




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

Complete this form in accordance with the instructions attached at the end of this form.

BASIC INFORMATION

Title and UNFCCC reference number of the project activity	LFG flaring project at Dubai, UAE UNFCCC reference number: 8269
Scale of the project activity	<input checked="" type="checkbox"/> Large-scale <input type="checkbox"/> Small-scale
Version number of the verification and certification report	03
Completion date of the verification and certification report	23/09/2019
Monitoring period number and duration of this monitoring period	06; 01/09/2017 to 31/08/2018 (first and last day included)
Version number of the monitoring report to which this report applies	03
Crediting period of the project activity corresponding to this monitoring period	19/11/2012 to 18/11/2019
Project participants	<ul style="list-style-type: none"> • Green Energy Solutions & Sustainability LLC • Dubai Municipality • Ministry of climate & Environment, Norway
Host Party	United Arab Emirates
Applied methodologies and standardized baselines	ACM0001 (Version 12)- Flaring or use of landfill gas
Mandatory sectoral scopes	13
Conditional sectoral scopes, if applicable	-
Estimated amount of GHG emission reductions or GHG removals for this monitoring duration in the registered PDD	244,049
Certified amount of GHG emission reductions or GHG removals for this monitoring period	322,330
Name and UNFCCC reference number of the DOE	E-0052: Carbon Check (India) Private Ltd.
Name, position and signature of the approver of the verification and certification report	Amit Anand, CEO 

SECTION A. Executive summary

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The Project Participants, (Green Energy Solutions & Sustainability LLC has appointed the DOE, Carbon Check (India) Private Ltd. (CCIPL) to perform an independent sixth periodic verification of the CDM Project Activity “LFG flaring project at Dubai, UAE” in UAE (hereafter referred to as “Project Activity”). The project activity involves installation of a landfill gas recovery and closed type flaring system at the Al-Quasis landfill in Dubai, UAE. The project activity has replaced the existing passive venting system of landfill gas pre-project with a closed type of flaring system. The purpose of the project activity is to destroy the methane gas emitted from landfill, by using the closed type flaring system before letting out into the atmosphere. 1 MW LFG based gas engine has also been installed at the project site which is being used to meet the captive power requirement by using part of the LFG.

This report summarises the findings of the verification of the project, performed on the basis of paragraph 62 of the CDM Modalities & Procedures, as well as criteria given to provide for consistent project operations, monitoring and reporting and the subsequent decisions by the CDM Executive Board. Verification is required for all registered CDM project activities intending to confirm their achieved emission reductions and proceed with request for issuance of CERs. This report contains the findings and resolutions from the verification and a certification statement for the certified emission reductions.

Verification is the periodic independent review and ex-post determination of both quantitative and qualitative information by a Designated Operational Entity (DOE) of the monitored reductions in GHG emissions that have occurred as a result of the registered CDM project activity during a defined monitoring period.

Certification is the written assurance by a DOE that, during a specific period, a project activity achieved the emission reductions as verified.

The objective of this verification was to verify and certify emission reductions reported for the “LFG flaring project at Dubai, UAE” in the host country UAE for the period 01/09/2017 to 31/08/2018 (including both the days).

The purpose of verification is to review the monitoring results and verify that the monitoring methodology was implemented according to the monitoring plan and monitoring data and used to confirm the reductions in anthropogenic emissions by sources, is sufficient, definitive and presented in a concise and transparent manner. CCIPL’s objective is to perform a thorough, independent assessment of the registered project activity.

In particular, the monitoring plan, monitoring report and the project’s compliance with relevant UNFCCC and host Party criteria are verified in order to confirm that the component project/s has/have been implemented in accordance with the previously registered project design and conservative assumptions, as documented. It is also confirmed if the monitoring plan is in compliance with the registered PDD and the approved monitoring methodology.

Scope:

The scope of the verification is:

- To verify the project implementation and operation with respect to the registered PDD
- To verify the implemented monitoring plan with the registered PDD or approved revised PDD and applied baseline and monitoring methodology.
- To verify that the actual monitoring systems and procedures are in compliance with the monitoring systems and procedures described in the monitoring plan.
- To evaluate the GHG emission reduction data and express a conclusion with a reasonable level of assurance about whether the reported GHG emission reduction data is free from material misstatement.

- To verify that reported GHG emission data is sufficiently supported by evidence.

The verification shall ensure that the reported emission reductions are complete and accurate in order to be certified.

Verification process:

The verification comprises a review of the monitoring report over the monitoring period from 01/09/2017 to 31/08/2018 and based on the registered PDD in part of the monitoring parameters and monitoring plan, emission reduction calculation spreadsheet, monitoring methodology and all related evidence provided by project participant.

On-site visit and stakeholders' interviews are also performed as part of the verification process.

Conclusion:

The verification team assigned by the DOE concludes that the monitoring report (Version 03 dated 22/09/2019) /2/, meet all relevant requirements of the UNFCCC for CDM project activities including article 12 of the Kyoto Protocol and paragraph 62 of CDM Modalities & Procedures, the modalities and procedures for CDM (Marrakesh Accords) and the subsequent decisions by the COP/MOP and CDM Executive Board. The verification has been conducted in-line with the CDM VVS for project activities, version 02.0 /B01-a/.

The project activity was correctly implemented according to the selected monitoring methodology, monitoring plan and the approved revised PDD /B05/. The monitoring system was installed, maintained in a proper manner, while collected monitoring data allowed for the verification of the amount of achieved GHG emission reductions. Through the review and on site visit the verification team confirms that the project activity has resulted in the 322,330 tCO₂e emission reductions during the sixth monitoring period.

CC IPL as a DOE is therefore pleased to issue a positive verification opinion expressed in the attached Certification statement.

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 / Verifier / Technical Expert / Local Expert	IR	Singh	Vikash Kumar	CC IPL	X	X	X	X

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	Anand	Amit	CC IPL
2.	Approver	IR	Anand	Amit	CC IPL

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

No.	Risk that could lead to material errors, omissions or misstatements	Assessment of the risk		Response to the risk in the verification plan and/or sampling plan
		Risk level	Justification	
1.	Human Error: Recording and reporting of the information in the ER spreadsheet.	Medium	All the ER spreadsheet data of the landfill gas collection and flaring plant are transposed manually from the monitoring database (downloaded from the software in excel sheet). This includes all the parameters to be monitored ex-post as per the approved revised PDD /B05/.	The recording of the ER spreadsheet data of the landfill gas collection and flaring plant is directly linked to the emission reduction calculations. The verification audit plan for the project included checking the following during the on-site visit to mitigate the risk: a. Interview with the personnel recording and reporting the information in the ER spreadsheet. b. Review of the ER spreadsheet. c. Cross-check the data in the ER spreadsheet with the raw data sheet downloaded from the software based monitoring system. Verification team based on the interviews and reviews confirms that the personnel are well familiar with the process of recording and reporting the monitored data in to the ER spreadsheet. Verification team confirms that the human error risk is appropriately mitigated.
2.	Information System: Use of spreadsheets without adequate controls related to data changes/updates, version tracking, traceability, security	Medium	Since the emission reduction calculations are presented in the ER spreadsheet and monitoring database is also reported in a spreadsheet (downloaded from the software based monitoring system), it needs to be checked if appropriate controls have been established. Otherwise, it	The spreadsheets have been used for reporting ER calculations. To check that adequate controls related to data changes/updates, version tracking, traceability security are followed, following details were checked in the documents and during the site visit: a. Interview with the relevant personnel to ensure that

			<p>could lead to material errors, omissions or misstatements.</p>	<p>roles and responsibilities according to section B.7.2 of the PDD /B05/ are being followed.</p> <p>b. Data and information flow procedures to be followed as per PDD and MR.</p> <p>c. Check the established controls on the spreadsheets used.</p> <p>Verification team mitigated the risk by conducting interviews with the personnel responsible for activities as provided in PDD and MR. Site manager is responsible administering the electronic data storage, and data review. Site manager maintains the data changes/updates and a version tracking system is also maintained for the ER spreadsheet. Further, the traceability and security of the spreadsheet is being maintained by keeping a protected copy of the files in the PP's network. The data and information flow requirements are being followed as stated in the registered PDD and the MR. Interviews with the monitoring personnel were conducted to confirm the established procedures. Verification team confirms that the information system risk is appropriately mitigated.</p>
3.	Accuracy of the measuring equipment	Medium	<p>To ensure accuracy in measurements, all the measuring equipment need to be regularly calibrated by an accredited entity.</p>	<p>In order to ensure accuracy in measuring equipment the verification team checked whether calibration of each of the measuring equipment is done at intervals specified in the registered PDD /B05/. The verification team performed the following tasks:</p> <p>a. Review of all the calibration certificates /12/ and taking note of the date of calibration on each one for each specific monitoring equipment.</p> <p>b. Interviewing the relevant</p>

				<p>personnel to ensure the calibration procedures are being followed as per the registered monitoring plan.</p> <p>Verification team based on the interviews and reviews confirms that the personnel are well familiar with the process of calibration of measuring equipment as per the monitoring plan.</p> <p>Verification team confirms that the information system risk is appropriately mitigated.</p>
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C.2. Consideration of materiality in conducting the verification

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The identified threshold for materiality is 1% in accordance with paragraph 329(b) of CDM VVS for project activities, version 02 /B01-a/. At the beginning of the verification the team leader has assessed the nature, complexity of the verification tasks by carrying out a strategic analysis of all activities relevant to the project activity. The team leader has collected and reviewed the information relevant to assess that the designated verification team is sufficiently competent to carry out the verification and to ensure that it is able to conduct the necessary risk analysis. As explained above, the potential sources of error were:

- Human error: This could be on account of erroneous recording and reporting of the information in the ER spread sheet.
- Information System: Use of spreadsheets without adequate controls related to data changes/ updates, version tracking, traceability and security.
- Accuracy of the measuring equipment: The measuring equipment does not provide accurate reading as calibration is not conducted at regularly defined intervals as per the PDD.

The verification team performed the following checks in order to mitigate the effects of the above-identified sources of error:

- Mitigation of Human error risks: The verification team mitigated the risk by checking the training records /11/ of the personnel during the on-site visit. These records have been provided to the verification team by the PP. Further, data was crosschecked with the ER calculation spreadsheet /4/ and the raw data spread sheet (downloaded from the software based monitoring system) /14/. Verification team, based on the above, confirms that the risk is appropriately mitigated.
- Mitigation due to error in Information system: Validation team by conducting interviews with the personnel responsible for such activities mitigated the risk due to error in information system. Further, the traceability and security of the spreadsheet is being maintained by keeping a protected copy of the files in the PP’s network. The data and information flow requirements are being followed as stated in the PDD and the MR. Interviews with the monitoring personnel were conducted to confirm the established procedures. Verification team confirms that the information system risk is appropriately mitigated.

Accuracy of the measuring equipment: The risk due to inaccuracy in measurements will be assessed by reviewing calibration certificates of all the project measuring equipment. The verification team will review the dates of calibration and to check whether all equipment are being calibrated at regularly defined intervals as per the registered PDD /B05/.

SECTION D. Means of verification

D.1. Desk/document review

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The verification was performed primarily based on the review of the Monitoring report /1/ and the supporting documentation. This process included review of data and information presented to verify their completeness and review of the monitoring plan and monitoring methodology. Documents reviewed or referenced during the verification are listed in Appendix 3 below.

D.2. On-site inspection

Duration of on-site inspection: 20/05/2019 to 21/05/2019				
No.	Activity performed on-site	Site location	Date	Team member
1.	An assessment of the implementation and operation of the registered project activity as per the registered PDD	Al Quasis Landfill, Dubai, UAE	20/05/2019 to 21/05/2019	Vikash Kumar Singh
2.	A review of information flows for generating, aggregating and reporting the monitoring parameters	Al Quasis Landfill, Dubai, UAE	20/05/2019 to 21/05/2019	Vikash Kumar Singh
3.	Interviews with relevant personnel to determine whether the operational and data collection procedures are implemented in accordance with the monitoring plan in the PDD	Al Quasis Landfill, Dubai, UAE	20/05/2019 to 21/05/2019	Vikash Kumar Singh
4.	A cross check between information provided in the monitoring report and data from other sources such as plant logbooks, inventories, purchase records or similar data sources	Al Quasis Landfill, Dubai, UAE	20/05/2019 to 21/05/2019	Vikash Kumar Singh
5.	A check of the monitoring equipment including calibration performance and observations of monitoring practices against the requirements of the PDD and the selected methodology and corresponding tool(s), where applicable	Al Quasis Landfill, Dubai, UAE	20/05/2019 to 21/05/2019	Vikash Kumar Singh
6.	A review of calculations and assumptions made in determining the GHG data and emission reductions	Al Quasis Landfill, Dubai, UAE	20/05/2019 to 21/05/2019	Vikash Kumar Singh
7.	An identification of quality control and quality assurance procedures in place to prevent or identify and correct any errors or omissions in the reported monitoring parameters	Al Quasis Landfill, Dubai, UAE	20/05/2019 to 21/05/2019	Vikash Kumar Singh

D.3. Interviews

No.	Interviewee			Date	Subject	Team member
	Last name	First name	Affiliation			
1.	Biswas	Subhendu	GSS	20/05/2019 to 21/05/2019	Project implementation and operation, monitoring procedure, data and information flow, CER calculation and completeness of monitoring report, QA/QC Procedures, Quality Assurance – Management and operating system	Vikash Kumar Singh
2.	Nouri	Zachary	GESS	20/05/2019 to 21/05/2019	Project implementation and operation,	Vikash Kumar Singh

					monitoring procedure, data and information flow	
4.	Gebor	Nickolas	GESS	20/05/2019 to 21/05/2019	Project implementation and operation, monitoring procedure, data and information flow	Vikash Kumar Singh
5.	Kumar	Nirmal	GESS	20/05/2019 to 21/05/2019	Project operation, monitoring procedure, data and information flow	Vikash Kumar Singh

D.4. Sampling approach

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Not applicable

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

Areas of verification findings	No. of CL	No. of CAR	No. of FAR
Compliance of the monitoring report with the monitoring report form	-	01	-
Compliance of the project implementation and operation with the registered PDD	02	-	-
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	04	-	-
Compliance with the calibration frequency requirements for measuring instruments	-	-	-
Assessment of data and calculation of emission reductions or net removals	-	01	-
Assessment of reported sustainable development co-benefits	-	-	-
Global stakeholder consultation	-	-	-
Others (please specify)	-	-	-
Total	06	02	-

SECTION E. Verification findings

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

Means of verification	Document Review, Interview
Findings	CAR 01 had been raised and resolved. Please refer to Appendix 4 for further details.
Conclusion	The verification team has determined whether the monitoring report was completed using the valid version of the applicable monitoring report form /B03/. The verification team has checked whether all the sections of the monitoring report follow the guidelines provided in the template and instruction text requirement. Verification team confirms that the latest available version of monitoring report

	<p>template /B03/ has been used by the PP and the MR /02/ is in compliance of the monitoring report form and instructions therein.</p> <p>CCIPL, had made the version 01, dated 22/04/2019 of the Monitoring report /01/, covering the monitoring period from 01/09/2017 to 31/08/2018 (both days inclusive) publicly available on 29/04/2019 through its dedicated interface on the UNFCCC website /B05/.</p> <p>This confirms compliance with the §352 and §353 of CDM VVS for project activities, version 02.0 /B01-a/.</p>
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E.2. Remaining forward action requests from validation and/or previous verifications

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This is the 6th periodic verification of the project activity. There is no forward action request from validation or the previous verification. Please refer to Table 1 in Appendix 4 below for further details.

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

Means of verification	Document Review, Interview
Findings	CL 01 and CL 02 had been raised and resolved. Please refer to Appendix 4 for further details.
Conclusion	<p>CCIPL by means of an on-site inspection and document review, assessed that all the features (technology, project equipment and monitoring) of the PDD /B05a/ are in place and that the project participants have operated the project as per the PDD /B05a/.</p> <p>The CDM project activity involves collection of landfill gas (LFG) emanating from the anaerobic digestion of solid waste at the landfill site and further destroying it through the process of flaring. Comprising of two closed type flare units, the project activity replaces the existing practice of passive venting of LFG. 1 MW LFG based gas engine has also been installed at the project site which is being used to meet the captive power requirement by using part of the LFG since January 2013. The verification team confirms that the 1 MW LFG gas engine was operational during the monitoring period. The project activity is located at Al Qusais Landfill site in Dubai and has been commissioned by Hofstetter Umwelttechnik AG on 18/11/2012 /5/.</p> <p>The LFG is captured and transported through a gas collection network consisting of combination of horizontal and vertical pipes (total 120 in number), which delivers the gas to the extraction plants and the flare units through the help of two blowers. In order to effectively draw the gas from the vertical wells and to further deliver it to the flare units, the system operating pressure is kept marginally lower than the atmospheric pressure. The process of flaring involves burning of the methane gas in LFG, which produces CO₂ (having lower global warming potential) and thus reduces the global warming impact on the atmosphere.</p> <p>It was confirmed during OSV that the project involves collection, destruction and utilization of LFG released from the collection wells at the landfills. The monitoring system includes flow measurement, gas analysing, and temperature measurement devices, as well as a centralized controlling unit. The data from these monitoring instruments is transferred to software based monitoring system. The raw consolidated data /14/ from the monitoring system is generated in the form of excel sheet. The values from these excel sheets are used for calculation of emission reductions. The online software based monitoring system has been checked and confirmed by the verification team during the on-site visit.</p> <p>The verification team confirms that the LFG flared in the two trains is destroyed in flare and monitored separately. This monitored and reported LFG does not contain</p>

the LFG used in the 1 MW gas engine (as clarified in Annex 2 of this report below). No claims are made on the amount of LFG used for onsite power generation. Hence the LFG which is flared is monitored separately by dedicated flow meters and does not include the LFG which is sent for power generation. Verification team confirms this on review of the block diagram provided in section B.1 of the MR /2/ and cross-check during the on-site visit.

The project activity complies with all the national statutory requirements /7/, /8/, /9/.

The verified timeline of the project’s implementation is as follows:

Milestone of the project activity	Timeline	Assessment by the verification team
Starting date of operation	18/11/2012	The starting date of operation of the project activity is the date of commissioning. This was verified after reviewing the commissioning certificate issued by Hofstetter Umwelttechnik AG /5/.
Registration of the project activity	19/11/2012	Verified from UNFCCC website /B06/.
Crediting period		
1 st monitoring period	19/11/2012 to 15/01/2013	Verified from UNFCCC website /B06/.
2 nd monitoring period	16/01/2013 to 31/05/2015	Verification not concluded
3 rd monitoring period	01/06/2015 to 31/12/2015	Verified from UNFCCC website /B06/.
4 th monitoring period	01/01/2016 to 31/08/2016	Verified from UNFCCC website /B06/.
5 th monitoring period	01/09/2016 to 31/08/2017	Verified from UNFCCC website /B06/.

CC IPL’s verification team considers the project description to be complete and accurate.

CC IPL’s verification team confirms that the project activity is implemented within the boundary of the project activity as described in the PDD /B05/ and the implementation and operation of the project activity has been conducted in accordance with the description contained in the PDD /B04/.

In summary, the monitoring period is reasonable, and the operation of the project activity is in accordance with the registered PDD /B04/.

There were no changes observed during OSV from the technology stated during the validation and earlier verification.

CC IPL’s verification team considers the project description to be complete and accurate. The verification team took cognizance of §338 (b)(i), §354, §355 and §356 of CDM VVS for project activities, version 02 /B01-a/.

E.4. Post-registration changes

E.4.1. Temporary deviations from the registered monitoring plan, applied methodologies, standardized baselines or other methodological regulatory documents¹

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

Not applicable

E.4.2. Corrections

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Not applicable

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

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Not applicable

E.4.4. Inclusion of a monitoring plan

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Not applicable

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

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Not applicable

E.4.6. Changes to the project design

>> Post registration changes due to project design change for the project activity was approved on 29/09/2016 by UNFCCC² with the revised PDD (Version 8, 18/07/2016) and the corresponding validation opinion (Version 02, 23/08/2016).

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

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Not applicable

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

Means of verification	Document Review, Interview
Findings	-
Conclusion	<p>The verification team is able to confirm that the monitoring plan contained in the MR /02/ is in accordance with the monitoring plan contained in the registered PDD /B05a/ and the approved methodology applied by the project activity, i.e. ACM 0001, version 12 /B02/. The calculation of emissions has been done in accordance with the formulae and methods described in monitoring plan and the applied methodology. The required information provided in the monitoring report has been cross-checked against the data provided in the ER sheet, monitoring database and the PP and the observations during OSV.</p> <p>The verification team took cognizance of §357, 358 and §359 of CDM VVS for project activities, version 02 /B01-a/.</p>

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	Document Review, Interview
Findings	CL 03 had been raised and resolved. Please refer to Appendix 4 for further details.
Conclusion	Verification team confirms that the data and parameters fixed ex ante are in compliance with the registered PDD and monitoring plan /B05a/. Please refer to the Annex 1 for assessment of each parameter.

² <http://cdm.unfccc.int/Projects/DB/SGS-UKL1353081555.78/view>

	The verification team took cognizance of §357 of CDM VVS for project activities, version 02 /B01-a/.
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E.6.2. Data and parameters monitored

Means of verification	Document Review, Interview
Findings	CL 04, CL 05 and CL 06 had been raised and resolved. Please refer to Appendix 4 for further details.
Conclusion	<p>The verification team confirms that the data and parameters monitored are in compliance with the registered PDD and the monitoring plan /B05a/.</p> <p>It is confirmed that the verification team assessed the data / information flow from the point of monitoring to emission reduction calculation and found no gap in the same.</p> <p>Detailed assessment of each parameter has been provided in Annex 2.</p> <p>The verification team took cognizance of §360, §361 and 364 of CDM VVS for project activities, version 02 /B01-a/.</p>

E.6.3. Implementation of sampling plan

Means of verification	Not applicable
Findings	-
Conclusion	Not applicable

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

Means of verification	Document Review, Interview
Findings	CL 04 and CL 05 had been raised and resolved. Please refer to Appendix 4 for further details.
Conclusion	<p>The verification team confirms that all the monitoring equipment have been installed in the project activity as per the registered monitoring plan.</p> <p>In summary, the verification team is able to verify that the accuracy of the monitoring equipment were set according to the registered monitoring plan and relevant ISO/IEC 17025:2005 standard or ISO 9001:2008 standard. Furthermore, the verification team confirms all calibration procedures were carried at the frequency as specified by the methodology, monitoring plan of the PDD /B05a/ and aligned with the manufacturer specifications. Therefore, the accuracy of the monitoring equipment is assured.</p> <p>The verification team took cognizance of §365 of CDM VVS for project activities, version 02 /B01-a/.</p>

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

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

Means of verification	Document Review, Interview
Findings	CAR 02 had been raised and resolved. Please refer to Appendix 4 for further details.
Conclusion	<p>The equations for baseline emissions, as provided in the monitoring report /2/ and confirmed with the PDD /B05a/, the methodology ACM0001 (version 12) /B02/ and supporting tools are:</p> $BE_y = BE_{CH_4,y} + BE_{EC,y} + BE_{HG,y} + BE_{NG,y} \quad (1)$ <p>Where:</p> <p>BE_y= Baseline emissions in year y (t CO₂e/y)</p>

$BE_{CH_4,y}$ = Baseline emissions of methane from the SWDS in year y (t CO₂e/y)
 $BE_{EC,y}$ = Baseline emissions associated with electricity generation in year y (t CO₂e/y)
 $BE_{HG,y}$ = Baseline emissions associated with heat generation in year y (t CO₂e/y)
 $BE_{NG,y}$ = Baseline emissions associated with natural gas use in year y (tCO₂e/y)

Step A: Baseline emissions of methane from the SWDS ($BE_{CH_4,y}$)

The baseline emissions due to generation of methane from SWDS is calculated using equation (2) of the applied methodology, which is given as:

$$BE_{CH_4,y} = ((1 - OX_{top_layer}) \times F_{CH_4,PJ,y} - F_{CH,BL,y}) \times GWP_{CH_4} \quad (2)$$

Where:

$BE_{CH_4,y}$ = Baseline emissions of methane from the SWDS in year y (t CO₂e/y)
 OX_{top_layer} = Fraction of methane in the LFG that would be oxidized in the top layer of the SWDS in the baseline (dimensionless)
 $F_{CH_4,PJ,y}$ = Amount of methane in the LFG which is flared and/or used in the project activity in year y (t CH₄/y)
 $F_{CH,BL,y}$ = Amount of methane in the LFG that would be flared in the baseline in year y (t CH₄/y)
 GWP_{CH_4} = Global warming potential of CH₄ (t CO₂e/t CH₄)

Step A.1: Amount of methane in the LFG which is flared and/or used in the project activity in year y (t CH₄/y)

$$F_{CH_4,PJ,y} = F_{CH_4,Flared,y} + F_{CH_4,EL,y} + F_{CH_4,HG,y} + F_{CH_4,NG,y} \quad (3)$$

Where:

$F_{CH_4,Flared,y}$ = Amount of methane in the LFG which is destroyed by flaring in year y (t CH₄)
 $F_{CH_4,EL,y}$ = Amount of methane in the LFG which is used for electricity generation in year y (t CH₄)
 $F_{CH_4,HG,y}$ = Amount of methane in the LFG which is used for heat generation in year y (t CH₄)
 $F_{CH_4,NG,y}$ = Amount of methane in the LFG which is sent to natural gas distribution network in year y (t CH₄)

Amount of methane in the LFG which is flared and/or used in the project activity in year y (t CH₄/y)

$$F_{CH_4,Flared,y} = F_{CH_4,sent_flared,y} - (PE_{flare,y} / GWP_{CH_4}) \quad (4)$$

Where:

$F_{CH_4,sent_flared,y}$ = Amount of methane in the LFG which is sent to the flare in year y (t CH₄)
 $PE_{flare,y}$ = Project emissions from flaring the residual gas stream in year y (t CO₂e/y)

Mass flow of greenhouse gas I in the gaseous stream per hour $F_{i,t}$

$$F_{i,t} = V_{t,wb,n} \times v_{i,t,wb} \times \rho_{i,n} \quad (5)$$

With

$$\rho_{i,n} = (P_n \times MM_i) / (R_u \times T_n) \quad (6)$$

Where:

$V_{t,wb,n}$ = Volumetric flow of the gaseous stream in time interval t on a dry basis (m³ dry gas/h)

$v_{i,t,wb}$ = Volumetric fraction of greenhouse gas I in the gaseous stream in a time interval t on a dry basis (m³ gas i/m³ dry gas)

$\rho_{i,n}$ = Density of greenhouse gas I in the gaseous stream in time interval t (kg gas i/m³ gas i)

P_n = Absolute pressure of the gaseous stream in time interval t (Pa)

MM_i = Molecular mass of greenhouse gas i (kg/kmol)

R_u = Universal ideal gases constant (Pa.m³ /kmol.K)

T_n = Temperature of the gaseous stream in time interval t (K)

Volumetric flow of gaseous stream/hour on a wet basis at normal conditions

$$V_{t,wb,n} = V_{t,wb} \times [(T_n / T_t) \times (P_n / P_t)] \quad (7)$$

Where:

$V_{t,wb}$ = Volumetric flow of the gaseous stream per hour on a wet basis (m³ wet gas/h)

T_t = Temperature of the gaseous stream in time interval t (K)

P_t = Pressure of the gaseous stream in time interval t (Pa)

Step 1: Determination of the mass flow rate of the residual gas that is flared

$$FM_{RG,h} = \rho_{RG,n,h} \times FV_{RG,h} \quad (8)$$

Where:

$FM_{RG,h}$ = Mass flow rate of the residual gas in hour h (Kg/h)

$\rho_{RG,n,h}$ = Density of the residual gas at normal conditions in hour h (Kg/Nm³)

$FV_{RG,h}$ = Volumetric flow rate of the residual in dry basis at normal conditions in the hour h (Nm³/h)

With

$$\rho_{RG,n,h} = P_n / (R_u / MM_{RG,h}) \times T_n \quad (9)$$

Where:

$MM_{RG,h}$ = Molecular mass of the residual gas in hour h (Kg/kmol)

Molecular mass of the residual gas in hour h

$$MM_{RG,h} = \sum (fv_{i,h} \times MM_i) \quad (10)$$

Where:

$fv_{i,h}$ = Volumetric fraction of component I in the residual gas in the hour h

Step 2: Determination of the mass fraction of carbon, hydrogen, oxygen and nitrogen in the residual gas

$$f_{mj,h} = \sum_I fv_{i,h} \times AM_j \times NA_{j,i} / MM_{RG,h} \quad (11)$$

Where:

$f_{mj,h}$ = Mass fraction of element j in the residual gas in hour h

AM_j = Atomic mass of element j (kg/kmol)

$NA_{j,i}$ = Number of atoms of element j in component i

j = The elements carbon, hydrogen, oxygen and nitrogen

I = The components CH₄, CO, CO₂, O₂, H₂, N₂

Step 3: Determination of the volumetric flow rate of the exhaust gas on a dry basis

$$TV_{n,FG,h} = V_{n,FG,h} \times FM_{RG,h} \quad (12)$$

Where:

$TV_{n,FG,h}$ = Volumetric flow rate of the exhaust gas on a dry basis at normal conditions in hour h (Nm³/hour)

$V_{n,FG,h}$ = Volume of the exhaust gas of the flare in dry basis at normal conditions per kg of residual gas in hour h (Nm³/kg residual gas)

Volume of the exhaust gas of the flare in dry basis at normal conditions per kg of residual gas in hour h

$$V_{n,FG,h} = V_{n,CO_2,h} + V_{n,O_2,h} + V_{n,N_2,h} \quad (13)$$

Where:

$V_{n,CO_2,h}$ = Quantity of CO₂ volume free in the exhaust gas of the flare at normal conditions per kg of residual gas in the hour h (Nm³/kg residual gas)

$V_{n,O_2,h}$ = Quantity of O₂ volume free in the exhaust gas of the flare at normal conditions per kg of residual gas in the hour h (Nm³/kg residual gas)

$V_{n,N_2,h}$ = Quantity of N₂ volume free in the exhaust gas of the flare at normal conditions per kg of residual gas in the hour h (Nm³/kg residual gas)

Quantity of O₂ volume free in the exhaust gas of the flare at normal conditions per kg of residual gas in the hour h

$$V_{n,O_2,h} = n_{O_2,h} \times MV_n \quad (14)$$

Where:

$n_{O_2,h}$ = Quantity of moles of O₂ in the exhaust gas of the flare per kg residual gas

flared in hour h

MV_n = Volume of one mole of any ideal gas at normal temperature and pressure (Nm³/kmol)

Quantity of N₂ volume free in the exhaust gas of the flare at normal conditions per kg of residual gas in the hour h

$$V_{n,N_2,h} = MV_n \times \{fm_{N,h}/200AM_N + (1 - MF_{O_2} / MF_{O_2}) \times [F_h + n_{O_2}]\} \quad (15)$$

Where:

$fm_{N,h}$ = Mass fraction of nitrogen in the residual gas in the hour h

AM_N = Atomic mass of nitrogen (kg/mol)

MF_{O_2} = O₂ volumetric fraction of air

n_{O_2} = Quantity of moles of O₂ in the exhaust gas of the flare per kg residual gas flared in hour h (kmol/kg residual gas)

F_h = Stoichiometric quantity of moles of O₂ required for a complete oxidation of one kg residual gas in hour h (kmol/kg residual gas)

Quantity of CO₂ volume free in the exhaust gas of the flare at normal conditions per kg of residual gas in the hour h

$$V_{n,CO_2,h} = (fm_{C,h} / AM_C) \times MV_n \quad (16)$$

Where:

$fm_{C,h}$ = Mass fraction of carbon in the residual gas in the hour h

AM_C = Atomic mass of carbon (kg/kmol)

Quantity of moles of O₂ in the exhaust gas of the flare per kg residual gas flared in hour h

$$n_{O_2,h} = t_{O_2,h} / (1 - (t_{O_2} / MF_{O_2})) \times [(fm_{C,h} / AM_C) + (fm_{N,h} / 2AM_N) + ((1 - MF_{O_2}) / MF_{O_2}) \times F_h] \quad (17)$$

Where:

$t_{O_2,h}$ = Volumetric fraction of O₂ in the exhaust gas I the hour h

Stoichiometric quantity of moles of O₂ required for a complete oxidation of one kg residual gas in hour h

$$F_h = (fm_{C,h} / AM_C) + (fm_{H,h} / 4AM_H) - (fm_{O,h} / 4AM_O) \quad (18)$$

Where:

$fm_{H,h}$ = Mass fraction of Hydrogen in the residual gas in hour h

AM_H = Atomic mass of Hydrogen (kg/kmol)

AM_O = Atomic mass of Oxygen (kg/kmol)

$fm_{O,h}$ = Mass fraction of oxygen in the residual gas in the hour h

Step 4: Determination of methane mass flow rate in the exhaust gas on a dry basis

$$TM_{FG,h} = (TV_{n,FG,h} \times fv_{CH_4,FG,h}) / 1000000 \quad (19)$$

Where:

$TM_{FG,h}$ = Mass flow rate of methane in exhaust gas of the flare in dry basis at normal conditions in the hour h (Kg/hour)

$fv_{CH_4,FG,h}$ = Concentration of methane in the exhaust gas of the flare in dry basis at normal conditions in hour h (Mg/Nm³)

Step 5: Determination of methane mass flow rate in the residual gas on a dry basis

$$TM_{RG,h} = FV_{RG,h} \times fv_{CH_4,FG,h} \times \rho_{CH_4,n} \quad (20)$$

Where:

$TM_{RG,h}$ = Mass flow rate of methane in residual gas in the hour h (kg/hour)

$fv_{CH_4,FG,h}$ = Volumetric fraction of methane in the residual gas in hour h

$\rho_{CH_4,n}$ = Density of methane at normal conditions (kg/Nm³)

Step 6: Determination of the hourly flare efficiency

As per the tool, the flare efficiency in the hour h ($\eta_{flare,h}$) is:

- 0% if the temperature in the exhaust gas of the flare (T_{flare}) is below 500°C for more than 20 minutes during hour h
- determined as follows in cases where the temperature of the exhaust gas of the flare (T_{flare}) is above 500 °C for more than 40 minutes during the hour h :

$$\eta_{flare,h} = 1 - (TM_{FG,h} / TM_{RG,h}) \quad (21)$$

Where:

$\eta_{flare,h}$ = Flare efficiency in hour h (%)

$TM_{RG,h}$ = Mass flow rate of methane in the residual gas in the hour h

$TM_{FG,h}$ = Mass flow rate of methane in the exhaust gas of the flare in dry basis

Step 7: Annual Project Emissions from flaring

$$PE_{flare,y} = \sum TM_{RG,h} \times (1 - \eta_{flare,h}) \times (GWP_{CH_4}/1000) \quad (22)$$

Where:

$PE_{flare,y}$ = Project emissions from flaring of the residual gas stream in the year y (t CO₂e)

From the above equations and parameter values, the total baseline emissions for the monitoring period are:

$$BE_y = BE_{CH_4,y} = 327,034 \text{ tCO}_2\text{e}$$

The verification took cognizance of § 372 of CDM VVS for project activities, version 02.0) /B01-a/.

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

Means of verification	Document Review, Interview
Findings	CAR 02 had been raised and resolved. Please refer to Appendix 4 for further details.
Conclusion	<p>The equations for project emissions, as provided in the monitoring report /2/ and confirmed with the PDD /B05a/, the methodology ACM0001 (version 12) /B02/ and supporting tools are:</p> $PE_y = PE_{EC,y} + PE_{FC,y} \quad (23)$ <p>Where:</p> <p>PE_y = Project emissions in year y (t CO₂e) $PE_{EC,y}$ = Emissions from consumption of electricity due to the project activity in year y (t CO₂e) $PE_{FC,y}$ = Emission from consumption of fossil fuels due to the project activity, for purpose other than electricity generation, in year y (t CO₂e)</p> <p>With:</p> $PE_{EC,y} = \sum EC_{PJ,j,y} \times I_{j,y} \times (1 + TDL_{j,y}) \quad (24)$ <p>And</p> $PE_{FC,y} = 0$ <p>Where:</p> <p>$EC_{PJ,j,y}$ = Quantity of electricity consumed by the project electricity consumption source j in year y (MWh) $I_{j,y}$ = Emission factor for electricity generation for source j in year y (t CO₂e/MWh) $TDL_{j,y}$ = Average technical transmission and distribution losses for providing electricity to source j in year y j = Sources of electricity consumption in the project</p> <p>From the above equations and parameter values, the total project emissions are</p> $PE_y = 4,704 \text{ t CO}_2\text{e}$ <p>The verification took cognizance of § 372 of CDM VVS for project activities, version 02.0) /B01-a/.</p>

E.8.3. Calculation of leakage GHG emissions

Means of verification	Document Review, Interview
Findings	-
Conclusion	As per the applied methodology ACM0001 (version 12) /B02/ no leakage effects are accounted for. Thus, there will no leakage emissions from the project activity.

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

Means of verification	Document Review, Interview
Findings	-
Conclusion	According to the applied methodology, the emission reductions are calculated as:

	$ER_y = BE_y - PE_y \quad (25)$ <p>Where:</p> <p>ER_y = Emission reductions in year y (t CO₂e/y)</p> <p>From the above calculated value of BE_y and PE_y, the total emission reductions are</p> <p>$ER_y = 322,330 \text{ tCO}_2\text{e}$</p> <p>The verification team confirms that all parameters are used correctly in the calculations, all results are verifiable and transparent, all assumptions are described and based on verifiable evidence and calculations are done in accordance with the pre-defined formulae from PDD /B05a/. The total number of CERs achieved during the monitoring period is 322,330 tCO₂e.</p>
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E.8.5. Comparison of actual GHG emission reductions or net anthropogenic GHG removals by sinks with estimates in registered PDD

Means of verification	Document Review, Interview
Findings	CAR 02 had been raised and resolved. Please refer to Appendix 4 for further details.
Conclusion	<p>The ex-ante estimate value of the emission reductions for the monitoring period as per the PDD /B05a/ is 244,049 tCO₂e and the actual emission reductions achieved for the monitoring period is 322,330 tCO₂e. The actual emission reductions are around 32% higher than the estimate of the PDD /B05a/ for the current monitoring period. The verification team noted the explanation provided by the PP for this increase is mainly due to the change in GWP of methane from 21 to 25 during the monitoring period. Also, it is noted that in the registered PDD /05a/, the estimated emission reductions were based on the assumptions that the waste dumping at the landfill site would stop by 2013. But it is seen that the waste dumping is still continuing at the project site which was confirmed during the on-site visit by the verification team. This is deemed acceptable.</p> <p>The verification team took cognizance of §372 of CDM VVS for project activities, version 01 /B01-a/.</p>

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

Means of verification	Document Review, Interview
Findings	CAR 02 had been raised and resolved. Please refer to Appendix 4 for further details.
Conclusion	<p>The actual emission reductions are around 32% higher than the estimate of the PDD /B05a/ for the current monitoring period. The verification team noted the explanation provided by the PP for this increase is mainly due to the change in GWP of methane from 21 to 25 during the monitoring period. Also it is noted that in the registered PDD /05a/, the estimated emission reductions were based on the assumptions that the waste dumping at the landfill site would stop by 2013. But it is seen that the waste dumping is still continuing at the project site which was confirmed during the on-site visit by the verification team. This is deemed acceptable.</p>

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

Means of verification	Document Review, Interview
Findings	-
Conclusion	<p>CERs achieved upto 31st Dec 2012 = 0 tCO₂e. CERs achieved from 1st Jan 2013 = 322,330 tCO₂e</p>

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

Means of verification	Not applicable
Findings	-
Conclusion	Not applicable

E.10. Global stakeholder consultation

Means of verification	Not applicable (this is not first MP)
Findings	-
Conclusion	Not applicable (this is not first MP)

SECTION F. Internal quality control

>>

The final verification report passed a technical review before being submitted to the UNFCCC Executive Board. The technical review is performed by a technical reviewer qualified in accordance with CCIPL's qualification scheme for CDM validation and verification.

SECTION G. Verification opinion

>>

Carbon Check (India) Private Ltd. (CCIPL) has performed the sixth periodic verification of the registered CDM Project Activity "LFG flaring project in Dubai, UAE" having UNFCCC reference number as 8269.

The verification team assigned by the DOE concludes that the project activity as described in the approved revised PDD (Version 8, date 18/07/2016) /B05a/ and the Monitoring report (version 03, dated 22/09/2019) /2/, meets all relevant requirements of the UNFCCC for CDM project activities including article 12 of the Kyoto Protocol and paragraph 62 of CDM Modalities & Procedures, the modalities and procedures for CDM (Marrakesh Accords) and the subsequent decisions by the COP/MOP and CDM Executive Board. The verification has been conducted in-line with the CDM VVS requirements for project activities, version 02.0 /B01-a/.

Verification methodology and process

The Verification team confirms the contractual relationship signed on 15/04/2019 between the DOE, Carbon Check (India) Private Ltd. and the Project Participant, GESS. The team assigned to the verification meets the CCIPL's internal procedures including the UNFCCC requirements for the team composition and competence. The verification team has conducted a thorough contract review as per UNFCCC and CCIPL's procedures and requirements.

The verification has been performed as per the requirements described in the CDM VVS for project activities, version 02.0 and constitutes the review and completion of the following steps:

- Reviewing the approved revised PDD (Version 8 dated 18/07/2016) /B05a/, including the monitoring plan and the corresponding validation report;
- Publication of the MR (Version 01 dated 22/04/2019) /1/ on the UNFCCC website /B06/ on 29/04/2019);
- Desk review of the validation report /B05a/, MR /1/ /2/ and other relevant documents including documents related to the project activities in emission reductions;
- Review of the applied monitoring methodology (ACM0001, Version 12) /B02/;
- Review of any CMP and EB decisions, clarifications and guidance;
- On-site assessment (20/05/2019 and 21/05/2019)
- Resolution of CARs and CLs raised during verification
- Issuance of Verification Report

The project activity was correctly implemented according to selected monitoring methodology, monitoring plan and the registered PDD. The monitoring system was installed, maintained in a

proper manner, while collected monitoring data allowed for the verification of the amount of achieved GHG emission reductions. Through the review and on-site visit, the verification team confirms that the project activity has resulted in the 322,330 tCO₂e emission reductions during the second monitoring period.

The break-up of emission reduction up-to 31/12/2012 and 01/01/2013 onwards as verified during the course of verification are as below:

Item	Emission reductions up to 31 December 2012	Emission reductions from 1 January 2013 onwards
Emission reductions (t CO₂e)	0	322,330

CC IPL as a DOE is therefore pleased to issue a positive verification opinion expressed in the attached Certification statement.

SECTION H. Certification statement

>>

Carbon Check (India) Private Ltd., the DOE, has performed the verification of the registered project activity “LFG flaring project at Dubai, UAE” having UNFCCC Registration Number 8269. The project activity involves collection of landfill gas (LFG) emanating from the anaerobic digestion of solid waste at the landfill site and further destroying it through the process of flaring. Comprising of two closed type flare units the project activity replaces the existing practice of passive venting of LFG.

The project activity is designed to generate emission reductions by installation of LFG capture and flaring system at Al Qusais Landfill site in Dubai, UAE. The PP is responsible for collection of data in accordance with the monitoring plan and the reporting of GHG emission reductions. It is DOE’s responsibility to express an independent verification statement on the reported GHG emission reductions from the project activity. The DOE does not express any opinion on the selected baseline scenario or on the validated and registered PDD. The verification is carried out in-line with the requirements of CDM VVS for project activities, version 02.0 .

The verification was performed to identify the compliance with implementation and monitoring requirements, and to verify the actual amount of achieved emission reductions, through obtaining evidence and information on-site that included i) checking whether the provisions of the monitoring methodology and the monitoring plan were consistently and appropriately applied and ii) the collection of evidence supporting the reported data.

- Revised and approved PDD (Version 8 dated 18/07/2016) and the corresponding validation report;
- Approved monitoring methodology ACM0001 “Flaring or use of Landfill gas”, Version 12;
- Monitoring reports versions 01, 02 and 03 dated 22/04/2019, 28/08/2019 and 22/09/2019 respectively.

This statement covers verification period from 01/09/2017 and 31/08/2018 (including both the dates).

The DOE has raised 06 clarifications and 02 corrective action requests, all of which have been resolved by the PP.

The DOE considers necessary to give reasonable assurance that reported GHG emission reductions were calculated correctly on the basis of the approved baseline and monitoring methodology and the monitoring plan contained in the registered PDD are fairly stated.

The DOE, hereby certifies that the project activity, achieved emission reductions by sources of GHG equal to 322,330 tCO₂ equivalent and all monitoring requirements have been fulfilled and is substantiated by an audit trail that contains evidence and records. The break-up of emission reduction up-to 31/12/2012 and 01/01/2013 onwards as verified during the course of verification are as below:

Item	Emission reductions up to 31 December 2012	Emission reductions from 1 January 2013 onwards
Emission reductions (t CO₂e)	0	322,330

Appendix 1. Abbreviations

Abbreviations	Full texts
BE	Baseline Emissions
CA	Corrective Action/ Clarification Action
CER	Certified Emission Reduction
CAR	Corrective Action Request
CC IPL	Carbon Check (India) Private Ltd.
CDM	Clean Development Mechanism
CH ₄	Methane
CL	Clarification Request
CO ₂	Carbon Dioxide
CO _{2e}	Carbon Dioxide Equivalent
DOE	Designated Operational Entity
DVR	Draft Verification Report
EB	CDM Executive Board
EF	Emission Factor
ERPA	Emission reduction purchase agreement
FA	Final Approval
FAR	Forward Action Request
FVR	Final Validation Report
GESS	Green Energy Solutions & Sustainability LLC
GSS	GreenGrowth Sustainability Services
GHG	Greenhouse gas(es)
GWh	Giga Watt Hour
GWP	Global Warming Potential
IPCC	Intergovernmental Panel on Climate Change
LE	Leakage Emissions
LFG	Landfill gas
MP	Monitoring Period
MR	Monitoring Report
MWh	Mega Watt Hour
OSV	On Site Visit
PE	Project Emissions
PP(s)	Project Participant(s)
PRC	Post registration change
QC/QA	Quality Control/ Quality Assurance
TA	Technical Area
TR	Technical Review
UNFCCC	United Nations Framework Convention on Climate Change
VVS	Validation and Verification Standard

Appendix 2. Competence of team members and technical reviewers



Carbon Check (India) Private Ltd.

Vikash Kumar Singh

has been qualified as per CCIPL's internal qualification procedures, in accordance with requirements of Accreditation Standard (version 07.0):

For following functions:

Validator Team Leader Technical reviewer
 Verifier Technical Expert Local Expert¹

In the following Technical Areas:

TA 1.1 TA 3.1 TA 5.2 TA 9.2 TA 13.2
 TA 1.2 TA 4.1 TA 8.1 TA 10.1 TA 14.1
 TA 2.1 TA 5.1 TA 9.1 TA 13.1

Mr. Amit Anand
CEO

Date of Approval
24/12/2018

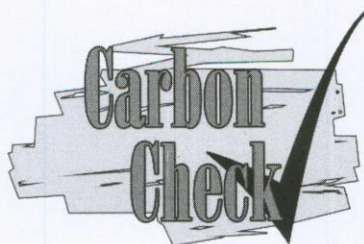
Valid Till
23/12/2019

Revision History of the Document

Date	Description
26/12/2014	Initial Adoption
24/12/2015	Annual Revision
20/01/2016	Interim Revision for office address change
23/12/2016	Annual Revision
24/12/2017	Annual Revision
24/12/2018	Annual Revision

¹ India, South Africa

CARBON CHECK (INDIA) PRIVATE LIMITED
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 Regd. Off: 2071/38, 2nd Floor, Naiwala, Karol Bagh, New Delhi - 110005
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Carbon Check (India) Private Ltd.

Amit Anand

has been qualified as per CCIPL’s internal qualification procedures, in accordance with requirements of Accreditation Standard (version 07.0):

For following functions:

- Validator Team Leader Technical reviewer
 Verifier Technical Expert Local Expert¹

In the following Technical Areas:

- TA 1.1 TA 3.1 TA 5.2 TA 9.2 TA 13.2
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 TA 2.1 TA 5.1 TA 9.1 TA 13.1

Mr. Vikash Kumar Singh
Compliance Officer

Date of Approval	Valid Till
24/12/2018	23/12/2019

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Appendix 3. Documents reviewed or referenced

No.	Author	Title	References to the document	Provider
1	GESS	1. Monitoring Report (published MR) 2. Monitoring Report	Version 01, Date: 22/04/2019 Version 02, Date: 28/08/2019	PP
2	GESS	Final Monitoring Report	Version 03 Date: 22/09/2019	PP
3	GESS	Emission reduction spreadsheet corresponding to /1/	-	PP
4	GESS	Emission reduction spreadsheet corresponding to /2/	-	PP
5	Hofstetter Umwelttechnik AG	Project commissioning certificate/report issued by Hofstetter Umwelttechnik AG	Dated: 18/11/2012	PP
6	Dubai Municipality	No-objection certificate issued by Dubai Municipality for construction, completion and operation of the project activity	Dated: 04/06/2012	PP
7	Dubai Municipality	Approval Letter issued by Dubai Municipality to Green Energy Solutions and Sustainability LLC	Dated: 04/10/2011	PP
8	Dubai Municipality	Copy of the written declaration issued by Dubai Municipality confirming their contract between Green Energy Solutions and Sustainability LLC	Dated: 30/10/2012	PP
9	Department of Economic Development, Government of Dubai	Industrial license no.: 658940 for the Landfill gas project activity (valid until 17/09/2019) from Government of Dubai	Dated: 18/09/2011	PP
10	Hofstetter Umwelttechnik AG	Operating instruction manual/ Technical specifications of the project equipment and monitoring equipment issued by Hofstetter Umwelttechnik AG	Ref. No.: H10979; Dated: 12/03/2012	PP
11	GESS	Training manuals, records and certificates of personnel involved with the project activity	-	PP
12	GESS	Calibration certificates for the following measuring instruments (for Flare units 1 and 2): a. Gas Flow meters b. Weekly Calibration Reports for Landfill Gas Analysers (CH ₄ , CO ₂ , O ₂) c. Weekly Calibration Reports for Flue Gas Analysers (CH ₄ and O ₂) d. Flue Gas Temperature (Thermocouple)-S type e. Energy meters		PP

		f. The calibration certificates reference numbers SOC/QC-7720/10/16 and SOC/QC-7357/12/17 dated 20/10/2016 and 12/12/2017 and for span gases used in the analysis of Landfill gas and flue gas respectively		
13	Hofstetter Umwelttechnik AG	Evidence for technical specification for all the monitoring equipment used during the monitoring period	-	PP
14	GESS	Copy of primary documents acting as evidence of all monitored parameters (raw data downloaded from the monitoring "Readwin 2000" software)	-	PP
/B01/	UNFCCC	a. CDM Validation and Verification Standard for project activities, version 02.0 b. CDM Project Standard for project activities, version 02.0 c. CDM Project Cycle Procedure for project activities, version 02.0	-	UNFCCC
/B02/	UNFCCC	Approved consolidated methodology "Flaring or use of Landfill gas" ACM0001, Version 12	-	UNFCCC
/B03/	UNFCCC	Monitoring report form and guidelines, Version 06.0	-	UNFCCC
/B04/	UNFCCC	Guideline on the application of Materiality in verifications, Version 02	-	UNFCCC
/B05/	UNFCCC	CDM Project documents: a. Approved revised PDD for CDM project "LFG flaring project at Dubai, UAE" Version 8 dated 18/07/2016 and the corresponding validation report b. Previous Monitoring Reports for CDM project "LFG flaring project at Dubai, UAE" and the corresponding verification reports	-	UNFCCC
/B06/	UNFCCC	UNFCCC website: http://cdm.unfccc.int	-	UNFCCC

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

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

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				
-				
DOE assessment				Date: DD/MM/YYYY
-				

Table 2. CL from this verification

CL ID	CL 01	Section no.	E.3	Date: 26/08/2019
Description of CL				
In section B.1 of the published MR, PP has not provided the major milestones for the project activity.				
Project participant response				Date: 30/08/2019
<i>Major milestone has now been provided in the revised MR V2</i>				
Documentation provided by project participant				
<i>Revised MR Ver 2</i>				
DOE assessment				Date: 11/09/2019
PP has provided the major project milestones in section B.1 of the revised PDD. The CL is closed.				

CL ID	CL 02	Section no.	E.3	Date: 26/08/2019
Description of CL				
In section B.1 of the published MR, the stated flare temperature range is incorrect.				
Project participant response				Date: 30/08/2019
<i>The stated flare temperature has now been changed in the revised Monitoring Report.</i>				
Documentation provided by project participant				
<i>Revised Monitoring Report Version 2</i>				
DOE assessment				Date: 11/09/2019
In section B.1 of the revised MR, the flare temperature range has been corrected. Hence the CL is closed.				

CL ID	CL 03	Section no.	E.6.1	Date: 26/08/2019
Description of CL				
PP has not stated the value of GWP _{CH4} in section D.1 of the published MR.				
Project participant response				Date: 30/08/2019
<i>GWP_{CH4} value has now been included in section D.1 of the revised MR</i>				
Documentation provided by project participant				
<i>Revised Monitoring Report Version 2</i>				
DOE assessment				Date: 11/09/2019
In the revised MR, value of GWP _{CH4} has been stated. The CL is closed.				

CL ID	CL 04	Section no.	E.6.2 / E.7	Date: 26/08/2019
Description of CL				
PP needs to state the correct monitoring equipment used for all the monitoring parameters along with their calibration dates during the monitoring period and provide the respective calibration certificates.				
Project participant response				Date: 30/08/2019
<i>All monitoring equipment has now been updated with correct calibration dates in the revised MR</i>				
Documentation provided by project participant				
<i>Revised Monitoring Report Version 2</i>				
<i>Calibration Certificates for all instruments for both Line 1 and 2</i>				
<i>Scan copy of the samples of internal calibration records for the analysers</i>				
DOE assessment				Date: 11/09/2019

In the revised MR, the correct monitoring equipment used during the monitoring period along with their respective dates of calibration / change of equipment date have been provided and also corresponding evidences provided to the verification team. Hence the CL is closed.

CL ID	CL 05	Section no.	E.6.2 / E.7	Date: 26/08/2019
Description of CL				
PP is requested to provide the date of replacement of the thermocouple during the monitoring period along with its evidence. Details of energy meters used during the monitoring period have also not been stated in a complete manner.				
Project participant response				Date: 30/08/2019
<i>Date of Replacement of thermocouples has now been provided in the revised MR along with the Purchase Order.</i>				
<i>Details of energy meter used has now been updated in the revised monitoring report.</i>				
Documentation provided by project participant				
<i>Revised Monitoring Report Version 02</i>				
<i>Purchase order for thermocouples</i>				
<i>Calibration report for the new Energy meters installed at site.</i>				
DOE assessment				Date: 11/09/2019
PP has submitted revised MR with the date of replacement of the thermocouple and the details of the energy meters used during the monitoring period. This has been checked with the relevant evidence provided by the PP. Hence the CL is closed.				

CL ID	CL 06	Section no.	E.6.2	Date: 26/08/2019
Description of CL				
In section D.2 of the MR, monthly average values of the monitoring parameters do not match with the ER spread sheets. Raw data sheets need to be provided for cross checking of all the monitoring parameters.				
Project participant response				Date: 30/08/2019
<i>All the average values for all the monitored parameters have been aligned with the values of the spreadsheet in the revised monitoring report</i>				
Documentation provided by project participant				
<i>Revised MR version 02</i>				
<i>Revised ER sheets v2</i>				
DOE assessment				Date: 11/09/2019
PP has submitted the revised MR with correct values of the monitored parameters. This has been cross checked with the ER spread sheet and the raw data spread sheets for the monitoring period. Hence the CL is closed.				

Table 3. CAR from this verification

CAR ID	CAR 01	Section no.	E.1	Date: 26/08/2019
Description of CAR				
PP needs to adopt the latest template of the CDM-MR-FORM as available on UNFCCC web site. Also the table in section D.1 of the MR for the parameter $OX_{top\ layer}$ is not as per the MR template.				
Project participant response				Date: 30/08/2019
<i>CDM MR Form has been revised to the new version (Version 07.0) and the table has been rectified in section D.1</i>				
Documentation provided by project participant				
<i>Revised MR version 02</i>				
DOE assessment				Date: 11/09/2019
PP has updated the MR in the latest available version of the MR template (version 07) and also section D.1 has been corrected. The CAR is closed.				

CAR ID	CAR 02	Section no.	E.7 / E.8.1 / E.8.2 / E.8.5 / E.8.6	Date: 26/08/2019
Description of CAR				

<p>In the published MR, the achieved emission reductions for the monitoring period are stated 312,715 tCO₂e. In version 1 of the submitted ER spread sheets, it is observed that in the “Emission summary” sheets for the months of Oct 17, Dec 17, Jan 18, April 18, May 18, Jun 18 and Aug 18, ERs are not aggregated for both the lines (line 1 and line 2) for many days. Necessary corrective action is required in the spread sheets. In order to check the correctness of the ER calculations, PP needs to submit the raw data for the monitoring period. PP also needs to justify the increase of ERs as compared to the ex-ante estimated value for the monitoring period.</p>	
Project participant response	Date: 30/08/019
<p>The ER sheets have been corrected. The ER achieved during the period under verification is around 32% more than the ex-ante estimates during the registration process. Part of the change, which amounts to 20% , is due to the change in GWP of Methane from 21 to 25 as per IPCC latest report applicable for 2nd Commitment period. The other part. Around 10%, is due to the fact that the site is still receiving fresh waste which during the PDD preparation stage was envisaged to be stopped by 2013. Fresh waste results in higher emission due to increase in amount of bio-degradable material in the landfill.</p>	
Documentation provided by project participant	
<p><i>Revised ER sheets V2</i> <i>Excel sheet submitted during registration process. Which demonstrate the assumption that the site would have received waste only up to 2013.</i></p>	
DOE assessment	Date: 11/09/2019
<p>PP has submitted revised ER spread sheets. The verification has cross verified the data input in the ER spread sheets with the raw daw sheets and found it to be appropriate. Due to this correction, the ERs have increase from 312,715 tCO₂e (in the published MR) to 322,330 tCO₂e in the final MR which is found to be correct and hence deemed acceptable. PP has clarified that the actual emission reductions are around 32% higher than the estimate of the PDD for the current monitoring period. The verification team noted the explanation provided by the PP for this increase is mainly due to the change in GWP of methane from 21 to 25 during the monitoring period. Also it is noted that in the registered PDD, the estimated emission reductions were based on the assumptions that the waste dumping at the landfill site would stop by 2013. But it is seen that the waste dumping is still continuing at the project site which was confirmed during the on-site visit by the verification team. This is deemed acceptable. The CAR is closed.</p>	

Table 4. 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
-				

Annex 1: Assessment of data and parameters fixed ex-ante at the time of validation

Parameter	$OX_{\text{top layer}}$
Data unit	Dimensionless
Default values used	0.1
Purpose of data	Determination of baseline emissions
Source of verification of the source	The value of the parameter is fixed ex-ante /B05a/

Parameter	GWP_{CH_4}
Data unit	$\text{tCO}_2\text{e/tCH}_4$
Default values used	25 ³
Purpose of data	Determination of baseline emissions
Source of verification of the source	The value of the parameter is fixed ex-ante /B05a/

Parameter	$\rho_{i,n}$
Data unit	kg/Nm^3
Default values used	0.716
Purpose of data	Determination of baseline emissions
Source of verification of the source	The value of the parameter is fixed ex-ante /B05a/

Parameter	$EF_{\text{EL},j,y}$
Data unit	tCO_2/MWh
Default values used	1.3
Purpose of data	Determination of project emissions
Source of verification of the source	The value of the parameter is fixed ex-ante /B05a/

³ The GWP of methane has been updated from 21 to 25 by IPCC and it came into effect from 01/01/2013 (EB 69 Annex 3). (https://www.ipcc.ch/publications_and_data/ar4/wg1/en/ch2s2-10-2.html)

Annex 2: Assessment of data and parameters monitored

Monitoring Parameter Requirement	Assessment/ Observation by the DOE																																									
Data / Parameter: (as in monitoring plan of PDD):	Volumetric flow of the gaseous stream per hour on a wet basis at normal conditions $\{V_{t,wb,n}(\text{same as } FV_{RG,h})\}^4$																																									
Measuring frequency/Time Interval:	Continuous monitoring and hourly recording																																									
Reported value:	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th rowspan="2" style="width: 20%;">Months</th> <th colspan="2" style="text-align: center;">Hourly average gas flow (Nm³ LFG/hour)</th> </tr> <tr> <th style="width: 40%;">Train 01</th> <th style="width: 40%;">Train 02</th> </tr> </thead> <tbody> <tr><td>Sep 2017</td><td style="text-align: center;">2144</td><td style="text-align: center;">2241</td></tr> <tr><td>Oct 2017</td><td style="text-align: center;">2146</td><td style="text-align: center;">2224</td></tr> <tr><td>Nov 2017</td><td style="text-align: center;">2093</td><td style="text-align: center;">2288</td></tr> <tr><td>Dec 2017</td><td style="text-align: center;">2239</td><td style="text-align: center;">2242</td></tr> <tr><td>Jan 2018</td><td style="text-align: center;">2141</td><td style="text-align: center;">2241</td></tr> <tr><td>Feb 2018</td><td style="text-align: center;">2132</td><td style="text-align: center;">2250</td></tr> <tr><td>Mar 2018</td><td style="text-align: center;">2132</td><td style="text-align: center;">2241</td></tr> <tr><td>April 2018</td><td style="text-align: center;">2217</td><td style="text-align: center;">2249</td></tr> <tr><td>May 2018</td><td style="text-align: center;">2245</td><td style="text-align: center;">2247</td></tr> <tr><td>June 2018</td><td style="text-align: center;">2219</td><td style="text-align: center;">2245</td></tr> <tr><td>July 2018</td><td style="text-align: center;">2254</td><td style="text-align: center;">2218</td></tr> <tr><td>Aug 2018</td><td style="text-align: center;">2251</td><td style="text-align: center;">2235</td></tr> </tbody> </table>	Months	Hourly average gas flow (Nm ³ LFG/hour)		Train 01	Train 02	Sep 2017	2144	2241	Oct 2017	2146	2224	Nov 2017	2093	2288	Dec 2017	2239	2242	Jan 2018	2141	2241	Feb 2018	2132	2250	Mar 2018	2132	2241	April 2018	2217	2249	May 2018	2245	2247	June 2018	2219	2245	July 2018	2254	2218	Aug 2018	2251	2235
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Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Yes																																									
Details of monitoring equipment:	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 30%;">Instrument Name</td> <td>Flow Transmitter</td> </tr> <tr> <td>Manufacturer</td> <td>Endress Hauser</td> </tr> <tr> <td>Serial Number</td> <td>EC07090109D – Flare 1 EC070C0109D – Flare 2</td> </tr> <tr> <td>Accuracy Class</td> <td>+/-1.5%</td> </tr> </table>	Instrument Name	Flow Transmitter	Manufacturer	Endress Hauser	Serial Number	EC07090109D – Flare 1 EC070C0109D – Flare 2	Accuracy Class	+/-1.5%																																	
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Calibration frequency /interval: Is it as per monitoring methodology /CDM EB guidance / local or national standards / manufacturers specification	Annual (As per PDD)																																									
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 practise?	Yes																																									
Company performing the calibration (internal or external calibration):	PROCAL																																									
Did calibration confirm proper functioning of monitoring equipment? (Yes / No):	Yes																																									
Is (are) calibration(s) valid for the whole reporting period?	Yes. Calibrations dates for the flow meters is as below: Flare 1: 08/12/2016 and 04/12/2017 Flare 2: 07/12/2016 and 04/12/2017																																									

⁴ The monitored and reported LFG is the only part which is flared and not that which is used in the 1 MW gas engine to generate power

	Hence the calibration was valid for the full monitoring period for which the emission reductions are being claimed (01/09/2017 to 31/08/2018). No delay in calibration or failure of the monitoring instrument was observed.
If applicable, has the reported data been cross-checked with other available data?	Yes, the value of parameter has been cross-checked with the raw data spread sheets
How were the values in the monitoring report verified?	The values were verified with the raw data sheet and calculations in the ER spread sheets
Does the data management (from data generation to emission reduction calculation) ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?	Yes, the data management ensures correct transfer of data and reporting of emission reductions and all necessary QA/QC processes are in place.
In case only partial data are available because activity levels or non-activity parameters have not been monitored in accordance with the registered monitoring plan, has the most conservative assumption theoretically possible been applied or has a request for deviation been approved?	NA

Monitoring Parameter Requirement	Assessment/ Observation by the DOE																																									
Data / Parameter: (as in monitoring plan of PDD):	Amount of methane in the LFG which is sent to the flare in year y ($F_{CH_4, sent_flare, y}$)																																									
Measuring frequency/Time Interval:	This parameter is calculated from the monitored values of volumetric flow of LFG and its methane concentration																																									
Reported value:	<table border="1"> <thead> <tr> <th rowspan="2">Months (2016)</th> <th colspan="2">Amount of methane in LFG which is sent to flare (tCH₄)</th> </tr> <tr> <th>Line 01</th> <th>Line 02</th> </tr> </thead> <tbody> <tr><td>Sep 2017</td><td>0.80</td><td>0.92</td></tr> <tr><td>Oct 2017</td><td>0.88</td><td>0.84</td></tr> <tr><td>Nov 2017</td><td>0.80</td><td>0.86</td></tr> <tr><td>Dec 2017</td><td>0.84</td><td>0.84</td></tr> <tr><td>Jan 2018</td><td>0.81</td><td>0.84</td></tr> <tr><td>Feb 2018</td><td>0.79</td><td>0.85</td></tr> <tr><td>Mar 2018</td><td>0.80</td><td>0.84</td></tr> <tr><td>April 2018</td><td>0.83</td><td>0.88</td></tr> <tr><td>May 2018</td><td>0.88</td><td>0.85</td></tr> <tr><td>June 2018</td><td>0.83</td><td>0.84</td></tr> <tr><td>July 2018</td><td>0.85</td><td>0.84</td></tr> <tr><td>Aug 2018</td><td>0.85</td><td>0.86</td></tr> </tbody> </table>	Months (2016)	Amount of methane in LFG which is sent to flare (tCH ₄)		Line 01	Line 02	Sep 2017	0.80	0.92	Oct 2017	0.88	0.84	Nov 2017	0.80	0.86	Dec 2017	0.84	0.84	Jan 2018	0.81	0.84	Feb 2018	0.79	0.85	Mar 2018	0.80	0.84	April 2018	0.83	0.88	May 2018	0.88	0.85	June 2018	0.83	0.84	July 2018	0.85	0.84	Aug 2018	0.85	0.86
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Details of monitoring equipment:	Not applicable																																									
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Calibration frequency /interval: Is it as per monitoring methodology /CDM EB guidance / local or national standards / manufacturers specification	Not applicable																																									
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Company performing the calibration (internal or external calibration):	Not applicable
Did calibration confirm proper functioning of monitoring equipment? (Yes / No):	Not applicable
Is (are) calibration(s) valid for the whole reporting period?	Not applicable
If applicable, has the reported data been cross-checked with other available data?	Yes, the value of parameter has been cross-checked with the raw data spread sheets and emission reduction calculation sheet
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In case only partial data are available because activity levels or non-activity parameters have not been monitored in accordance with the registered monitoring plan, has the most conservative assumption theoretically possible been applied or has a request for deviation been approved?	NA

Monitoring Parameter Requirement	Assessment/ Observation by the DOE																																						
Data / Parameter: (as in monitoring plan of PDD):	Project emissions from flaring of the residual gas stream (PE_{flare,y})																																						
Measuring frequency/Time Interval:	This parameter is calculated as per the “Tool to determine project emissions from flaring gases containing methane” using equation $PE_{flare,y} = \sum TM_{RG,h} * (1 - \eta_{flare,h}) * (GWP_{CH4} / 1000)$, where $\sum TM_{RG,h}$ = Mass flow rate of methane in the residual gas in the hour h $\eta_{flare,h}$ = Flare efficiency in hour h GWP_{CH4} = Global Warming potential of methane																																						
Reported value:	<table border="1"> <thead> <tr> <th rowspan="2">Months (2016)</th> <th colspan="2">Project emissions from flaring (tCO_{2e})</th> </tr> <tr> <th>Line 01</th> <th>Line 02</th> </tr> </thead> <tbody> <tr> <td>Sep 2017</td> <td>86.00</td> <td>79.00</td> </tr> <tr> <td>Oct 2017</td> <td>1.56</td> <td>21.87</td> </tr> <tr> <td>Nov 2017</td> <td>5.16</td> <td>0.00</td> </tr> <tr> <td>Dec 2017</td> <td>104.73</td> <td>0.00</td> </tr> <tr> <td>Jan 2018</td> <td>13.62</td> <td>0.00</td> </tr> <tr> <td>Feb 2018</td> <td>11.24</td> <td>0.00</td> </tr> <tr> <td>Mar 2018</td> <td>31.71</td> <td>0.00</td> </tr> <tr> <td>April 2018</td> <td>127.62</td> <td>0.00</td> </tr> <tr> <td>May 2018</td> <td>29.37</td> <td>40.63</td> </tr> <tr> <td>June 2018</td> <td>21.46</td> <td>21.04</td> </tr> <tr> <td>July 2018</td> <td>0.00</td> <td>0.00</td> </tr> </tbody> </table>	Months (2016)	Project emissions from flaring (tCO _{2e})		Line 01	Line 02	Sep 2017	86.00	79.00	Oct 2017	1.56	21.87	Nov 2017	5.16	0.00	Dec 2017	104.73	0.00	Jan 2018	13.62	0.00	Feb 2018	11.24	0.00	Mar 2018	31.71	0.00	April 2018	127.62	0.00	May 2018	29.37	40.63	June 2018	21.46	21.04	July 2018	0.00	0.00
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Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	This is calculated value		
Details of monitoring equipment:	Not applicable		
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Calibration frequency /interval: Is it as per monitoring methodology /CDM EB guidance / local or national standards / manufacturers specification	Not applicable		
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Company performing the calibration(internal or external calibration):	Not applicable		
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Monitoring Parameter Requirement	Assessment/ Observation by the DOE																																		
Data / Parameter: (as in monitoring plan of PDD):	Volumetric fraction of component i (i represents CH ₄ , CO ₂ , O ₂ , N ₂) in the landfill gas in the hour h (fv_{i,h})																																		
Measuring frequency/Time Interval:	Continuous monitoring and hourly recording																																		
Reported value:	<table border="1"> <thead> <tr> <th rowspan="2">Months</th> <th colspan="6">Volume %</th> </tr> <tr> <th colspan="3">Train 01</th> <th colspan="3">Train 02</th> </tr> <tr> <th></th> <th>CH₄</th> <th>CO₂</th> <th>O₂</th> <th>CH₄</th> <th>CO₂</th> <th>O₂</th> </tr> </thead> <tbody> <tr> <td>Sep 2017</td> <td>0.52</td> <td>0.42</td> <td>0.00</td> <td>0.58</td> <td>0.39</td> <td>0.00</td> </tr> <tr> <td>Oct 2017</td> <td>0.57</td> <td>0.38</td> <td>0.00</td> <td>0.53</td> <td>0.38</td> <td>0.00</td> </tr> </tbody> </table>	Months	Volume %						Train 01			Train 02				CH ₄	CO ₂	O ₂	CH ₄	CO ₂	O ₂	Sep 2017	0.52	0.42	0.00	0.58	0.39	0.00	Oct 2017	0.57	0.38	0.00	0.53	0.38	0.00
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	Aug 2018	0.53	0.43	0.00	0.54	0.37	0.01																																																
Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Yes																																																						
Details of monitoring equipment:	<table border="1"> <tbody> <tr> <td>Instrument Name</td> <td colspan="3">Continuous Gas Quality Analyzer-GAE CH₄</td> </tr> <tr> <td>Manufacturer</td> <td colspan="3">NUK NENNING UND KRUMM GmbH</td> </tr> <tr> <td>Serial Number</td> <td colspan="3">A1715 – Flare 1 A2149 – Flare 2</td> </tr> <tr> <td>Accuracy Class</td> <td colspan="3">+/-1%</td> </tr> <tr> <td>Instrument Name</td> <td colspan="3">Continuous Gas Quality Analyzer-GAE CO₂</td> </tr> <tr> <td>Manufacturer</td> <td colspan="3">NUK NENNING UND KRUMM GmbH</td> </tr> <tr> <td>Serial Number</td> <td colspan="3">A2200– Flare 1 A2198 – Flare 2</td> </tr> <tr> <td>Accuracy Class</td> <td colspan="3">+/-1%</td> </tr> <tr> <td>Instrument Name</td> <td colspan="3">Continuous Gas Quality Analyzer-GAE O₂</td> </tr> <tr> <td>Manufacturer</td> <td colspan="3">NUK NENNING UND KRUMM GmbH</td> </tr> <tr> <td>Serial Number</td> <td colspan="3">A1739 – Flare 1 A2106 – Flare 2</td> </tr> <tr> <td>Accuracy Class</td> <td colspan="3">±2%/±1%</td> </tr> </tbody> </table>							Instrument Name	Continuous Gas Quality Analyzer-GAE CH ₄			Manufacturer	NUK NENNING UND KRUMM GmbH			Serial Number	A1715 – Flare 1 A2149 – Flare 2			Accuracy Class	+/-1%			Instrument Name	Continuous Gas Quality Analyzer-GAE CO ₂			Manufacturer	NUK NENNING UND KRUMM GmbH			Serial Number	A2200– Flare 1 A2198 – Flare 2			Accuracy Class	+/-1%			Instrument Name	Continuous Gas Quality Analyzer-GAE O ₂			Manufacturer	NUK NENNING UND KRUMM GmbH			Serial Number	A1739 – Flare 1 A2106 – Flare 2			Accuracy Class	±2%/±1%		
Instrument Name	Continuous Gas Quality Analyzer-GAE CH ₄																																																						
Manufacturer	NUK NENNING UND KRUMM GmbH																																																						
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Is accuracy of the monitoring equipment as stated in the PDD? If the PDD does not specify the accuracy of the monitoring equipment, does the monitoring equipment represent good monitoring practise?	Yes																																																						
Calibration frequency /interval: Is it as per monitoring methodology /CDM EB guidance / local or national standards / manufacturers specification	Weekly (As per PDD)																																																						
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	Yes																																																						

represent good monitoring practise?	
Company performing the calibration(internal or external calibration):	In house by GESS using standard sample
Did calibration confirm proper functioning of monitoring equipment? (Yes / No):	Yes
Is (are) calibration(s) valid for the whole reporting period?	Yes. Calibrations for the gas analysers were performed every week /12b/. The first calibration was done on 05/09/2017 and last on 29/08/2018. Hence the calibration was valid for the full monitoring period for which the emission reductions are being claimed (01/09/2017 to 31/08/2018). It was also confirmed that the span gas used for calibration was supplied by Sharjah Oxygen Company whose traceability could be confirmed /12f/. No delay in calibration or failure of the monitoring instrument was observed.
If applicable, has the reported data been cross-checked with other available data?	Yes, the value of parameter has been cross-checked with the raw data spread sheets
How were the values in the monitoring report verified?	The values were verified with the raw data sheet and calculations in the ER spread sheets
Does the data management (from data generation to emission reduction calculation) ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?	Yes, the data management ensures correct transfer of data and reporting of emission reductions and all necessary QA/QC processes are in place.
In case only partial data are available because activity levels or non-activity parameters have not been monitored in accordance with the registered monitoring plan, has the most conservative assumption theoretically possible been applied or has a request for deviation been approved?	NA

Monitoring Parameter Requirement	Assessment/ Observation by the DOE																																									
Data / Parameter: (as in monitoring plan of PDD):	Volumetric fraction of O ₂ in the exhaust gas of the flare in the hour h (t _{O₂,h})																																									
Measuring frequency/Time Interval:	Continuous monitoring and hourly recording																																									
Reported value:	<table border="1"> <thead> <tr> <th rowspan="2">Months</th> <th colspan="2">O₂ in the exhaust gas stream (%)</th> </tr> <tr> <th>Train 01</th> <th>Train 02</th> </tr> </thead> <tbody> <tr><td>Sep 2017</td><td>0.04</td><td>0.05</td></tr> <tr><td>Oct 2017</td><td>0.04</td><td>0.05</td></tr> <tr><td>Nov 2017</td><td>0.05</td><td>0.05</td></tr> <tr><td>Dec 2017</td><td>0.05</td><td>0.05</td></tr> <tr><td>Jan 2018</td><td>0.05</td><td>0.05</td></tr> <tr><td>Feb 2018</td><td>0.05</td><td>0.05</td></tr> <tr><td>Mar 2018</td><td>0.05</td><td>0.05</td></tr> <tr><td>April 2018</td><td>0.04</td><td>0.03</td></tr> <tr><td>May 2018</td><td>0.04</td><td>0.05</td></tr> <tr><td>June 2018</td><td>0.04</td><td>0.07</td></tr> <tr><td>July 2018</td><td>0.04</td><td>0.05</td></tr> <tr><td>Aug 2018</td><td>0.05</td><td>0.05</td></tr> </tbody> </table>	Months	O ₂ in the exhaust gas stream (%)		Train 01	Train 02	Sep 2017	0.04	0.05	Oct 2017	0.04	0.05	Nov 2017	0.05	0.05	Dec 2017	0.05	0.05	Jan 2018	0.05	0.05	Feb 2018	0.05	0.05	Mar 2018	0.05	0.05	April 2018	0.04	0.03	May 2018	0.04	0.05	June 2018	0.04	0.07	July 2018	0.04	0.05	Aug 2018	0.05	0.05
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Aug 2018	0.05	0.05																																								
Is measuring and reporting frequency in accordance with the monitoring plan and	Yes																																									

monitoring methodology? (Yes / No)									
Details of monitoring equipment:	<table border="1"> <tr> <td>Instrument Name</td> <td>Continuous Gas Quality Analyzer</td> </tr> <tr> <td>Manufacturer</td> <td>NUK NENNING UND KRUMM GmbH</td> </tr> <tr> <td>Serial Number</td> <td>A1732 – Flare 1 A2177 – Flare 2</td> </tr> <tr> <td>Accuracy Class</td> <td>+/-2%</td> </tr> </table>	Instrument Name	Continuous Gas Quality Analyzer	Manufacturer	NUK NENNING UND KRUMM GmbH	Serial Number	A1732 – Flare 1 A2177 – Flare 2	Accuracy Class	+/-2%
Instrument Name	Continuous Gas Quality Analyzer								
Manufacturer	NUK NENNING UND KRUMM GmbH								
Serial Number	A1732 – Flare 1 A2177 – Flare 2								
Accuracy Class	+/-2%								
Is accuracy of the monitoring equipment as stated in the PDD? If the PDD does not specify the accuracy of the monitoring equipment, does the monitoring equipment represent good monitoring practise?	Yes								
Calibration frequency /interval: Is it as per monitoring methodology /CDM EB guidance / local or national standards / manufacturers specification	Weekly (As per PDD)								
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 practise?	Yes								
Company performing the calibration(internal or external calibration):	In house by GESS using standard sample								
Did calibration confirm proper functioning of monitoring equipment? (Yes / No):	Yes. Calibrations for the gas analyser was performed every week /12c/. The first calibration was done on 05/09/2017 and last on 29/08/2019. Hence the calibration was valid for the full monitoring period for which the emission reductions are being claimed (01/09/2017 to 31/08/2018). It was also confirmed that the span gas used for calibration was supplied by Sharjah Oxygen Company whose traceability could be confirmed /12f/. No delay in calibration or failure of the monitoring instrument was observed.								
Is (are) calibration(s) valid for the whole reporting period?	Yes								
If applicable, has the reported data been cross-checked with other available data?	Yes, the value of parameter has been cross-checked with the raw data spread sheets								
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Does the data management (from data generation to emission reduction calculation) ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?	Yes, the data management ensures correct transfer of data and reporting of emission reductions and all necessary QA/QC processes are in place.								
In case only partial data are available because activity levels or non-activity parameters have not been monitored in accordance with the registered monitoring plan, has the most conservative assumption theoretically possible been applied or has a request for deviation been approved?	NA								

Monitoring Parameter Requirement	Assessment/ Observation by the DOE																																									
Data / Parameter: (as in monitoring plan of PDD):	Concentration of methane in the exhaust gas of the flare in dry basis at normal conditions in the hour h (fv_{CH4,FG,h})																																									
Measuring frequency/Time Interval:	Continuous monitoring and hourly recording																																									
Reported value:	<table border="1"> <thead> <tr> <th rowspan="2">Months</th> <th colspan="2">Concentration of Methane (mg/Nm³)</th> </tr> <tr> <th>Train 01</th> <th>Train 02</th> </tr> </thead> <tbody> <tr><td>Sep 2017</td><td>0</td><td>0</td></tr> <tr><td>Oct 2017</td><td>0</td><td>0</td></tr> <tr><td>Nov 2017</td><td>0</td><td>0</td></tr> <tr><td>Dec 2017</td><td>0</td><td>0</td></tr> <tr><td>Jan 2018</td><td>0</td><td>0</td></tr> <tr><td>Feb 2018</td><td>0</td><td>0</td></tr> <tr><td>Mar 2018</td><td>0</td><td>0</td></tr> <tr><td>April 2018</td><td>0</td><td>0</td></tr> <tr><td>May 2018</td><td>0</td><td>0</td></tr> <tr><td>June 2018</td><td>0</td><td>0</td></tr> <tr><td>July 2018</td><td>0</td><td>0</td></tr> <tr><td>Aug 2018</td><td>0</td><td>0</td></tr> </tbody> </table>	Months	Concentration of Methane (mg/Nm ³)		Train 01	Train 02	Sep 2017	0	0	Oct 2017	0	0	Nov 2017	0	0	Dec 2017	0	0	Jan 2018	0	0	Feb 2018	0	0	Mar 2018	0	0	April 2018	0	0	May 2018	0	0	June 2018	0	0	July 2018	0	0	Aug 2018	0	0
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Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Yes																																									
Details of monitoring equipment:	<table border="1"> <tbody> <tr> <td>Instrument Name</td> <td>Continuous Gas Quality Analyzer</td> </tr> <tr> <td>Manufacturer</td> <td>NUK NENNING UND KRUMM GmbH</td> </tr> <tr> <td>Serial Number</td> <td>A1731– Flare 1 A1792– Flare 2</td> </tr> <tr> <td>Accuracy Class</td> <td>+/-2%</td> </tr> </tbody> </table>	Instrument Name	Continuous Gas Quality Analyzer	Manufacturer	NUK NENNING UND KRUMM GmbH	Serial Number	A1731– Flare 1 A1792– Flare 2	Accuracy Class	+/-2%																																	
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Manufacturer	NUK NENNING UND KRUMM GmbH																																									
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Is accuracy of the monitoring equipment as stated in the PDD? If the PDD does not specify the accuracy of the monitoring equipment, does the monitoring equipment represent good monitoring practise?	Yes																																									
Calibration frequency /interval: Is it as per monitoring methodology /CDM EB guidance / local or national standards / manufacturers specification	Weekly (As per PDD)																																									
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 practise?	Yes. Calibrations for the gas analysed was performed every week /12c/. The first calibration was done on 05/09/2017 and last on 29/08/2018. Hence the calibration was valid for the full monitoring period for which the emission reductions are being claimed (01/09/2017 to 31/08/2018). It was also confirmed that the span gas used for calibration was supplied by Sharjah Oxygen Company whose traceability could be confirmed /12f/. No delay in calibration or failure of the monitoring instrument was observed.																																									
Company performing the calibration(internal or external calibration):	In house by GESS using standard sample																																									
Did calibration confirm proper functioning of	Yes																																									

monitoring equipment? (Yes / No):	
Is (are) calibration(s) valid for the whole reporting period?	Yes
If applicable, has the reported data been cross-checked with other available data?	Yes, the value of parameter has been cross-checked with the raw data spread sheets
How were the values in the monitoring report verified?	The values were verified with the raw data sheet and calculations in the ER spread sheets
Does the data management (from data generation to emission reduction calculation) ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?	Yes, the data management ensures correct transfer of data and reporting of emission reductions and all necessary QA/QC processes are in place.
In case only partial data are available because activity levels or non-activity parameters have not been monitored in accordance with the registered monitoring plan, has the most conservative assumption theoretically possible been applied or has a request for deviation been approved?	NA

Monitoring Parameter Requirement	Assessment/ Observation by the DOE																																									
Data / Parameter: (as in monitoring plan of PDD):	Temperature in the exhaust gas of the flare (T_{flare})																																									
Measuring frequency/Time Interval:	Continuous monitoring and hourly recording																																									
Reported value:	<table border="1"> <thead> <tr> <th rowspan="2">Months</th> <th colspan="2">Flare temp (°C)</th> </tr> <tr> <th>Train 01</th> <th>Train 02</th> </tr> </thead> <tbody> <tr><td>Sep 2017</td><td>1035</td><td>1024</td></tr> <tr><td>Oct 2017</td><td>1047</td><td>1036</td></tr> <tr><td>Nov 2017</td><td>1036</td><td>1051</td></tr> <tr><td>Dec 2017</td><td>1049</td><td>1057</td></tr> <tr><td>Jan 2018</td><td>1041</td><td>1055</td></tr> <tr><td>Feb 2018</td><td>1045</td><td>1061</td></tr> <tr><td>Mar 2018</td><td>1037</td><td>1055</td></tr> <tr><td>April 2018</td><td>1032</td><td>1056</td></tr> <tr><td>May 2018</td><td>1045</td><td>1053</td></tr> <tr><td>June 2018</td><td>1041</td><td>1053</td></tr> <tr><td>July 2018</td><td>1056</td><td>1057</td></tr> <tr><td>Aug 2018</td><td>1047</td><td>1054</td></tr> </tbody> </table>	Months	Flare temp (°C)		Train 01	Train 02	Sep 2017	1035	1024	Oct 2017	1047	1036	Nov 2017	1036	1051	Dec 2017	1049	1057	Jan 2018	1041	1055	Feb 2018	1045	1061	Mar 2018	1037	1055	April 2018	1032	1056	May 2018	1045	1053	June 2018	1041	1053	July 2018	1056	1057	Aug 2018	1047	1054
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Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Yes																																									
Details of monitoring equipment:	<table border="1"> <tr> <td>Instrument Name</td> <td>Thermocouple, Type S</td> </tr> <tr> <td>Manufacturer</td> <td>JUMO</td> </tr> <tr> <td>Serial Number</td> <td>R1_P170017/1– Flare 1 R1_P170017/2– Flare 2 (Older thermocouples were replaced on 03/02/2018: 14187-01 – Flare 1 14187-02– Flare 2)</td> </tr> <tr> <td>Accuracy Class</td> <td>+/-1.5%</td> </tr> </table>	Instrument Name	Thermocouple, Type S	Manufacturer	JUMO	Serial Number	R1_P170017/1– Flare 1 R1_P170017/2– Flare 2 (Older thermocouples were replaced on 03/02/2018: 14187-01 – Flare 1 14187-02– Flare 2)	Accuracy Class	+/-1.5%																																	
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Accuracy Class	+/-1.5%																																									
Is accuracy of the monitoring equipment as stated in the PDD? If the PDD does not specify the accuracy of the monitoring	Yes																																									

equipment, does the monitoring equipment represent good monitoring practise?	
Calibration frequency /interval: Is it as per monitoring methodology /CDM EB guidance / local or national standards / manufacturers specification	Annual (As per PDD)
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 practise?	Yes. The Thermocouples are changed annually
Company performing the calibration (internal or external calibration):	-
Did calibration confirm proper functioning of monitoring equipment? (Yes / No):	As per the registered PDD monitoring plan, the thermocouples are changed annually and the last replacement was done in February 2018 for the period for which emission reductions are being claimed as confirmed during the on-site visit interview.
Is (are) calibration(s) valid for the whole reporting period?	Yes
If applicable, has the reported data been cross-checked with other available data?	Yes, the value of parameter has been cross-checked with the raw data spread sheets
How were the values in the monitoring report verified?	The values were verified with the raw data sheet and calculations in the ER spread sheets
Does the data management (from data generation to emission reduction calculation) ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?	Yes, the data management ensures correct transfer of data and reporting of emission reductions and all necessary QA/QC processes are in place.
In case only partial data are available because activity levels or non-activity parameters have not been monitored in accordance with the registered monitoring plan, has the most conservative assumption theoretically possible been applied or has a request for deviation been approved?	NA

Monitoring Parameter Requirement	Assessment/ Observation by the DOE
Data / Parameter: (as in monitoring plan of PDD):	Flare efficiency in hour h ($\eta_{flare,h}$)
Measuring frequency/Time Interval:	This parameter has been calculated based on steps mentioned in "Tool to determine project emissions from flaring gases containing methane" Version 1
Reported value:	Please refer to the ER spread sheets /4/
Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Yes
Details of monitoring equipment:	Not applicable
Is accuracy of the monitoring equipment as stated in the PDD? If the PDD does not specify the accuracy of the monitoring equipment, does the monitoring equipment represent good monitoring practise?	Not applicable

Calibration frequency /interval: Is it as per monitoring methodology /CDM EB guidance / local or national standards / manufacturers specification	Not applicable
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 practise?	Not applicable
Company performing the calibration(internal or external calibration):	Not applicable
Did calibration confirm proper functioning of monitoring equipment? (Yes / No):	Not applicable
Is (are) calibration(s) valid for the whole reporting period?	Not applicable
If applicable, has the reported data been cross-checked with other available data?	Yes, the value of parameter has been cross-checked with the raw data spread sheets
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Monitoring Parameter Requirement	Assessment/ Observation by the DOE
Data / Parameter: (as in monitoring plan of PDD):	Project emissions from electricity consumption by the project activity during the year y (PE_{EC,y})
Measuring frequency/Time Interval:	This parameter has been calculated based on the electricity consumed by the project activity
Reported value:	Please refer to the ER spread sheets /4/
Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Yes
Details of monitoring equipment:	Not applicable
Is accuracy of the monitoring equipment as stated in the PDD? If the PDD does not specify the accuracy of the monitoring equipment, does the monitoring equipment represent good monitoring practise?	Not applicable
Calibration frequency /interval: Is it as per monitoring methodology /CDM EB guidance / local or national standards / manufacturers specification	Not applicable
Is the calibration interval in line with the	Not applicable

monitoring plan of the PDD? If the PDD does not specify the frequency of calibration, does the selected frequency represent good monitoring practise?	
Company performing the calibration (internal or external calibration):	Not applicable
Did calibration confirm proper functioning of monitoring equipment? (Yes / No):	Not applicable
Is (are) calibration(s) valid for the whole reporting period?	Not applicable
If applicable, has the reported data been cross-checked with other available data?	Yes, the value of parameter has been cross-checked with the raw data spread sheets
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Monitoring Parameter Requirement	Assessment/ Observation by the DOE																																									
Data / Parameter: (as in monitoring plan of PDD):	Quantity of electricity consumed by the project electricity consumption source j in year y ($EC_{P,j,y}$)																																									
Measuring frequency/Time Interval:	Continuous monitoring and hourly recording																																									
Reported value:	<table border="1"> <thead> <tr> <th rowspan="2">Months</th> <th colspan="2">Energy consumption (MWh)</th> </tr> <tr> <th>Train 01</th> <th>Train 02</th> </tr> </thead> <tbody> <tr><td>Sep 2017</td><td>149.75</td><td>151.28</td></tr> <tr><td>Oct 2017</td><td>158.10</td><td>155.41</td></tr> <tr><td>Nov 2017</td><td>149.27</td><td>151.17</td></tr> <tr><td>Dec 2017</td><td>155.20</td><td>152.78</td></tr> <tr><td>Jan 2018</td><td>156.04</td><td>155.67</td></tr> <tr><td>Feb 2018</td><td>140.67</td><td>140.95</td></tr> <tr><td>Mar 2018</td><td>154.77</td><td>156.22</td></tr> <tr><td>April 2018</td><td>133.55</td><td>151.00</td></tr> <tr><td>May 2018</td><td>156.17</td><td>155.46</td></tr> <tr><td>June 2018</td><td>147.07</td><td>122.37</td></tr> <tr><td>July 2018</td><td>156.61</td><td>155.57</td></tr> <tr><td>Aug 2018</td><td>156.08</td><td>156.24</td></tr> </tbody> </table>	Months	Energy consumption (MWh)		Train 01	Train 02	Sep 2017	149.75	151.28	Oct 2017	158.10	155.41	Nov 2017	149.27	151.17	Dec 2017	155.20	152.78	Jan 2018	156.04	155.67	Feb 2018	140.67	140.95	Mar 2018	154.77	156.22	April 2018	133.55	151.00	May 2018	156.17	155.46	June 2018	147.07	122.37	July 2018	156.61	155.57	Aug 2018	156.08	156.24
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June 2018	147.07	122.37																																								
July 2018	156.61	155.57																																								
Aug 2018	156.08	156.24																																								
Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Yes																																									
Details of monitoring equipment:	<table border="1"> <tr> <td>Instrument Name</td> <td>Energy meter</td> </tr> <tr> <td>Manufacturer</td> <td>EMU</td> </tr> <tr> <td>Serial Number</td> <td>215230/01– Flare 1 215230/02– Flare 2 (Older meters were replaced on 26/02/2018:</td> </tr> </table>	Instrument Name	Energy meter	Manufacturer	EMU	Serial Number	215230/01– Flare 1 215230/02– Flare 2 (Older meters were replaced on 26/02/2018:																																			
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		135513/01 – Flare 1 135513/02– Flare 2)	
	Accuracy Class	+/-1%	
Is accuracy of the monitoring equipment as stated in the PDD? If the PDD does not specify the accuracy of the monitoring equipment, does the monitoring equipment represent good monitoring practise?	Yes		
Calibration frequency /interval: Is it as per monitoring methodology /CDM EB guidance / local or national standards / manufacturers specification	Annual		
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 practise?	Yes		
Company performing the calibration(internal or external calibration):	EMU		
Did calibration confirm proper functioning of monitoring equipment? (Yes / No):	Yes		
Is (are) calibration(s) valid for the whole reporting period?	Yes. The new meters were deemed calibrated as they were newly purchased. Hence the calibration was valid for the whole reporting period for which emission reductions are being claimed.		
If applicable, has the reported data been cross-checked with other available data?	Yes, the value of parameter has been cross-checked with the raw data spread sheets		
How were the values in the monitoring report verified?	The values were verified with the raw data sheet and calculations in the ER spread sheets		
Does the data management (from data generation to emission reduction calculation) ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?	Yes, the data management ensures correct transfer of data and reporting of emission reductions and all necessary QA/QC processes are in place.		
In case only partial data are available because activity levels or non-activity parameters have not been monitored in accordance with the registered monitoring plan, has the most conservative assumption theoretically possible been applied or has a request for deviation been approved?	NA		

Annex 3 Assessment of Monitoring parameters monitored through sampling/surveys

SI. No.	Checklist Questions	Assessment
1.	Does the Monitoring Report apply sampling for determination of ex-post monitoring parameters?	No, the monitoring report does not apply sampling for determination of ex-post monitoring parameters.
2.	Is the applied sampling plan in accordance with the sampling plan proposed in the registered PoA-DD/ PDD?	Not applicable
3.	List the parameters determined through sampling and respective parameters of interest.	Not applicable
4.	Is the sample size calculated in accordance with the formula presented in the registered PoA-DD/PDD?	Not applicable
5.	Are the assumptions used for calculation of sample size appropriate and correct? P.S.: Provide assessment on appropriateness of value of proportion (p), standard deviation (STDEV) or variance (v) used for calculation of sample size.	Not applicable
6.	What are the sample sizes obtained for the parameters being monitored? Is the determined sample size deemed adequate for the parameter of interest being monitored? P.S.: If the sample size calculation returns a value of less than 30 samples, a minimum sample size of 30 shall be chosen when the parameter of interest is a proportion. If the parameter of interest is a numeric mean value (i.e. not a proportion or percentage) the Student's t-distribution shall be used if the resulting sample size is less than 30.	Not applicable
7.	Has reliability specification been applied to determine the sampling requirements for each individual parameter value determined through a sampling effort? P.S.: If there is more than one parameter to be estimated in a CDM project activity, then a sample size calculation should be done for each of them. Then either the largest number for the sample size is chosen for the sampling effort with one common survey, or the sampling effort and survey is repeated for each of the parameters. A random sub-sample within the common survey is allowed as long as: (i) the reliability specification (e.g. 90/10 confidence/precision for small-scale CDM project activities and 95/10 for large scale CDM project activities) is achieved for each individual parameter; and (ii)	Not applicable

	the random sub-sample is consistent with the design of the survey and the corresponding sample size calculation.	
8.	Is the assumed response rate reasonable (appropriate and correct) for the determination of samples to be surveyed?	Not applicable
9.	Is the sample selected by PP for determination of the monitored parameters unbiased (random) and representative?	Not applicable
10.	Has minimum target level of precision been achieved based on estimates from the actual samples?	Not applicable
11.	In case the minimum target level of precision has not been achieved based on estimates from the actual samples, please specify the approach adopted by PP to reach the required precision and also justify the appropriateness of the adopted approach in accordance with the applied methodology or paragraph 17 of Sampling and surveys for CDM project activities and programmes of activities (Version 07.0).	Not applicable
12.	<p>Has VT applied acceptance sampling to verify that the results of sampling efforts undertaken by PP for determination of ex-post parameters. If yes, please provide a detailed justification of the approach adopted including information on (but not limited to):</p> <ul style="list-style-type: none"> (a) Selected AQL Level (b) Selected UQL Level (c) Selected Consumer Risk Level (d) Selected Producer Risk Level (e) Sample Size chosen for acceptance sampling (f) Acceptance number (c) <p>Approach adopted by VT to in case value of greater than c discrepant records were observed in the sample</p>	Not applicable
13.	Are the procedures for the selected survey and data collection method unambiguously defined and do they adequately provide for minimizing non-sampling errors?	Not applicable
14.	Have potential sources of bias inherent in the selected data collection method, such as self-selection and under-coverage, been anticipated? Have mechanisms for mitigating these been considered?	Not applicable
15.	Is the quality control and assurance strategy adequate?	Not applicable
16.	Are the proposed skill sets, qualifications and experience of the personnel/institutions engaged to conduct the standardized tests/data collection exercise adequate?	Not applicable
17.	<p>Does the PP have a process in place to ensure data quality is maintained to a high standard? This should include:</p> <ul style="list-style-type: none"> a) Are the personnel trained and experienced? b) What is the level of supervision and guidance provided to staff? 	Not applicable

	<ul style="list-style-type: none">c) Is there a standardized system for data entry and analysis to produce final result?d) Is there a system or process in place to minimize the introduction of errors?e) Is there a system in place to ensure all collected data is processed;f) Are quality checks performed on data entered, for example range checks,g) inconsistency checks, checking of subsamples of data by supervisors;h) is there a system to check for errors, record and report errors reported and document the remedial action taken;i) What is the level of security and type of backup processes to guarantee data integrity, for example methods to prevent fraud and accidental deletion?	
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Document information

<i>Version</i>	<i>Date</i>	<i>Description</i>
03.0	31 May 2019	Revision to: <ul style="list-style-type: none">• Ensure consistency with version 02.0 of the “CDM validation and verification standard for project activities” (CDM-EB93-A05-STAN);• Make structural and editorial improvements.
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
