SUSTAINABILITY VALIDATION REPORT

for the Voluntary GS Project Activity

Biogas Program for the Animal Husbandry Sector of Vietnam

in

Viet Nam

Report No. 01 997 9105066812-GS

Version No. 02.2, 2012-10-25

TÜV Rheinland (China) Ltd.

I. Project description:

Project title: Biogas Program for the Animal Husbandry Sector of Vietnam

Host Country: Viet Nam

Methodology: Gold Standard Methodology: Technologies and Practice to Displace Decentralized Thermal Energy Consumption ☒ Large Scale ☐ Small Scale ☐ Micro Scale

Annual average emission reductions (estimate): 589,125 tCO_2/year in the first crediting period

GHG reducing measure/technology: Biogas Digester

II. Validation:

Contract party: Nexus Carbon for Development Ltd.

GS-CDM Validation Team:

Role	Full name	Appointed for Sectoral Scopes	Affiliation
Team Leader	Harold Hai	1.2, 13.1	TÜV Rheinland Hong Kong Ltd.
Team Member	Tommy Lo	1.2, 13.1	
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Technical Reviewer	Walter Tang	1.1, 1.2, 2.1, 2.2, 3.1, 4.3, 4.5, 13.1	TÜV Rheinland (China) Ltd.

Validation Phases:
☒ Desk Review
☒ Follow up interviews
☒ Resolution of outstanding issues

Validation Status:
☐ Corrective Actions / Clarifications Requested
☒ Full Approval and Submission for Registration
☐ Rejected

III. Validation Report:

Report No.:	Current revision No.:	Date of current revision:	Date of first issue:
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Final approval:	Released on:	Designated Operational Entity (DOE):
☒	**2012-10-26** **By: Mr. Praveen N. Urs**	**TÜV Rheinland (China) Ltd.** Unit 707, AVIC Building, No.10B, Central Road, East 3rd Ring Road, Chaoyang District, Beijing, CHINA 100022 Tel.: 0086-10-6566-6667 E-mail: praveen.urs@bj.chn.tuv.com, ghg-doe@bj.chn.tuv.com

Introduction

Nexus Carbon for Development Ltd. has commissioned the DOE TÜV Rheinland (China) Ltd. to perform a validation of the Voluntary Gold Standard Project Activity "Biogas Program for the Animal Husbandry Sector of Vietnam" in Viet Nam (hereafter called "the project"). The purpose of a validation is to have an independent third party assess the project design. In particular, the project's sustainable development matrix, sustainability monitoring plan, and the project's compliance with relevant Gold Standard and host Party criteria are validated in order to confirm that the programme meets the identified criteria. This report summarises the findings of the validation of the project activity, performed on the basis of Gold Standard criteria for the Voluntary Gold Standard (VGS) project activity, as well as criteria given to provide for consistent programme operations, monitoring and reporting.

The VGS validation was executed independently, and with the following steps so far:

- Desk review of preliminary Gold Standard Passport (received on 17th October 2011), Local Stakeholder Consultation report and Project Design Document (PDD, version 1.2 dated 17th October 2011) submitted to GS on 17th October 2011
- On-site visit with stakeholder interviews (24th October 2011 to 27th October 2011)
- Issue of checklist with corrective action requests (CARs) and clarification requests (CLs) and the draft validation report & protocol (Table 1)
- Desk review of revised PDD (version 3.1, 24th September 2012), Local Stakeholder Consultation report (version 3.1, 25th September 2012) and GS Passport (version 3.1, 25th September 2012)
- Review of proposed corrections and clarifications
- Issue of the final validation report & protocol

The additionality of the project activity is demonstrated in the PDD according to the requirements of the UNFCCC for CDM project activity. The validation team has checked that the project correctly applies Gold Standard Methodology: Technologies and Practice to Displace Decentralized Thermal Energy Consumption dated 11th April 2011. The monitoring of emission reductions and sustainable indicators is clear identified in the GS Passport and GS-PDD. The total emission reductions are estimated to be 4,123,873 tCO_2e over the selected first 7-year renewable Voluntary Gold Standard crediting period, as expected from 1st May 2010 to 30th April 2017.

In summary, the validation team of TÜV Rheinland (China) Ltd. concludes that the Voluntary GS project activity "Biogas Program for the Animal Husbandry Sector of Vietnam" in Viet Nam as described in the PDD (version 2.7) and GS Passport (version 2.4), meets all relevant requirements of the Gold Standard version 2.1 for the Voluntary GS project activity. The selected baseline/monitoring methodology is applicable to the project and correctly applied in the PDD. The DOE therefore would request the registration of the project activity as a Voluntary Gold Standard project activity.

Abbreviations

The following abbreviations have been used in the report.

ADB	Asian Development Bank
AWMS	Animal Waste Management System
BE_y	Baseline Emissions
BFT	Baseline Performance Field Test
BP	Biogas Program for the Animal Husbandry Sector of Vietnam
BPD	Biogas Project Division
CAR	Corrective Action Request
CDM	Clean Development Mechanism
CDM EB	CDM Executive Board
CER	Certified Emission Reductions
CL	Clarification Request
CO_2	Carbon Dioxide
CO_2e	Carbon Dioxide Equivalent
CMS	Carbon Monitoring Survey
CPA	CDM Programme activity
DARD	Department of Agriculture and Rural Development
DOE	Designated Operational Entity
DLP	Department of Livestock Production
DNA	Designated National Authority
DR	Document Review
EB	Executive Board
EIA	Environmental Impact Assessment
ER	Emission Reduction
ERPA	Emission Reduction Purchase Agreement
FAO	Food and Agricultural Organization of United Nations
FAR	Forward Action Request
FSR	Feasibility Study Report
GHG	Greenhouse Gas
GS	Gold Standard
I	Interview
IPCC	Intergovernmental Panel on Climate Change
kW	Kilo Watt
kWh	Kilo Watt Hours
L_y	Leakage
LDCs	Least Developed Countries
LoA	Letter of Approval
LPG	Liquid Petroleum Gas
MARD	Ministry of Agriculture and Rural Development
MDG	Millennium Development Goals
MONRE	Ministry of Natural Resources and Environment of Viet Nam
MoV	Means of Verification
MW	Mega Watt
MWh	Mega Watt Hours
NGO	Non Government Organisation
NOx	Nitrogen Oxides
NRB	Non-Renewable Biomass
O&M	Operation and Maintenance
ODA	Official Development Assistance

OSV	On Site Visit
PE	Project Emissions
PFT	Project Performance Field Test
PoA	Programme of Activities
PP	Project Participant
RSP	Respirable Suspended Particulates
SA	Sensitivity Analysis
SD	Sustainable Development
SNV	Netherlands Development Organization of Vietnam
SO_2	Sulphur Dioxide
STHS	Stakeholder Survey
T	Tonne
UNDP	United nations Development Programme
UNFCCC	United Nations Framework Convention on Climate Change
VER	Voluntary Emission Reductions
VGS	Voluntary Gold Standard
VND	Viet Nam Dong
VVM	Validation and Verification Manual
WHO	World Health Organization

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1 REVIEWED DOCUMENTATION

The following table outlines the documentation reviewed during the validation:

General Documents		
/1/	/1.1/	PDD/ Version 1.2, 17th October 2011 (First submission to GS, but not required to be published)
	/1.2/	PDD/ Version 3.1, 24th September 2012
/2/	UNFCCC, Clean Development Mechanism Validation and Verification Manual (Version 01.2), EB55 Annex 1	
/3/	Gold Standard Methodology: Technologies and Practice to Displace Decentralized Thermal Energy Consumption, version 1.0, 11th April 2011 http://www.cdmgoldstandard.org/wp-content/uploads/2011/10/GS_110411_TPDDTEC_Methodology.pdf	
/4/	UNFCCC, "Guidelines on the assessment of investment analysis" (Version 03.1), EB51 Annex 58	
/5/	UNFCCC, "Glossary of CDM Terms" (Version 06.0)	
/6/	/6.1/	Gold Standard Passport (initially version), received on 17th October 2011
	/6.2/	Gold Standard Passport, Version 3.1, 25th September 2012
/7/	/7.1/	Local Stakeholder Consultation Report (initial version), received by Gold Standard but not yet published (first submission to Gold Standard on 17th October 2011)
	/7.2/	Local Stakeholder Consultation Report, for final submission to Gold Standard (version 3.1, 25th September 2012)
/8/	Gold Standard Requirements and Toolkit (with its Annexes), Version 2.1, 1st July 2009	
/9/	National Biogas Programme in Vietnam, Webpage for Notification of the commencement of stakeholder feedback round, http://210.245.92.22/English/Home.aspx	
/10/	Decision from the Ministry of for Development Corporation of Dutch Government (declaration of no division of ODA to the Biogas Programme in Vietnam), (ref. no.: DMW/FK-308/06) 10th April 2006	
/11/	Biogas Project Division, Organizational chart	
/12/	Vietnam Government, Decree no. 149 on "Regulation on Licensing of Water Resources Exploitation, Extraction and Utilization and Waste Water Discharge in Water Sources"	
/13/	"Guiding Strategic Environmental Assessment, Environmental Impact Assessment and Environmental Protection Commitment" issued by the Ministry of	

	Natural Resources and Environment, December 2008 (No. 05/2008/TT-BTNMT)
/14/	Law on Environmental Protection of Vietnam (No: 52/2005/ QH11)
/15/	BPD and SNV, Biogas User Survey (BUS) 2006 prepared by InvestConsult Group, January 2008
/16/	Final Report on Biogas User Survey (BUS) 2009 prepared by Joint Stock Company for Agricultural, Rural, Environmental Development and GIS (RICA), January 2010
/17/	Biogas Program Division, SNV ODA Decision No. 2968 QD/BNN-HTQT, 12th October 2006 (for the notification of financial support to the biogas programme to Vietnamese Government up to 2011)
/18/	Memorandum of Understanding between the Minister of Development Organization and SNV – the Netherlands Development Organization regarding cooperation in the framework of the Asia Biogas Programme (including Vietnam), 14th December 2004
/19/	Sampled Form 3 of Biogas Programme, Application for Receiving Biogas Plant Construction Support, 19th July 2006, 15th August 2006 and 20th July 2009
/20/	Sampled Form 4 of Biogas Programme, cooperation agreement between the households and BPD for the clear description of the transfer of credits ownership all along the investment chain, 15th August 2006 and 25th July 2009
/21/	Sampled Form 6 of Biogas Programme, cooperation agreement between the households and mason for the construction of biogas digester, 15th August 2006 and 8th September 2009
/22/	Sampled Form 7 of Biogas Programme, Minutes of Acceptance Check for Biogas Plant, 1st January 2007 and 18th September 2009
/23/	Sampled Form 9 of Biogas Programme, BPD Inspection Form for biogas digester operation (for quality control)
/24/	Acknowledgement of Receipt of financial subsidies signed by participated households
/25/	BPD, VGS Excel Database for biogas digester households (extracted version for reference, and more details are included in the original database in BPD computer system)
/26/	BPD, Computer Database for trained technicians and masons
/27/	Voluntary Gold Standard Small Scale Biodigester Methodology (old methodology), Indicative programme, baseline, and monitoring methodology for Small Scale Biodigester
/28/	Revised 2006 IPCC Guidelines for National Greenhouse Gas Inventories, Table 2.5, Page 2.22, Chapter 2, Volume 2
/29/	TÜV Rheinland Hong Kong Ltd. and Nexus Carbon for Development Ltd., VGS Validation Service Contract, 23rd September 2011
/30/	UNFCCC, “Guideline on the demonstration and assessment of prior consideration

	of the CDM" Version 04, EB62
/31/	Project brochures, user manuals, promotional video disc and safety leaflets
/32/	List of Project Information Note (PIN) for CDM project issued by Vietnamese DNA (ref. no.: SO4185/BTNMT-HTQT), 28th September 2006 http://www.noccop.org.vn/Data/profile/Airvariable_Projects_75233Tong%20hop%20PIN.pdf
/33/	Mitsubishi Securities UFJ, PDD developed with the financial assistance for the project development with carbon credit, 2006
/34/	SNV, Draft GS PDD
/35/	Memoradum of Understanding for draft PoA methodology development and project documentation with the finanical assistance from GFA Envest, 5th April 2009
/36/	Investconsult Group, "Micro Credit for Households Constructing Biogas Plants in 2009" for DLP of MARD, April 2010
/37/	Sustainable Energy Development Consultancy Joint Stock Company, "Evaluation Study for Household Biogas Models" issued by the", April 2010
/38/	Vietnam Statistics Office, Household Information for the farming animals 2009, http://www.gso.gov.vn/Modules/Doc_Download.aspx?DocID=8875
/39/	Sample training records for the biogas users before the digester construction (5th January 2010) and after the digester construction (20th November 2010)
/40/	MARD, Biogas User Survey (BUS) 2010-2011 for fuel consumption
/41/	Nexus Carbon For Development and BPD (Department of Livestock Production of MARD), Services Agreement for Technical Assistance and Carbon Asset Management, 20th September 2011
/42/	EPRO Consulting JSC (Independent consulting company), Final Research Report for Assessment of biogas effects on decreasing air pollution around cooking place for Biogas Programme for the Animal Husbandry Sector in Vietnam, September 2011
/43/	Nong Thon Newspaper, Announcement of Stakeholder Feedback Invitation, 10th and 11th November 2011
/44/	Nong Nghiep Vietnam Newspaper, Announcement of Stakeholder Feedback Invitation, 10th and 11th November 2011
/45/	BPD, Invitation letter to stakeholder for feedback round comment, 11th November 2011
/46/	Summary of Received Public Comment from Stakeholder Feedback Round (4 comments), 16th January 2012
/47/	Phu Tho Province Agricultural Extension Center under MARD, Report on Training of Masons, March 2010
/48/	General statistics principle in the webpage of University of Florida,

	http://edis.ifas.ufl.edu/pd006
/49/	SNV, Popular Summary of the Test Reports on Biogas Stoves and Lamps prepared by testing institutes in China, India and the Netherlands (with the data for Vietnam), 2009
/50/	MARD and SNV, Preliminary Design Report for the Biogas Programme 2007-2010, September 2006
/51/	Food and Agriculture Organization (FAO) of the United Nations Regional Office for Asia and the Pacific, Vietnam Forestry Outlook Study 2009
/52/	Food and Agriculture Organization (FAO) of the United Nations, Global Forest Resources Assessment 2010
/53/	Vietnam National Forest Programme Process Evaluation Report, January 2010 http://www.vietnamforestry.org.vn/NewsFolder/NFP%20Assessment%20Report_EN.pdf
/54/	Vietnam Forestry Booklet of the Forest Sector Support Partnership (FSSP) (2011) http://vietnamforestry.org.vn/mediastore/fsspco/2011/07/11/ForestryOfVietNam_2011_EN_Version15.pdf
/55/	MARD Statistics 2010 http://www.gso.gov.vn/Modules/Doc_Download.aspx?DocID=14413
/56/	Survey on Cookstove Usage in Northern Vietnam (2011) SNV and Mekong Development Services
/57/	Drigo R. 2007. Wood-energy supply/demand scenarios in the context of poverty mapping. A WISDOM case study in Southeast Asia for the years 2000 and 2015
/58/	MARD, Decision No. 3662 QD/BNN-HTQT on approval of the Preliminary Design Report of the QSEAP-BDP with CDM consideration, 20th November 2008
/59/	Vietnamese DNA, Vietnam CDM Project Pipeline (2007 updated) http://www.noccop.org.vn/images/article/Viet%20Nam%20CDM%20Pipeline_a43.pdf
/60/	Vietnam Statistics Office, Household Information for the farming animals 2009 http://www.gso.gov.vn/Modules/Doc_Download.aspx?DocID=8875
/61/	World Health Organization (WHO), Fuel for life Household Energy and Health 2006 http://www.who.int/indoorair/publications/fuelforlife.pdf
/62/	Robert Magnani, 1997. Sampling guide. Food and Nutrition Technical Assistance project (FANTA). Academy for Educational Development http://gametlibrary.worldbank.org/FILES/1337_LQAS%2520sampling%2520for%2520FANTA.pdf
/63/	Abstract Domestic biogas and CDM financing by Vietnamese Biogas Project Division and SNV http://www.natuurenmilieu.nl/pdf/0500_2.1_domestic_biogas_and_cdm_financing_background_paper.pdf

/64/	Gold Standard Pre-feasibility Assessment Checklist for GSV2.1 Retroactive Projects (version 1.0)
/65/	T.K.V Vu et al (2007), A survey of manure management on pig farms in Northern Vietnam, Livestock Science http://www.prairieswine.com/pdf/34560.pdf
/66/	MARD national standard: 10 TCN 97 issued in 2006 issued in the decision No. 4006/QĐ-BNN-KHCN of Ministry of Agriculture and Rural development, 26th December 2006
/67/	Correspondence email between the BPD and their Dutch partner SNV for the discussion of CDM work progress particularly on the methodology development, 6th August 2007
/68/	SNV, Building viable domestic biogas programmes http://www.snvworld.org/sites/www.snvworld.org/files/publications/snv_domestic_biogas_leaflet.pdf
/69/	Email of SNV for the invitation of GS VER development proposal to the carbon credit consultant, 25th May 2011

1.1 Follow-up Interviews with Project Stakeholders

The following table identifies the personnel who have been interviewed and/or provided additional information to the presented documentation:

	Date	Name	Organization	Title
/i/	24th Oct 2011	Trine G. Doan	WWF, Vietnam (NGO)	Climate Change Advisor
/ii/		Steven Collet	Embassy of the Kingdom of Netherland	Deputy Chief of Mission
/iii/		Phan Minh Uyen		Economic Officer
/iv/		Hoang Kim Giao	Department of Livestock Production of MARD	Director
/v/		Ng Thi Minh Nguyet	Biogas Programme for the Animal Husbandry Sector of Vietnam	Coordinator
/vi/	25th Oct 2011	Luu Cong Hoa	Department of Agriculture and Rural Development (DARD) of Nghe An Province	Head of Livestock Department
/vii/		Nguyen Tho Canh		Director
/viii/		Cao Xuan Tuan	Extension Center (Nghe An Province)	Vice Director
/ix/		Nguyen Van Thang		Director
/x/		Nguyen Thi Tam		Accountant
/xi/		Nguyen Dinh Phuong	Nghi Thuan Commune	Head of Agriculture Division
/xii/		Hoang Thi Binh	Women Association of Nghi Thuan Commune (NGO)	Former Chair-person
/xiii/		Nguyen Thi Ly	Nghi Thuan Commune	Household
/xiv/		Vo Thi Ha	Nghi Thuan Commune	Household
/xv/		Che Dinh Minh	Nghi Trung Commune	Household
/xvi/		Nguyen Thi Quyen	Nghi Hoa Commune	Household
/xvii/		Pham Huy	Quynh Thanh Commune	Household
/xviii/		Hoang Hong	Quynh Luu District	Household
/xix/		Le Cong Van	Nghe An Province	Mason

/xx/	26th Oct 2011	Pham Duc Thang	Tang Thanh Commune, Yen Thanh District	Biogas Appliance Shop Owner
/xxi/		Nguyen Thi Minh Duc	Dien Thanh Commune, Dien Chau District	Technician
/xxii/		Dau Danh Nhan	Extension Center, Dien Thanh Commune, Dien Chau District	Officer
/xxiii/		Le Si Thang	Quynh Luu District	Household
/xxiv/		Nguyen Van Truyen	Dien Thanh Commune, Dien Chau District	Household
/xxv/		Cao Thi Cong	Dien Thanh Commune, Dien Chau District	Household
/xxvi/	24-27th Oct 2011	Dagmar Zwebe	SNV Vietnam	Technical Advisor
/xxvii/		Le Anh Duc	Vietnam Biogas Project Division	Biogas Engineer
/xxviii/		Eric Buysman	Nexus Development	CDM Specialist Consultant

2 PROJECT ELIGIBILITY

The “Biogas Program for the Animal Husbandry Sector of Vietnam” is a large-scale Voluntary Gold Standard (VGS) project activity aims to develop the commercial and structural deployment of domestic biogas in Vietnam. The VGS project a unilateral project which involves two project participants (PP): Biogas Program for the Animal Husbandry Sector of Vietnam (BP) and SNV (Netherlands Development Organization of Vietnam). Biogas Project Division (BPD) is the representative of the Biogas Program for the Animal Husbandry Sector of Vietnam (BP), and Biogas Project Division is part of the Department of Livestock Production (DLP) under Ministry of Agriculture and Rural Development (MARD) in Vietnam, while SNV Vietnam (Netherlands Development Organization) is a NGO for the development of sustainable projects in Vietnam with the Dutch funding. As described in the PDD /1/, the installation of biogas digester in households with livestock manure management could reduce fuel (such as firewood) consumption. In addition, the bio-slurry from the biogas digester will be used as fertilizers for farming purpose. By reducing firewood consumption, the VGS project activity can reduce CO_2, CH_4 and N_2O emissions from the use of non-renewable biomass in which this is eligible for Voluntary Gold Standard crediting.

Applicability criteria for the baseline methodology are assessed by the validation team by means of document review and interview. According to GS Toolkit Annex C, the proposed project can be categorized as improved distributed heating and cooking devices using renewable energy sources as it results in reduction in the amount of fossil fuel required for cooking services. According to the MARD’s biogas digester design /50/ and the on-site observation from the validation team, all the biogas generated from the biogas digester will be recovered in the fully enclosed underground dome-shaped bio-digester and used for cooking or lighting purpose. Trainings will be provided by the BPD to the biodigester end-users. The training materials were checked by the validation team /31/. Thus this can ensure that the households can use the biogas recovered from the biodigester correctly and efficiently. As per the applied GS methodology, the possible leakage is applied by the BPD as a default leakage value of 10%. Please refer to Section 3.3 for the detailed validation. Thus the MARD’s biogas digester design is applied to ensure at least 65% of gas recovered can be used for providing energy sources.

In addition, since the project involves a large amount of heating device, the validation team also checked the cooperation agreement template (namely “Form 4”) between the households and BPD for the clear description of the transfer of credits ownership all along the investment chain, and with the proof that the biogas digester end-users agrees to transfer all carbon credits to the BPD /20/. The validation team considers that the proposed project activity fully qualifies as a large scale Voluntary Gold Standard project and meets the applicability criteria of the GS approved methodology of “Technologies and Practices to Displace Decentralized Thermal Energy Consumption”.

The host country is Viet Nam, which meet all relevant participation requirements in UNFCCC. This also fulfils the requirement of GS Toolkit 1.2.2. Viet Nam ratifies the Kyoto Protocol[1] on 22nd February 2002.

The proposed project activity enables the development of the commercial and structural deployment of domestic biogas in Vietnam. Thus this could reduce greenhouse gas emissions that would otherwise be generated from traditional fuel for cooking and lighting, such as firewood, charcoal and kerosene etc. The proposed project will neither generate any electricity nor connect to any power grids. The amount of households being benefited will be estimated as 185,363 units at this crediting period.

According to Section A.4.5 of the PDD, the project activity receives funding from Dutch government for project implementation. Such funding would not involve diversion of official development assistance (ODA). The validation team do not reveal any information indicating that the programme can be seen as a diversion of ODA towards the host country. An ODA declaration is presented in the Annex 1 of the Gold Standard Passport based on the ODA Declaration Template in the Annex D of Toolkit version 2.1, in which the BPD has declared the project's non-use of ODA /17/. In addition, the validation team also checked the Decision from the Ministry of for Development Corporation of Dutch Government dated 10th April 2006 for the declaration of no division of ODA to the Biogas Programme in Vietnam /10/.

The project participant, as the representative from the MARD /iv/ also confirmed that there is no cap and trade scheme implemented in Vietnam, thus there is no arrangement for the allowances for any cap and trade scheme. According to the GS Toolkit Section 3.5.1, the validation team considers that the project is eligible for GS project.

According to the GS Toolkit Section 2.5.1, since the project activity is already operational and still under implementation at the time of first submission to the Gold Standard (on 17th October 2011) as the project was started on 19th July 2006. The validation team considers that it is appropriate to apply a retroactive project cycle for the Voluntary Gold Standard project activity.

3 DEVIATIONS IN GHG EMISSION REDUCTION ESTIMATION (GS CONSERVATIVENESS PRINCIPLE)

According to the PDD and GS Passport, the project activity applies the GS approved methodology "Technologies and Practices to Displace Decentralized Thermal Energy Consumption" dated 11th April 2011 /3/. The validation team participated the GS discussion for pre-feasibility assessment on 17th October 2011 with the representatives from GS and BPD, in which the GS representative (Ms. Ellen May Zanoria) realized that the local stakeholder report, GS Passport and PDD have been already provided to GS. The validation team also checked the VER Gold Standard project documentation submitted to the GS is the

[1] Information from UNFCCC website:
http://unfccc.int/files/kyoto_protocol/status_of_ratification/application/pdf/kp_ratification.pdf

most recent version of the methodology available at the time of first submission of the project activity for Gold Standard was applied as per GS Requirement III.f.2.

3.1 Assessment of Project Applicability for Applied Methodology

Applicability criteria for the baseline methodology are assessed by the validation team by means of document review and interview. It is agreed in the validation team's opinion that the project activity fully met the criteria as described below:

1. According to the PDD, the project boundary is clearly identified in the involved 63 provinces in the whole country of Vietnam where all the included biogas digesters are to be operated by the end-users and implemented for the VGS project activity. This is considered encompassing all anthropogenic emissions by sources of greenhouse gases under the control of the PP that are significantly and reasonably attributable to the VGS project activity. These spots of installed biogas digesters can be identified at the current stage according to the internal database of the BPD, with all the contracts between BPD and end-user households. The validation team visited the head office of BPD and notified that all the documents were stored in the BPD data office. The BPD electronic database in the computer system was also checked by the validation team, in which it includes all the information as mentioned in Section A.4.1.4. Some sample contracts and reports were reviewed during on-site validation.

   The validation team also checked that this VGS project includes the households in Biogas Programme Phase II implemented by the BPD. However, some of the households will be extracted as the target households for the UNFCCC CDM PoA. The CDM PoA is also under validation by TÜV Rheinland (China) Ltd. The validation team reviewed the table 1 in the PDD for the allocation of carbon credit between the CDM PoA and VGS, and confirmed that the households for CDM CPA1 and CPA2 will be only included in the PoA once the CDM PoA is registered within UNFCCC. Thus before the CDM PoA registration, all the households can be included in the VGS database, as there is no other carbon crediting scheme at the period. Since the CDM PoA is still under validation, at this stage, the validation team does not reveal the double-counting of the carbon credits. For the subsequent CPA inclusion, the households involved will be considered to be separated from this VGS project activity. Moreover, the BPD can also decide whether the households will be included in the CDM CPA or VGS depending on the future carbon market or policy. However, this can be further confirmed in the future (forward action request during the verification stage).

   The validation team also observed during the on-site visit that every biogas digester is labeled with a unique identification code and type of biogas digester painted on the seeable area of the digester or engraved on the opening of the digester. As the project will only involve two types of MARD approved biogas digesters (with 25 years of operational lifetime), namely KT.1 and KT.2 (including KT2A and KT2B), and all the biogas digesters installed should be categorized as either KT.1 or KT.2. Moreover, since all the biogas digesters in the project must follow the MARD national standard: 10 TCN 97 issued in 2006, in which it is stated that the operational lifetime

can be maintained up to 25 years /66/. Together with the unique personal identification number, the identification code on the biogas digesters will be unique. Thus this can avoid double-counting of the biogas digester during the monitoring.

2. The validation team checked the PDD Table for the calculation of average specific thermal output of biogas digester, in which it is sourced from the Biogas User Survey 2006 conducted by independent consultant for BPD and SNV /15/. The validation team considered the estimation is reliable, and the average specific thermal output based on the biogas flow and cooking time is estimated as 0.0997 kW per cubic meter of digester volume. Please find the details of validation of specific capacity of biogas digester in later part of this Section. The validation team checked the updated VGS extracted database with all the information of biogas digesters constructed in this biogas programme, the maximum volume of biogas digester is 49.2m^3 and the average volume is 11.5m^3. Thus the energy output is less than 150kW per unit. In order to exceed the threshold volume in the GS methodology of 150kW, the volume of biogas digester would reach 1,500m^3. The validation team considers that this will not be constructed for the small-scale households as they are the project target population. Thus the validation team considers that the biogas digester in the project activity can comply with the requirement of the 150kW threshold capacity in the GS methodology.

3. The validation team considers that the project introduces the application of improved technology of biogas digester, and the baseline technology of firewood stove will be still be used in parallel as a backup or auxiliary technology. According to the monitoring plan in the PDD, the PP will monitor the project emissions for the old technology (i.e. firewood stoves) in use in parallel. This also fulfills the conditions for the project applicability according to the Section I of the GS methodology.

4. The validation team checked the cooperation agreement template (namely “Form 4”) between the households and BPD for the clear description of the transfer of credits ownership all along the investment chain, and with the proof that the biogas digester end-users agrees to transfer all carbon credits to the BPD. Thus the PP has claimed the ownership rights of and selling the emission reductions resulting from the project activity.

5. The project activity does not involve biomass feedstock, and the project activity is defined as improved distributed heating and cooking devices as per GS Toolkit Annex C.

6. The project activity also applies the Annex 6 of methodology for the application to bio-digesters, including animal waste management. Since Vietnam can be divided into two climate zones according to guidelines in IPCC 2006 Chapter 10. The validation team can also confirm the climate zones defined in the ER excel worksheet “Temperatures” /25/ according to the temperature ranges of each province in IPCC 2006 Chapter 10. Thus the validation team considers that the geographical boundary of each project province is correctly documented in the ER excel worksheet /25/. Thus the sampling approach will be based on two different climate zones in the

monitoring. Please refer to the Section 3.4 for validation of monitoring plan to be applied in two different climate zones.

Validation of unit capacity per volume of biogas digester

According to the PDD, the specific thermal capacity is validated as follows:

Item	Value	Validation Opinion
Average biogas production per digester	1.31m^3/day	BPD and SNV's Biogas User Survey 2006 statistics /15/
Average digester volume	9.6m^3	
Specific biogas production	136.8 L	Calculated from 1.31/9.6 = 0.136m^3
Methane content in biogas	60%	Consistent with default value from UNFCCC SSC methodology AMS-III.D
Methane density	0.67 kg/m^3	
Methane energy density	55.65 MJ/kg	Consistent with IPCC 2006 volume 4 chapter 10
Biogas stove efficiency	39%	The validation team checked the SNV (Netherlands Development Organization in Viet Nam) test report 2009 for biogas stoves and lamps prepared by the accredited testing institutes /49/.
Average operating hours of biogas stove	3.3 hour/ household/day	BPD and SNV's Biogas User Survey 2006 /15/

According to the PDD Section B.2., the specific capacity is correctly estimated as about 0.0997kW/m^3.

Thus the validation team considers that the project participant has correctly applied the approved methodology for the project activity.

3.2 Assessment of Identification of Baseline Scenario

According to GS methodology "Technologies and Practices to Displace Decentralized Thermal Energy Consumption" dated 11th April 2011 applied in the PDD, the baseline is defined as the typical baseline fuel consumption patterns in a population that is targeted for adoption of the project technology.

During the on-site interview with the rural residents /xii-xviii, xxiii-xxv/, they stated that they used the traditional firewood stove for cooking and heating purposes, and some used electricity of kerosene for lighting purpose. It is also confirmed with the Department of Agriculture and Rural Development (DARD) that most of the households also use traditional

firewood stove as a common situation in the rural areas. They bought the firewood from the local market.

The households understand that the biogas digester can utilize the biogas for cooking and lighting, thus reduce firewood consumption and with less smoke and ash production. Although they are willing to use the biogas, they cannot afford to construct biogas digesters if there is no financial subsidy as the construction cost is too high. Therefore the biogas digester is not commonly used in the rural villages. During the on-site interview with DARD /vi-vii/, the representatives from DARD stated that the usage rate of biogas digester was still very low in the region. However, the demand for the biogas digester construction is very high, subject to the provision of financial subsidy to the households. Thus it can be confirmed that the baseline scenario is the typical baseline fuel consumption patterns in a population that is targeted for adoption of the project technology. The “target population” is a representative baseline for the project activity.

For the Animal Waste Management System (AWMS), the baseline is identified as the emissions of animal waste without any treatment. The validation team also checked the Circular “Guiding Strategic Environmental Assessment, Environmental Impact Assessment and Environmental Protection Commitment” issued by the Ministry of Natural Resources and Environment, December 2008 (No. 05/2008/TT-BTNMT) /13/, and Law on Environmental Protection of Vietnam (No: 52/2005/ QH11) /14/. There are no special requirements for the small farm households for the waste management of the farm manure. During the on-site interview, the representative from the Ministry of Agriculture and Rural Development (MARD) /iv/ also confirmed that there are no mandatory requirements for the waste management for small-scale household farms. Only for large farms with more than 1,000 pig heads and 20,000 poultry head requires the waste management facilities, but these large-scale farms are not the target population for the project activity. The validation team also visited to a rural household without biogas digester, the animal manure is just kept in a storage pit without any treatment. The household stated that the manure will be kept for composting purpose /xxv/.

The baseline determination is considered as transparent and reasonable. The validation team also considers that the project activity for using biogas digester is not common for the rural residents.

During the on-site interview with MARD and DARD /iv, vi-vii/, they advised that there were no regulations or plans to restrict the biogas digester application for the rural residents. The validation team also did not realize any policy and regulations for the biogas digester application for rural villagers. Therefore following an overview of the current and known future legally binding regulatory instruments, the validation team confirms that there is no indication for the project to be implemented with mandatory requirements.

According to the GS Toolkit Sections 2.2 and 3.5.1, the validation team confirms that the most conservative baseline scenario is selected, and the methodology that results in lowest baseline emissions is used.

3.3 Assessment of Estimation of Greenhouse Gas Emission Reductions

Referring to the PDD, the calculations of GHG emission reductions are transparently documented with assumptions regarding the forecast emission reductions.

As indicated in the PDD, the emission reductions (ER_y) by the project activity can be estimated from the formula (7) of the applied GS methodology.

$ER_y = \sum BE_{b,y} - \sum PE_{p,y} - \sum LE_{p,y}$ (Formula 7 in the applied GS methodology)

Where:

ER_y Emission reduction for total project activity in year y (tCO_2e/yr)
$BE_{b,y}$ Baseline emissions for baseline scenario b in year y (tCO_2e/yr)
$PE_{p,y}$ Project emissions for project scenario p in year y (tCO_2e/yr)
$LE_{p,y}$ Leakage for project scenario p in year y (tCO_2e/yr)

Baseline emissions comprises of two sources:

1. Thermal Energy use: CO_2, CH_4 and N_2O emissions from combustion of non-renewable cooking and lighting fuels. The fuels include LPG, charcoal, coal, firewood, agricultural residues and kerosene.
2. CH_4 emissions from the animal waste management system

$BE_h = BE_{th,h} + BE_{aw,h}$ (Equation 1 of the PDD)

where

BE_h = Baseline emissions in the pre-project situation of households h (tCO_2e/year)

$BE_{th,h}$ = Baseline emissions from fuel consumption for thermal energy needs of households h (tCO_2e/year)

$BE_{aw,h}$ = Baseline emissions from animal waste handling of households h (tCO_2e/year)

Baseline emissions from thermal energy use, $BE_{th,h}$

The PP applies the formula (3) in the PDD for the calculation of baseline emissions from thermal energy. The formula is based on the equation (1) of the applied GS methodology with the extracted part for the calculation of baseline emissions for thermal energy use.

$$BE_{th,h} = \sum_i (f_{NRB,y} F_{i,bl,h} \times NCV_i \times EF_{CO2,i} + F_{i,bl,h} \times NCV_i \times EF_{nonCO2,i})$$

$F_{i,bl,h}$	=	*Quantity of fuel i consumed in the baseline during year y per household*

		(kg/household/year)
$EF_{CO2,i}$	=	CO_2 emission factor arising from use of fuels in the baseline scenario for different fuel i ($kgCO_2/TJ$ fuel) This is consistent with the default value in the IPCC Guideline 2006 Volume 2 chapter 2 Table 2.2, 2.3, and 2.5. For agricultural residues, the IPCC value of EF_{CO2} for "other primary solid biomass" is applied. The validation team considers that it is reasonable and traceable.
$EF_{CH4,i}$	=	CH_4 emission factor arising from use of fuels in the baseline scenario for different fuel b ($kgCH_4/TJ$ fuel) For charcoal production, it is consistent with the default value of IPCC Good Practice Guidance and Uncertainty Management in National GHG inventories: http://www.ipcc-nggip.iges.or.jp/public/gp/bgp/2_2_Non-CO2_Stationary_Combustion.pdf For the $EF_{CH4,i}$ of other fuels, these are consistent with the average of default values in the IPCC Guideline 2006 Volume 2 chapter 2 Table 2.2, 2.3 and 2.9. For agricultural residues, the IPCC value of EF_{CH4} for "other primary solid biomass" is applied. The validation team considers that it is reasonable and traceable.
$EF_{NO2,i}$	=	N_2O emission factor arising from use of fuels in the baseline scenario for different fuel b (kgN_2O/TJ fuel) This is consistent with the default value in the IPCC Guideline 2006 Volume 2 chapter 2 Table 2.2, 2.3 and 2.9. The validation team checked in the excel calculation that if the EFs are given with several values, then average values are then applied. The validation team considers that this is a reasonable for the estimation of EF_{N2O} for different kinds of fuels applied by the households.
NCV_i	=	Net calorific value of the fuels used in the baseline (TJ/ton) These are consistent with the default values in the IPCC Guideline 2006 Volume 2 chapter 1 Table 1.2. For agricultural residues, the IPCC values of "other primary solid biomass" are applied. The validation team considers that it is the lowest value of solid biomass in the IPCC table, thus it is considered as conservative and reasonable.
GWP_{CH4}	=	Global Warming Potential of methane This is consistent with GS default value of 21, and this will be updated for future COP/MOP as required in the applied GS methodology.
GWP_{N2O}	=	Global Warming Potential of nitrous oxide This is consistent with GS default value of 310, and this will be updated for future COP/MOP as required in the applied GS methodology.

It is noted that the fuel consumption in the baseline will be obtained from the BPD database, and this will be monitored continuously as the BPD database is updating during the project implementation. Moreover, the baseline fuel consumption cannot be obtained through

baseline performance field test (BFT) during the project implementation, the baseline survey can be only conducted for a new biodgester before the digest construction. Since after the households equipped with biodigesters, the fuel consumption would be changed, and thus can no longer provide any baseline fuel consumption data. Thus the PP can only use the continuous baseline from the database, as all the new households will be surveyed for the baseline fuel consumption. Therefore the BFT cannot be updated every two years. Instead, it is updated continuously. Please refer to the Section 3.4 for the detailed validation of monitoring plan.

The validation team considers that the PP apply the correct formula as stipulated in the applied GS methodology. The validation team also considers that it is conservative for the PP to exclude the baseline emissions for agricultural residues in Table 11, results in lowest baseline emissions.

According to the Annex 1 of the applied GS methodology, the **parameter $f_{NRB,\,y}$** equals to NRB/ (NRB + DRB),

Where:

NRB = Non-renewable biomass

DRB = Demonstrably renewable woody biomass

By reviewing the PDD, $f_{NRB,y}$ is determined by quantitative and qualitative assessment. For quantitative assessment, the information is obtained from the 2009 report from Food and Agricultural Organization (FAO) of the United Nations /51/. The validation team checked the FAO research 2009 and considers that this was not specified for the woody biomass consumption, but focused on the forestry development in 2009. Thus this can be used as a reference only, but cannot fully reflect the project baseline situation in terms of woody biomass consumption. For the qualitative assessment, different information including case study of The Can Tho Study, improve cooling stove study, and FAO WISDOM study is applied /53-55, 57/. The scenario of minimum f_{NRB} of quantitative assessment is applied as 67%. Since this is the latest MARD's study specified on the woody biomass consumption for the project activity in 2010, the validation team considers that the determination of $f_{NRB,\,y}$ is conservative and traceable.

According to the validation of the excel ER worksheet /39/, the validation team considers that the ex-ante baseline emissions from thermal energy use is correctly estimated as 4.965 tCO_2e/year per household.

Baseline emissions from Animal Waste Management

The PP applies the IPCC TIER 1 approach of the Annex 6 of for the applied GS methodology calculation of baseline emissions from animal waste management. The validation team considers that it is applicable since the baseline data required for an estimation of the methane emission factor per category of livestock are not available in Vietnam. In addition, according to the on-site validation, the validation team confirms that some animal waste is

collected for utilization without any treatment. The estimation of baseline emissions from animal waste management is applied in accordance with equation (14) of the applied GS methodology:

$BE_{awms,h} = GWP_{CH4} * \sum_T (EF_{awms(T)} * N_{(T),h})$

(PDD equation 4)

where

$BE_{awms,h}$	=	Baseline emissions from handling of animal waste in premise h (tCO_2e/year)
$GWP_{,CH4}$	=	This is consistent with GS default value of 21, and this will be updated for future COP/MOP as required in the applied GS methodology.
$N_{(T),h}$	=	The number of animals of livestock species per animal category T This is sourced from the ex-ante VGS database /25/ for the total number of animals per category T at the time of PDD submission to GS. This will be monitored for each crediting period. The validation team checked the VGS database, and the average numbers of animals are correctly applied for the calculation of baseline emissions per household.
$EF_{AWMS(T)}$	=	Emission factor for different category of livestock, T (pig, buffalo, dairy cow and cattle) in the project situation According to the CER calculation worksheet for the baseline emissions of animals /25, the total numbers of animals in each province are measured. The average temperature information is sourced from the MARD. The validation team also confirmed the emission factor for CH_4 for different category of livestock depending on the local temperature of different provinces is sourced in accordance with the default value for Asia in the IPCC 2006 Guideline Volume 4 Chapter 10 Table 10.14, 10.15, 10.16, 10A-5 and 10A-6. The EF_{AWMS} for pig, buffalo, daily cow and cattle in the CER calculation worksheet are checked and confirmed to be reliable. According to BPD database, the maximum number of pigs per m^3 is 5.17 in the north and 6.9 in the south based on the average pig weight of 50 kg. Only biogas plants where the pig population is 5 or less per m3 are included in the estimation of AWMS emission. It is considered as conservative since this is less than the maximum number of pigs allowed per m3 and the average pig weight is estimated higher than the IPCC guidelines for Vietnam (28 kg), as referenced from http://www.ipcc-nggip.iges.or.jp/public/2006gl/pdf/4_Volume4/V4_10_Ch10_Livestock.pdf Thus it results in the selection of 98% of the farms (i.e. only 2 % have more pigs than the biodigesters treatment capacity) owning 91% of the pig population. The PP also confirmed that the average digester treatment capacity i.e., 5 pigs/m^3 will be treated as the cap for further inclusion of the household under this project activity. Thus the validation team considers

	that it already complies with the IPCC requirements and it represents the majority of the households situation in the estimation of AWMS emission.

According to the validation of the excel ER worksheet /39/, the validation team considers that the ex-ante baseline emissions from animal waste management is correctly estimated as 2.077 tCO_2e/year per household.

Project emissions from thermal energy use, $PE_{p,y}$

Referring to the equation (5) in the applied GS methodology for the project emissions from thermal energy use per biogas digester, the total project emissions from thermal energy demand of one household is estimated in PDD p.34:

$$PE_{p,y,h} = \sum_i (f_{NRB,y} * F_{i,p,h} * NCV_i * EF_{CO2,i} + F_{i,p,h} * NCV_i * EF_{nonCO2,i})$$

Where:

$PE_{p,y,h}$	The total project emissions from thermal energy demand of one household in tCO_2e
$f_{NRB,y}$	Fraction of biomass used during year y that can be established as non-renewable biomass (drop this term from the equation when using a fossil fuel baseline scenario)
$F_{i,p,h}$	Quantity of fuel i consumed in the project during year y (kg/household/year)
NCV_i	Net calorific value of the project fuel type in TJ/ton of fuel (IPCC 2006 default values in TJ/ton are applied by the PP for the NCV values for various fuels)
$EF_{CO2,i}$	CO_2 emission factor per unit of energy of fuel i in tCO_2/TJ (IPCC 2006 default values in tCO_2/TJ are applied by the PP for the EF values for various fuels)
$EF_{nonCO2,i}$	Non-CO_2 emission factor per unit of energy of fuel i in tCO_2/TJ (IPCC 2006 default value in tCO_2/TJ for charcoal is applied by the PP)

The validation team checked the emission reduction excel worksheet /25/, in which the calculation follows the equation indicated in the applied GS methodology. The ex-ante data of fuel consumption for project scenario is sourced from the Biogas User Survey (BUS) 2010-2011 /40/. The fuel consumption in project scenario will be monitored according to the monitoring plan. The calculation is summarized in the PDD Table 15, in which the project emissions per biogas digester are estimated as 0.605 tCO_2e/year ex-ante.

Assessment of Leakage

The PP has investigated the potential sources leakage and it is validated by the validation team as follows:

a) The baseline technologies i.e. the application of traditional fuel such as firewood and agricultural residues will not be used outside the project boundary, i.e. Vietnam. All the baseline fuel will be used within Vietnam. Thus this will not replace lower emitting technology outside the project boundary.

b) According to the on-site visit, the households mainly only use firewood for cooking /xii-xviii/. Only some rich households would use lower emitting energy source, such as LPG. However, these households are deemed not switching back to non-renewable biomass (NRB) or fossil fuels due to the project implementation.

c) The project will not cause significant impacts to NRB fraction, as there is no other registered CDM or VER projects that account for NRB in the baseline of Vietnam at the moment.

d) According to the weather information for the covered provinces, only 1 province (Lam Dong Province) with different weather zone with the average temperature lower than 20°C. According to the VGS database /25/, only 206 biogas digesters are installed in Lam Dong Province, and it accounts for 0.25% of the project population. Thus the validation team considers that the overall project population can compensate the loss of the space heating effect of inefficient technology (due to the lower temperature).

e) According to the interview households /xii-xviii, xxiii-xxv/, the households would remain using the baseline technology if there is no financial subsides for the construction of biogas digesters. In addition, the project will substitute the baseline technology such as using firewood with relatively higher emissions compared with the project activity.

So the validation team considers that the project would not induce increase in fuel consumption by the non-project households attributable to the project activity. Leakage is therefore not included in the calculation of emission reductions. Nevertheless the physical leakage from biogas digester and biogas stove is also required to be considered in the project emissions as discussed in the followings.

Project Emissions from Animal Waste Management, $PE_{awms,h,y}$

The PP correctly applies the GS methodology Annex 6 Section A6.3 (equation 17 of methodology) for the calculation of project emissions from animal waste management.

$$PE_{awms,h,y} = GWP_{CH4} * \sum (N_{(T),h} \cdot EF_{AWMS(T)}) \cdot PL_y + \sum (N_{(T),h} \cdot EF_{AWMS(T)}) \cdot (1-\eta_{biogastove})(1- PL_y)$$

Where:

$GWP_{,CH4}$	=	This is consistent with GS default value of 21, and this will be updated for future COP/MOP as required in the applied GS methodology.
N(T),h	=	Number of animals of livestock category T in premise h This is sourced from the GS project database for the average number of animals of livestock category T. The validation team checked the database in the CER worksheet /25/, and confirmed that it is correctly applied in the ex-ante estimation.
PL_y	=	Physical leakage of the biodigester in year y: 10% According to the applied GS methodology Section A6.3, the PP applies the default value of 10% from IPCC for the physical leakage of the biogas digester. The validation team considers that this is reasonable and traceable.

$\eta_{biogastove}$	=	Stove combustion efficiency to account for incomplete combustion resulting in emission of methane post-combustion: 98% This is sourced from previous GS biodigester methodology, "Indicative programme, baseline, and monitoring methodology for Small Scale Biodigester" /27/. The validation team checked the GS methodology and confirms that the stove combustion efficiency recommended by GS is 98%. Thus the leakage for biogas stove is 2% accordingly.
$EF_{AWMS(T)}$	=	Emission factor for different category of livestock, T (pig, buffalo, dairy cow and cattle) in the project situation (tCH_4 per animal per year)

For the calculation of $EF_{AWMS(T)}$, emission factor for different category of livestock in the project situation, the PP correctly applies the IPCC TIER 2 approach equation (16) as per the GS methodology Annex 6 Section A6.3:

$$EF_{AWMS(T)} = (VS_{(T)} \times 365) \times \left[Bo_{(T)} \times D_{CH4} \times \sum_{k} \frac{MCF_{BL,k}}{100} \times MS_{(T,S,k)} \right]$$

where

$VS_{(T)}$	=	Daily volatile solid excreted for livestock category, T The validation checked that the values applied in the CER calculation excel worksheet are consistent with the values from the IPCC Volume 4 Chapter 10 Table 10A4-8.
$B_{O(T)}$	=	Maximum methane production capacity for manure produced by livestock category T (m^3CH_4 per kg of VS excreted) The validation checked that the values applied in the CER calculation excel worksheet are consistent with the values from the IPCC Volume 4 Chapter 10 Table 10A4-8.
D_{CH4}	=	CH_4 density: it is applied as the default value of 0.67m^3/kg in the applied GS methodology.
$MCF_{BL,k}$	=	Methane conversion factors for the animal waste handling system in the baseline situation by climate zone k: 10% The validation team checked the IPCC Volume 4 Table 10A-4 and Table 10A-5. The MCF values for all temperatures for pig, buffalo, dairy cow and cattle for pasture burned for digesters are all 10%. The validation team considers that it is traceable and correctly applied.
$MS_{(T,S,k)}$	=	Fraction of livestock category T's manure treated in the animal waste management system S, in climate region k Manure management system (MS) is 100% biodigester. The PP ex-ante assumed that the animal manure management system (AWMS) in the project scenario is that all manure is fed to the digester. During the on-site validation of biogas digesters in operation, it was found that the households would rinse all the animal manure into the collection pits of the biogas digesters. Thus it is considered that the assumption of all the manure will

	be fed to the digester in the project scenario is reasonable, since it is also the design of the biogas digesters to facilitate the feeding of animal manure and there is no other treatment system for the animal manure. Thus the validation team considers that the fraction of livestock manure treated in the AWMS of 100% is reliable.

For ex-ante assumption, the amount of manure to biodigester is assumed as 100%, while this will be surveyed in the monitoring plan. Moreover, there are two different temperature zones in Vietnam according to the definite in IPCC chapter 10 volume 4. According to equation (16) of the GS methodology, the MS (fraction of livestock manure fed into the biodigester) for each province of the climate zone should be monitored. Since not all the province will be sampled for the surveying of number of animals and the MS, the PP then adopt the approach of MS for the average of each climate zone. The validation team considers that since this is limited by the monitoring plan, and this adopted approach is also deemed to be the most reliable option by taking the average MS in each climate zone to be calculated in the equation (16).

In addition, the PP correctly applies the IPCC TIER 2 approach equation (16) as per the GS methodology Annex 6 Section A6.3 for the estimation of emissions from anaerobic disposal of bio-slurry. The usage of bio-slurry will be monitored by the PP in order to apply the mentioned equation for the calculation of project emission from bio-slurry, while the same paramter such as $VS_{(T)}$, $B_{O(T)}$ and MCF will be applied as validated in the previous section. For ex-ante estimation of project emissions due to bio-slurry, since the validation team also notified from the households that they would use up all the bio-slurry as fertilizer in their agricultural fields, thus there is no dumping or prolonged storage for methane emission. Therefore it can be estimated as zero emission ex-ante. Moreover the project emissions due to bio-slurry will be monitored during the project implementation.

According to the review of the excel ER worksheet /39/, the calculation of project emissions from AWMS is validated as 0.094 tCO_2e/year per household and is considered as in line with the requirements in the GS methodology.

The validation team validated the PDD that the ex-ante emission reductions per household according to the excel calculation /39/, and is calculated by

$BE_{y,h} – PE_{y,h,}$

Where:

$BE_{y,h}$ Annual average total baseline emissions per household in year y
= 7.042 tCO_2e/h/year

$PE_{y,h}$ Annual average total project activity emissions (including leakage) per household in year y
= 0.699 tCO_2e/h/year

Thus the ex-ante emission reductions per household are calculated as 6.343 tCO_2e/h/year.

The validation team also checked the PDD that the ex-ante total emission reductions are estimated according to the following:

$ER_y = U_{y,h} \times (BE_{y,h} - PE_{y,h}) \times N_{p,y,}$

Where:

ER_y Annual average emission reductions per household in year y (tCO_2e/yr)

$U_{y,h}$ Cumulative usage rate for technologies in project scenario p in year y, based on cumulative adoption rate and drop off rate revealed by usage surveys (fraction)

$BE_{y,h}$ Annual average baseline emissions per household in year y (tCO_2e/yr)

$PE_{y,h}$ Annual average project activity emissions per household in year y (tCO_2e/yr)

$N_{p,y}$ Total number of biogas units commissioned as of year y, which will monitored ex-post

The emission reductions (ER) spreadsheet for the calculation of the estimated CER for the project activity was provided and checked by the validation team /39/. The validation team considers the calculation is complete and traceable. It is also noted that the usage rate is assumed to be 100% ex-ante for the above estimation of ER, and the validation team considers that it is also acceptable, and the usage rate shall be also monitored during crediting period. In addition, the estimated emissions reductions are based on the most recent data available at the time of submission of the PDD to the DOE and Gold Standard for validation.

The validation team checked the calculation in the excel ER worksheet “ERdatabase”, the emission reductions are correctly calculated as per month basis, in which the emission reductions were only accounted starting from one month after the biodigester construction. The validation team interviewed with the biogas digester users /xiii-xviii, xxiii-xxv/, and they also stated that the biodigesters could be worked after 1-2 weeks after construction acceptance commissioning test. Actually after the biodigesters were built, the households could feed the animal waste to the biodigesters immediately in order to start the operation. It usually takes about 1-2 weeks for anaerobic digestion in the digesters, in order to supply adequate biogas for cooking and lighting purposes. Thus the emission reductions can be started to be accounted. At the same time, the commissioning would be carried out within 5-14 days of construction completion. The inspectors would approve the final quality of the biodigester and issued the Form 7 for Acceptance Check /22/. Thus the biodigester would usually start to have full operation after 1-2 weeks of construction completion. As biogas is started to be produced, emission reductions could be started to be accounted. The validation team considers that it is conservative for the emission reductions to be accounted in the next month after biodigester commissioning (date of acceptance test of biodigester in Form 7). This also ensures that the biodigester is commissioned and started to generate biogas. In this regards, it is reasonable to start the generation of ER for AMWS and thermal energy demand.

According to the GS Toolkit Sections 2.1 and 3.5.1, the validation team checked also the assumption statements, calculation procedures and parameters applied from the reference documents in the estimation of emission reductions. It is noted that the emission reductions are based on the no. of biogas units commissioned, and this will be monitored ex-post. According to the estimated accumulated installed biogas units at the end of each crediting

period (up to 107,078 biogas digesters by the end of first 7-year renewable crediting period from 1st May 2010 to 30th April 2017), the emission reductions are correctly estimated as 4,123,873 tCO_2e in the first crediting period, which is 589,125 tCO_2e/yr in average.

Since the number of biogas digesters is the prediction value from the PP for the implementation strategy, the number of biodigester built can be also checked during the verification. Moreover, the PP stated that the actual number of biogas digesters to be built would depend on the uncertainty around carbon market in the future. Thus the validation team does not have adverse comment on the PP's prediction. In addition, according to the PP's past record, the validation team considers that the PP has the ability to achieve the implementation strategy and target in the number of biogas digesters to be built provided that the PP has enough financial support such as from Dutch government funding.

The information is verifiably presented in the in the PDD with a sufficient degree of detail and transparency, so that the estimation of emissions can be reproduced. The validation team checked that full transparency is applied with regard to the selected data based on the prerogative of conservativeness.

3.4 Assessment of Monitoring Plan for Greenhouse Gas Emission Reductions

The project monitoring plan in the PDD has clearly described the monitoring procedures in accordance with the applied GS methodology. In the monitoring plan, BPD will be responsible for the overall monitoring management of carbon monitoring and sustainable development monitoring. As per BPD, the monitoring will be divided into three parts.

A) Quality control monitoring

The validation team checked the PDD, this is mainly related to the quality control of the physical features of the biogas digester. The quality control flow chart is included in the PDD in order to indicate the process flow of biogas, and the roles and responsibilities of monitoring personnel. The trained technicians will check the installation, operation and maintenance of the biogas digesters. The relevant inspection will be recorded in several forms, such as form 7 and form 9 /22-23/. The validation team reviewed the sample forms and considers that the quality of the biogas digesters can be therefore guaranteed.

B) Carbon monitoring survey (CMS).

As per BPD, the carbon monitoring survey will include data from two climate zones identified in the PDD according to the guidelines in IPCC 2006 Chapter 10. This is complied with the requirement in the Annex 6 Section A6.1 of the applied GS methodology. Moreover, the carbon monitoring survey will be carried out by independent entities. The independent competent entities will be invited by tender bidding. Thus the validation team considers that the CMS can be reliable and transparent.

The CMS includes the monitoring of the fraction of non-renewability ($f_{NRB,y}$) according to available literature, such as the information from Food and Agricultural Organization (FAO) of

United Nations. The validation team considers that it is appropriate by applying authoritative information for the monitoring of non-renewable biomass. The BPD also propose to monitoring NRB assessment at the frequency of once for the first crediting period. This is also complied with the requirement in the Annex 5 of the applied methodology, in which the updating NRB assessment can be proposed by project proponent.

According to the monitoring plan, the CMS also includes the project survey (PS) of the target population characteristics (such as no. of animals and type of animals etc.), project performance field test (PFT) of fuel consumption and sustainability assessment at least once per year. This project survey will also include the assessment of leakage every two year after first verification. This is complied with the requirement in the applied methodology Annex 5.

The baseline performance field test (BFT) will be only conducted for new biogas digester before the digester construction. The baseline situation will be revised continuously when the new biogas digesters are confirmed to be installed. This depends on the irregular interval for confirmation of household participation from different province. This will be monitored by the BPD with the VGS database throughout the project implementation. It is also noticed that the BFT cannot be updated since once the biogas digester is installed, it becomes the project scenario and the baseline situation for the household is no longer existed. Thus the baseline situation (such as number of installed biogas digesters and baseline fuel consumption) will be continuously measured and recorded through baseline performance test. For each crediting period, this will be applied as the baseline scenario, and the validation team considers that it complies with requirement for the baseline performance test in the Section 7 of applied GS methodology.

Validation of carbon monitoring survey for the monitoring of project performance parameters

The project performance parameters will be recorded at least annual or more frequently using survey method as per “Standard for Sampling and Surveys for CDM project activities and PoA” version 02.0 in EB65 Annex 2 and Section III of the applied GS methodology. The monitoring frequency fulfills the requirement in the Annex 5 of the applied GS methodology. This also complies with the requirement of the applied GS methodology by applying the 90% confidence rule. The PP applies the 90/10 confidence and precision level has been adopted for determining project performance parameters. The calculation of sample size according to 90/10 of confidence/precision level has been verified by the validation team and it is considered appropriate for the project.

According to EB65 Annex 2, clustered random sampling can be applied for decentralized project, in which this can offer cost advantages for monitoring of widespread households. The BPD also applies clustered random sampling in the monitoring plan for the CMS of this project activity. According to IPCC 2006 IPCC Guidelines for National Greenhouse Gas Inventories, Volume 4: Agriculture, Forestry and Other Land Use, Chapter 10 Emissions from Livestock and Manure Management, Vietnam can be divided into two climate zone: temperate and warm. The validation team checked the temperatures in Vietnam in respect to the IPCC definition of the climate zone, it is confirmed that there are only 2 climate zones

(temperate for ≥15°C & <25°C and warm for ≥25°C) present in Vietnam. The BPD would therefore divide the households into two climate zones. The sampling size is determined for each climate zone according to 90/10 of confidence/precision level. The validation team checked that a sample size of 100 is calculated according to the 90% confidence rule (similar results regardless of change of number of biogas digesters). Then totally 20 clusters (one cluster refers to one district) will be selected randomly from the two climate zones, and the no. of clusters in each zone will be proportional to the sampling size of households for the VGS project. The validation team noted that there is no solid guideline from the above mentioned UNFCCC Sampling Standard clause 16, but it is deemed that totally 20 clusters from the two climate zones can be also a representative amount for sampling. Moreover, the BPD would increase the no. of sample in each cluster in order to achieve a higher level of precision.

Referring to the applied GS methodology page 12, "*whenever another method than Simple Random Sampling is used, the statistical analysis becomes more complicated than the approach described in Annex 4 and must be carried out by a statistician*". According to the statistics theory from a statistician, Magnani (1997) /62/, for the homogenous group of population, the "cluster design effect adjustment factor" can be selected as a lower value. In this project, the households in each district can be assumed to be homogenous as they live in the same district, with similar financial environmental, assess to technology and local regulations. The BPD therefore applies the cluster design effect adjustment factor as 1.5 in the sampling size for each climate zone. For conservative approach, the BPD also applies oversampling for 10%. For example, if the sampling size for climate zone calculated from 90/10 confidence/precision is 100 (example in PDD is for 60,000 biodigesters), this will result in 165 households in each climate zone [100 × 1.5 × (1+10%)]. Finally the sampling size is rounded off to 170 households. Then the 20 random clusters will be divided proportionally according to the sampling size in the two climate zones. For the quoted example in the PDD, 170 households will be divided into 10 clusters proportionally in each zone. Therefore the total samples will be 340 households for two zones. The validation team considers that this sampling approach is deemed conservative and traceable.

The details of the data collection procedures have been described in the monitoring plan, which was verified and confirmed by the validation team to be valid. Therefore, the validation team considers that the monitoring requirements of applied GS methodology can be fulfilled.

Validation of Sampling Plan for Carbon Monitoring Survey (CMS)

According to Section V of the EB65 annex 2 and Section III of the applied GS methodology, the validation results are tabulated as follows:

Parameters	Validation Opinion
Sampling Objective	It is defined that project performance parameters will be monitored from the carbon monitoring survey.
Field Measurement	It is defined that the households will be interviewed in order to

Objectives and Data to be collected	carry out field measurement for data collection. The validation team considers that this is the most direct way for the monitoring team to collect the data from the randomly selected households.
Target Population and Sampling Frame	The target population will be defined according to the updated VGS database, and the sampling frame will be determined according to the unique identification of biogas digester users such as the identification code of the biogas digester. According to IPCC 2006 Chapter 10, Vietnam can be classified into two climate zones, temperature and warm. Thus the PP will conduct the CMS from each of the climate zone. The validation team considers that this complies with the requirements in the applied GS methodology Annex 6 Section A6.1.
Sampling approach, sampling size, survey and cluster sample size	The general situations in rural areas are similar to each other, thus is considered to be homogenous for the rural households. Therefore the cluster random sampling is applied in each climate zone as per the mentioned Guideline. Totally 20 clusters will be randomly selected in the two climate zones in proportional to sampling size in each zone, and totally 170 samples will be selected from each climate zone. The validation team considers the sampling method can comply with the above mentioned Standard on sampling, and the samples are representative of the population according to the 90/10 confidence/precision level.
Implementation	The CMS will be implemented at least annually or more frequent by independent competent entities. This fulfills the requirements in the Section III of the applied GS methodology as this is aimed for PFT.
Desired Precision/Expected Variance and Sample Size	The sampling size of 100 is determined according to the minimum 90/10 confidence/precision requirements. Moreover, the BPD applies the cluster design effect adjustment factor as 1.5 in the sampling size for each climate zone. For conservative approach, the BPD also applies oversampling for 10%. Thus the validation team considers that it is conservative for the BPD to over-sample (for example up to 340 households) for two climate zones. The validation team considers that the oversampling approach is also reasonable and to be considered as good practice as per EB65 Annex 2 paragraph 11.
Procedures for Administering Data Collection and Minimizing Non-Sampling Errors	Questionnaire will be developed and the survey will be conducted by training surveyors. Quality assurance and quality control procedures for recording, maintaining and data collection will be implemented. In case of non-response the surveyor will proceed to the next household in the list of random selected households. Moreover, the trained surveyor will ensure the household interviewees understand the questionnaires, and with competent knowledge on cooking and manure practices. Thus the validation considers that this can minimize the non-sampling errors induced.

C) Usage survey (US)
According to the Section III, Monitoring Methodology of the applied GS methodology, the usage survey is developed. Each year the BPD will monitor the usage of biogas units by selecting randomly at least 30 samples from each year credited, and the total sample will be at least 100. Moreover, it is also assumed that the drop off will be replaced by fuel consumption of the applicable baseline scenario.

Validation of Sampling Plan for Usage survey (US)

The validation results are tabulated as follows:

Parameters	Validation Opinion
Sampling Objective	It is defined that project equipment usage parameter will be monitored from the usage survey.
Field Measurement Objectives and Data to be collected	It is defined that the households will be interviewed in order to carry out field measurement for data collection. The validation team considers that this is the most direct way for the monitoring team to collect the data from the randomly selected households.
Target Population and Sampling Frame	The target population will be defined according to the updated VGS database, and the sampling frame will be determined according to each age group from the database.
Sampling Method (approach)	The general situations in rural areas are similar to each other, thus is considered to be homogenous for the rural households. Therefore the simple random sampling is applied as per the mentioned Guideline.
Implementation	The US will be implemented at least annually or more frequent by independent competent entities. This fulfills the requirements in the Section III of the applied GS methodology.
Desired Precision/Expected Variance and Sample Size	The minimum sampling size of 100, with at least 30 samples for project technologies of each age group being credited. This complies with the requirements in the Section III of the applied GS methodology.
Procedures for Administering Data Collection and Minimizing Non-Sampling Errors	Questionnaire will be developed and the survey will be conducted by training surveyors. Quality assurance and quality control procedures for recording, maintaining and data collection will be implemented. In case of non-response the surveyor will proceed to the next household in the list of random selected households. Moreover, the trained surveyor will ensure the household interviewees understand the questionnaires, and with competent knowledge on cooking and manure practices. Thus the validation considers that this can minimize the non-sampling errors induced.

Therefore the validation team considers that the sampling plans for both carbon monitoring survey and usage survey are developed according to the requirements in the Section III of the applied methodology. The sampling plans also in line with the Standard for Sampling and Surveys for CDM Project Activities and PoA" (Version 02.0), EB65 Annex 2.

In summary, the collected project performance data from carbon monitoring survey (CMS) and usage survey, including (i) fuel consumption in project scenario, (ii) percentage of biogas digester in use and (iii) type and number of animals will be monitored by the BPD as described in the monitoring plan. The overall monitoring procedure is clearly described in the monitoring plan, and has been verified by the validation team and confirms to complying of requirements in the applied GS methodology. For the monitoring of sustainable development indicators, please refer to Section 9 of this report.

3.4.1 Management system and quality assurance

According to the monitoring plan, the training programme for project monitoring will be carried out continuously during the project implementation. The QA/QC procedures are also described in the PDD. Detailed monitoring procedures have been developed and the implementation of these will enable subsequent verification of the project's emission reductions.

According to the PDD, the project's quality control monitoring is described in which it includes the QC control of the biogas digester under construction and completed construction, and also the provision of subsidy to each participated households. The district technicians will visit every digester being constructed. The validation team also checked the sample Form 7 for the acceptance of biogas digester construction confirmed by qualified technicians /22/. In addition, Form 9 for the general inspection of the operation of biogas digesters was also checked for ensuring the quality of biogas digester operation after construction /23/. According to the monitoring plan, the biogas users will be trained after the digester construction and the technicians will provide after-sale service to the households if there are any compliant from biogas users. In addition, the trainings will be also provided to technicians and masons in order to ensure they are qualified to carry out the construction, inspection and monitoring work for the biogas digesters. The training records for the technicians and masons are checked by the validation team from the computer database /26/. Furthermore, the validation team also checked for some training materials which include the brochures, user manuals, promotional video disc and safety leaflets during the on-site visit /31/. According to the BPD /iv/, all the forms and monitoring records shall be stored for at least 5 years.

According to document review in PDD, on-site interview with representatives from BPD /iv, xxvii/, the monitoring arrangements described in the monitoring plan is assessed; it is reasonably believed that the monitoring plan can be feasible within the project operation stage. The validation team considered that project participant is capable to implement the monitoring plan provided that sufficient training can be arranged to the monitoring team.

4 GOLD STANDARD CRITERIA ON ADDITIONALITY

According to Gold Standard, the PP is required to use one of the UNFCCC or Gold Standard approved additionality tools. The evaluation of the project additionality is based on latest version of the "Tool for the demonstration and assessment of additionality" (i.e. version 06.0.0). The validation of additionality is described in this section.

4.1 CDM Consideration of the Project

According to the latest "guideline on the demonstration and assessment of prior consideration of the CDM" Version 04 /30/, the PP has demonstrated the prior CDM consideration of the project.

The DLP of MARD and SNV started the national biogas programme in 2003 with the support from the Government of Netherlands. The first phase was completed in 2006 with a total of 18,000 biogas units installed nationwide. Then the phase 2 of the biogas programme was started in 2007 under the subsidy from Dutch government. This VGS project refers to the phase 2 of the national biogas programme of DLP of MARD and SNV and also the subsequent phases of national biogas programme.

Date	Project Milestones for VGS/CDM development
November 2005	Abstract Domestic biogas and CDM financing by Vietnamese Biogas Project Division and SNV /63/
Mid-2006	PDD Development with the financial assistance from Mitsubishi Securities UFJ for the project development with carbon credit /33/
19th July 2006	VGS starting date as the first application for a biogas plant by a biogas household /19/ N.B. This first application biogas plant was completed in construction on 1st January 2007 /22/.
28th September 2006	MARD developed a PIN for CDM project to Vietnamese DNA. Vietnamese DNA issued a Letter of Endorsement to (LoE) MARD /32/ (This is the formal procedure for applying CDM, but the project was approved since the Biogas Programme Phase I in 2003, thus the project was authorized to be implemented from the MARD.)
Sept 2006	MARD developed a PIN for CDM project to Vietnamese DNA. Vietnamese DNA issued a Letter of Endorsement to (LoE) MARD /32/
January 2008	Biogas User Survey 2006 Report for MARD and SNV /15/

Date	Project Milestones for VGS/CDM development
Nov 2008	Draft GS PDD development by SNV /34/
20 November 2008	Approval of the Preliminary Design Report using ADB loan with CDM consideration issued by MARD /58/
March to Sept 2009	Draft PoA methodology development and project documentation with the finanical assistance from GFA Envest with Memoradum of Understanding, 5th April 2009 /35/
April 2009	Local stakeholder consultation record for the discussion of VGS/CDM issues /7/
31 Dec 2009 to 29 Jan 2010	PoA-DD and CPA-DD publication on UNFCCC webpage (PoA-DD and CPA-DD were prepared on 24 Dec 2009 as the uploaded version to UNFCCC) (Some portions of biogas digesters were seek for other carbon fundings such as CDM)
May 2011	Invitation of GS VER development proposal from carbon credit consultancy (from SNV, on behalf of BPD) /69/
20 Sept 2011	GS consultancy service contract between the Nexus Carbon and BPD /41/
23 Sept 2011	Validation service contract between the Nexus Carbon and TÜV Rheinland /29/

Starting date of Project Activity

From the project history described above concerning VGS/CDM development for carbon credit, the starting date of project activity is defined as the first successful application was submitted by the participated household, which was on 19th July 2006 as indicated in form 3 of biogas programme /19/. Then the BPD approved with the application and signed the agreement (Form 4) with the household on 15th August 2006 /20/. At the same time, the household also signed the biogas digester construction contract (Form 6) with the trained mason on 15th August 2006 /21/. The first biogas digester for the VGS project activity was operated on 1st July 2007 /22/. The validation team considers that the defined date was the earliest date at which implementation or construction or real action of the project activity begins as per CDM glossary. So the subsequent applications of the biogas digester construction are also included in the VGS project activity.

Prior CDM consideration and continuous actions

Since the starting date of the project activity is defined as 19th July 2006, which was before 2nd August 2008 and also before the submission of GS document to Gold Standard. During November 2005, the Biogas Project Division of Vietnamese Government and SNV were

considered for the CDM carbon financing /63/. The validation team also checked that the MARD has developed a draft PDD with Mitsubishi Securities UFJ in mid-2006 /33/, and submitted the project information note (PIN) to the Vietnamese DNA for the development of the project activity /32/. (The biogas digester project was already approved since the Biogas Programme Phase I in 2003, thus the project was authorized to be implemented from the MARD.) The validation team also checked the Vietnamese DNA website for the "Vietnam CDM Project Pipeline" /59/, it is also indicated in the chapter 7 about the PIN approved that the CDM supported the Biogas Programme for the Animal Husbandry Sector in some provinces of Vietnam (Phase 2003-2005). Thus financial support from carbon credit was considered and demonstrated before the project starting date. This is also indicated in the webpage of Vietnamese DNA for the pre-announcement of the project activity /32/: http://www.noccop.org.vn/Data/profile/Airvariable_Projects_75233Tong%20hop%20PIN.pdf

The validation team also checked that the SNV and MARD have carried out CDM continuous action after the project starting date. The validation team can check the correspondence email between the BPD and their Dutch partner SNV for the discussion of CDM work progress particularly on the methodology development dated 6th August 2007 /67/. It is deemed that the BPD and SNV have been carried out some work related to carbon financial support.

Throughout the implementation of the project since July 2006, Vietnamese independent consultant in Hanoi, InvestConsult Group was commissioning by SNV and MARD to conduct the Biogas User Survey (BUS) 2006. The report of BUS 2006 was issued in January 2008. This report is also reviewed by the validation team. It contains the information of biogas user information in 2006, and also includes the GDP figures in 2007. Thus the validation team considers that it is credible to recognize the report issued in January 2008. According to the BUS 2006 report /15/, it also suggests the CDM monitoring strategy such as the surveying work for monitoring. Then the SNV also issued a draft PDD for the project activity in order to apply for carbon credit. Then the BPD prepared the PoA-DD and CPA-DD in December 2009 and published for global stakeholder consultation in UNFCCC webpage on 31st December 2009. The validation team considers these are all the CDM continuous actions conducted for the project activity after the project starting date. After that the SNV and BPD also invited GS development proposal from the carbon credit consultancy in May 2011 /69/ for continuous GS dvelopment work.

Actually, throughout the whole project implementation since July 2006, the BPD assessed the successful biodigester applicant in the Form 3 /19/, the BPD would sign with the participated households for cooperation agreements Form 4 /20/ for the voluntary transfer of carbon credit ownership all along the investment chain. Thus all the participated households have agreed to transfer all the carbon credit to BPD. The validation team considers that this is a kind of carbon credit agreement with similar feature of ERPA, but the nature is a bit different in the way that the households would transfer the carbon credit to BPD for "free" as they can obtain the financial support in this project activity. During the on-site interview, the validation team also interviewed with the participated households with biodigesters installed in different years. They all realized that they have signed the ER transfer document to BPD in order to participate in this project. Thus the validation team considers that this is one of the solid evidences indicating that the BPD needs the carbon credit throughout the project

implementation in order to support their activity. As the biodigesters are constructed since July 2007 up to mid-2012, the BPD also continuous to install the biodigesters in the project and requires all the participated households to sign this Form 4 for the documentation of carbon credit transfer. Therefore the validation team considers that the CDM continuous actions have been carried throughout the project implementation period.

According to the above table, the CDM continuous actions such as draft GS-PDD development, Carbon Credit Transfer Document between the BPD and households, local stakeholder consultation and confirmation of validation contract etc. were evidenced with less than 2 years of gap. Thus the validation team considers that continuing and real actions were taken to secure CDM status for the project activity.

4.2 Additionality of the Project

According to the GS PDD Section B.5., the PP has demonstrated the additionality as per "Tool for demonstration and assessment of additionality" version 06.0.0.

According to the applied GS methodology and the steps in the latest version of the "Tool for the demonstration and assessment of additionality", the discussion on alternative identification is included in the PDD.

1) Continued use of unsustainable fuel wood and fossil fuel for cooking and kerosene for lighting;
2) The proposed project activity undertaken without being registered as VGS activity;
3) Switch to fossil fuel;
4) Continuation of baseline manure management systems;
5) Development of BP based on donor and/or public funding;

The identified alternatives are described in a transparent manner in the PDD. The validation team has verified the justifications for the barriers faced by the alternatives and are described as follows:

1) – According to the MARD, it is confirmed that the VGS project is in compliance with all mandatory applicable legal and regulatory requirements in Vietnam, as it is the baseline scenario of the cooking and lighting fuel consumption for rural households.

2) – It is demonstrated that without the carbon revenue such as VGS, the BPD cannot continue with the biogas programme because of lack of financial support from Vietnamese and Dutch government starting from the year 2012 /18/. Moreover, the rural households would also find financial difficulties in raising the initial investment for the installation of biogas digester. The investment barrier will be discussed in detail in the next section. Thus the project activity cannot be financially feasible without the VGS carbon revenue.

3) – The validation team confirms that it is in compliance with all mandatory

applicable legal and regulatory requirements in Vietnam. However, this approach does not promote sustainable development in Vietnam. In addition, the LPG is rather expensive to the rural households and coal only covers 22% of fuel consumption in the rural areas /25/. Thus this is not likely to be a plausible alternative for the project activity.

4) – The validation team checked the literature from international reference journal "Livestock Science", an article titled "A survey of manure management on pig farms in Northern Vietnam" prepared by T.K.V Vu et al (2007) /64/. It is indicated that the manure is used as crop fertilizer, fish feed or discharge to sewer. These practices would create more pollution or emissions compared with the project scenario. Moreover, these practices would continue without the biogas programme.

5) – It is demonstrated that without the donor or public funding, the BPD cannot continue with the biogas programme, since the financial support from Dutch government will then be terminated by the end of 2011 /18/. Apart from new installation of biogas digesters, the technical support for the installed biogas units under the national biogas programme phase 2 can no longer be continued. It is confirmed with the representative from Dutch Embassy that the Dutch subsidy will be stopped for the Vietnamese biogas programme by the end of 2012 /ii-iii/. Moreover, the representative from MARD stated that there is no other funding from Vietnamese government or other foreign countries by the end of year 2012 /iv/. Thus the project activity cannot be financially feasible without the VGS carbon revenue.

Therefore, based on above discussion and Section 3.5.3, the validation team considers that the baseline scenario of the project activity is alternative 1 "Continued use of unsustainable fuel wood and fossil fuel for cooking and kerosene for lighting". The alternative identification is traceable and reasonable.

Barrier Analysis

The PP carried out the barrier analysis which includes: (a) investment barrier, (b) technological barrier and (c) barrier due to prevailing practice. According to the requirements in the "Guidelines for objective demonstration and assessment of barriers" EB50, the validation results are stated in the following paragraphs.

- Investment barriers

Investment barrier at the level of the BP

The validation team realizes that the national biogas programme is managed by BPD, SNV and Nexus (project consultant), which is a public entity for dissemination of biogas facilities to rural households. This project activity is not designed to attract commercial investment for generation of revenues. The sources of investment mainly come from public funding and biogas digester user's self- contribution.

This is illustrated in the implementation of phase 1 of the national biogas program (2003-2005), in which the program was supported by the Government of Netherlands. For the phase 2 program, the BPD aims to install 140,000 biogas facilities in all provinces of Vietnam as the original objective for phase 2 program up to the year of 2012. It is indicated in PDD that before the start of phase 2 program, the MARD pursued carbon revenues such as CDM or VGS incomes as one of the financing options of the program in 2006 /32/. For the CDM revenue, the similar project was already published in UNFCCC for validation in form of CDM PoA. The PoA-DD/ Version 01 and real-case CPA-DD/ Version 01 dated 24th December 2009, and CPA-DD/ Version 01 without effective date were made publicly available on UNFCCC's website (http://cdm.unfccc.int/ProgrammeOfActivities/Validation/DB/FYHTWZ3QLWM91NKR9DB47YIHGQ5KSU/view.html) and parties, stakeholders and NGOs were through the CDM website invited to provide comments during a 30 days period from 31st December 2009 to 29th January 2010.

Investment barrier for biogas facilities at household level

According to the PDD, the average investment cost for biogas facility which includes the construction and supporting costs of biogas digesters. According to the Biogas User Survey 2009 Table 10 in page 34 /16/, the average income per person per year for non-biogas household was 11.9 million VND. In addition, it is indicated in the updated BPD VGS database that the average size of digester was 11.35m^3 and the cost of construction was 0.95 million VND/m^3. The validation team considers that the biogas digester construction cost occupies the major portion of the households' annual income, and thus is considered as a significant amount for small-scale farm households.

According to the survey "Micro Credit for Households Constructing Biogas Plants in 2009" carried out by the "Investconsult Group" and coordinated by Department of Livestock /36/, it is stated that the small households were willing to install the biogas digester, however, most of them required loan (up to 72.4%). Thus it is evidenced that the construction cost is relatively high compared with the households' annual income. Although they want to install the biogas digester, but an affordable loan rate is one of the factors to be considered by the households.

Since the project is not a commercial project, but only relied on the subsidies from Vietnamese government or support from Dutch Government, the project finance for implementation is not guaranteed. Owing to the low households' annual income, financial incentives are really required to promote the project implementation, so that the households can obtain the financial aid from the BPD in order to install the biogas digester. In this regards, the CDM income to BPD would be used to alleviate the investment barriers. Thus BPD considers the carbon finance such as CDM before the project implementation. Thus the Guideline 2 in the "Guidelines for objective demonstration and assessment of barriers" is compiled in the barrier test in Step 3 of the Tool for the demonstration and assessment of additionality.

- Technological barrier

According to the PDD, poor quality of biogas digesters is a barrier for the dissemination of biogas digesters in Vietnam. The validation team also checked the research report "Evaluation Study for Household Biogas Models" issued by the "Sustainable Energy Development Consultancy Joint Stock Company" issued in April 2010 for the study of various types of biogas digesters in LDC /37/.

It is reported that the most common type of biogas digester is the nylon bag. It is easy to construct, low requirements of skillful workers for construction, and with easy availability of raw material. The construction cost is relatively low, about 1-1.2 million VND compared with KT.1 and KT.2 for 2.6-3.5 million VND (Part VI of the report). However, since it is made by nylon, it is comparably low durability and safety. Biogas leakage will be easily happened. Thus the O&M is comparably inconvenient. There is another type of digester called the Vacvina type. It is excluded in the study: "Vacvina model was not selected because its weaknesses like non-material saving, less durable structure, low safety as gas is stored in nylon bag or low gas pressure etc."

It is reported that in Vietnam, since more skillful labours are required for the construction of KT.1 and KT.2 biogas digesters, it causes a technological barrier to the installation of KT.1 and KT.2 digesters. In addition, the relatively high construction cost also is another investment barrier to the rural households.

Thus it is substantiated that without the financial subsidies, other cheaper types of biogas digesters might be installed with lower quality, thus it is a technological barrier to the construction of the KT.1 and KT.2 biogas digester. It is also demonstrated according to the Guidelines 1 of "Guidelines for objective demonstration and assessment of barriers" for the lack of skilled labour.

- Barriers due to prevailing practice

According to the PDD, it is common for Vietnam households to burn fossil fuels and biomass for cooking. According to PDD table 10, most of the rural households apply firewood and agricultural residual as cooking fuel. This is also confirmed by the validation team during the on-site visit to the rural village and the interview with the rural residents /xii-xviii/. Thus this is the prevailing practice for rural households and it is a barrier for the rural residents to switch the fuel type with financial support as incentives.

According to the representative from DARD /vi-vii/, the demand for the biogas digesters is still very large. Now only less than 10% of target population can be subsided for the installation of biogas digester. The validation team checked the information from the Statistics Documentation Centre - General Statistics Office Of Vietnam in 2009 /60/, the number of farming households for each province is indicated. Moreover, the number of households equipped with biogas digesters is illustrated in the statistics. It is found that about 111,000 rural eligible households out of total 1,828,900 households have installed the biogas digesters. The percentage is about 6.1%. Since this is the national statistics information, the validation team considers that it is an existing credible source of information within the total population in the target region, i.e. the whole country. However since there is limitation of

supporting funding as financial subsidy to the rural households, the project cannot be widely developed.

According to the approved GS methodology Section II 3, as the project technology has been adopted by less than 20% of the population in the target area (as defined in section II, 1.b), the technology can be qualified as "first of its kind" and hence a realistic and credible barrier due to prevailing practice can be claimed by the PP.

Common Practice Analysis

As validated in the previous section, the project can be claimed as "first of its kind". Therefore the project is additional without the common practice analysis.

In summary, the validation team can conclude that the project activity is additional in accordance to "Tool for the demonstration and assessment of additionality" (i.e. version 06.0.0).

5 SUSTAINABILITY ASSESSMENT

The 'Do no harm" assessment was carried out by the BPD, as presented in the GS Passport Section F. According to the GS Toolkit Section 2.1, the "Do no harm" assessment is based on the 11 safeguarding principles of the UNDP in four aspects: Human Rights, Labour Standards, Environmental Protection and Anti-Corruption. The potential risks alongside the safeguarding principles are listed in the Section F of the GS Passport. The assessment of "Do no harm" is carried out according to the relevance to the project activity, such as voluntary settlement, cultural heritage, labour force and environmental challenges etc. It is analysed in the GS Passport that it would create low risks of relevance to the project activity in all aspects of "Do no harm" assessment.

During the site interview, the representative from the BPD /v, viii-x/ stated that they will monitor the design, construction, operation and maintenance of biogas digesters in the biogas programme according to the monitoring plan in order to control the quality of the biogas digesters. The technicians and mason will be trained by the BPD in order to ensure the construction of biogas digesters. In addition, the subsidy to the participated households will be distributed through the local post office upon the approval from the accredited technicians, thus the risk of corruption will be very low.

The validation team considers the "Do no harm" assessment has been based on the accurate local situation and the corresponding mitigation measures are included in the GS Passport.

Detailed Impact Assessment

Detailed assessment has been applied to establish the sustainable development matrix in Section F.2 of the GS Passport. In addition, the discussion of Millennium Development Goals is included in the sustainable development matrix. According to the BPD, the project activity could enhance to achieving the World Health Organization (WHO)'s Millennium Development

Goals (MDG) in the areas of “Eradicate extreme poverty and hunger (Goal 1)”, “Promote gender equality and empower women (Goal 3)”, “Reduce child mortality (Goal 4)”, “Improve Material Health” (Goal 5), “Ensure environmental sustainability (Goal 7)” and “Develop a global partnership for development” (Goal 8).

According to GS Toolkit Section 2.4 and Annex I, the validation of sustainable development matrix is tabulated below:

Indicator	Preliminary Score proposed in the GS Passport	Validation Team’s opinion
Environment		
Air quality	+	The validation team considers that the project activity brings positive impact to the air quality. The biogas digester can reduce the consumption of firewood, coal for cooking and kerosene for lighting in the baseline scenario for the rural households in Vietnam. From the reduction of fuel consumption, the amount of soot, H_2S, smoke, RSP etc. could be reduced. The validation team checked the AIP (Indoor Air Pollution) data from the research report issued by independent consultant (EPRO Consulting JSC) in 2011. The improvement in IAP (Indoor Air Pollution) is indicated by using the biogas as cooking fuel compared with the baseline fossil fuel. The obvious improvement in CO, SO, HCs and CH_4 is indicated in the Table 2 of Air quality of Section F.2 /42/, in which at least 100% of improvement can be resulted from the calculation of AIP. In addition, the validation team considers that the measurement of reduction in fuel consumption can reflect the improvement in air quality. Therefore the preliminary score is confirmed to be “+”.
Water quality and quantity	0	According to the on-site interview with the representative from the BPD, and also the physical inspection of the operation of biogas digesters, the validation team confirms that the operation of biogas digesters does not involve the extra water usage, but only requires a small amount of water to rinse the animal manure in the collection channels or pits. In addition, the water from washing the animals will be also collected into the collection pits of the biogas

		digesters, and this does not create extra water consumption compared with the baseline scenario. Instead, the water collected will be treated by the biogas digester rather than discharging to the nearby water bodies without treatment. Thus the programme activity would not cause negative impact to the water quality and quantity, and the preliminary score is confirmed to be “0”.
Soil condition	+	The validation team considers that the project activity would bring positive impact to the soil condition. Instead the project can reduce the firewood consumption, and thus help to reduce deforestation, thus would also improve the soil condition in prevention of soil erosion and floods. In addition, the biogas digester does not occupy the farmland areas and the biogas digester operation does not release any extra pollutants that will affect the soil condition. According to the BUS 2010-2011, the bioslurry was usually used by the biogas digester user as the agricultural fertilizer. According to the interview with the digester users, the bioslurry was also one of the reasons for them to install the biogas digester, since they can use more effective fertilizer in order to improvement their yield in the agricultural products. Moreover, the validation team considers that the bioslurry would not cause any adverse effect to the water quality and quantity compared with the baseline. Please be noted that baseline is without any treatment of the raw animal manure, this would be easier to be discharged to the water body. Moreover, the organic content of the raw animal manure is much higher than the bio-slurry since lots of organic content has been converted to biogas. In addition, the validation team considers that the measurement of usage of bio-slurry obtained from the biogas digesters can reflect the improvement in soil condition. Thus the preliminary score for the soil condition can be confirmed to be “+”.
Other pollutants	0	The validation team considers that the biogas digester can reduce the use of fuel such as firewood for cooking, and thus reduce the smoke and ash generation as by-products of wood burning. The validation team also considers that noise and light pollution would not be induced during the operation of

		biogas digester. Moreover, a public source from SNV biogas programme documentation indicating that the biodigester can help to reduce the smell from animal manure /68/. Thus the preliminary score is confirmed to be "0".
Biodiversity	+	The validation team considers that the project activity brings positive impact to the biodiversity. The biogas digester can reduce the consumption of firewood in Vietnam. The validation team considers that the use of biogas digester can help to reduce the pressure on forests for wood fuel production, thus would also improve reservation of plant and fauna being affected due to deforestation. The validation team checked the United Nations Development Programme Millennium Development Goals MDG 7 on the biodiversity, in which the CO_2 emission can be considered as one of the indicator for the biodiversity. http://www.undp.org/mdg/goal7.shtml It is indicated that as the CO_2 emission induces the global warming and thus the climate change. The change of climate would ultimately affect the growth of fauna and flora, and thus the biodiversity. Thus the preliminary score is confirmed to be "+".
Social Development		
Quality of employment	+	The validation team considers that the project activity brings positive impact to the quality employment. The construction of biogas digester requires lots of skilful manpower, and the BPD provides training to the technicians and the construction masons. This can enhance the skill of workers, thus the quality of employment can be improved. Moreover, the improvement can be quantified from the number of trained technicians and masons. Thus the preliminary score is confirmed to be "+".
Livelihood of the poor	+	The validation team considers that the project can bring positive impacts to the livelihood of the poor by improving the indoor air quality. According to the United Nation Development Programme (UNDP)

		http://www.undp.org/energy/engmdgtop1pov.htm and World Health Organization (WHO) information http://www.who.int/indoorair/publications/fuelforlife.pdf , the validation team realizes that the reduction in fuel consumption can improve the livelihood of the poor, by saving the money to purchase fuel and time to collect woody fuel. The parameter of reduction in fuel consumption can be an indirect parameter to qualitatively indicate the improvement of livelihood of the poor. Thus the preliminary score is confirmed to be "+".
Access to affordable and clean energy services	+	The validation team considers that the use of biogas digester can reduce fuel consumption and thus the associated expenditure for cooking and lighting. The biogas generated from the digester is a free energy source originated from the animal manure waste. Thus the preliminary score is confirmed to be "+".
Human and institutional capacity	0	The validation team agrees that the project does not bring negative impact to the human and institutional capacity. Instead it promotes the job opportunities, training and management for project officers. However, as education or training is not directly addressed in the project activity, thus the preliminary score for "human and institutional capacity" is considered to be "0".
Economic and technological development		
Quantitative employment and income generation	0	The validation team considers that the project activity brings positive impact to the quantitative employment and income generation. The programme can enhance job opportunities and training chances to the masons and technicians. However, as income generation is not directly addressed in the project activity, thus the preliminary score for "quantitative employment and income generation" is considered to be "0".
Balance of payments and investment	0	According to the representative of BPD, the project activity only involves the initial investment from local households. The households can raise the money from bank loan or self-asset. Thus the project activity has no impact to balance of payments and investment. The preliminary score for the balance of payments and investment is confirmed to be "0".
Technology transfer and	+	According to GS Toolkit Annex I, the technology transfer involves the activities that build usable and

technological self-reliance		sustainable know-how in a region where the know-how was previously lacking. As advised from the villagers /xii-xviii, xxiii-xxv/, they learned the idea of biogas digester from the workshop organized by the BPD. The concept of biogas technology is therefore transferred to the rural villages. However, as the installation cost of biogas digester is relatively high compared with their annual income, the households could consider installing digesters with financial support from the biogas programme. In addition, once the biogas digesters are installed, the digesters can be operated without special operational skills. The designs of the digesters have been proven by the MARD to be virtually maintenance-free. The households are required to rinse the animal manure for the feeding of the biogas digesters regularly. Thus this can be considered as technological self-reliance. Through the measurement of biogas digester constructed, this indicator can be quantified. Thus the preliminary score is confirmed to be "+".

The programme activity has applied the sustainable development assessment matrix as required by the Gold Standard. The total score obtained is +7 based on the validation results, while other indicators are neutral. The scoring in each section is summarized below:

- **Environment** scores a subtotal of +3 (from positive impacts of air quality, soil condition and biodiversity);
- **Social development** scores a subtotal of +3 (from positive impacts of quality of employment, livelihood of the poor and access to affordable and clean energy services);
- **Economic and technological development** scores a subtotal of +1 (from positive impact of technology transfer and technological self-reliance).

Thus the programme activity is eligible under the Gold Standard as per GS Toolkit Section 2.4.2, in which the programme activity contributes positively to all three categories (Environment, Social development and Economic and technological development).

6 ENVIRONMENTAL IMPACT ASSESSMENT

According to the PDD Section D, environmental impact assessment is not required for the project activity, since the project only involves the construction of biogas digester for small-scale households.

The validation team also checked the Circular "Guiding Strategic Environmental Assessment, Environmental Impact Assessment and Environmental Protection Commitment" issued by the Ministry of Natural Resources and Environment, December 2008 (No. 05/2008/TT-BTNMT) /13/, and Law on Environmental Protection of Vietnam (No: 52/2005/ QH11) /14/. There are no special requirements for the small farm households for the waste management of the farm manure. During the on-site interview, the representative from the Ministry of Agriculture and Rural Development (MARD) also confirmed that there are no mandatory requirements for the waste management for small-scale household farms. In general, the households would only bury the animal waste nearby the farm for composting. Then the compost will be used for farming purpose. The MARD and DARD also stated that there is no requirement to conduct any environmental impact assessment for operating a biogas digester. In addition, once the households participate in the project, the trained technician from MARD or DARD will evaluate whether the area is suitable for construction of biogas digester. Thus the government will be informed for the biogas digester installation.

The validation team checked the Decree no. 149 on "Regulation on Licensing of Water Resources Exploitation, Extraction and Utilization and Waste Water Discharge in Water Sources" /12/, it is stated in article 13 that "only wastewater discharge into water sources at a rate of 5,000 m^3/day or higher" requires the wastewater discharge license. Thus this would be only applied to large scale of animal farms with more than 1,000 pig heads and 20,000 poultry heads, and not applied to small scale of rural households, in which they have only less than 10 pig heads and 40 poultry heads according to the validation team's on-site observation. The validation team also interviewed with the rural households, in which they were all small-scale households with only several pigs or cows in the small huts in their living areas.

No significant environmental impacts were identified during the on-site visit to the households' biogas digesters. The local DARD official also did not receive any environmental complaints on the project activity /vi-vii/.

7 GOLD STANDARD CRITERIA FOR STAKEHOLDER CONSULTATION

The Local Stakeholder Consultation (LSC) report /7/ is based on the currently valid GS LSC template and is correctly completed in accordance with requirements in the Toolkit Sections 2.6 and 2.11.

According to the Local Stakeholder Consultation report, the design of stakeholder meeting was reported. The PP has carried out two stakeholder meetings in April 2009. On 3rd April 2009, the consultation was carried out in Nghi Thuan commune, Nghi Loc district of Nghe An Province; while on 8th April 2009, another consultation was carried out in Phong Chau town, Phu Ninh of Phu Tho Province.

The invitation tracking table is included in the Section B1 iii of the LSC report. The invitations were conducted from 29th March – 1st April 2009 in Nghe An Province and from 24th March –

6th April 2009 in Phu Tho Province respectively. The consultation included the representatives from local authorities, biogas masons, NGO and local households (biogas digester users) etc. The stakeholders were invited by a number of methods:

- Official invitation letter to the relevant individual government offices such as local Commune Party Committee (CPC), District Extension Centre, Town Extension Team, Farmer Union, World Wide Fund for Nature (WWF) and provincial technical staff etc. The copy of invitation letter is available in the Section B1 iv of the LSC report. This includes the brief introduction of consultation agenda, purpose of stakeholder meeting and contact information;
- Verbal invitation to the households. The copies of non-technical summary in local Vietnamese language were provided to households and are available in the Section B1 v of the LSC report. This also includes the brief introduction of benefits of biogas programme, purpose of stakeholder meeting and consultation agenda.

All the invitations were confirmed to be received. The validation team interviewed with the local government officials /iv, vi-xi/ during the on-site visit, they also realized that they were invited by the Biogas Project Division for the local stakeholder consultation meeting.

Stakeholder Consultation Meetings

The stakeholder consultation meeting in Nghe An Province was carried out on 3rd April 2009 in Nghi Thuan commune with 44 people attended, while the stakeholder consultation meeting in Phu Tho Province was carried out on 8th April 2009 in Phong Chau town with 39 people attended. According to the invitation tracking table in GS Passport Section B iii, all the invitees were attended the stakeholder consultation meetings.

The lists of participants for the both meetings are included in the Section C of the LSC report. From the background of the stakeholders, the stakeholders consisted of government officials from local authority (Provincial BPD, district extension centre), environmental office, Women union, Farmer Union, town representatives and local villagers. The surveyed stakeholders included representatives from different genders, age groups, educational levels and occupations. It was reasonably believed that the survey could reflect the general attitudes towards the project activity from the local stakeholders who were possibly affected by the project, thus the validation team considers that the local stakeholder consultations were adequate and appropriate. The validation team has reviewed the attendance lists with the signatures of the participants, as indicated in the Annex 1 of the LSC report.

In the meetings, a non-technical summary of the project in Vietnamese language was presented along with presentation slides for the introduction of biogas digesters.

Then the BPD presented the benefits, application and operational instruction of biogas digester, concept of sustainable development and global warming, national biogas programme, proposed programme financing to the local stakeholders. After that, group discussions were arranged for the local stakeholders to raise their queries and comments.

During the stakeholder meetings, the participants completed the evaluation forms. However, the BPD cannot find out the copies of returned evaluation form. Then the validation team has interviewed the participants in the local stakeholder interview in 2009 during the on-site

validation. The representative from the NGO, former Women Union of Nghi Thuan Commune /xii/ stated that they have completed the evaluation forms during the meeting. In addition, the overall comments are supportive to the biogas programme, and showed the interest to install biogas digesters if they could obtain the financial support from the project activity.

The minutes of physical meetings and consultations are included in Section C.3 of the LSC report. According to the comments from the local stakeholders, all the participants understood the biogas digester operation and national biogas programme. Most participants considered that the project activity brings positive effects on reduction of fuel consumption for cooking and lighting, pollution reductions and improvement of living standards. In addition, they were also concerned about the financial support, such as some households stated that there was a delay in the subsidy payment. This is already concerned by the BPD for transparent payment of financial subsidy. Their comments from the blind stakeholder exercise were combined with project participant's assessment, and the consolidated sustainable development matrix is presented. The validation of the sustainable development matrix can be referred to Section 5 of this report.

According to the consolidated sustainable development matrix presented in the Section D.3 of the LSC report, there are no negative scores. In addition, there are no negative comments received during the local stakeholder consultation. Since there are no negative comments, the BPD considered that there will be no alternations to the project activity. According to the GS Toolkits Section 2.7 and 2.8, it is not necessary to perform a revisit sustainability assessment. The validation team considers the LSC has been carried out in accordance with requirements in the Toolkit Sections 2.6 and 2.11.

Stakeholder Feedback Round

According to the GS Toolkit Section 2.11, the stakeholder feedback round (SFR) was held in order to collect the stakeholder feedback. The SFR was started since 7th November 2011 from the email notification to NGOs and related DARD officials. A website of Biogas Programme is launched while NGOs and related stakeholders are invited to provide the opinion for the VGS project until 7th January 2012. The validation team has also received such email notification for the commencement of stakeholder feedback round. This notification is also provided to the Gold Standard according to the GS requirements. Moreover, the BPD has published the announcement in national newspapers for the stakeholder feedback. The newspaper announcement were reviewed by the validation team for the invitation of stakeholder feedback /43-44/. In addition, the BPD also sent letters to local stakeholders in order to seek their comments. The sampled letters for invitation were also checked by the validation team /45/.

After the closure of feedback invitation period, totally 4 feedback comments were received in form of email and letters /46/. These are all positive comments, and some of them are the VGS participants and technicians stating the benefits received from the biogas digester of VGS project activity. Thus there are no follow-up actions required for the PP. This also re-confirms the benefits in the sustainable development contributed by the project activity to the local households.

Thus the validation team considers that the BPD has carried out the stakeholder feedback round as per GS requirements.

8 PRE-FEASIBILITY ASSESSMENT

As the project is applying for retroactive registration, the PP has uploaded the PDD and LSC report to Gold Standard for pre-feasibility assessment as per GS Toolkit Section 2.5. Until the issue of this report, there is no formal feedback to the PP from Gold Standard.

As per the "Gold Standard Pre-feasibility Assessment Checklist for GSV2.1 Retroactive Projects" version 1.0 /64/, the following items are checked in tabular form.

Validation Summary for the Pre-feasibility Assessment Checklist	
Items	**Validation Report Section**
1. Eligibility	
a. Type of project activity	
i. The project activity is a renewable energy supply project. ii. The project activity is a retroactive project that requires PFA. iii. Biogas type of project design is applied with at least 65% of gas recovery as per MARD's design.	2
b. Project	2
i. The project claim for the emission reductions of CO_2, CH_4 and N_2O only.	2
c. Host country or state	
i. VER project: According to MARD, it is ensured that Vietnam does not have a cap enforced, or provide satisfactory assurances that an equivalent amount of allowances will be retired to back-up the issued GS VERs.	2
d. Project timeframe	
i. The validation team checked that a statement for attesting that no previous announcement of the project going ahead without carbon revenues has been made or that the project has subsequently been cancelled or the design has been significantly revised.	2
ii. The project applies 7-year renewable crediting period, and the first crediting period is expected from 1st May 2010 to 30th April 2017.	3.3
iii. The project is not upgrading from GS VER to GS CDM.	Not applicable
iv. Some portion of biodigesters will be applied for CDM, but the total crediting period under all schemes does not overlapped. Please also refer to the validation of double-counting of the carbon credits.	3.1
v. The project is applying for GS VERs, thus the project is potentially eligible for receiving credits for realized emission reductions prior to Gold Standard registration for a maximum period of two years.	2, 3.3
vi. Parallel submission: Some portion of biodigesters is applied for CDM, but the carbon credits in different crediting periods will not be overlapped. Please also refer to the validation of	3.1

double-counting of the carbon credits.	
e. Applicability of methodology	
i.- iii. The validation team considers that the project participant has correctly applied the approved methodology "Technologies and Practices to Displace Decentralized Thermal Energy Consumption" version 1.0 for the project activity.	3
f. Project scale	
i.- iv. The validation team confirms that the project is a large-scale VER project.	2
g. ODA	
i. An ODA declaration is presented in the Annex 1 of the Gold Standard Passport based on the ODA Declaration Template in the Annex D of Toolkit version 2.1, in which the MARD (BPD is a division under MARD) has declared the project's non-use of ODA.	2
h. Projects related to other schemes	
i. The project activity does not claim any Green or White Certificates, or equivalent.	Not applicable
i. Pre-CDM VERs	
i. Some portions of biodigesters are applying for CDM PoA registration, but since it is still under review by the EB. Thus it is not applicable for the pre-CDM VERs at the issue date of this report.	Not applicable
j. Programmes of activities	
i. This project is not a PoA.	Not applicable
2. Clarification on Additionality	
a. Additionality tools	
i.- iii. The validation team confirms that the PP has demonstrated the additionality as per "Tool for demonstration and assessment of additionality" version 06.0.0, which is the latest valid version of Tool approved by UNFCCC. Necessary steps such as alternative scenarios, barrier analysis and common practice analysis were assessed with the publicly available information.	4.2
b. Early consideration of CDM/carbon revenues	
i. The validation team checked the Abstract Domestic biogas and CDM financing by Vietnamese Biogas Project Division and SNV before the project starting date /63/. Thus the early consideration of CDM/carbon revenues is clearly explained.	4.1
c. Sensitivity analysis	
i. Since the project additionality is demonstrated from barrier analysis but not investment analysis, thus sensitivity analysis is not required.	Not applicable
d. References	
i. The validation checked all the provided information for the demonstration	4.2

of project additionality, and confirmed to be valid.	
3. Baseline and Project Emission Reductions	
a. Check PDD	
i.- vii. The validation team considers that the project participant has correctly applied the approved methodology "Technologies and Practices to Displace Decentralized Thermal Energy Consumption" version 1.0 for the project activity. There is also no legally binding regulatory instruments for the project implementation. The validation team also checked the PDD for the evidences assessed of not "common practice". Moreover, the validation team checked that the leakage is addressed as part of project emissions as per the GS methodology.	3.3
b. Ensure that the most conservative baseline scenario is selected	
i.- iv. According to the GS Toolkit Sections 2.2 and 3.5.1, the validation team confirms that the most conservative baseline scenario is selected, and the methodology that results in lowest baseline emissions is used. In addition, the expected lifetime of biogas digester can be up to 25 years.	3.1, 3.2
c. Ensure that the baseline emissions are conservative	
i.- iv. According to the validation of the excel ER worksheet /39/, the validation team considers that the ex-ante baseline emissions from thermal energy use and Animal Waste Management are conservative and correctly estimated as per the applied GS methodology. Correct values are applied for the numerical data sets. Public available information is presented for reproducible and transparent ER estimation. As all the ex-ante estimation was based on publicly available information, there is no data uncertainty ex-ante.	3.3
d. Project emission reductions	
i.- iv. According to the validation of the excel ER worksheet /39/, the validation team considers that the ex-ante project emissions from thermal energy use and Animal Waste Management are conservative and correctly estimated as per the applied GS methodology. Summary tables in the PDD and excel worksheet are also validated by the validation team for the quick review of baseline and project emissions, leakage, and emission reductions. The contact details of the person who conducted the baseline and project emission reductions study are also provided in the PDD Section B.8.	3.3
4. Sustainable Development Assessment	
a. 'Do no harm' assessment	

i.- iv. According to the GS Toolkit Section 2.1 and Annex H, the "Do no harm" assessment is based on the 11 safeguarding principles of the UNDP in four aspects: Human Rights, Labour Standards, Environmental Protection and Anti-Corruption. The validation team considers that potential risks to each safeguarding principles are listed and assessed in the GS Passport. There is no case of a medium to high risk to any safeguarding principle for the project activity.	5
b. Sustainable development matrix	
i.- x. According to the GS Passport, all twelve indicators are correctly scored against the baseline. The scoring of the SD indicators is easily reproducible according to the publicly available and easily accessible information sources, expert opinions, or other supporting documents. In addition, there are no negatively scored indicators, and all the non-neutral indicators are monitored as well. The programme activity has applied the sustainable development assessment matrix as required by the Gold Standard. The total score obtained is +6 in the three sections based on the validation results, while other indicators are neutral. According to the MARD and DARD, environmental impact assessment is not required for the project activity, since the project only involves the construction of biogas digester for small-scale households.	5, 6
c. Stakeholder consultation	
i. The Local Stakeholder Consultation (LSC) report /7/ is based on the currently valid GS LSC template and is correctly completed in accordance with requirements in the Toolkit Sections 2.6 and 2.11. Although this is a retroactive project, but the BPD started the promotion programme since phase I in 2003. The BHP also carried out the stakeholder consultation after the project starting date and present the results in the report according to the LSC report requirements. ii. Recommendations for the stakeholder feedback round (SFR): The BPD has invited stakeholder feedback via webpage, email notification, newspaper and letters to stakeholders, NGO and GS etc. After the closure of feedback invitation period, totally 4 feedback comments were received in form of email and letters /46/ and these are all positive comments. iii. The validation team checked the LSC report, the list of stakeholders, copy of invitation advertisement in newspaper or letter, meeting attendance record, non-technical summary, summary of stakeholder comments are included.	7
5. Monitoring	

a. Monitoring plan in the PDD	
i.- iv. The project monitoring plan in the PDD has clearly described the monitoring procedures in accordance with the applied GS methodology. The validation team also checked that the roles and responsibilities of the monitoring and quality control process are included in the monitoring protocol.	3.4
b. Monitoring plan in the GS Passport	
i.- iv. The validation checked the GS Passport, in which all non-neutral indicators from the matrix as well as indicators are included in the SD monitoring plan. Since there is no negatively scored indicator, it is not required to monitor the mitigation or compensation measures.	5
6. Other	
a. Double-counting	
i. The project just makes use of one energy technology of biogas digester. It is noted that some of the households will be extracted as the target households for the UNFCCC CDM PoA. The CDM PoA is also under validation by TÜV Rheinland (China) Ltd. The emission reductions will be credited in different crediting period for different carbon scheme. Before the CDM PoA registration, all the households can be included in the VGS database, as there is no other carbon crediting scheme at the period. Since the CDM PoA is still under review by UNFCCC, at this stage, the validation team does not reveal the double-counting of the carbon credits.	3.1
b. Credit ownership	
i. The validation team checked the cooperation agreement template (namely "Form 4") between the households and BPD for the clear description of the transfer of credits ownership all along the investment chain, and with the proof that the biogas digester end-users agrees to transfer all carbon credits to the BPD. Thus the PP has claimed the ownership rights of and selling the emission reductions resulting from the project activity.	3.1

9 SUSTAINABILITY MONITORING PLAN

The monitoring of the project activity consists of the monitoring of the emission reductions and the monitoring of the contribution to sustainable development. The monitoring of emission reductions is described in the PDD according to the "Technologies and Practices to Displace Decentralized Thermal Energy Consumption" dated 11th April 2011. Please refer to the Section 3.4 for the validation of monitoring plan for emission reductions. The

sustainability monitoring plan is included in the GS Passport as per the requirements in the GS Toolkit Annex I. The validation of each indicator is tabulated as follows:

No	Indicator	Validation Team's opinion
1	Air quality	According to the research report issued by independent consultant (EPRO Consulting JSC) in 2011, the emission of CO, SO_2, HCs and CH_4 can be reduced from wood and fossil fuel consumption after the use of biogas digester and at least 100% of improvement can be resulted from the calculation of AIP. This project can reduce the baseline emission due to incomplete combustion of wood or fossil fuel, such as soot, smoke, respiratory particulate, CO, H_2S and HCs etc. These are also indicated in the GS Passport for how this can be improved quantitatively from the emission reductions of CO_2 equivalent. Thus the reduction in fuel consumption would induce the reduction in the reductions in soot, smoke, respiratory particulate, CO, SO_2 and HCs etc. This is also quantitatively indicated in the GS Passport for how they are related to fuel consumption. Thus the validation team considers that the reduction in fuel consumption can indirectly reflect the reduction in the soot, smoke, respiratory particulate, CO, SO_2 and HCs etc. Therefore, it can be considered to be used as a SD indicator in air quality. The validation team considers that the measurement of reduction in fuel consumption every 2 years or more frequently is appropriate, as it complies with the requirements from the applied GS methodology for the Project Performance Test (PFT).
2	Soil condition	The validation team considers that the project activity brings positive impact to the soil condition. The reduction in usage of bio-slurry is deemed to be an indirect parameter for the soil condition. This is a clear indicator of the proportion of participants who would use the bio-slurry for the replacement of chemical fertilizer, and thus with the improvement in the soil condition and agricultural product yield. Thus the validation team considers that the selected parameter of usage of bio-slurry to illustrate the improvement of soil condition can be an appropriate indirect indicator. The validation team considers that the usage of bio-slurry compared with baseline every 2 years or more frequently is appropriate, as it complies with the requirements from the applied GS methodology for the Project Performance Test

		(PFT).
3	Biodiversity	The validation team considers that the project activity brings positive impact to the biodiversity. The biogas digester can reduce the consumption of firewood in Vietnam. The validation team considers that the use of biogas digester can help to reduce the pressure on forests for wood fuel production, thus would also improve reservation of plant and fauna being affected due to deforestation. This is also illustrated in the United Nations Development Programme Millennium Development Goals MDG 7 on the biodiversity, in which the CO_2 emission can be considered as one of the indicator for the biodiversity. The reduction in wood fuel consumption is deemed to be a direct parameter for the biodiversity. This is a clear indicator of prevention of habitat loss due to reducing deforestation. The monitoring is also revised for referring to CMS monitoring results for the wood consumption in project scenario compared with the baseline wood consumption in the BPD database. Then it is multiplied by the number of biodigester in use which is monitored in the User Survey. Thus the validation team considers that the selected parameter of reduction in wood consumption to illustrate the improvement of biodiversity can be an appropriate indirect indicator. The validation team considers that the measurement of wood consumption compared with baseline every 2 years or more frequently is appropriate, as it complies with the requirements from the applied GS methodology for the Project Performance Test (PFT).
4	Quality of employment	The validation team considers that the quality of employment can be monitored directly from the number of masons and technicians participating in the trainings arranged by the BPD. According to the BPD, they will arrange trainings to the technicians and masons regularly. The validation team also checked the computer database from BPD for the registration and record of qualified masons and technicians during the on-site visit. The validation team also interviewed with the mason for the construction of biogas digester, in which he confirmed that he received the trainings from provincial BPD regularly. So that the workers can improve their skills in the biogas programme, and thus improve the quality of employment. Since there is no requirement for the monitoring of trainings of workers, the project participant proposes the monitoring of the training reports and records biannually or annually. The

		monitoring of the training of workers will be carried out by the BPD office staff, as they are all familiar with the computer database and training arrangement. The validation team considers that the monitoring frequency is reasonable but shall depend on the future verification frequency requested by the PP. At this stage, the PP complies the requirements of the monitoring of the indicator of quality of employment.
5	Livelihood of the poor	The validation team considers that the project can bring positive impacts to the livelihood of the poor by improving the indoor air quality. According to the UNDP and WHO information /61/, the validation team realizes that the reduction in fuel consumption can improve the livelihood of the poor, by saving the money to purchase fuel and time to collect woody fuel. The parameter of reduction in fuel consumption can be an indirect parameter to qualitatively indicate the improvement of livelihood of the poor. The validation team checked that the PP would monitor the number of improved waste management system, which is proposed in the table I-3 of the GS Toolkit Annex I as one of the possible indicator of the parameter of livelihood of the poor. The validation team considers that this can be appropriate to reflect direct for the positive impact of the improvement in livelihood of the poor. The validation team considers that the measurement of number of improved waste management system every 2 years or more frequently is appropriate, as it complies with the requirements from the applied GS methodology for the Project Performance Test (PFT).
6	Access to affordable and clean energy services	The validation team considers that the use of biogas digester can reduce fuel consumption and thus the associated energy consumption for cooking and lighting. The validation team considers that the measurement of “total amount of energy replaced by biogas” is an indirect indicator, as the actual monitored parameter is the “reduction in fuel consumption” and then multiplying constant values of energy factors. In addition, the monitoring frequency for every 2 years or more frequently is appropriate, as it complies with the requirements from the applied GS methodology for the Project Performance Test (PFT).
7	Technology transfer and technological self-reliance	It is confirmed that without this proposed project activity, there is no such biodigester installed following the MARD standards. This technology is sourced from foreign country adopted from China and Germany design. The Vietnamese

		institute of Energy (IE) worked on the modification of the biodigester design in order to implement in Vietnamese households. The KT model is finally adopted as the Vietnamese standard approved by the MARD. Thus this technology can be considered as sourced from outside country as long as it is new to the rural areas of Vietnamese households, and introduced in a proven sustainable way. According to the LSC report and the information from BPD webpage, lots of seminar, workshop, and trainings have been organized by the BPD in order to promote this technology to the potential households or other stakeholders. Thus the PP applies the parameters of number of masons received the training for the installation of biodigester as the direct practice of technology transfer from BPD to mason and then to the households users. This is also indicated that the number of participants attending the capacity building activities can be considered as the monitoring parameter in the GS Toolkit Annex I Table I-4. Thus the validation team considers that the number of masons trained in the construction of KT model digesters can be the appropriate indicator for the monitoring of "technology transfer and technological self-reliance". Thus the monitoring of this indicator can be fulfilled with the requirements from the applied GS methodology, in which the training would be monitored by PBPD biannually or annually. The validation team therefore considers that the monitoring parameter and procedure is feasible and appropriate.

10 VALIDATION OPINION

Nexus Carbon for Development Ltd. has commissioned the DOE TÜV Rheinland (China) Ltd. to perform a validation of the Voluntary Gold Standard project activity "Biogas Program for the Animal Husbandry Sector of Vietnam". The validation is based on the information made available to the validation team, and the validation engagement only covered the project components detailed in this report. The validation team of TÜV Rheinland (China) Ltd. would not be held liable by any party for decisions made or not made based on the validation opinion, which will go beyond that purpose.

According to the GS requirements version 2.1, the chosen parameters and the justification of preliminary scores could be fully demonstrated in the sustainable development matrix and the corresponding sustainability monitoring plan.

The additionality of the project activity is demonstrated in the PDD according to the requirements of the UNFCCC for CDM project activity. The validation team has checked that

the project correctly applies Gold Standard Methodology: Technologies and Practice to Displace Decentralized Thermal Energy Consumption dated 11th April 2011. The monitoring of emission reductions and sustainable indicators is clear identified in the GS Passport and GS-PDD. The total emission reductions are estimated to be 4,123,873 tCO_2e over the selected first 7-year renewable Voluntary Gold Standard crediting period, as expected from 1st May 2010 to 30th April 2017.

In summary, the validation team of TÜV Rheinland (China) Ltd. concludes that the Voluntary GS project activity "Biogas Program for the Animal Husbandry Sector of Vietnam" in Viet Nam as described in the PDD (version 3.1 dated 24th September 2012) and GS Passport (version 3.1 dated 25th September 2012), meets all relevant requirements of the Gold Standard version 2.1 for the Voluntary GS project activity. The selected baseline/monitoring methodology is applicable to the project and correctly applied in the PDD. The DOE therefore would request the registration of the project activity as a Voluntary Gold Standard project activity.

Appendix A

SUSTAINABILITY VALIDATION PROTOCOL
- FOR VOLUNTARY GOLD STANDARD PROJECT ACTIVITY -

PROJECT TITLE: BIOGAS PROGRAM FOR THE ANIMAL HUSBANDRY SECTOR OF VIETNAM

PROJECT LOCATION: VIET NAM

REPORT NO. 01 997 9105066812-GS

Table 1: Validation requirements

(based on the GS Toolkit, GS Requirements and their relevant Annexes)

Checklist question	Ref.	MoV*	Findings, comments, references, data sources	Draft conclusion	Final conclusion
1. Project Eligibility					
1.1 Has the correct project size been selected?	/1-8/	DR, I	Yes. The project activity qualifies as a large scale project activity and meets the applicability criteria of Gold Standard Methodology: Technologies and Practice to Displace Decentralized Thermal Energy Consumption dated 11th April 2011.	OK	OK
1.2 Does a written statement (e.g. in the PDD) clearly describe that the project is not a de-bundled part of a large or small scale project?	/1-8/	DR, I	Not applicable since this is a large scale project activity.	OK	OK
1.3 If there is an applicable cap-and-trade scheme in the project's host country, has an arrangement been made to cancel allowances in the applicable scheme?	/1-8/	DR, I	Not Applicable. According to the MARD, there is no cap-and-trade scheme in Vietnam.	OK	OK
1.4 Does the project clearly demonstrate its eligibility under Gold Standard?	/1-8/	DR, I	Yes. The project activity has demonstrated its eligibility under Gold Standard. Please refer to Section 2 for detailed validation.	OK	OK
1.5 Does the project reduce an applicable GHG?	/1-8/	DR, I	Yes. Through the implementation of the programme activity, applicable GHG emissions such as CO_2, CH_4, N_2O can be reduced	OK	OK
1.6 Does the project clearly demonstrate that no	/1-8/	DR, I	Yes. The SNV and BPD declares that no	OK	OK

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

	ODA has been used under the condition that the credits coming out of the project are transferred to the donor country?			ODA has been used under the condition that the credits coming out of the programme are transferred to the donor country in the Annex 1 of GS Passport. During the on-site interview, the MARD and Dutch Embassy officials also confirmed that there is no ODA for the programme activity.		
1.7	Does the project apply the correct project cycle (regular vs. prefeasibility assessment)?	/1-8/	DR, I	Yes. Since the project activity is already operational and still under implementation at the time of first submission to the GS. The validation team considers that it is appropriate to apply a retroactive project cycle for the Voluntary Gold Standard project activity Thus a pre-feasibility assessment will be carried out by GS accordingly. **CL13** Please clarify the starting date of project activity according to Glossary of CDM term, in which this was the earliest date at which implementation or construction or real action of the project began. **CL14** Please provide the substantiation information for the GS consultancy service contract between the Nexus Carbon and BPD as indicated in the PDD table 3. **CL15** Please provide the data source in PDD	~~CL13~~ ~~CL14~~ ~~CL15~~	OK (Refer to Table 2)

			table 4 for the price of digester and also the average size of digester which built between 1st January 2007 and 31st August 2011.		
1.8 Is the project being registered under any other certification scheme for the same or overlapping crediting periods?	/1-8/	DR, I	No. The project activity will be implemented in 63 provinces in the whole country of Vietnam. The validation team also checked that this VGS project includes the households in Biogas Programme Phase II implemented by the BPD. However, some of the households will be extracted as the target households for the UNFCCC CDM PoA. It is confirmed that the households for CDM CPA1 and CPA2 will be only included in the PoA once the CDM PoA is registered. Thus before the CDM PoA validation, all the households can be included in the VGS database, as there is no other carbon crediting scheme at the period. Since the CDM PoA is still under validation, at this stage, the validation team does not reveal the double-counting of the carbon credits. For the subsequent CPA inclusion, the households involved will be separated from this VGS project activity. Moreover, the BPD can also decide whether the households will be included in the CDM CPA or VGS depending on the future carbon market or policy.	OK	OK
2. Deviations in GHG Emission Reduction Estimation (Gold Standard Conservativeness Principle)					
2.1 Has the baseline scenario been constructed in a conservative manner (i.e. assumptions	/1-8/	DR, I	Yes. According to the CDM validation of the programme activity, the baseline is	OK	OK

	are made explicitly and choices are substantiated)?			identified according to applied GS methodology “Technologies and Practices to Displace Decentralized Thermal Energy Consumption” dated 11 April 2011, as the typical baseline fuel consumption patterns in a population that is targeted for adoption of the project technology. Thus the baseline scenario has been constructed in a conservative manner, and the assumptions are made explicitly and choices are substantiated.		
2.2	Does the PDD use the latest version of the methodology and the latest interpretation form the EB at the time of first submission to the GS?	/1-8/	DR, I	The latest version of methodology, “Technologies and Practices to Displace Decentralized Thermal Energy Consumption” dated 11 April 2011, is used in the PDD accordingly at the time of first submission of the project activity for Gold Standard as per GS Requirement III.f.1. **CL01** Please identify the project boundary as per the Section I for the applicability of the project in the GS approved methodology. **CL02** The validation team considers that the baseline technology of firewood stove will be still be used in parallel as a backup or auxiliary technology. Please clarify the conditions for the project applicability according to the Section I of the GS methodology.	~~**CL01**~~ ~~**CL02**~~	OK (Refer to Table 2)

2.3 Does the PDD describe the baseline methodology?	/1-8/	DR, I	Yes. The PDD describes the baseline methodology according to “Technologies and Practices to Displace Decentralized Thermal Energy Consumption” dated 11 April 2011. The validation team verified that the project activity correctly applies the methodology.	OK	OK
2.4 Does the PDD describe the quantified baseline scenario?	/1-8/	DR, I	Yes. The PDD describes the quantified baseline scenario according to “Technologies and Practices to Displace Decentralized Thermal Energy Consumption” dated 11 April 2011, in which the baseline is correctly identified as the typical baseline fuel consumption patterns in a population that is targeted for adoption of the project technology.	OK	OK
2.5 Does the PDD include and overview of the current and known future legally binding regulatory instruments and assess whether the project would be implemented anyway because of these?	/1-8/	DR, I	Yes. The PDD describes the baseline scenario according to “Technologies and Practices to Displace Decentralized Thermal Energy Consumption” dated 11 April 2011, which is in line with the current and known future legally binding regulatory instruments. The PDD also includes the assessment of whether the project activity would be implemented anyway because of these.	OK	OK
2.6 Does the PDD provide evidence based on which “common practice” of the technology used can be assessed?	/1-8/	DR, I	Yes. The PDD provides evidence to illustrate that the project activity is not considered as “common practice”. The local residents mainly rely on traditional cooking fuels such as firewood, and this is also confirmed by the government officials. The usage of biogas digester is therefore confirmed as not the “common	OK	OK

			practice".		
2.7 Does the PDD address leakage issues as part of the baseline and project boundary?	/1-8/	DR, I	Yes. It is addressed in the PDD that according to "Technologies and Practices to Displace Decentralized Thermal Energy Consumption" dated 11 April 2011, leakage is analysed to be neglected. The physical leakage from biogas digester and biogas stoves are included in the calculation of project emissions.	OK	OK
2.8 Does the project apply the methodology that results in the lowest baseline emission?	/1-8/	DR, I	Yes. The PDD describes the baseline scenario according to "Technologies and Practices to Displace Decentralized Thermal Energy Consumption" dated 11 April 2011, in which the baseline is correctly identified as the typical baseline fuel consumption patterns in a population that is targeted for adoption of the project technology. This results in the lowest baseline emissions. **CL04** Please clarify the exclusion of baseline emissions for agricultural residues in Table 7 although the validation team considers it is a conservative estimation.	~~**CL04**~~	OK (Refer to Table 2)
2.9 Are all likely baseline scenarios developed and quantified in the PDD?	/1-8/	DR, I	Yes. The PDD describe the baseline scenario according to "Technologies and Practices to Displace Decentralized Thermal Energy Consumption" dated 11th April 2011, in which the baseline is prescribed. Thus it is not necessary to develop and quantify likely baseline scenario.	~~**CL07**~~	OK (Refer to Table 2)

			CL07 Please clarify (if any) the quality control for the VGS database so that the baseline information can be referred reliably.		
2.10 Are there any material uncertainties over the numerical data sets applied (e.g. generator efficiencies, and fuel types and resulting emission factors, etc.)?	/1-8/	DR, I	No. The validation team checked the estimation of emission reductions in the PDD, and there is no indication of any material uncertainties over the numerical data sets applied.	OK	OK
2.11 Is there a systematic referencing to publicly available information or to expert or expert opinions?	/1-8/	DR, I	Yes. A systematic referencing to publicly available information is available as indicated in the PDD. **CL10** Please provide the monitoring organization structure information including the roles and responsibility of main monitoring personnel. **CL11** Please provide data collection and storage arrangement such as data archiving and storage time in the monitoring plan. **CL12** Please provide sampled training records for the biogas users before and after construction for validation.	~~**CL10**~~ ~~**CL11**~~ ~~**CL12**~~	OK (Refer to Table 2)
2.12 Is information verifiably presented with a	/1-8/	DR, I	Yes. The validation team considers that	~~**CL08**~~	OK

sufficient degree of detail and transparency?			the verifiably information is presented with a sufficient degree of detail and transparency. **CL08** Please clarify how the reliability of the monitoring can be ensured as unbiased as the monitoring is arranged by the BPD. **CL09** Please supplement in the sampling plan about the "procedures for administrating data collection and minimizing non-sampling" and "implementation" in accordance with the requirements in the relevant sampling standards from UNFCCC.	~~CL09~~	(Refer to Table 2)
2.13 Is it fully transparent from the PDD which sets of data were selected based on the prerogative of conservativeness?	/1-8/	DR, I	Yes. The validation team considers that it is fully transparent from the PDD which sets of data were selected based on the prerogative of conservativeness he verifiably information is presented with a sufficient degree of detail and transparency. **CL03** Please clarify the EF_b and NCV_b for agricultural residues in the IPCC Guideline 2006 Volume 2 chapter 2, whether the agricultural residues belong to wood waste.	~~CL03~~ ~~CL05~~ ~~CL06~~	OK (Refer to Table 2)

			CL05 The validation team considers that the determination of $f_{NRB, y}$ is transparent and traceable. However, the PP is requested to clarify the selection of the conservative scenario compared with the qualitative assessment of FAO for 2010 with timber inclusion. **CL06** Please provide the Biogas User Survey (BUS) 2010-2011 for cross-checking of the data source of fuel consumption in project scenario.		
2.14 Does the PDD include full references to sources of data used?	/1-8/	DR, I	Yes. The PDD includes full references to source of data used. The reference sources are also verified by the validation team, and confirmed to be valid.	OK	OK
2.15 Are data uncertainties clearly stated, if possible, with associated margins of error?	/1-8/	DR, I	N/A. The data are certainly stated in the PDD.	OK	OK
3. Gold Standard Criteria on Additionality					
3.1 Has the PP selected and applied the correct tool for demonstrating additionality?	/1-8/	DR, I	Yes. The programme activity correctly applies the UNFCCC's "Tool for demonstration and assessment of additionality" for demonstration of project additionality.	OK	OK
3.2 Is the line of argumentation used by the PP to demonstrate additionality correct?	/1-8/	DR, I	Yes. The BPD used a correct argument to demonstrate programme additionality. As noted in the PDD, the barrier analysis is carried out. This includes the investment barrier, technological barrier due to prevailing practice and financial	OK	OK

			barriers at user level. It is demonstrated that the project activity is unlikely to be financially viable without carbon revenue support.		
3.3 Are the references used to demonstrate additionality up-to-date and reliable?	/1-8/	DR, I	Yes. The references used to demonstrate additionality are updated and reliable.	OK	OK
3.4 Has the PP compared the proposed project activity with normal practice in the region (especially if similar projects have already been implemented on a commercial basis in the region)?	/1-8/	DR, I	Yes. The validation team confirms that the project activity is first of its kind in Vietnam. Thus this cannot be compared with other practice in the region of Vietnam. There are no similar projects being implemented on a commercial basis in the region.	OK	OK
3.5 Are assumptions (qualitative or quantitative) used to demonstrate additionality conservative?	/1-8/	DR, I	Yes. The validation team checked the qualitative assessment of the programme, and confirmed that the assumptions used to demonstrate additionality are conservative.	OK	OK
4. Sustainability Assessment					
4.1 Is “Do no harm” assessment based on accurate information?	/1-8/	DR, I	Yes. The validation team checked the “Do no harm” assessment is based on accurate information from the project participant, particularly from the local knowledge of government such as DARD, PBPD and experience from NGO.	OK	OK
4.2 Has a sustainable development matrix been developed? If yes, is it prepared according to the guidance under GS Toolkit Section 2.4.2, Table 3.2 and Annex I?	/1-8/	DR, I	Yes. A sustainable development matrix has been developed. The validation team considers that the chosen parameters in the matrix are suitable Gold Standard indicators.	~~CL16~~ ~~CL17~~ ~~CL18~~ ~~CL19~~	OK (Refer to Table 2)

			CL16 Please provide (if any) quantitative information for the potential biogas users, i.e. the rural households with small farms for validation. **CL17** Please clarify how the reduction in fuel consumption reflects the reduction of air pollutants quantitatively. **CL18** Please clarify how the emission reduction is used to quantify the improvement in biodiversity. **CL19** Please clarify how the project reduces drudgery and how the improvement of livelihood of the poor can be illustrated quantitatively from the change in traditional fuel consumption.		
4.3 Is the matrix based on existing sources of information (data from existing reports, results from stakeholder consultation, experiences with similar projects in similar situations, expert judgement if data are unavailable or are of poor quality, etc)?	/1-8/	DR, I	Yes. The matrix is based on existing sources of information. However, some clarifications of the chosen parameters for the Gold Standard indicator are requested.	OK	OK
4.4 Are data and expert opinions presented in a sufficient degree of detail and transparency? Are they verifiable?	/1-8/	DR, I	Yes. The validation team considers that the data and expert opinions are presented in a sufficient degree of detail and transparency. However, some chosen parameters for the Gold	OK	OK

			Standard indicator are considered as not clearly verifiable.		
4.5 Are data uncertainties clearly stated with associated margins of error?	/1-8/	DR, I	N/A. The data are clearly stated with uncertainties.	OK	OK
4.6 Is 'scoring' reproducible and verifiable?	/1-8/	DR, I	No. The validation team considers that some chosen parameters and the corresponding scoring for the Gold Standard indicator are considered as not clearly reproducible and verifiable.	OK	OK
4.7 Are at least two of the sub-totals (categories) positive? Is the third sub-total at least neutral?	/1-8/	DR, I	Yes. All the sub-totals categories are scored as positive.	OK	OK
4.8 Is there a clear explanation on 'how the matrix was completed together with the stakeholders'?	/1-8/	DR, I	Yes. The LSC report provides clear explanation on the combination of stakeholders' comments with the PP's matrix into the consolidated sustainable development matrix.	OK	OK
5. Environmental Impact Assessment					
5.1 Does the project activity conform to host country (local, regional or national) requirements concerning environmental impact assessment?	/1-8/	DR, I	Yes. The project activity conforms to the local requirement from the Circular "Guiding Strategic Environmental Assessment, Environmental Impact Assessment and Environmental Protection Commitment" issued by the Ministry of Natural Resources and Environment, December 2008 (No. 05/2008/TT-BTNMT), and Law on Environmental Protection of Vietnam (No: 52/2005/ QH11). There are no special requirements for the small farm households for the waste management of the farm manure. The MARD and DARD also stated that there is no	OK	OK

			requirement to conduct any environmental impact assessment for operating a biogas digester.		
5.2 For micro-scale projects, is there an owner declaration that guarantees that the project complies with local environmental regulations?	/1-8/	DR, I	N/A. The project activity is not a micro-scale project.	OK	OK
6. Gold Standard Criteria for Stakeholder Consultation					
6.1 Stakeholder Consultation					
6.1.1 Have PPs fulfilled the GS requirements, set out in GS Toolkit Section 2.6 and 2.11, regarding stakeholder consultation?	/1-8/	DR, I	Yes. The BPD fulfilled the GS requirements set out in GS Sections 2.6 and 2.11, regarding stakeholder consultation.	OK	OK
6.1.2 Has an Invitation tracking table been filled out?	/1-8/	DR, I	Yes. An invitation tracking table has been filled out as indicated in the Section Biii of the LSC report.	OK	OK
6.1.3 Are copies of invitations published/sent out available?	/1-8/	DR, I	Yes. The copies of invitation letter in form of email and letter are available, and the samples are also included in the Section B of the LSC report.	OK	OK
6.1.4 Is a non-technical summary included in the Local Stakeholder Consultation report?	/1-8/	DR, I	Yes. A non-technical summary is included in the Section Bii of the LSC report.	OK	OK
6.1.5 Is a participant list available?	/1-8/	DR, I	Yes. A participant list is available as indicated in the Section C of the LSC report.	OK	OK
6.1.6 Are stakeholder evaluation forms available?	/1-8/	DR, I	Yes. The returned stakeholder evaluation forms are available as indicated in the Annex 2 of the LSC report.	OK	OK
6.1.7 Are minutes of the meeting(s) available?	/1-8/	DR, I	Yes. The meeting minutes are available	OK	OK

			as indicated in the Section C3 of the LSC report.		
6.1.8 Has due account been made on comments received?	/1-8/	DR, I	Yes. Due account has been made on the comments received from the participated local stakeholders.	OK	OK
6.1.9 If stakeholders required a revisit of the sustainable development assessment, has this been done?	/1-8/	DR, I	No. As there are no negative comments received from the evaluation forms, the BPD considered that there would be no alternations to the project activity. According to the GS Toolkits Section 2.7 and 2.8, it is not necessary to perform a revisit sustainability assessment.	OK	OK
6.1.10 Is the consolidated sustainable development matrix presented based on own 'preliminary' scoring and the matrix from the outcome of the blind stakeholder exercise?	/1-8/	DR, I	Yes. The consolidated sustainable development matrix presented in the LSC report is based on BPD's preliminary scoring and the matrix from the outcome of the blind stakeholder exercise.	OK	OK
6.2 Stakeholder Feedback Round					
6.2.1 Is there evidence clearly showing that the latest version of the complete PDD (including the EIA, if applicable) was made publicly available for a period of two months prior to completion of the validation in a readily accessible form?	/1-8/, /43-46/	DR, I	Yes. The stakeholder feedback round is currently in progress since 7 November 2011 from the email notification to NGOs and related DARD officials. A website of Biogas Programme is launched and NGOs and related stakeholders are invited to provide the opinion for the VGS project until 7 January 2012. Moreover, the BPD has published the announcement in national newspapers for the stakeholder feedback. The validation team has also received such email notification for the commencement of stakeholder feedback round. This notification is also provided	~~CL20~~	OK (Refer to Table 2)

			to the Gold Standard according to the GS requirements. Thus there is evidenced that latest version of documents were made publicly available for a period of two months prior to completion of the validation in a readily accessible form. **CL20** Please provide the stakeholders' comment collected from the stakeholder feedback round for validation.		
6.2.2 Is there evidence clearly showing that the non-technical summary of the project (in appropriate local language(s)) was made publicly available for a period of two months prior to completion of the validation in a readily accessible form?	/1-8/, /43-46/	DR, I	Yes. The validation team checked all the evidence showing that non-technical summary of the project (in Vietnamese language(s)) was made publicly available for a period of two months prior to completion of the validation.	OK	OK
6.2.3 Is there evidence clearly showing that all relevant supporting information (if available, in appropriate local language(s)) was made publicly available for a period of two months prior to completion of the validation in a readily accessible form?	/1-8/, /43-46/	DR, I	Yes. The validation team checked all the evidence showing that relevant supporting information (in Vietnamese language(s)) was made publicly available for a period of two months prior to completion of the validation.	OK	OK
6.2.4 Does the Passport include a description of the procedure followed to invite comments, including addressing all the details of the oral hearing such as place, date, participants, language, local or national GS NGO supporters, etc.?	/1-8/, /43-46/	DR, I	Yes. The validation team checked the Passport which includes a description of the procedure followed to invite comments, including addressing all the details of stakeholder feedback round.	OK	OK
6.2.5 Does the Passport include all written or oral comments received?	/1-8/, /43-46/	DR, I	Yes, The Passport includes all written or oral comments received in stakeholder feedback round.	OK	OK

6.2.6	Does the Passport include the argumentation on whether or not comments are taken into account and the respective changes to the project design?	/1-8/, /43-46/	DR, I	Yes, The Passport includes all comments but there is no comment respective to changes to the project design.	OK	OK
7.	**Pre-Feasibility Assessment**					
7.1	Has the feedback from GS been followed-up?	/1-8/, /64/	DR, I	Yes. The feedback for pre-feasibility assessment checklist is provided by GS, and the checklist is assessed by the validation team as reported in Section 8.	OK	OK
8.	**Sustainability Monitoring Plan**					
8.1	Are chosen parameters relevant to the indicators?	/1-8/	DR, I	Yes. The validation team considers that the chosen parameters are clearly indicated as relevant to the GS indicators. **CL21** According to the monitoring of sustainable indicators, please clarify the party carrying out the monitoring survey, whether all the participated households will be surveyed or sampled households will be taken part. **CL22** Please clarify whether the reduction in fuel expenditure can completely reflect the amount of reduction in fuel consumption.	~~CL21~~ ~~CL22~~	OK (Refer to Table 2)
8.2	Is the sustainability monitoring plan unambiguous about who will monitor with what frequency?	/1-8/	DR, I	Yes. The sustainability monitoring will be carried out by the BPD with specified frequency as indicated in the GS Passport.	OK	OK

8.3 Is there any concern regarding the feasibility of the plan?	/1-8/	DR, I	The validation team considers that the chosen parameters are clearly indicated as relevant to the GS indicators. Please refer to 8.1 of Table 1.	OK	OK

Table 2: List of Requests for Corrective Action (CAR) and Clarification (CL)						
No.	**CAR/CL**		**Observation (CAR/CL)**	**Reference**	**Summary of programme proponent response**	**Validation team conclusion**
1.		√	**CL01** Please identify the project boundary as per the Section I for the applicability of the project in the GS approved methodology.	2.2	The eligibility criteria according to section I of the methodology are discussed in PDD section B2. Section II of the methodology focusses on the project boundary. The project boundary is identified using that section of the methodology. The boundary is the geographical sites of the project technology. As BPD will gradually cover the whole of Vietnam, the project boundary is Vietnam. Section B.3 is modified accordingly, see PDD version 1.6.	The validation team checked the updated PDD, in which the project boundary is defined as the whole Vietnam. After 2013, it is expected that the project can extend to all 63 provinces in the whole country of Vietnam. The baseline firewood will be also collected from Vietnam within the project boundary. The validation team considers that the project boundary is correctly identified. OK. Therefore the CL is closed.
2.		√	**CL02** The validation team considers that the baseline technology of firewood stove will be still be used in parallel as a backup or auxiliary technology. Please clarify the conditions for the project applicability according to the Section I of the GS methodology.	2.2	That is also what the PP assumes. Point tree of the eligibility criteria stipulates this: The use of the baseline technology as a backup or auxiliary technology in parallel with the improved technology introduced by the project activity is permitted as long as a mechanism is put into place to encourage the removal of the old technology (e.g discounted price for the improved technology) and the definitive discontinuity of its us.	The validation team checked the updated PDD, in which the baseline technology of firewood stove will be also used in parallel of the newly introduced technology of the project activity. The fuel consumption of continuation of baseline technology will be monitored as the project emissions of the project activity. This also fulfills the requirement of the applied GS methodology Section I clause 3. OK. Therefore the CL is closed.

					Biogas plants are not an improved technology but a new technology. A technology that is improved refers to the same technology but with a higher efficiency, for example in the case of improved cook stoves. Therefore, it is not necessary to encourage the removal of the old technology. Baseline fuels used in the project is monitored in the carbon monitoring survey.	
3.		√	**CL03**: Please clarify the EF_b and NCV_b for agricultural residues in the IPCC Guideline 2006 Volume 2 chapter 2, whether the agricultural residues belong to wood waste.	2.13	The value is changed to the one of 'other primary solid biomass'. The value for agricultural residues is considered to be more closely resembling other primary solid biomass (see table 2.5 of that document). The EF and the NCV is changed accordingly. Note the non-CO2 EF (methane and n20) values are changed by applying table 2.9 which provides specific values for stoves, see page 28 of IPCC guideline chapter 2. Where a range is provided, the average is taken as EF. In case of wood stoves, the one with reference number 7 is used, as these values are regional values.	The validation team checked NCV for agricultural residues is revised to "other primary solid biomass", which is in line with the data in the IPCC Guideline 2006 Volume 2 Table 1.2. Since the NCV is the lowest among all the solid biomass in Table 1.2, the validation team considers that it is reasonable and traceable to apply this value in the ER calculation. The validation team also checked the EF_{CO2} for agricultural residues which is sourced from the EF_{CO2} of "other primary solid biomass" in the IPCC Guideline 2006 Volume 2 Table 2.5. The default values for EF_{CO2} is 100,000 kg/TJ, which is consistent with the value in the ER calculation. The EF_{CH4} and EF_{N2O} are sourced from "other primary

					The EFch4 value of kerosene has been updated accordingly, this is the average of 2.2 and 23 = 12.6 kgCH4/TJ, see PDD and the updated excel workbook	solid biomass" in the IPCC Guideline 2006 Volume 2 Table 2.9 for traditional stoves. The default values for EF_{CH4} and EF_{N2O} are averaged as 2,210 and 9.7 kg/TJ respectively, which are consistent with the values in the ER calculation. Moreover, the validation team checked the updated PDD, in which the EFCH4 of kerosene is revised to the average value indicated in the IPCC Volume 2 Table 2.9. The validation team considers that this is applicable to apply the average value for the estimation of EF_{CH4} of kerosene. The validation team also checked that the PDD and ER excel worksheet are then revised accordingly. OK. Therefore the CL is closed.
4.		√	**CL04**: Please clarify the exclusion of baseline emissions for agricultural residues in Table 7 although the validation team considers it is a conservative estimation.	2.8	It is assumed that the CO2 emission from agricultural residues is renewable. These emissions belong to the short cycle carbon emissions, where the release of carbon is offset by the uptake by the crops/plants.	The validation team considers that it is conservative to exclude the CO_2 emissions from renewable agricultural residues in the baseline, and the carbon release will be offset from forestry. OK. Therefore the CL is closed.

5.		√	**CL05**: The validation team considers that the determination of $f_{NRB, y}$ is transparent and traceable. However, the PP is requested to clarify the selection of the conservative scenario compared with the qualitative assessment of FAO for 2010 with timber inclusion.	2.13	The fNRB value adopted is second lowest in the range of 6 fNRB values (see figure 10 on page 76). The PP belief that the chosen fNRB is conservative as it is lower than the average of the 6 values (67% instead of 69%). In addition, the FAO used the forestry assessment of 2005, while the calculated fNRB used the forest cover assessment of 2010 (latest available) and therefore more closely resembles the actual situation. The latest date available is applied for the NRB assessment. This is based on the latest MARD forest assessment of 2010. The PP has never adopted older values for the calculated NRB fraction. The reason calculated fNRB using the FAO outlook study of 2009 was not adopted is because it used the forestry assessment of 2005. The FAO country report of 2010 is not usable as this is only an assessment of the forest, not of wood demand and supply balances. In all cases, the FAO uses the MARD forestry assessment values and in the case of the 2010 country report the values of 2007.	The validation team checked the estimation of f_{NRB}, and agrees that the information in 2005 is the available information at the time of project starting date. The validation team considers that the FAO research was not specified for the woody biomass consumption, but focused on the forestry development in 2009. The validation team also considers that it is more reliable to adopt the quantitative assessment according to latest MARD's study specified on the woody biomass consumption for the project activity in 2010. Thus it is conservative for the PP to apply the minimum value of 67% for f_{NRB} as sourced from MARD information. As it is indicated in the applied GS methodology Annex 5 that the update of NRB assessment for one crediting period can be proposed by the PP. "The PP may be updated the NRB prior to verification". The validation team also considers that the f_{NRB} is not mandatory for monitoring in one crediting period, and therefore it is correctly applied by the PP to use

					In conclusion, the PP does not adopt the calculated fNRB fraction based on the FAO outlook study of 2009 because it uses the forestry assessment of 2005, which is outdated. The PP does not use the FAO country report of 2010 as it uses the forestry assessment of 2007 and does not include a wood demand and supply assessment. Rather, the PP uses the latest forestry assessment of MARD of 2010 to ensure that a reliable and recent fNRB is obtained that is valid for the first crediting period. The validity is assessed in the NRB section of the PDD by showing that the wood fuel deficit will not diminish, see page 75 (*Wood shortfall and therefore wood deficit is forecast to continue in the near and far future. This will mean that the unsustainable harvesting practices will continue and that the pressure on the forest will not decrease before 2020)* The FAO country report of 2010 is included for validation. In annex 5 of the methodology the project preparation and monitoring schedule is shown, this states that the NRB	the ex-ante f_{NRB} during the first crediting period. OK. Therefore the CL is closed.

					assessment has to be executed for the validation and may be updated as proposed by the PP. The PP will update the NRB assessment for the next crediting period. See also page 9 of the methodology where this is stated: *'The approach to calculating the NRB is defined in Annex 1. The NRB assessment may be updated prior to verification if further analysis and or surveys are conducted after the baseline study. Project proponents applying for a renewal of the crediting period must reassess the NRB based on most recent information available'* This implies that it is not necessary to update the NRB during the first crediting period. The PP choses therefore not to update the NRB assessment as no further studies will be conducted before the second crediting period.	
6.		√	**CL06**: Please provide the Biogas User Survey (BUS) 2010-2011 for cross-checking of the data source of fuel consumption in project scenario.	2.13	See the data from the survey. Please also note, that these are ex-ante estimates and that the BUS survey is not a carbon monitoring survey. Ex-post values will be made available after the CMS for each monitoring period	The Biogas User Survey (BUS) 2010-2011 is checked by the validation team for the data source of fuel consumption in the ex-ante estimation for project scenario in the PDD.

						The fuel consumption data is in line with the Table 12 of the PDD. The validation team understands that the fuel consumption will be monitored during monitoring period according to the monitoring plan in the PDD, and BUS survey is another study from official department. OK. Therefore the CL is closed.
7.		√	**CL07**: Please clarify (if any) the quality control for the VGS database so that the baseline information can be referred reliably.	2.9	Data entered into the VGS database is collected by the district technician and in the decentralized provinces checked by the provincial technician before entered into the database. In the not decentralized (new provinces) provinces, the head office checks the data and enters the data in the database. In addition to this, BPD staff checks randomly 1% of the biogas plants and cross checks with the database for QC purposes. Hence, there is QC on QC in place to ensure that the information entered is reliable.	The validation team interviewed with the PBPD in which the households information will be collected and monitored by the district technicians. The district technicians were also trained by the PBPD, the training record was also checked by the validation team during the on-site visit. The validation team also visited the BPD, and understanding the cross-checking procedures carried out by the trained BPD staff for quality control. Since the BPD is also under the management from MARD, the validation team considers the VGS database is deemed to be reliable as it is cross-checked by different staff in different levels of BPD. Moreover, the carbon monitoring survey will be finally carried by independent parties, thus it is monitoring based on the VGS database is

						considered to be reliable. OK. Therefore the CL is closed.
8.		√	**CL08**: Please clarify how the reliability of the monitoring can be ensured as unbiased as the monitoring is arranged by the BPD.	2.12	There are two monitoring processes, the internal monitoring on construction and the external monitoring. Internal monitoring: The project is implemented by BPD, and contracted to independent masons or trained mason teams. BPD staff monitors the implementation by various quality checks; see section B.7.2 of the PDD. Therefore a conflict of interest between monitoring and implementation is avoided since implementation and QC is separated. External monitoring: In addition to this, the CMS (carbon monitoring survey) is not executed by BPD but by an external independent party. The external party is an independent consultant with relevant experience in conducting surveys. This can be any legal entity, i.e. a private, an NGO etc, provided that they have experience in surveys and a sound understanding of the field. Generally, it is an open bidding for which entities can apply to,	The validation team interviewed with the PBPD in which the households information will be collected and monitored by the district technicians and masons. This was also confirmed during the on-site interview with district masons. Then the BPD staff will cross-check again for the information collected from district masons and technicians. Finally the carbon monitoring survey will be carried out by independent third party. The PP will arrange independent party with relevant experience for the carbon monitoring survey. Since this will be an open bidding for the invitation of independent party, the exact entity is not yet known at this stage. The PP will ensure the monitoring party is competent and independent. Thus this can avoid the conflict of interest during the monitoring work. OK. Therefore the CL is closed.

					and then the best is selected. The monitoring report however will be prepared by an experienced independent carbon consultant. The carbon consultant for the first monitoring report is in this case also the one who is the lead consultant for the validation: Eric Buysman. He has amply experience in this field. Eric will ensure that the monitoring survey is executed according to the GS requirements.	
9.		√	**CL09**: Please supplement in the sampling plan about the "procedures for administrating data collection and minimizing non-sampling" and "implementation" in accordance with the requirements in the relevant sampling standards from UNFCCC.	2.12	See section B.7.2 of PDD where this is included (under the calculation of the sample size): Carbon monitoring survey. There it is now indicated that the CMS is executed by an independent party and not by BPD.	The validation team checked the sampling plan in the revised PDD in which the "procedures for administrating data collection and minimizing non-sampling" is included. It is also indicated in the sampling plan for the "Implementation", in which the monitoring will be carried out by BPD and checked by the independent party, as arranged by BPD. OK. Therefore the CL is closed.
10.		√	**CL10**: Please provide the monitoring organization structure information including the roles and responsibility of main monitoring personnel.	2.11	The monitoring organization structure is provided in section B.7.2, where the persons involved are listed in a table and a figure including their roles and responsibilities.	The validation team checked the table in PDD Section B.7.2 for the monitoring activities with the corresponding personnel in-charge for the roles and responsibilities of monitoring plan.

						OK. Therefore the CL is closed.
11.		√	**CL11**: Please provide data collection and storage arrangement such as data archiving and storage time in the monitoring plan.	2.11	The data collection plant is included in section B.7.2. See the heading: Data storage arrangement. The data collection arrangement are the three monitoring tools mentioned in section B.7.2: BPD applies three monitoring methods (A) quality control measures and the (B) carbon monitoring survey. In addition, (C) many trainings and refreshment trainings are executed to ensure that the QC is executed in a proper manner ensuring high quality digesters and data collection/management.	Please also indicate the storage arrangement such as data archiving and storage time in the monitoring plan. It seems that the PP is describing the monitoring methods, and training is provided for proper data collection/management. The data storage arrangement such as record keeping by centralized and by district, the length of storage time is indicated in the monitoring plan. This staff for data storage will be also trained in order to carry out the storage. OK. Therefore the CL is closed.
12.		√	**CL12**: Please provide sampled training records for the biogas users before and after construction for validation.	2.11	See evidences of the translated file in English and the VN original.	The validation team checked the sample training records for the biogas users before and after the construction on 5th January 2010 and 20th November 2010 respectively. OK. Therefore the CL is closed.
13.		√	**CL13**: Please clarify the starting date of project activity according to Glossary of CDM term, in which this was the earliest date at which implementation or construction or real action of the	1.7	The earliest date of implementation or construction of the VGS project is19/07/2006 (and evidenced before with form 03).	According to the CDM glossary, the starting date of the project should be the earliest date of implementation or construction, as 19 July 2006. This is the date for the first household with the

			project began.		Please note, the start date of operation is 1/1/2007 (date that the biodigester is commissioned and working)	submission for application of construction of biogas digester. The validation team considers that this is the starting date of VGS project as per CDM glossary. The start date of first VGS digester operation was on 1 Jan 2007. OK. Therefore the CL is closed.
14.		√	**CL14**: Please provide the substantiation information for the GS consultancy service contract between the Nexus Carbon and BPD as indicated in the PDD table 3.	1.7	Nexus provides upfront finance to BPD for the VGS development and consultancy services. This will be paid back later on by BPD after credit issuance. Nexus is otherwise not involved in this project. The consultancy contract is included.	The consultancy service contract between Nexus and BPD was checked by the validation team. OK. Therefore the CL is closed.
15.		√	**CL15**: Please provide the data source in PDD table 4 for the price of digester and also the average size of digester which built between 1st January 2007 and 31st August 2011.	1.7	1. A mason was interviewed on the prices at two different locations Hai Duong and Hanoi). The average of the two prices is the price in the PDD table 8. The prices of the other digesters are obtained in similar fashion. 2. The other excel sheet shows the average m3 costs of the digesters calculated using the survey BUS 2011 (see cells B25:C29) The values are very close to the values reported in table 6 (which are obtained from masons, see the reply above)	The validation team checked the research for the mason interview about the cost of biogas digester. It is found that the construction costs and material costs are different among different regions in Vietnam. In general, it is averaged at VND 0.78M per m^3 of biogas digester, as per the statistics in BUS2010-2011. OK. Therefore the CL is closed.

					Please note, the BUS values are averages of many households and of different digester sizes. Larger digesters will always cost less than the average cubic meter price due to higher building efficiency (less materials are required for each m3 of volume in the case of larger digesters) and smaller digesters are likewise more expensive. The differences are small however.	
16. 1		√	**CL16**: Please provide (if any) quantitative information for the potential biogas users, i.e. the rural households with small farms for validation.	4.2	An excel file was sent to the validator for information of livestock farms from Vietnam Office Statistics Office 2009.	The validation team checked excel file which is sourced from the Vietnam Statistics Office, Household Information for the farming animals 2009. It is indicated that about 6.1% of eligible households have equipped with biogas digesters from the 1.8 million rural households. OK. Therefore the CL is closed.
17. 1		√	**CL17**: Please clarify how the reduction in fuel consumption reflects the reduction of air pollutants quantitatively.	4.2	As referenced in the GS passport, combustion of solid fuel is detrimental to indoor air pollution (IAP), reduction of these fuels by switching to biogas will improve the indoor air quality (IAQ). Quantitative information on IAQ improvement is not available, nor is this intended to be monitored. The link between the	The validation team checked the parameters for the air quality for the different fuel users before and after cooking, and the difference in the air quality between the baseline fuel and project fuel. The validation team agrees that it is not necessary to monitor the air quality directly, and the PP could apply the reduction in fuel

					use of solid fuels and bad IAP is well known, see http://www.who.int/heli/risks/indoorair/indoorair/en/index.html In that document the WHO recommends that switching to biogas is a good option to reduce IAP. 'Shifting from solid fuels to cleaner energy technologies – for instance, liquid petroleum gas (lpg), biogas or solar power generation – can potentially yield the largest reduction in indoor air pollution levels while minimizing environmental impacts of energy production and consumption in general.' What is monitored quantitatively is the reduction of solid fuel use, which will serve as a proxy for the improvement of indoor air quality. The use of proxy indicators that have a clear link to IAP is assumed sufficient. Less solid fuels use → less IAP. This approach is followed by a similar biogas programme in Cambodia that is registered and that approach was accepted by the GS. The BPD carbon consultant also developed the VGS for that program.	consumption in order to imply the improvement in air quality. From the reduction of fuel consumption, the amount of soot, H_2S, smoke, RSP etc. could be reduced. The validation team also checked the revised GS Passport Section F.2, the improvement in IAP (Indoor Air Pollution) is indicated by using the biogas as cooking fuel compared with the baseline fossil fuel. The obvious improvement in CO, SO_2, HCs and CH_4 is indicated in the Table 2 of Air quality of Section F.2, in which at least 100% of improvement can be resulted from the calculation of AIP. The data source of the AIP data from the research report issued by independent consultant (EPRO Consulting JSC) in 2011 is checked by the validation team. In addition, the validation team considers that the measurement of reduction in fuel consumption can reflect the improvement in air quality, although it may not be exactly quantified. OK. Therefore the CL is closed.

					Description included in the GSPP, see section F2 and the updated table is also paste in LSCR. The validator can find the excel sheet with the calculations and the AIP study.	
18. 1		√	**CL18** Please clarify how the emission reduction is used to quantify the improvement in biodiversity.	4.2	This is as referenced in the GS passport based on the indicator provided by MDG 7 on biodiversity. Applies to MDG 7; target 7B Reduce biodiversity loss, achieving, by 2010, a significant reduction in the rate of loss: Indicator 7.2 belonging to 7B: CO2 emission reduction See http://www.undp.org/mdg/goal7.shtml CO2 causes global warming and climate change. Quote from an IIED study, http://pubs.iied.org/pdfs/G00433.pdf : A growing body of research indicates that, as a result, climate change may lead to a sharp increase in extinction rates. Mid-range predictions from one recent study suggest that 24 per cent of species in the five study regions will be on their way to	The validation team checked the United Nations Development Programme Millennium Development Goals MDG 7 on the biodiversity, in which the CO_2 emission can be considered as one of the indicator for the biodiversity. http://www.undp.org/mdg/goal7.shtml It is indicated that as the CO_2 emission induces the global warming and thus the climate change. The change of climate would ultimately affect the growth of fauna and flora, and thus the biodiversity. OK. Therefore the CL is closed.

					extinction by 2050 due to climate change. The study indicates that for many species, climate change poses a greater threat to their survival than the destruction of their natural habitat. See page 11 of that document. Hence, CO2 emission → global warming → climate change → extinction rate increases → reduction in biodiversity	
19.		√	**CL19** Please clarify how the project reduces drudgery and how the improvement of livelihood of the poor can be illustrated quantitatively from the change in traditional fuel consumption.	4.2	Traditional fuel consumption poses a significant time expenditure by: a) collection practices are time consuming b) taking care of the fire is time consuming and requires constant attention compared to biogas c) Biogas cooks faster than traditional fuels. The reduction in traditional fuel consumption is a proxy for the improvement of the livelihoods. Less time spend on collection, taking care of the fire = more time available. Furthermore as discussed above, AIP will be reduced and this will drastically improve living conditions.	According to the UNDP and WHO information, the validation team realizes that the reduction in fuel consumption can improve the livelihood of the poor, by saving the money to purchase fuel and time to collect woody fuel. The parameter of reduction in fuel consumption can be an indirect parameter to qualitatively indicate the improvement of livelihood of the poor. OK. Therefore the CL is closed.

					The chosen parameter is not drudgery or time savings, but is a change in the reliance on traditional non sustainable fuels to reliable and clean fuels (biogas) This will improve the living conditions see http://www.undp.org/energy/engmdgtop1pov.htm There it is stated: *Having access to energy is a pre-requisite to reduce poverty and a the challenge presents an opportunity to find ways of producing and using energy that are economically, socially and environmentally sustainable and of using this important tool as a means to achieve sustainable development.* See also http://www.who.int/indoorair/publications/fuelforlife.pdf Figure 15, and figure 2, where it is shown that access to improved fuels (biogas) will improve the living conditions. The evidence of use of this improved fuel is the reduction of the use of traditional	

					fuels The GSPP is changed accordingly	
20.		√	**CL20** Please provide the stakeholders' comment collected from the stakeholder feedback round for validation.	6.2.1	Feedback round was closed on 15/01/2012 (after the 2 months GS feedback round). The GSPR is updated accordingly; see GSPR v2.1 and the evidences in the folder GS feedback round.	The 2 months GS feedback round was finished on 15 Jan 2012. The stakeholder feedback was invited by sending invitation to stakeholders and announcement from the newspapers. The invitation letters and the newspaper announcement in November 2011 were reviewed by the validation team. After the closure of feedback invitation period, totally 4 feedback comments were received. These are all positive comments, and some of them are the VGS participants and technicians stating the benefits received from the biogas digester of VGS project activity. Thus there are no follow-up actions required for the PP. This also re-confirms the benefits of sustainable development of the project activity to the local households. OK. Therefore the CL is closed.
21.		√	**CL21** According to the monitoring of sustainable indicators, please clarify the party carrying out the monitoring survey, whether all	8.1	The approach for the GS SD monitoring is described in PDD section B.7.2. See B: **Carbon monitoring**	The validation team checked the revised PDD for the carbon monitoring survey (CMS). It is indicated that the CMS will be carried out independent

			the participated households will be surveyed or sampled households will be taken part.		**survey (CMS)** In addition, BPD will undertake a carbon monitoring survey (CMS), for the carbon monitoring and the sustainable development monitoring. It will combine 4 project studies: 1. Project non-renewable biomass (NRB) assessment; 2. Project survey (PS) of target population characteristics; 3. Project performance field test (PFT) of fuel consumption; 4. Monitoring of the SD parameters. A sample will be taken as described in B.7.2 of the PDD. BPD will commission the CMS which will be executed by an independent entity. In addition, a carbon monitoring survey (CMS) is executed, for the carbon monitoring and the sustainable development monitoring. The CMS will be executed by an independent experienced party that is selected through an open tender.	experienced party commissioned by the BPD. The independent party will be finalized before the monitoring, and selected from tender bidding for eligible competent party. It includes the PFT and monitoring of SD parameters by sampling as described in the PDD and GS Passport. OK. Therefore the CL is closed.

22.		√	**CL22** Please clarify whether the reduction in fuel expenditure can completely reflect the amount of reduction in fuel consumption.	8.1	This indicator is the same as used by a similar biogas programme in Cambodia and accepted by the GS (GS751). The same carbon consultant developed that VGS project. With this project participants have access to a clean and affordable energy source and this is shown by examining the reduction in fuel expenditure. However, the new parameter is changed as amount of energy replaced by biogas. This will be expressed in MJ/year of energy replaced by biogas. The replacement is calculated by subtracting the amount of baseline energy use with the remaining non-biogas fuel consumption in the project. Baseline fuel use data collection will be sourced from the VGS database and the remaining fuel use from the carbon monitoring survey. Both values will be multiplied with the NCV of the respective fuels, the NCV is the same as used for the ER calculations in the PDD.	The validation team considers that since the households can use biogas to replace firewood, thus there is reduction of firewood consumption. Therefore money can be saved as indicated from the reduction in fuel expenditure. (From the on-site visit, the households buy the firewood rather than collect for free.) Referring to the GS Toolkit Annex I for the possible parameters of “access to affordable and clean services”, the parameter is changed to “energy displaced by biogas”. The validation team considers the measurement of “energy displaced by biogas” is an indirect indicator, as the actual monitored parameter is the “reduction in fuel consumption” and then multiplying constant values of energy factors. It is deemed to be applicable to measure an indirect parameter in the SD monitoring plan, as it is clearly indicated in the actual parameters to be monitored. OK. Therefore the CL is closed.

					This is measured using survey methods. Measurement one: baseline fuel data collecting during the application for a biogas plant, measurement 2, the carbon monitoring survey. By multiplying each of the obtained value with the respective NCV and then the difference is the amount of energy displaced by biogas.	

Table 3: List of Forward Action Request (FARs)

No.	CAR/CL		Observation (CAR/CL)	Reference	Summary of programme proponent response	Validation team conclusion
1.		√	**FAR01** Please confirm if any double-counting of the biogas digester households between the VGS and potential subsequent CPA in the CDM PoA under the UNFCCC.			

Appendix B

Certificates of Competence

Qualification

Hai, Harold /

Emission Trading
United Nations Framework Convention on Climate Change

Auditor No.:
(AuditorenRegNr)

Appointed: (Zugelassen)	☒ ja	Qualification Level: (Qualifikationsstufe)	Lead Auditor
External: (Externer)	☐ ja	Add. reviewer: (Zusätzlicher Prüfer)	☐ yes
EAC Scopes: (EAC Branchen)	CDM 13 - Waste handling and disposal CDM 01 - Energy industries (renewable - / non-renewable sources) CDM 06 - Construction		
Add. qualification: (zus. Qualifikation)			
First Appointment: (Erstberufung)	12/19/2007	Valid to: (Gültig bis)	09/24/2015

Remarks:	TA1.2 - Renewable Energies TA 13.1- Waste handling & disposal TA 6.1 - Construction
Languages:	Chinese English Mandarin Chinese simplified Chinese traditional

Experience Exchange

Date	Location	Remarks	Accreditation(s)
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:

View / Edit Monitoring

History of scope allocation

Date:	2012-06-29
Change:	EAC CDM added
By:	Praveen Urs
Reason:	

Date:	2011-01-04
Change:	EAC CDM added; Non-EAC CDM 01 Energy Industries removed
By:	Manfred Brinkmann
Reason:	

Date:	2010-04-15
Change:	CDM 01 Energy Industries added
By:	Manfred Brinkmann
Reason:	Scope 1: limited to renewable energies except biomass power generation / geothermal

Date:	2007-12-20
Change:	EAC CDM added
By:	Manfred Brinkmann
Reason:	

History

Created:	12/19/2007 02:32:34 PM	Harold Hai/Hk/Chn/TUV
Modified:	09/26/2012 06:21:49 PM	Harold Hai/Hk/Chn/TUV
	09/24/2012 11:49:37 AM	Harold Hai/Hk/Chn/TUV
	06/29/2012 03:42:54 PM	Praveen Urs/Chn/TUV
	03/19/2012 07:31:44 PM	
	01/31/2011 09:25:37 AM	
	01/04/2011 03:16:31 PM	
	ZE9	
	01/04/2011 03:16:11 PM	
	ZE9	
	01/04/2011 03:15:12 PM	
	ZE9	
	09/13/2010 02:53:26 PM	
	ZE9	

Export to ICMS

Last Export:

Qualification

Lo, Tommy /

Emission Trading
United Nations Framework Convention on Climate Change

Auditor No.:
(AuditorenRegNr)

Appointed: (Zugelassen)	☒ ja	Qualification Level: (Qualifikationsstufe)	Lead Auditor
External: (Externer)	☐ ja	Add. reviewer: (Zusätzlicher Prüfer)	☐ yes
EAC Scopes: (EAC Branchen)	CDM 13 - Waste handling and disposal CDM 01 - Energy industries (renewable - / non-renewable sources) CDM 05 - Chemical industry		
Add. qualification: (zus. Qualifikation)			
First Appointment: (Erstberufung)	2008-04-28	Valid to: (Gültig bis)	2015-10-11

Remarks:	CDM 01 limited to TA1.2 - Renewable Energies CDM 13 limited to TA13.1 / 13.2 - Waste handling and disposal (as GHG auditor from 2009-10-14)
Languages:	Chinese English Mandarin Chinese simplified Chinese traditional

Experience Exchange

Date	Location	Remarks	Accreditation(s)
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:

View / Edit Monitoring

History of scope allocation

Date:	2012-03-17
Change:	EAC CDM added
By:	Praveen Urs
Reason:	
Date:	
Change:	
By:	
Reason:	
Date:	2011-01-13
Change:	EAC CDM removed
By:	Manfred Brinkmann
Reason:	CDM 01 limited to TA1.2 - Renewable Energies
Date:	
Change:	
By:	
Reason:	
Date:	2010-05-25
Change:	EAC CDM added
By:	Manfred Brinkmann
Reason:	First appointment as expert: 2008/04/29
Date:	2008-04-29
Change:	EAC CDM, CDM added
By:	Manfred Brinkmann
Reason:	

History

Created:	2008-04-27 03:19:00 PM ZE9	Manfred Brinkmann/Jpn/TUV
Modified:	2012-10-10 07:47:39 PM	Praveen Urs/Chn/TUV
	2012-03-17 08:18:09 PM	Praveen Urs/Chn/TUV
	2011-01-13 03:13:56 PM ZE9	Manfred Brinkmann/Jpn/TUV
	2011-01-13 03:12:34 PM ZE9	
	2011-01-13 03:12:05 PM ZE9	
	2010-09-13 11:37:26 PM ZE9	

Qualification

Tang, Walter /

Emission Trading
United Nations Framework Convention on Climate Change

Auditor No.:
(AuditorenRegNr)

Appointed: (Zugelassen)	☒ ja	Qualification Level: (Qualifikationsstufe)	Lead Auditor
External: (Externer)	☐ ja	Add. reviewer: (Zusätzlicher Prüfer)	☐ yes
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: (Erstberufung)	10/11/2011	Valid to: (Gültig bis)	09/11/2015

Remarks:	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 Accrediation Standard
Languages:	Chinese simplified English

Experience Exchange

Date	Location	Remarks	Accreditation(s)

Monitoring

Latest Monitoring: (letzte Beurteilung)	Next Monitoring: (nächste Beurteilung)

Remarks:

View / Edit Monitoring

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:	12/06/2011 05:00:51 PM	Walter Tang/Chn/TUV
Modified:	07/02/2012 03:08:57 PM	Praveen Urs/Chn/TUV
	07/02/2012 03:08:48 PM	Praveen Urs/Chn/TUV
	05/15/2012 03:30:46 PM	Nelly Yong/MY/TUV
	02/13/2012 08:00:10 PM	
	12/06/2011 05:01:30 PM	