$ is *ex-ante* determined as 3% ($TDL_{grid,export,y}$).<br><br>$EF_{EL,grid,y}$ Emission factor for grid-sourced electricity in year *y*. For the considered monitoring period, $EF_{EL,grid}$ is determined as the Combined margin $CO_2$ emission factor ($EF_{grid,CM,y}$) that is calculated as the weighted average of the ex-ante determined value for the monitoring parameters "Operating margin $CO_2$ emission factor in year *y*" ($EF_{grid,OM,y}$) and "Build margin $CO_2$ emission factors" ($EF_{grid,BM,y}$). In order to appropriately weight these two factors, the also previously determined and validated default values for the *ex-ante* determined parameters "Weighting of operating margin emission factor" ($w_{OM}$) and "Weighting of build margin emission factor" ($w_{BM}$) are applied. For the considered monitoring period, $EF_{grid,CM,y}$ is thus |

determined 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. As established in the registered PDD [2], $w_{OM}$ is ex-a*nte* determined as 0.25 (25%).

$w_{BM}$ Weighting of operating margin emissions factor. As established in the registered PDD [2], $w_{BM}$ is *ex-ante* determined as 0.75 (75%).

$EF_{grid,OM,y}$ Operating margin $CO_2$ emission factor in year *y*. As indicated in the registered PDD [2], $EF_{grid,OM,y}$ is ex-ante determined as 0.7479 $tCO_2$/MWh.

$EF_{grid,BM,y}$ Build margin $CO_2$ emission factor in year *y*. As indicated in the registered PDD [2], $EF_{grid,BM,y}$ is ex-ante determined as 0.7046 $tCO_2$/MWh.

$EF_{EL,grid,y}$ is thus calculated as 0.7154 $tCO_2$/MWh.

As confirmed by the EPIC verification team, the calculated accumulated value for $BE_{EC,y}$ for the considered monitoring period is correctly determined as 102,871 $tCO_2e$.

$BE_{CH4,y}$ 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:

$F_{CH4,BL,y} = F_{CH4,hist,y} = F_{CH4,BL,x-1} / F_{CH4,x-1} * F_{CH4,PJ,y}$

Where:

$F_{CH4,hist,y}$ Historical amount of methane in the LFG which is captured and destroyed (in t $CH_4$/yr).

$F_{CH4,BL,x-1}$ Historical amount of methane in the LFG which is captured and destroyed in the year prior to the implementation of the project activity. $F_{CH4,BL,x-1}$ is ex-ante determined as 516.16 t $CH_4$/yr.

$F_{CH,x-1}$ Amount of methane in the LFG generated in the SWDS in the year prior to the implementation of the project activity. $F_{CH4,BL,x-1}$ is ex-ante determined as 41,292.46 t $CH_4$/yr (year 2006).

$F_{CH4,PJ,capt,y}$ Amount of methane collected by 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:

$F_{CH4,EL,y}$ Amount of methane in the LFG which is used for electricity generation in year y (in $tCH_4$/yr). Assessment details for the determination of every-minute values for $F_{CH4,EL,y}$ during the considered monitoring period are presented below (under "*Determination of every-minute values for the calculation parameter $F_{CH4,EL,y}$*").

$F_{CH4,sent,flare,y}$ Amount of methane in the LFG which is sent to the flare (in $tCH_4$) during the whole monitoring period. While no collected LFG was sent to the flares during the considered monitoring period, $F_{CH4,sent,flare,y}$ is thus considered as null.

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 346 $tCH_4$.

$F_{CH4,PJ,y}$ Amount of methane in the LFG which is flared and/or used in the project activity. 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 in the LFG which is used for electricity generation in year *y* (in $tCH_4$/yr). Assessment details for the determination of every-minute values for $F_{CH4,EL,y}$ are presented below (under "*Determination of every-minute values for the calculation parameter $F_{CH4,EL,y}$*").

$F_{CH4,flared,y}$ Amount of methane in the LFG flared by the project activity (in $tCH_4$). While no collected LFG was sent to the flares during the considered monitoring period, $F_{CH4,flared,y}$ is thus considered as null.

*Assessment details for the determination of every-minute values for the calculation parameter $F_{CH4,EL,y}$:*

In accordance with ACM0001 version 15.0) /7/, the amount of methane in the LFG which is sent to the project's electricity generation component is determined 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 C (volume flow of LFG and volumetric fraction of $CH_4$ in collected LFG being measured in wet basis) of this methodological tool is selected. As per Option C of this methodological tool, the amount of methane in the LFG which is sent to the engine-generator sets is determined as follows:

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

Where:

$V_{t,wb,n}$ Volumetric flow of the gaseous stream (LFG) sent to the electricity generation infrastructure in time interval *t* on a wet basis at normal conditions. While measurements of volumetric flow of LFG sent to the electricity generation infrastructure are automatically processed and recorded in Nm³ of wet gas/h (normal conditions), the following assumption is valid:

$V_{t,wb,n} = v_{t,wb}$

Where:

$V_{t,wb}$ Volumetric flow of the gaseous stream (LFG) in time interval *t* on a wet basis at actual conditions.

$v_{CH4,t,wb}$ Volumetric fraction of $CH_4$ in the gaseous stream in time interval *t* on a wet basis.

$\rho_{CH4,n}$ 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 calculated as follows:

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

Where:

$P_n$ Absolute pressure at normal conditions. *Ex-ante* determined as 101,325 Pa.

$T_n$ Temperature at normal conditions. *Ex-ante* determined as 273.15 Kelvin.

$MM_i$ Molecular mass of greenhouse gas *i* (*i* = $CH_4$). *Ex-ante* determined as 16.04 kg/mol.

$R_u$ Universal ideal gases constant. *Ex-ante* determined as 8,314 $Pa.m^3/kmol.K$.

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

*Assessment details for the additional monitoring requirements applicable for the simplified monitoring approach of the registered PDD "Use of a single flow meter for multi-use of recovered biogas":*

During the performed on-site visit, the EPIC assessment team has confirmed that, as appropriately outlined in Box 1 of the latest version of the Monitoring Report /3/, during the considered monitoring period collected LFG sent to the project's electricity generation infrastructure was measured by a single LFG flow meter (with no collected LFG being sent to the project's high temperature enclosed flares for combustion). While the determination of baseline emissions for the considered monitoring period is performed by applying the simplified monitoring approach of the registered PDD termed "*Use of a single flow meter for multi-use of recovered biogas*", all additional requirements for the use of such simplified monitoring approach were assessed by the EPIC

verification team.

During the performed on-site visit, the EPIC assessment team has also confirmed that there is an individual safety shut-off valve installed/located within each section of the project's LFG supply pipeline that directs LFG towards each operational individual flare (and prior to each one of these biogas destruction devices) that automatically closes whenever the underlying biogas utilization device becomes under non-operational status. Through assessment of historical additional monitoring data (every-minute records of the status of each one of the 3 installed valves) and operational records of the project activity /6/, the EPIC verification team confirmed that such 3 valves (one valve for each installed flare) have been kept under "closed" status since 10/03/2014 (incl. the whole considered monitoring period). The non-operational status of the 3 flares during the whole considered monitoring period was also confirmed through assessment of records of the monitoring parameter "Flame detection of flare in the minute *m"* ($Flame_m$) valid for the considered monitoring period.

The EPIC assessment team has also confirmed that the design of the installed engine-generator sets of the project's electricity generation infrastructure and the whole construction of the project's electricity generation infrastructure ensure that no collected LFG is vented (directly emitted into the atmosphere) through any one of the installed engine-generators when they are not under operational status.

Whenever installed engine-generators are under operational status, for all time instants all collected LFG sent to such biogas utilization devices is utilized (combusted) as gaseous fuel for electricity generation.

As also confirmed by the EPIC verification team, all installed engine-generator sets are of design and constructions where there is an individual safety/control valve (located in the air/fuel mix intake manifold of each set) that is automatically kept under "closed" status/position whenever the underlying engine-generator set is not under operation.

Through assessment of the main emission reductions calculation spreadsheets valid for the considered monitoring, the EPIC assessment team has also confirmed that the following checking requirements (as described in the Monitoring Report) were fulfilled during the considered monitoring period:

*"(…)*

- *Records of electricity generated by the engine generator sets and records from the status of the both the flare(s) (by means of a flame detector(s) and the valves located prior to the flares within the project's LFG pipeline). In the particular case of the engine-generator sets, it is demonstrated that electricity generation (as the output from operation of such devices) corresponds to the flow of LFG actually consumed by the devices (in energy basis).*

- *For any time instants minute m where one or more biogas destruction/utilization devices connected downstream to the utilized single LFG flow meter (i.e. engine-generator set(s) and/or flare(s)) were under non-operational status, it is demonstrated that the set of remaining devices under operational status (i.e. engine-generator sets utilizing LFG as fuel for electricity generation in the particular case of the considered monitoring period) have the quantitative capacity to combust the amount of LFG flow that was sent to the underlying devices during*

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| | *the underlying minute m.*"<br><br>As assessed by the EPIC verification team, the 2 emission reduction calculation spreadsheets valid for the considered monitoring includes a Section termed "*Checking of meeting of the condition "that the output corresponds to the flow of gas (e.g., through mass and/or energy balance)*". Under such section of the main emission reductions calculation spreadsheets, for every minute of the considered monitoring period, by appropriately taking into account the conversion efficiency range of installed equipment (specific fuel consumption for the engine generator sets) and additional energy losses (e.g. heat and noise) energy content of supplied LFG (input) is compared against energy content of generated electricity (output). As verified by the EPIC verification team, whenever the ratio between output energy (power generated in the minute *m* (in MWh) and input energy (energy content of LFG consumed in the minute *m* (in MWh)) is between 0.35 and 0.40 (LFG to electricity conversion efficiency within the range from 35% to 40%), it is correctly assumed that the condition "*output corresponds to the flow of gas"* is met. It is the opinion of the EPIC verification team that the applied approach for checking meeting of the underlying condition (as reported in the main emission reductions calculation spreadsheets) is deemed reasonable and correct. The EPIC verification team has assessed fact sheets with specifications of the installed engine generator sets /31/ /32/ and technical literature issued by the US Environmental Agency (US-EPA) /36/ that confirms that assuming the project's electricity generation infrastructure as operating with LFG to electricity energy conversion efficiency within the range from 35% to 40% is deemed realistic and correct.<br><br>Furthermore, the EPIC assessment team also confirmed that installed $CH_4$ content gas analyzer used for measuring methane content in collected LFG during the considered monitoring period is indeed located immediately downstream of the utilized unique LFG flow meter as required in the registered PDD.<br><br>The calculated accumulated value for $F_{CH4,PJ,y}$ = $F_{CH4,EL,y}$ for the considered monitoring period is correctly determined as 27,557 $tCH_4$.<br><br>The calculated value for $BE_{CH4,y}$ for the monitoring period from 01/01/2017 to 31/12/2017 is correctly determined as 611,383 $tCO_2e$.<br><br>The calculated total value for baseline emissions ($BE_y$) for the monitoring period from 01/01/2017 to 31/12/2017 is correctly determined as 714,254 $tCO_2e$. |
| **Findings** | A CAR was raised concerning the calculations of baseline emissions:<br><br>**CAR 3:**<br>Calculated accumulated values of $F_{CH4,PJ,y}$, $F_{CH4,BL,y}$, $BE_{CH4,y}$, $EC_{BL,y}$, $BE_{EC,y}$ and $BE_y$ as reported in the initial version of the Monitoring Report are not in accordance with emission reductions calculation spreadsheets.<br><br>The representatives of the project participant KDM S.A. were requested to address the above-summarized raised CAR by providing to the EPIC verification team sufficient evidences to determine that the applicable CDM requirements have been met and/or through performance sufficient modification (corrections/improvements) in the initial version of the Monitoring Report and/or enclosed calculation spreadsheets if applicable. |
| **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 main emission reduction calculation spreadsheets files /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 |

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| | spreadsheets /5/, were verified to be performed under full conformance with applicable requirements of the registered PDD /2/, ACM0001 (version 15.0) /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.<br><br>The calculated value for $BE_y$ for the monitoring period from 01/01/2017 to 31/12/2017 is correctly determined as 714,254 $tCO_2e$.<br><br>It is noteworthy that, as a result of the applied correction approach for addressing the raised related CAR, the calculated value of $BE_y$ as per the latest version of the Monitoring Report is lower than the value as per the previous and initial version of the Monitoring Report. |

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

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| **Means of verification** | The EPIC verification team assessed whether the methods and formulae used to determine project emissions for the considered monitoring period are appropriate. The performed assessment encompassed checking whether applied methods and formulae as described in the registered monitoring plan and applicable methodology + methodological tools were correctly applied, including confirmation whether the Monitoring Report includes 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.<br><br>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:<br><br>$PE_y = PE_{EC,grid,y} + PE_{EC,captive,y}$<br><br>Where:<br><br>$PE_{EC,grid,y}$ Project emissions due to the consumption of grid-sourced electricity by the project activity in year *y*<br><br>$PE_{EC,captive,y}$ Project emissions from consumption of electricity generated by a captive off-grid electricity generator fuelled by fossil fuel (diesel) in year *y*<br><br>*Project emissions due to the consumption of grid-sourced electricity by the project activity ($PE_{EC,grid,y}$):*<br><br>As correctly outlined in the latest version of the Monitoring Report /3/, for the whole considered monitoring period, 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:<br><br>$PE_{EC,grid,y} = EC_{PJ,grid,y} * EF_{EL,grid,y} * (1 + TDL_{grid,y})$<br><br>Where:<br><br>$EC_{PJ,grid,y}$ Quantity of grid-sourced electricity consumed by the project activity in year *y*. Total accumulated amount of grid-sourced electricity consumption during the considered monitoring period is reported as 186.565 MWh. Assessment details for the monitoring parameter $EC_{PJ,grid,y}$ valid for the considered monitoring period are included in Section E.6.2. |

$TDL_{grid,y}$ Average technical transmission and distribution losses for providing electricity to the grid and/or for grid sourced electricity consumed by the project activity. As indicated in the registered PDD /2/, in the particular case of the determination of $PE_{EC,grid,y}$, $TDL_{grid,y}$ is *ex-ante* determined as 20% ($TDL_{grid,import,y}$).

$EF_{EL,grid,y}$ Emission factor for grid-sourced electricity in year *y*. For the considered monitoring period, $EF_{EL,grid}$ is determined as the Combined margin $CO_2$ emission factor ($EF_{grid,CM,y}$) that is calculated as the weighted average of the ex-ante determined values for the monitoring parameters "Operating margin $CO_2$ emission factor in year *y*" ($EF_{grid,OM,y}$) and "Build margin $CO_2$ emission factors" ($EF_{grid,BM,y}$). In order to appropriately weight these two factors, the also previously determined and validated default values for the *ex-ante* determined parameters "Weighting of operating margin emission factor" ($w_{OM}$) and "Weighting of build margin emission factor" ($w_{BM}$) are applied. For the considered monitoring period, $EF_{grid,CM,y}$ is thus determined 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. As established in the registered PDD /2/, $w_{OM}$ is ex-ant*e* determined as 0.25 (25%).

$w_{BM}$ Weighting of operating margin emissions factor. As established in the registered PDD /2/, $w_{BM}$ is *ex-ante* determined as 0.75 (75%).

$EF_{grid,OM,y}$ Operating margin $CO_2$ emission factor in year *y*. As indicated in the registered PDD /2/, $EF_{grid,OM,y}$ is ex-ante determined as 0.7479 $tCO_2/MWh$.

$EF_{grid,BM,y}$ Build margin $CO_2$ emission factor in year *y*. As indicated in the registered PDD /2/, $EF_{grid,BM,y}$ is ex-ante determined as 0.7046 $tCO_2/MWh$.

The calculated value for $PE_{EC,grid,y}$ for the considered monitoring period from 01/01/2017 to 31/12/2017 is correctly determined as 160 $tCO_2$ (rounded value).

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

As correctly outlined in the latest version of the Monitoring Report /3/, for the considered monitoring period, emissions due to the consumption of electricity sourced by the captive diesel off-grid electricity generators I, II and III by the project activity ($PE_{EC,captive,y,1}$, $PE_{EC,captive,y,2}$ and $PE_{EC,captive,y,3}$) 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:

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

Where:

n Diesel Backup Generator number (for the considered monitoring period, n = 1, 2 and 3).

$EC_{PJ,captive,y,n}$ Amount of electricity sourced by the captive electricity generator (fuelled by Diesel) in question and consumed by the project activity. For the considered monitoring period, total accumulated amount of

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| | electricity sourced by the captive backup diesel generators 1, 2 and 3 are reported as 13.344 MWh ($EC_{captive,y,1}$), 5,629 MWh ($EC_{captive,y,1}$) and 0.103 MWh ($EC_{captive,y,2}$) respectively. Assessment details for the monitoring parameter $EC_{PJ,captive,y}$ valid for the considered monitoring period are included in Section E.6.2.<br><br>$TDL_{captive,y}$ Average technical transmission and distribution losses for electricity sourced by the captive electricity generator. As indicated in the registered PDD [/2/], $TDL_{captive,y}$ is *ex-ante* determined as zero.<br><br>$EF_{EL,captive,y}$ $CO_2$ emission factor for electricity sourced by the captive off-grid electricity generators. As indicated in the registered PDD [/2/], $EF_{EL,captive,y}$ is *ex-ante* determined as 1.3 $tCO_2$/MWh.<br><br>The calculated values for $PE_{EC,captive,y,1}$, $PE_{EC,captive,y,2}$ and $PE_{EC,captive,y,3}$ for the considered monitoring period from 01/01/2017 to 31/12/2017 are correctly determined as 18 $tCO_2$ (rounded value), 8 $tCO_2$ (rounded value) and 1 $tCO_2$ (rounded value), respectively.<br><br>Total project emissions due to the consumption of electricity sourced by the backup captive off-grid electricity generators (fuelled by Diesel) are thus calculated as 27 $tCO_2$.<br><br>Total project emissions ($PE_y$) are correctly calculated and reported as 187 $tCO_2$ (rounded value) and are correctly considered in the context of the emission reduction calculations. |
| **Findings** | A CAR was raised regarding the calculations of project emissions:<br><br>**CAR 4:**<br>Calculated accumulated values of $EC_{PJ,grid,y}$, $PE_{EC,grid,y}$, $EC_{PJ,captive,y}$, $PE_{EC,captive,y}$ and $PE_y$ as reported in the initial version of the Monitoring Report are not in accordance with emission reductions calculation spreadsheets. |
| **Conclusion** | Upon closure of the raised CAR, 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 15.0) [/7/] and applicable methodological tools [/13/ /15/ /17/]. Applied methods and formulae, as described in the monitoring plan from the registered PDD [/2/] and applicable methodology + methodological tools, were correctly applied.<br><br>The calculated value for $PE_y$ for the monitoring period from 01/01/2017 to 31/12/2017 is correctly determined as 187 $tCO_2$ (rounded value).<br><br>It is noteworthy that, as a result of the applied correction approach for addressing the raised related CAR, the calculated value of $PE_y$ as per the latest version of the Monitoring Report is slightly higher than the value as per the previous and initial version of the Monitoring Report. |

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

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| **Means of verification** | Not applicable. In accordance with the applied CDM baseline and monitoring methodology ACM0001 (version 15.0) [/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

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| **Means of verification** | The EPIC verification team assessed whether calculation and reporting of achieved GHG emission reductions for the considered monitoring period are correct.<br><br>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:<br>- Monitoring plan and other related provisions of the registered PDD /2/.<br>- CDM baseline and monitoring methodology ACM0001 - 'Flaring or use of landfill gas" (version 15.0) /7/,<br>- Tool to calculate baseline, project and/or leakage emissions from electricity consumption (version 01) /13/.<br>- Tool to calculate project or leakage $CO_2$ emissions from fossil fuel combustion" (version 02) /15/<br>- "Tool to calculate the emission factor for an electricity system" (version 04.0 /17/)<br>- "Project emissions from flaring" (version 02.0.0) /12/<br>- "Tool to determine the mass flow of a greenhouse gas in a gaseous stream" (version 03.0.0) /14/<br><br>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/.<br>EPIC was thus able to confirm that the emission reductions reported for the monitoring period from 01/01/2017 to 31/12/2017 are based on authentic measurements of related monitoring data and are also based on the application of a semi-automatic and systematic data monitoring procedure for automatically recorded monitoring data as well as data related to the consumption of LPG, electricity sourced by the installed captive off-grid electricity generator (fuelled by diesel), grid–sourced electricity by the project activity and electricity generated by the project activity. Moreover, as also assessed by the EPIC verification team, 01/01/2017 to 31/12/2017 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 the monitoring period from 01/01/2017 to 31/12/2017 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 |

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| | 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 15.0) /7/ and applicable methodological tools /13/ /14/ /15/ /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 365 days within year of 2017 were compared against the equivalent related *ex-ante* estimation of emission reductions for year 2017 for such period 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 01/01/2017 to 31/12/2017 (considered monitoring period) | 1,306,501 | 714,067 |

**Findings**

A CAR was raised regarding the comparison of achieved emission reductions against related *ex-ante* estimation of emission reductions as per the registered PDD:

**CAR 5:**
The initial version of the Monitoring Report wrongly indicates the ex-ante estimation of emission reductions as per the registered PDD for the considered monitoring period (year of 2017).

**Conclusion**

As confirmed by the EPIC verification team, upon closure of the raised CAR, for the 365-day length monitoring period from 01/01/2017 to 31/12/2017, achieved emission reductions are correctly indicated as about ~45% lower than the comparable value of *ex-ante* estimation of emission reductions as per the registered PDD /2/ valid for such period.

As further assessed in Section E.8.6., the Monitoring Report presents a set of factors and aspects that sufficiently explains the occurred differences 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

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| **Means of verification** | The EPIC verification team assessed the remarks on the difference between |

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| | achieved GHG emission reductions and applicable estimated value in the registered PDD [2].<br><br>As appropriately indicated in Section E.6 of the latest version of the Monitoring Report [3], there are a set of factors and aspects that sufficiently explain the occurred slightly 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 factors and aspects are summarized below:<br><br>*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:*<br><br>*1. Uncertainties associated with the application of First Order Decay (FOD) multi-phased model for estimating the emission reductions in the registered PDD:*<br>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 "Loma Los Colorados Landfill Gas Project". The EPIC verification team has confirmed that it is reasonable to assume that the uncertainties associated with the application of such decay model have somehow underestimated the amount of LFG to be generated and collected by the project activity during the considered monitoring period.<br><br>*2. Reduced performance of the project's LFG collection infrastructure and no improvement of existing infrastructure (with no collected LFG being sent to the project's flares for destruction):*<br>The EPIC verification team was also able to verify that, as correctly indicated in the Monitoring Report [3], during the considered monitoring period, the project's LFG destruction (flaring) facility was out of operation due to operational difficulties/challenges faced in the latest years by KDM S.A. where incremental and required investment on improvement of LFG collection infrastructure at the Loma Los Colorados landfill (e.g. increase of the number and/or quality of LFG collection wells beyond the number/specifications previously considered as part of the project design conceptualization) in order to allow excess of LFG to be combusted in the flares were not made.. As confirmed by the EPIC verification team, this negatively affected the amount of emission reductions achieved by the project activity during the considered monitoring period. |
| **Findings** | No findings (CARs, CLs) were raised regarding the difference from estimated GHG emission reductions as per the registered PDD and actual emission reductions achieved by the project activity during the considered monitoring period. |
| **Conclusion** | As a conclusion, by taking into account the factor/aspect 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

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| **Means of verification** | As the monitoring period covered by this Verification Report (01/01/2017 to 31/12/2017) started after 01/01/2013, this verification does not include assessment |

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| | 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 01/01/2017 to 31/12/2017 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 15.0) /7/ and applicable methodological tools /13/ /14/ /15/ /17/.<br>No emission reductions occurred prior 01/01/2013 were considered in the current verification. |

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

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| **Means of verification** | Not applicable. The project activity does not encompass monitoring of sustainable development co-benefits. |
| **Findings** | Not applicable. |
| **Conclusion** | Not applicable. |

### E.10. Global stakeholder consultation

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| **Means of verification** | Not applicable. This verification report does not encompass assessment of the first monitoring period of 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 "Loma Los Colorados Landfill Gas Projects" for the monitoring period from 01/01/2017 to 31/12/2017, as reported in the latest version of the Monitoring Report issued on 18/02/2018 (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 15.0) /7/ and applicable methodological tools /13/ /14/ /15/ /17/.

EPIC thus confirms the following regarding verified emission reductions:

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| Project title: | Loma Los Colorados Landfill Gas Project |

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| UNFCCC ref no: | 0822 |
| PDD<br>Monitoring Report | Version 1.6, dated 24/06/2017.<br>Version 2.0, dated 18/02/2018 |
| Methodology used for verification: | ACM0001 (version 15.0) |
| Applicable monitoring period: | 01/01/2017 to 31/12/2017<br>(first and last day included) |
| Achieved emission reductions: | 714,067 $tCO_2e$ |

## SECTION H. Certification statement

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EPIC Sustainability Services Pvt. Ltd. (EPIC) has performed the 13th periodic verification assessment of the registered CDM project activity titled "Loma Los Colorados Landfill Gas Project". The project activity was registered by the UNFCCC on 17/03/2007 as CDM project activity with registration no. 0822 and it is currently under its 2nd 7-year renewable crediting period (period from 17/03/2014 to 16/03/2021).

The performed CDM verification assessment covered the monitoring period from 01/01/2017 to 31/12/2017 (including both days) and represents the 13th periodic verification 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 Loma los Colorados landfill. In accordance with related project design information made available in the registered and latest version of the Project Design Document (PDD) valid 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 utilization of landfill gas (LFG) for electricity generation in the project's CLLC-1 and CLLC-2 electricity generation facilities.

While LFG is rich in $CH_4$, as established in the registered PDD for the project activity, in the absence of the project activity (baseline scenario) it is assumed that the largest share of LFG collected and utilized by the project activity would be directly emitted into the atmosphere. Moreover, the project also promoted emission reductions resulting from the displacement of an equivalent amount of electricity generated by the project activity which would otherwise be generated by existing grid-connected power plants, including fossil-fuel fired power plants (and addition of new power generation units) within the CDEC-SIC Electricity Grid of Chile).

The host-country project participant and project operator KDM 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, KDM 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 15.0), the monitoring plan included in the registered and latest version of the PDD for the 2nd 7-year crediting period of the project activity (version 1.6, dated 24/06/2017) and also as per the latest version of Monitoring Report for the considered monitoring period (version 2.0, dated 18/02/2018).
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 latest version of 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 (as per the registered PDD) were 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 obtaining evidence, information and explanations that were considered necessary for providing reasonable assurance that reported GHG emission reductions 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.

It is the opinion of EPIC that reported GHG emission reductions for the CDM project activity "Loma Los Colorados Landfill Gas Project" for the monitoring period from 01/01/2017 to 31/12/2017, as reported in the latest version of the Monitoring Report issued on 18/02/2018 (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 15.0) and applicable methodological tools.

EPIC Sustainability Services Pvt. Ltd. (EPIC) herewith confirms that GHG emission reductions were achieved by the CDM project activity "Loma Los Colorados Landfill Gas Project" during the monitoring period from 01/01/2017 to 31/12/2017 as follows:

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| Emission reductions for the monitoring period from 01/01/2017 to 31/12/2017: | 714,067 $tCO_2e$ |

| Prepared by | Approved by : |
|---|---|
|  |  |
| (Marco A. Ratton)<br>Verification Team Leader | (K. Sudheendra)<br>Director & Head-Operations |

# Appendix 1. Abbreviations

| Abbreviations | Full texts |
|---|---|
| ACM | Approved Consolidated Methodology (CDM baseline and monitoring methodology) |
| CAR | Corrective Action Request |
| CDEC-SIC | Coordinador Eléctrico Nacional (former Centro de Despacho Econômico de Carga Del Sistema Interconectado Central) (Grid operation / dispatch coordinating entity for the Chilean SIC (Interconnected Central System) grid) |
| CDM | Clean Development Mechanism |
| CDM-EB | Clean Development Mechanism Executive Board |
| CDM-M&P | Modalities and Procedures for Clean Development Mechanism |
| CDM-PCP-PA | Clean Development Mechanism project cycle procedures for project activities |
| CDM-PS-PA | Clean Development Mechanism project standard for project activities |
| CDM-VVS-PA | Clean Development Mechanism validation and verification standard for project activities |
| CER | Certified Emission Reduction |
| $CH_4$ | 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 |
| DNA | Designated National Authority |
| DOE | Designated Operational Entity |
| ER | Emission Reduction |
| FAR | Forward Action Request |
| GHG | Greenhouse Gas |
| HDPE | High Density Polyethylene |
| LFG | Landfill gas |
| LPG | Liquefied petroleum gas |
| IPCC | Intergovernmental Panel on Climate Change |
| MP | Monitoring Plan |
| MR | Monitoring Report |
| MSW | Municipals solid waste |
| PDD | Project Design Document |
| PLC | Programmable logic controller |
| PP | Project Participant |
| PPA | Power purchase agreement |
| QA/QC | Quality Assurance / Quality Control |
| SCADA | Supervisory Control and Data Acquisition |
| UNFCCC | United Nations Framework Convention for Climate Change |
| US-EPA | Environmental Protection Agency of the U.S.A. |
| 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): | Sectors 1 and 13 | N/A | Sectors 1 and 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 since 2007. He holds vast experience with independent assessments of CDM project activities within the area of solid waste management and effluent treatment implemented 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 under Technical Area "Waste handling and disposal" and Sector Scope 1 in accordance with procedures of EPIC sustainability services Pvt. Ltd. He also has previous 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 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 | Clean Development Mechanism validation and verification standard for project activities (CDM-VVS-PA), version 01.0 as per EB 93. | Dated 03/03/2017. Available online: https://cdm.unfccc.int/Reference/new_reg.html | Others |
| /2/ | KDM S.A. | Latest version of the registered Project Design Document (PDD) for the 2nd 7-year renewable crediting period for the CDM project activity: "Loma Los Colorados Landfill Gas Project", version 1.6. | Dated 24/06/2017. | Project Participants [11] |
| /3/ | KDM S.A. | Monitoring Report for the CDM project activity "Loma Los Colorados Landfill Gas Project" - monitoring period from 01/01/2017 to 31/12/2017, version 2.0. | Dated 18/02/2018. | Project Participants |
| /4/ | KDM S.A. | Monitoring Report for the CDM project activity "Loma Los Colorados Landfill Gas Project" - monitoring period from 01/01/2017 to 31/12/2017, version 1.0. | Dated 13/01/2018. Available online: http://cdm.unfccc.int/Projects/DB/DNV-CUK1166695034.41/view | Project Participants |
| /5/ | KDM S.A. | Annual emission reduction calculation spreadsheets + summarized emission reduction spreadsheet for the CDM project activity "Loma Los Colorados Landfill Gas Project" - monitoring period from 01/01/2017 to 31/12/2017.<br><br>File names:<br>*"MR13 LLC – V.2 - Annual I.xls"*<br>*"MR13 LLC – V.2 - Annual II.xls"*<br>*"MR13 Summarized - LLC - V.2.xls"* | Dated 18/02/2018. | Project Participants |
| /6/ | KDM S.A. | Input data for the emission reduction calculation spreadsheets for the project activity "Loma Los Colorados Landfill Gas Project" - monitoring period from 01/01/2017 to 31/12/2017. | Dated 10/01/2018. | Project Participants |

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

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| | | File name:<br>*"1 jan to 31 dec 2018.xls"* | | |
| /7/ | UNFCCC/CDM-EB | Consolidated baseline and monitoring methodology ACM0001 - "Flaring or use of landfill gas¨, version 15.0 as per EB 67. | Dated 08/11/2013.<br>Available online:<br>https://cdm.unfccc.int/methodologies/DB/LZK7FFF1UVA2IILFNAQ0I0CUCW3RJJ | Others |
| /8/ | UNFCCC | Kyoto Protocol to the United Nations Framework Convention on Climate Change | Dated 1998.<br>Available online:<br>http://unfccc.int/resource/docs/convkp/kpeng.pdf | Others |
| /9/ | UNFCCC | Decision 3/CMP. 1 (Marrakesh – Accords) | Dated 30/03/2006.<br>Available online:<br>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" for the project activity Loma Los Colorados Landfill Gas Project, Version 03. | Dated 31/03/2015.<br>Available online:<br>https://cdm.unfccc.int/Projects/DB/DNV-CUK1166695034.41/view | Others |
| /11/ | IPCC | 1996 IPCC Guidelines for National Greenhouse Gas Inventories: work book;<br>2006 IPCC Guidelines for National Greenhouse Gas Inventories: work book. | Available online:<br>http://www.ipcc-nggip.iges.or.jp/public/gl/invs5.html<br><br>http://www.ipcc-nggip.iges.or.jp/public/2006gl/vol5.html | Others |
| /12/ | UNFCCC/CDM-EB | "Project emissions from flaring", version 02.0.0 as per EB 68. | Dated 20/07/2012.<br>Available online:<br>https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-06-v2.0.pdf/history_view | Others |
| /13/ | UNFCCC/CDM-EB | "Tool to calculate baseline, project and/or leakage emissions from electricity consumption", version 01 as per EB 39. | Dated 16/05/2008.<br>Available online:<br>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 03.0 as per EB 61. | Dated 27/11/2015.<br>Available online:<br>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 as per EB 41. | Dated 02/08/2008.<br>Available online:<br>https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-03-v2.pdf/history_view | Others |

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| /16/ | EPIC | CDM Verification and Certification Report for the CDM project activity "Loma Los Colorados Landfill Gas Project". 11th verification (monitoring period from 15/09/2014 to 11/05/2016, version 1.2. | Dated 27/06/2017. Available online: http://cdm.unfccc.int/Projects/DB/DNV-CUK1166695034.41/CP/E7OHFHB23WH3B2I0X0AGJ7MTBQEEP9/iProcess/EPIC_Sust1489990689.38/view | Others |
| /17/ | UNFCCC/CDM-EB | "Tool to calculate the emission factor for an electricity system", version 04.0 as per EB 75. | Dated 04/10/2013. Available online: https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-07-v1.1.pdf/history_view | Others |
| /18/ | UNFCCC/CDM-EB | Clean Development Mechanism project standard for project activities (CDM-PS-PA), version 01.0 as per EB 93. | Dated 03/03/2017. Available online: https://cdm.unfccc.int/Reference/new_reg.html | Others |
| /19/ | UNFCCC/CDM-EB | Clean Development Mechanism project cycle procedure for project activities (CDM-PCP-PA), version 01.0 as per EB 93 | Dated 03/03/2017. Available online: https://cdm.unfccc.int/Reference/new_reg.html | Others |
| /20/ | KDM S.A. | Main emission reduction calculation spreadsheets + summarized emission reduction spreadsheet.for the CDM project activity "Loma Los Colorados Landfill Gas Project" - monitoring period from 01/01/2017 to 31/12/2017.<br><br>File names:<br>*"MR13 LLC - V.1 – Annual I.xls"*<br>*"MR13 LLC - V.1 – Annual II.xls"*<br>*"MR13 Summarized - LLC - V.1.xls"* | Dated 13/01/2018. | Project Participants |
| /21/ | EPIC / KDM S.A. | Comparative emission reduction calculation spreadsheets for the project activity "Loma Los Colorados Landfill Gas Project" - monitoring period from 01/01/2017 to 31/12/2017.<br><br>Created as part of the *Data authenticity checking* procedure performed during the verification.<br><br>File names:<br>*"MR13 LLC - V.1 – Annual I – for checking.xls"*<br>*"MR13 LLC - V.1 – Annual II – for checking.xls"*<br>*"MR13 Summarized - LLC - V.1 – for checking.xls"* | Dated 16/02/2018. | Project Participants |

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| /22/ | EPIC / KDM S.A. | Comparative spreadsheet with monitoring records for the project activity "Loma Los Colorados Landfill Gas Project" – monitoring period from 01/01/2017 to 31/12/2017. Created as part of the *Data authenticity checking* procedure performed during the on-site visit.<br><br>File name:<br>*"1 jan to 31 dec 2018 – for checking.xls"* | Dated 16/02/2018. | Project Participants |
| /23/ | KDM S.A. | Blank version of the annual emission reduction calculation spreadsheets applied for the project activity "Loma Los Colorados Landfill Gas Project" - monitoring period from 01/01/2017 to 31/12/2017.<br><br>File names:<br>*"MR13 LLC - V.1 – Annual I – blank.xls"*<br>*"MR13 LLC - V.1 – Annual II – blank.xls"*<br>*"MR13 Summarized - LLC - V.1 – blank.xls"* | Dated 10/01/2018. | Project Participants |
| /24/ | KDM 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 "Loma Los Colorados Landfill Gas Project"). | Available at the project's data control room. | Project Participants |
| /25/ | KDM S.A. | Completed Modalities of Communication (MoC) form for the CDM project activity "Loma Los Colorados Landfill Gas Project". | Latest version dated 28/04/2017.<br>Available online:<br>https://cdm.unfccc.int/Projects/DB/DNV-CUK1166695034.41/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 13th verification of the CDM project activity "Loma Los Colorados Landfill Gas Project". | Dated 16/02/2018 | Others |
| /28/ | EPIC | CDM Verification and Certification Report for the CDM project activity "Loma Los Colorados Landfill Gas Project". 9$^{th}$ verification (monitoring period | Dated 29/05/2017 | Others |

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| | | from 01/01/2013 to 16/03/2014. | | |
| /29/ | Germanischer Lloyd Certification GmbH | CDM Verification and Certification Report for the CDM project activity "Loma Los Colorados Landfill Gas Project". 4th periodic verifications (monitoring period from 01/09/2009 to 31/08/2010). GLC Report No. 115, Rev 07. | Dated 05/11/2012. Available online: https://cdm.unfccc.int/Projects/DB/DNV-CUK1166695034.41/iProcess/Germanischer1307274708.81/view | Others |
| /30/ | EPIC | CDM Verification and Certification Report for the CDM project activity "Loma Los Colorados Landfill Gas Project". 10th verification (monitoring period from 17/03/2014 to 14/09/2014, version 1.1. | Dated 27/06/2017. Available online: http://cdm.unfccc.int/Projects/DB/DNV-CUK1166695034.41/CP/E7OHFHB23WH3B2I0X0AGJ7MTBQEEP9/iProcess/EPIC_Sust1489990517.31/view | Others |
| /31/ | GE Jenbacher | Specifications for the Jenbacher Type 4 Gas Engines (Jenbacher Type 4 Gas Engines / Product specifications / J 420 model/ "Bio Gas" fuel / "60 Hz" AC frequency) | Available online: https://powergen.gepower.com/products/reciprocating-engines/jenbacher-type-4.html | Others |
| /32/ | GE Energy | Specification sheet for Waukesha gas engines APG1000 | Available online: http://sl-energie.com/fileadmin/templates/makeit/cms/cms_upload/documents/APG1000_BG_Form%204171_0811.pdf | Others |
| /33/ | TÜV Industrie Service GmbH | CDM Verification and Certification Report for the CDM project activity "Loma Los Colorados Landfill Gas Project". 1st verification (verification period from 17/03/2007 to 17/06/2007. Report No. 1066682, version 02. | Dated 11/02/2008. Available online: https://cdm.unfccc.int/Projects/DB/DNV-CUK1166695034.41/iProcess/TUEV-SUED1190733289.61/view | Others |
| /34/ | FCI Fluid Components International LLC. | Certificate of Calibration for the installed LFG flow meter with S/N 633755 - calibration event performed on 24/07/2017. Certificate No. C086339. | - | Others |
| /35/ | FCI Fluid Components International LLC. | Certificate of Calibration for the installed LFG flow meter with S/N 437121-A - calibration event performed on 12/02/2016. Certificate No. RA378038. | - | Others |
| /36/ | US-EPA | LFG Energy Project Development Handbook. / Landfill Methane Outreach Program | Dated September 2016 Available online: https://www.epa.gov/sites/production/files/2016-11/documents/pdh_full.pdf | Others |
| /37/ | EPIC | Validation Opinion Report for | Dated 25/06/2017. | Others |

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|---|---|---|---|---|
| | | Post-Registration Changes for the CDM project activity Loma los Colorados Landfill Gas Project. Version 01.0. | | |
| /38/ | Schneider Electric | Technical Specification sheet for the electricity meter PM820MG. | Available online: http://www.ops-ecat.schneider-electric.com/cut.CatalogueRetrieverServlet/CatalogueRetrieverServlet?fct=get_element&env=publish&scp_id=Z008&lc=pt&el_typ=product&cat_id=BU_POW_918_L1_Z008&maj_v=1&min_v=2&nod_id=0000000002&prd_id=PM820MG&frm=pdf&pdf_frm=A4 | Others |
| /39/ | CAM Chile S.A. | Calibration certificate for electricity meter Serial No. 26207716. Certificate No. KD201505000002. Calibration event date: 13/05/2015. | - | Others |
| /40/ | CAM Chile S.A. | Calibration certificate for electricity meter Serial No. 2620541. Certificate No. KD201505000001. Calibration event date: 11/05/2015. | - | Others |
| /41/ | Honeywell Analytics Ltd. | Specification sheet for the C7035A 1031 Ultra-Violet Flame Detector. | Available online: https://customer.honeywell.com/en-US/Pages/Category.aspx?cat=HonECC+Catalog&category=C7035&catpath=1.3.5.2.4 | Others |
| /42/ | TAG Instrumentación y Automatización de Processos Industriales | Calibration certificate for the installed $CH_4/O_2$ content gas analyzer unit with S/N N1-W2-678. Calibration Certificate No. 1102-16. Calibration event date: 19/08/2016. | - | Others |
| /43/ | TAG Instrumentación y Automatización de Processos Industriales | Calibration certificate for the installed $CH_4/O_2$ content gas analyzer unit with S/N N1-W2-678. Calibration Certificate No. 1307-17. Calibration event date: 15/06/2017. | - | Others |
| /44/ | UNFCCC/CDM-EB | "Guideline – Application of materiality in verifications", version 02.0, as per EB82. | Dated 20/02/2015. | Others |
| /45/ | CAM Chile S.A. | Calibration certificate for electricity meter Serial No. PT-1011A447-01. Certificate No. KD201707001. Calibration event date: 06/07/2017. | - | Others |
| /46/ | CAM Chile S.A. | Calibration certificate for electricity meter Serial No. PT-1011A447-01. Certificate No. | - | Others |

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| | | KD201505000002. Calibration event date: 12/05/2015. | | |
| /47/ | Germanischer Lloyd Certification GmbH | CDM Verification and Certification Report for the CDM project activity "Loma Los Colorados Landfill Gas Project". 7th periodic verification (monitoring period from 01/06/2012 to 31/08/2012). GLC Report No. 273 Rev 05. | Dated 23/11/2012. Available online: https://cdm.unfccc.int/Projects/DB/DNV-CUK1166695034.41/iProcess/Germanischer1347886109.23/view | Others |
| /48/ | Germanischer Lloyd Certification GmbH | CDM Verification and Certification Report for the CDM project activity "Loma Los Colorados Landfill Gas Project". 6th periodic verification (monitoring period from 01/05/2011 to 31/05/2012). GLC Report No. 272 Rev 05. | Dated 09/11/2012. Available online: https://cdm.unfccc.int/Projects/DB/DNV-CUK1166695034.41/iProcess/Germanischer1341240392.68/view | Others |
| /49/ | Germanischer Lloyd Certification GmbH | CDM Verification and Certification Report for the CDM project activity "Loma Los Colorados Landfill Gas Project". 5th periodic verification (monitoring period from 01/09/2010 to 30/04/2011). GLC Report No. 149, Rev 05. | Dated 08/11/2012. Available online: https://cdm.unfccc.int/Projects/DB/DNV-CUK1166695034.41/iProcess/Germanischer1307547070.73/view | Others |
| /50/ | Schneider Electric | Technical Specification sheet for the electricity meter ION 8600. | Available online: http://www.schneider-electric.com/products/br/bz/4100-sistema-de-monitoramento-de-energia-potencia/4105-medidores-de-consumo-powerlogic/1462-ion8600/ | Others |
| /51/ | TÜV SÜD Industrie Service GmbH | CDM Verification and Certification Report for the CDM project activity "Loma Los Colorados Landfill Gas Project". 3rd periodic verification (monitoring period from 13/03/2008 to 31/08/2009). Report No. 600500381. | Dated 02/02/2011. Available online: https://cdm.unfccc.int/Projects/DB/DNV-CUK1166695034.41/iProcess/TUEV-SUED1253544672.79/view | Others |
| /52/ | Fluid Components International (FCI) | Technical Specification sheet for the ST98 flow meter. | Available online: http://www.fluidcomponents.com/Industrial/Products/MassFlowMeters/ProdST98.asp | Others |
| /53/ | TÜV SÜD Industrie Service GmbH | CDM Verification and Certification Report for the CDM project activity "Loma Los Colorados Landfill Gas Project". 2nd periodic verification (monitoring period from 18/06/2007 to 12/03/2008). Report No. 1156950, Version 04. | Dated 14/10/2009. Available online: https://cdm.unfccc.int/Projects/DB/DNV-CUK1166695034.41/iProcess/TUEV-SUED1207302127.33/view | Others |

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|---|---|---|---|---|
| /54/ | 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 |
| /55/ | Solid Waste Association of North America (SWANA) | Landfill Gas Collection System Efficiencies (2007). | Report dated 2007. | Others |
| /56/ | 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 |
| /57/ | UNFCCC / CDM-EB | Monitoring Report Form (CDM-MR-FORM). Version 06.0. | Dated 04/05/2015. Available online: https://cdm.unfccc.int/Reference/PDDs_Forms/index.html#proj_cycle | Others |
| /58/ | Gordon J. Van Wylen, Richard E. Sonntag and Borgnakke: | Fundamentals of Classical Thermodynamics; 3rd Edition, John Wiley & Sons, Inc. Table A-4: Saturated Water-Temperature. | Dated 1996. Available online: http://fireflylabs.com/disted/courses/m275-data(all%20years)/SaturatedWaterTables-T&P.pdf | Others |
| /59/ | Siemens AG | Technical Catalogue for the installed $CH_4/O_2$ content gas analyser unit Ultramat 23. | Available online: http://w3.siemens.com/mcms/sensor-systems/en/process-analytics/gas-analyzer-gas-analysis/extractive/ir-active-components/pages/ultramat-23.aspx | Others |
| /60/ | Emerge Ingenieria Ltda. | Declaration documents reporting the outcome of the technical evaluations performed at the Loma los Colorados landfill comparing the management practices at the Loma los Colorados landfill vis-a-vis the previously conceived design of the landfill. | Documents dated, 05/10/2016 (first evaluation), 21/02/2017 (second evaluation) and 05/01/2018 (third evaluation). | Others |
| /61/ | CDEC-SIC | Monthly reports of electricity exported and grid-sourced electricity imported by KDM S.A. (months from January 2017 to December 2017). | - | |
| /62/ | EPIC | Validation Opinion Report for Post-Registration Changes for the CDM project activity Loma los Colorados Landfill Gas Project. Version 02.1 | Dated 14/03/2017. https://cdm.unfccc.int/Projects/DB/DNV-CUK1166695034.41/view . | Others |
| /63/ | KDM S.A. | Project Design Document (PDD) | Dated 14/03/2017. | Project |

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| | | for the 2nd 7-year renewable crediting period for the CDM project activity: "Loma Los Colorados Landfill Gas Project", version 1.5.1. | Available online: https://cdm.unfccc.int/Projects/DB/DNV-CUK1166695034.41/view | Participants |
| /64/ | Germanischer Lloyd Certification GmbH | CDM Verification and Certification Report for the CDM project activity "Loma Los Colorados Landfill Gas Project". 8th periodic verification (monitoring period from 01/09/2012 to 31/31/2012). GLC Report No. 325 Rev 05. | Dated 08/02/2013. Available online: http://cdm.unfccc.int/Projects/DB/DNV-CUK1166695034.41/iProcess/Germanischer1357569512.77/view | Project Participants |
| /65/ | EPIC | CDM Verification and Certification Report for the CDM project activity "Loma Los Colorados Landfill Gas Project". 12th verification (monitoring period from 12/05/2016 to 31/12/2016, version 1.2. | Dated 27/06/2017. Available online: http://cdm.unfccc.int/Projects/DB/DNV-CUK1166695034.41/CP/E7OHFHB23WH3B2I0X0AGJ7MTBQEEP9/iProcess/EPIC_Sust1489993536.62/view | Project Participants |
| /66/ | CAM Chile S.A. | Calibration certificate for electricity meter Serial No. 26207716. Certificate No. KD201707003. Calibration event date: 05/07/2017. | - | Others |
| /67/ | CAM Chile S.A. | Calibration certificate for electricity meter Serial No. 2620541. Certificate No. KD201707007. Calibration event date: 05/07/2017. | - | Others |
| /68/ | CAM Chile S.A. | Calibration certificate for electricity meter Serial No. 26204495. Certificate No. KD201505000003. Calibration event date: 13/05/2015. | - | Others |
| /69/ | CAM Chile S.A. | Calibration certificate for electricity meter Serial No. 26204495. Certificate No. KD201707004. Calibration event date: 25/07/2017. | - | Others |

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

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

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|---|---|---|---|---|
| **FAR ID** | xx | **Section no.** | E.2 | **Date:** DD/MM/YYYY |
| **Description of FAR** | | | | |
| | | | | |
| **Project participant response** | | | | **Date:** DD/MM/YYYY |
| | | | | |
| **Documentation provided by project participant** | | | | |
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| **DOE assessment** | | | | **Date:** DD/MM/YYYY |
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**Table 2. CL from this verification**

| | | | | |
|---|---|---|---|---|
| **CL ID** | xx | **Section no.** | | **Date:** DD/MM/YYYY |
| **Description of CL** | | | | |
| | | | | |
| **Project participant response** | | | | **Date:** DD/MM/YYYY |
| | | | | |
| **Documentation provided by project participant** | | | | |
| | | | | |
| **DOE assessment** | | | | **Date:** DD/MM/YYYY |
| | | | | |

**Table 3. CAR from this verification**

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|---|---|---|---|---|
| **CAR ID** | 1 | **Section no.** | E.6.2. | **Date:** 16/02/2018 |
| **Description of CAR** | | | | |
| Details presented in Section D.2. of the initial version of the Monitoring Report about the LFG flow meters installed and utilized during the considered monitoring are incomplete. | | | | |
| **Project participant response** | | | | **Date:** 18/02/2018 |
| As a response to the raised CAR, further details about the LFG flow meters utilized during the considered monitoring period were included in the revised version of the Monitoring Report. | | | | |
| **Documentation provided by project participant** | | | | |
| No additional documentation was provided. | | | | |
| **DOE assessment** | | | | **Date:** 19/02/2018 |
| The EPIC verification team confirmed that performed related amendments in the Monitoring Report are deemed reasonable, correct and sufficiently address the raised CAR. This CAR is thus successfully closed. | | | | |

**Table 4. CAR from this verification**

| **CAR ID** | 2 | **Section no.** | E.7. | **Date:** 16/02/2018 |
|---|---|---|---|---|
| **Description of CAR** | | | | |
| While relative delays in the performance of calibration events for selected monitoring instruments/equipment occurred vis-à-vis recommended calibration frequencies for these instruments (installed electricity meters used for measuring electricity generated by the backup captive diesel generators and consumed by the project activity and electricity meter used for measuring electricity generated by the project activity and grid electricity consumed by the project activity), no conservative deductions were applied in project emissions calculations for addressing such delays as required by applicable provisions of the CDM-VVS-PA. | | | | |
| **Project participant response** | | | | **Date:** 18/02/2018 |
| As a response to the raised CAR, conservative correction factors were systematically applied in baseline emissions and project emissions calculations for addressing the acknowledged delays in the performance of calibration events for the installed electricity meters. | | | | |
| **Documentation provided by project participant** | | | | |
| No additional documentation was provided. | | | | |
| **DOE assessment** | | | | **Date:** 19/02/2018 |
| It is the opinion of the EPIC verification team performed related corrections in the Monitoring Report are reasonable, correct and sufficiently address the raised CAR. This CAR is closed. | | | | |

**Table 5. CAR from this verification**

| **CAR ID** | 3 | **Section no.** | E.8.1. | **Date:** 16/02/2018 |
|---|---|---|---|---|
| **Description of CAR** | | | | |
| Calculated accumulated values of $F_{CH4,PJ,y}$, $F_{CH4,BL,y}$, $BE_{CH4,y}$, $EC_{BL,y}$, $BE_{EC,y}$ and $BE_y$ as reported in the initial version of the Monitoring Report are not in accordance with emission reductions calculation spreadsheets. | | | | |
| **Project participant response** | | | | **Date:** 18/02/2018 |
| As a response to the raised CAR, the reported calculated values for the parameters $F_{CH4,PJ,y}$, $F_{CH4,BL,y}$, $BE_{CH4,y}$, $EC_{BL,y}$, $BE_{EC,y}$ and $BE_y$ were corrected in the revised version of the Monitoring Report in accordance with the emission reductions calculation spreadsheets. | | | | |
| **Documentation provided by project participant** | | | | |
| No additional documentation was provided. | | | | |
| **DOE assessment** | | | | **Date:** 19/02/2018 |
| The EPIC verification team confirmed that performed related amendments in the Monitoring Report 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.8.2. | **Date:** 16/02/2018 |
|---|---|---|---|---|
| **Description of CAR** | | | | |
| Calculated accumulated values of $EC_{PJ,grid,y}$, $PE_{EC,grid,y}$, $EC_{PJ,captive,y}$, $PE_{EC,captive,y}$ and $PE_y$ as reported in the initial version of the Monitoring Report are not in accordance with emission reductions calculation spreadsheets. | | | | |
| **Project participant response** | | | | **Date:** 18/02/2018 |
| As a response to the raised CAR, the reported calculated values for the parameters $EC_{PJ,grid,y}$, $PE_{EC,grid,y}$, $EC_{PJ,captive,y}$, $PE_{EC,captive,y}$ and $PE_y$ were corrected in the revised version of the Monitoring Report in accordance with the emission reductions calculation spreadsheets. | | | | |
| **Documentation provided by project participant** | | | | |
| No additional documentation was provided. | | | | |
| **DOE assessment** | | | | **Date:** 19/02/2018 |

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| The EPIC verification team confirmed that performed related amendments in the Monitoring Report are deemed reasonable, correct and sufficiently address the raised CAR. This CAR is thus successfully closed. |

**Table 7. CAR from this verification**

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|---|---|---|---|---|
| **CAR ID** | 5 | **Section no.** | E.8.5. | **Date:** 16/02/2018 |
| **Description of CAR** | | | | |
| The initial version of the Monitoring Report wrongly indicates the ex-ante estimation of emission reductions as per the registered PDD for the considered monitoring period (year of 2017). | | | | |
| **Project participant response** | | | | **Date:** 18/02/2018 |
| As a response to the raised CAR, ex-ante estimation of emission reductions for the considered monitoring period encompassing the whole year of 2017 was corrected in the revised version of the Monitoring Report in accordance with latest version of the registered PDD. | | | | |
| **Documentation provided by project participant** | | | | |
| No additional documentation was provided. | | | | |
| **DOE assessment** | | | | **Date:** 19/02/2018 |
| The EPIC verification team confirmed that performed related amendments in the Monitoring Report are deemed reasonable, correct and sufficiently address the raised CAR. This CAR is thus successfully closed. | | | | |

**Table 8. CAR from this verification**

| | | | | |
|---|---|---|---|---|
| **CAR ID** | 6 | **Section no.** | E.1. | **Date:** 16/02/2018 |
| **Description of CAR** | | | | |
| The name of the Chilean electricity dispatch coordinating entity is wrongly indicated in the initial version of the Monitoring Report. | | | | |
| **Project participant response** | | | | **Date:** 18/02/2018 |
| As a response to the raised CAR, the name of the Chilean electricity dispatch coordinating entity was corrected in the revised version of the Monitoring Report. | | | | |
| **Documentation provided by project participant** | | | | |
| No additional documentation was provided. | | | | |
| **DOE assessment** | | | | **Date:** 19/02/2018 |
| The EPIC verification team confirmed that performed related amendments in the Monitoring Report are deemed reasonable, correct and sufficiently address the raised CAR. This CAR is thus successfully closed. | | | | |

**Table 9. FAR from this verification**

| | | | | |
|---|---|---|---|---|
| **FAR ID** | xx | **Section No.** | | **Date:** DD/MM/YYYY |
| **Description of FAR** | | | | |
| | | | | |
| **Project participant response** | | | | **Date:** DD/MM/YYYY |
| | | | | |
| **Documentation provided by project participant** | | | | |
| | | | | |
| **DOE assessment** | | | | **Date:** DD/MM/YYYY |
| | | | | |

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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). |
| 01.0 | 23 March 2015 | Initial publication. |

Decision Class: Regulatory
Document Type: Form
Business Function: Issuance
Keywords: project activities, verifying and certifying