



VALIDATION REPORT

For the CDM Project Activity

Reducing Gas Leakages within the Titas Gas Distribution Network in Bangladesh

In
People's Republic of Bangladesh

Report No. 01 997 9105078339

Version No. 02.3, 2015-03-16

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I. Project description:

Project title:	Reducing Gas Leakages within the Titas Gas Distribution Network in Bangladesh		Report No.: 01 997 9105078339
Host Country:	People’s Republic of Bangladesh		Current revision No.: 02.3
Methodology:	AM0023, Version 04.0.0	☒ Large Scale	Date of current revision: 2015-03-16
		☐ Small Scale	Date of first issue: 2014-03-28
Annual average emission reductions (estimate):			4,378,506tCO2e/yr
GHG reducing measure/technology:	reducing natural gas physical leaks in components through the introduction of an advanced LDAR program		

Party	Project Participants	Party considered a project participant	Contract party
People's Republic of Bangladesh (host)	Titas Gas Transmission & Distribution Co., Ltd.	No	☐
Denmark	NE Climate A/S	No	☒

II. Validation Team:

Validation Team			Role									
Full name	Affiliation TÜV Rheinland	Appointed for Sectoral Scopes (Technical Areas)	Team leader	Acting Team Leader	Local Expert	Team Member (Auditor)	Technica Expert	Acting Tech. Expert	Trainee Auditor	Technical Reviewer	Expert to TR	Trainee TR
Mr. YAN Chong	China	1.2, 2.1, 3.1, 4.3, 4.5, 9.1	X									
Mr. ZHU Jiang	China	1.1, 1.2, 4.5				X						
Ms. LIU Qing	China	1.2, 8.2, 10.2					X					
Mr. Sami Al Karim	China	N/A			X							
Mr. Norbert Heidelmann	Germany	1.1, 13.1, 15.2				X						
Mr. Walter TANG	China	1.1, 2.2, 2.1, 2.2, 3.1, 4.3, 4.5, 13.1								X		
Dr. LI Lixin	China	1.1, 1.2, 2.1, 2.2, 3.1, 4.5								X		
Mr. YUAN Limin	China	1.1, 4.5, 8.2, 10.2									X	

Validation Phases	Validation Status
☒ Desk Review ☒ Follow up interviews ☒ Corrective Actions / Clarifications Requested ☒ Resolution of outstanding issues	☒ Full Approval and Submission for Registration ☐ Rejected

III. Validation Report:

Final approval	Released	Distribution
☒	By: Mr. Henri Phan	☐ No distribution without permission from the Client or responsible organizational unit
Date: 2015-03-17		☒ Unrestricted distribution

Abbreviations

CAR	Corrective Action Request
CDM	Clean Development Mechanism
CER	Certified Emission Reduction
CGS	City Gate Stations
CL	Clarification request
CM	Combined Margin
CO ₂	Carbon dioxide
CO ₂ e	Carbon dioxide equivalent
DNA	Designated National Authority
DRS	District Regulatory Stations
EB	Executive Board
EF	Emission Factor
EIA	Environmental Impact Assessment
EPB	Environmental Protection Bureau
FAR	Forward Action Request
FSR	Feasibility Study Report
GHG	Greenhouse gas(es)
HCA	Host Country Apporval
IPCC	Intergovernmental Panel on Climate Change
LDAR	Leak Detection and Repair
LDC	Least Developed Country
LoA	Letter of Approval
NGO	Non-governmental Organisation
ODA	Official Development Assistance
OM	Operating Margin
PDD	Project Design Document
RMS	Regulator Metering Stations
PPs	Project Participants
TBS	Town Border Stations
UNFCCC	United Nations Framework Convention on Climate Change
VAT	Value-added Tax
VVS	Validation and Verification Standard

Executive Summary – Validation Opinion

The validation team assigned by the DOE (TÜV Rheinland (China) Ltd.), here after called TRC, has been assigned by “NE Climate A/S” to perform the validation of their project “Reducing Gas Leakages within the Titas Gas Distribution Network in Bangladesh”. The validation was performed on the basis of UNFCCC criteria for the Clean Development Mechanism. The scope of the validation is defined as an independent and objective review of the project design document, the project’s baseline study and monitoring plan and other relevant documents. The information in these documents is reviewed against CDM Validation and Verification Standard (Version 07.0), Kyoto Protocol requirements, CDM Executive Board/UNFCCC rules.

The report is based on the assessment of the project design document undertaken through stakeholder consultations, application of standard auditing techniques including but not limited to document reviews, site visit, and stakeholder interviews, review of the applicable methodology and its underlying formulae and calculations.

Validation methodology and process

The validation has been performed as described in the VVS Version 07.0 and constitutes the following steps:

- Publication of the PDD (Version 1, dated 21/02/2014) on the UNFCCC website (26 Feb. 2014 to 27 Mar. 2014)
- Desk review of the PDD (Version 1, dated 21/02/2014) and the relevant documents
- On-site assessment (11/03/2014-13/03/2014)
- Issue of checklist with corrective action requests (CARs) and clarification requests (CLs) and the draft validation report & protocol
- Review of proposed correction and clarifications
- Desk review of revised PDD (Version 6, dated 16/03/2015)
- Issuance of Validation Report

Validation criteria

The following CDM requirements have been considered:

- Article 12 of the Kyoto Protocol,
- Modalities and procedures for CDM (Marrakech Accords)
- Subsequent decisions by the COP/MOP and CDM Executive Board
- Host country criteria
- Criteria given to provide for consistent project operations, monitoring and reporting.

The project is a bilateral project, the host country is People's Republic of Bangladesh and the Annex I country is Denmark. Both parties fulfill the participation criteria and have approved and authorized the project and the project participants. Then DNA from People's Republic of Bangladesh confirms that the project assists in achieving sustainable development.

The project correctly applies the approved baseline and monitoring methodology AM0023, Version 04.0.0, “Leak detection and repair in gas production, processing, transmission, storage and distribution systems and in refinery facilities”.

The project results in reductions of CO₂ emissions that are real, measurable and give long-term benefits to the mitigation of climate change. It is demonstrated that the project is not a likely baseline scenario. Emission reductions attributable to the project are hence additional to any that would occur in the absence of the project activity.

The validation did not reveal any information that indicates that the project can be seen as a diversion of ODA funding towards “People’s Republic of Bangladesh”.

The monitoring plan provides for the monitoring of the project’s emission reductions. The monitoring arrangements described in the monitoring plan are feasible within the project design and it is TRC’s opinion that the project participants are able to implement the monitoring plan.

By reducing natural gas physical leaks in components through the introduction of an advanced LDAR program, the project activity will result in reductions of greenhouse gas (GHG) emissions that are real, measurable and give long-term benefits to the mitigation of climate change.

The total emission reductions from the project are estimated to be 43,785,060t of CO₂e over the fixed 10-years crediting period, averaging 4,378,506t of CO₂e annually. The emission reduction forecast has been checked and it is deemed likely that the stated amount is achieved given the underlying assumptions do not alter.

The validation protocol describes a total of 20 findings which include:

(15) Corrective Action Requests (CARs);

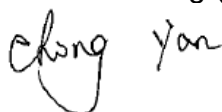
(5) Clarification Requests (CLs);

(0) Forward Action Requests (FARs); and all findings have been closed satisfactorily.

TRC concludes that the CDM Project Activity “Reducing Gas Leakages within the Titas Gas Distribution Network in Bangladesh” in People’s Republic of Bangladesh, as described in the PDD (Version 6, dated 16/03/2015), meets all relevant requirements of the UNFCCC for CDM project activities including article 12 of the Kyoto Protocol, the modalities and procedures for CDM (Marrakesh Accords) and the subsequent decisions by the COP/MOP and CDM Executive Board.

The selected baseline and monitoring methodologies (AM0023, Version 04.0.0) are applicable to the project and correctly applied. The TRC therefore requests the registration of the project as a CDM project activity with UNFCCC.

Mr. YAN Chong (Team Leader)



TÜV Rheinland (Shanghai) Ltd.
Shanghai, 2015-03-16

Mr. Henri Phan (DOE Manager)



TÜV Rheinland (China) Ltd.
Beijing, 2015-03-17

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1 INTRODUCTION

The organization “NE Climate A/S” has commissioned the DOE TÜV Rheinland (China) Ltd. to perform a validation of the CDM Project Activity “Reducing Gas Leakages within the Titas Gas Distribution Network in Bangladesh” in People’s Republic of Bangladesh (hereafter called “the project”). This report summarises the findings of the validation of the project, performed on the basis of UNFCCC criteria for the CDM, as well as criteria given to provide for consistent project operations, monitoring and reporting. The term “UNFCCC criteria” refers to Article 12 of the Kyoto Protocol, the simplified modalities and procedures for small-scale CDM project activities and the subsequent decisions by the CDM Executive Board.

1.1 Objective

The purpose of a validation is to have an independent, professional, ethical and fair third party assessment of the project design. In particular, the project’s baseline, monitoring plan, and the project’s compliance with relevant UNFCCC and host Party criteria are validated in order to confirm that the project design, as documented, is sound and reasonable and meets the identified criteria. Validation is a requirement for all CDM projects and is seen as necessary to provide assurance to stakeholders of the quality of the project and its intended generation of certified emission reductions (CERs).

1.2 Scope

The validation scope is defined as an independent and objective review of the project design document (PDD). The PDD is reviewed against the relevant criteria (see above) and decisions by the CDM Executive Board, including the approved baseline and monitoring methodology. The validation team has, based on the recommendations in the Validation and Verification Standard employed (latest version) a risk-based approach, focusing on the identification of significant risks for project implementation and the generation of CERs.

The validation is not meant to provide any consulting towards the project participants. However, stated requests for clarifications and/or corrective actions may have provided input for improvement of the project design.

While carrying out the validation, TRC determines if the project activity complies with the requirements of Para 37 of the CDM M&P and also assess the claims and assumptions made in the PDD without limitation on the information provided by the project participants.

The scope of the validation is:

- To apply TRC’s own quality management system integrated with the VVS standard along with the recent decisions and guidance provided by the UNFCCC board to determine if the project activity meets all applicable CDM requirements, including those specified in the project standard, relevant methodologies, tools and guidelines and processing the same with CDM project cycle procedure;
- Asses the accuracy, conservativeness, relevance, completeness, consistency and transparency of the information provided by the project participants;
- Determine whether information provided by the project participants are reliable and credible;

- Present information in the form of validation report in a factual, neutral, coherent manner and document all assumptions, provide references to the background material and identify changes made to the documentation;
- Base the findings and conclusions on objective evidence and conduct all validation in accordance with CDM rules and procedures;
- Apply consistent validation criteria in providing expert judgments to the requirements of applicable approved methodologies, tools and also cross check the same with projects of similar characteristics, technology, time period and region;
- Safeguard the confidentiality of all information's obtained or created during validation; and
- Where sampling is involved, the standard for sampling and surveys are applied.

2 METHODOLOGY

The validation consists of the following four phases:

- I A desk review of the project design documents
 - Publication of PDD in UNFCCC for global stakeholder consultation
 - A review of data and information;
 - Cross checking between information provided in PDD with all necessary means without limitations to the information provided by the project proponent;
- II On-site visit and follow-up interviews with project stakeholders
 - Interviews with relevant stakeholders in host country with personnel's having knowledge with the project development via telephone, email or direct on-site visits;
 - Cross checking between information provided by interviewed personnel with all necessary means without limitations to the information provided by the project proponent;
- III Reference to available information's relating to projects or technologies similar projects under validation and review based on the approved methodology being applied of the appropriateness of formulae and accuracy of calculations.
- IV The resolution of outstanding issues and the issuance of the final validation report and opinion.

The following sections outline each step in more detail.

2.1 Desk Review of the Project Design Documentation

The following table outlines the documentation reviewed during the validation:

Ref No.	Reference Document
/1/	PDD [initially published version], Version 1, dated 21/02/2014
/2/	PDD [final version], Version 6, dated 16/03/2015
/3/	Host Country Approval: People's Republic of Bangladesh, Department of Environment, Ref. DoE/Int.Con./CDM/HCA/2011/06/46, dated 21/08/2014
/4/	Annex I Country Approval: Denmark, Ministry of Climate, Energy and Building, File No. 5013/5038-0003, dated 24/10/2014
/5/	Modalities of Communication Form, dated 16/09/2014
/6/	CDM Validation and Verification Standard, Version 07.0, EB 79, Annex 4, dated 01/06/2014
/7/	CDM Project Standard, Version 07.0, EB 79, Annex 3, dated 01/06/2014
/8/	CDM Project Cycle Procedure, Version 07.0, EB 79, Annex 5, dated 01/06/2014
/9/	F-CDM-PDD – Project Design Document form, Version 05.0, dated 25/06/2014
/10/	Guidelines for Completing the Project Design Document Form, Version 01.0, EB 66, Annex 8, dated 02/03/2012
/11/	Approved baseline and monitoring methodology AM0023 "Leak detection and repair in gas production, processing, transporation, storage and distribution systems and in refinery facilities", Version 04.0.0, EB 63, Annex 14, dated 29/09/2011
/12/	Combined tool to identify the baseline scenario and demonstrate additionality, Version 05.0.0, EB 70, Annex 9, dated 23/11/2012

/13/	Guidelines for objective demonstration and assessment of barriers, Version 01, EB 50, Annex 13, dated 16/10/2009
/14/	Guidelines on the demonstration and assessment of prior consideration of the CDM, Version 04, EB 62, Annex 13, dated 15/07/2011
/15/	Glossary of CDM terms, Version 07.0, EB 70, Annex 7, dated 23/11/2012
/16/	Guidelines on the registration fee schedule for proposed project activities under the clean development mechanism, Version 02, EB 54, Annex 29, dated 28/05/2010
/17/	F-CDM-MOC – Modalities of Communication statement, Version 02.1, dated 16/03/2012
/18/	Standard for application of the global warming potentials to clean development mechanism project activities and programmes of activities for the second commitment period of the Kyoto Protocol, Version 01.0, EB 69, Annex 3, dated 13/09/2012
/19/	Report of the Conference of the Parties serving as the meeting of the Parties to the Kyoto Protocol on its seventh session (4/CMP.7), held in Durban from 28 November to 11 December 2011
/20/	Errata to the contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change, dated 15/06/2012
/21/	CDM Pipeline compiled by UNEP Risoe Centre, dated 01/11/2014
/22/	4th monitoring report of the registered CDM project (UNFCCC No.0170), dated 03/03/2010 via http://cdm.unfccc.int/filestorage/9/2/P/92P3X8CKWTHEN4L6SJYUIVQFZMAB57/Monitoring%20Report%204.pdf?t=dnd8bjMxZHcyfDAVO_KTESMud1Op8C8TwJU8
/23/	Revision to the approved consolidated baseline methodology ACM0001 “Consolidated baseline methodology for landfill gas project activities”, Version 02, dated 30/09/2005
/24/	Chapter 6 «Quantifying Uncertainties in Practice» of IPCC Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories», dated in 2000
/25/	Guideline for sampling and surveys for CDM project activities and programmes of activities, EB 75, Annex 8, dated 04/10/2013
/26/	Survey report of measurement study in Titas Gas Distribution and Transmission Co., Ltd. Submitted by Heath Consultants Incorporated, dated 10/06/2013
/27/	Feasibility study report of the project issued by ICF International, dated in July 2013
/28/	Certified Emission Reductions Project Investment Agreement signed between Titas Gas Transmission & Distribution Co., Ltd. and NE Climate A/S, dated 06/12/2013
/29/	CDM development consulting contract signed between NE Climate A/S and ICF International, dated 24/01/2013
/30/	Physical leak measurement survey contract signed with Heath Consultant, dated 08/02/2013
/31/	Recent three years of statistics in the physical leak and repair records (2010-2012), dated 16/01/2013

/32/	Meeting minutes of Titas Gas Management Board to review and address questions concerning existing maintenance practices, investment priorities and barriers, dated 14/02/2013
/33/	Statement on the sale of Hi Flow Samplers from Heath Consultants, dated 30/01/2014
/34/	Leak detection and repair procedures within Titas Gas Transmission & Distribution Co., Ltd., dated 10/02/2013
/35/	Official letter regarding the project from the pipeline design department of Titas Gas Transmission & Distribution Co., Ltd., Reference No. CDM Project/PDD/310, dated 10/02/2014
/36/	Operation & Maintenance log copies of gas distribution network during the recent three years
/37/	Certificate of Incorporation of Titas Gas Transmission & Distribution Co., Ltd., Certificate No. 2260-E.P./76 of 1964-1965
/38/	Prior consideration of the CDM form to Bangladesh DNA
/39/	Email confirmation on the Prior Consideration Form of the CDM received by the Bangladesh DNA (Department of Environment), dated 11/05/2013
/40/	Prior Consideration of the CDM received on 30/07/2013 from website http://cdm.unfccc.int/Projects/PriorCDM/notifications/index_html
/41/	Stakeholder consultation invitation evidences, incl. newspaper, email and public notice
/42/	Stakeholder consultation summary
/43/	Stakeholder consultation attendance list, dated 18/11/2013
/44/	Gas Transmission Pipeline System Layout in Bangladesh
/45/	Instruction of operation & Maintenance on Natural Gas Leak Rate Measurement of Hi Flow Sampler, Rev No. 2, dated in May 2005
/46/	Technical specifications of Hi Flow Sampler via link http://www.heathus.com/tasks/sites/_hc/assets/File/hiflow.pdf
/47/	Technical specifications of Gassurveyor 500 series via link http://www.heathus.com/_hc/res/InfoCenter/Gasurveyor500Series.pdf
/48/	Technical specifications of GORE® Valve Stem Packing DP via link http://www.gore.com/MungoBlobs/165/448/GORE_Valve_Stem_Packing_Datasheet_us.pdf
/49/	Statement on the Hi Flow Sampler Calibration issued from Heath Consultant, dated 19/03/2014
/50/	List of Least Developed Countries (LDC) issued by the Development Policy and Analysis Division of the UN secretariat, via link https://www.un.org/en/development/desa/policy/cdp/ldc_info.shtml
/51/	Annual Report 2012-13 of Titas Gas Transmission & Distribution Co., Ltd., dated 24/12/2013
/52/	Justification email on the sampling size in measurement study for the project from ICF International, dated 13/03/2014
/53/	Natural Gas Chemical Composition Report from Production & Marketing Division,

	Petrobangla, via link http://www.titasgas.org.bd/docs/Gas_Composition.pdf
/54/	Sovereigns Rating List from Standard & Poor's Rating Services, via link http://www.standardandpoors.com/ratings/sovereigns/ratings-list/en/us?sectorName=Go
/55/	Credit rating of Bangladesh from Trading Economics via link http://www.tradingeconomics.com/bangladesh/rating
/56/	Definition of credit rating symbol "BB-/BA3" via link http://www.investopedia.com/terms/b/ba3-bb.asp
/57/	National Report on Sustainable Development issued by the Ministry of Environment and Forests, People's Republic of Bangladesh, dated in May 2012
/58/	The official statistics on the above ground leak facilities within Titas gas distribution system, dated 24/03/2014
/59/	ER calculation spreadsheet of Reducing Gas Leakages within the Titas Gas Distribution Network in Bangladesh; Spreadsheets on the sampling size appropriateness of each leaking facilities
/60/	2006 IPCC Guidelines for National Greenhouse Gas Inventories
/61/	Gas Marketing Law issued by Petrobangla, dated in Mar. 2013
/62/	Natural Gas Security Law 1991 (Revised in 2003)
/63/	MoC authorization statement from the validation contractual PP of NE Climate A/S, dated 12/05/2014
/64/	Email on the issuance of MoC, dated 24/10/2014
/65/	Quotation of Hi Flow Samplers from Health Consultants Incorporated, dated 23/06/2014
/66/	Price of Gassurveyor (500 Serials) via link http://www.ijstech.com/44522r.html
/67/	Price of GORE® Valve Stem Packing via link https://shop.galloup.com/index.jsp?path=product&part=3006965&ds=dept&process=search&qdx=0&ID=,38,0
/68/	Other repair cost: Flange Gasket, Ring via link http://www.grainger.com/product/W-L-GORE-Flange-Gasket-4CYT5 ; Directed Inspection and Maintenance at Compressor Stations issued by Environmental Protection Agency, United States, dated in Oct. 2003
/69/	Email on the issuance of LoA issuance from Bangladesh DNA, dated 25/08/2014
/70/	Email on the issuance of LoA issuance from Danish DNA, dated 24/10/2014
/71/	Addendum to the LoA from Bangladesh DNA, Ref. DoE/Int.Con./CDM/HCA/2011/06/86, dated 05/02/2015
/72/	Technical standards for emergency gas leakage repair issued by both Emergency Gas Control Section and System Operation Department of Titas Gas Transmission & Distribution Co., Ltd.

2.2 Follow-up Interviews with Project Stakeholders

TÜV Rheinland validation team carried out an on-site visit (dated 11/03/2014-13/03/2014) and performed interviews with the project representatives and stakeholders. The site visit was conducted to validate the accuracy and completeness of the project description as specified under webhosted PDD.

	Date	Name	Organization	Topic
/i/	2014-03-11	Mr. Nowshad Islam Mr. Fakhrul Islam Mr. Md. Khairul Haque Mr. Md. Ahsikul Islam Mr. Syed Monjur Morshed Mr. Mir Mashior Mr. Md. Mukbul Ahmed	Titas Gas Transmission & Distribution Co., Ltd.	– Project Management – Technical issues – Sustainable development issues – Investment risks and barriers – Additional – Monitoring plan – Training plan – Environmental impacts – Stakeholder process – Financial source – CDM incentive consideration
/ii/	2014-03-11	Mr. Daragh Glynn	NE Climate A/S	– Project design document – Baseline determination – Emission reductions calculation – Project additionality – Monitoring plan – Training plan – Status of LoAs
/iii/	2014-03-11	Ms. Samina A. Shahrukh	Royal Danish Embassy in Bangladesh	– Natural gas regulation law
/iv/	2014-03-12	Mr. Kazi Ariful Islam	Tongi PS RMS	– Operation & Maintenance
/v/	2014-03-12	Mr. Md. Tabarakullah	Ashulia TBS	– Operation & Maintenance
/vi/	2014-03-13	Mr. Ravi Kantamaneni	ICF International	– Project design document – Baseline determination – Emission reductions calculation – Project additionality

The validation team carried the on site visit on 11/03/2014-13/03/2014, which is prior to the date of Global Stakeholder Publication (GSP) closure (i.e. 27 Mar. 2014). If there are comments during the GSP, the second visit will be done if necessary. By the end of GSP, no any comments were received, thus the second site visit is not necessary. Detailed assessment as referred in the following section 3.10.

2.3 Resolution of Outstanding Issues

The objective of this phase of the validation is to resolve any outstanding issues (issues that require further elaboration, research or expansion) which need be clarified prior to TÜV Rheinland's positive conclusion on the project design. In order to ensure

transparency a validation protocol is customized for the project. The protocol shows in transparent manner criteria (requirements), means of validation and the results from validating the identified criteria. The validation protocol serves the following purposes:

- It organizes, details and clarifies the requirements a CDM project is expected to meet CDM requirements;
- It ensures a transparent validation process where the validator will document how a particular requirement has been validated and the result of the validation.
- It ensures that the issues are accurately identified, formulated, discussed and concluded in the validation report.
- It ensures the determination of achieving credible emission reductions from the project activity.

The validation protocol consists of three tables. The different columns in these tables are described in the figure below. The completed validation protocol for this project is enclosed in Appendix A to this report.

Findings established during the validation can either be seen as a non-fulfillment of CDM criteria or where a risk to the fulfillment of project objectives is identified. Corrective action requests (CAR) are issued, where:

- Mistakes have been made with a direct influence the ability of the project activity to achieve on project results like real, measurable, verifiable and additional emission reductions;
- CDM and/or methodology specific requirements have not been met; or
- There is a risk that the project would not be accepted as a CDM project or that emission reductions will not be certified.

A request for clarification (CL) may be used where additional information is needed to fully clarify an issue.

A forward action request (FAR) is raised during validation to highlight issues related to project implementation that require review during the first verification of the project activity. FARs shall not relate to the CDM requirements for registration.

Validation Protocol Table 1: Validation requirements				
Checklist Question	Reference	Means of verification (MoV)	Comment	Draft and/or Final Conclusion
The various UNFCCC requirements as specified in the VVS are linked to checklist questions the project should meet. The checklist is organized in different sections, following the logic of the VVS.	Gives reference to documents where the answer to the checklist question or item is found.	Explains how conformance with the checklist question is investigated. Examples of means of verification are document review (DR) or interview (I). N/A means not applicable.	The section is used to elaborate and discuss the checklist question and/or the conformance to the question. It is further used to explain the conclusions reached.	This is either acceptable based on evidence provided (OK), or a corrective action request (CAR) due to non-compliance with the checklist question (See below). A request for clarification (CL) is used when the validation team has identified a need for further clarification.

Validation Protocol Table 2: List of Requests for Corrective Action (CAR) and Clarification (CL)			
Draft report clarifications and corrective action requests	Ref. to checklist question in table 1	Summary of project owner response	Validation conclusion
If the conclusions from the draft Validation are	Reference to the checklist question	The responses given by the project participants	This section should summaries the validation

either a CAR or a CL, these should be listed in this section.	number in Table 1 where the CAR or CL is explained.	during the communications with the validation team should be summarized in this section.	team's responses and final conclusions. The conclusions should also be included in Table 1, under "Final Conclusion".
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Table 3: List of forward action requests (FARs)			
FAR number	Reference	Summary of project owner response	Validation team conclusion
Forward action request (FAR) to be raised during validation to highlight issues related To project implementation that requires review during the first verification of the project activity. FARs Shall not relate to the CDM requirements for registration.	Reference to the checklist question number in Table 1 where the CAR or CL is explained.	The responses given by the project participants during the communications with the validation team should be summarized in this section.	This section should summaries the validation team's responses and final conclusions. The conclusions should also be included in Table 1, under "Final Conclusion".

Figure 1. Validation protocol tables

2.4 Internal Quality Control

The final validation report underwent a technical review by a qualified independent reviewer before requesting registration of the project activity. The technical review was performed by a technical reviewer qualified in accordance with TÜV Rheinland's qualification scheme for CDM validation and verification that meets the criteria of EB guidelines for qualification.

2.5 Validation Team

Before the assessment begins, members of the validation team are ensured to cover the technical area(s), sectoral scope(s) and relevant host country experience including local language ability for evaluating the CDM project activity. The qualification of the team is as per the criterias defined by the EB guidelines for qualification.

Validation Team			Type of Involvement						
Full name	Affiliation TÜV Rheinland	Appointed for Sectoral Scopes (Technical Areas)	Supervising the work	Desk review	Site Visit + Interview	Report and protocol Writing	Technica Expert Input	Reporting Support	Technical Reviewer
Mr. YAN Chong	China	1.2, 2.1, 3.1, 4.3, 4.5, 9.1	X	X	X	X			
Mr. ZHU Jiang	China	1.1, 1.2, 4.5		X	X			X	
Ms. LIU Qing	China	1.2, 8.2, 10.2		X	X		X		
Mr. Sami Al Karim	China	N/A			X				
Mr. Norbert Heidelmann	Germany	1.1, 13.1, 15.2		X					
Mr. Walter TANG	China	1.1, 2.2, 2.1, 2.2, 3.1, 4.3, 4.5, 13.1							X

Dr. LI Lixin	China	1.1, 1.2, 2.1, 2.2, 3.1, 4.5							X
Mr. YUAN Limin	China	1.1, 4.5, 8.2, 10.2					X		

3 VALIDATION FINDINGS

The findings of the validation are stated in the following sections. The validation criteria (requirements), the means of verification and the results from validating the identified criteria are documented in more detail in the validation protocol in Appendix A.

The final validation findings relate to the project design as documented and described in the revised and resubmitted project design documentation.

3.1 Approval and Participation

3.1.1 Letter of Approval

The project is a bilateral project, and the project participant of the project is Titas Gas Transmission & Distribution Co., Ltd. (the project owner) from People's Republic of Bangladesh, where the host party meets all relevant participation requirements in the CDM. The other project participant is NE Climate A/S from Denmark identified as the Annex I party involved in the project.

The Letter of Approval (LoA) and its addendum, received from the project participant, has been issued from the Bangladesh's DNA, i.e. Department of Environment (DOE) /3//71/, for authorizing the project owner as project participant and confirming that the project contributes to People's Republic of Bangladesh's sustainable development. The validation team has checked up the original email on the issuance of LoA from Bangladesh DNA/69/and considered the LoA submitted is valid.

The LoA of Denmark, received also from the project participant, has been issued by the DNA of the Denmark, i.e. the Ministry of Climate, Energy and Building on 24 Oct. 2014/4/. It states that the NE Climate A/S is authorized to participate in the project. The validation team is able to confirm that the LoA submitted is valid via checking the original email on the LoA issuance from Danish DNA/70/.

The validation team also confirms that the title of the project in the PDD/2/ is identical to the one stated in the respective LoA from People's Republic of Bangladesh and Denmark/3//4/.

Based on the description above, the validation team is able to confirm approval and participation requirements relating to the project as per the VVS/Version 07.0/6/ in a tabular manner below:

Project participants	Titas Gas Transmission & Distribution Co., Ltd.	NE Climate A/S
Parties involved	People's Republic of Bangladesh(host)	Denmark
Ratification status of the parties	Bangladesh ratified the Kyoto Protocol on 22 Oct. 2001	Denmark ratified the Kyoto Protocol on 31 May 2002.
APPROVAL		
LoA received	Yes	Yes
Date of LoA	21/08/2014	24/10/2014
Reference to document	Ref. DoE/Int.Con./CDM/HCA/2011/06/46/3/	File No. 5013/5038-0003/4/

LoA received from	PP	PP
Validation of authenticity	Email from Bangladesh DNA/69/	Email from Danish DNA/70/
Validity of LoA	Valid	Valid
PARTICIPATION		
Party is party to Kyoto Protocol	Yes	Yes
Voluntary participation	Yes	Yes
Diversion of official development aid towards host country	N/A	No
Project contribution to SD	Yes	N/A

3.1.2 Modalities of Communications

Requirement of MOC	Criteria fulfilled	Determination by the validation team
Is the focal point identified	☒ Yes ☐ No	By means of checking the MOC signed on 16/09/2014/5/, the focal points of the project are confirmed to be clearly indicated in the Section 2 of MOC, NE Climate A/S is nominated as sole focal point with the authority to - (a) Communicate in relation to requests for forwarding of CER; and - (b) Communicate in relation to requests for addition and/or voluntary withdrawal of project participants and focal points, as well as changes to company names, legal status contact details and specimen signature; and, - (c) Communicate on all other project or programme related matters not covered by (a) or (b) above.
Is the MOC signed by all project participant (including focal point identified entity/personal)	☒ Yes ☐ No	As reflected in the MOC signed on 16/09/2014/5/, the MOC is confirmed to be signed by both Titas Gas Transmission & Distribution Co., Ltd. from host country of People's Republic of Bangladesh and NE Climate A/S from Annex I party of Denmark.
Is the written confirmation obtained by the PP's stating the authorization, specimen signatures and personal details, employment status are valid and accurate?	☒ Yes ☐ No	Yes. The validation team has received the written confirmation document/63/, stating the authorization, specimen signatures and personal details, employment status are valid and

		accurate.
Is MOC received by the validation team from the PP with whom DOE has the contractual relationship?	☒ Yes ☐ No	The MOC was received by the validation team from the validation contractual party of NE Climate A/S, which can be substantiated with the MOC issuance email dated 24/10/2014/64/.

The validation team confirms that the applicable latest Version 02.1 of MOC Form/17/ has been employed by the project participant for the MOC. The MOC is been received from the DOE's contractual project participant. All the personal who have duly signed the MOC are been confirmed from the written communication by the project proponent regarding their personal identity, specimen signatures and employment status.

The project does not receive any public funding according to the Section A.4.4 and the Annex 2 of the PDD/2/. The documentation review and background investigation on the internet did not reveal any information indicating that the project can be seen as a diversion of ODA funding towards People's Republic of Bangladesh, which is further confirmed by onsite interview with PPs/i/iii/ and review of the certified emission project investment agreement/28/.

3.2 Project Design Document

The Project Design Document (Version 6, dated 16/03/2015) is prepared based on the currently valid PDD form /9/ and is completed in accordance with the Guidelines for Completing the Project Design Document Form/10/.

3.3 Project Description

The validation means of documentation review, onsite observation, stakeholders' interview and background investigation on the internet have been conducted by the validation team to ensure that the description of the project activity is accurate and complete.

In compliance with both LoAs from People's Republic of Bangladesh and Denmark/3//4/, the project title is slightly revised from "Certified Emission Reductions project within the Titas Gas distribution network, People's Republic of Bangladesh" in the webhosted PDD/1/ to "Reducing Gas Leakages within the Titas Gas Distribution Network in Bangladesh, which is considered reasonable according to the item (d) of para. 39 of VVS Version 07.0/7/ and is confirmed to be accurately reflected in the final PDD/2/. And also both slightly different titles of projects are confirmed to be the same project, detailed assessment as seen in the following section 3.5.1.

The project is hosted by Titas Gas Transmission & Distribution Co., Ltd. (hereafter referred to as "Titas"). Titas headquarters in Dhaka of Bangladesh with the coordinates of 23.7000° N and 90.3833°E, which can be cross checked by the validation team via public online source (i.e. Google Earth).

The project activity is aimed to reduce natural gas physical leaks from above ground components in the gas distribution network of Titas, through the introduction of advanced leak detection and repair programme.

As per the feasibility study report/27/, the project activity will include the leak detection and leak flow rate measurement, as well as repair works at components in the gas distribution system. The project implementation covers the Titas gas distribution network only located in the Greater Dhaka and its adjacent areas, specifically including 12 regions of Dhaka, Narayanganj, Narsingdi, Munshiganj, Manikganj, Gazipur, Tangail, Mymensingh, Jamalpur, Sherpur, Netrokona and Kishoreganj. During the on-site interview, this has been confirmed by the Titas with its gas transmission pipeline system layout/44/.

Within the above defined regions, the physical location for the project activity includes 4 City Gate Stations (CGS), 80 Town Border Stations (TBS)/District Regulatory Stations (DRS), 10,530 Commercial Regulator Metering Stations (RMS), 5,938 Industrial RMS and 1,519,124 Residential RMS, which was confirmed by the official statistics from Titas/58/.

As reflected in the latest Titas Annual Report 2012-13/51/, Titas was established in Nov. 1964, and its constructed pipeline length had reached 12,253.22km as of 30 Jun. 2013. Over the years the system has not been adequately maintained, leaks in the gas distribution system are caused by normal component wear, thermal and vibrational stresses and seasonal expansion/contraction cycling from ambient air temperature changes. Based on onsite interview with Mr. Syed Monjur Morshed and review of summary on current leak detection and repair procedures/34/, current leak detection and repair practices are mainly implemented out of safety concerns in locations where gas from leaks can accumulate underground and pose a threat of explosion/31/, in order to comply with legal requirements outlined in the "Gas Safety Rules 1991 (revised in 2003)" /62/.

As summarized in the management meeting minutes/32/, at present Titas has only two hydrocarbon leak detectors for use throughout the more than 12,000km gas distribution network, i.e. Gasman Personal Gas Monitor (Model: CE1180exII1G) manufactured by Crowcon Oxon, UK. Obviously, the quantity of these conventional leak detecting devices is not sufficient for the widespread use. Instead, the examination of leaks is primarily undertaken through visual (i.e. bubbling of leaks through water), noise and odour detection. As a result, the existing procedures can only detect a minority of leaks occurred in the system. Even though some leaks were identified through these conventional methods, Titas lacks advanced repair materials to fix all but the simplest leaks, principally using polyethylene-based tape and leak repair clamps to repair above ground components. During the on-site inspection and interview/v/vi/, the validation team realized that the current repair practice is not long term effective for above ground components due to varying temperature and humidity, under which the material quickly dries out and loses any ability to stop leakage. In the current situation, a significant amount of methane (predominant in the gas leaks) is being released to the atmosphere, as confirmed in the survey report of measurement study in Titas/26/.

To reduce the natural gas physical leaks in components, Titas will introduce the advanced LDAR program with state-of-the art technology, including the GMI Gassurveyor 500 Series for leak detection, the Hi-Flow Sampler for the measurement of leak flow rate, the advanced materials (incl. GORE® Valve Stem Packing or similar PTFE sealing materials, non-asbestos sheeting, PTFE gasket and sealing material, advanced membrane material and insulating joints) for the repair of physical leaks, all of their technical advantages presented in the PDD/2/ can be cross checked with their technical specifications/46//47//48/.

It is observed by the validation team during the on-site assessment that the project has not started yet. The starting date of the project is expected on 1 Nov. 2014(i.e. Starting to procure advanced leak detection, measurement and repair technologies, contract to train and hire staff after its CDM registration)/i/, which would be the earliest of the dates at which the implementation or construction or real action of the project began in accordance with the latest CDM Glossary/15/. The validation team also confirmed that the implementation timeframe of the project described in the Section B.5 of the PDD is valid by means of documentation review and the on-site observation & interview. The project will achieve emission reductions by reducing natural gas physical leaks in components through the introduction of an advanced LDAR program. The operational lifetime of the project activity is expected to be 10 years, which is in line with the project investment agreement/28/. The fixed crediting period has been chosen for the project, starting from 1

Apr. 2015 or registration date, whichever is later. The expected emission reductions of the project activity are 4,378,506tCO₂e/yr and 43,785,057 tCO₂e in total over the crediting period of 10 years respectively. The summarized information is as following table,

Starting date of project	Expected project operational lifetime	Crediting period
1 Nov. 2014	10 years	Fixed crediting period of 10 years

In order to ensure operation of the proposed project activity, PP will provide specific technical trainings to relevant staff before the project starting operation, as prescribed in the project investment agreement/28/.

Herewith, the Validation Team summarizes major changes between webhosted PDD and final version of PDD for submission as follows:

Subject	Webhosted PDD (Version 1, dated 21/02/2014)	Correction to webhosted PDD in the final PDD submission for registration with DOE assessment and reason of acceptance. (Version 6, dated 16/03/2015)
Project title	Certified Emission Reductions project within the Titas Gas distribution network, People's Republic of Bangladesh	Reducing Gas Leakages within the Titas Gas Distribution Network in Bangladesh Pls. refer to CAR 6 of Table-2 of Appendix A.
Project boundary	-	- Pls. refer to CAR 7 of Table-3 of Appendix A.
Barrier analysis	-	- Pls. refer to CL 3 of Table-2 of Appendix A.
CDM prior consideration of the project	-	- Pls. refer to CAR 12 of Table-2 of Appendix A.
Estimated amount of annual average GHG emission reductions	4,939,712 tonnes CO ₂	4,378,506 tonnes CO ₂ Pls. refer to CL 2 of Table-2 of Appendix A.
Monitoring plan	-	- Pls. refer to CAR 14 of Table-2 of Appendix A.
Start date of the project	January 24, 2013	01/11/2014 Pls. refer to CAR 10 of Table-2 of Appendix A.
Start date of Crediting Period	01/01/2015	01/04/2015 Pls. refer to CAR 5 of Table-2 of Appendix A.
PDD Form	F-CDM-PDD (Version 04.1)	F-CDM-PDD (Version 05.0) Pls. refer to CAR 4 of Table-2 of

	Appendix A.
Please refer to Appendix A of this report for details of each change between webhosted PDD and the final PDD for submission. The Validation Team has carried out the validation process based on the Webhosted PDD and raised CARs/CLs against the project by issuing the validation protocol. With the updated information and corrections done on final PDD, the PP has addressed all the CARs /CLs that were raised by the Validation Team. It is concluded that the Validation Team has reviewed the project in line with the VVS (Version 07.0) and all the evidence, corrections, justifications and updating done on the final PDD with respect to CARs /CLs raised are accepted and closed by the Validation Team, issuing the positive validation opinion for project registration.	

Based on the above assessment, TÜV Rheinland validation team considers the project description of the project contained in the PDD to be complete and accurate.

3.4 Baseline and Monitoring Methodology

3.4.1 Applicability of the selected methodology to the project activity

The project correctly applies the approved consolidated baseline and monitoring methodology AM0023, Version 04.0.0-Leak detection and repair in gas production, processing, transmission, storage and distribution systems and in refinery facilities/11/, in conjunction with "Combined tool to identify the baseline scenario and demonstrate additionality" (Version 05.0.0)/12/. Based on the information of UNFCCC website <http://cdm.unfccc.int/methodologies/DB/PZN9ZCTGF3KHFH0W21NY0NYL6X5CIR>, the validation team can confirm that the approved methodology AM0023, Version 04.0.0 and tool applied for the project are valid.

The justification of applicability criteria for the baseline and monitoring methodology are assessed by the validation team by means of documentation review and the onsite assessment. It is the validation team's opinion that the project fully meets the criteria as described as follows:

Applicability criteria of the methodology AM0023, Version 04.0.0	Criteria fulfilled	Determination by the validation team
This methodology is applicable to project activities that reduce physical leaks in components through the introduction of an advanced LDAR program.	☒ Yes ☐ No ☐ N/A	The project is to reduce physical leaks in above components through the introduction of an advanced program, incl. involvement of GMI Gassurveyor 500 Serials, Hi-Flow Sampler and advanced materials, which is confirmed to be advanced LDAR program by means of documentation review/11//27//28/ and physical observation & interviews/i//iii/ during the onsite assessment. Thus, the criterion is applicable to the proposed project activity.
The methodology is applicable under the following conditions:		
During the last three years prior to 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;	☒ Yes ☐ No ☐ N/A	By means of checking the summary on current leak detection and repair procedures/34/, the validation team confirmed that no advanced LDAR program was in place to address physical leakage from components in the whole Titas Gas Distribution Network. Also, both the recent three years of statistics in

Applicability criteria of the methodology AM0023, Version 04.0.0	Criteria fulfilled	Determination by the validation team
		the physical leak and repair records/31/ and the operation & maintenance log copies/36/ has been reviewed to reflect that no advanced LDAR program had been applied in the past three years. Further, as stated by the Hi Flow Sampler worldwide distributor of Heath Consultants/33/, Heath currently has not sold any Hi Flow Samplers to Bangladesh, and no any Hi Flow Samplers are being used in Bangladesh. Therefore, this condition is applicable to the proposed project activity.
New physical leaks that are detected at components during the crediting period (e.g. not at the time the project starts) are accountable only if the components were included in the project boundary at the validation of the project activity;	☒ Yes ☐ No ☐ N/A	As clearly defined in the PDD B.3/2/, new gas distribution sections will not be included in the project boundary after CDM project baseline definition. During the on-site interview, Titas management representative also confirmed that the proposed project will only address above components that were included in the project boundary at the validation of the project activity. Therefore, this condition is applicable to the proposed project activity.
Physical leaks that need to be repaired due to current regulations and legislation are accountable only if it can be demonstrated that relevant regulations and legislation are not enforced in the country.	☒ Yes ☐ No ☐ N/A	As described in details in the Section B.5 of the PDD/2/, the conventional LDAR program is performed mainly out of safety concerns, in compliance with legal requirements in the gas sector of People's Republic of Bangladesh, incl. - Gas Marketing Law/61/ - Natural Gas Security Law 1991 (Revised in 2003)/62/; The focus of these legislations is to ensure reliable and safe transmission of gas to consumers. Especially for the safety of residential RMS where components are close to the residents, any emergency call (logged on hotline) for residential RMS component leak is characterized as safe leaks and will be repaired in 24 hours, as confirmed via interview with Mr. Kazi Ariful Islam/iv/. Conventional LDAR program procedures only detect a fraction of leaks (mainly large leaks presenting an immediate safety hazard) occurring in the system and eliminate them temporarily/32/. Leaks often reoccur between regular inspections because sealing materials of a relatively low quality are used, as reflected in the most recent three years of

Applicability criteria of the methodology AM0023, Version 04.0.0	Criteria fulfilled	Determination by the validation team
		statistics in the physical leak and repair records (2010-2012)/31/. Under existing laws and regulations in People's Republic of Bangladesh, there is no quantitative threshold above which leaks are considered to be illegal or unsafe for those components in CGS, TBS, DRS and RMS. Furthermore, activities included in the proposed project are neither prohibited nor required by the existing mandatory laws and regulations/61//62/. Also there are no taxes or penalties for distribution gas losses in People's Republic of Bangladesh, as confirmed via interview/i//iii//iv//v/ and reviewing the meeting minutes of Titas Gas Management Board/32/. Further, the validation team checked all other similar registered CDM projects listed in the latest CDM pipeline/24/, and detected that the above identified practice for gas leaking and maintenance also exists in Georgia (UNFCCC No. 6213), Uzbekistan (UNFCCC No. 5176), Armenia (UNFCCC No. 5138), Serbia (UNFCCC No. 5430) and Moldova (UNFCCC No. 9397) where all other similar registered projects locate. Moreover, People's Republic of Bangladesh is a LDC country comparing with those countries/50/. Therefore the validation team has concluded that current safety regulation does not enforce repair of the leaks included in the project boundaries, but physical leaks that need to be repaired under emergency will be not accountable as defined in the PDD B.6.1/2/.
This methodology is not applicable to:		
Physical leaks that are detected and repaired under a conventional LDAR program;	☒ Yes ☐ No ☐ N/A	As clearly defined in the baseline emissions calculation of the PDD B.6.1/2/, the physical leaks that are detected and repaired under a conventional LDAR program shall not be included in the project activity. Therefore, this condition is applicable to the proposed project activity.
Physical leaks that can be repaired by tightening/re-greasing or by similar measures;	☒ Yes ☐ No ☐ N/A	As clearly defined in the baseline emissions calculation of the PDD B.6.1/2/, the physical leaks that can be repaired by tightening/re-greasing or by similar measures shall not be included in the

Applicability criteria of the methodology AM0023, Version 04.0.0	Criteria fulfilled	Determination by the validation team
		project activity. Therefore, this condition is applicable to the proposed project activity.
Physical leaks that are identified on components where the latest scheduled maintenance or replacement was not done before the starting date of a project activity as documented through maintenance logs, maintenance schedules, maintenance guidelines, worker logbooks, or other similar sources;	☐ Yes ☒ No ☐ N/A	As clearly defined in the baseline emissions calculation of the PDD B.6.1/2/, physical leaks that are identified on components where the latest scheduled maintenance or replacement was not done before the starting date of the project activity as documented through maintenance logs, maintenance schedules, maintenance guidelines, worker logbooks, will not be covered by the project activity. Therefore, this condition is applicable to the proposed project activity.
Reductions in process venting;	☒ Yes ☐ No ☐ N/A	According to the FSR of the project/27/, the project is to reduce the physical leaks from above components within the defined Titas gas distribution network boundary, and does not involve reductions in process venting. Therefore, this condition is applicable to the proposed project activity.
Reductions in natural gas or refinery gas combustion by process heaters or boilers, engines and thermal oxidizers.	☒ Yes ☐ No ☐ N/A	According to the FSR of the project/27/, the project is to reduce the physical leaks from above components within the defined Titas gas distribution network boundary, and does not involve reductions in natural gas or refinery gas combustion by process heaters or boilers, engines and thermal oxidizers. Therefore, this condition is applicable to the proposed project activity.
The methodology is only applicable if the most likely baseline scenario is the continuation of the current practice.	☒ Yes ☐ No ☐ N/A	As assessed in the section 3.5, the final identified baseline scenario for the project is the continuation of current practice. Thus, this criterion is applicable to the proposed project activity.

The assessment of the project is compliance with the applicability criteria of the methodology AM0023, Version 04.0.0 as documented in the Section B.2 and Appendix 3 of PDD/2/, which are evaluated in detail under the validation protocol in Appendix A to this report based from the webhosted PDD.

3.4.2 Project Boundary

The project boundary of the project has been assessed by means of on-site physical observation and documentation review. According to the applied methodology AM0023, Version 04.0.0/11/, the spatial extent of the project boundary includes the components where the project activity is being implemented.

By checking the random sampling survey on physical leakages/26/, the identified physical leaking components are confirmed to include 1) all connectors, valve stem packing, valve

seats, pressure relief valves, scrubber dump valve/flanges, and regulators in CGS, TBS/DRS, and RMS (residential, commercial and industrial) facilities; 2) all insulating joints in RMS facilities (residential, commercial and industrial), and all of them have been clearly defined in the project boundary of PDD/2/. Conservatively, the new gas distribution section constructed after CDM project baseline definition will not be included in the project boundary, as assumed in the PDD/2/. In addition, a flow diagram of the project boundary has been given in the PDD, following the gas distribution process chart.

And the overview of emission sources are presented as below,

	GHGs involved	Description
Baseline emissions	CH ₄	Main source of emissions in line with the applied methodology AM0023, Version 04.0.0/11/ and the natural gas chemical composition report from Petrobangla/53/.
Project emissions	CH ₄	Main source of emissions in line with the applied methodology AM0023, Version 04.0.0/11/ and the natural gas chemical composition report from Petrobangla/53/.
Leakage	N/A	No leakage is expected to occur in this type of project as per AM0023, Version 04.0.0/11/.

In summary, the project boundary was correctly identified in accordance with the methodology AM0023, Version 04.0.0. All greenhouse gas emissions occurring within the proposed project activity boundary as a result of the implementation of the proposed CDM project activity have been appropriately addressed in the PDD.

By means of on-site inspection and checking the FSR of the project/27/, the validation team confirmed that no other greenhouse gas emissions occurring within the proposed CDM project activity boundary as a result of the implementation of the proposed project activity which are expected to contribute more than 1% of the overall expected average annual emission reduction, with respect to the methodology applied.

3.4.3 Baseline Identification

The baseline of the project is identified based on the approved consolidated baseline and monitoring methodology AM0023, Version 04.0.0-*Leak detection and repair in gas production, processing, transmission, storage and distribution systems and in refinery facilities/11/*. In the absence of the proposed CDM project activity, Scenario 1: Continuation of the current situation with existing practices of leak detection and routine maintenance would occur, which has been sufficiently justified in the PDD/2/. Also the validation team has made assessment on the identification of baseline scenarios in the below section 3.5 and confirms the appropriateness of the identified Scenario 1 in the PDD/2/.

With regard to the § 94 of VVS/6/, the validation team can conclude following opinions in a tabular form,

<i>The approved baseline methodology applicable to the project</i> - explicit criteria - implicit criteria (e.g. available scenarios, applicability of formulas for BE/PE/LE calculations)	☒ Yes ☐ No	The applicability of the methodology AM0023, Version 04.0.0 has been justified in Section 3.4.1 above.
<i>PDD includes all assumptions and data used</i>	☒ Yes	The PDD listed all assumptions and

<i>by project participants</i>	☐ No	data in accordance with AM0023, Version 04.0.0/11/ and Version 05.0.0 of “Combined tool to identify the baseline scenario and demonstrate additionality”/12/.
<i>All the references and documents used are relevant for establishing the baseline scenario</i>	☒ Yes ☐ No	All the reference and documents used are relevant for establishing the baseline scenario, detailed as seen in the section 3.5.
<i>All the references and documents used are correctly quoted and conservatively interpreted in the PDD</i>	☒ Yes ☐ No	All the reference and documents used are correctly quoted and conservatively interpreted in the PDD/2/.
<i>All relevant policies / regulations considered are listed in the PDD</i>	☒ Yes ☐ No	All relevant policies/ regulations are considered in the PDD/2//61//62/.
<i>Identified potential baseline scenarios reasonably represent what would/could occur in the absence of the proposed project activity</i>	☒ Yes ☐ No	The identified baseline scenario to the project activity is the continuation of the current situation with existing practices of leak detection and routine maintenance, detailed assessment as seen in the section 3.5.
<i>The baseline scenario selection is appropriate and determined according to the methodology</i>	☒ Yes ☐ No	The baseline scenario to the project is appropriately selected as per the applied methodology AM0023, Version 04.0.0/11/ and Version 05.0.0 of “Combined tool to identify the baseline scenario and demonstrate additionality”/12/.
<i>The approved methodology used is applicable to the identified baseline scenario</i>	☒ Yes ☐ No	The applied methodology AM0023, Version 04.0.0/11/ is applicable to the identified baseline scenario in the PDD /2/.

3.4.4 GHG Emission Reductions

The validation team has assessed all the calculations of baseline emissions, project emissions, leakage and emission reductions in the PDD/2/ against the requirements presented in the applied methodology AM0023, Version 04.0.0/11/.

Baseline emissions:

In accordance with the applied methodology AM0023, Version 04.0.0/11/, the PDD/2/ correctly and transparently applies that the baseline emissions is 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) in four steps below.

Item	Validation Team's Assessment
Step 1: Establishment of criteria to identify which types of physical leaks are eligible for crediting	In line with the methodology AM0023, Version 04.0.0/11/, PP has accordingly described and assessed the current leak detection and repair practices in the PDD/2/, then established relevant criteria to identify whether the detection and repair of a physical leak during project implementation would also have occurred under conventional LDAR. The validation team checked the current leak detection and repair procedures within Titas Gas/34/

	and Technical Standards for Emergency Gas Leakage Repair/72/, the current leak detection and repair practices in Titas are confirmed to be only for two types of physical leaks incl. <u>Emergency / Safety repairs</u>, and <u>Leaks detected by visibility, audibility and/or smell</u>, detailed assessment as following: By means of on-site interview with the operation manager Mr. Md. Mukbul Ahmed/i/ who is responsible for physical leak detection and repair, the current leak detection and repair practices are confirmed to meet legal requirements in the gas sector of People's Republic of Bangladesh, i.e. Natural Gas Security Law 1991 (Revised in 2003)/62/. As required in the the law/62/, the main reason to reduce gas leak is to meet safety requirements, but no specification is given for what exactly counts as a safety concern. Via the on-site interview/i/, the safety concern is defined by Titas as "emergency cases" where there is significant risk to public health and safety of the gas distribution system (e.g. explosion or inflammation risk, or where a high concentration of gas can accumulate in an enclosed space). And the existing procedures do only focus on the components included in the underground gas distribution system, which can be substantiated with the most recent three years of statistics in the physical leak and repair records (2010-2012)/31/. At present, Titas has only two hydrocarbon leak detectors (i.e. Gasman Personal Gas Monitor, Model: CE1180ExII1G) for the use in more than 12,000km gas distribution system, both of them are technically old and obviously insufficient for widespread use, as confirmed in the management meeting minutes/32/. In addition, the feasibility study report of the project/27/ revealed that many gas physical leaks are missed due to operators lacking professional basic tools and training. Consequently, the detection of leaks is primarily undertaken through worker visual (i.e. bubbling of leaks through soap water), audio (i.e. hissing) and olfactory response. Further, even for some physical leaks identified through worker visual, audio or olfactory responses, Titas principally uses polyethylene-based tape and leak repair clamps to fix/i//iv//v//34/. Based on on-site inspection and the expertise of validation team, this kind of maintenance approach is not long-term effective to stop leakage from above ground component due to the varying temperature and humidity. As randomly sampled by the qualified third party of Heath Consultants/26/, many above components within the defined project boundary are leaking under the normal operation of Titas gas distribution system. Further, during the on-site interview, the validation team understood that there are no taxes or penalties for current distribution gas losses in People's Republic of Bangladesh/i//iii/, which is confirmed by checking the management meeting minutes/32/ as well. Thus, under the current practice for non-emergency, leaks that can be effectively identified and repaired, are only those physical leaks which can't only be detected by worker audio, visual and olfactory responses but also can be fixed by simply tightening loose fittings and connections. Based on the above, it is deemed reasonable and conservative for PP to exclude physical leaks from the project activity based on
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	below two criteria/2/, - Physical leaks identified and/or repaired under emergency or safety concerns; - All physical leaks that can be repaired by simply tightening loose fittings and connections; To facilitate the decision making process when classifying detected physical leaks are part of either a conventional or advanced LDAR program during the project implementation, a decision tree flowchart has been clearly addressed in the PDD(Figure 8) /2/ as well.
Step 2: Establishment of a database to management all information related to the project activity	Ok, one database to management all information related to the project activity has been established by PP as transparently described in the PDD/2/. After cross-checking the information included in the database, the validation team concludes that the proposed database is completely in compliance with the methodology AM0023, Version 04.0.0/11/.
Step 3: Documentation of the schedules for the maintenance and replacement of components	Regarding the schedule for the maintenance and replacement of components, after checking the current leak detection and repair procedures/34/ and the official letter from the pipeline design department of Titas/35/, the validation team detected that Titas had no existing long-time maintenance or replacement schedule for above ground components, except the following two cases in which the components would have been replaced under normal practice: 1. In emergency situations when the component has ceased to function; and 2. Those components in the priority list that can be replaced based on annual budget allocations as they are made known. And the components identified in the above two scenarios will not be included in the project activity, as documented in the PDD/2/. Therefore, it is considered reasonable that the maximum period for which baseline emissions from a leak are accountable is the end of the chosen fixed 10 years crediting period.
Step 4: Calculation of baseline emissions	For the calculation of baseline emissions, Option 2 “<u>Measure the flow rate of the physical leaks through the use of a Hi-Flow Sampler™, calibrated bag or other suitable flow measurements technology as described in the monitoring equipment section</u>” of AM0023, Version 04.0.0/11/, has been taken by the PP, and cannot be changed during the crediting period, as documented in the PDD/2/. In addition, the baseline emissions are capped to the baseline emission level of the first crediting year. In sum, it is considered appropriate to determine the baseline emissions as follows: $BE_Y = \min \left\{ BE_1, ConvFactor \times \sum_j [F_{CH4,j} \times T_{j,y} \times (1 - UR_j)] \times GWP_{CH4} \right\}$ 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: BE₁ = Baseline emissions for the first crediting year of the crediting period (t CO₂e) BE_y = Baseline emissions for crediting year y (tCO₂e) ConvFactor = Conversion factor to convert Nm³ CH₄ into t CH₄ 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_{CH₄,j} = Measured flow rate of methane for the physical leak j from the leaking component (m³ CH₄/h) UR_j = Uncertainty range for the flow rate measurement method applied to physical leak j 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_{CH₄} = The global warming potential of methane valid for the commitment period (t CO₂e/ t CH₄)
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The validation and justification for choice of data and parameters applied in calculating BE_y is presented in following table:

Parameter	Data applied	Ex ante determined / to be monitored	Assessment from Validation Team
ConvFactor	0.0007168 tCH ₄ /Nm ³ CH ₄	Ex ante determined	In line with the applied methodology AM0023, Version 04.0.0/11/, the leak flow rate (F_{CH₄}) and conversion factor (ConvFactor) should be reduced to the same reference conditions. As reflected in the statement on the Hi-Flow Sampler calibration from heath consultant/49/, the proposed Hi-Flow Sampler will automatically converter the leak flow rate measurements at standard temperature and pressure (i.e. 0 degree Celsius and 101.3kPa). From the version 02 of ACM0001 "Consolidated baseline methodology for landfill gas project activities"/23/ and 4th monitoring

			report of the registered CDM project (UNFCCC No. 0170)/22/, the validation team confirmed that the density of methane is $0.0007168 \text{ tCH}_4/\text{m}^3 \text{CH}_4$ at 0 degree Celsius and 101.3kPa. Therefore, it is appropriate to ex-ante determine the ConvFactor value of $0.0007168 \text{ tCH}_4/\text{Nm}^3 \text{CH}_4$ for the proposed project activity.
$F_{\text{CH}_4, j}$	$37 \text{ m}^3 \text{ CH}_4/\text{h}$ for CGS; $1,301 \text{ m}^3 \text{ CH}_4/\text{h}$ for commercial RMS; $1,008 \text{ m}^3 \text{ CH}_4/\text{h}$ for industrial RMS; $25,420 \text{ m}^3 \text{ CH}_4/\text{h}$ for residential RMS; $579 \text{ m}^3 \text{ CH}_4/\text{h}$ for residential RMS;	To be monitored	As per the FSR of the project/27/, the methane flow rate for physical leaks is estimated based on the random sampling results of different facilities, incl. CGS, TBS/DRS and RMS, which was finished by the qualified party of Heath Consultants Incorporated/26/. As confirmed by Titas/58/, the numbers of CGS, TBS/DRS and RMS are 4, 80 and 1,535,592 respectively. Since the gas distribution component configuration is generally homogeneous in each different category of facilities, i.e. CGS, TBS/DRS, Commercial RMS, Industrial RMS and Residential RMS, it is considered appropriate to apply random sampling to survey the methane flow rate of each physical leaking facility, in line with the Guideline for sampling and surveys for CDM project activities and programmes of activities/25/. As reflected in the ER calculation spreadsheet/59/, the sampling rule has been transparently explained, and each actual sampling size is more than the analyzed minimum size for each leaking facilities, accordingly the sampling is conservative and credible. After determining the sampling size, the surveyed results from randomly sampled leaking facilities under 5 different categories were first accumulated and then averaged to determine the ex-ante assumed leak flow rate for each facility, as reflected in the ER calculation spreadsheets/59/. Considering that the physical leaks are generally not stable, and actually the sampling and assumption from survey statistics has considered non-leaking ratio for all categories of leaking facilities, the validation team considered that the survey method deemed reasonable. Based on the above assessed survey method, the average annual methane flow rate is verified to be $37 \text{ m}^3 \text{ CH}_4/\text{h}$ for all involved CGSs, $1,301 \text{ m}^3 \text{ CH}_4/\text{h}$ for all involved commercial RMSs, $1,008 \text{ m}^3 \text{ CH}_4/\text{h}$ for all involved industrial RMSs, $25,420 \text{ m}^3 \text{ CH}_4/\text{h}$ for all involved residential RMSs, and $579 \text{ m}^3 \text{ CH}_4/\text{h}$ for all involved TBS/DRS, aggregating $28,345 \text{ m}^3 \text{ CH}_4/\text{h}$ in total, in line with the assumption made in the methodology AM0023, Version 04.0.0/11/, i.e. For

			components where no physical leak were detected at the initial survey and where physical leak(s) were detected during a subsequent survey, baseline emissions shall be accounted from the moment when the leak was detected. As per the methodology AM0023, Version 04.0.0/11/, the leak flow rate of methane from leaking component shall be ex post measured, and the baseline emissions are capped to the baseline emission level of the first crediting year. Thus, the ex-ante surveyed leak flow rate could be considered as reference, the actual monitored data shall prevail in the crediting period.						
UR _j	0.016	To be monitored	In line with the applied methodology AM0023, Version 04.0.0/11/, the uncertainty range for the measurement method shall be estimated, where possible, at a 95% confidence interval, consulting the guidance provided in Chapter 6 of 2000 IPCC Good Practice Guidance. Under the monitoring plan of the project, the uncertain quantities for leak flow rate are to be combined by addition, thus it is deemed appropriate to adopt the Equation 6.3 of Rule A in Chapter 6 “Quantifying Uncertainties in Practice” of IPCC Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories/24/ for the determination of uncertainty range (UR_j), details as below, $UR_j = \frac{\sqrt{(UR_1 * x_1)^2 + (UR_2 * x_2)^2 + \dots + (UR_n * x_n)^2}}{x_1 + x_2 + \dots + x_n}$ Where: <table><tr><td>UR_j</td><td>=</td><td>the percentage uncertainty in the sum of quantifies (half the 95% confidence interval divided by the total (i.e. mean) and expressed as a percentage)</td></tr><tr><td>x_n and UR_n</td><td>=</td><td>the uncertainty quantities and the percentage uncertainties associated with them, respectively</td></tr></table> <u>Note: “n” in this case refers to each recorded leak rate of each component surveyed.</u> As specified the technical specifications of Hi Flow Sampler/46/, the accuracy of calculated leak rate is ±5%, thus UR_n shall be 5%, which has been correctly reflected in the PDD/2/ and the ER	UR _j	=	the percentage uncertainty in the sum of quantifies (half the 95% confidence interval divided by the total (i.e. mean) and expressed as a percentage)	x _n and UR _n	=	the uncertainty quantities and the percentage uncertainties associated with them, respectively
UR _j	=	the percentage uncertainty in the sum of quantifies (half the 95% confidence interval divided by the total (i.e. mean) and expressed as a percentage)							
x _n and UR _n	=	the uncertainty quantities and the percentage uncertainties associated with them, respectively							

			calculation spreadsheet/59/. The survey report of measurement study from the qualified third party of Heath Consultants/26/ is confirmed to be accurately applied for the ex-ante estimation of UR_j by checking the ER calculation spreadsheet/59/, resulting in 0.016 via the above defined calculation method. Therefore, it is considered appropriate to apply 0.016 of UR_j for the estimation of baseline emission reductions, detailed ex-post monitoring assessment as seen in the section 3.6.2.
$T_{j,y}$	8,670hours	To be monitored	As assessed in the above section 3.3, Titas has no existing long-term maintenance or replacement schedule for above ground component. Only under emergency situation with safety concerns, the components will be repaired, which will be excluded from the project activity. Accordingly, the components applicable to the project could be continuously leaking in the absence of the project activity. Therefore, it is considered appropriate to apply annual 8,670hours of component leaking time for the ex-ante estimated baseline emissions reductions of the proposed project activity, detailed ex-post monitoring assessment as seen in the section 3.6.2.
GWP_{CH_4}	25t CO_2e/t CH_4	Ex ante determined	In the PDD C.2.2/2/, the crediting period is assumed to start from 01/01/2015, which obviously falls within the second commitment period of Kyoto Protocol (from 1 Jan. 2013). As per EB 69, Annex 3 «Standard for application of the global warming potentials to clean development mechanism project activities and programmes of activities for the second commitment period of the Kyoto Protocol»/18/, all emission reductions removals achieved by CDM project in the second commitment period of KP shall be calculated using the global warming potentials in accordance with decision 4/CMP.7/19/. Therefore, it is considered appropriate to use 25 of GWP for methane, based on the effects of greenhouse gases over a 100-year time horizon, as sourced from the column entitled «Global Warming Potential for Given Time Horizon» in table 2.14 of the errata to the contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change/20/.

BE _{CAP}	4,378,506 tCO ₂ e	To be monitored	In line with the applied methodology AM0023, Version 04.0.0/11/, this parameter will be ex-post sourced from the monitored baseline emissions during the first year of the chosen fixed crediting period. Based on the above appropriate ex-ante defined and ex-ante estimated parameters, the ex-ante estimated BE_{CAP} is calculated as 4,378,506 tCO₂e, as transparently produced in the ER calculation spreadsheet/59/.
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Project emissions:

In compliance with the applied methodology AM0023, Version 04.0.0/11/, the project emissions include emissions from 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 which was part of the initial survey and for which no physical leak was detected during that survey, as long as that physical leak is not repaired.

Since the **Option 2** has been taken by PP for the calculation of baseline emissions, it is accordingly appropriate to calculate the project emissions as follows,

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

Where:

PE_y = Project emissions in crediting year y (tCO₂e)

ConvFactor = Conversion factor to convert Nm³ CH₄ into t CH₄

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

F_{CH₄,z} = The leak flow rate of methane for the physical leak z from the leaking component (m³ CH₄/h)

UR_z = The uncertainty range for the measurement method applied to physical leak z

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

GWP_{CH₄} = The global warming potential of methane valid for the commitment period (t CO₂e/ t CH₄)

Since the proposed project activity has not started operation yet, it is deemed reasonable to adopt the ex-ante estimated value of 0 as the project emissions. And the actual project emissions will be calculated based on the ex post monitoring results during monitoring period.

Leakage:

According to AM0023, Version 04.0.0/11/, no significant leakage is expected to occur in this type of project, it is thus reasonable to consider the leakage emissions as zero for the project.

Emission reductions:

Based on the above assessment, the emission reductions can be determined as the difference between the baseline emissions and the project emissions. The expected annual emission reductions are therefore calculated as 4,378,506tCO₂e over the fixed crediting period of 10 years under the above conservative and appropriate assumptions, which is transparently demonstrated in the ER calculation spreadsheet/59/.

With regard to the § 99 of VVS/6/, the validation team can conclude following opinions in a tabular form,

<i>All assumptions made for estimating GHG are listed in the PDD</i>	☒ Yes ☐ No	All the assumptions made for estimating GHG have been confirmed listed in the PDD Section B.6. The main assumptions are in line with the survey report/26/, FSR/27/, the methodology/11//23/, 4/CMP.7/19/, IPCC guidance/24/ and official statistics of involved leak facilities from Titas/58/.
<i>All data used by project participants are listed in the PDD</i>	☒ Yes ☐ No	All data used by the project participants have been confirmed listed according to the survey report/26/, FSR/27/, the methodology/11//23/, 4/CMP.7/19/, IPCC guidance/24/ and official statistics of involved leak facilities from Titas/58/.
<i>Their references and sources are also listed in the PDD</i>	☒ Yes ☐ No	The references and sources have been confirmed listed in the PDD Section B.6 and Annex 3 Baseline Information.
<i>Formulas, parameters, values are complete, accurate, transparent and conservative</i>	☒ Yes ☐ No	Formulas, parameters, values have been confirmed completely, accurately, transparently and conservatively documented in the PDD Section B.6 and Annex 3 Baseline Information according to the survey report/26/, FSR/27/, the methodology/11//23/, 4/CMP.7/19/, IPCC guidance/24/ and official statistics of involved leak facilities from Titas/58/.
<i>All the references and documents used are correctly quoted and conservatively interpreted in the PDD</i>	☒ Yes ☐ No	All the references and documents used have been correctly quoted and conservatively interpreted in the PDD Section B.6 and Annex 3 Baseline Information according to the survey report/26/, FSR/27/, the methodology/11//23/, 4/CMP.7/19/, IPCC guidance/24/ and official statistics of involved leak facilities from Titas/58/.
<i>Methodology has been applied correctly to calculate project emissions, baseline emissions, leakage emissions and emission reductions</i>	☒ Yes ☐ No	The methodology (i.e. AM0023, Version 04.0.0) has been correctly applied to calculate project emissions, baseline emissions, leakage emissions and emission reductions. Please also see above descriptions in this section.

<i>All the emissions of baseline emissions can be replicated using information provided in the PDD</i>	☒ Yes ☐ No	All the emissions of baseline emissions can be replicated using information provided in the PDD/2/, which can also be reproduced with the transparent ER calculation spreadsheet/59/.
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3.5 Additionality

A step-wise discussion has been conducted by the validation team to assess the additionality of the project.

3.5.1 CDM consideration

During the on-site assessment (dated 11/03/2014-13/03/2014), the validation team observed that the project hasn't started yet. The starting date of the project activity is expected on 1 Nov. 2014 (i.e. Starting to procure advanced leak detection, measurement and repair technologies, contract to train and hire staff after its CDM registration)/i/, which would be the earliest date at which either the implementation or construction or real action of the project activity begins, in accordance with the latest version of "Glossary of CDM terms"/15/.

Based on the UNFCCC website information, the PDD of the project was published for global stakeholder consultation on 26 Feb. 2014. It is thus concluded that the starting date of the project activity is after both 2 Aug. 2008 and the publication date of the PDD for global stakeholder consultation. As per the para.2 of the latest version of "Guidelines on the demonstration and assessment of prior consideration of the CDM"/14/, the validation team can consider that the CDM was seriously considered in the decision to implement the project activity.

Additionally, the PP submitted one standardized CDM notification form of the project to Bangladesh DNA (i.e. Department of Environment) on 11 May 2013/39/ and one standardized prior consideration of the CDM form to UNFCCC secretariat on 30 Jul. 2013/40/ respectively, both of which contain the precise geographical location and a brief description of the proposed project activity.

However, the validation team identified that the project title "Reducing Gas Leakages within the Titas Gas Distribution Network in Bangladesh" described in these two forms is slightly different from the project title "Certified Emission Reductions project within the Titas Gas distribution network, People's Republic of Bangladesh" given in the webhosted PDD (Version 1, dated 21/02/2014) for global stakeholder publication/1/. As addressed in the CAR 5, the PP has corrected it consistent with both two forms/39//40/. The validation team further checked these submitted forms and confirmed that the described precise geographical location and brief description for the proposed project activity is fully consistent with the webhosted PDD/1/, thus could conclude that the project with title "Certified Emission Reductions project within the Titas Gas distribution network, People's Republic of Bangladesh" is just the project with title "Reducing Gas Leakages within the Titas Gas Distribution Network in Bangladesh", and these two forms are valid for the proposed project activity as described in the webhosted PDD/1/.

Starting date of project	Justification of and evidences (references) on the starting date of project	Date of CDM consideration
1 Nov. 2014	Starting to procure advanced leak detection, measurement and repair technologies,	11 May 2013, i.e. the earlier date between the CDM Prior consideration to Bangladesh

	contract to train and hire staff after its CDM registration/i/	DNA/39/ and the CDM Prior consideration to UNFCCC secretariate/40/
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3.5.2 Alternatives

In compliance with the applied methodology AM0023, Version 04.0.0/11/, the selection of the baseline scenario should be conducted using the latest version “Combined tool to identify the baseline scenario and demonstrate additionality”.

Following the para. 15 of the Version 05.0.0 “Combined tool to identify the baseline scenario and demonstrate additionality”, i.e. identify all alternative scenarios that (a) are available to the project participants, (b) cannot be implemented in parallel to the proposed project activity, and (c) provide the same output as the proposed CDM project activity, the plausible and credible alternative scenarios to the project activity have been identified in the PDD/2/, and also assessed by the validation team as below table,

Alternative scenarios	Option in PDD/2/	Validation team's opinion
Scenario 1: Continuation of the current situation with existing practices of leak detection and routine maintenance;	☒ Yes ☐ No	By means of on-site interview/i//iii//iv//v/ and documentation review/34/, continuation of the current situation with existing practices of leak detection and routine maintenance is confirmed to meet legal requirements in the gas sector of People's Republic of Bangladesh, i.e. Gas safety rules 1991 (Revised in 2003)/62/. As defined in the the law/62/, the main reason to reduce gas leak is to meet safety requirements, but no specification is given for what exactly counts as a safety concern. During the on-site interview/i/, the safety concern is defined by Titas as “emergency cases” where there is significant risk to public health and safety of the gas distribution system. And the existing procedures do only focus on the components included in the underground gas distribution system, which can be substantiated with the most recent three years of statistics in the physical leak and repair records (2010-2012)/31/. At present, Titas only has two hydrocarbon leak detectors (i.e. Gasman Personal Gas Monitor, Model: CE1180ExII1G) for the use in more than 12,000km gas distribution system, and both of them are technically old and obviously insufficient for widespread use, as confirmed in the management meeting minutes/32/. Consequently, the examination of leaks is primarily undertaken through visual (i.e. bubbling of leaks through soap water), audio (i.e. hissing) and odour detection. Further, even for some physical leaks identified through visual, audio or odour detection, Titas principally uses polyethylene-based tape and leak repair clamps to fix/i//iv//v//34/. Based on on-site inspection and the expertise of validation team, this kind of maintenance approach is not long-term

		effective to stop leakage from above ground component due to the varying temperature and humidity. As randomly sampled by the qualified third party of Heath Consultants/26/, many above components within the defined project boundary are leaking under the normal operation of Titas gas distribution system. Further, during the on-site interview, the validation team understood that there are no taxes or penalties for current distribution gas losses in People's Republic of Bangladesh/i/iii/, which is confirmed by checking the management meeting minutes/32/ as well. Therefore, the identified Scenario 1 is deemed credible and realistic alternative scenario.
Scenario 2: The proposed project activity undertaken without being registered as a CDM project activity;	☒ Yes ☐ No	Regarding this scenario, the validation team interviewed the project owner management representatives/i/ and reviewed the official letter from the Titas pipeline design department/35/, the project owner has no existing long-term maintenance schedule to implement the proposed project without being registered as CDM project, due to existing regulations, end of life of existing equipment and/or financing aspects. As per the item (a) of para. 114 of VVS Version 07.0/6/, i.e. <u>(a) the list of alternatives includes as one of the options that the project activity is undertaken without being registered as a proposed project activity</u>, it is thus considered appropriate to only identify Scenario 2 "The proposed project activity undertaken without being registered as a CDM project activity" to the proposed project activity.
Scenario 3: Similar efforts has been made or are expected to be made to reduce methane leaks from key components, using similarly capable leak detection and measurement technology as described in the AM0023, Version 04.0.0.	☒ Yes ☐ No	By means of on-site interview the project owner representatives/i/, the validation team got that due to the lack of technical and financial resources, Titas has not considered reducing gas leakages in its distribution system in the past, and does not intend to so in the near future. However, it is conservative and complete to define the plausible Scenario 3 for the determination of most plausible baseline scenario, in line with the item (b) of para. 114 of VVS Version 07.0/6/ and the item (e) of para. 15 of Version 05.0.0 of "Combined tool to identify the baseline scenario and demonstrate additionality"/12/.

Based on the above assessment, all alternative scenarios identified by the PP are complete and plausible in the context of the proposed CDM project activity.

Regarding the legal or regulation compliance, the validation team conducted assessment for each alternative scenarios above, details as below,

- **Scenario 1:** By means of on-site interview/i/iii/iv/v/ and documentation review/34/, continuation of the current situation with existing practices of leak detection and

routine maintenance is confirmed to meet legal requirements in the gas sector of People's Republic of Bangladesh, i.e. Gas safety rules 1991 (Revised in 2003)/62/, details as seen in the above table;

- **Scenario 2:** As per the effective "Gas safety rules 1991 (Revised in 2003)/62/, the current main reason to reduce gas leak is to meet safety requirements, and no specific definition on the illegal leakages is defined. Thus, **Scenario 2** to reduce physical gas leak under the project is obviously deemed being in compliance with the laws and regulations of People's Republic of Bangladesh;
- **Scenario 3:** As per the effective "Gas safety rules 1991 (Revised in 2003)/62/, the current main reason to reduce gas leak is to meet safety requirements, and no specific definition on the illegal leakages is defined. Thus, **Scenario 3** to reduce physical gas leak with similar efforts as the project is obviously deemed being in compliance with the laws and regulations of People's Republic of Bangladesh as well.

To sum, all the above three alternative scenario are remained for the determination of most plausible baseline scenario.

3.5.3 Barrier analysis

In compliance with the applied methodology AM0023, Version 04.0.0/11/, the demonstration of the additionality should be conducted using the latest version "Combined tool to identify the baseline scenario and demonstrate additionality".

Following the Version 05.0.0 "Combined tool to identify the baseline scenario and demonstrate additionality"/12/, **Step 2-Barrier analysis** is applied by PP to identify barriers and to assess which alternative scenarios are prevented by these barriers, as presented in the PDD B.5/2/.

Combined with the latest Version 01 of "Guidelines for objective demonstration and assessment of barriers"/13/, the validation team conducted thorough assessment on the appropriateness of two sub-steps applied in the PDD/2/.

Step 2a: Identify barriers that would prevent the implementation of alternative scenarios

As clearly presented in the PDD/2/, both investment barriers and technological barriers are identified to prevent the implementation of alternative **Scenario 2** and **Scenario 3** listed in the Section 3.5.2.

In line with the **Guideline 1** of Version 01 of "Guidelines for objective demonstration and assessment of barriers"/13/, while demonstrating barriers related to the lack of access to capital, technologies and skilled labour, the PP shall provide information on the nature of the companies and entities involved in the financing and implementation of the project.

By means of checking the Certificate of Incorporation of Titas Gas Transmission & Distribution Co., Ltd./37/, its public annual report 2012-13/51/ and Titas official website <http://www.titasgas.org.bd/background.htm>, the validation team confirmed that Titas was formed in Nov. 1964 as a joint stock company of the central government of Pakistan on the one hand and Pakistan Shell Oil Company on the other, with an objective of transmitting and distributing natural gas to the Dhaka city, the then provincial capital of Pakistan from the the discovered gas field called "Titas" located on the bank of the River Titas, within the closed vicinity of the present Brahmanbaria district of Bangladesh. After liberation of Bangladesh in 1971, Titas was nationalized under the Presidential Executive Order No. 27/1972 and its overall activities have been placed under the supervision and

control of Bangladesh Oil, Gas & Mineral Corporation (Petrobangla). Titas was listed with Dhaka Stock Exchange (DSE) on 9 Jun. 2008 and with Chittagon Stock Exchange (CSE) on 19 Jun. 2008 under the direct listing rules of Securities & Exchange Commission to offload 25% of its shares in the stock markets. Accordingly as provided in the PDD/2/, 75% shares of Titas is owned by the Government of Bangladesh (Main owner).

For investment barriers:

As estimated in the FSR/27/, the cost to implement the proposed project activity will include the equipment cost (incl. 50 Hi Flow Samplers and 50 leak detection devices), consulting cost related to staff training, labour cost of additional staff, IT equipment cost and advanced repair material cost. In addition, the sample survey report/26/ revealed a significant number of components (incl. valves, insulating joints, etc.) may need repair during the project implementation. The validation team has checked all cost assumptions against their supporting documents/65//66//67//68/ and combined with the expertise of validation team, then could deem that the annual average estimated 81.76 Million BDT is reasonable for the leak detection and repair of above ground components.

After reviewing the management meeting minutes/32/, the validation team detected that Titas currently has an annual transmission and distribution maintenance budget of approx. 80 million BDT to address reactive repairs and maintenance (i.e. emergency call outs), which is even less than the estimated cost for the proposed project activity.

As confirmed during site interview//i/, the primary benefit of reduced leakage by the project is the additional gas that would be available to address the demand deficit for the installation of new gas connections. Though these new gas connections will increase gas sales revenues of 45 million BDT/year (i.e. assumed that the gas savings afford 10,000 new household connections, the sales revenues would be 45 million BDT/year as per the regulated connection fee is approximately 450 BDT per double burner per month/32/), nearly 90% of sales revenue shall be distributed to the Government and PetroPangla subsidiaries. Accordingly under the project activity implementation, Titas would only get revenue of 4 – 5 million BDT, it is obviously not enough to overcome the investment barrier.

In addition, based on the onsite interview//i/ and documentation review/32//35/, the investment priorities for Titas focus on projects that support the operational viability of the gas network (i.e. replacing damaged underground pipelines), increasing service to consumers within the low pressure system constrains (i.e. installing new underground pipelines), and improving metering (pre-paid) to residential consumers, for which Titas is seeking finance from World Bank, Asian Development Bank and Japan International Cooperation Agency//i/.

In line with the latest list of Least Developed Countries (LDC) issued by the Development Policy and Analysis Division of the UN secretariat/50/, People's Republic of Bangladesh has been included in the LDC list since 1975. Therefore, the validation team can consider that this proposed investment for the project will be significant for Titas, and it would not be implemented under the baseline scenario due to the budget constraints, as reported in the PDD/2/.

The validation team has reviewed the supporting documents with respect to the credit rating of Bangladesh/54//55/, and verified that the credit rating of Bangladesh is BB- by Standard & Poor and Ba3 by Moody's respectively, both of them make Bangladesh as non-investment grade speculative country/56/.

Following the **Guideline 6** of Version 01 of "Guidelines for objective demonstration and assessment of barriers"/13/, the validation team reviewed the project investment

agreement/28/ and confirmed that the project investment would be provided upfront by NE Climate A/S as a pre-payment for expected CERs after CDM registration, which objectively demonstrates that only CDM enables the financing of the project.

Combining the above assessment with **Guideline 7** of Version 01 of “Guidelines for objective demonstration and assessment of barriers”/13/, “For projects in Leased Developed Countries it is sufficient to transparently describe the relevant barriers, as less stringency is needed with regards to data availability in the actual demonstration of barrier, as compared to the projects in other countries.”, the validation team can deem that Titas lacks the financial resources and access to finance to implement the proposed project activity in the LDC country of Bangladesh without CDM support.

For technological barriers:

In line with the Version 01 of “Guidelines for objective demonstration and assessment of barriers”/13/, two technological barriers have been accurately identified by PP in the PDD/2/ and assessed as following,

Barrier 1:	<u>Skilled and/or properly trained labor to operate and maintain the technology is not available in the applicable geographical area, which leads to an unacceptable high risk of equipment disrepair, malfunctioning or other underperformance.</u>
Assessment of Validation Team:	The validation team has reviewed the summary on current leak detection and repair procedures/34/ and the operation & maintenance log copies of gas distribution network/36/, and confirm that no any advanced LDAR defined by AM0023, Version 04.0.0 is used in the Titas existing practice, which can be further substantiated with the management meeting minutes/32/. During the on-site interview, the management representative/i/ of Titas clearly claimed that the proposed technology in the project is new in the gas sector of Bangladesh, there is no skilled and/or properly trained labor to operate and maintain the technology in Bangladesh. In addition, the validation team interviewed local on-site operators/iv//v/ for the advanced LDAR technologies prescribed in the AM0023, Version 04.0.0, they all have no concept in this field and think that skilled or trained person to operate the technology should be not available in Bangladesh. Further, as stated by the Hi Flow Sampler worldwide distributor of Heath Consultants/33/, Heath currently has not sold any Hi Flow Samplers to Bangladesh, and no any Hi Flow Samplers are being used in Bangladesh. Based on the above three aspects, the validation team can conclude that this identified barrier is applicable to the proposed project activity.
Barrier 2:	<u>The particular technology used in the proposed project activity is not available in the applicable geographical area.</u>
Assessment of Validation Team:	The validation team has reviewed the summary on current leak detection and repair procedures/34/ and the operation & maintenance log copies of gas distribution network/36/, and confirm that no any advanced LDAR defined by AM0023, Version 04.0.0 is used in the Titas existing practice, which is in compliance with the Gas safety rules 1991 (Revised in 2003)/57/, as assessed in the Section 3.5.2. By means of reviewing the statement from the Hi Flow Sampler worldwide distributor of Health Consultants/33/, Hi Flow Samplers have never been sold to People’s Republic of Bangladesh. In addition, as reflected in the PDD A.3/2/, all other advanced equipment (like Gassurveyor 500 Serials) and materials (like GORE® Valve Stem Packing) will be imported from abroad, thus they could be deemed not

	available in Bangladesh. Based on the above three aspects, the validation team can conclude that this identified barrier is applicable to the proposed project activity.
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As stipulated in the project investment agreement/28/, NE Climate A/S shall provide and cover the cost of the equipment installation and training to the relevant staff for the operation of the proposed CDM project once after CDM registration, thus it objectively demonstrates that the CDM will alleviate both the above two identified technological barriers.

Step 2b: Eliminate alternative scenario which are prevented by the identified barriers

Based on the analysed investment barrier and technological barriers, it is easily realized that **Scenario 2** and **Scenario 3** are prevented since both of them need additional finance and technology in the implementation.

Therefore, it is reasonable and reliable to consider the **Scenario 1** "Continuation of the current situation with existing practices of leak detection and routine maintenance" as the most plausible baseline scenario.

As sufficiently assessed in the above Step 2a, the registration of the CDM project activity will alleviate those identified barriers that prevent the proposed project activity from occurring in the absence of the CDM, which has been transparently prescribed in the project investment agreement/28/.

3.5.4 Investment analysis

In accordance with the Version 05.0.0 of "Combined tool to identify the baseline scenario and demonstrate additionality"/12/, investment analysis is not applicable since only one alternative scenario is not prevented by any barrier in the barrier analysis, as reflected in the PDD B.5/2/.

3.5.5 Common practice analysis

By means of checking the FSR/27/ and on-site inspection, the project activity is confirmed to reduce the gas physical leaks from components through the introduction of advanced LDAR program, thus this measure applied by the project does apply measure that are listed in the definitions section of Version 05.0.0 "Combined tool to identify the baseline scenario and demonstrate additionality"/12/.

Hence it is considered appropriate to adopt Step-4b to conduct common practice analysis in the PDD/2/, detailed assessment as following,

- **Applicable geographical area:** As per the item (a) of para. 9 of Version 05.0.0 "Combined tool to identify the baseline scenario and demonstrate additionality"/12/, applicable geographical area should be the entire host country. Thus, it is appropriate to choose People's Republic of Bangladesh as the applicable geographical area for common practice analysis of the proposed project;
- **Similar scale** is those advanced LDAR program practices as defined in Version 05.0.0 "Combined tool to identify the baseline scenario and demonstrate additionality"/12/, but shall be similar to that proposed in the project, i.e. advanced leak detectors, advanced measurement devices, advanced repair materials and advanced technical training etc.

On the basis of the above selection criteria, by means of internet searching and on-site interview/i//iii/, the validation team got that no any similar advanced LDAR program has

been introduced into the gas distribution network of People's Republic of Bangladesh until now due to the lack of technical and financial resources, which is also confirmed in the barrier analysis in the Section 3.5.3. Further, the validation team reviewed the statement on the sale of Hi Flow Sampler/33/ from the worldwide distributor of Heath Consultants, and confirmed that no any Hi Flow Samplers have been used in Bangladesh.

Therefore, the validation team confirmed that the proposed CDM project activity is not common practice.

3.5.6 Conclusion of assessment of Additionality

The CDM was seriously considered by the PP. The evidences were transparently reviewed by the validation team and considered to be effective. Barrier analysis clearly demonstrates that the proposed project activity is unfeasible in both investment and technology. Common practice analysis was carried out showing tha the proposed project activity is not a common practice. Therefore, the proposed project activity is additional.

3.6 Monitoring

The project applies the approved monitoring methodology AM0023, Version 04.0.0/11/. The data monitored and the monitoring interval and frequency is in compliance with the methodology. The monitoring plan has been clearly described in section B.7 of the PDD and examined by the validation team to be appropriate.

3.6.1 Parameters determined ex-ante

According to the applied methodology AM0023, Version 04.0.0/11/, the following parameters are determined ex-ante:

Parameter	Description	Listed in PDD?	Ex-ante value	Value Justified?
GWP _{CH4}	Global warming potential of CH ₄ valid for the commitment period	☒ Yes ☐ No	25 tCO ₂ /tCH ₄	Yes, pls. refer to the discussion in Section 3.4.4 of this report.
ConvFactor	The factor to convert Nm ³ CH ₄ into t CH ₄ .	☒ Yes ☐ No	0.0007168tCH ₄ /Nm ³ CH ₄	Yes, pls. refer to the discussion in Section 3.4.4 of this report.

3.6.2 Parameters determined ex-post

In accordance with the applied methodology AM0023, Version 04.0.0/11/, following data and parameters will be monitored for the project,

Parameter	Description	Listed in PDD?	Monitoring method described Justified?
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)	☒ Yes ☐ No	According to the PDD/2/, the parameter will be sourced from the Titas operational logs, in which any outages will be recorded. Any outages resulting from system repairs will be documented and logged in the project database in the form of a reduction in the time of operation. And the monitoring frequency is constant. In addition, the operation hours will end when components are replaced for a non-leak

			related reasons (i.e. it breaks down), or when the date of predicted replacement as identified in the PDD is reached, whichever is earlier. Thus, the proposed monitoring method for this parameter is considered in compliance with the applied methodology AM0023, Version 04.0.0/11/.
T_z	The time (in hours) the relevant component has been leaking during the crediting year y	☒ Yes ☐ No	According to the PDD/2/, the parameter will be sourced from the Titas operational logs, in which any outages will be recorded. Any outages resulting from system repairs will be documented and logged in the project database in the form of a reduction in the time of operation. And the monitoring frequency is constant. In addition, the operation hours will end when components are replaced for a non-leak related reasons (i.e. it breaks down), or when the date of predicted replacement as identified in the PDD is reached, whichever is earlier. Thus, the proposed monitoring method for this parameter is considered in compliance with the applied methodology AM0023, Version 04.0.0/11/.
UR_j	The uncertainty range for the measurement method applied to leak j	☒ Yes ☐ No	According to the PDD/2/, the parameter will be estimated at a 95% confidence interval, in line with the guidance provided in the Chapter 6 of the 2000 IPCC Good Practice Guidance. The monitoring frequency is periodically. Thus, the proposed monitoring method for this parameter is considered in compliance with the applied methodology AM0023, Version 04.0.0/11/.
UR_z	The uncertainty range for the measurement method applied to leak z	☒ Yes ☐ No	According to the PDD/2/, the parameter will be estimated at a 95% confidence interval, in line with the guidance provided in the Chapter 6 of the 2000 IPCC Good Practice Guidance. The monitoring frequency is periodically. Thus, the proposed monitoring method for this parameter is considered in compliance with the applied methodology AM0023, Version 04.0.0/11/.
$F_{CH_4,j}/F_{CH_4,z}$	The leak flow rate of methane for leak (i,z) from the leaking component	☒ Yes ☐ No	According to the PDD/2/, the parameter will be annually measured by Hi-Flow samplers with accuracy of $\pm 5\%/46/$, automatically adjusting and showing the methane leak flow rate reading at the standard conditions (0°C, 101.3kPa), in accordance with its measurement procedures/45//49/. Thus, the proposed monitoring method for

			this parameter is considered in compliance with the applied methodology AM0023, Version 04.0.0/11/.
BE _{CAP}	Capped quantity of the baseline emissions, defined as the baseline emissions for the first year of the crediting period	☒ Yes ☐ No	According to the PDD/2/, the parameter will be sourced from the monitored baselines emissions during the first year of the first crediting period. Thus, the proposed monitoring method for this parameter is considered in compliance with the applied methodology AM0023, Version 04.0.0/11/.

A complete monitoring procedure is available in B.7.3 of the PDD/2/. The function, accuracy and calibration frequency of all relevant monitoring equipment have been clearly described in the PDD and confirmed can reflect the project's monitoring plan.

In conclusion, to the validation team's opinion, all parameters to be monitored are listed completely in the PDD, which is in line with the methodology, and their corresponding monitoring methods are clearly described in the PDD.

3.6.3 Management system and quality assurance

As described in the PDD/2/, one well organized CDM management team has been established for the monitoring of the project, and each member's responsibility has been clearly defined for the collection and reporting of data. In addition, the emergency procedures have been well documented for the project.

In order to ensure the monitoring accuracy, one training program will be provided to local relevant staff, and all applied monitoring equipments are stipulated to be calibrated periodically in compliance with the relevant operation & maintenance instruction/45/. And all parameters monitored under the monitoring plan will be archived electronically and be kept at least for 2 years after the end of last crediting period.

To the validation team's opinion, all indicators of importance for controlling and reporting of project performance are incorporated in the monitoring plan.

3.7 Sustainable Development

The DNA of People's Republic of Bangladesh as host county, i.e. the Department of Environment, issued the LoA of the project on 21/08/2014/3/. It is stated in the LoA that the Reducing Gas Leakages within the Titas Gas Distribution Network in Bangladesh assists People's Republic of Bangladesh in achieving sustainable development. The validity of the LoA from People's Republic of Bangladesh has been assessed by the validation team in the section 3.1.

3.8 Environmental Impacts

By means of onsite interview/1/11/, inspection and document review/1/27/32/, the proposed project is to reduce the physical gas leaks through the introduction of the advanced LDAR program, which does not require any infrastructure or components that would create any local or regional air/water/pollution impacts. In particular, materials and equipment used in this project do not emit harmful substances into the atmosphere, and are not a source of noise, vibration, or any other harmful physical impact. Neither project activity has transboundary environmental impacts, and requires no environmental impact assessment (EIA) per Bangla environmental legislation.

To confirm the impact associated with the project proponent, the validation team has physically inspected during the on-site visit and also through conducting the relevant

stakeholders interview/iv//v/. It is validation team's opinion that the project activity does not cause the adverse environmental impacts and there are no regulations or requirement by the host country to conduct the EIA for the project activity.

3.9 Local Stakeholder Consultation

The local stakeholders' comments on the project were invited via a public forum held on 18 Nov. 2013/43/, which was prior to the global publication of PDD on the UNFCCC website (26 Feb. 2014-27 Mar. 2014).

By means of on-site interview with PP/i//ii/iii/, the invitation means include newspaper, email invitation, and public notice/40/. The identified stakeholders are checked by the validation team to come from different stakeholder groups, incl. Titas' residential and non-residential customers, Petrobangla, the Department of Environment, and the Ministry of Energy and Mineral Resources/43/, thus they are deemed plausible.

It is reflected in the stakeholder consultation summary/42/ that all of the invited stakeholders fully supported the implementation of the project, and all comments received were adequately summarized in the PDD/2/.

Therefore, it is the validation team's opinion that the local stakeholder consultation for the project is adequate.

3.10 Comments by Parties, Stakeholders and NGOs

The PDD (Version 1, dated 21/02/2014) of the project "Reducing Gas Leakages within the Titas Gas Distribution Network in Bangladesh" was made publicly available on (<http://cdm.unfccc.int/Projects/Validation/DB/71XQQXDS5O2YL7J9SB4MARUUCHBC63/view.html>) from 26 Feb. 2014 to 27 Mar. 2014 in order to invite comments from public stakeholders.

No public comments have been received during that period.

Appendix A

CDM Validation Protocol

Reducing Gas Leakages within the Titas Gas Distribution Network in Bangladesh

In

People's Republic of Bangladesh

Report No. 01 997 9105078339

Table 1: Validation requirements

(based on § 37 of the CDM Modalities and Procedures and on CDM Validation and Verification Standard Version 07.0)

Checklist question	Ref.	MoV*	Findings, comments, references, data sources	Draft conclusion	Final conclusion
1. Approval(VVS Section 7.6, 7.7, 7.8 & 7.9)					
1.1 Have Letters of Approval have been provided from all involved Parties?	/1//3/ /4/	I DR	CAR 1 The LoAs from Bangladesh and Denmark haven't been received yet.	CAR 1	OK
1.2 Are all Parties, who issued the LoA, Parties to the Kyoto Protocol and are this, stated in the LoA?	/1//3/ /4/	I DR	Pls. refer to 1.1.	CAR 1	OK
1.3 Is every LoA from the Parties involved issued by an organization listed as Designated National Authority (DNA) on the UNFCCC web site?	/1//3/ /4/	I DR	Pls. refer to 1.1.	CAR 1	OK
1.4 Is the participation in the CDM project activity voluntary and is this stated in all LoAs?	/1//3/ /4/	I DR	Pls. refer to 1.1.	CAR 1	OK
1.5 Is the LoA unconditional with respect to 1.2 to 1.4?	/1//3/ /4/	I DR	Pls. refer to 1.1.	CAR 1	OK
1.6 Is the title of the CDM project activity as given in the PDD identical with the title given in all LoAs and Modalities of Communication?	/1//3/ /4//5/	I DR	For LoA, pls. refer to 1.1. CAR 2 The MoC of the project shall be provided.	CAR 1 CAR 2	OK

* MoV = Means of Verification, DR = Document Review, I = Interview, www = internet search.

1.7 If any of provided LoAs contains additional specification of the CDM project activity (PDD version number, validation report version number, amount of ER, etc.) are those specifications valid and consistent with other documents?	/1//3/ /4/	I DR	Pls. refer to 1.1.	CAR 1	OK
1.8 Does the project activity involve any public funding from Annex I Parties? If yes, has Annex I Party provided a written confirmation that the use of such funding does not lead to the diversion of the official development assistance.	/1//27/ /28//32/ /i/	DR I	By means of checking the certified emission reductions project investment agreement, the project participant NE Climate A/S shall provide all finance during the project implementation, incl. feasibility study, installation of equipment, training etc. During the opening meeting, the CDM project manager Mr. Syed Monjour Morshed from the project owner confirmed that all project implementation finance will be provided by NE Climate A/S, and there is no public funding from Annex I party to assist the proposed project. Therefore, the validation team can consider that the project doesn't involve any public funding from Annex I Parties.	OK	OK
1.9 Is the MOC provided in line with the latest template available from the UNFCCC	/1//3/ /4//5/	I DR	Pls. refer to 1.6	CAR 2	OK
1.10 Is MOC correctly filled and signed by authorized signatories identifying the focal point?	/1//3/ /4//5/	I DR	Pls. refer to 1.6	CAR 2	OK
1.11 Is the written confirmation obtained by the PP's stating the authorization, specimen	/1//3/ /4//5/	I DR	CAR 3 As per the para. 54 of CDM VVS (Version 07.0), the written confirmation stating the authorization, specimen signatures and personal details of focal point signing the MOC shall be	CAR 3	OK

signatures and personal details are valid and accurate?			provided.		
2. Participation (VVS Section 7.6, 7.7 & 7.8)					
2.1 Are the Parties and project participants (PP) listed in the section A.4 of the PDD correctly and is this information consistent with the contact details provided in Annex 1 of the PDD?	/1//3/ /4/	I DR	Pls. refer to 1.1.	CAR 1	OK
2.2 Has every Party involved approved the participation of each corresponding PP, either by means of a LoA or by a separate written document?	/1//3/ /4/	I DR	Pls. refer to 1.1.	CAR 1	OK
2.3 Do all participating Parties fulfill the participation requirements as follows: a) Party has ratified the Kyoto Protocol b) Party has designated a Designated National Authority c) The assigned amount has been determined	/1//3/ /4/	I DR	Pls. refer to 1.1.	CAR 1	OK
2.4 Do the letters of approval meet the following requirements? a) LoA confirms that Party has ratified the Kyoto Protocol; b) LoA confirms that	/1//3/ /4/	I DR	Pls. refer to 1.1.	CAR 1	OK

participation is voluntary c) The LoA confirms that the project contributes to the sustainable development of the host country? d) The LoA refers to the precise project activity title in the PDD					
3. Project Design Document (VVS Section 7.10)					
3.1 Is the PDD presented for validation based on the latest template available at the UNFCCC website?	/1//9/	DR	CAR 4 As per EB latest guidance via link https://cdm.unfccc.int/Reference/Guidclarif/old_pdd/index.html, the latest version 05.0 of PDD form shall be applied for this project after 18/07/2014, in line with its attachment guidance and font format requirements.	CAR-4	OK
3.2 Has the PDD been established in accordance with the CDM requirements for completing PDDs issued by the CDM EB?	/1//9/ /10/	DR	CAR 5 By means of checking PDD against EB 66 Annex 8, following issues are identified, 1) The data defined in the PDD C.1.1 and C.2.2 shall be stated in the format of DD/MM/YYYY, and the crediting period start date shall be updated well; 2) The establishment of PDD section E was not in compliance with the requirement of latest "Guidelines for completing the project design document form".	CAR-5	OK
4. Project Description (VVS Section 7.11)					
4.1 a) Does the PDD contain a description, which provides the reader with a clear understanding of the precise nature of the project activity and the technical aspects of its	/1//10/ /26//27/ /32/	DR	CAR 6 By means of checking PDD against relevant documents provided by PP, below issues are identified, (1) The project title in the PDD is not consistent with both prior CDM consideration forms to Bangladesh DNA and UNFCCC secretariat respectively;	CAR-6	OK

implementation? b) Is the description (incl. any process flow-charts, Spreadsheets etc.) complete, coherent and consistent with the provisions of the monitoring plan? c) Is the project's location clearly defined?			(2) The description on the project implementation in the PDD A.1 is much unclear against the other part of PDD, e.g. additional staff will be hired to implement the project in residential sector, in the case, is there any plan to address the physical leak in other facilities referred in PDD A.2.4 and B.2? (3) In the PDD A.2.4, the project location description, i.e. the project will be implemented across Titas' residential distribution network, is insufficient against the project boundary defined in the B.2. (4) The indicative map given in the PDD A.2.4 is not clear enough to identify the project geographical location.		
4.2 In the case of greenfield project activity, is the project design described sufficiently by means of specifications, drawings and manuals?	/1//27/	DR I	Not applicable. Based on the onsite interview and review of CDM feasibility study report, the project is confirmed to be the alteration of current conventional LDAR program with advanced LDAR program.	OK	OK
4.3 Does the project activity reflects current good practices, uses state of the art technology or would the technology result in a significantly better performance, than any commonly used technologies in the host country?	/1//27/	DR W I	Yes. Based on the onsite interview and review of CDM feasibility study report, the project activity reflects current good practices, details as following, In the absence of the project activity, the above ground physical leak in the gas distribution system can't be effectively resolved through conventional LDAR preprogram, which results in the emission of methane. After the project implementation, those existing physical leaks will be detected with the advanced detector "GMI Gassurveyor 500 series", and then repaired with the advanced leak repair materials (incl. GORE® valve stem packing and new insulating joints), which will effectively ensure the	OK	OK

			avoidance of gas leak.		
4.4 In cases where the project activity involves the alteration of an existing installation or process, does the PDD provide a clear description of the differences between the project and the pre-project scenario?	/1//27/	DR I	Yes, the differences between the project and the pre-project scenario has been clearly described in the PDD A.3.	OK	OK
4.5 What type is the project?	/1//7/ /27//59/	DR	Not applicable since the proposed project is a large scale project activity, considering that the annual ex-ante emission reduction is more than 60kt CO ₂ .	OK	OK
4.6 How was the design of the project assessed? i) Physical site inspection ii) Reviewing available designs and feasibility studies	/1//27/ /59/	DR I	The design of the project was assessed based on the following measures: 1) Physical site inspection 2) Interviewing 3) Reviewing available designs and feasibility studies	OK	OK
4.7 Does the project qualify as a small scale CDM project activity as defined in paragraph 6(c) of decision 17/CP.7 on the modalities and procedures for the CDM?	/1//7/ /27//59/	DR	Not applicable since the project is large scale CDM project activity as assessed in the above section 4.5.	OK	OK
4.8 In case of small scale project – is the project a bundled project activity? In this case the bundled output shall not exceed the small scale project activity limit	/1//7/ /27//59/	DR	Not applicable since the project is large scale CDM project activity as assessed in the above section 4.5.	OK	OK
4.9 Is the small scale project activity a debundled	/1//7/ /27//59/	DR	Not applicable since the project is large scale CDM project activity as assessed in the above section 4.5.	OK	OK

component of a larger project activity in accordance with the rules defined in appendix C of the simplified modalities and procedures for small-scale CDM project activities?					
5. Baseline and Monitoring methodology(VVS Section 7.12)					
5.1 General requirements (VVS Section 7.12.1)					
5.1.1 Is the methodology used in the project activity approved by the CDM EB and is the selected version still valid?	/1//11/	DR www	Yes. The methodology AM0023, Version 04.0.0 applied in the project has been approved by the CDM EB, and is latest valid version.	OK	OK
5.2 Applicability of the selected methodology (VVS Section 7.12.2)					
5.2.1 Does the project activity qualify under the criteria for small-scale CDM project activities set out in § 6 (c) of decision 17/CP.7 and Annex II of the Modalities and Procedures for the CDM?	/1//7/ /27//59/	DR	Not applicable since the project is large scale CDM project activity as assessed in the above section 4.5.	OK	OK
5.2.1.1 If yes, does the PDD extensively demonstrates and confirms that the small-scale project activity is not a debundled component of a larger project?	/1//7/ /27//59/	DR	Not applicable since the project is large scale CDM project activity as assessed in the above section 4.5.	OK	OK
5.2.2 Are all applicability conditions of the	/1//11/	DR	CL 1 The justification on all methodology applicability conditions	CL 1	OK

selected baseline and monitoring methodology and all tools involved satisfied by the project activity?			shall be further described with specific documentation or quotation in PDD B.2.		
5.2.3 Is the selection of the applied baseline and monitoring methodology justified?	/1//11/	DR	Pls. refer to 5.2.2.	GL-1	OK
5.2.4 Is the selected methodology correctly quoted in all related documents?	/1//11/	DR	Pls. refer to 5.2.2.	GL-1	OK
5.2.5 Does the PDD sufficiently describe all the GHG emission sources or sinks occurring as a result of project activity, which have not been accounted for under the selected methodology and are expected to contribute more than 1% of the overall expected average annual emission reductions?	/1//11/ /59/	DR I	It is confirmed by the validation team during on-site assessment, interviews and document review that no other GHG emission sources or sinks, which have not been accounted for under the applied methodology AM0023, Version 04.0.0 and are expected to contribute more than 1% of the overall expected average annual emission reductions, occur as a result of the implementation of the proposed project.	OK	OK
5.3 Project boundary (VVS Section 7.12.5)					
5.3.1 Does the PDD correctly describe the project boundary? Are they clearly defined and in accordance with the methodology?	/1//11/ /27/	DR	CAR 7 By means of checking the project boundary defined PDD B.3 against the methodology AM0023 and EB 66 Annex 8, following issues are identified, 1) The surveyed leaking components are not transparently given in the PDD B.3 and Annex 4 in line with the measurement study report;	CAR-7	OK

			2) The components defined in the project boundary are not fully consistent with the surveyed results; 3) All RMS facilities are not accurately delineated in the flow diagram of the project boundary. Besides, the emission sources and GHGs included in the project boundary shall be clearly indicated in the diagram.		
5.3.2 Does the PDD correctly indicate and describe the emission sources and sinks of GHG gases that are included in the project boundary?	/1//11/ /27/	DR	CAR 8 The Table 3 in PDD B.3 is not fully in compliance with the applied methodology AM0023.	CAR 8	OK
5.3.3 In cases where the methodology allows project participants to choose whether a source or gas is to be included in the project boundary, is the choice explained and justified by PPs?	/1//11/ /27/	DR	Pls. refer to 5.3.2.	CAR 8	OK
5.3.4 Does the project involve other emissions sources not foreseen by the methodologies that may question the applicability of the methodology? Do these sources contribute with more than 1% of the estimated emission reductions of the project?	/1//11/ /59/	DR I	Yes. Based on the onsite inspection and interview, the project implementation will involve the vehicle usage for leak measurement and repair of components among the defined geographical region, and results in the transportation emissions. However, by checking the vehicle emission calculation sheet, the emission sources is verified to be less than 0.1% of the estimated emission reductions. Thus, this kind of project emissions shall be negligible.	OK	OK
5.4 Baseline identification (VVS Section 7.12.6)					
5.4.1 Has the procedure contained in the	/1//11/	DR	Yes. In compliance with the applied methodology AM0023, Version	OK	OK

selected methodology to identify the most reasonable baseline scenario been applied correctly and documented in the PDD?			04.0.0, the “Combined tool to identify the baseline scenario and demonstrate additionality” has been correctly applied and documented in the PDD.		
5.4.1.1 Is the identified baseline scenario plausible?	/1//11/ /27//28/ /30//32/ /61//62/	DR I	Yes, the identified baseline scenario is plausible, based on the on-site interview, inspection and document review.	OK	OK
5.4.1.2 Are all assumptions stated in a transparent and conservative manner?	/1//11/	DR	Pls. refer to 7.4.1	GL-3	OK
5.4.2 Does the selected methodology require the use of tools and does PDD reflects that correctly?	/1//11/ /12/	DR	Yes. All required tools have been correctly reflected in the PDD.	OK	OK
5.4.2.1 Were all the tools applied correctly?	/1//12/	DR	CAR 9 By means of checking UNFCCC website, the version 02.2 of “Combined tool to identify the baseline scenario and demonstrate additionality” is invalid, pls. update this tool through the PDD.	CAR-9	OK
5.4.3 In case the methodology requires several alternative scenarios to be considered in the identification of the most reasonable baseline scenario, have all scenarios been considered and have no reasonable alternative	/1//11/ /12/	DR	Yes.	OK	OK

scenario excluded?	been					
5.4.3.1 Has the choice of the baseline scenario been done using conservative assumptions?	/1//11/ /12/	DR	Pls. refer to 7.4.1		CL-3	OK
5.4.4 Is the identified baseline scenario reasonable according to the assumptions, calculations and rationales used in the PDD and other reference sources?	/1//11/ /12/	DR	Pls. refer to 7.4.1		CL-3	OK
5.4.6 Does the PDD describe how the national and sectoral policies, macro-economic trends and political aspirations relevant to the baseline scenario have been identified and considered in the PDD? Refer CDM PS para 45	/1//11/ /12/	DR	Yes.		OK	OK
5.4.7 Does the PDD provide a verifiable description of the identified baseline scenario, including a description of the technology that would be employed and/or the activities that would take place in the absence of the project activity?	/1//11/ /12/	DR	Yes.		OK	OK
5.5 Algorithm and/or formulae used to determine emission reductions (VVS Section 7.12.7)						

5.5.1 a) Are all calculations applied and documented according to the selected methodology and in a complete and transparent manner to calculate emission reductions from the project activity? b) Are correct units applied and consistency between parameter dimensions and parameter value ensured?	/1//11/ /59/	DR	Yes. All calculations are correctly applied and documented as per the applied methodology in a complete and transparent manner. And units applied are correct and consistent between parameter dimensions and parameter value ensured.	OK	OK
5.5.2 In case the methodology allows a selection between different options for equations or parameters, has adequate justification been given and have the correct equations and parameters been used, in accordance with the methodology selected?	/1//11/	DR	For the calculation of baseline emissions and project emissions, the option 2 has been selected by PP in the PDD and will be not changed during the crediting period, which is in compliance with the methodology AM0023, Version 04.0.0.	OK	OK
5.5.3 In case some data and parameters will not be monitored throughout the crediting period, but have already been determined and fixed, are all data sources, assumptions and	/1//11/ /18//19/ /20//22/ /49/	DR	Yes. As per EB 69, Annex 3, all emission reductions removals achieved by CDM project in the second commitment period of KP shall be calculated using the global warming potentials in accordance with decision 4/CMP.7, thus it is considered appropriate to use 25 of GWP for methane, based on the effects of greenhouse gases over a 100-year time horizon.	OK	OK

calculations correct, applicable to the proposed CDM project activity and conservative?			Regarding to the factor to convert $\text{Nm}^3 \text{CH}_4$ to tCH_4 ex-ante defined for the project, the validation team checked the statement on the Hi Flow Sampler Calibration from Heath Consultant and confirmed the measurement standard conditions to be defined as 0 degree Celsius and 1 atmosphere pressure. By means of checking the 4th monitoring report of the registered CDM project (UNFCCC 0170), it is confirmed to that the ConvFactor is 0.0007168 at 0 degree Celsius and 1 atmosphere pressure, thus applicable to the project activity as well.		
5.5.4 In case data and parameters will be monitored on implementation and hence become available only after validation of the project activity, are the estimates provided in the PDD for these data and parameters reasonable?	/1//11/ /26//59/	DR	CL 2 By means of checking the leak flow rate ex-ante estimated in PDD against the ER calculation sheet, following issues are detected, 1) Pls. clarify how to ensure the sampling measurement surveyed leak results are representative for the whole gas distribution system, and also provide the explanation in the PDD; 2) Pls. carefully check the "Leak Data Inputs" sheet of CER potential analysis, and ensure all information are complete and correct, e.g. GPS locations of A2 to A7 are incorrectly combined in B2 to B7, etc. 3) In the "Leak data inputs" sheet, the validation team detected the flow rates in both U31 and U135 are obviously higher compared with other leak component, thus it is required clarify if these two sampled leaks are applicable to the defined project activity under the methodology AM0023; 4) In the column W "Deviation" of "Leak data inputs" sheet, some measurement deviations are higher than 15% defined on PDD p.24, pls. clarify if these measurement results are appropriate to be used in the ex-ante CER estimation. 5) Pls. provide the official statistics on the number of leaking facilities, and also clarify whether they are comparable for	CL-2	OK

			the ex-ante total gas leak estimate.		
5.5.5 Have the major risks and uncertainties, which can influence the emission reduction estimates, been identified and addressed in the PDD?	/1//11/	DR	Yes, the uncertainty influencing the emission reduction estimate has been identified and addressed in the PDD, i.e. estimated at a 95% confidence interval per guidance provided in Chapter 6 of the 2000 IPC Good Practice Guidance, which is fully in compliance with the methodology AM0023, Version 04.0.0.	OK	OK
5.5.6 Are the calculations documented according to the approved methodology and in a complete and transparent manner in calculating the project emissions? Have conservative assumptions been used when calculating the project emissions?	/1//11/ /26//59/	DR	Pls. refer to 5.5.4.	GL-2	OK
5.5.7 Are uncertainties in the project emission estimates properly addressed?	/1//11/	DR	Pls. refer to 5.5.4.	GL-2	OK
5.5.8 Does any of the parameters require the use of sampling? If yes – how the sampling is been carried out?	/1//11/	DR	Not applicable since the applied methodology AM0023, Version 04.0.0 does not involve any parameter to be determined by sampling.	OK	OK
5.6 Leakage					
5.6.1 Has the leakage been identified and calculated according to the approved methodology?	/1//11/	DR	Not applicable. According to the applied methodology AM0023, Version 04.0.0, no significant leakage is expected to occur in this type of project.	OK	OK

5.6.2 Have the leakage been addressed in complete, conservative and substantiated manner?	/1//11/	DR	No applicable as referred in 5.6.1.	OK	OK
5.6.3 Are uncertainties in the leakage emission estimates properly addressed?	/1//11/	DR	No applicable as referred in 5.6.1.	OK	OK
6. Methodology-related issues for afforestation or reforestation CDM project activities					
Add specific A/R requirements	/1//11/	DR	Not applicable.	OK	OK
7. Additionality (VVS Section 7.12.8)					
7 a) What approach/tool does the project use to assess additionality? Is this in line with the methodology? In case of small-scale CDM project activities, is Attachment A to Appendix B of the simplified modalities and procedures for small-scale CDM project activities applied considering also the “Non-binding best practice examples to demonstrate additionality for SSC project activities” with any applicable additionality tools.	/1//11/ /12/	DR	Combined tool to identify the baseline scenario and demonstrate additionality is adopted for the additionality demonstration in the PDD, which is in line with the applied methodology AM0023, Version 04.0.0.	OK	OK
7 b) Have the regulatory requirements correctly been taken into account	/1//11/	DR	Yes.	OK	OK

to evaluate the project activity and the alternatives? Is sufficient evidence provided to support the relevance of the arguments made?					
7 c) What is the project additionality mainly based on (Investment analysis or barrier analysis)?	/1/	DR	The project additionality is mainly based on barrier analysis.	OK	OK
7.1 Prior consideration of the CDM (VVS Section 7.12.9)					
7.1.1 Is there documented evidence provided by the project participants on how and when the decision to proceed with the project activity was taken?	/1//28/	DR I	As confirmed by onsite interview and checking investment agreement, the PPs made the decision to proceed with the project activity by signing the Certified Emission Reductions Project investment agreement on 6 Dec. 2013.	OK	OK
7.1.2 Is the starting date of the project activity, reported in the PDD, in accordance with the "Glossary of CDM terms" and CDM PS section C and VVS (§106)?	/1//28/ /29//30/	DR	CAR 10 The start date of the project defined in the PDD is not in compliance with the "Glossary of CDM terms", i.e. "the earliest date at which either the implementation or construction or real action of a CDM project activity".	CAR 10	OK
7.1.3 Is the date stated in the provided evidence consistent with other available real action evidence (e.g. dates of construction, purchase orders for equipment)?	/1//27/ /28//29/ /30//38/ /39//40/	DR	CAR 11 By means of checking the project implementation timeline in PDD against evidences provided by PP, following issues are identified, (1) Some other CDM relevant project implementation milestones are not listed in the Table 4 of PDD, like CDM consulting contract, Feasibility study, the project start date,	CAR 11	OK

			etc.;		
			(2) The receiving date of CDM notification to Bangladesh DNA is not accurately reflected in the PDD.		
7.1.4 If the project was not published and the starting date is on or after 2nd August 2008, was it possible to receive from UNFCCC secretariat and DNA a written confirmation that PPs previously informed the above entities on commencement of the project activity and of their intention to seek CDM status?	/1//27/ /28//29/ /30//38/ /39//40/	DR	CAR 12 The justification on the serious CDM prior consideration in PDD B.5 shall be updated in line with the accurate timeline.	CAR 12	OK
7.1.5 For the project activities with a starting date before 2nd August 2008 and before the actual publication, was there enough evidence presented to prove that PPs were previously aware of CDM?	/1//27/ /28//29/ /30/	DR	Not applicable since the project startind date is after 2nd August 2008.	OK	OK
7.1.6 For the project activities with a starting date before 2nd August 2008 and before the actual publication, was there enough evidence presented to prove that CDM benefits have been a decisive factor in	/1//27/ /28//29/ /30/	DR	Not applicable since the project startind date is after 2nd August 2008.	OK	OK

the decision to proceed with the project activity?					
7.1.7 Does the individual or body that took the decision to proceed with the project activity have/had the authority to do so?	/28//37/	DR	Yes. As reflected in the business license of the project owner, the board has authority to make decision to proceed with the project activity.	OK	OK
7.1.8 For the project activities with a starting date before 2nd August 2008 and before the actual publication, was there enough evidence presented to prove that PPs were taking continuing and real actions to secure CDM status for the project in parallel with its implementation?	/1//27/ /28//29/ /30/	DR	Not applicable since the project startind date is after 2nd August 2008.	OK	OK
7.1.9 In case there is a significant gap between the start date of the project activity and the commencement of validation, how was it possible for the project participant to commit funds to the project in advance of receiving a positive validation opinion?	/1//27/ /28//29/ /30/	DR www	No applicable.	OK	OK
7.1.10 How has the starting date of the project	/1//27/ /28//29/	DR	Pls. refer to 7.1.2.	CAR 10	OK

activity been determined? What are the dates of the first contracts for the project activity? When was the first construction activity?	/30/				
7.1.11 Is the stated expected operational lifetime of the project activity reasonable?	/1//28/	DR	Yes, the expected operational lifetime of 10 years is considered reasonable in line with the investment agreement.	OK	OK
7.1.12 Is the crediting period start date, the type (renewable/fixed) and the length of the crediting period clearly defined and reasonable?	/1/	DR	Yes. In the PDD, a fixed 10 years of crediting period was clearly defined. For the appropriateness of crediting period start date, pls. refer to 3.2.	CAR-5	OK
7.2 Identification of alternatives(VVS Section 7.12.10)					
7.2.1 Does the PDD identify and list credible alternatives to the CDM project activity in order to determine the most realistic baseline scenario, unless selected approved methodology prescribes/identifies the baseline scenario and no further analysis is required?	/1//11/	DR	Yes, in line with the Combined tool to identify the baseline scenario and demonstrate additionality, the PDD identifies and lists credible alternatives to the CDM project activity in order to determine the most realistic baseline scenario. CAR 13 As per EB 66, Annex 8, it is required to integrate the baseline scenario identification information of PDD B.4 into the PDD B.5, and directly give the final identified baseline scenario in PDD B.5 with a reference to the other relevant.	CAR-13	OK
7.2.2 Does the list of alternatives include as one of the options that	/1//11/	DR	Yes.	OK	OK

the project activity is undertaken without being registered as a CDM project activity?					
7.2.3 Does the list contain all realistic/credible alternatives that the DOE, on the basis of its local and sectoral knowledge, considers to be viable means of supplying the outputs or services that are to be supplied by the project activity?	/1//11/	DR	Yes.	OK	OK
7.2.4 Is the exclusion of the alternatives for legal reasons justified?	/1//11/	DR	Pls. refer to 7.4.1	CL-3	OK
7.3 Investment Analysis(VVS Section 7.12.11)					
7.3.1 Are all sources of revenues (including savings) have been considered in the PDD and all calculations?	/1//11/ /12/	DR	Not applicable since the barrier analysis is selected for the additionality demonstration in the PDD.	OK	OK
7.3.2 Is the type of investment analysis selected correctly in the PDD? Is the choice of benchmark analysis, investment comparison or simple cost analysis correct and justified?	/1//11/ /12/	DR	Not applicable.	OK	OK
7.3.3 Is the selected financial indicator chosen and applied correctly? Is it	/1//11/ /12/	DR	Not applicable.	OK	OK

on equity/project basis? Before/after tax? Is the financial indicator in correspondence with the benchmark?					
7.3.4 Is the guidance on IRR calculation and assessment correctly applied?	/1//11/ /12/	DR	Not applicable.	OK	OK
7.3.5 In case project participants use values from Feasibility Study Reports (FSR) is it possible to verify that the period between the FSR date and investment decision was reasonably short and FSR values did not change materially?	/1//11/ /12/	DR	Not applicable.	OK	OK
7.3.6 Are all the values consistent between FSR and PDD and are inconsistencies properly justified?	/1//11/ /12/	DR	Not applicable.	OK	OK
7.3.7 Were all the values from FSR applicable and valid at the time of the investment decision?	/1//11/ /12/	DR	Not applicable.	OK	OK
7.3.8 Is it reasonable to assume that no investment would be made at a rate of return lower than the	/1//11/ /12/	DR I	Not applicable.	OK	OK

benchmark by, for example, assessing previous investment decisions by the project participants or some verifiable circumstances that have led to a change in the benchmark?					
7.3.9 Is the Investment Analysis prepared in compliance with the latest version of the "Guidance on the Assessment of Investment Analysis" as provided by the CDM EB?	/1//11/ /12/	DR	Not applicable.	OK	OK
7.3.10 Do the project include all the data sources used (input & output / loss & profit) and list all the projects that have been used for cross-checking in accordance with VVS paragraph 123. a. How was the total investment cost accepted, and if it was available at the time of decision? b. Does the income tax calculation take depreciation into account? Is the	/1//11/ /12/	DR	Not applicable.	OK	OK

depreciation year in accordance with normal accounting practice in the host country? c. Has salvage value been taken into account? Is working capital returned in the last year of operation? d. How are the PLF of the project assessed? e. How are output price assessed? f. How are O&M cost assessed?					
7.3.11 Sensitivity analysis: Have the key parameters contributing to more than 20% of the revenue/costs during operating or implementation been identified? Has possible correlation between the parameters been considered? Is the range of variations (10% in default) is reasonable in the project context? Have the key parameters been vary to reach or cross the	/1//11/ /12/	DR	Not applicable.	OK	OK

benchmark and have the likelihood of this to happen been justified?					
7.4 Barrier analysis(VVS Section 7.12.12)					
7.4.1 Are there any issues addressed in the barrier analysis that have a clear impact on the financial viability of the project activity and that shall be assessed by an investment analysis? Refer «Guidelines for objective demonstration and assessment of barriers»	/1//11/ /12//13/ /50/	DR	Yes, the investment barriers and technological barriers are addressed in the barrier analysis. CL 3 Regarding to the barrier analysis, following issues are identified, 1) The revenue on the leak reduction by the project shall be transparently justified, as the domestic gas consumption only accounts 11.69% of total gas consumption as reflected on the p.40 of Titas Annual report 2012-13; 2) The investment barrier analysis shall be much reasonably presented fully in line with the requirements guided in «Combined tool to identify the baseline scenario and demonstrate additionality» and «Guidelines for objective demonstration and assessment of barriers»;	CL-3	OK
7.4.2 Do the listed barriers exist and is their existence substantiated?	/1//11/ /12//13/ /50/	DR	Pls. refer to 7.4.1	CL-3	OK
7.4.3 Would any of the identified barriers prevent the implementation of the project activity but not equally prevent the implementation of the possible alternatives, in particular the implementation of the identified baseline	/1//11/ /12//13/ /50/	DR	Pls. refer to 7.4.1	CL-3	OK

scenario?					
7.5 Common practice analysis(VVS Section 7.12.13)					
7.5.1 If the PPs claim in the PDD that CDM project activity is not common practice, is it justified?	/1//11/ /12/	DR	CL 4 As clearly stated in the PDD p.21, the project does not involve any of the measures listed in the definitions, it is thus required to clarify why the version 02.0 of «Guidelines on common practice» is still used for the justification of applicable geographical area.	CL-4	OK
7.5.2 Step 1: How is the assessment done on capacity output within the applicable range, is it within (+/- 50%) of the proposed projects	/1//11/ /12/	DR	Not applicable since the project does not apply any the measures that are listed in the definitions of Version 05.0.0 «Combined tool to identify the baseline scenario and demonstrate additionality».	OK	OK
7.5.3 Step 2: How have similar projects (both CDM and non-CDM) projects been identified, confirm data source and information: - Located at applicable geographical area, - Apply the same measure as the proposed project activity, - Use same energy source/fuel and feedstock as the proposed project activity, if a technology switch measure is implemented by the proposed project activity,	/1//11/ /12/	DR	Not applicable.	OK	OK

- The plants in which the projects are implemented produce goods or services with comparable quality, properties and application areas (e.g. clinker) as the proposed project plant, - The capacity or output of the projects is within the applicable capacity or output range calculated (+/- 50%) of the proposed projects, - The projects started commercial operation before the CDM-PDD is published for GSC or before the start date of the proposed project activity, whichever is earlier for the proposed project activity.					
7.5.4 Step 3: Within the projects identified in Step 2, how many have been identified: are neither registered CDM project activities, project activities submitted for registration, nor project activities undergoing validation. Note N_{all}.	/1//11/ /12/	DR	Not applicable.	OK	OK
7.5.5 Step 4: Within similar projects	/1//11/ /12/	DR	Not applicable.	OK	OK

identified in Step 3; has it been identified those that apply technologies that are different to the technology applied in the proposed project activity. Note N_{diff} .					
7.5.6 Step 5: Assess the calculation of $F=1-N_{diff}/N_{all}$ and confirm if it is acceptable.	/1//11/ /12/	DR	Not applicable.	OK	OK
7.5.7 Conclusion: Is the assessment of common practice completed with evaluation of N_{all} , N_{diff} and F and concluded that the proposed project activity is not a common practice: $F < 0.2$, and $N_{all} - N_{diff} < 3$	/1//11/ /12/	DR	Not applicable.	OK	OK
7.6 First-of-its-kind (VVS Section 7.12.13)					
If the PPs claim in the PDD that CDM project activity is the “first of its kind”, is it justified?	/1/	DR	Not applicable since PP does not claim in the PDD that the proposed project is the “first of its kind”.	OK	OK
8 Conclusion					
What is the conclusion with regard to the additionality of the project activity?	/1/	DR	The conclusion depends on the closure of issues raised in 7.1.2, 7.1.3, 7.1.4, 7.2.1, 7.4.1 and 7.5.1.	CAR 10 CAR 11 CAR 12 CAR 13 CL 3 CL 5	OK
9.1 Monitoring plan (VVS Section 7.12.14)					
9.1.1 Are all parameters required by the selected approved methodology	/1//9/ /11/	DR I	Since the PP has selected Option 2 to calculate the baseline emissions and project emissions, all parameters listed in the PDD B.7.1 are considered appropriate and complete.	OK	OK

or tool identified and listed in the PDD?					
9.1.2 Are the parameters in the PDD clearly described and the measurement method clearly stated for each value to be monitored and deemed appropriate?	/1//11/	DR I	CAR 14 By means of checking PDD B.7.1 against the methodology AM0023 and EB 66 Annex 8, following issues are identified, 1) The parameter table is not consistent with the latest version 04.1 of PDD form, and shall be correctly filled; 2) The description of measurement methods for UR_j is not accurate, i.e. why UR_z is involved in the UR_j? 3) The inapplicable parameters for the project activity are to be deleted for monitoring transparency.	CAR 14	OK
9.1.3 Does the monitoring plan record data in the original form as generated, providing QA/QC procedures to be used on the measurement method?	/1//11/	DR	Yes.	OK	OK
9.1.4 Is the measurement equipment for each parameter described and deemed appropriate? Are the locations of all measurement equipment clearly identified and consistently described, incl. process flow-charts contained in the PDD?	/1//11/	DR I	Yes. Both the selected measurement equipment and monitoring arrangement for each parameter are fully in compliance with the applied methodology AM0023, Version 04.0.0.	OK	OK
9.1.5 Is the measurement accuracy addressed and deemed appropriate?	/1//11/ /46//47/	DR I	Yes. The addressed measurement accuracy is consistent with the measurement equipment technical specification, and is	OK	OK

			deemed appropriate.		
9.1.6 Are procedures in place on how to deal with erroneous measurements and are the corrective actions identified?	/1//11/	DR	Yes. The procedures to deal with erroneous measurements has been clearly defined in the PDD.	OK	OK
9.1.7 Is the frequency of measurement identified and deemed appropriate?	/1//11/	DR I	Yes. The defined monitoring frequency is fully in compliance with the applied AM0023, Version 04.0.0, thus is deemed appropriate.	OK	OK
9.1.8 Is the monitoring plan documented according to the approved methodology and in a complete and transparent manner?	/1//11/	DR I	Pls. refer to 9.1.2.	CAR 14	OK
9.1.9 Are the sampling, measurement methods and procedures defined?	/1//11/	DR I	Not applicable, pls. refer to 5.5.8.	OK	OK
9.1.10 Are procedures identified for maintenance of monitoring equipment and installations?	/1//11/ /45/	DR	Yes. The relevant procedures have been documented in the PDD, and is considered appropriate by checking the operation & maintenance manual of Hi Flow Sampler.	OK	OK
9.1.11 Are the equipment calibration intervals identified and justified? Is the calibration conducted by accredited person or intuition?	/1//11/ /45/	DR I	Yes. The 30 days of calibration interval for Hi-Flow Sampler is defined and justified in the PDD, which can be evidenced with the operation & maintenance manual of Hi Flow Sampler. Besides, as described in the PDD Appendix 5, the calibration will be conducted by the certified staff.	OK	OK
9.1.12 Are procedures identified for day-to-day	/1/	DR I	Yes.	OK	OK

records handling (including what records to keep, storage area of records and how to process performance documentation)?					
9.1.13 Are the monitoring arrangements described in the monitoring plan feasible within the project design?	/1//11/ /ii//ii/	DR I	Yes.	OK	OK
9.1.14 Are the means of implementation of the monitoring plan, including the data management and quality assurance and quality control procedures, sufficient to ensure that the emission reductions achieved by / resulting from the project activity can be reported ex post and verified?	/1//11/	DR	Yes. The means of implementation of the monitoring plan has been clearly documented in the PDD, which will ensure that the emission reductions can be reported ex-post and verified.	OK	OK
9.1.15 Do the PPs make provisions for personnel training needs?	/1//28/	DR	Yes. In CER project investment agreement, the PP has made provisions for personnel training needs, which has been clearly reflected in the project monitoring plan.	OK	OK
9.1.16 Is the authority and responsibility of overall project management clearly described?	/1/	DR	Yes. The authority and responsibility of monitoring team have been clearly documented in the PDD Appendix 5.	OK	OK
9.1.17 Are procedures identified for emergency	/1/	DR	Yes.	OK	OK

preparedness for cases where emergencies can cause unintended emissions?					
9.1.18 Are procedures identified for review of reported results/data?	/1/	DR	Yes. The procedures have been described in the PDD.	OK	OK
9.1.19 Does responsibilities and institutional arrangements for data collection and archiving in place? Is the data archiving period for this project activity stated in the PDD and appropriate?	/1/	DR	Yes.	OK	OK
9.1.20 Is the monitoring parameters for all project emissions captured?	/1//11/	DR	Yes.	OK	OK
9.1.21 Will all monitored data required for verification and issuance be kept for two years after the end of the crediting period or the last issuance of CERs, for this project activity, whichever occurs later?	/1//11/	DR	Yes. It is clearly stipulated in the PDD that all the electronic data will be kept for a period of two years following the end of the crediting period.	OK	OK
9.1.22 Are the data management and quality assurance and quality control procedures sufficient to ensure that the emission	/1/	DR	Yes. The data management and QA/QC procedures have been sufficiently documented in the PDD to ensure that the emission reductions achieved from the project can be reported expost and verified.	OK	OK

reductions achieved by/resulting from the project can be reported ex post and verified?					
9.1.23 Is operational and management structure in place to implement the monitoring plan?	/1/	DR I	Yes, the operational and management structure has been documented in place to implement the monitoring plan.	OK	OK
9.2 Monitoring of the leakage					
9.2.1 Does the monitoring plan provide for the collection and archiving of all relevant data necessary for determining leakage?	/1//11/	DR	Not applicable under the applied AM0023, Version 04.0.0.	OK	OK
9.2.2 Is the choice of project leakage indicators made according to selected methodology in a reasonable and conservative manner?	/1//11/	DR	Not applicable.	OK	OK
9.2.3 Is the measurement method clearly stated and deemed appropriate for each leakage value?	/1//11/	DR	Not applicable.	OK	OK
10. Sustainable development(VVS Section 7.8)					
10.1 Does the LoA from the Host country DNA contain the confirmation that the proposed CDM project activity contributes to the sustainable development of the host Party?	/1//3/	DR	The LoA from People's Republic of Bangladesh (host country) is pending, pls. refer to 1.1.	CAR 1	OK

10.2 If PDD indicates any additional environmental benefits of the project, other than GHG emission reductions, were those benefits properly substantiated?	/1//57/ /i//iii/	DR I	Yes. The additional benefits other than GHG emission reductions in the PDD can be substantiated by on-site stakeholder interview and checking the national report on sustainable development.	OK	OK
11. Stakeholders' consultation and comments (VVS Section 7.5 & 7.14)					
11.1 Were the stakeholders identified in appropriate and complete manner?	/1//43/ /i/	DR I	Yes. By means of checking the consultation attendance list, the identified stakeholders are from below, - Titas 's residential and non-residential customers; - Petrobangla, Titas' mother company - The Department of Environment - The Ministry of Energy and Mineral Resources Based on the project background and onsite interview, the identified stakeholders are much relevant with the project implementation, and thus considered to be appropriate and complete.	OK	OK
11.2 Are the identified stakeholders plausible?	/1//43/	DR	Yes. As assessed in the item 11.1, the identified stakeholders are deemed plausible.	OK	OK
11.3 Does PDD describe the means being used to invite local stakeholder's comments?	/1//43/	DR	Yes. The stakeholder invitation means have been completely described in the PDD.	OK	OK
11.4 Were those means appropriate?	/1//43/	DR	Yes. The invitation means, incl. Daily newspaper, email invitation and notice in Titas office, are deemed appropriate manner.	OK	OK
11.5 Was the project presented to the stakeholders in unbiased manner?	/1//43/ /i//ii//iii/	DR I	Yes. The project was presented to the stakeholders in unbiased manner, which was checked by onsite stakeholder interviewing.	OK	OK

11.6 If a stakeholder consultation process is required by regulations/laws in the host country, has the stakeholder consultation process been carried out in accordance with such regulations/laws?	/i/iii/	I	The stakeholder consultation process is not required for this kind of project, in accordance with Bangladesh regulations or laws.	OK	OK
11.7 Is a summary of the stakeholder comments provided in the PDD?	/1//43/	DR	Yes. The summary of the stakeholders comments has been accurately provided in the PDD.	OK	OK
11.8 Has due account of any stakeholder comments been taken by PPs and reflected in the PDD?	/1/	DR	CAR 15 As per Annex 8 of EB 66, pls. provide information that all comments received have been considered in PDD E.3.	CAR 15	OK
12. Environmental impacts(VVS Section 7.13)					
12.1 Is the documentation supplied by the PPs regarding environmental impacts relevant and accurately reflected in the PDD?	/1//35/ /i/iii/	DR I	Based on the onsite stakeholder interview, document review and onsite inspection, the project is confirmed to use advanced LDAR program to replace the conventional LDAR program, and does not involve any construction and/or engineering retrofit which would create any environmental impacts, thus it is acceptable not to conduct environmental impact assessment for this kind of project. CL 5 Regarding the description in PDD D.1, it is required to provide the written approval from the Environment Department of Bangladesh, and further clarify the environmental approval relevant procedures for the project.	CL 5	OK
12.2 Is an environmental impact assessment (EIA) required for the CDM project activity?	/1//35/ /i/iii/	DR I	No, details as referred in 12.1.	OK	OK
12.3 In case an EIA is	/1//35/	DR	No applicable, details as referred in 12.1.	OK	OK

required, has the EIA has been approved by local authorities and is the outcome accurately reflected in the PDD?	/i/iii/				
12.4 Does the PDD include a brief description of the environmental effects of the project, including trans-boundary?	/1//35/ /i/iii/	DR	Yes, the PDD section D includes a brief description of the environmental effects of the project including transboundary.	OK	OK
12.5 Are those effects properly addressed in the design of the project activity?	/1//35/ /i/iii/	DR I	No applicable, details as referred in 12.1.	OK	OK
12.6 Does the project comply with environmental legislation in the host country?	/1//35/ /i/iii/	DR	Yes, the project complies with environmental legislation of People's Republic of Bangladesh.	OK	OK

Table 2: List of Requests for Corrective Action (CAR) and Clarification (CL)

No.	CAR/CL	Observation (CAR/CL)	Reference	Summary of project owner response	Validation team conclusion
1.	CAR 1	The LoAs from Bangladesh and Denmark haven't been received yet.	1.1-1.7 2.1-2.4	Both LoAs from Bangladesh and Denmark have been provided.	OK. Both LoAs have been received, and they are confirmed to be valid via checking the original email on the LoA issuance from their DNA respectively. Therefore, CAR 1 is closed.
2.	CAR 2	The MoC of the project shall be provided.	1.6 1.9 1.10 10.1	The MoC has been provided.	OK. The MoC has been received, and NE Climate A/S is nominated as the sole focal point. Therefore, CAR 2 is closed.
3.	CAR 3	As per the para. 54 of CDM VVS (Version 07.0), the written confirmation stating the authorization, specimen signatures and personal details of focal point signing the MOC shall be provided.	1.11	The written confirmation has been provided.	OK. The written confirmation has been checked and could confirm both the contact person in the MoC are authorized. Therefore, CAR 3 is closed.
4.	CAR 4	As per EB latest guidance via link https://cdm.unfccc.int/Reference/Guidclarif/old_pdd/index.html , the latest version 05.0	3.1	PDD has been updated based on version 05.0, and its attachment guidance and font format requirements.	OK. The updated PDD is in compliance with the latest

		of PDD form shall be applied for this project after 18/07/2014, in line with its attachment guidance and font format requirements.			version 05.0 of PDD Form and its filling requirement. Therefore, CAR 4 is closed.
5.	CAR 5	By means of checking PDD against EB 66 Annex 8, following issues are identified, 1) The data defined in the PDD C.1.1 and C.2.2 shall be stated in the format of DD/MM/YYYY, and the crediting period start date shall be updated well; 2) The establishment of PDD section E was not in compliance with the requirement of latest "Guidelines for completing the project design document form".	3.2	1) The dates in C.1.1 and C.2.2. are in the DD/MM/YYYY format, and the start data of the crediting period has been proposed to 01/04/2015. 2) Section E has been revised, with E.1, E.2 and E.3 addressed according to "Guidelines for completing the project design document form".	OK. The revised PDD is in compliance with the latest version 01.0 "Guidelines for completing the project design document form". Therefore, CAR 5 is closed.
6.	CAR 6	By means of checking PDD against relevant documents provided by PP, below issues are identified, 1) The project title in the PDD is not consistent with both prior CDM consideration forms to Bangladesh DNA and UNFCCC secretariat respectively; 2) The description on the project implementation in the PDD A.1 is much unclear against the other part of PDD, e.g. additional staff will be hired to implement the project in residential sector, in the case, is there any plan to address the physical leak in other facilities referred in PDD A.2.4 and B.2? 3) In the PDD A.2.4, the project location description, i.e. the project will be implemented across Titas' residential	4.1	1) The project title has been corrected to be consistent with the prior CDM consideration forms submitted to the Bangladesh DNA and UNFCCC secretariat 2) The sentence in A.1 has been revised to better clarify the scope of the project: <i>"Additional staff (around 50) will need to be hired to implement the project."</i> 3) The sentence in A.2.4 has been revised to better clarify the broader scope of the project: <i>"The project will be implemented across Titas' distribution network which covers Greater Dhaka..."</i> 4) The map of the Titas franchise	OK. Regarding issued 1), the validation team checked these submitted forms and confirmed that the described precise geographical location and brief description for the proposed project activity is fully consistent with the webhosted PDD, thus could conclude that the project with title "Certified Emission Reductions project within the Titas Gas distribution network, People's Republic of Bangladesh" is just the project with title "Reducing Gas Leakages within the Titas Gas Distribution Network in Bangladesh",

		distribution network, is insufficient against the project boundary defined in the B.2. 4) The indicative map given in the PDD A.2.4 is not clear enough to identify the project geographical location.		area in Greater Dhaka has been revised to better illustrate the project geographical location.	and the typo correction is acceptable. The revision in the other three issues is validated to be accurate based on the on-site interview, review of official gas distribution network map. Therefore, CAR 6 is closed.
7.	CAR 7	By means of checking the project boundary defined PDD B.3 against the methodology AM0023 and EB 66 Annex 8, following issues are identified, 1) The surveyed leaking components are not transparently given in the PDD B.3 and Annex 4 in line with the measurement study report; 2) The components defined in the project boundary are not fully consistent with the surveyed results; 3) All RMS facilities are not accurately delineated in the flow diagram of the project boundary. Besides, the emission sources and GHGs included in the project boundary shall be clearly indicated in the diagram.	5.3.1	1) Surveyed leaking components were at CGS, TBS/DRS, and RMS residential, commercial and industrial. Annex 3 has been revised to include the following sentence <i>"Measurements were conducted at CGS, TBS, DRS and RMS Residential, Commercial and Industrial sites in the area of Dhaka by Heath Consultants Incorporated"</i>. In B.3, the sentence has been revised to <i>"During the feasibility study, CGS, TBS/DRS and RMS (residential, commercial and industrial) facilities were checked for potential leaks"</i>. These two sentences are consistent with the measurement study report, which states in Section 4.0 Field Measurement Results <i>"The Heath survey consisted of a sampling across five different type of facility categories which</i>	OK. The revision in the PDD is in compliance with the applied methodology AM0023, Version 04.0.0 and EB 66 Annex 8. Further, the information revised in the revised PDD is verified to be consistent with the measurement study report. Therefore, CAR 7 is closed.

				<i>consisted of 3 City Gate Stations (CGS), 22 Commercial Regulator & Metering Stations (Commercial RMS), 36 Industrial Regulator & Metering Stations (Industrial RMS), 135 Residential Regulator and Metering Stations (Residential RMS) and 8 Town Border and District Regulatory Stations (TBS/DRS)."</i> 2) To be consistent with the measurement study report, Section B.3 has been revised to state: • All connectors, valve stem packing, valve seats, pressure relief valves, scrubber dump valve, flanges, and regulators in CGS, TBS/DRS, and RMS (residential, commercial and industrial) facilities; • All insulating joints in RMS facilities (residential, commercial and industrial). 3) Figure 7 entitled "Titas distribution network components and CDM project boundary" has been revised. The following changes have been made: • Industrial RMS has been included in the diagram • CER estimates for each facility	
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				category has been added to the Figure	
8.	CAR 8	The Table 3 in PDD B.3 is not fully in compliance with the applied methodology AM0023.	5.3.2 5.3.3	Table 3 has been revised to be compliant with AM0023 methodology.	OK. The revised table 3 is confirmed to be consistent with the methodology AM0023, Version 04.0.0. Therefore, CAR 8 is closed.
9.	CAR 9	By means of checking UNFCCC website, the version 02.2 of “Combined tool to identify the baseline scenario and demonstrate additionality” is invalid, pls. update this tool through the PDD.	5.4.2.1	The “Combined tool to identify the baseline scenario and demonstrate additionality” has been updated to version 05.0.0. All references to the “Combined tool” Version 05.0.0 have been updated in the PDD.	OK. The latest Version 05.0.0 “Combined tool to identify the baseline scenario and demonstrate additionality” and its relevant part have been correctly updated in the PDD. Therefore, CAR 9 is closed.
10.	CAR 10	The start date of the project defined in the PDD is not in compliance with the “Glossary of CDM terms”, i.e. “the earliest date at which either the implementation or construction or real action of a CDM project activity”.	7.1.2 7.1.10	Project start date (01 November 2014) has been included in Table 4 and C.1.1, which is the anticipated date for registration of the PDD. Once this is completed, the procurement of advanced leak detection, measurement, and repair technologies, and contracting of services to train and hire staff will begin. As requested, B.5. has been revised to remove reference to F-CDM-Prior Consideration notification. The following sentence has been added “Per EB 62, Annex 13, since the project activity start date is both after 2	OK. During the on-site assessment, the project has not started yet. As stated by PPs during on-site interview, the project start date is expected on 1 Nov. 2014 after its CDM registration. Since the project start date is after the PDD GSP date, it is appropriate to revise the corresponding justification on the prior CDM consideration. Therefore, CAR 10 is closed.

				August 2008, and after the global stakeholder consultation, an F-CDM-Prior Consideration notification is not necessary"	
11.	CAR 11	By means of checking the project implementation timeline in PDD against evidences provided by PP, following issues are identified, 1) Some other CDM relevant project implementation milestones are not listed in the Table 4 of PDD, like CDM consulting contract, Feasibility study, the project start date, etc.; 2) The receiving date of CDM notification to Bangladesh DNA is not accurately reflected in the PDD.	7.1.3	1) Additional CDM milestones, including NE Climate/ ICF contract signing; ICF/measurement study subcontractor contract signing; measurement study; and final study report, have been added to Table 4. As well as, the expected project start date (01 November 2014) has been added to Table 4 2) The receiving date of CDM notification to the Bangladesh DNA has been changed to 5 November 2013	OK. The corrected timeline is able to cross check with their relevant documentations. As assessed in the CAR 9, the project start date is expected on 1 Nov. 2014, which has been accurately reflected in the PDD as well. Therefore, CAR 11 is closed.
12.	CAR 12	The justification on the serious CDM prior consideration in PDD B.5 shall be updated in line with the accurate timeline.	7.1.4	The Prior Consideration discussion has been updated to reflect the revised timeline. Section B.5 has been revised to include the expected project start date of 01/11/2014.	OK. The proposed project activity is expected to start from 1 Nov. 2014, and it is obviously after the PDD GSP date (26 Feb. 2014). And the revised prior CDM consideration justification in PDD is confirmed to in compliance with the latest "Guidelines on the demonstration and assessment of prior consideration of the CDM". Therefore, CAR 12 is closed.

13.	CAR 13	As per EB 66, Annex 8, it is required to integrate the baseline scenario identification information of PDD B.4 into the PDD B.5, and directly give the final identified baseline scenario in PDD B.5 with a reference to the other relevant.	7.2.1	Section B.4 and B.5 have been updated in accordance with EB 66, Annex 8 requirements. Section B.4 provides a summary of the baseline scenario, with Section B.5 providing details on the baseline and alternate scenarios.	OK. The revision is confirmed to be in compliance with the EB 66, Annex 8. Therefore, CAR 13 is closed.
14.	CAR 14	By means of checking PDD B.7.1 against the methodology AM0023 and EB 66 Annex 8, following issues are identified, 1) The parameter table is not consistent with the latest version 04.1 of PDD form, and shall be correctly filled; 2) The description of measurement methods for UR _j is not accurate, i.e. why UR _z is involved in the UR _j ? 3) The inapplicable parameters for the project activity are to be deleted for monitoring transparency.	9.1.2 9.1.8	1) The following changes have been implemented in the B.7.1 parameter table to ensure consistency with PDD version 04.1. 2) Description of measurement methods for UR _j has been corrected. UR _z has been replaced with UR _j ; 3) Non relevant parameters have been deleted from the PDD.	OK. The revised PDD is in compliance with the latest version 04.1 of PDD form, methodology AM0023, Version 04.0.0 and the project FSR. Therefore, CAR 14 is closed.
15.	CAR 15	As per Annex 8 of EB 66, pls. provide information that all comments received have been considered in PDD E.3.	11.8	Section E.3 has been revised to confirm that all comments received have been considered.	OK. The prented information is consistent with the stakeholder consultation summary. Therefore, CAR 15 is closed.
16.	CL 1	The justification on all methodology applicability conditions shall be further described with specific documentation or quotation in PDD B.2.	5.2.2- 5.2.4	Section B.2 has been revised, with additional details and associated references included.	OK. All specific quotation and documentation have been indicated in the justification on the applicability of methodology AM0023, Version 04.0.0. Therefore, CL 1 is closed.

17.	CL 2	By means of checking the leak flow rate ex-ante estimated in PDD against the ER calculation sheet, following issues are detected, 1) Pls. clarify how to ensure the sampling measurement surveyed leak results are representative for the whole gas distribution system, and also provide the explanation in the PDD; 2) Pls. carefully check the "Leak Data Inputs" sheet of CER potential analysis, and ensure all information are complete and correct, e.g. GPS locations of A2 to A7 are incorrectly combined in B2 to B7, etc. 3) In the "Leak data inputs" sheet, the validation team detected the flow rates in both U31 and U135 are obviously higher compared with other leak component, thus it is required clarify if these two sampled leaks are applicable to the defined project activity under the methodology AM0023; 4) In the column W "Deviation" of "Leak data inputs" sheet, some measurement deviations are higher than 15% defined on PDD p.24, pls. clarify if these measurement results are appropriate to be used in the ex-ante CER estimation. 5) Pls. provide the official statistics on the number of leaking facilities, and also clarify whether they are comparable for the ex-ante total gas leak estimate.	5.5.4 5.5.6 5.5.7	1) The statistical sampling size justification for the measurement study has been included in Annex 4. This confirms that the measurement sampling is representative of the Titas gas distribution system. 2) "Leak Data Inputs" sheet has been revised; the following actions have been undertaken: • Column A has been corrected; all GPS location data has been filled. • Column B (address or location) data has been filled so there are no missing gaps • Previously all cells with no leakage were left blank; now, a clarifying remark has been included "no leakage found". This indicates that while a leakage was detected, it was lower than the reporting threshold of the Hi-Flow sampler, and thus insignificant. 3) Leaks U31 and U135 were previously discussed with the validation team during the field visit (11-13 March 2014). At that time, we explained that both leaks occur on pressure	OK. 1) The justification on the sampling in the measurement survey has been provided in the PDD. Since the gas distribution component configuration is generally homogeneous in each different facility, it is considered appropriate to apply random sampling to survey the methane flow rate of each physical leaking facility, in line with the Version 3.0 "Guideline for sampling and surveys for CDM project activities and programmes of activities". Each actual sampling size is more than the analyzed minimum size for each leaking facilities, thus the sampling is conservative and could be deemed representative for the whole gas distribution network. 2) The revision is reasonable against the on-site assessment;
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				relief valve vents that are >30 feet off the ground, in a noisy environment. Furthermore, both leaks are at TBS facilities, and therefore away from residential locations. Thus, they are not noticeable or detectable using current Titas practices. However, considering the questions raised by the validation team, we have decided to remove U31 and U135 from the leak statistics, on the assumption that these leaks are large and thus would be addressed by their emergency team. Thus, ex-ante estimates have been revised, with data reflecting the removal of U31 and U135 from leak statistics. 4) When a measurement is made, the hi-flow takes a 2 stage test on each leak. First test is at the highest flow rate allowed by the Hi Flow Sampler. The second stage test is immediately initiated after saving the first data stream whereby the leak is measured at a lower flow rate by approximately 25%. The deviation in the display shows the % difference between test 1 and test 2 in real time, hence the % deviation between the	3) The justification is reasonable, and the corresponding action is considered to be conservative. 4) The justification is conservative and reasonable, resulting a conservative the ex-ante estimated emission reductions. 5) The validation team has checked the official statistics on the number of involved leaking facilities, and confirmed that they are accurate and all of them fall within the proposed project boundary, thus they could be comparable for the ex-ante gas leak estimate. Based on the above further justification and revision, the estimated amount of annual average GHG emission reductions is verified to 4,378,506 tonnes CO₂, as reproduced from the emission reductions calculation spreadsheet. Therefore, CL 2 is closed.
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				two tests. Ideally, if the deviation is >15%, the measurement is not used, and another measurement conducted. However, since another measurement was not conducted, we have excluded the data in the ex-ante calculations. The ex-ante estimates have been revised to account for this change. 5) An official letter from Titas confirming the number of facilities in the Titas franchise area is provided with this document ("Titas letter_Component age & Facility number.doc")	
18.	CL 3	Regarding to the barrier analysis, following issues are identified, 1) The revenue on the leak reduction by the project shall be transparently justified, as the domestic gas consumption only accounts 11.69% of total gas consumption as reflected on the p.40 of Titas Annual report 2012-13; 2) The investment barrier analysis shall be much reasonably presented fully in line with the requirements guided in «Combined tool to identify the baseline scenario and demonstrate additionality» and «Guidelines for objective demonstration and assessment of barriers»;	5.4.1.2 5.4.3.1 5.4.4 7.2.4 7.4.1- 7.4.3	1) The barrier analysis discussion surrounding the investment costs has been revised. The discussion transparently presents the investment costs, and illustrates that these are comparable to the annual Titas maintenance budget. 2) The investment barrier analysis discussion has been revised. In line with Guideline 7 of the "Guidelines for objective demonstration and assessment of barriers", we clarify that the project is being implemented in a Least Developed Country and, thus, lacks the financial resources	OK. The justification can be cross checked with relevant documentations, incl. management meeting minutes, official letter of the project and Titas's annual report 2012-13, and detailed assessment as seen in the section 3.5.3. Therefore, CL 3 is closed.

				(project cost is 80 million BDT/year; comparable to annual maintenance budget) and access to finance (poor credit rating; non-investment grade) to implement the proposed project activity without external support/investment (CDM).	
19.	CL 4	As clearly stated in the PDD p.21, the project does not involve any of the measures listed in the definitions, it is thus required to clarify why the version 02.0 of «Guidelines on common practice» is still used for the justification of applicable geographical area.	7.5.1	Reference to the “Guidelines on common practice” has been removed, and replaced with “Combined tool to identify the baseline scenario and demonstrate additionality” (Version 05.0.0)”	OK. As per the para 9. (a) of Version 05.0.0 “Combined tool to identify the baseline scenario and demonstrate additionality”, the applicable geographical area should be the entire host country, thus it is appropriate to define People’s Republic of Bangladesh as applicable geographical area of the proposed project activity. Therefore, CL 4 is closed.
20.	CL 5	Regarding the description in PDD D.1, it is required to provide the written approval from the Environment Department of Bangladesh, and further clarify the environmental approval relevant procedures for the project.	12.1	The receival of a written letter of approval from the Department of Environment for Bangladesh was incorrect. Titas have confirmed that no letter was recieved and, in fact, no letter is required to move forward with the project. The sentence has been deleted. <i>As noted in the PDD “The project activity has no trans-boundary environmental impacts, and requires no environmental impact</i>	OK. As confirmed from the official letter from the pipeline design department of Titas, the project activity does not require EIA. In addition, based on the validation team’s expertize, the project does not involve any construction or retrofitting existing equipment, thus it does not

				<i>assessment (EIA) per the Bangladesh's environmental legislation."</i> A letter from Titas noting that no EIA is required has been provided to the validation team.	need EIA and even approval. Therefore, both the clarification and revision are deemed reasonable, CL 5 is closed.
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Appendix B

CERTIFICATES OF COMPETENCE

Qualification

Yan, Chong /

Emission Trading

United Nations Framework Convention on Climate Change

Auditor No. :
(AuditorenRegNr)

Appointed:
(Zugelassen)

☒ ja

Qualification Level: Lead Auditor
(Qualifikationsstufe)

External:
(Externer)

☐ ja

Add. reviewer: ☒ yes
(Zusätzlicher Prüfer)

EAC Scopes:
(EAC Branchen)

CDM 01 – Energy industries (renewable – / non-renewable sources)
CDM 02 – Energy distribution
CDM 03 – Energy demand
CDM 04 – Manufacturing industries
CDM 09 – Metal production

Add. qualification:
(zus. Qualifikation)

First Appointment: 12/15/2011
(Erstberufung)

Valid to: 12/14/2017
(Gültig bis)

Remarks: Valid for TA 1.2, 2.1, 3.1, 4.3, 4.5, 9.1
+ Part Time TR

Languages: Chinese
English

Experience Exchange

Date

Location

Remarks

Accredita

Monitoring

Latest Monitoring:
(letzte Beurteilung)

Next
Monitoring:
(nächste
Beurteilung)

Remarks:

[View](#) / [Edit Monitoring](#)

History of scope allocation

Date: 2012-01-10
Change: EAC CDM, CDM, CDM, CDM, CDM added
By: Manfred Brinkmann
Reason: Valid for TA 1.2, 2.1, 3.1, 4.3, 4.5, 9.1

History

Created:	01/28/2011 10:33:30 AM	Chong Yan/Shg/Chn/TUV
Modified:	09/19/2014 03:33:52 PM	Lixin Li/Chn/TUV
	09/28/2012 11:54:16 AM	Praveen Urs/Chn/TUV
	01/10/2012 08:49:02 AM ZE9	Manfred Brinkmann/Jpn/TUV
	11/14/2011 06:09:04 PM	
	01/28/2011 10:33:53 AM	

Export to ICMS

Last Export:

Qualification

Zhu, Jiang /

Emission Trading

United Nations Framework Convention on Climate Change

Auditor No.:
(AuditorenRegNr)

Appointed:
(Zugelassen)

☒ ja

Qualification Level: Lead Auditor
(Qualifikationsstufe)

External:
(Externer)

☐ ja

Add. reviewer: ☒ yes
(Zusätzlicher Prüfer)

EAC Scopes:
(EAC Branchen)

CDM 01 – Energy industries (renewable – / non-renewable sources)
CDM 04 – Manufacturing industries

Add. qualification:
(zus. Qualifikation)

First Appointment: 2009/03/08
(Erstberufung)

Valid to: 2015/03/07
(Gültig bis)

Remarks: CDM 01: valid for TA 1.1, 1.2
CDM 04: valid for TA 4.5 – Other WHR and Fuel Switch
+ Part Time TR

Languages: Chinese
English

Experience Exchange

Date	Location	Remarks	Accredita
2011-06-18	Beijing	Beijing CDM Seminar-EB61/62	United Nations Framework Convention
2010-12-21	Beijing	GC CDM Auditor Experience Exchange, Beijing, 2010-12-21to23	
United Nations Framework Convention on Climate Change			

Monitoring

Latest Monitoring:
(letzte Beurteilung)

Next
Monitoring:
(nächste
Beurteilung)

Remarks:

History of scope allocation

Date: 2009-03-08
Change: EAC CDM added
By: Manfred Brinkmann
Reason:

History

Created:	2008/03/20 13:56:52	Daxun Li/Bj/Chn/TUV
Modified:	2012/09/28 11:52:16	Praveen Urs/Chn/TUV
	2012/09/28 11:27:35	Praveen Urs/Chn/TUV
	2012/03/12 15:05:17	Praveen Urs/Chn/TUV
	2012/03/07 14:06:06	
	2011/01/13 15:24:11 ZE9	
	2011/01/13 15:22:23 ZE9	
	2010/11/10 18:24:28 ZE9	
	2010/11/10 18:23:35 ZE9	
	2008/03/20 13:57:07	

Export to ICMS

Last Export:

Qualification

LIU, QING /

Emission Trading

United Nations Framework Convention on Climate Change

Auditor No.:

(AuditorenRegNr)

Appointed:
(Zugelassen)

☒ ja

Qualification Level: Lead Auditor
(Qualifikationsstufe)

External:
(Externer)

☐ ja

Add. reviewer: ☒ yes
(Zusätzlicher Prüfer)

EAC Scopes:
(EAC Branchen)

CDM 01 – Energy industries (renewable – / non-renewable sources)
CDM 08 – Mining/Mineral production
CDM 10 – Fugitive emissions from fuels (solid; oil and gas)

Add. qualification:
(zus. Qualifikation)

First Appointment: 08/05/2014
(Erstberufung)

Valid to: 07/05/2017
(Gültig bis)

Remarks: Valid for TA 1.2, 8.2/10.2

Languages: Chinese
English

Experience Exchange

Date	Location	Remarks	Accreditation
2011-06-18	Beijing	Beijing CDM Seminar-EB61/62	United Nations Framework Convention on Climate Change

Monitoring

Latest Monitoring:
(letzte Beurteilung)

Next
Monitoring:
(nächste
Beurteilung)

Remarks:

History of scope allocation

Date: 2011-05-09

Change: EAC CDM, CDM, CDM added
By: Manfred Brinkmann
Reason: Valid for TA 1.2, 8.2/10.2

History

Created:	04/25/2011 03:35:53 PM	Qing Liu/Bj/Chn/TUV
Modified:	05/27/2014 04:31:18 PM	Henri Phan/Chn/TUV
	05/27/2014 03:30:39 PM	Qing Liu/Chn/TUV
	05/27/2014 01:22:34 PM	Qing Liu/Chn/TUV
	03/25/2013 07:42:31 PM	
	03/25/2013 05:29:31 PM	
	03/25/2013 04:20:59 PM	
	03/25/2013 12:22:24 PM	
	04/19/2012 09:43:11 AM	
	05/09/2011 11:56:09 AM	ZE9
	04/25/2011 03:36:07 PM	

Export to ICMS

Last Export:

Qualification
Mr. Sami Al Karim

Emission Trading

United Nations Framework Convention on Climate change

Appointed:	☒		
		Qualification level:	Local Expert
External:	☒		
Scopes:			

Scope:	
Languages:	Bengali English
Legal requirements	☒

Validity:

First Appointment	7 March 2014	Valid To:	6 March 2017
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Approved By:

Mr. Henri Phan	
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History of Scope Allocation:

Date:	
Change:	
By:	
Reason:	

Qualification

Heidelmann, Norbert /

Emission Trading

United Nations Framework Convention on Climate Change

Auditor No.:

(AuditorenRegNr)

Appointed:
(Zugelassen)

☒ ja

Qualification Level: Lead Auditor
(Qualifikationsstufe)

External:
(Externer)

☐ ja

Add. reviewer: ☐ yes
(Zusätzlicher Prüfer)

EAC Scopes:
(EAC Branchen)

CDM 01 – Energy industries (renewable – / non-renewable sources)
CDM 13 – Waste handling and disposal
CDM 15 – Agriculture

Add. qualification:
(zus. Qualifikation)

First Appointment: 05/03/2010
(Erstberufung)

Valid to: 05/02/2016
(Gültig bis)

Remarks: Appointment valid for
TA 1.2, 13.1, 13.2, 15.2

Languages: German
English

Experience Exchange

Date	Location	Remarks	Accreditation
2011-03-22 Change	Cologne	Experience Exchange Cologne 2011	United Nations Framework Convention

Monitoring

Latest Monitoring:
(letzte Beurteilung)

Next
Monitoring:
(nächste
Beurteilung)

Remarks:

History of scope allocation

Date: 2010-05-04
Change: EAC CDM, CDM, CDM added
By: Manfred Brinkmann
Reason: cdm 15 limited to manure treatment

History

Created:	03/10/2010 11:20:57 AM CET	Norbert Heidelbergmann/TEU/DE/TUEV
Modified:	04/17/2014 04:59:53 PM CEST	Norbert Heidelbergmann/TEU/DE/TUEV
	01/04/2013 02:50:32 PM CET	Klaus-Dieter Fritsch/TRC/DE/TUEV
	01/05/2012 10:41:28 AM CET	Norbert Heidelbergmann/TEU/DE/TUEV
	12/22/2010 02:34:26 PM CET	
	12/22/2010 02:34:21 PM CET	
	12/21/2010 01:12:41 PM ZE9	
	09/12/2010 08:01:52 PM ZE9	

Export to ICMS

Last Export:	01/04/2013 02:50:32 PM CET	Klaus-Dieter Fritsch/TRC/DE/TUEV
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Qualification

Tang, Walter /

Emission Trading

United Nations Framework Convention on Climate Change

Auditor No.:

(AuditorenRegNr)

Appointed:
(Zugelassen)

☒ ja

Qualification Level: Lead Auditor
(Qualifikationsstufe)

External:
(Externer)

☐ ja

Add. reviewer: ☒ yes
(Zusätzlicher Prüfer)

EAC Scopes:
(EAC Branchen)

CDM 01 – Energy industries (renewable – / non-renewable sources)
CDM 02 – Energy distribution
CDM 03 – Energy demand
CDM 13 – Waste handling and disposal
CDM 04 – Manufacturing industries

Add. qualification:
(zus. Qualifikation)

First Appointment: 2011/10/11
(Erstberufung)

Valid to: 2015/09/11
(Gültig bis)

Remarks:

Appointed as Technical Reviewer for TA 1.1, 1.2, 2.1, 2.2, 3.1 Direct work experience. TA 4.3, 4.5, 13.1 based on Annex D para 9 of the Accreditation Standard

Languages:

Chinese simplified
English

Experience Exchange

Date

Location

Remarks

Accredita

Monitoring

Latest Monitoring:
(letzte Beurteilung)

Next
Monitoring:
(nächste
Beurteilung)

Remarks:

History of scope allocation

Date:	2012-02-13
Change:	EAC CDM added
By:	Praveen Urs
Reason:	
Date:	2012-02-13
Change:	EAC CDM, CDM, CDM, CDM added
By:	Praveen Urs
Reason:	

History

Created:	2011/12/06 17:00:51	Walter Tang/Chn/TUV
Modified:	2012/07/06 16:47:48	Praveen Urs/Chn/TUV
	2012/07/02 15:08:57	Praveen Urs/Chn/TUV
	2012/07/02 15:08:48	Praveen Urs/Chn/TUV
	2012/05/15 15:30:46	
	2012/02/13 20:00:10	
	2011/12/06 17:01:30	

Export to ICMS

Last Export:

Qualification

Li, Lixin /

Emission Trading

United Nations Framework Convention on Climate Change

Auditor No. :
(AuditorenRegNr)

Appointed:
(Zugelassen)

☒ ja

Qualification Level: Lead Auditor
(Qualifikationsstufe)

External:
(Externer)

☐ ja

Add. reviewer: ☒ yes
(Zusätzlicher Prüfer)

EAC Scopes:
(EAC Branchen)

CDM 01 – Energy industries (renewable – / non-renewable sources)
CDM 03 – Energy demand
CDM 02 – Energy distribution
CDM 04 – Manufacturing industries

Add. qualification:
(zus. Qualifikation)

First Appointment: 06/09/2013
(Erstberufung)

Valid to: 05/09/2016
(Gültig bis)

Remarks: Appointed as Technical Reviewer for TA 1.1, 1.2, 2.1, 2.2, 3.1
TA 4.5

Languages:

Experience Exchange

Date

Location

Remarks

Accredita

2010-12-21 Beijing GC CDM Auditor Experience Exchange, Beijing, 2010-12-21 to 23
United Nations Framework Convention on Climate Change

Monitoring

Latest Monitoring:
(letzte Beurteilung)

Next
Monitoring:
(nächste
Beurteilung)

Remarks:

History of scope allocation

Date: 2012-03-10
Change: EAC CDM, CDM added
By: Praveen Urs
Reason:

Date:
Change:
By:
Reason:

Date:
Change:
By:
Reason:

Date: 2010-11-08
Change: EAC CDM, CDM added
By: Manfred Brinkmann
Reason: Appointed as Technical Reviewer for

History

Created:	08/13/2010 11:09:24 AM	Lixin Li/Bj/Chn/TUV
Modified:	07/02/2014 04:11:27 PM	Lixin Li/Chn/TUV
	12/11/2013 05:38:34 PM	Henri Phan/Chn/TUV
	07/06/2012 04:55:01 PM	Lixin Li/Bj/Chn/TUV
	03/10/2012 08:33:44 PM	
	02/12/2012 06:12:39 PM	
	11/15/2010 04:02:03 PM	
	11/15/2010 04:01:56 PM	
	11/08/2010 09:36:09 AM ZE9	
	11/08/2010 09:28:17 AM ZE9	
	11/08/2010 09:28:07 AM ZE9	
	11/08/2010 09:27:39 AM ZE9	
	08/13/2010 11:09:41 AM	

Export to ICMS

Last Export: