VALIDATION REPORT

THE MODEL PROJECT FOR RENOVATION TO INCREASE THE EFFICIENT USE OF ENERGY IN BREWERY IN VIET NAM

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DET NORSKE VERITAS

VALIDATION REPORT

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Summary:

Det Norske Veritas Certification AS (DNV) has performed a validation of the "The model project for renovation to increase the efficient use of energy in brewery" in Viet Nam on the basis of UNFCCC criteria for the CDM, as well as criteria given to provide for consistent project operations, monitoring and reporting. UNFCCC criteria refer to Article 12 of the Kyoto Protocol, the CDM modalities and procedures, the simplified modalities and procedures for small-scale CDM project activities and the subsequent decisions by the CDM Executive Board.

The validation consisted of the following three phases: i) a desk review of the project design documents, ii) follow-up interviews with project stakeholders and iii) the resolution of outstanding issues and the issuance of the final validation report and opinion.

In summary, it is DNV's opinion that the "The model project for renovation to increase the efficient use of energy in brewery" as described in the project design document version 4.7 dated 14 November 2008, meets all relevant UNFCCC requirements for the CDM and correctly applies the approved baseline and monitoring methodology AMS-I.C version 9 and AMS-II.D version 08. Hence, DNV requests the registration of the "The model project for renovation to increase the efficient use of energy in brewery" as a CDM project activity.

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Work carried out by: Akira Sekine, Thanh Tung Vo, Michael Lehmann		
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Abbreviations

BTH	Thanh Hoa Beer Joint Stock Company
CAR	Corrective Action Request
CDM	Clean Development Mechanism
CEF	Carbon Emission Factor
CER	Certified Emission Reduction
CH_4	Methane
CL	Clarification request
CO_2	Carbon dioxide
CO_2e	Carbon dioxide equivalent
DNV	Det Norske Veritas
DNA	Designated National Authority
DONRE	Department of Resoueces and Environment of Thanh Hoa Province
GHG	Greenhouse gas(es)
EVN	Electricity of Viet Nam
EIA	Environmental Impact Assessment
GWP	Global Warming Potential
HABECO	Hanoi Beer Alcohol Beverage Corporation
IPCC	Intergovernmental Panel on Climate Change
MOI	Ministry of Industry
MONRE	Ministry of Natural Resources and Environment
MP	Monitoring Plan
MVP	Monitoring and Verification Plan
MYCOM	Mayekawa Manufacturing Co., Ltd.
N_2O	Nitrous oxide
NEDO	New Energy and Industrial Technology Development Organization
NGO	Non-governmental Organisation
NOCCOP	National Office for Climate Change and Ozone Protection
ODA	Official Development Assistance
PDD	Project Design Document
UNFCCC	United Nations Framework Convention on Climate Change
VRC	Vapour Recompression Compressor

1 INTRODUCTION

New Energy and Industrial Technology Development Organization (NEDO) has commissioned Det Norske Veritas Certification AS (DNV) to validate the "The model project for renovation to increase the efficient use of energy in brewery" (the project). This report summarises the findings of the validation of the project, performed on the basis of UNFCCC criteria for small-scale CDM projects, as well as criteria given to provide for consistent project operations, monitoring and reporting.

The validation team consists of the following personnel:

Akira Sekine	DNV Japan	Team Leader, GHG auditor
Thanh Tung Vo	DNV Viet Nam	GHG auditor
Michael Lehmann	DNV Oslo	Sector expert
C Kumaraswamy	DNV India	Technical reviewer

1.1 Validation Objective

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

1.2 Scope

The validation scope is defined as an independent and objective review of the project design document (PDD). The PDD is reviewed against the criteria stated in Article 12 of the Kyoto Protocol, the CDM modalities and procedures as agreed in the Marrakech Accords, the simplified modalities and procedures for small-scale CDM project activities and the relevant decisions by the CDM Executive Board, including the approved baseline and monitoring methodology AMS-I.C and AMS-II.D. The validation team has, based on the recommendations in the Validation and Verification Manual /5/ employed a risk-based approach, focusing on the identification of significant risks for project implementation and the generation of CERs.

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

1.3 Description of Proposed CDM Project

The proposed project activity, which will be implemented in the Thanh Hoa Beer Joint Stock Company (BTH) in Thanh Hoa City, Thanh Hoa Province, Socialist Republic of Viet Nam, consists of the integration of the following five (subcomponents) energy efficiency improvement measures:

1) Steam consumption reduction by "Vapour recompression compressor (VRC) system"
2) Improvement of refrigeration efficiency by "Cascade cooling system"

3) Improvement of cold thermal energy generation by "Ice thermal storage system operated in night time"
4) Steam consumption reduction by "Optimisation of pasteurizer operation"
5) Usage of "Biogas from waste water treatment system"

The aforementioned items 1), 4) and 5) aim to reduce or displace the steam consumption generated by the in-house coal fired boiler and items 2) and 3) aim to reduce the electric power consumption from the in-house diesel generators and the power drawn from the grid.

Hence, the project activities will lead to reduction of GHG emission by means of reducing coal consumption by the in-house boiler and fossil fuel consumption by the grid connected power plants and the in-house diesel generator.

The starting date of the project is 25 May 2004 and the operational lifetime of the project is 30 years and is deemed reasonable. A ten year crediting period starting from 1 January 2009 or the date of registration, whichever is later, has been selected. The project on implementation will lead to an estimated emission reduction of 8763 tCO_2/year during crediting period of 10 years.

2 METHODOLOGY

The validation consisted of the following three phases:

I a desk review of the project design and the baseline and monitoring methodology
II follow-up interviews with project stakeholders
III the resolution of outstanding issues and the issuance of the final validation report and opinion.

In order to ensure transparency, a validation protocol was customised for the project, according to the Validation and Verification Manual /5/. The protocol shows in transparent manner criteria (requirements), means of verification and the results from validating the identified criteria. The validation protocol serves the following purposes:

- It organises, details and clarifies the requirements a CDM project is expected to meet;
- It ensures a transparent validation process where the validator will document how a particular requirement has been validated and the result of the validation.

The validation protocol consists of three tables. The different columns in these tables are described in Figure 1.

The completed validation protocol for the "The model project for renovation to increase the efficient use of energy in brewery" is enclosed in Appendix A to this report.

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

i) mistakes have been made with a direct influence on project results;
ii) validation protocol requirements have not been met; or
iii) there is a risk that the project would not be accepted as a CDM project or that emission reductions will not be certified.

The term Clarification may be used where additional information is needed to fully clarify an issue.

Validation Protocol Table 1: Mandatory Requirements for CDM Project Activities			
Requirement	***Reference***	***Conclusion***	***Cross reference***
The requirements the project must meet.	*Gives reference to the legislation or agreement where the requirement is found.*	*This is either acceptable based on evidence provided (**OK**), a **Corrective Action Request (CAR)** of risk or non-compliance with stated requirements or a request for **Clarification (CL)** where further clarifications are needed.*	*Used to refer to the relevant checklist questions in Table 2 to show how the specific requirement is validated. This is to ensure a transparent Validation process.*

Validation Protocol Table 2: Requirement Checklist				
Checklist Question	***Reference***	***Means of verification (MoV)***	***Comment***	***Draft and/or Final Conclusion***
The various requirements in Table 1 are linked to checklist questions the project should meet. The checklist is organised in seven different sections. Each section is then further sub-divided. The lowest level constitutes a checklist question.	*Gives reference to documents where the answer to the checklist question or item is found.*	*Explains how conformance with the checklist question is investigated. Examples of means of verification are document review (DR) or interview (I). N/A means not applicable.*	*The section is used to elaborate and discuss the checklist question and/or the conformance to the question. It is further used to explain the conclusions reached.*	*This is either acceptable based on evidence provided (**OK**), or a **Corrective Action Request (CAR)** due to non-compliance with the checklist question (See below).A request for **Clarification (CL)** is used when the validation team has identified a need for further clarification.*

Validation Protocol Table 3: Resolution of Corrective Action Requests and Requests for Clarification			
Draft report corrective action requests and requests for clarifications	***Ref. to Table 2***	***Summary of project participants' response***	***Final conclusion***
If the conclusions from the draft Validation are either a Corrective Action Request or a Clarification Request, these should be listed in this section.	*Reference to the checklist question number in Table 2 where the Corrective Action Request or Clarification Request is explained.*	*The responses given by the project participants during the communications with the validation team should be summarised in this section.*	*This section should summarise the validation team's responses and final conclusions. The conclusions should also be included in Table 2, under "Final Conclusion".*

Figure 1 Validation protocol tables

2.1 Review of Documents

The PDD /1/ submitted by NEDO and additional background documents related to the project design and baseline /2/ - /8/were assessed as a part of the validation.

2.2 Follow-up Interviews

From 30 June to 8 July 2006, a member of the validation team performed interviews with the key personnel of NEDO and the other relevant stakeholders to confirm selected information and to resolve issues identified in the preliminary validation. On 10 August 2006, DNV performed interviews with the key personnel of NEDO again confirming the amendments in the PDD.

The main topics of the interviews are summarised in Table 1

Table 1 Interview topics

Interviewed organisation	Interview topics
➢ New Energy & Industrial Technology Development Organization (NEDO) ➢ Mayekawa MFG Co., Ltd. (MYCOM) ➢ Climate Expert	➢ Project technology ➢ Common technology in Viet Nam and/or Asian beer industry ➢ Estimation of emission reductions ➢ Monitoring plan and management system ➢ Project additionality
➢ Ministry of Natural Resources and Environment (MONRE)	➢ Environmental regulations related to the project ➢ EIA approval status
➢ Designated national authority for CDM in Viet Nam (CCOP in MONRE)	➢ Compliance with the requirement relevant to sustainable development of Viet Nam ➢ Compliance with the EIA requirements ➢ Host country approval status
➢ Department of Natural Resources and Environment, Thanh Hoa Province (DONRE)	➢ Local environmental regulations related to the project ➢ The EIA requirements
➢ Ministry of Industry (MOI)	➢ Viet Nam's policy to energy conservation ➢ Legislation and approval of energy related facilities
➢ Electricity of Viet Nam (EVN)	➢ Viet Nam's power sources and future plan ➢ Generation capacity expansion plan
➢ Thanh Hoa Beer Joint Stock Company (BTH)	➢ Technological barrier of the project activity ➢ Investment barrier of the project activity ➢ Monitoring plan ➢ Stakeholder consultation plan
➢ Research Institute of Brewing (RIB)	➢ Technology of brewery in Viet Nam

2.3 Resolution of Clarification and Corrective Action Requests

The objective of this phase of the validation was to resolve any outstanding issues which needed to be clarified for DNV's positive conclusion on the project design.

To guarantee the transparency of the validation process, the concerns raised and responses given are summarised in chapter 3 below and documented in more detail in the validation protocol in Appendix A.

Since modifications to the Project design were necessary to resolve DNV's concerns, the project participants decided to revise the PDD and resubmitted the PDD. After reviewing the revised PDD, DNV issued this final validation report and opinion.

2.4 Internal Quality Control

The draft validation report including the initial validation findings underwent a technical review before being submitted to the project participants. The final validation report underwent another technical review before requesting registration of the project activity. The technical review was performed by a technical reviewer qualified in accordance with DNV's qualification scheme for CDM validation and verification.

3 VALIDATION FINDINGS

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

The final validation findings relate to the project design as documented and described in the revised and resubmitted project design document version 4.4 dated 15 November 2007.

3.1 Participation Requirements

The project participants of the non-Annex I Party Viet Nam are:

- Thanh Hoa Beer Joint Stock Company (BTH)
- Hanoi Beer-Alcohol and Beverage Corporation (HABECO)
- The Technical Institute of Brewing of Hanoi Beer-Alcohol and Beverage Corporation
- Ministry of Industry and Trade, Viet Nam (MOI)

The Government of the Socialist Republic of Viet Nam ratified the Kyoto Protocol on 25 September 2002 and designated the Ministry of Natural Resources and Environment (MONRE) as the DNA.

The Ministry of Natural Resources and Environment (MONRE) was a participant of the project formerly however it withdrawn the participation.

The project participants of Annex I Party Japan are New Energy & Industrial Technology Development Organization (NEDO) and Mayekawa MFG Co. Ltd.. The Government of Japan ratified the Kyoto Protocol on 4 June 2002 and designated the Liaison Committee for Utilisation of the Kyoto Mechanism as the DNA.

The project has already received the approval of the DNAs of the host Party (Viet Nam: 13 August 2007) and the Annex 1 Party (Japan: 12 January 2005).

Mayekawa Mfg. Co., Ltd was authorised by the DNA of Japan on 27 April 2007 in addition to NEDO.

3.2 Project Design

The project is being implemented in the Thanh Hoa Beer Joint Stock Company (BTH) plant which is the fifth largest brewery in the Socialist's Republic of Viet Nam producing about 66,000 kiloliters of beer per year. The maximum volume of beer production at the brewery is 100,000 kiloliters annually.

The brewery used to utilise steam generated by the coal fired boiler and electricity from the Vietnamese national power grid and the brewery's own diesel generator. The energy efficiency project consists of the following five subcomponents:

- The installation of vapour re-compression compressor system (VRC)
- Improvement of refrigeration efficiency by cascade cooling system
- Ice thermal storage system
- Optimization of pasteurization system
- Biogas boiler and anaerobic wastewater treatment facilities

The first subsystem of the project involves the installation of a vapour re-compression (VRC) system in the brew house. The VRC system recompresses the spent steam from one batch of brew for reuse in the next batch, there by saving on the steam consumption.

The second subsystem involves the installation of a cascade cooling system in cooling down process after pasteurization.

The third system is aiming to improve the refrigeration efficiency by means of storage of ice which is produced in the night time. The electric power consumption is therefore expected to be saved by the second and third subsystems.

The fourth subsystem involves the installation of a heat pump system in the pasteurisation section. Both the heating and cooling efficiencies are expected to be optimised and the consumption of the electric power and the steam will be saved as a result.

The last subsystem involves the installation of a new small biogas boiler for the generation of steam using the methane generated from the anaerobic waste water treatment section of the plant and which otherwise will be flared in the baseline scenario because such kind of wastewater technology shall be implemented to comply with the new wastewater regulation. The biogas boiler reduces the fuel consumption for steam generation by sharing a part of the steam generation load of the coal fired boiler.

Hence, the above components of the project result in the reduced coal consumption for steam generation and the power consumption from the Vietnamese national grid and the in-house diesel generator. The reduction in the coal consumption (kg coal/kL beer) from the baseline figure of 59.9 to 38.9 and the power consumption (kWh/kL beer) from the baseline figure of 91.7 to 68.8, will lead to reduction in the GHG emission.

The operational lifetime of the project is stated to be more than thirty (30) years which is reasonable and the project participants have chosen a fixed crediting period of ten (10) years starting from 1 January 2009 or from the date of registration of the project, whichever is the later.

3.3 Project Baseline

The project consists of a new boiler firing biogas (methane) captured from an anaerobic wastewater treatment facility that is currently being flared, and four types of thermal energy recovery system, a VRC, a cascade cooling system, ice thermal storage and a heat pump pasteurizer.

The project has selected to apply the methodologies Type I.C, "Renewable energy technologies that supply thermal energy for user" version 9 and Type II.D, "Energy efficiency and fuel switching measures for industrial facilities" version 8 for the five components of the project activities.

The versions of the applied methodologies are valid for request for registration until 17 January 2008.

The capacity of the biogas boiler to be installed is 0.63 MW and is below the eligibility of Type-I small scale CDM project of 15 MW. The expected energy consumption reduction by installation of the other four energy efficiency measures is 22.1 GWh_{therm}/year at maximum from coal reduction and 2.7 GWh_{elec}/year at maximum from electricity per kiloliter beer production, thus totalling to an equivalent of 30.2 $GWh_{thermal}$/year and therefore demonstrated to be below the Type-II SSC eligibility of 60 GWh/year.

The current energy consumption rate in terms of "energy rate per packaged beer production" of 59.6 [kg-coal/kl-beer] and 91.3 [kWh/kl-beer] are calculated based on the data derived from production from February 2003 to January 2004. The rates of the periods from December 2002 to November 2003 and from January 2003 to December 2003 are compared and the most conservative (lowest) figures are selected. This is considered to be sufficient to demonstrate the adequacy and/or conservativeness. As the in-house diesel generator is for emergency use, the fuel consumption is excluded for conservativeness.

The background data for emission reductions were provided by the participants and were verified to be consistent with the description in the PDD.

3.4 Additionality

The additionality of the project has been demonstrated using the technological barrier and the barrier due to prevailing practice.

Although heat-pumps and biogas boilers represent common technologies in Viet Nam, the integrated utilization of these components with VRC and ice thermal storage require a comprehensive energy management of the brewery. The integrated utilisation of a VRC with a heat pump is being implemented for the first time in Viet Nam and not implemented outside of Japan, thus it is not expected to be introduced from other than one of the project participants, Mayekawa Manufacturing Co., Ltd.

Due to easier accessibility to coal in the northern part of Viet Nam, most companies conventionally practice energy intensive operations rather than being energy-saving conscious. Thus the barrier due to the prevailing practice claimed is deemed reasonable.

The date of the implementation of the project activity was 25 May 2004.

The validation team has verified that the project had been seriously considered as a CDM project prior to the implementation by confirming the following documented evidences /14/:

- Agreement on CER transfer between MONRE and NEDO dated 30 January 2004
- Agreement on CER transfer between MOI and NEDO dated 20 February 2004
- The implementation document dated 25 May 2004

Thus the project is deemed not to be a likely baseline scenario and that emission reductions are hence additional to what would have happened in the project's absence.

3.5 Monitoring Plan

Since all the components of the project ultimately result in lower coal combustion in the existing boilers and power consumption from the Vietnamese power grid and the in-house diesel generator, the project directly measures the coal, power and diesel oil consumption before and after the project implementation. The following parameters will be monitored:

- Coal consumption by the existing boilers
- Fuel oil consumption by the existing diesel generator
- Electric power consumption from the Vietnamese power grid
- Volume of beer production (packaged beer)

For ex-post baseline determination, necessary data are defined in the monitoring plan. In addition to the above parameters, following information is also addressed in order to check the appropriateness of the parameters to be monitored: (1) specifications of replaced equipment and (2) change of products and/or utility process that requires the change of fuel and/or equipment

The authority and responsibility for monitoring, measurement and reporting are sufficiently described.

The procedures relevant to training, controlling monitoring equipment, internal audit and corrective actions are identified in the PDD.

As the project activities will not result in equipment transfer from/to another activity, leakage effects are not necessary to be monitored.

Regulatory compliance of wastewater discharge is to be monitored.

3.6 Calculation of GHG Emissions

The baseline specific coal consumption of 59.6 kg coal/kl and power consumption of 91.3 kWh/kl of beer produced have been calculated based on the minimum of three continuous periods, and are deemed conservative.

The data source of ex ante carbon emission factor of power grid and the coal emission factors are provided. All data defined are available.

The emission reductions have been estimated as the difference of the baseline emissions and the sum of the project emissions. The emission reduction calculations are described in the PDD, Sec. E in a transparent manner and are verified to be appropriate.

Formerly the expected emission reduction was 8863 tCO2 for the entire crediting period of 10 years. Now the expected starting date of the crediting period was changed from 15 February 2008 to 1 October 2008. During the days, the brewery capacity expansion will be conducted.

Thus the project is expected to result in emission reductions of 8763 tCO_2 for the entire crediting period of 10 years now.

3.7 Environmental Impacts

It has been confirmed through interviews with the environmental authority of Viet Nam that the EIA of the project had been already approved by Ministry of Natural Resources and Environment on 29 July 2004.

3.8 Comments by Local Stakeholders

The local stakeholder consultation process was performed by means of local stakeholder meeting on 9 December 2004 and all comments raised at the meeting were properly addressed.

4 COMMENTS BY PARTIES, STAKEHOLDERS AND NGOS

The PDD of 28 June 2006 (version 2.4) was made publicly available on DNV's climate change website (www.dnv.com/certification/climatechange) and Parties, stakeholders and NGOs were through the CDM website invited to provide comments during a 30 days period from 1 July 2006 to 30 July 2006. No comments were received during the period.

Further the revised PDD of 21 February 2007 (version 3.1) was again made publicly available on DNV's climate change website from 28 February 2007 to 29 March 2007. This is due to the expiration of the formerly applied methodologies. No comments were received during the period.

5 VALIDATION OPINION

Det Norske Veritas Certification AS (DNV) has performed a validation of "The model project for renovation to increase the efficient use of energy in brewery" in Viet Nam on the basis of UNFCCC criteria for small-scale CDM project activities, as well as criteria given to provide for consistent project operations, monitoring and reporting.

The review of the project design documentation and the subsequent follow-up interviews have provided DNV with sufficient evidence to determine the fulfilment of stated criteria.

The host Party is the Socialist Republic of Viet Nam and the Annex I Party is Japan. Both countries fulfil the participation criteria and have approved the project and authorised the project participants. The DNA from Socialist Republic of Viet Nam confirmed that the project assists in achieving sustainable development.

The validation did not reveal any information that indicates that the project can be seen as a diversion of official development assistance (ODA) funding towards Viet Nam.

The project correctly applies AMS-I.C, version 09 "Renewable energy technologies that supply thermal energy for the user" and AMS-II.D, version 08 "Energy efficiency and fuel switching measures for industrial facilities". The determination of the baseline is well elaborated, transparent and sufficiently supported with facts. The selected baseline scenario, i.e. the continuation of the current situation, where there will be no installation of energy efficiency measures, is reasonable for the 10 year fixed crediting period. Moreover, an analysis of the technical barriers of the project and the barriers due to prevailing practice of the beer manufacturing industry in Viet Nam demonstrated that project is not a likely baseline scenario.

The project will mitigate GHG emissions by installing the new biogas boiler and various energy efficiency measures partially displacing the coal consumption and the power supplied from the power grid in Viet Nam. The project thus results in the reduction of GHG emissions that are real, measurable and give long-term benefits and that are additional to what would have occurred in the absence of the projects.

The monitoring plan makes sufficient provision for monitoring relevant project and baseline emission indicators. Detailed responsibilities and authorities for project management, monitoring and reporting and QA/QC procedures have also been envisaged.

The total emission reductions from the project are estimated to be on the average 8763 t CO_2e per year over the 10 year fixed crediting period. The emission reduction forecast has been checked and is deemed likely that the stated amount is achieved given that the underlying assumptions do not change.

Adequate training and monitoring procedures have been implemented.

In summary, it is DNV's opinion that "The model project for renovation to increase the efficient use of energy in Brewery" in the Socialist Republic of Viet Nam as described in the PDD, version 4.7 of 14 November 2008, meets all relevant UNFCCC requirements for the small-scale CDM and all relevant host country criteria and correctly applies the indicative simplified baseline and monitoring methodology AMS-I.C, version 09 and AMS-II.D, version 08. DNV thus requests the registration of the project as a CDM project activity.

6 REFERENCES

Documents provided by the project proponent that relate directly to the project:

/1/ New Energy & Industrial Technology Development Organization (NEDO): *CDM PDD: The model project for renovation to increase the efficient use of energy in brewery, June 2004*

New Energy & Industrial Technology Development Organization (NEDO): *CDM PDD: The model project for renovation to increase the efficient use of energy in brewery, version 3.0, 11 February 2007*

New Energy & Industrial Technology Development Organization (NEDO): *CDM PDD: The model project for renovation to increase the efficient use of energy in brewery, version 4.4, 15 November 2007.*

New Energy & Industrial Technology Development Organization (NEDO): *CDM PDD: The model project for renovation to increase the efficient use of energy in brewery, version 4.7, 14 November 2008.*

/2/ DNA of Viet Nam: Host country approval letter, dated 13 August 2007

/3/ DNA of Japan: Annex 1 country approval letter for Mayekawa, dated 27 April 2007

DNA of Japan: Annex 1 country approval letter for NEDO, 12 January 2005

/4/ Thanh Hoa Beer Joint Stock Company (BTH), *Operational Record 2002 – 2006*

Background documents related to the design and/or methodologies employed in the design or other reference documents:

/5/ International Emission Trading Association (IETA) & the World Bank's Prototype Carbon Fund (PCF): *Validation and Verification Manual*. http://www.vvmanual.info

/6/ AMS – I.C: *"Thermal Energy for the User", version 08, 3rd March 2006.*

AMS – I.C: *"Thermal Energy for the User", version 09, 23 December 2006.*

/7/ AMS –II.D: *"Energy efficiency and fuel switching measures for industrial facilities", version07, 28th November 2005*

AMS –II.D: *"Energy efficiency and fuel switching measures for industrial facilities", version 08, 23 December 2006*

/8/ Thanh Hoa Beer Joint Stock Company (BTH), *Quality Management System Manual*

/9/ Vietnamese Government, Using Effectiveness and Saving Energy, Decree by Viet Nam Government, 102/2003/ND-CP, September 2003

/10/ Ministry of Industry (Viet Nam), Guidance for Implementation of Using Energy Efficiency and Saving Energy in Production Factory, Guidance by MOI, 01/2004/TT-BCN, July 2004

/11/ Ministry of Natural Resources and Environment (Viet Nam), Procedure for Determination, Establishment, Registration of Project Related to CDM Project, Guidance by MONRE, 465/BTNMT-HTQT, March 2004

/12/ National Office for Climate Change and Ozone Protection of Ministry of Natural Resources and Environment (Viet Nam), Country Report of Viet Nam, 2004

/13/ National Office for Climate Change and Ozone Protection of Ministry of Natural Resources and Environment (Viet Nam), CDM and Main Criteria for CDM Project Assessment in Viet Nam, 2003

/14/ Hanoi Beer Alcohol Beverages Corporation / Beer Thanhoa Co., Ltd. and Mayekawa Mfg. Co., Ltd., The Implementation Document, 25 May 2004

Persons interviewed during the validation, or persons who contributed with other information that are not included in the documents listed above:

/15/ New Energy & Industrial Technology Development Organization (NEDO), 30 June 2004

- Ms. Keiko Hirano, Deputy Director, International Project Department, NEDO
- Mr. Michihiko Fukui, Deputy Director, International Project Department, NEDO
- Mr. Toyohiko Kanekiyo, Project Coordinator, International Project Department, NEDO
- Ms. Chiyoko Kawakami, International Project Department, NEDO
- Ms. Yayoi Iijima, International Project Department, NEDO
- Mr. Tetsuro Touma, Assistant General Manager, Overseas Planning Dert., Mayekawa Mfg. Co., Ltd.
- Ms. Kanako Oji

/16/ Ministry of Natural Resources and Environment (MONRE, Viet Nam), 8 July 2004

- Mr. Nguyen Van Tai, Department of Environment, MONRE
- Ms. Le Thi Hai Le, Department of Environment, MONRE

/17/ National Office for Climate Change and Ozone Protection, MONRE, 8 July 2004

- Mr. Hoang Manh Hoa, National Office for Climate Change and Ozone Protection, MONRE

/18/ Ministry of Industry (MOI, Viet Nam), 8 July 2004

- Ms. Dang Phan Thu Huong, Department of International Cooperation, MOI
- Mr. Nguyen Sy Tram, department of Science and Technology, MOI

/19/ Headquarters, Electricity of Viet Nam (EVN), 8 July 2004

- Mr. Tran Tuan Dzung, International Cooperation Department

/20/ Department of Natural Resources and Environment, Thanh Hoa Province (DONRE), 7 July 2004

- Ms. Nguyen Hanh Thanh (DONRE)
- Mr. Nguyen Quang Thai (DONRE)

/21/ Thanh Hoa Beer Joint Stock Company (BTH), 7 July 2004

- Mr. Luong Dung, Director, BTH
- Mr. Le Anh Tuan, Vice Director, BTH
- Mr. Le Nguyen Hung, BTH
- Mr. Nguyen Van Son, BTH
- Mr. Nguyen Kim Cuong, BTH

/22/ The Research Institute of Brewery (RIB), 9 July 2004

- Ms. Nguyen Thi Thu Vinh, RIB
- Mr. Tran Dunh Thanh, RIB

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APPENDIX A

VALIDATION PROTOCOL
FOR SMALL-SCALE CDM PROJECT ACTIVITIES

Table 1 Mandatory Requirement for Small Scale Clean Development Mechanism (CDM) Project Activities

Requirement	Reference	Conclusion	Cross Reference/ Comment
1. The project shall assist Parties included in Annex I in achieving compliance with part of their emission reduction commitment under Art. 3	Kyoto Protocol Art. 12.2	OK	Table 2, Section E.4.1 The project will assist Annex 1 country Japan in achieving compliance.
2. The project shall assist non-Annex I Parties in achieving sustainable development and shall have obtained confirmation by the host country thereof	Kyoto Protocol Art. 12.2, Simplified Modalities and Procedures for Small Scale CDM Project Activities §23a	OK	Table 2, Section A.3
3. The project shall assist non-Annex I Parties in contributing to the ultimate objective of the UNFCCC	Kyoto Protocol Art. 12.2.	OK	Table 2, Section E.4.1
4. The project shall have the written approval of voluntary participation from the designated national authority of each party involved	Kyoto Protocol Art. 12.5a, Simplified Modalities and Procedures for Small Scale CDM Project Activities §23a	OK	The host/investor Parties had already approved the project activity. Viet Nam: 13 August 2007 Japan: 27 April 2007 (Mayekawa), 12 January 2005 (NEDO)
5. The emission reductions should be real, measurable and give long-term benefits related to the mitigation of climate change	Kyoto Protocol Art. 12.5b	OK	Table 2, Section E.1 to E.4
6. Reduction in GHG emissions must be additional to any that would occur in absence of the project activity, i.e. a CDM project activity is additional if anthropogenic emissions of greenhouse gases by sources are reduced below those that would have occurred in the absence of the registered CDM project activity	Kyoto Protocol Art. 12.5.c, Simplified Modalities and Procedures for Small Scale CDM Project Activities §26	OK	Table 2, Section B.2.1
7. In case public funding from Parties included in Annex I	Decision 17/CP.7,	OK	There is no funding from

Requirement	Reference	Conclusion	Cross Reference/ Comment
is used for the project activity, these Parties shall provide an affirmation that such funding does not result in a diversion of official development assistance and is separate from and is not counted towards the financial obligations of these Parties.	CDM Modalities and Procedures Appendix B, § 2		any Annex-1 Party.
8. Parties participating in the CDM shall designate a national authority for the CDM	CDM Modalities and Procedures § 29	OK	Viet Nam has designated the "International Cooperation Department, Ministry of Natural Resources and Environment" as the national authority for CDM projects. Japan has designated "the Liason Committee for the Utilization of the Kyoto Mechanisms" as the national authority for CDM projects.
9. The host Party and the participating Annex I Party shall be a Party to the Kyoto Protocol	CDM Modalities and Procedures § 30, 31b	OK	Viet Nam is a Party to the Kyoto Protocol and has ratified it on 25 September 2002. Japan is a Party to the Kyoto Protocol and ratified it on 4 June 2002.
10. The participating Annex I Party's assigned amount shall have been calculated and recorded	CDM Modalities and Procedures §31b	OK	The assigned amount for Japan is 94% of 1990's emission levels.
11. The participating Annex I Party shall have in place a national system for estimating GHG emissions and a	CDM Modalities and Procedures §31b	OK	Japan has in place national systems for

Requirement	Reference	Conclusion	Cross Reference/ Comment
national registry in accordance with Kyoto Protocol Article 5 and 7			estimation of GHG emissions and submits regularly the most recent inventories to the UNFCCC.
12. The proposed project activity shall meet the eligibility criteria for small scale CDM project activities set out in § 6 (c) of the Marrakesh Accords and shall not be a debundled component of a larger project activity	Simplified Modalities and Procedures for Small Scale CDM Project Activities §12a,c	OK	Table 2, Section A.1
13. The project design document shall conform with the Small Scale CDM Project Design Document format	Simplified Modalities and Procedures for Small Scale CDM Project Activities, Appendix A	OK	The PDD is in line with the template, SSC-CDM-PDD version 02.
14. The proposed project activity shall confirm to one of the project categories defined for small scale CDM project activities and uses the simplified baseline and monitoring methodology for that project category	Simplified Modalities and Procedures for Small Scale CDM Project Activities §22e	OK	Table 2, Section A.1.3, B and D The project activity conforms to the small scale CDM activities of Type I.C. and II.D.
15. Comments by local stakeholders are invited, and a summary of these provided	Simplified Modalities and Procedures for Small Scale CDM Project Activities §22b	OK	Table 2, Section G
16. If required by the host country, an analysis of the environmental impacts of the project activity is carried out and documented	Simplified Modalities and Procedures for Small Scale CDM Project Activities §22c	OK	Table 2, Section F
17. Parties, stakeholders and UNFCCC accredited NGOs have been invited to comment on the validation requirements and comments have been made publicly available	Simplified Modalities and Procedures for Small Scale CDM Project Activities §23b,c,d	OK	The PDD was made publicly available on www.dnv.com/certification/climatechange and

Requirement	Reference	Conclusion	Cross Reference/ Comment
			Parties, stakeholders and NGOs were through the CDM website invited to provide comments during a 30 day period from 1 July 2006 to 30 July 2006, and from 28 February 2007 to 29 March 2007. No comments were received during the period.

Table 2 Requirements Checklist

Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
A. **Project Description** The project design is assessed.					
A.1. Small scale project activity It is assess whether the project qualifies as small scale CDM project activity.					
A.1.1. Does the project qualify as a small scale CDM project activity as defined in paragraph 6 (c) of decision 17/CP.7 on the modalities and procedures for the CDM?	/1/	DR	The project consists of five components and all the components totally have to qualify as small scale methodologies AMS II D. • The installation of vapour re-compression compressor system (VRC) • Improvement of refrigeration efficiency by the installation of cascade cooling system • Ice thermal storage system • Optimization of pasteurization system • Biogas boiler. In line with the methodology, the project must be an energy efficiency measure and the aggregate energy savings do not exceed the equivalent of 45 GWh_{th} per year. The total thermal energy reduction by the project activities are estimated to be 22.1 GWh_{th} annually and the total electric power reduction by the project activities are estimated to be 12.7 GWh_{e} annually equivalent to 30.2 GWh_{th} and comply with the eligibility requirements of Small-scale CDM projects.	~~CAR 1~~	OK

* MoV = Means of Verification, DR= Document Review, I= Interview

Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
			However AMS I C shall be applied for a biogas boiler to be implemented.		
A.1.2. The small scale project activity is not a debundled component of a larger project activity?	/1/	DR	It is demonstrated that the project activity is not a de-bundled component of a larger project activity.	-	OK
A.1.3. Does proposed project activity confirm to one of the project categories defined for small scale CDM project activities?	/1/	DR	The four of the five components of the project activity conforms to the categories of AMS II D. However a biogas boiler to be implemented shall apply AMS I C.	~~CAR 1~~	OK
A.2. Project Design Validation of project design focuses on the choice of technology and the design documentation of the project.					
A.2.1. Are the project's spatial (geographical) boundaries clearly defined?	/1/	DR	The project is located in BTH brewery plant, located in Thanh Hoa City, Thanh Hoa Province, Socialist Republic of Viet Nam.		OK
A.2.2. Are the project's system (components and facilities used to mitigate GHG's) boundaries clearly defined?	/1/ /23/	DR I	The projects systems consists of installation of a Vapour Re-Compression (VRC) system in the brew house, cascade cooling system, ice thermal storage system, optimization of pasteurization system and biogas boiler. It is not clearly stated about the current situation and the capacity of the energy consumption reduction measures and the biogas boiler to be installed (CL 1) however it was confirmed that the energy efficiency effects stated in the PDD are totally reasonable through the actual operation results.	~~CL 1~~	OK

* MoV = Means of Verification, DR= Document Review, I= Interview

Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
A.2.3. Does the project design engineering reflect current good practices?	/1/ /15/ /23/	DR I	The project design engineering is of proven technology and is in use in more than ten breweries projects in Japan. Hence the project design engineering reflects current good practices.		OK
A.2.4. Will the project result in technology transfer to the host country?	/1/	DR	Yes, the project will result in technology transfer from Annex 1 country Japan to the host country of Viet Nam. The technology has not yet been utilized outside of Japan.		OK
A.2.5. Does the project require extensive initial training and maintenance efforts in order to work as presumed during the project period? Does the project make provisions for meeting training and maintenance needs?	/1/ /15/ /21/ /22/	DR I	As the technology being implemented is new in the host country and the organisation, BTH, initially extensive training is necessary for the project to work. The project participants from the Annex-1 country Japan, Mayekawa Manufacturing will provide necessary training for system operation as a technology provider. BTH is an ISO9001 certified organisation and have a system in place to identify the training needs. It is expected to establish a management team to implement the maintenance and monitoring system for the project activity. The agreements with respect to the training and technical support are included in the project.		OK
A.3. Contribution to Sustainable Development The project's contribution to sustainable development is assessed					
A.3.1. Will the project create other environmental or social benefits than GHG emission reductions?	/1/ /17/	DR I	The project will make the energy efficiency technologies prevail in the other food industries as well. It is also expected to create more opportunity of employment for skilled workers such as operators and maintenance personnel.		OK

Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
A.3.2. Will the project create any adverse environmental or social effects?	/1/ /17/	DR I	Since the project activity reduces the coal and grid power consumption per kiloliter of beer manufactured, the project will have only positive environmental impacts. There are no negative impacts due to the project.		OK
A.3.3. Is the project in line with sustainable development policies of the host country?	/1/ /17/	DR I	The DNA of Viet Nam had already issued the letter of approval for the project as it had been considered that the import of the technologies for energy conservation and wastewater treatment are in line with the priority in the SD policy of Viet Nam.		OK
A.3.4. Is the project in line with relevant legislation and plans in the host country?	/1/ /17/	DR I	EIA was approved by MONRE in July 2004 and the project is in line with the relevant legislation in Viet Nam.		OK
B. **Project Baseline** The validation of the project baseline establishes whether the selected baseline methodology is appropriate and whether the selected baseline represents a likely baseline scenario.					
B.1. Baseline Methodology It is assessed whether the project applies an appropriate baseline methodology.					
B.1.1. Is the selected baseline methodology in line with the baseline methodologies provided for the relevant project category?	/1/	DR	The four of the five components of the project activities fall under small scale methodology Type II D, version 07 (energy efficiency and fuel switching measures for industrial facilities). However a biogas boiler to be implemented shall apply Type I C.	~~CAR 1~~	OK
B.1.2. Is the baseline methodology applicable to the project being considered?	/1/	DR	The project consists of a biogas fired boiler and four types of thermal energy recovery system,	~~CL 1~~	OK

Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
			"VRC", improvement of refrigeration efficiency, ice thermal storage system and energy saving operation of pasteurizer". The current situation of the biogas generated from the waste water treatment facility is not clearly described in the PDD.		
B.2. Baseline Determination It is assessed whether the project activity itself is not a likely baseline scenario and whether the selected baseline represents a likely baseline scenario.					
B.2.1. Is it demonstrated that the project activity itself is not a likely baseline scenario due to the existence of one or more of the following barriers: investment barriers, technology barriers, barriers due to prevailing practice or other barriers?	/1/ /21/ /22/	DR I	The additionality of the project is established on the grounds of the investment and technological barriers to the implementation of the project. In beer industry in Viet Nam, brewery companies have focused on production capacity expansion and tend not to invest for energy efficiency measures. The estimated pay-back period of the proposed project activity is more than 5.5 years without CER revenue and BTH has no intension to invest a project with pay-back period of more than 5 years. Thus the investment barrier claimed is reasonable however the calculation should be presented in the PDD as the information is not considered to be confidential. The technologies used in the project are not available in the host country without the cooperation of the project participants and the similar technology is not implemented outside of Japan both for brewery industry or other industries.	~~CL 2~~	OK

* MoV = Means of Verification, DR= Document Review, I= Interview

Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
			On the other hand, "technology transfer" is one of the key missions of the project participant, NEDO and the reason why NEDO doesn't intend to implement the project activity without CER revenue should be clarified.	~~CL 3~~	
B.2.2. Is the application of the baseline methodology and the discussion and determination of the chosen baseline transparent and conservative?	/1/ /15/	DR I	By the baseline methodology AMS-II.D, the energy baseline consists of the energy use of the existing equipment, and the grid CEF is calculated in accordance with AMS-I.D. The energy consumptions of the existing equipment are estimated based on historical data. The selection of the baseline scenario of continuation of present practice is justified and transparent. However the figures described in Table-2 should be clarified in order to be verified.	~~CL 4~~	OK
B.2.3. Are relevant national and/or sectoral policies and circumstances taken into account?	/1/ /15/ /21/ /22/	DR I	Although MOI plans to implement energy saving program in the future, currently there are no national and/or sectoral policies and circumstances to accelerate the energy efficiency in the beer industry in Viet Nam. Regulatory compliance of wastewater discharge should be clarified.	~~CL 5~~	OK
B.2.4. Is the baseline selection compatible with the available data?	/1/ /15/ /21/	DR I	Data for estimation of energy consumption are based on the BTH's own data. Data for calculation of the grid CEF can be		OK

Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
			obtained from EVN. Data for CEF of the fossil fuels are to be obtained from the fuel suppliers or monthly analysis.		
B.2.5. Does the selected baseline represent the most likely scenario describing what would have occurred in absence of the project activity?	/1/ /15/	DR	The selected baseline scenario - in the absence of the project activity, the manufacture of beer would be with the existing technology without any energy conservation efforts - is justified and transparent.		OK
C. **Duration of the Project / Crediting Period** It is assessed whether the temporary boundaries of the project are clearly defined.					
C.1.1. Are the project's starting date and operational lifetime clearly defined?	/1/ /14/	DR	The project starting date is 25 May 2004, and the expected operational lifetime of the project is 30 years.		OK
C.1.2. Is the assumed crediting time clearly defined (renewable crediting period of seven years with two possible renewals or fixed crediting period of 10 years with no renewal)?	/1/	DR	A fixed crediting period of 10 years has been selected with the starting date as 1 October 2008 or at the date of registration.		OK

Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
D. **Monitoring Plan** The monitoring plan review aims to establish whether all relevant project aspects deemed necessary to monitor and report reliable emission reductions are properly addressed.					
D.1. Monitoring Methodology It is assessed whether the project applies an appropriate monitoring methodology.					
D.1.1. Is the selected monitoring methodology in line with the monitoring methodologies provided for the relevant project category?	/1/	DR	Monitoring methodology for category II.D version 07 (Energy efficiency and fuel switching measures for industrial facilities) of Appendix B of the simplified modalities and procedures for small scale CDM project activities are selected. Category I. C shall be applied to the application of the biogas boiler.	~~CAR 1~~	OK
D.1.2. Is the monitoring methodology applicable to the project being considered?	/1/	DR	Yes, the monitoring methodology Type II.D is applicable to the four components of the project activities. In the beer manufacturing process, energy is consumed in two forms. a) coal for steam and hot water generation and b) grid electric power. The project activity results in the reduction of specific coal consumption per KL of beer manufactured. The electricity used in the BTH plant is mainly from the EVN grid is and is accounted and monitored annually on *ex post* basis.		OK
D.1.3. Is the application of the monitoring	/1/	DR	The monitoring items are not sufficiently defined.	~~CL 6~~	OK

Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
methodology transparent?			They should be more project-specific.		
D.1.4. Will the monitoring methodology give opportunity for real measurements of achieved emission reductions?	/1/	DR	Same as D.1.3	~~CL 6~~	OK
D.2. Monitoring of Project Emissions It is established whether the monitoring plan provides for reliable and complete project emission data over time.					
D.2.1. Does the monitoring plan provide for the collection and archiving of all relevant data necessary for estimation or measuring the greenhouse gas emissions within the project boundary during the crediting period?	/1/	DR	The monitoring plan provides for the collection and archiving of the following parameters required for the estimation of the specific fuel oil consumption of beer. ➢ annual energy consumption in BTH plant measured ➢ annual beer manufactured P2, P3 and P4 in D.3 should be project specific. (not only in Annex 5)	~~CL 6~~	OK
D.2.2. Are the choices of project GHG indicators reasonable?	/1/	DR	CO_2 is the only GHG indicator that needs to be accounted for and this has been considered.		OK
D.2.3. Will it be possible to monitor / measure the specified project GHG indicators?	/1/	DR	Yes, it will be possible to monitor / measure the specified project GHG indicators.		OK
D.2.4. Will the indicators give opportunity for real measurements of project emissions?	/1/	DR	Yes		OK

Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
D.3. Monitoring of Leakage If applicable, it is assessed whether the monitoring plan provides for reliable and complete leakage data over time.					
D.3.1. Does the monitoring plan provide for the collection and archiving of all relevant data necessary for determining leakage?	/1/	DR	As per the methodologies AMS II D, leakages need not be considered as there is no transfer of equipment. AMS I C shall also be considered.	~~CAR 1~~	OK
D.4. Monitoring of Baseline Emissions It is established whether the monitoring plan provides for reliable and complete project emission data over time.					
D.4.1. Does the monitoring plan provide for the collection and archiving of all relevant data necessary for determining baseline emissions during the crediting period?	/1/ /15/ /21/	DR I	The baseline emissions will be estimated as the product of the beer manufacture per year and the specific coal and power consumption per KL of the beer manufactured. The specific coal consumption of 59.6 Kg coal/KL and power consumption of 91.3 kWh/KL of beer are fixed *ex-ante.*		OK
D.4.2. Is the choice of baseline indicators, in particular for baseline emissions, reasonable?	/1/	DR	Yes, CO_2 is the only baseline GHG indicator that needs to be accounted for and it has been considered.		OK
D.4.3. Will it be possible to monitor / measure the specified baseline indicators?	/1/	DR	Yes, the CO_2 emissions from the beer production process can be measured since the coal and power consumption in the baseline are from monitored data.		OK
D.4.4. Will the indicators give opportunity for real measurements of baseline emissions?	/1/	DR	Yes.		OK

* MoV = Means of Verification, DR= Document Review, I= Interview

Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
D.5. Project Management Planning It is checked that project implementation is properly prepared for and that critical arrangements are addressed.					
D.5.1. Is the authority and responsibility of project management clearly described?	/1/ /21/	DR I	BTH will establish the energy saving team with six members headed by its Plant Manager.		OK
D.5.2. Is the authority and responsibility for registration monitoring measurement and reporting clearly described?	/1/ /21/	DR I	The authority and responsibility for monitoring measurement and reporting are not sufficiently described.	~~CL 7~~	OK
D.5.3. Are procedures identified for training of monitoring personnel?	/1/ /21/	DR I	The training program necessary for the operation of the equipment is to be provided by Mayekawa Manufacturing. The procedures planned for the monitoring personnel will be added to the existing quality management system. The project proponent is requested to provide information on the training procedures in the PDD.	~~CL 8~~	OK
D.5.4. Are procedures identified for emergency preparedness for cases where emergencies can cause unintended emissions?	/1/ /21/	DR I	Unintended emissions due to emergency can be captured by means of monitoring the fuel consumption.		OK
D.5.5. Are procedures identified for calibration of monitoring equipment?	/1/ /21/	DR I	The measurement equipments used for monitoring project emissions are not clearly identified and the relevant uncertainty level can not be verified.	~~CL 9~~	OK
D.5.6. Are procedures identified for maintenance of monitoring equipment and installations?	/1/ /21/	DR I	The technical assistance necessary for stable operation of the equipment is to be provided by Mayekawa Manufacturing during the crediting period. Procedures for maintenance of monitoring equipment and installations are planned to be		OK

Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
			added in the existing quality management system.		
D.5.7. Are procedures identified for monitoring, measurements and reporting?	/1/	DR	Same as D.5.6		OK
D.5.8. Are procedures identified for day-to-day records handling (including what records to keep, storage area of records and how to process performance documentation)	/1/	DR	Same as D.5.6		OK
D.5.9. Are procedures identified for dealing with possible monitoring data adjustments and uncertainties?	/1/	DR	Same as D.5.5	~~CL 9~~	OK
D.5.10. Are procedures identified for internal audits of GHG project compliance with operational requirements as applicable?	/1/	DR	These procedures are defined in the existing quality management system of the plant. However, the project proponent is requested to update the procedures for internal quality audit to cover the project activities also and mention the procedures in the PDD.	~~CL 10~~	OK
D.5.11. Are procedures identified for project performance reviews?	/1/	DR	BTH will establish the energy saving team with six members headed by its Plant Manager and he/she will be responsible for performance review.		OK
D.5.12. Are procedures identified for corrective actions?	/1/	DR	These procedures are defined in the existing quality management system of the plant. However, the project proponent is requested to update the procedures for corrective actions to cover the project activities also and mention the procedures in the PDD. Same as D.5.10	~~CL 10~~	OK

Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
E. **Calculation of GHG emission** It is assessed whether all material GHG emission sources are addressed and how sensitivities and data uncertainties have been addressed to arrive at conservative estimates of projected emission reductions.					
E.1. Project GHG Emissions The validation of ex-ante estimated project GHG emissions focuses on transparency and completeness of calculations.					
E.1.1. Are all aspects related to direct and indirect project emissions captured in the project design?	/1/	DR	The formulae used to estimate project emission should be more project-specific.	~~CL 11~~	OK
E.1.2. Have all relevant greenhouse gases and sources been evaluated?	/1/	DR	Yes, CO_2 is the only relevant GHG and it has been evaluated.		OK
E.1.3. Do the methodologies for calculating project emissions comply with existing good practice?	/1/	DR	The project emissions are calculated as the amount of the energy consumption and the emission coefficient of the energy being used. The formulae used to estimate project emission should be more project-specific. Same as E.1.1.	~~CL 11~~	OK
E.1.4. Are the calculations documented in a complete and transparent manner?	/1/	DR	Same as E.1.1.	~~CL 11~~	OK
E.1.5. Have conservative assumptions been used?	/1/	DR	Although the assumption used for carbon emission factors of grid is explained in the PDD, the carbon emission factors of coal are not clearly explained.	~~CL 12~~	OK

Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
E.1.6. Are uncertainties in the project emissions estimates properly addressed?	/1/	DR	It is uncertain whether the project participant is able to obtain the data from the coal supplier. The data source should be considered to be consistent despite the data availability.	~~CL 13~~	OK
E.2. Leakage It is assessed whether there leakage effects, i.e. change of emissions which occurs outside the project boundary and which are measurable and attributable to the project, have been properly assessed and estimated ex-ante.					
E.2.1. Are leakage calculation required for the selected project category and if yes, are the relevant leakage effects assessed?	/1/	DR	Leakage calculation is not required by the methodologies applied.		OK
E.3. Baseline GHG Emissions The validation of ex-ante estimated baseline GHG emissions focuses on transparency and completeness of calculations.					
E.3.1. Are the baseline boundaries clearly defined and do they sufficiently cover sources for baseline emissions?	/1/	DR	The baseline boundaries have been defined clearly. However the section E.1.2.4 is not project specific. Same as E.1.1.	~~CL 11~~	OK
E.3.2. Are all aspects related to direct and indirect baseline emissions captured in the project design?	/1/	DR	Same as E.1.1.	~~CL 11~~	OK
E.3.3. Have all relevant greenhouse gases and sources been evaluated?	/1/	DR	Yes, CO_2 is the only relevant GHG and it has been evaluated.		OK

Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
E.3.4. Do the methodologies for calculating baseline emissions comply with existing good practice?	/1/	DR	The baseline emissions are estimated based on the historical records of energy consumptions and beer production between December 2002 and January 2004. The carbon emission factor of the power grid is explained in a transparent manner. However the coal emission factor is missing. Same as E.1.5.	~~CL 12~~	OK
E.3.5. Are the calculations documented in a complete and transparent manner?	/1/	DR	Same as E.1.5.	~~CL 12~~	OK
E.3.6. Have conservative assumptions been used?	/1/	DR	Yes. The assumption for the power grid CEF is conservative. However the coal emission factor is missing Same as E.1.5.	~~CL 12~~	OK
E.3.7. Are uncertainties in the baseline emissions estimates properly addressed?	/1/	DR	It is uncertain whether the project participant is able to obtain the data from the coal supplier. The data source should be considered to be consistent despite the data availability. Same as E.1.6.	~~CL 13~~	OK
E.4. Emission Reductions Validation of ex-ante estimated emission reductions.					
E.4.1. Will the project result in fewer GHG emissions than the baseline case?	/1/	DR	Yes. However the table in section E.2 includes some miscalculations and needs be corrected.	~~CL 14~~	OK

Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
F. **Environmental Impacts** It is assessed whether environmental impacts of the project are sufficiently addressed.					
F.1.1. Does host country legislation require an analysis of the environmental impacts of the project activity?	/1/ /16/	DR I	EIA is required for the project activity and MONRE had approved it on 29 July 2004.		OK
F.1.2. Does the project comply with environmental legislation in the host country?	/1/ /16/	DR I	Same as F 1.1.		OK
F.1.3. Will the project create any adverse environmental effects?	/1/ /16/	DR I	Being an energy efficiency project, the project is not expected to create any adverse environmental effects.		OK
F.1.4. Have environmental impacts been identified and addressed in the PDD?	/1/ /16/	DR I	Being an energy efficiency project, the environmental impacts of the project are not significant.		OK
G. **Comments by Local Stakeholder** Validation of the local stakeholder consultation process.					
G.1.1. Have relevant stakeholders been consulted?	/1/ /17/	DR I	Although the stakeholder consultation is not required for this kind of project in Viet Nam, the following organisations and individuals are invited to the stakeholder meeting on 9 December 2004: ● People's Committee of Than Hoa ● BTH employee ● Neighbouring residents ● Mass media in Viet Nam		OK

Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
G.1.2. Have appropriate media been used to invite comments by local stakeholders?	/1/ /17/	DR I	Same as G 1.1.		OK
G.1.3. If a stakeholder consultation process is required by regulations/laws in the host country, has the stakeholder consultation process been carried out in accordance with such regulations/laws?	/1/ /17/	DR I	Same as G.1.1.		OK
G.1.4. Is a summary of the comments received provided?	/1/ /17/	DR I	Yes.		OK
G.1.5. Has due account been taken of any comments received?	/1/ /17/	DR I	Some questions were raised at the meeting and the project participants properly answered.		OK

Table 3 Resolution of Corrective Action and Clarification Requests

Draft report corrective action requests and requests for clarification	Ref. to Table 2	Summary of project participants' response	Final conclusion
CAR 1 AMS II. D is applicable to the four of the five components of the project activities and AMS I. C shall be applied to a biogas boiler component.	A.1.1, 1.3, B.1.1. D.1.1., 3.1.	The PDD was updated reflecting the DNV's request. .	OK The capacity of the biogas boiler is 0.63 MW_{th} and eligible for AMS I.C renewable energy project.
CL 1 The expected energy saving of the biogas boiler, methane recovery system from a wastewater treatment system and "Other Energy Saving Improvement" should be clarified. The current situation of the biogas generated from the waste water treatment facility is not clearly described in the PDD, and is also likely to be covered under AMS I C, not AMS II D.	A.2.2, B.1.2	The PDD was updated reflecting the DNV's request. (A.2, A.4.2 and B.5)	OK It is clearly described in the updated PDD that the biogas boiler is to be newly installed for the project and the PP selected AMS I.C instead of II.D. The wastewater treatment system to be newly installed is aiming for environmental compliance and no seeking for CER.
CL 2 The calculation used for claiming the investment barrier should be presented in the PDD as the information is not considered to be confidential.	B.2.1	The investment barrier was eliminated.	OK The technologies employed for the project is the first of this kind in Viet Nam, and the coal is very common industry fuel in this region and no economical incentive is considered due to its low prices. Thus the "technological barrier" and "prevailing practice barrier" are sufficient to demonstrate the additionality of the project.
CL 3 It is not clearly explained why NEDO doesn't	B.2.1	The PDD, B. 3 will be revised reflecting the DNV comment.	OK It was clarified that the project is

Draft report corrective action requests and requests for clarification	Ref. to Table 2	Summary of project participants' response	Final conclusion
intend to implement the project without CDM revenue.			additional due to the technological barrier and the barriers due to prevailing practice.
CL 4 The figures described in Table-2 should be made transparent in order to be verified.	B.2.2	The PDD was revised referring Section E.2.	OK Table-2 is confirmed to be appropriate by verifying Section E.2.
CL 5 Regulatory compliance of wastewater discharge should be clarified.	B.2.3	Annex 5 of the PDD will be updated reflecting the DNV comment.	OK Annex 5, monitoring plan was updated describing the environmental monitoring properly.
CL 6 The monitoring items are not sufficiently defined. These should be made more project-specific.	D.1.3, 1.4, 2.1	Annex 5 of the PDD was revised reflecting the DNV comment.	OK Annex 5 (Monitoring Plan) describes the monitoring items, measurement equipment and records to be maintained properly.
CL 7 The authority and responsibility for monitoring measurement and reporting are not sufficiently described.	D.5.2	The Annex 5 of the PDD will be updated reflecting the DNV comment.	OK Annex 5 describes the authority and responsibility for monitoring, measurement and reporting.
CL 8 The project proponent is requested to provide information on the training procedures in the PDD.	D.5.3	The PDD will be revised reflecting the DNV comment.	OK Trainings related to operation and monitoring are to be provided by Mayekawa MFG Co., Ltd.
CL 9 The measurement equipments used for monitoring project emissions are not clearly identified	D.5.5, 5.9	Annex 5 of the PDD was revised reflecting the DNV comment.	OK Annex 5 (Monitoring Plan) describes the monitoring items, measurement equipment and records to be maintained properly.

Draft report corrective action requests and requests for clarification	Ref. to Table 2	Summary of project participants' response	Final conclusion
			-Same as CL6-
CL 10 The project proponent is requested to update the procedures for internal quality audit to cover the project activities also and mention the procedures in the PDD.	D.5.10, 5.12	The existing quality management system will be expanded to cover the project activity.	OK The management system for the project activities including internal audits is to be implemented by expanding the current QMS.
CL 11 The formulae used to estimate project emission should be made more project-specific.	E.1.1, 1.3, 1.4, 3.1, 3.2	Section e of the PDD was revised reflecting the DNV comment.	OK The calculations in Section E revised to be easily verified and confirmed to be appropriate.
CL 12 Although the assumption used for carbon emission factors of grid is explained in the PDD, the carbon emission factors of coal are not clearly explained.	E.1.5, 3.4 – 3.6	The explanation about the carbon emission factor of the coal is added in Annex 4.	OK The assumption explained in Annex 4 confirmed to be reasonable.
CL 13 It is uncertain whether the project participant is able to obtain the data from the coal supplier. The data source should be considered to be consistent despite the data availability.	E.1.6, 3.7	The data sources are confirmed to be available from "Vietnamese standard organization" and the Annex 4 was revised adding the data of the coal.	OK Same as CL 12.
CL 14 The table in section E.2 includes some miscalculations and needs be corrected.	E.4.1	The miscalculation was due to round up/down and the foot note was added to the table.	OK The calculations are confirmed to be correct.

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APPENDIX B

CERTIFICATES OF COMPETENCE

CERTIFICATE OF COMPETENCE

Thanh Tung Vo

Qualification in accordance with DNV's Qualification scheme for CDM/JI (ICP-9-8-i1-CDMJI-i1

GHG Auditor:	Yes		
CDM Validator:	--	***JI Validator:***	--
CDM Verifier:	--	***JI Verifier:***	--
Industry Sector Expert for Sectoral Scope(s):	--		

Høvik, 6 November 2006

Einar Telnes
Director, International Climate Change Services

Michael Lehmann
Technical Director

CERTIFICATE OF COMPETENCE

Akira Sekine

Qualification in accordance with DNV's Qualification scheme for CDM/JI (ICP-9-8-i1-CDMJI-i1

GHG Auditor:	Yes		
CDM Validator:	Yes	***JI Validator:***	--
CDM Verifier:	Yes	***JI Verifier:***	--
Industry Sector Expert for Sectoral Scope(s):	--		

Høvik, 30 October 2007

Michael Lehmann
Techncal Director, International Climate Change Services

CERTIFICATE OF COMPETENCE

Kumaraswamy Chandrashekara

Qualification in accordance with DNV's Qualification scheme for CDM/JI (ICP-9-8-i1-CDMJI-i1

GHG Auditor:	Yes		
CDM Validator:	Yes	***JI Validator:***	--
CDM Verifier:	Yes	***JI Verifier:***	--
Industry Sector Expert for Sectoral Scope(s):	Sectoral scope 4 & 5		
Technical Reviewer for (group of) methodologies:			
ACM0001, AM0002, AM0003, AM0010, AM0011, AM0012, AMS-III.G	Yes	*AM0027*	Yes
ACM002, AMS-I.A-D, AM0019, AM0026, AM0029, AM0045	Yes	*AM0030*	Yes
ACM003, ACM0005, AM0033, AM0040	Yes	*AM0031*	Yes
ACM0004, ACM0012	Yes	*AM0032*	Yes
ACM0006, AM0007, AM0015, AM0036, AM0042	Yes	*AM0035*	Yes
ACM0007	Yes	*AM0038*	Yes
ACM0008	Yes	*AM0041*	Yes
ACM0009, AM0008, AMS-III.B	Yes	*AM0034*	Yes
AM0006, AM0016, AMS-III.D, ACM0010	Yes	*AM0043*	
AM0009, AM0037	Yes	*AM0046*	
AM0013, AM0022, AM0025, AM0039, AMS-III.H, AMS-III.I	Yes	*AM0047*	
AM0014	Yes	*AMS-II.A-F, AM0044*	Yes
AM0017	Yes	*AMS-III.A*	Yes
AM0018	Yes	*AMS-III.E, AMS-III.F*	Yes
AM0020	Yes		
AM0021, AM0028, AM0034, AM0051	Yes		
AM0023	Yes		
AM0024	Yes		

Høvik, 5 February 2007

Einar Telnes
Director, International Climate Change Services

Michael Lehmann
Technical Director

CERTIFICATE OF COMPETENCE

Michael Lehmann

Qualification in accordance with DNV's Qualification scheme for CDM/JI (ICP-9-8-i1-CDMJI-i1

GHG Auditor:	Yes		
CDM Validator:	Yes	***JI Validator:***	--
CDM Verifier:	Yes	***JI Verifier:***	--
Industry Sector Expert for Sectoral Scope(s):	Sectoral scope 1, 2, 3		
Technical Reviewer for (group of) methodologies:			
ACM0001, AM0002, AM0003, AM0010, AM0011, AM0012, AMS-III.G	Yes	*AM0027*	Yes
ACM002, AMS-I.A-D, AM0019, AM0026, AM0029, AM0045	Yes	*AM0030*	Yes
ACM003, ACM0005, AM0033, AM0040	Yes	*AM0031*	Yes
ACM0004, ACM0012	Yes	*AM0032*	Yes
ACM0006, AM0007, AM0015, AM0036, AM0042	Yes	*AM0035*	Yes
ACM0007	Yes	*AM0038*	Yes
ACM0008	Yes	*AM0041*	Yes
ACM0009, AM0008, AMS-III.B	Yes	*AM0034*	Yes
AM0006, AM0016, AMS-III.D, ACM0010	Yes	*AM0043*	
AM0009, AM0037	Yes	*AM0046*	
AM0013, AM0022, AM0025, AM0039, AMS-III.H, AMS-III.I	Yes	*AM0047*	
AM0014	Yes	*AMS-II.A-F, AM0044*	Yes
AM0017	Yes	*AMS-III.A*	Yes
AM0018	Yes	*AMS-III.E, AMS-III.F*	Yes
AM0020	Yes		
AM0021, AM0028, AM0034, AM0051	Yes		
AM0023	Yes		
AM0024	Yes		

Høvik, 5 February 2007

Einar Telnes
Director, International Climate Change Services

Michael Lehmann
Technical Director