



REDUCING GAS LEAKAGES WITHIN THE TITAS GAS DISTRIBUTION NETWORK IN BANGLADESH

Document Prepared By:

Carbon Check (India) Private Ltd.



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Prepared By	Carbon Check (India) Private Ltd.
Contact	Carbon Check (India) Private Ltd. Registered Office: 2071/38, 2nd Floor, Naiwala, Karol Bagh, New Delhi 110005 Corporate Office: Unit No. 1701, Logix City Centre Office Tower, Plot No. BW-58, Sector 32 Noida, Uttar Pradesh projects@carboncheck.co.in www.carboncheck.co.in
Approved By	Amit Anand, CEO
Work Carried Out By	Sanjay Kumar Agarwalla (Team Leader, Technical Expert, Local expert) Manas Halder (Trainee Assessor) R V Nesari (Technical Expert) Vikas Bankar (Technical Reviewer) S P Reddy (Technical Expert to TR)

Summary:

- A brief description of the VCS gap validation and verification and the project**

Verification: Carbon Check (India) Private Ltd. (CC IPL) has been contracted by NE Climate A/S, the project proponent, to carry out the VCS gap validation and verification of voluntary greenhouse gas emission reductions generated by the Project, “Reducing Gas Leakages within the Titas Gas Distribution Network in Bangladesh”. The verification is based on the desk review of the Monitoring report /01/, VCS PD /06/, registered CDM PDD & previous CDM verifications /B03/, supporting emission reduction calculation spreadsheet for the monitoring period /02/ and other relevant supporting documents made available to the verification team by the project proponent accompanied by on-site interviews. This verification involves the period of 01/01/2021 to 31/12/2021 (including both days).

Project: The project’s transmission and distribution of natural gas are located in Greater Dhaka and its adjacent areas in Bangladesh. The project will lead to reductions in methane, a potent greenhouse gas (GHG). The project reduces gas leakages from components in the natural gas transmission and distribution system operated by Titas Gas Transmission and Distribution Company Limited (TGT DCL) in Bangladesh. During the present monitoring period, the project has reported a total of 37,741 leaks within the project boundary.

- The purpose and scope of verification**

Purpose: The purpose of the verification is to review the monitoring results and verify that the monitoring methodology was implemented according to the monitoring plan and monitoring data,

used to confirm the reductions in anthropogenic emissions by sources is sufficient, definitive, and presented in a concise and transparent manner. In particular, the monitoring plan, monitoring report, and the project's compliance with relevant VCS, UNFCCC, and host party criteria are verified to confirm that the project has been implemented in accordance with the previously registered design and conservative assumptions, as documented.

Scope: The scope of the verification is:

- To verify the VCS gap validation and project implementation and operation with respect to the VCS PD.
- To verify the implemented monitoring plan with the VCS PD and applied baseline and monitoring methodology.
- To verify that the actual monitoring systems and procedures comply 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 to be certified.

- **The method and criteria used for verification**

(a) Desk review, involving:

- (i) Review of the data and information presented to verify their completeness;
- (ii) Review of the monitoring plan and monitoring methodology, paying particular attention to the frequency of measurements, the quality of metering equipment including calibration requirements, and the quality assurance and quality control procedures;
- (iii) Evaluation of data management and the quality assurance and quality control system in the context of their influence on the generation and reporting of emission reductions;

(b) On-site assessment involving:

- (i) Assessment of the implementation and operation of the proposed VCS project as per the VCS PD;
- (ii) Review of information flows for generating, aggregating, and reporting the monitoring parameters;
- (iii) Interview with relevant personnel to confirm that the operational and data collection procedures are implemented in accordance with the monitoring plan in the VCS PD;
- (iv) A cross-check between information provided in the monitoring report and data from other sources such as inventories, purchase records or similar data sources;
- (v) A check of the monitoring equipment including calibration performance and observations of monitoring practices against the requirements of the VCS PD and the selected methodology;
- (vi) Review of calculations and assumptions made in determining the GHG data and emission reductions;
- (vii) 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.

- **The number of findings raised during verification**

A risk-based approach has been followed to perform gap validation and this verification. During the course of verification, a total of 09 findings were raised, which include:

02 Corrective Action Request (CAR); 07 Clarification Requests (CLs);

All the raised findings have been resolved by the PP.

- **Any uncertainties associated with the verification**

The VCS PD /06/, MR /01/, emissions reduction calculations /02/ along with the supporting documents provided are considered to be in line with all the VCS requirements /B01/. The verification team has detected no further uncertainties or quality restrictions.

- **Summary of the verification conclusion**

In CCIPL's opinion, the emission reductions reported for the project "Reducing Gas Leakages within the Titas Gas Distribution Network in Bangladesh" in the monitoring report are fairly and correctly stated. CCIPL is, therefore, able to certify that the emission reductions from the project during the period from 01/01/2021 to 31/12/2021, are 4,137,966 tCO₂ equivalents.

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1 INTRODUCTION

1.1 Objective

Carbon Check (India) Private Ltd. (CC IPL) has been contracted by NE Climate A/S, the Project Proponent (PP), to undertake the VCS gap validation and verification of the project titled “Reducing Gas Leakages within the Titas Gas Distribution Network in Bangladesh” for the monitoring period 01/01/2021 to 31/12/2021 (including both days). Through the verification activities, it is to be confirmed that:

- The project is implemented as described in the VCS Project Description document /06/;
- The monitoring system is implemented and fully functional to generate emission reductions without any double-counting, and
- The data reported are accurate, complete, consistent, transparent, and free of material error or omission by checking the monitoring records and the emissions reductions calculation.

The verification followed the requirements of the current version of the VCS Standard, Version 4.3, and the VCS program guide, Version 4.2 /B01/ to ensure the quality and consistency of the verification work and the report.

1.2 Scope and Criteria

The verification of this project is based on the Monitoring Report of this monitoring period /01/, VCS PD /06/, Emission reduction calculation spreadsheets /02/, supporting documents made available to the verifier, and information collected through performing on-site visit interviews. Furthermore, publicly available information was considered as far as available and required.

CC IPL has employed a risk-based approach in the verification, focusing on the identification of significant risks and reliability of project monitoring and generation of emission reductions.

The verification is carried out on basis of the following requirements, applicable for this project activity:

- VCS Standard, Version 04.3 /B01/
- VCS Program Guide, Version 04.2 /B01/
- CDM Methodology: AM0023, Version 04 /B02/.
- Other relevant rules, including the host country legislation

The scope of this verification, by independent checking of objective evidence, is as follows:

- To verify that the project is implemented as described in the registered CDM PDD and the VCS PD.
- To assess the project’s compliance with other relevant rules including the host country legislation.

- To confirm that the monitoring system is implemented and fully functional to generate voluntary emission reductions without any double counting.
- To establish that the data reported are accurate, complete, consistent, transparent, and free of material error or omission by checking the monitoring records and the emissions reduction calculation.
- 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 to be certified.

The method and criteria used for verification consisted of the following phases:

1. Completeness check and desk review;
2. On-site visit interviews with stakeholders;
3. Resolution of outstanding issues and issuance of final verification report and applicable VCS Validation and Verification Deeds of Representation.

CCIPL conducts all its work under strict rules to safeguard impartiality and ensure the independence of the verification team. The verification team does not provide any consulting or recommendations for the client. However, stated requests for clarifications and/or corrective actions may provide input for improvement of the monitoring activities.

1.3 Level of Assurance

The verification report is based on the Monitoring report /01/, ER spread sheet /02/, supporting documents /03/-/25/ made available to the verifier, and information collected through performing interviews.

The verification has been planned and organized to achieve a:

- ☒ Reasonable level of assurance as per VCS Standard, version 4.3
☐ Limited level of assurance

1.4 Summary Description of the Project

This is the first monitoring report under VCS for the project which employs the CDM methodology; AM0023, Version 04 /B02/. The project aims to reduce gas leakages from components in the natural gas transmission and distribution system operated by TGTDCI in Bangladesh. The gas risers covered under the project boundary are from Greater Dhaka and its adjacent areas and include the following twelve regions: Dhaka, Narayanganj, Narsingdi, Munshiganj, Manikganj, Gazipur, Tangail, Mymensingh, Jamalpur, Sherpur, Netrokona, and Kishoreganj. The project reduces the leaks in the transmission/distribution system caused by normal component wear, thermal and vibrational stresses, and seasonal expansion/contraction cycling from ambient air temperature changes. The project implements advanced leak detection and repairs (LDAR) procedures to identify and implement various interventions to arrest leakage and thus reduce methane emissions at valves, insulating joints, pressure regulators, and other above-ground gas transmission/distribution infrastructure. The project proponent for the project activity is NE Climate A/S, which owns the rights to VERs /04/.

The total GHG emission reductions achieved from Project activity are 4,137,966 tCO_{2e} for this monitoring period.

The project activity has been implemented as described in the VCS PD and the emission reductions are calculated conservatively as per the applied methodology /B02/.

2 VERIFICATION PROCESS

2.1 Method and Criteria

The method and criteria used for verification:

The verification consists of the following three phases:

1. Completeness check and desk review of the validation report, monitoring plan, monitoring report, monitoring methodology, VCS PD, and applicable tools in particular attention to the frequency of measurements, quality of metering equipment including calibration requirements, QA/QC procedures, and other relevant documents;
2. On-site visit interviews (including follow-up interviews with project stakeholders, when deemed necessary). The on-site interviews include the following:
 - An assignment of implementation and operation of project activity with respect to validated VCS PD
 - Review of information flows for generating, aggregating, and reporting the monitoring parameters;

- Interview with relevant personnel to determine whether the operational and data collection procedures are implemented and in accordance with the monitoring plan of the validated VCS PD,
 - Cross-check information and data provided in the monitoring report with purchase records or similar data sources;
 - Review of assumptions made in calculating the emission reductions (if any);
 - Implementation of QA/QC procedure inline with the VCS PD and methodology requirements.
3. Resolution of outstanding issues and the issuance of the final Verification report and as applicable the VCS Verification Deed of Representation.

2.2 Document Review

During the document review, CCIPL has applied standard auditing techniques to assess the quality of the information provided. The verification was performed primarily based on the review of the monitoring report and the supporting documentation. This process included:

- A review of data and information presented by the PP to verify their completeness
- A review of the MP and monitoring methodology, paying particular attention to the frequency of measurements, the quality of metering equipment including calibration requirements, the QA/QC procedures, and
- An evaluation of data management and the QA/QC system in the context of their influence on the generation and reporting of ERs.

The monitoring report (version 1, dated 16/04/2022) /01-1/ was initially reviewed and CCIPL requested the PP to present the supporting information and documents /03 -25/. The documents were reviewed by CCIPL. Through the process of the verification, the revised monitoring report and the supporting documents were evaluated to confirm the actions taken by the PP to the CARs and CLs issued by the verification team.

The list of documents referred during the course of this verification has been provided in Appendix-1.1.

2.3 Interviews

A site visit to the project activity was undertaken on 12/06/2022 to confirm the information as outlined in the table below and to resolve issues identified in the document review. The site visit was conducted to assess the implementation and operation of the project activity and review evidence, and interview key personnel to confirm evidence associated with the project design, implementation, plant operations, environmental impacts, stakeholders, etc.

The table below describes the on-site interview process and further identifies personnel, including their roles, who were interviewed and/or provided information additional to that provided in the project description, Monitoring report /01/, and any supporting documents.

	Date	Name	Organization	Topic	Persons Interviewed
/1/	12/06/2022	Daragh Glynn	NE Climate A/S	Project implementation and operation	Sanjay Kumar Agarwalla, Manas Halder, and R V Nesari
/2/	12/06/2022	Kevin James	Climate Compass LLC	Project implementation and operation, monitoring procedure, data and information flow, CER calculation and MR preparation, QA/QC Procedures, Management, and operating system	
/3/	12/06/2022	Oleksandr Potapenko	MBS	Project implementation and operation, monitoring procedure, data and information flow, data management, monitoring instrument maintenance and calibration, training of the PSL staff	
/4/	12/06/2022	S M Rezaul Haque	TGTDCL	Leak maintenance under safety and emergency situations	
/5/	12/06/2022	Md Ehsanul Matin Shujan	TGTDCL	Leak maintenance under safety and emergency situations	
/6/	12/06/2022	Asma Huque	PSL	Project implementation and operation	
/7/	12/06/2022	Tanvir Ahmed		Project implementation and operation, monitoring procedure, data and information flow, data management, monitoring instrument maintenance and calibration	
/8/	12/06/2022	Tuhin Subra Ghosh			
/9/	12/06/2022	Asadujjanan Akash			
/10/	12/06/2022	Md Ibrahim Hossain			
/11/	12/06/2022	Arifur Rahaman			

	Date	Name	Organization	Topic	Persons Interviewed
/12/	12/06/2022	Shah Ashequr Rahaman			

The verification team has carried out on-site interviews to assess the information included in the monitoring report and monitoring measurement procedures adopted during the monitoring period. During the desk review, the relevant monitoring records were checked.

Through the review of validation reports, comparing the relevant evidence, and interviewing with the PP's representatives through on-site visit interviews, CCIPL has confirmed that the project is implemented in line with the VCS PD /06/ during the monitoring period. There is no change in the project design, operation, and monitoring plan.

2.4 Site Inspections

Carbon Check has conducted an on-site inspection to confirm all physical features of the project activity proposed in the registered PD are in place and that the project proponent has operated and correctly monitored all parameters of the project activity as per the registered CDM PDD and VCS PD during this monitoring period. A reasonable level of assurance has been maintained for verification as follows:

- 1) An assessment of the implementation and operation of the project activity as per the VCS PD
- 2) A review of information aggregating and reporting of the monitoring parameters
- 3) Interviews with relevant personnel to confirm that the operational and data collection procedures are implemented in accordance with the MP
- 4) A cross-check between product sales information provided in the MR and data from other sources.
- 5) A check of the monitoring equipment including calibration performance, and observations of monitoring practices against the requirements of the VCS PD and the applied monitoring methodologies
- 6) A review of calculations and assumptions made in determining the GHG data and ERs, and
- 7) An identification of QA/QC procedures in place to prevent, or identify and correct, any errors or omissions in the reported monitoring parameters

The total number of leaks identified, repaired, and then re-surveyed within the monitoring period was cross-checked by the verification team with the ER calculation spreadsheets /02/ and can be confirmed to be correct.

The verification team took note of paragraphs 26 and 27 of the Sampling Standard, version 09 which states the following:

Paragraph 26: The DOE may apply a sampling approach for on-site visits and/or remote surveys as part of validation/verification, applying the “Guideline: Sampling and surveys for CDM project activities and programme of activities”, irrespective of whether the above-mentioned sampling plan exists or the project participants or the coordinating/managing entity have undertaken sampling surveys.

Paragraph 27: When the project participants or the coordinating/managing entity have not applied a sampling approach, the DOE may apply a sampling approach, choosing a different confidence/precision than the ones indicated in paragraph 11 above, provided that samples are randomly selected and are representative of the population.

As it is not possible to individually verify all the reported leaks, the verification team applied a sampling approach for the on-site assessment/inspection. The verification team has then randomly selected 25 sample points for the on-site inspection. The detailed method/steps applied to randomly select the sample points out of the total leaks are provided below:

The verification team used an online Raosoft calculator to derive an appropriate initial number of samples for an on-site visit. The verification team has applied a 90/10 confidence/precision (assuming response distribution as 90%) and the sample size calculated is 25 and the same is conveyed to the PP in the verification audit plan. The verification team had also indicated in the verification audit plan, that during the on-site visit inspection if the discrepancy is identified in the selected samples, the verification team shall increase its sample size (applying the materiality concept in line with VVS for project activities, version 03.0).

During the assessment of sample points, as applicable, the verification team has conducted an on-site inspection and also a plausibility check of information provided in:

- (i) hard copy protocols
- (ii) data tags fixed on-site at every surveyed leak,
- (iii) leak report files,
- (iv) ER calculation spreadsheets and HFS Data Log Files /15/.

All information of the selected sample points verified was consistent and plausible and thus no further samples were conducted by the verification team and the records of all the repaired leaks were acceptable to the verification team. The verification team carried out on-site interviews with representatives of PP to assess the information included in the project documentation and to gain additional information regarding the compliance of the project with the relevant criteria applicable for the VCS.

2.5 Resolution of Findings

CCIPL, during this verification, identified issues related to the monitoring, implementation, or operation of the VCS project that could impair the capacity of the proposed VCS project to achieve project emission reductions or influence the reporting of emission reductions. CCIPL has identified and discussed these issues within the Verification report in Appendix 4.

- Clarification requests (CLs): Project reporting lacks transparency and further information is needed to determine if a material discrepancy is present.
- Corrective action requests (CARs): The VVB has identified a material discrepancy or non-conformance that the project proponent must address.

The verification team identified 02 CARs and 07 CLs. All CAR and CLs raised by Carbon Check during this verification have been resolved by the PP. If this was not completed, the ERs cannot be certified and recommended for issuance to the VCS Registry.

2.5.1 Forward Action Requests

Forward Action Request (FAR) is to be raised when the monitoring and reporting require attention and/or adjustment for the next verification period. FARs do not relate to VCS requirements for issuance of ERs achieved during subject monitoring.

No FAR was raised either during CDM validation or previous verifications. CCIPL has not raised any FAR during this verification.

2.6 Eligibility for Validation Activities

The project activity falls under sectoral scope 10 and the CCIPL is accredited for validation /verification of project activities under this scope.

3 VALIDATION FINDINGS

3.1 Participation under Other GHG Programs

This is a registered CDM project activity by UNFCCC (Reference number 10077). UNFCCC Clean Development Mechanism is approved by VCS Program and meets VCS criteria. The validation report was issued on 16/03/2015 and the project was registered by UNFCCC on 17/03/2015.

UNFCCC Clean Development Mechanism is approved by VCS Program and meets VCS criteria. As the project has been validated under CDM, validation of only the clauses 1.1, 1.2, 1.3, 1.5, 1.6, 1.7, 1.8, 1.9, 1.10, 1.12, 1.13, 1.14, 1.15.1, 1.16, 1.17, 1.18 and 3.6 of the VCS PD as per VCS Standard, Version 04.3 were carried out as below:

1.1: Summary Description of the Project

The proposed project activity aims to reduce potent greenhouse gas leakage from components into the system and then to the atmosphere (predominantly methane). Leaks in the distribution system are caused by normal component wear, thermal and vibrational stresses, and seasonal expansion/contraction cycling from ambient air temperature changes. Natural gas leaks occur through various sources including, ball/gate/plug valves, flanges, and connectors. These components have not been routinely checked for leaks under the existing safety practices of TGTDCCL. The gas company operators lack the advanced leak detection equipment, advanced repair materials, and trained workers to identify chronically leaking components, accurately measure the leak rates and make reliable repairs to the leaks.

The project activity is planned to reduce natural gas leakage in the distribution network of TGTDCCL. The project implements advanced leak detection and repairs (LDAR) procedures to identify and implement various reduction of methane emissions repair works at components in the natural gas above-ground distribution system, using advanced leak detection and measurement technology including HiFlow Samplers. Leak Measurement Devices and Gasurveyors as well as advanced repair materials. It is confirmed from training documents that the selected staff of TGTDCCL will be trained in advanced leak detection, measurement, and repair techniques. The project will lead to the reduction of methane emissions at flanges, valves, insulating joints, and other above-ground equipment components.

The estimated total amount of emission reductions over the chosen 10-year “fixed crediting period” is 34,913,136 tCO_{2e}. The estimated amount of average annual emission reductions is 3,491,314 tCO_{2e}.

During the on-site visit inspection, the location (as mentioned in section 1.12 of VCS PD) and all the technical aspects of the project activity mentioned in the VCS PD have been verified. The VVB has checked all the above-mentioned details and confirms that all the information provided is accurate.

1.2: Sectoral Scope and Project Type

The project activity falls under Sectoral Scope 10: Fugitive emissions from fuels (solid, oil, and gas). The project is not a grouped project.

1.3: Project Eligibility VVB confirms that the project is eligible under the VCS program as below:

1. The emissions reduction of the project comes by arresting Methane (CH₄) emissions by finding and repairing the leak in the project scenario; hence the project is applicable to this scope.

2. Ozone-depleting substances: This project does not involve ODSs.

3. Project activities supported by a methodology approved under the VCS Program through the methodology approval process: This project does not use a methodology approved under the VCS Program through the methodology approval process. The project is based on CDM-approved Methodology AM0023 version 04.

4. Project activities supported by a methodology approved under a VCS approved GHG program, unless explicitly excluded under the terms of Verra approval: The project uses CDM-approved methodology AM0023, version 04 which is a VCS-approved GHG program.

5. Jurisdictional REDD+ programs and nested REDD+ projects as set out in the VCS Program Document Jurisdiction and Nested REDD+ (JNR) Requirements: This project does not involve REDD+.

Also, the project is not included in the projects excluded in Table 1 of VCS Standard 4. 2.

Hence the VVB confirms that the project is eligible under the scope of the VCS program.

1.5: Project Proponent

NE Climate A/S is the Project Proponent for the project activity. This was verified from the LoA issued by the Annex 1 party DNA /B06/ in the name of the PP for the project activity,

1.6: Other Entities Involved in the Project

Other entities involved in the project activity is Climate Compass LLC. The main responsibilities of this entity are project development and implementation. This was verified on review of the CDM registered PDD and corresponding validation report /B03/, VCS PD /06/, and on-site visit interviews by the VVB.

1.7: Ownership

Evidence of Project Ownership has been demonstrated by the right of PP to use the emission reductions arising due to this project activity as verified from LoA issued in the name of the PP for the project activity /B06/. This was further verified from the agreement between Titas Gas Transmission & Distribution Co., Ltd., and NE Climate A/S, dated 06/12/2013 /04/.

1.8: Project Start Date

As per the VCS PD, 29 January 2017 is the date of the commencement of the full baseline study, and repairs and actual emission reductions started from this date. Some minor work was done as part of a pilot phase earlier, but during the pilot study, no leak repairs were done and only a preliminary study on leakages was done which was confirmed with interviews with the PSL representatives and also study of the database. The VVB team has verified the log record of repairs done on the first day i.e., 29 January 2017 to confirm the date of 1st repair done under this project activity /03/. This is in accordance with section 3.7 of the VCS Standard, Version 4.3 /B01/.

1.9: Project Crediting Period

10-year fixed crediting period has been selected by the PP from 29/01/2017 to 28/01/2027 which is deemed acceptable to the VVB.

1.10: Project Scale and Estimated GHG Emission Reductions or Removals

Project Scale

Project Scale	
Project	
Large project	√

The estimated average annual GHG emission reductions as per the VCS PD are 3,512,909 tCO₂e/annum which is greater than 300,000 tCO₂e.

1.12: Project Location

The project is hosted by Titas Gas Transmission & Distribution Company Ltd. The company's headquarters are based in Dhaka. The project is implemented across Titas' distribution network which covers Greater Dhaka and its adjacent areas and includes the following twelve regions: Dhaka, Narayanganj, Narsingdi, Munshiganj, Manikganj, Gazipur, Tangail, Mymensingh, Jamalpur, Sherpur, Netrokona, and Kishoreganj. This was confirmed on review of the registered CDM PDD /B03/ and also confirmed during the on-site visit interviews by the VVB.

1.13: Conditions Prior to Project Initiation

In the absence of the project activity significant percentage of natural gas leaks from components in the system & atmosphere. The project aims to reduce gas leakages from components in the natural gas transmission and distribution system operated by TGTDCCL in Bangladesh. Currently, TGTDCCL does not have a formal operational procedure or specification on what type of maintenance should actually be implemented to ensure the proper functioning of components across the network. During the on-site visit interviews, it was confirmed that the TGTDCCL team generally relies on odor and soap bubbles to identify leaks which is ineffective as odor does not allow a repair person to identify a leak or its size and this method gives no information on the actual size of the leak which is critical to making cost-effective repairs. Also, there is no limit on how much a component can leak before it is declared unsafe. Also, on interviews with the officials of TGTDCCL, it was confirmed that the TGTDCCL does not have any advanced leak detection equipment and the company lacks the modern repair materials required to fix all leakages. The VVB team has checked this scenario with the registered CDM PDD /B03/ and deemed it consistent with the VCS PD /06/.

1.14: Compliance with Laws, Statutes and Other Regulatory Frameworks

The assessment team by its document review /21/confirmed that the project activity is in compliance with all the applicable Bangladesh laws. The project complies with the 'Natural Gas Security Law' also known as 'Prakitik Gas Nirapatta Bidhimala,1991 -Revised in 2003'. Declaration /24/ has been provided by the PP to confirm that all repair works are carried out in compliance with "National Gas Security Law" also known as "Prakitik Gas Nirapatta Bidhimala, 1991 –Revised in 2003" and other Bangladesh regulatory requirements.

The assessment team has also confirmed that the baseline scenario presented in the VCS PD is also in compliance with the laws and regulations of Bangladesh. The same is elaborated in detail in section 1.14 of VCS PD.

1.15.1: Projects Registered (or seeking registration) under Other GHG Program(s)

The project is registered under the United Nations Clean Development Mechanism (CDM) Program with the registration number 10077 and all project information can be found at <https://cdm.unfccc.int/Projects/DB/TUEV-RHEIN1418008670.0/view>.

1.16.1: Emissions Trading Programs and Other Binding Limits

This is not applicable as the project is registered by UNFCCC Registration Reference number 10077 and is approved by the host party DNA. PP has submitted self-declaration in this respect /24/. Hence it is confirmed that the project does not reduce GHG emissions from activities that are included in an emissions trading program or any other mechanism that includes GHG allowance trading.

1.16.2: Other Forms of Environmental Credit

The project is located in Bangladesh and is developed and operated by NE Climate A/S. There is no other environmental credit that has or will be produced by or obtained for the project. A self-declaration letter from the project proponent addressing that the project does not yield any green benefits has been provided /24/.

1.17: Sustainable Development Contributions

Natural gas leaks result in emissions of methane into the atmosphere. The implementation of the project from 29 January 2017 has already started emission reductions. The average annual estimated emission reduction is 3,491,314tCO₂e over its ten-year crediting period. In addition to reducing greenhouse gas emissions, this project will also contribute to the People's Republic of Bangladesh's sustainable development goals by:

Improving environmental quality and minimizing risks for employees and local communities due to the reduction of harmful pollutants (methane);

Preserving a finite resource (natural gas). The reduction in gas losses will mean that the same amount of service can be provided to customers of Titas but with a lesser amount of gas required. Using a finite resource more efficiently, and thus preventing waste of that resource, is an important example of sustainable development;

Capacity building of the local staff in advanced LDAR techniques;

Transferring advanced technology in the form of leak detection kits and repair materials that have not been utilized in Bangladesh;

Job creation through the hire of around 23 staff;

Strengthening human capital in the country through retention and employment of locals to support the project implementation (leak measurement program, repair works, and monitoring).

1.18: Additional Information Relevant to the Project

Leakage Management

NA- There is no expected change of emissions outside the project boundary expected from reducing leakage from gas pipelines.

Commercially Sensitive Information

No commercially sensitive information has been excluded from the public version of the project description.

3.6: Methodology Deviations

Based on the review of the VCS PD, the VVB team is able to confirm that no methodology deviation has been applied.

Hence the project activity meets the criteria of clauses 1.1, 1.2, 1.3, 1.5, 1.6, 1.7, 1.8, 1.9, 1.10, 1.12, 1.13, 1.14, 1.15.1, 1.16, 1.17, 1.18 and 3.6 of the VCS PD as per VCS Standard, Version 04.3 and is likely to achieve the estimated emission reductions.

3.2 Methodology Deviations

There is no methodology deviation identified during the current monitoring period.

3.3 Project Description Deviations

There is no project description deviation identified during the current monitoring period.

3.4 Grouped Project

This is not a group project hence this section is not applicable.

4 VERIFICATION FINDINGS

4.1 Project Implementation Status

The VCS project, “Reducing Gas Leakages within the Titas Gas Distribution Network in Bangladesh” (VCS Project ID 2930) applies the CDM methodology AM0023 version 04 /B02/. This is the first monitoring report for the project under VCS.

CCIPL by means of on-site visit interviews and document review assessed that all the features (technology, project equipment, and monitoring) of the registered PDD are in place and that the project participants have operated the project as per the registered PDD /B03/.

The project aims to reduce gas leakages from components in the natural gas transmission and distribution system operated by TGTDCI in Bangladesh. The gas risers covered under the project boundary are from Greater Dhaka and its adjacent areas and include the following twelve regions: Dhaka, Narayanganj, Narsingdi, Munshiganj, Manikganj, Gazipur, Tangail, Mymensingh, Jamalpur, Sherpur, Netrokona, and Kishoreganj. The project reduces the leaks in the transmission/distribution system caused by normal component wear, thermal and vibrational stresses, and seasonal expansion/contraction cycling from ambient air temperature changes. The project implements advanced leak detection and repairs (LDAR) procedures to identify and implement various interventions to arrest leakage and thus reduce methane emissions at valves, insulating joints, pressure regulators, and other above-ground gas transmission/distribution infrastructure.

The verification team noted that a similar project covering other distinct subareas of the Titas service area is being proposed under VCS (Project ID: 3021). None of the subdistricts, regions, or infrastructure in this project overlap with each other. The emission reductions implemented through this project will be demonstrably unique in their location through GPS coordinates and other identification data like street addresses and visual markings and not be included in any other project claiming emission reduction credits under other GHG programs so there is no double counting.

As stated in the MR, the project is funded by NE Climate, which provides survey equipment, repair materials, and project transportation. The PP (NE Climate) has hired Climate Compass LLC as a technical partner to help manage the project implementation and compliance with the registered CDM PDD. Climate Compass has hired M.B.S as a 3rd party technical consultant to help confirm through regular inspections that the project is compliant with the methodology and PDD. Climate Compass has hired Prokaushali Sangsad Limited (PSL) to do the project implementation work on a day-to-day basis.

The PSL team includes project managers to direct the daily workflow, database managers to ensure the data gathered from the project is recorded correctly, and operators in the field who take the appropriate measurements and log the data. The roles and responsibilities of each of the above parties are discussed and the respective documentation has been verified by the verification team. The training certificates of the monitoring personnel and calibration team are checked and verified by the verification team /23/ which could also be confirmed by the verification team during the on-site visit interviews.

37,741 gas leaks are included in the database of the current monitoring period and were monitored. As per the registered PDD: The project boundary will be defined in detail in a database, of all the leaking components identified and repaired during the baseline study completed on the above-ground equipment in the TGTDCCL gas system. The PP had done the baseline survey from 29/01/2017 to 28/01/2018 and the components covered during the baseline survey form the project boundary. This is in line with the registered PDD and also the applied methodology. The verification team also noted that in some components, second or third leaks were identified during the monitoring and PP is claiming emission reductions only for the period after the monitoring date when the new leaks were repaired or after the date of re-repair for any re-emerged leaks till the end of the monitoring period. This is deemed acceptable to the verification team as these newly found leaks are within the project boundary.

The assessment of gas leak repairs made with advanced material was done by visual inspection of the quality of the repair of all leaks assessed during on-site visit inspection and interviews by the verification team. The check of the quality of the repairs was made through the leak flow identification made by the verification team by on-site inspection with the application of GS/HFS device and soap spray solution, monitoring records check for selected leaks via cross-checking of references as well as desk review and check of Emission Reduction calculation spreadsheet /02/.

The project activity is processed using multiple steps for every individual leak surveyed, starting with the leak identification by an LDMT, the subsequent repair of these detected leaks by repair teams, and, finally, the LDMT undertakes additional measurements to monitor the effectiveness of the repairs undertaken. If required, re-repair steps are included in this process chain. The major measurement devices applied are a set of up to four identical Hi-Flow Samplers obtained from the US-based distributor Heath Consulting, where the proper operation and maintenance of these Hi-Flow Sampler devices, including staff training, is supervised and controlled by MBS. The HFS, a product of Bacharach Inc., is a machine designed to detect and measure leaks in gas infrastructure.

The Hi-Flow Sampler, a high volume sampler, represents a technology directly referenced in the applied monitoring methodology AM0023, version 04 /B02/ and the registered CDM PDD /B03/ for use in quantifying emissions. The device operates by capturing all emissions from a leaking component to accurately quantify leak flow rates. Leak emissions, plus a large volume sample of the air around the leaking component, are pulled into the instrument through a vacuum sampling hose.

Methane emissions are obtained by calibrating the hydrocarbon detectors to a range of concentrations of methane in the air. Hi-Flow Samplers are equipped with special attachments designed to ensure complete emissions capture and to prevent interference from other nearby emissions sources. The hydrocarbon sensors are used to measure the exit concentration in the air stream of the system. The Hi-Flow Sampler automatically accounts for standard temperature and pressure (i.e., 0 degrees Celsius and 101.3 kPa) in its leak flow rate measurements. The normalized results of the measured leaks are $\pm 10\%$ accurate.

The data management team coordinates the process of detecting, repairing, and monitoring leaks involving thorough management of data through different media (weather-proof data tags, hard copy protocols, leak report files, data log files, and ER calculation spreadsheet). In this respect for every individual leak, the ER calculation basically starts with the first monitoring after this individual leak repair has been successfully undertaken (or with the start date of the monitoring period, whichever is later), and ends with the end date of the monitoring period. For this monitoring period (from 01/01/2021 to 31/12/2021) a total number of 37,741 leaks have been included in the data system of the project activity.

During the desk review process and on-site visit, it could be confirmed that the implementation and the operation of the project activity are consistent with the approved baseline and monitoring methodology AM0023, version 04 /B02/ and the registered CDM PDD. Also, the project operated continuously during the monitoring period with a steady supply of natural gas without any outages as confirmed by TGTDC /11/.

Technical specifications of the Gas Surveyor and High Flow sampler were checked with the websites <https://www.manualslib.com/manual/537303/Bacharach-Hi-Flow-Sampler.html> and <https://www.manualslib.com/manual/1635234/Gmi-Gasurveyor-11-500.html>. The age and average lifetime of the material used in the repair was checked with the letter from MBS Ltd, which confirms that the repair materials used in the project are designed to and capable of ensuring that the leaks mostly do not reappear within the 10 years of the project crediting period.

A complete set of monitoring data as specified in the registered CDM PDD have been provided to the verification team relevant for the monitoring period from 01/01/2021 to 31/12/2021 (including both days) and all necessary evidence, data files, and underlying documents have been transparently provided to the verification team, such as ER calculation spreadsheet /02/, Leak Report Files, Hard Copy Protocols and Data Log Files of the Hi-Flow Sampler /15/.

Furthermore, the verification team noted that there were a few risers for which the gas supply was stopped for some period during the monitoring period or during the monitoring, and PP was not able to reach a few of them. In all such cases of outages, PP has not considered these risers for emission reductions for the full monitoring period which is a conservative approach and hence deemed acceptable to the verification team.

The verification team has cross-checked whether the leak tags correspond to the photos of leak tags made and provided in the excel sheets - leak report files /15/, and also whether the hand-written information entered by the operator provided in the leak tags such as:

- leak ID number on leak tags
- Date of baseline leak flow measurement (before the repair), the date of leak flow measurement after leak repair (or also re-repair, if any), and the date of leak flow monitoring measurement(s)
- The values of leak flow on the date of baseline leak measurement, on the date of leak flow measurement after leak repair (or also re-repair, if any), and on the date of monitoring measurement(s)
- The HFS number applied on the date of baseline leak flow measurement, the date of measurement after leak repair (or also re-repair, if any) and the date of leak monitoring measurement(s), and the records numbers in HFS memory corresponding to each leak flow measurements
- The name of the operator who has performed each corresponding leak flow measurement corresponds to the information contained in (i) hard copy protocols (ii) leak report files, (iii) ER calculation spreadsheet, and (iv) Data Log Files, as appropriate, for each on-site visit surveyed leak.

The total amount of GHG reductions calculated for this monitoring period from 01/01/2021 to 31/12/2021 including both days is 4,137,966tCO_{2e}.

The verification team confirms that an appropriate approach has been chosen by the PP to ensure that within the monitoring period, the claim for emission reductions for any new leaks that have been identified during monitoring is restricted to the period after the monitoring date when the new leaks were repaired or after the date of re-repair for any re-emerged leaks till the end of the monitoring period (i.e. 31/12/2021).

Following the decision tree of leaks inclusion in the project activity (page 25 of the CDM PDD) when equipment ceases to function and leaks in emergency situations, these leaks will be repaired by an emergency repair team that works completely independent from the operation of the project activity. The corresponding procedures are described in the MR /2/. No emergency leaks and cases with replacement of equipment were included in the emission reduction calculation spreadsheet which could be confirmed through interviews with the representatives of TGTDCI and PSL and also a declaration provided by TGTDCI and a sample log of emergency repairs maintained by TGTDCI /11/. During each monitoring visit, the operator checks the current configuration of the equipment against the photographs and technical schematics completed during the baseline study. Database entries representing leaks that have been shut off are no longer used to calculate emission reductions. Thus, it can be confirmed that emission reductions resulting from the leaks repaired before the list of scheduled equipment to be replaced in the baseline scenario are not claimed in the ER calculation spreadsheet.

Following the decision tree of leaks inclusion in the project activity, the leak which can be identified and repaired with materials and know-how available before the CDM Project (like a simple tightening of a loose-fitting or connection) has not been included in the CDM Project Database which could be confirmed by the interviews made with the members of LDMT and representative of MBS and PSL. Based on the visual observation of the sample leaks during the on-site visit assessment of the project performed, the verification team has confirmed the usage of only advanced repair materials for all leaks repaired as part of the project activity.

The project activity complies with all the national statutory requirements /21/. CCIPL's verification team considers the project description to be complete and accurate.

CCIPL's verification team confirms that the project activity is implemented within the boundary of the project activity as described in the registered PDD /B03/ and the implementation and operation of the project activity have been conducted in accordance with the description contained in the registered PDD /VCS PD.

During the on-site interviews verification, QA/QC procedures were identified which demonstrate that: the operational and management system of the project is in place; data were centralized; monitoring data were crosschecked, records stored and confirmation that all operational staff was trained before taking up positions. The verification team thus confirmed that the monitoring of the project activity has been implemented in accordance with the monitoring plan in the VCS PD.

The VCS PD clearly describes the monitoring and responsibility of monitoring done by PP. During the on-site interviews, monitoring, data collection, and reporting procedures were confirmed with the relevant staff and through document review of samples of all relevant records.

All the ex-ante parameters which are used in the calculation of emission reductions are consistent with the CDM PDD / VCS PD. It is confirmed that ex-ante parameters mentioned in section 4.1 of the MR /01/ are in line with the parameters mentioned in section 5.1 of the VCS PD. All the ex-post parameters have been monitored as per the monitoring plan and presented in section 4.2 of the MR /01/.

In summary, the monitoring period is reasonable, and the operation of the project activity is in accordance with the registered PDD /B03/. There were no changes observed from the technology stated during the validation. CCIPL's verification team considers the project description to be complete and accurate.

4.2 Safeguards

4.2.1 No Net Harm

Not applicable as the project does not pose any potential negative environmental and socio-economic impact.

4.2.2 Local Stakeholder Consultation

The local stakeholder consultation meetings were held during the CDM validation. Also, ongoing communication with local stakeholders has been stated in section 2.2 of the MR /01/. To undertake the monitoring activity, the monitoring teams visit every riser included in the database during each monitoring period. In the process of conducting the monitoring, they regularly meet the customer and explain that they are repairing and maintaining leaks and receive regular feedback from the customers. In addition, the gas company maintains a customer service line and any issues that arise are passed to the teams as needed. TGTDCI also maintains a log of any complaints/emergency leakage.

The validation team confirms the procedure and method for engagement, the method for documenting the outcomes of the consultation, and the account of all inputs received. The verification team confirms that the project proponent has taken due account of all input (no negative comments were received for the project). Hence the verification team deemed the local stakeholders meeting procedure including the inputs received as appropriate.

4.3 AFOLU-Specific Safeguards

This is a non-AFOLU project and hence this section is not applicable.

4.4 Accuracy of GHG Emission Reduction and Removal Calculations

The equations and choices provided in the methodology and all other methodological tools are correctly quoted in the MR /01/. The emission reductions of the project are calculated using the formulae mentioned in the applied methodology AM0023 version 04 /B02/. The verification team has reviewed the emission reduction spreadsheets (ER sheets) and checked all the formulae and found they are correct and are in accordance with the monitoring plan of the PD and the applied monitoring methodology.

The verification team checked the Emission Reduction calculation sheet /02/ and confirms that the equations used have been correctly applied and as per the selected methodologies AM0023 “Leak detection and repair in gas production, processing, transmission, storage and distribution systems and in refinery facilities”, version 04 /B02/ and the registered CDM PDD /B03/.

Baseline emissions:

Baseline emissions are determined based on the quantity of CH₄ emitted through physical leaks that are detected and repaired as part of the project activity (i.e., by the advanced LDAR program).

Option 2 of the methodology AM0023 /B02/ has been chosen to measure the flow rate of the physical leaks through the use of a Hi-Flow Sampler. In addition, the baseline emissions are capped to the baseline emission level of the first crediting year, which is again as per the methodology.

The baseline emissions are calculated as follows:

$$BE_y = \min \left\{ BE_1, ConvFactor \times \sum_j [F_{CH_4,j} \times T_{j,y} \times (1 - UR_j)] \times GWP_{CH_4} \right\}$$

With,

$$BE_1 = ConvFactor \times \sum_j [F_{CH_4,j} \times T_{j,y=1} \times (1 - UR_j)] \times GWP_{CH_4}$$

Where:

BE_1 = Baseline emissions for the first crediting year of the crediting period (tCO₂e).

BE_y = Baseline emissions for crediting year y (tCO₂e)

ConvFactor = Conversion factor to convert Nm³ CH₄ into tCH₄. The Hi-Flow sampler automatically accounts for standard temperature and pressure in data readings; as such this factor amounts to 0.0007168tCH₄/Nm³ CH₄ (i.e., 0 degree Celsius and 101.3 kPa).

j	=	All physical leaks that are included in the project activity for which physical leaks were detected and repaired and which would leak in the baseline scenario during the crediting year y .
$F_{CH_4,j}$	=	Measured flow rate of methane for the physical leak j from the leaking component ($Nm^3 CH_4/h$)
UR_j	=	Uncertainty range for the flow rate measurement method applied to physical leak j . The uncertainty of the measurement is taken into account by using the flow rate at the lower end of the uncertainty range for the measurement at a 95% confidence interval for baseline emissions from leaks
$T_{j,y}$	=	The time the relevant component, in which physical leak j occurred, would leak in the baseline scenario and would be eligible for crediting during the crediting year y (hours)
GWP_{CH_4}	=	The global warming potential for methane valid for the commitment period (tCO_2e/tCH_4). After the commitment period, this value may be revised based on any decision by the CMP.

Uncertainty is calculated using the following formula:

$$UR_j = \frac{\sqrt{(UR_1 * x_1)^2 + (UR_2 * x_2)^2 + \dots + (UR_n * x_n)^2}}{x_1 + x_2 + \dots + x_n}$$

Where

UR_j = the percentage uncertainty in the sum of the quantities (half the 95% confidence interval divided by the total (i.e. mean) and expressed as a percentage);

x_n and UR_n = the uncertain quantities and the percentage uncertainties associated with them, respectively.

(Note: “n” in this case refers to each recorded leak rate of each component surveyed)

For all physical leaks detected, the following assumptions are applied in calculating the baseline emissions:

- For components where no physical leaks were detected at the initial baseline survey and where the physical leak(s) were detected during a subsequent survey, baseline emissions shall be accounted from the moment when the leak was detected;
- Baseline emissions from a specific leak j or a specific component r are included in the calculations until whichever of the following occurs first:

- The component concerned is replaced for a non-leak-related reason (i.e. it breaks down); or
- The end of the last crediting period of the overall project activity; or
- The maximum period for which a specific leak can be accounted for emission reductions is over.
This maximum period is the end of the crediting period (i.e., 10 years).

Further, the information provided in the monitoring report has been cross-checked with other sources such as detailed log sheets of all leaks /15/, to confirm the correctness and for plausibility check. The calculation of baseline GHG emissions has been carried out in accordance with the formulae and methods described in the registered monitoring plan and the applied methodology. Any assumptions used in emission or removal calculations have been justified. Appropriate emission factors, IPCC default values, GWPs, and other reference values have been correctly applied. The verification team also confirms that there is no material misstatement in the calculation of reported baseline emissions.

Project emissions:

For project emissions, it is required to include physical leaks that take place on components included in the project boundaries in the following cases:

- If a repair of a physical leak ceases to function, for as long as it is not repaired again; or
- If a new physical leak is detected in a component that was part of the initial baseline survey and for which no physical leak was detected during that survey, as long as that physical leak is not repaired.

Project emissions are calculated using the following formula (Option 2):

$$PE_y = ConvFactor \times \sum [F_{CH_4,z} \times T_z \times (1 - UR_z)] \times GWP_{CH_4}$$

Where:

PE_y = Project emissions in crediting year y ((tCO₂e)

ConvFactor = Conversion factor to convert m³ CH₄ into Tch₄. The Hi-Flow sampler automatically accounts for standard temperature and pressure in data readings; as such this factor amounts to 0.0007168 tCH₄/Nm³ CH₄ (i.e., 0 degree Celsius and 101.3 kPa).

z = All leaks that are accounted for as project emissions during the crediting year y

F_{CH 4} = Measured leak flow rate of methane for the physical leak *z* from the leaking component (m³ CH₄/h)

UR_z = Uncertainty range for the flow rate measurement method applied to physical leak *z*. The uncertainty of the measurement is taken into account by using the flow rate at the upper end of the uncertainty range for the measurement at a 95% confidence interval for project emissions from leaks.

T_z = The time the relevant component has been leaking during the crediting year y

GWPC_{H4} = Global warming potential of methane valid for the commitment period ((tCO₂e /tCH₄).

The following assumptions are made in the calculation of project emissions:

If a repair of a physical leak ceases to function, it is conservatively assumed that the leak resumed either:

- At the same flow rate that was measured before its repair when using only leak detection equipment;
- At the newly measured leak rate if the leak is re-measured using leak measurement equipment at the time of monitoring (in case of Option 2);

It is further assumed that the leak resumed on the day when the leak was last checked and confirmed not to leak and that it continued to leak for the entire time since that date. Thus, leaks, where the repair failed and are not immediately re-repaired, are included in the project emissions.

For components where no physical leak was detected at the initial baseline survey and where the physical leak(s) were detected during subsequent survey, project emissions from these components shall be accounted since the moment when the leak was detected.

Project emissions from a specific physical leak are included in the calculations until whichever of the following are earlier:

The date of any repair of the physical leak as long as the repair does not cease to function; or the equipment concerned is replaced (i.e. it breaks down).

During the current monitoring period, there are no project emissions for the project activity.

As per the applied methodology AM0023, version 04 /B02/ no leakage effects are accounted for. Thus, there will no leakage emissions from the project activity.

According to the applied methodology, the emission reductions are calculated as:

$$ER_y = BE_y - PE_y$$

From the above-calculated value of BE_y and PE_y , the total emission reductions are:

$$ER_y = 4,137,966tCO_2e$$

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 registered PDD /B03/. As the measuring instruments directly read out the amount of methane leakage rate per unit time, the “sample gas methane concentration” and “ambient air methane concentration” parameters are rendered redundant in the calculation of ER. The total number of emission reductions achieved during the monitoring period is 4,137,966 tCO₂e.

Emission reductions have been calculated in accordance with the applied methodology AM0023, version 04 /B02/, and VCS PD /06/. The PP has used monitored data and ex-ante fixed data including default values as mandated/permitted by the applied methodology. The values used for the calculation of GHG emission reductions have been thoroughly checked by the verification team and were found appropriate and correct.

Parameters Determined ex-ante

The following parameters are determined ex-ante and mentioned in the CDM PDD / VCS PD:

Parameter	Unit	Value	Assessment
GWP_{CH4}	tCO ₂ e/tCH ₄	28	Fixed ex-ante from the 5 th Assessment Report of the IPCC which is in accordance with the VCS Standard, version 04.3 and deemed acceptable
ConvFactor	tCH ₄ / m ³ CH ₄	0.0007168	The value of the parameter is fixed ex-ante in the PDD. As per the methodology the leak flow rate (FCH _{4,i}) and conversion factor (ConvFactor) should be reduced to the same reference conditions. The verification team has checked that the Hi-Flow Samplers automatically accounts for standard temperature and pressure (i.e., 0 degree Celsius and 101.3 kPa) in its leak flow rate measurements.

The spread sheet submitted by the PP clearly and transparently mentions values of the data parameters used for calculation of emission reductions. The input values have been verified from the reliable and authentic sources including monitoring records, MR /01/, and applied methodology /B02/. The emission reductions calculated were compared with the emission reduction spread sheet /02/ and found to be correct. No significant reporting risks have been identified for the data reported.

The details of monitoring parameters used for calculation of emission reductions are provided below:

Parameters monitored ex-post

Monitoring Parameter Requirement	Assessment/ Observation by the DOE
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Data / Parameter: (as in monitoring plan of PDD):	The time the relevant component, in which physical leak j , occurred, would leak in the baseline scenario and would be eligible for crediting during the crediting year y (hours) ($T_{j,y}$)
Measuring frequency/Time Interval:	Ongoing throughout the monitoring period and the final value calculated at the end of the monitoring period
Reported value:	Multiple Values for each leak ' j ' (Please refer to the ER spreadsheet for each leak /02/)
Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Yes
Details of monitoring equipment:	This is a calculated parameter. 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?	The reported data on the hours of operation, during which each leak is venting gas was verified by examination of the formula for the calculation of hours

	between each corresponding date of leak flow measurement in ER calculation spreadsheet /02/. It can be confirmed that the final calculation of hours of operation, during which each leak is venting gas was done in the correct manner in line with procedures defined in PDD /B03/, and the hours of shut-offs where the leaks ceased to operate were appropriately subtracted from the total amount of hours of operation. During the desk review of the leak reports /15/ and on-site visit surveys for the sampled leaks, the verification team has come to the conclusion that all the leak repairs were made with advanced repair material, as specified in PDD. It can be confirmed that there have been no hours of operation calculated for the equipment replaced for a non-leak related reason (i.e., when it breaks down), or when replacement of the equipment is made.
How were the values in the monitoring report verified?	The values were verified with the ER spreadsheets. The recording of hours has been verified from the complete data for each leak j, in the baseline scenario and also from the shutdown records
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 the 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?	Not applicable

Monitoring Parameter Requirement	Assessment/ Observation by the DOE
Data / Parameter: (as in monitoring plan of PDD):	The time (in hours) the relevant component has been leaking during the crediting year y (T_z)

Measuring frequency/Time Interval:	Ongoing throughout the monitoring period and the final value calculated at the end of the monitoring period
Reported value:	Multiple Values for each leak 'z' (Please refer to the ER spreadsheet for each leak /02/)
Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Yes
Details of monitoring equipment:	This is a calculated parameter. 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?	The reported data have been cross-checked in the ER spreadsheet /02/ and the gas supply shut down reports /22/
How were the values in the monitoring report verified?	The values were verified with the ER spreadsheets. The recording of hours has been verified from the complete data for each leak z, in the baseline scenario and also from the shutdown records

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 the 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):	(Conditions observed at the point and time of the leak rate measurement) Temperature and pressure of natural gas (°C and bar)								
Measuring frequency/Time Interval:	As and when a leak is measured using HFS								
Reported value:	The Hi-Flow™ Sampler automatically adjusts readings to standard temperature and pressure (0°C and 101.3 kPa) and is integrated into the results from the Hi-Flow sampler device /19/. The verification team confirms that the values are automatically corrected in accordance with the HFS manual. This is in line with the monitoring plan in PDD /B03/ and monitoring methodology /B02/.								
Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Yes								
Details of monitoring equipment:	<table> <tr> <td>Instrument Name</td><td>Hi Flow Sampler</td></tr> <tr> <td>Manufacturer</td><td>Heath Consultants</td></tr> <tr> <td>Serial Numbers</td><td>NQ1001, NQ1005, MP1032, 16020932, 16020936</td></tr> <tr> <td>Accuracy Class</td><td>+/-10%</td></tr> </table>	Instrument Name	Hi Flow Sampler	Manufacturer	Heath Consultants	Serial Numbers	NQ1001, NQ1005, MP1032, 16020932, 16020936	Accuracy Class	+/-10%
Instrument Name	Hi Flow Sampler								
Manufacturer	Heath Consultants								
Serial Numbers	NQ1001, NQ1005, MP1032, 16020932, 16020936								
Accuracy Class	+/-10%								

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	Every 30 days while in use
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):	Calibration of the HFS was done internally by the trained personnel of PSL by MBS. The competence of the calibrating persons could be confirmed during the on-site visit interviews by the verification team
Did calibration confirm proper functioning of monitoring equipment? (Yes / No):	Yes
Is (are) calibration(s) valid for the whole reporting period?	Yes
If applicable, has the reported data been cross-checked with other available data?	-
How were the values in the monitoring report verified?	-
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?	-
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	Not applicable

been applied or has a request for deviation been approved?	
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Monitoring Parameter Requirement	Assessment/ Observation by the DOE
Data / Parameter: (as in monitoring plan of PDD):	The uncertainty range for the measurement method applied to leak j (UR _j)
Measuring frequency/Time Interval:	As and when a leak is measured using HFS
Reported value:	Multiple Values for each leak “j” (PI refer to the ER spreadsheet for each leak)
Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Yes
Details of monitoring equipment:	The UR _j is calculated using leakage flow rates and the respective UR of the Hi-Flow sampler used for the leak. Leaks are measured using the Hi-Flow samplers. The readings as per the operator’s manual are $\pm 10\%$ accurate /17/. Having applied uncertainty values of 10% for each individual HFC measurement undertaken (as given as “accuracy of calculated leak rate” in the HFS manual /17/), a total uncertainty of 0.00076235 had been calculated correctly by the PP based on 2000 IPCC Good Practice Guidance (Chapter 6 and the registered PDD). The calculation procedure is given as separate sheets attached to the CER calculation spreadsheets /02/ which have been checked and found to be correct by the verification team.
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	Every 30 days while in use

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):	Calibration of the HFS was done internally by the trained personnel of PSL by MBS. The competence of the calibrating persons could be confirmed during the on-site visit interviews by the verification team
Did calibration confirm proper functioning of monitoring equipment? (Yes / No):	Yes
Is (are) calibration(s) valid for the whole reporting period?	Yes
If applicable, has the reported data been cross-checked with other available data?	The reported data was verified by examination of the formula for the calculation in ER calculation spreadsheet /02/.
How were the values in the monitoring report verified?	The uncertainty data is calculated using leakage flow rates and the respective UR of the Hi-Flow sampler used for the leak. The uncertainty calculations are included in the CER calculations spreadsheet and the same has been checked by the audit team for all the leaks.
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 the 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?	Not Applicable

Monitoring Parameter Requirement	Assessment/ Observation by the DOE
Data / Parameter:	The leak flow rate of methane for leak (j, z) from the leaking component ($F_{CH_4, j} / F_{CH_4, z}$)

(as in monitoring plan of PDD):									
Measuring frequency/Time Interval:	As per the applied methodology and the registered PDD, it is to be monitored annually. This monitoring period is of less than a year, and this parameter has been measured once during the monitoring period								
Reported value:	Multiple Values for each leak 'j' and 'z' (Please refer to the ER spreadsheet for each leak /02/)								
Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Yes								
Details of monitoring equipment:	<table> <tr> <td>Instrument Name</td><td>Hi Flow Sampler</td></tr> <tr> <td>Manufacturer</td><td>Heath Consultants</td></tr> <tr> <td>Serial Numbers</td><td>NQ1001, NQ1005, MP1032, 16020932, 16020936</td></tr> <tr> <td>Accuracy Class</td><td>+/-10%</td></tr> </table>	Instrument Name	Hi Flow Sampler	Manufacturer	Heath Consultants	Serial Numbers	NQ1001, NQ1005, MP1032, 16020932, 16020936	Accuracy Class	+/-10%
Instrument Name	Hi Flow Sampler								
Manufacturer	Heath Consultants								
Serial Numbers	NQ1001, NQ1005, MP1032, 16020932, 16020936								
Accuracy Class	+/-10%								
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	Every 30 days while in use								
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):	Calibration of the HFS was done internally by the trained personnel of PSL by MBS. Competence of the calibrating persons could be confirmed during the on-site visit interviews by the verification team								
Did calibration confirm proper functioning of monitoring equipment? (Yes / No):	Yes								

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 the parameter has been cross-checked with the Hi-Flow sampler readings records for the baseline survey period and also during the monitoring
How were the values in the monitoring report verified?	The values were verified with the raw data sheet and calculations in the ER spreadsheets Measurements with Hi-Flow™ Sampler are automatically adjusted to the methane content, temperature, and pressure and, thus, will directly yield methane leak flow rates. The audit team has verified the leak flow rate of methane for leaks j and z from the complete data for the leaks.
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 the 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):	Capped quantity of the baseline emissions, defined as the baseline emissions for the first year of the crediting period (BE_{CAP})
Measuring frequency/Time Interval:	Monitored baseline emissions during the first year of the first crediting period (CDM)
Reported value:	4,315,391
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?	Not applicable
How were the values in the monitoring report verified?	The values were verified in the ER spreadsheets
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 the 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

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 CDM PDD /B03/ VCS PD /06/. The total number of emission reductions for the monitoring period (01/01/2021 to 31/12/2021) is 4,137,966tCO₂e.

The verification team has checked and confirmed the calculations in the spreadsheet and found them to be accurate. The monitoring report is supported by the emission reduction spreadsheet. The consistency and formula were verified and found to be accurate.

4.5 Quality of Evidence to Determine GHG Emission Reductions and Removals

When verifying the report emission reduction, CCIPL ensured that there was a clear audit trail that contained the evidence and records that validate the stated figures. All source documents that form the basis for assumptions and other information underlying the GHG data are shown above.

When assessing the audit trails, CCIPL also examined:

1. whether sufficient evidence was available, both in terms of frequency and in covering the full monitoring period
2. the source and nature of the evidence
3. if comparable information was available from sources other than that used in the monitoring report,

CCIPL cross-checked the monitoring report against the other sources to confirm that the stated figures were correct. The sources and the data referenced are shown in Appendix 1 below.

The verification team confirms that all the monitoring equipment has been provided to adhere to the monitoring requirement as specified in the project activity as per the registered monitoring plan.

All Hi-Flow Samplers and Gasurveyors are calibrated to ensure accuracy in their measurements. The calibration is done as per the PDD at 30 day and one-year frequency for HFS and GS respectively by certified and trained staff on the calibration procedure. The verification team confirms that HFS and GS used for monitoring leaks were duly calibrated at the time of their usage for the current monitoring period. The Verification team checked the calibration records and the same was found to be satisfactory /20/.

CCIPL also assessed that the data collection system met the requirements of the monitoring plan as per the applied methodology. Proper data management inclusive of data acquisition and aggregation, data management system is being followed for the project activity. The monitoring personnel at the site are well trained and follow reproducible routines. Thus, they are competent to carry out the relevant tasks with sufficient accuracy.

4.6 Non-Permanence Risk Analysis

Not Applicable

5 VERIFICATION CONCLUSION

The Project Participant, NE Climate A/S, has commissioned the VVB, Carbon Check (India) Private Ltd. to perform gap validation and verification of the VCS Project Activity “Reducing Gas Leakages within the Titas Gas Distribution Network in Bangladesh”. This report summarises the findings of the verification of the project, performed based on VCS criteria, as well as criteria given to provide for consistent project operations, monitoring, and reporting.

The verification process was performed based on all guidance and criteria as provided in VCS Standard version 4.3 /B01-a/, VCS Program Guide version 4.2/B01-b/, VCS Validation and Verification Manual version 3.2 /B01-c/ and Registration & Issuance Process version 4.2 /B01-d/.

The selected baseline and monitoring methodology (AM0023, Version 04) applies to the project and correctly applied.

The verification team confirm that the project has been implemented in accordance with the project description/06/.

Verification period: From 01/01/2021 to 31/12/2021 (both days inclusive)

Verified GHG emission reductions and removals in the above verification period:

Year	Baseline emissions or removals (tCO ₂ e)	Project emissions or removals (tCO ₂ e)	Leakage emissions (tCO ₂ e)	Net GHG emission reductions or removals (tCO ₂ e)
01/01/2021 to 31/12/2021	4,137,966	0	0	4,137,966
Total	4,137,966	0	0	4,137,966

The verification team is of the opinion that the project has been implemented in accordance with the registered project description, the MP complies with the approved monitoring methodology, the monitoring complies with the MP, and the monitored data and calculation of ERs are assessed and confirmed as correct.

Therefore, CCIPL hereby certifies and requests the issuance of, the reported ERs during the monitoring period of 01/01/2021 to 31/12/2021 amounting to 4,137,966tCO₂e to the VCS Registry.

APPENDIX 1.1: REFERENCE DOCUMENTS

Ref	Document
/01/	1. Initial Monitoring report version 1, dated 16/04/2022 2. Final Monitoring report version 3, dated 03/11/2022
/02/	ER sheet corresponding to: 1. /01-1/ 2. /01-2/
/03/	Evidence for the project start date on 29/01/2017
/04/	Proof of project ownership complying with section 3.6.1 of VCS Standard version 4.3 (agreement in between NE Climate A/S and Titas Gas Company, dated 25/10/2021)
/05/	Company registration certificate for the PP
/06/	VCS PD for the “Reducing Gas Leakages within the Titas Gas Distribution Network in Bangladesh” version 2.2, dated 03/11/2022, and ex-ante emission reduction estimation spreadsheet
/07/	Map – Transmission and distribution pipeline of TGTDC
/08/	“Gas leak project service agreement” / contract between NE Climate, Climate Compass LLC, and PSL, dated 25/10/2021
/09/	Organization structure for the project activity
/10/	Baseline study from 29/01/2017 to 28/01/2018
/11/	Evidence for the meth applicability criteria (Self declaration dated 06/06/2022): - During the last three years before the implementation of the project activity, no advanced LDAR program was in place to address physical leakage from components that are included in the project boundary – self-declaration - The project only addresses components that were included in the project boundary at the validation of the project activity. For instance, the project boundary will not include new sections of the distribution network. – self-declaration - Physical leaks detected and repaired as part of the current maintenance programme are not covered by the CDM project activity. The leaks repaired under current practices by the Emergency Repair team are excluded from the project – self-declaration - Physical leaks that can be repaired by tightening/re-greasing (incl. connectors and plug valves steams) or by similar measures are not covered by the project activity – self-declaration - Log of the emergency repair and replacements done as a result of a failed part
/12/	Summary report from MBS for the project monitoring including inspection visits and baseline study database and monitoring database, dated 23/05/2022
/13/	Evidence for the lifetime of the repair materials used in the leak repairs
/14/	Log of the materials used for leakage repairing using advanced LDAR
/15/	Detailed log sheets of all leaks with leak code, photographs, and GPS coordinates the leaks detected, measurements were done following with repairs carried out (along with all relevant details as stated under bullet points 1 to 11 under step 2 in section B.6.1 of the CDM PDD: like along with the records of the downloaded data taken from the memory of HFS photographs, tags, handwritten records with raw data, etc.)
/16/	Evidence to confirm that no leaks scheduled for replacement or emergency repair were included in the emission reduction calculation spreadsheet, dated 06/06/2022
/17/	Technical specifications and manuals for the Hi-Flow Samplers and GMI Gas surveyor (500 Series) and Photographs of the HFS and GS used during the monitoring period
/18/	Deed concerning calibration to perform the calibration of HFS
/19/	Evidence to confirm the Hi-Flow Sampler automatically accounts for standard temperature and pressure (i.e., 0 degrees Celsius and 101.3 kPa) in its leak flow rate (FCH _{4,j}) measurements
/20/	Calibration records for all the Hi-Flow Sampler and GS used during the monitoring period

/21/	Statutory Documents: - Natural Gas Safety and Security Law - Gas distribution rules (Domestic) & (Industry) - Gas Act - Gas Marketing Law
/22/	Letter from TGTDCCL confirming no system outages in gas supply during the monitoring period, dated 06/06/2022
/23/	Training evidence along with competence of the personnel involved in the monitoring
/24/	Declaration(s) from Project proponent on the following dated 08/06/2022: • Project not registered or under the process of registration in any other Emissions Trading Programs and Other Binding Limits • Project not registered or in process of getting Other Forms of Environmental Credit • The project has not been registered and is not seeking registration under any other GHG program • Projects not Rejected by Other GHG Programs • Declaration from PP confirming that the project is not claiming any other environmental credits other than VCUs • All repair works are carried out in compliance with “National Gas Security Law” also known as “Praktik Gas Nirapatta Bidhimala, 1991 –Revised in 2003” and other Bangladesh regulatory requirements
/25/	Evidence for employment generated by the project

APPENDIX 1.2: BACKGROUND DOCUMENTS

Ref	Document
/B01/	VCS Requirements a. VCS Standard, version 4.3 b. VCS Program Guide, version 4.2 c. VCS Validation and Verification Manual version, version 3.2 d. Registration & Issuance Process, version 4.2 e. VCS Program Definitions version, version 4.1 f. VCS MR template version 4.1 g. VCS PD template, version 4.1
/B02/	Applied baseline and monitoring methodology AM0023, version 04, “Leak detection and repair in gas production, processing, transmission, storage and distribution systems and in refinery facilities”
/B03/	Registered CDM PDD for CDM project “Reducing Gas Leakages within the Titas Gas Distribution Network in Bangladesh” and the corresponding validation report including documents related to the first, second and third CDM monitoring periods
/B04/	a. “Standard for sampling and surveys for CDM project activities and programme of activities” (version 09.0) b. Guidelines for sampling and surveys for CDM project activities and Programme of Activities (version 04)
/B05/	Website and links: 1. http://cdm.unfccc.int 2. http://www.verification.org
/B06/	LoA from the Annex 1 party DNA for the registered CDM project activity reference no. 10077

APPENDIX 2: ABBREVIATIONS

CDM	Clean Development Mechanism
BE	Baseline Emission
CAR	Corrective Action Request
CC IPL	Carbon Check (India) Private Ltd.
CDM	Clean Development Mechanism
CL	Clarification Request
CO ₂	Carbon Dioxide
CO _{2e}	Carbon Dioxide Equivalent
DOE	Designated Operational Entity
DPR	Detailed project report
DVR	Draft Validation Report
EB	CDM Executive Board
EF	Emission Factor
ER	Emission Reduction
FAR	Forward Action Request
FVR	Final validation Report
GHG	Greenhouse gas(es)
GWh	Giga Watt Hour
HFS	Hi Flow Sampler
IPCC	Intergovernmental Panel on Climate Change
LDAR	Leak detection and repairs
MW	Mega Watt
MWh	Mega Watt Hour
NA	Not Applicable
OSV	On Site Visit
PD	Project Description
PP	Project Proponent
PSL	Prokaushali Sangsad Limited
QC/QA	Quality control/Quality assurance
TGTDCL	Titas Gas Transimission and Distribution Company Ltd.
TR	Technical Review
UNFCCC	United Nations Framework Convention on Climate Change
VCS	Verified Carbon Standard
VCSA	Verified Carbon Standard Association
VCU	Verified Carbon Unit
VB	Validation Verification Body
VM	Validation and Verificatoin Manual
VVS	Validation and Verification Standard

APPENDIX 3: CERTIFICATES OF COMPETENCE



Carbon Check (India) Private Ltd.

Mr. Sanjay Agarwalla

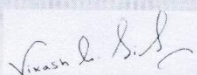
has been qualified as per CCIPL's internal qualification procedures, in accordance with requirements of Accreditation Standard (version 07.0):

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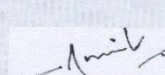
Validator	☒	Team Leader	☒	Technical reviewer	☒
Verifier	☒	Technical Expert	☒	Local Assessor ¹	☒

In the following Technical Areas:

TA 1.1	☒	TA 3.1	☒	TA 5.2	☒	TA 9.2	☒	TA13.2	☐
TA 1.2	☒	TA 4.1	☒	TA 8.1	☐	TA 10.1	☐	TA14.1	☐
TA 2.1	☒	TA 5.1	☒	TA 9.1	☒	TA 13.1	☒		



Mr. Vikash Kumar Singh
Compliance Officer



Mr. Amit Anand
CEO

Date of Approval
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01/09/2020	Interim Revision for CCIPL logo change
24/12/2020	Annual Revision
24/12/2021	Annual Revision

¹ India

² Please refer to previous version of competency certificates for the revision history.

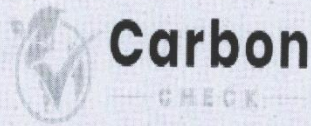
CARBON CHECK (INDIA) PRIVATE LIMITED

CIN: U74930DL2012PTC232495

Regd. Off: 2071/38, 2nd Floor, Naiwala, Karol Bagh, New Delhi - 110005

Corporate off: Unit No. 1701, Logix City Centre Office Tower, Plot No. BW-58, Sector-32 Noida, Uttar Pradesh

Tel: +91 120 4373114 | URL: www.carboncheck.co.in | e-mail: info@carboncheck.co.in



Carbon Check (India) Private Ltd.

Mr. Ramchandra Nesari

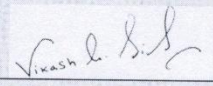
has been qualified as per CCIPL's internal qualification procedures, in accordance with requirements of Accreditation Standard (version 07.0):

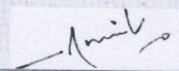
For following functions:

Validator	☐	Team Leader	☐	Technical reviewer	☐
Verifier	☐	Technical Expert	☒	Local Assessor ¹	☒

In the following Technical Areas:

TA 1.1	☒	TA 4.1	☒	TA 9.1	☒	TA 13.1	☒
TA 1.2	☒	TA 5.1	☒	TA 9.2	☒	TA 13.2	☐
TA 3.1	☒	TA 5.2	☒	TA 10.1	☒	TA 14.1	☐


Mr. Vikash Kumar Singh
Compliance Officer


Mr. Amit Anand
CEO

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Tel: +91 120 4373114 | URL: www.carboncheck.co.in | e-mail: info@carboncheck.co.in



Carbon Check (India) Private Ltd.

Vikas Vilasrao Bankar

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 Assessor ¹	☒

In the following Technical Areas:

TA 1.1	☒	TA 4.1	☐	TA 9.1	☐	TA 13.1	☐
TA 1.2	☒	TA 5.1	☐	TA 9.2	☐	TA 13.2	☐
TA 3.1	☒	TA 5.2	☐	TA 10.1	☐	TA 14.1	☐



Mr. Vikash Kumar Singh
Compliance Officer



Mr. Amit Anand
CEO

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Tel: +91 120 4373114 | URL: www.carboncheck.co.in | e-mail: info@carboncheck.co.in



Carbon Check (India) Private Ltd.

Mr. SP Reddy

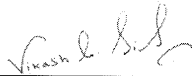
has been qualified as per CCIPL's internal qualification procedures, in accordance with requirements of Accreditation Standard (version 07.0):

For following functions:

Validator	☐	Team Leader	☐	Technical reviewer	☐
Verifier	☐	Technical Expert	☒	Local Assessor	☐

In the following Technical Areas:

TA 1.1	☐	TA 4.1	☐	TA 9.1	☐	TA 13.1	☐
TA 1.2	☐	TA 5.1	☐	TA 9.2	☐	TA 13.2	☐
TA 3.1	☐	TA 5.2	☐	TA 10.1	☒	TA 14.1	☐


Mr. Vikash Kumar Singh
 Compliance Officer


Mr. Amit Anand
 CEO

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 Tel: +91 120 4373114 | URL: www.carboncheck.co.in | e-mail: info@carboncheck.co.in

APPENDIX 4: FINDINGS LOG

Table 1. CLs from this Validation / Verification

Finding	CL 01
Classification	☐ CAR ☒ CL ☐ FAR
Description of finding (VVB)	PP is requested to state the source of data used for ex-ante estimation of emission reductions for the crediting period and provide ER spreadsheet.
Corrective Action or clarification #1 (PP shall write a detailed and clear corrective action or further information for clarification as per finding)	<i>An explanation of the source of data has been provided along with an ER spreadsheet.</i>
VVB Assessment #1 <i>The assessment shall encompass all open issues in the finding. In case of non-closure, additional corrective action and VVB assessments (#2, #3, etc.) shall be added.</i>	As the project has already been commissioned and also verified under CDM, ex-ante estimation of emission reductions is based on the previous monitoring results which are deemed acceptable to the VVB. This has been clarified in the ER spreadsheet. The CL is closed.
Conclusion <i>Tick the appropriate checkbox</i>	☐ To be checked during the next periodic verification ☐ Outstanding finding (not closed) ☒ The finding is closed

Finding	CL 02
Classification	☐ CAR ☒ CL ☐ FAR
Description of finding (VVB)	The VCS ID reference number for the project has been incorrectly stated on the cover page of the MR and ER spreadsheet.
Corrective Action or clarification #1 (PP shall write a detailed and clear corrective action or further information for clarification as per finding)	<i>The correct VCS ID has been included.</i>
VVB Assessment #1 <i>The assessment shall encompass all open issues in the finding. In case of non-closure, additional corrective action and VVB assessments (#2, #3, etc.) shall be added.</i>	PP has submitted a revised MR and ER spread with the correct reference number of VCS for the project activity. The CL is closed.
Conclusion <i>Tick the appropriate checkbox</i>	☐ To be checked during the next periodic verification ☐ Outstanding finding (not closed) ☒ The finding is closed

Finding	CL 03
Classification	☐ CAR ☒ CL ☐ FAR
Description of finding (VVB)	In section 1.1 of the MR, the CDM registration date for the project activity is incorrectly stated.
Corrective Action or clarification #1 (PP shall write a detailed and clear corrective action or further information for clarification as per finding)	A correction to the date was made.
VVB Assessment #1 The assessment shall encompass all open issues in the finding. In case of non-closure, additional corrective action and VVB assessments (#2, #3, etc.) shall be added.	PP has submitted a revised MR stating the correct CDM registration date. The CL is closed.
Conclusion Tick the appropriate checkbox	☐ To be checked during the next periodic verification ☐ Outstanding finding (not closed) ☒ The finding is closed

Finding	CL 04
Classification	☐ CAR ☒ CL ☐ FAR
Description of finding (VVB)	In section 1.5 of the MR, the project start date has been stated as 24 th April 2016 which is not consistent with the VCS PD.
Corrective Action or clarification #1 (PP shall write a detailed and clear corrective action or further information for clarification as per finding)	The start date in 1.5 has been updated.
VVB Assessment #1 The assessment shall encompass all open issues in the finding. In case of non-closure, additional corrective action and VVB assessments (#2, #3, etc.) shall be added.	29 th January 2017 has been stated as the project start date which is deemed acceptable to the VVB. The CL is closed.
Conclusion Tick the appropriate checkbox	☐ To be checked during the next periodic verification ☐ Outstanding finding (not closed) ☒ The finding is closed

Finding	CL 05
Classification	☐ CAR ☒ CL ☐ FAR
Description of finding (VVB)	PP is requested to provide evidence for each of the claimed SDG parameters' values.
Corrective Action or clarification #1 (PP shall write a detailed and clear corrective action or further information for clarification as per finding)	The values have been updated to align with the excel sheet. Additional evidence has been provided to document the employment figures.

Finding	CL 05
VVB Assessment #1 <i>The assessment shall encompass all open issues in the finding. In case of non-closure, additional corrective action and VVB assessments (#2, #3, etc.) shall be added.</i>	PP has provided evidence for each of the claimed SDG parameters. The CL is closed.
Conclusion <i>Tick the appropriate checkbox</i>	☐ To be checked during the next periodic verification ☐ Outstanding finding (not closed) ☒ The finding is closed

Finding	CL 06
Classification	☐ CAR ☒ CL ☐ FAR
Description of finding (VVB)	The stated value for the monitored parameter "URj" does not match with the ER calculation spreadsheet.
Corrective Action or clarification #1 <i>(PP shall write a detailed and clear corrective action or further information for clarification as per finding)</i>	<i>The URj has been updated based on the final calculation in the ER calculation excel sheet provided.</i>
VVB Assessment #1 <i>The assessment shall encompass all open issues in the finding. In case of non-closure, additional corrective action and VVB assessments (#2, #3, etc.) shall be added.</i>	PP has submitted a revised MR with the correct value of URj. The CL is closed.
Conclusion <i>Tick the appropriate checkbox</i>	☐ To be checked during the next periodic verification ☐ Outstanding finding (not closed) ☒ The finding is closed

Finding	CL 07
Classification	☐ CAR ☒ CL ☐ FAR
Description of finding (VVB)	The stated value for the emission reductions in section 5.4 of the MR does not match with the ER calculation spreadsheet.
Corrective Action or clarification #1 <i>(PP shall write a detailed and clear corrective action or further information for clarification as per finding)</i>	<i>The emission reductions in 5.4 have been updated based on the final calculation in the ER calculation excel sheet provided.</i>
VVB Assessment #1 <i>The assessment shall encompass all open issues in the finding. In case of non-closure, additional corrective action and VVB assessments (#2, #3, etc.) shall be added.</i>	PP has submitted a revised MR stating the correct value of ERs. The CL is closed.

Finding	CL 07
Conclusion <i>Tick the appropriate checkbox</i>	☐ To be checked during the next periodic verification ☐ Outstanding finding (not closed) ☒ The finding is closed

Table 2. CARs from this Validation / Verification

Finding	CAR 01
Classification	☒ CAR ☐ CL ☐ FAR
Description of finding (VVB)	The VCS PD template used is not the latest one.
Corrective Action or clarification #1 <i>(PP shall write a detailed and clear corrective action or further information for clarification as per finding)</i>	The latest template 4.1 has been used in the revised version.
VVB Assessment #1 <i>The assessment shall encompass all open issues in the finding. In case of non-closure, additional corrective action and VVB assessments (#2, #3, etc.) shall be added.</i>	PP has adopted the latest version of PD in the revised submission. The CAR is closed.
Conclusion <i>Tick the appropriate checkbox</i>	☐ To be checked during the next periodic verification ☐ Outstanding finding (not closed) ☒ The finding is closed

Finding	CAR 02
Classification	☒ CAR ☐ CL ☐ FAR
Description of finding (VVB)	As per section 3.16.1 of VCS Standard, version 4.2: <i>"The project proponent shall demonstrate how the project activities, or additional activities implemented by the project proponent, contribute to sustainable development, as defined by and tracked against the United Nations Sustainable Development Goals (SDGs). The project proponent must demonstrate that a project contributes to at least three SDGs by the end of the first monitoring period, and in each subsequent monitoring period".</i> This is missing in the PD.
Corrective Action or clarification #1 <i>(PP shall write a detailed and clear corrective action or further information for clarification as per finding)</i>	Additional details and information has been added to the PD section on sustainability and the figures have been updated based on the final updated excel ER calculation sheet.

Finding	CAR 02
VVB Assessment #1 <i>The assessment shall encompass all open issues in the finding. In case of non-closure, additional corrective action and VVB assessments (#2, #3, etc.) shall be added.</i>	PP has provided revised PD with relevant SD parameters in line with section 3.16.1 of VCS Standard, version 4.3. The CAR is closed.
Conclusion <i>Tick the appropriate checkbox</i>	☐ To be checked during the next periodic verification ☐ Outstanding finding (not closed) ☒ The finding is closed