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# VALIDATION REPORT

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## A.T. BIOPOWER RICE HUSK POWER PROJECT IN PICHIT, THAILAND

REPORT No. 2005-0174

REVISION No. 02

DET NORSKE VERITAS



## VALIDATION REPORT

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### Summary:

Det Norske Veritas Certification AS (DNV) has performed a validation of the “A.T. Biopower Rice Husk Power Project in Pichit, Thailand” 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 and the subsequent decisions by the CDM Executive Board. This validation report summarizes the findings of the validation.

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 project, as described in the project design document of 25 January 2007, meets all relevant UNFCCC requirements for the CDM and correctly applies the approved baseline and monitoring methodology ACM0006 (version 04). Hence, DNV will request the registration of the “A.T. Biopower Rice Husk Power Project in Pichit, Thailand” as a CDM project activity.

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<i><b>Table of Content</b></i>	<i><b>Page</b></i>
1 INTRODUCTION .....	1
1.1 Validation Objective	1
1.2 Scope	1
1.3 Description of Proposed CDM Project	2
2 METHODOLOGY .....	2
2.1 Review of Documents	4
2.2 Follow-up Interviews	4
2.3 Resolution of Clarification and Corrective Action Requests	4
2.4 Internal Quality Control	5
3 VALIDATION FINDINGS .....	5
3.1 Participation Requirements	5
3.2 Project Design	5
3.3 Baseline Determination	6
3.4 Additionality	6
3.5 Monitoring Plan	7
3.6 Calculation of GHG Emissions	8
3.7 Environmental Impacts	9
3.8 Comments by Local Stakeholders	9
4 COMMENTS BY PARTIES, STAKEHOLDERS AND NGOS.....	9
5 VALIDATION OPINION .....	10
6 REFERENCES .....	11
Appendix A Validation Protocol	
Appendix B Stakeholder Comments	
Appendix C Competence Certificates	

***Abbreviations***

ATB	A.T. Biopower Co. Ltd
CDM	Clean Development Mechanism
CER	Certified Emission Reduction
CEF	Carbon Emission Factor
CO <sub>2</sub>	Carbon dioxide
CO <sub>2</sub> e	Carbon dioxide equivalent
DNA	Designated National Authority
DNV	Det Norske Veritas
EGAT	Electricity Generating Authority of Thailand
EIA	Environmental Impact Assessment
GHG	Greenhouse gas(es)
GWP	Global Warming Potential
IPCC	Intergovernmental Panel on Climate Change
KP	Kyoto Protocol
MP	Monitoring Plan
NEB	National Environmental Board
NEPO	National Energy Policy Office
ODA	Official Development Assistance
O&M	Operation & Maintenance
PDD	Project Design Document
PPA	Power Purchase Agreement
SPP	Small Power Producers
UNFCCC	United Nations Framework Convention for Climate Change



## 1 INTRODUCTION

Mitsubishi UFJ Securities has commissioned Det Norske Veritas Certification AS (DNV) to perform a validation of the “A.T. Biopower Rice Husk Power Project in Pichit, Thailand” (hereafter called “the project”).

The first part of the validation of this project has been performed by DNV during the period March 2002-February 2003. At this time, the project activity was titled “A.T. Biopower Rice Husk Power Project” and included 5 sites located in the Pichit, Singburi, Nakhon Sawan, Nakhon Pathom and Supanburi provinces. Eventually, the project design has been revised to meet the requirements of ACM0006. Moreover, of the 5 sites originally included in the original project design, the “A.T. Biopower Rice Husk Power Project in Pichit, Thailand” now only comprises the site located in the Pichit province.

This report summarises the findings of the validation of the project, performed based on UNFCCC criteria for CDM projects, as well as criteria given to provide for consistent project operations, monitoring and reporting.

The validation team consists of the following personnel:

Ms. Mari Viddal	DNV Oslo, Norway	Team leader, CDM validator
Mr Einar Telnes	DNV Oslo, Norway	Energy sector expert
Mr. Michael Lehmann	DNV Oslo, Norway	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 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 Kyoto Protocol criteria for the CDM, the CDM rules and modalities and relevant decisions by the CDM Executive Board, including the applied baseline and monitoring methodology ACM0006 (version 04). The validation team has based on the recommendations in the Validation and Verification Manual /10/ 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 corrective actions may provide input for improvement of the project design.



### 1.3 Description of Proposed CDM Project

The “A.T. Biopower Rice Husk Power Project in Pichit, Thailand” involves the construction and operation of a new rice husk power plant in Pichit province, central Thailand, with approximately 22 MW gross generating capacity (20MW net). Electricity will be sold through a 25-year power purchase agreement (PPA) with the Electricity Generating Authority of Thailand (EGAT).

The project is designed to use for electricity generation rice husk that would otherwise be burned in the open air or left to decay. The plant will operate using suspension-fired boilers, designed to burn ground rice husk in suspension. This particular boiler technology was adopted due to their ability to produce high quality ash product, which will be suitable as a substitute ingredient for cement. Although this will lead to both process- and energy-related emission reductions in cement manufacturing, the project will not claim CERs for these reductions.

The plant is one of five similar rice husk power plants currently being planned by A.T. Biopower (ATB). Although originally presented as a single CDM project, the five projects have eventually been separated individual projects with Pichit being the first presented for CDM registration.

The forecasted amount of GHG emission reductions from the project is projected to be 495 405 tonnes CO<sub>2</sub> equivalents (tCO<sub>2</sub>e) during the first renewable 7 years crediting period (with the potential of being renewed twice), resulting in forecasted average annual emission reductions of 70 772 tCO<sub>2</sub>e.

## 2 METHODOLOGY

The validation consisted of the following three phases:

- I a desk review of the project design documents
- 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 /10/. 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 “A.T. Biopower Rice Husk Power Project in Pichit, Thailand” is enclosed in Appendix A to this report.

Findings established during the validation can be seen as either a non-fulfilment of validation 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) CDM or host Party 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* (CL) may be used where additional information is needed to fully clarify an issue.

<b>Validation Protocol Table 1: Mandatory Requirements for CDM Project Activities</b>			
<b>Requirement</b>	<b>Reference</b>	<b>Conclusion</b>	<b>Cross reference</b>
<i>The requirements the project must meet.</i>	<i>Gives reference to the legislation or agreement where the requirement is found.</i>	<i>This is either acceptable based on evidence provided (OK), a <b>Corrective Action Request (CAR)</b> of risk or non-compliance with stated requirements or a request for <b>Clarification (CL)</b> where further clarifications are needed.</i>	<i>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.</i>

<b>Validation Protocol Table 2: Requirement Checklist</b>				
<b>Checklist Question</b>	<b>Reference</b>	<b>Means of verification (MoV)</b>	<b>Comment</b>	<b>Draft and/or Final Conclusion</b>
<i>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.</i>	<i>Gives reference to documents where the answer to the checklist question or item is found.</i>	<i>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.</i>	<i>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.</i>	<i>This is either acceptable based on evidence provided (OK), or a <b>Corrective Action Request (CAR)</b> due to non-compliance with the checklist question (See below). A request for <b>Clarification (CL)</b> is used when the validation team has identified a need for further clarification.</i>

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

**Figure 1 Validation protocol tables**



## 2.1 Review of Documents

The Project Design Document (applying ACM0006) /1/ and earlier versions of the PDD /2/ submitted by Mitsubishi UFJ Securities and additional background documents /3/-/12/ were assessed.

## 2.2 Follow-up Interviews

Follow-up interviews with project stakeholders /13/-/19/ in Thailand were performed from 3-7 June 2002. The objective of the interviews was to resolve issues that have been identified by reviewing the PDD and that needed be clarified to successfully conclude the validation. The resulting conclusions from the meetings can be found in the validation protocol.

Mitsubishi UFJ Securities and AT Biopower Co. Ltd. assisted the validation team with contact and meeting arrangements in Thailand. The main topics of the interviews are summarised in Table 1.

**Table 1 Interview topics**

Interviewed organisation	Interview topics
CDM Focal Point of Thailand	<ul style="list-style-type: none"> <li>- Potential Thai requirements for CDM projects</li> <li>- Establishment of the national CDM authority</li> </ul>
Thai Office for Environmental Policy and Planning:	<ul style="list-style-type: none"> <li>- Environmental legislation in Thailand</li> <li>- Sustainable development priorities of Thailand</li> </ul>
EGAT	<ul style="list-style-type: none"> <li>- Future developments in the Thai grid including planned capacity expansions</li> <li>- Tariff subsidies to renewable SPPs</li> <li>- Power purchase agreements</li> <li>- Baseline data availability</li> </ul>
Entity responsible for project O&M:	<ul style="list-style-type: none"> <li>- Ability and capacity to monitor and report project performance and other necessary project GHG indicators</li> </ul>
National Energy Policy Office	Support structure and subsidies to small power producers
A.T. Biopower Co. Ltd.	<ul style="list-style-type: none"> <li>- The intended project technology in comparison to current state of the art technology in Thailand</li> <li>- Impacts of carbon finance on the financial feasibility of the project</li> <li>- Technical and cultural barriers that inhibit the rice husk power technology to be implemented in absence of the project</li> </ul>

## 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. The validation of the PDD version 01 dated 11 September 2006 identified two corrective action requests (CARs) and the project participants were invited to provide a respond to these.





The project participants' response to DNV's findings, which also included the submission of the final PDD (version 2 dated 25 January 2007), addressed the raised requests to DNV's satisfaction.

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

## 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 findings of the validation of the "A.T. Biopower Rice Husk Power Project in Pichit, Thailand" 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 validation findings relate to the project design as documented and described in the PDD of 25 January 2007.

### 3.1 Participation Requirements

The project participants are A.T. Biopower Co., Ltd. (authorized by Thailand) and Chubu Electric Power Co, Inc. and Mitsubishi UFJ Securities Co., Ltd. (authorized by Japan). The participating Parties, Thailand as the host Party and Japan as Annex I Party, meet all relevant participation requirements.

The DNA of Thailand and Japan have provided approval of voluntary participation /5//6/.

### 3.2 Project Design

The project will mitigate GHG emissions by using renewable energy and hence result in emission reductions that are real, measurable and give long-term benefits.

The project intends to employ the most advanced technology currently available. This has been further sustained with provision of technical data and documentation for the intended project technology, such as flue gas cleaning, air emissions. As the project is the first of its kind in Thailand using suspension-fired boilers, it can be said to represent state of the art of rice husk combustion technology in Thailand.

Based on the information received, the project is also likely to improve environmental and social conditions in the regions where the power plants will be constructed. The project is thus likely to contribute to sustainable development in the region where it is located. This has also been discussed with the Thai national focal point for the UNFCCC subsequent to the site visit in Thailand /18/. Eventually, the DNA of Thailand provided a confirmation that the project assists Thailand in achieving sustainable development /5/.



A renewable 7 years crediting period is selected (with the potential of being renewed twice) starting on 21 December 2005. The starting date of the project activity was 5 January 2004. The expected operational lifetime of the project is 25 years.

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 Thailand.

### 3.3 Baseline Determination

The project applies the approved consolidated baseline methodology ACM0006 (version 04) - “*Consolidated baseline methodology for grid-connected electricity generation from biomass residues*” /7/.

This methodology is applicable to the project as this project consists of renewable energy generation unit using biomass residues (i.e. rice husk) that supplies electricity to the interconnected grid of Thailand and the project meets the applicability conditions of ACM0006.

The project activity complies with scenario 2 of ACM0006 and, in accordance with ACM0006, the selected baseline scenarios are:

- Generation of power in existing and/or new grid-connected power plants (P4).
- The rice husk is dumped or left to decay or burned in an uncontrolled manner without utilizing it for energy purposes (B1).

It is sufficiently demonstrated that due to the abundance of rice husk in Thailand and in the region where the project is located, uncontrolled burning or dumping of rice husk, without utilising it for energy purposes, is the predominant current practice and thus the most likely baseline scenario.

### 3.4 Additionality

In accordance with ACM0006, the additionality of the project is demonstrated through the “*Tool for the demonstration and assessment of additionality*” /9/, which includes the following steps:

*Step 0 - Preliminary screening based on the starting date of the project activity:* The start date of the project activity is 5 January, 2004, which is the date on which construction work for the Pichit plant started. Both a new methodology has been submitted (first submission in April 2003) and the project participants requested validation (February 2002) prior to 31 December 2005. The fact that validation was requested and a new methodology was submitted before starting construction demonstrates that the CDM was seriously considered in the decision to proceed with the project activity. The project thus meets the requirements to claim retroactive credits.

*Step 1 - Identification of alternatives to the project activity consistent with current laws and regulations:* All relevant baseline scenario are identified in accordance with ACM0006. All identified power generation alternatives meet Thailand’s legal and regulatory requirements. For rice husk, there is currently no regulation regulating the disposal method of agricultural waste.

*Step 2 - Investment analysis:* Not applicable (Only Step 3 is selected).

*Step 3. Barrier analysis:* Technological and investment barriers are presented in the PDD:

- a) *Technological barriers:* Technical barriers that inhibit the rice husk power technology to be implemented in absence of the project have been assessed during the validation. Thailand has



no previous experience with the suspension-fire technology used in this project, and there is a lack of engineers and operating staff with experience in the technology. This represents barriers to the project implementation.

- b) *Investment barriers:* Through interviews with the National Energy Policy Office (EPPO), the Office of Environmental Policy and Planning and the Electricity Generation Authority of Thailand (EGAT) /13/-/15/, DNV was able to verify that despite the incentives provided by EPPO subsidies and the small power producer program, which guarantees purchase of most of the electricity generated, it remains difficult to develop renewable electricity generation projects in Thailand. For the project in particular, a major investment barrier has been the perceived high risk of the project. The project differs from any of a small number of undertakings hitherto seen in Thailand for rice husk power generation. Other projects have a large rice mill as a core project sponsor and rely on it for the supply of all or nearly all of the rice husk to be used at their plants. In contrast, the project sources its rice husk from a great number of smaller mills. This fuel supply arrangement is different to usual practice where a rice husk power plant has a core supplier to supply most if not all of its fuel requirements. DNV was able to confirm that this significantly increases the risk in the eyes of investors, and this has also been a major contributor in the delay of project financing and the project as such.

The above barriers do not do not affect the alternatives to the project.

*Step 4 - Common practice analysis:* The project participants have provided an analysis of the power plants in Thailand that use rice husk as fuel. Since the proposed project will source its rice husk from many small suppliers and does not have a major supplier, it demonstrated that the proposed project is different to the other power plants, which are power plants owned by or attached to rice mills or other food processing plants and which thus have a single supply of rice husk.

*Step 5 - Impact of CDM registration:* The project participants were able to demonstrate that the CDM benefits have alleviated the above presented barriers.

### 3.5 Monitoring Plan

The project correctly applies the monitoring methodology ACM0006 (version 04). The monitoring plan includes monitoring:

- i) the net quantity of electricity generated by the plant which will be measured continuously by electricity meters (main meter and backup meter)
- ii) the quantity of rice husk combusted in the plant which will be measured continuously by a weighting meter (each time trucks arrive)
- iii) the on-site fossil fuel consumption of diesel for start-up/auxiliary use
- iv) the average return trip distance between rice mills and the plant and the number of truck trips for the transportation of rice husk will be determined to calculate project emissions due to transportation or rice husk from the rice mills to the plant
- v) the fossil fuel consumption for on-site transportation of rice husk
- vi) the net calorific value of rice husk, diesel and residual oil which will be measured on a yearly basis according to the national or international approved standards and procedures through a qualified laboratory



- vii) the surplus of the rice husk in the region (determined annually to ensure that the project does not cause any leakage effects).

The combined margin emission coefficient for the Thai grid has been determined *ex-ante* and will only be updated at renewal of the crediting period.

The plant manager and operators is responsible for the execution of the monitoring plan. ATB has set up a well-defined management and operational system. This system includes the operation and management of the monitoring plan, which specifies the requirements and procedures for parameters monitoring, data recording and data archiving.

### 3.6 Calculation of GHG Emissions

Baseline CO<sub>2</sub> emissions due to displacement of grid electricity, which is partly generated based on fossil fuels, are calculated by multiplying the net quantity of electricity generated by the plant with an *ex-ante* determined baseline grid emission coefficient.

The combined margin emission coefficient for the Thai national electricity grid has been determined *ex-ante* in accordance with ACM0002 (version 06) as required by ACM00006. The calculations were based on electricity generation data and fuel consumption data for the years 2002-2004 provided by EGAT, the Department of Alternative Energy Development and Efficiency and the Energy Policy and Planning Office. Data for the years 2002-2004 were the most recent statistics available at the time of PDD submission.

The values used for the calculation of  $COEF_i$  are those established by the 2006 IPCC Guidelines for National Greenhouse Gas Inventories.

The simple operating margin (OM) emission coefficient is calculated to be 0.60 tCO<sub>2</sub>/MWh. The BM emission factor of 0.42 tCO<sub>2</sub>/MWh was calculated based on the power plants capacity additions that comprise 20% of the system generation (in MWh) that have been built most recently. The resulting combined margin emission coefficient is 0.51 tCO<sub>2</sub>/MWh.

All aspects related to direct and indirect project and baseline emissions are captured by the proposed methodology for determining emission reductions. Burning rice husk, a biomass residue, the project's main direct on-site emissions are climate neutral. The project hence only results in direct on- and off-site CO<sub>2</sub> emissions from transporting rice husk from the rice mills to the rice husk power plant and CO<sub>2</sub> emissions from on-site fossil fuel consumption of diesel for start-up/auxiliary use. CH<sub>4</sub> emissions from the controlled combustion of rice husk in the project scenario and baseline CH<sub>4</sub> emissions from the uncontrolled combustion of rice husk in the baseline scenario are determined applying IPCC default emission factors, discounted for uncertainty as required by ACM0006.

The main source of potential leakage is that the project diverts biomass from other users and thereby increases fossil fuel use. However, the supply and demand analysis as required by ACM0006 demonstrates that the current supply of rice husk by far exceeds demand. The project is hence not expected to result in leakage effects. To ensure that no significant leakage occurs in the future, the supply and demand analysis will be conducted annually to monitor the surplus of biomass as required by ACM0006.



### 3.7 Environmental Impacts

According to Thai regulations, an Environmental Impact Assessment is required for the proposed plant. The assessment and mitigation plan for any impacts must be approved by the Office of Environmental Policy and Planning (OEPP) and National Environmental Board (NEB).

In September 2001, ATB submitted its completed EIA for the Pichit site, whose English summary was provided to DNV. DNV was able to confirm that the EIA was approved by the National Environmental Board (NEB) on 20 November 2002. Approval of the Project's EIA signifies conformity to all the Thai environmental standards specified in the Enhancement and Conservation of the National Environmental Quality Act B.E. 2535.

### 3.8 Comments by Local Stakeholders

ATB has held numerous meetings with local stakeholders. Local stakeholder comments were also sought in formal surveys. Opinion surveys were conducted amongst 20 community leaders and 150 villagers. The opinion survey results were very positive for the project, with as many as 87% of the respondents expressing agreement, while only 2.7% disagreed.

## 4 COMMENTS BY PARTIES, STAKEHOLDERS AND NGOS

DNV published the PDD of 11 September 2006 on the DNV Climate Change web site (<http://www.dnv.com/certification/ClimateChange>) and Parties, stakeholders and NGOs were, through the UNFCCC CDM web site, invited to provide comments during the period from 12 September 2006 to 11 October 2006. No comments were received.

The PDD for the "A.T. Biopower Rice Husk Power Project" /2/ of January 2003 was earlier published on the DNV Climate Change web site and Parties, stakeholders and NGOs were through the Climate-L mail list invited to provide comments from 7 February 2003 to 9 March 2003. Two comments by stakeholders were received. The comments included in Appendix B of this validation report address both the more general as well as technical aspects of the project. The comments have been considered by DNV in its validation of the project. The first comment raised some methodological issues which have been clarified by the CDM Executive Board's later approval of ACM0006. The issues raised by the second comment were addressed in revisions of the PDD subsequent to this first stakeholder consultation process.



## 5 VALIDATION OPINION

*Det Norske Veritas Certification AS (DNV) has performed a validation of the “A.T. Biopower Rice Husk Power Project in Pichit, Thailand”. The validation was performed on the basis of UNFCCC criteria for the Clean Development Mechanism and host country criteria, 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 project participants are A.T. Biopower Co., Ltd. (authorized by Thailand) and Chubu Electric Power Co, Inc. and Mitsubishi UFJ Securities Co., Ltd. (authorized by Japan). The participating Parties, Thailand as the host Party and Japan as Annex I Party, meet all relevant participation requirements. The DNA of Thailand and Japan have provided approval of voluntary participation, including a confirmation by the DNA of Thailand that the project assists in achieving sustainable development.*

*The project correctly applies the approved consolidated baseline and monitoring methodology ACM0006 (version 04).*

*By displacing grid electricity that is partly generated based on fossil fuels, with electricity generated from rice husk (a biomass residue), the project results in reductions of CO<sub>2</sub> emissions that are real, measurable and give long-term benefits to the mitigation of climate change. It is demonstrated that the project is not a likely baseline scenario. Emission reductions attributable to the project are hence additional to any that would occur in the absence of the project activity.*

*The monitoring plan provides for the monitoring of the relevant parameters to determine project and baseline emissions and to check that the project does not result in leakage. The combined margin emission coefficient .51 tCO<sub>2</sub>e/MWh for the Thai grid has been determined ex-ante and will only be updated at renewal of the crediting period.*

*The project’s average annual emission reduction forecast is has been checked and it is deemed likely that the state amount is achieved given that the underlying assumptions do not change.*

*In summary, it is DNV’s opinion that the project, as described in the project design document version 02 dated 25 January 2007, meets all relevant UNFCCC requirements for the CDM and correctly applies the approved baseline and monitoring methodology ACM0006 (version 04). Hence, DNV will request the registration of the “A.T. Biopower Rice Husk Power Project in Pichit, Thailand” as a CDM project activity.*





## 6 REFERENCES

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

- /1/ Mitsubishi UFJ Securities: *CDM PDD for the “A.T. Biopower Rice Husk Power Project in Pichit, Thailand”*, Version 01 dated 11 September 2006 and version 02 of 25 January 2007.
- /2/ Mitsubishi UFJ Securities: *PDD for the “A.T. Biopower Rice Husk Power Project”*, Version February 2002, January 2003 and July 2003.
- /3/ A.T. Biopower Co., Ltd.: *Environmental Input Assessment (English Summary) – Summary Reprot of the Rice Husk-Fueled Power Plant Project in Amphoe Bang Mun Nak, Pichit Province*, January 2003
- /4/ Preliminary Investment Brief for the A.T. Biopower Rice Husk Power Project. Initial Environmental Evaluation Report. June 2001
- /5/ Office of Natural Resources and Environment Policy and Planning (DNA of Thailand): *Letter of Approval dated 30 January 2007*
- /6/ The Liaison Committee for the Utilization of the Kyoto Mechanisms (DNA of Japan): *Letter of Approval dated 12 March 2007*

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

- /7/ CDM-EB: *Approved Consolidated Baseline and Monitoring Methodology ACM0006 - “Consolidated baseline methodology for grid-connected electricity generation from biomass residues”*, version 04.
- /8/ CDM-EB: *Approved Consolidated Baseline and Monitoring Methodology ACM0002 - “Consolidated baseline methodology for grid-connected electricity generation from renewable sources”*, version 06 of 19 May 2006.
- /9/ CDM-EB: *“Tool for the demonstration and assessment of additionality”*, version 02 of 28 November 2005.
- /10/ International Emission Trading Association (IETA) & the World Bank’s Prototype Carbon Fund (PCF): *Validation and Verification Manual*. <http://www.vvmanual.info>
- /11/ Energy Information Administration: *Thailand & Thailand Environmental Issues*. <http://www.eia.doe.gov/>
- /12/ EGAT Power Development Plan PDP

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

- /13/ Meeting with the National Energy Policy Office, June 4, 2002:
  - Viraphol Jirapraditkul, Director, Energy Conservation and Renewable Energy Division.



- /14/ Meeting with the Office of Environmental Policy and Planning, June 5, 2002
  - Mrs. Piyanan Soponkanabhorn, Chief of energy section.
- /15/ Meeting with Electricity Generation Authority of Thailand, June 5, 2002:
  - Phaiboon Pipattanasomporn, Director Economic Policy Division
- /16/ Meeting with Elektrowatt-Ekono and Operational Energy Group Ltd, June 5, 2002:
  - Richard G. Li and Pichai Thirapolvanichkul
- /17/ Meeting with Electricity Generation Authority of Thailand, June 6, 2002:
  - Vinit Tangnoi, Director, and
  - Nopporn Boonyaprasit, Assistant Director, Domestic Power Purchase Division.
- /18/ Telephone interview with Ms. Asdaporn Krarapanond, UNFCCC Focal Point of Thailand, Office of Environmental Policy and Planning
- /19/ Meeting with A.T. Biopower Co. Ltd., June 4, 2002:
  - Thavat Watanatada, Chief Executive Officer
  - Jackrit Watanatada, Business Development

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## **APPENDIX A**

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### **CDM VALIDATION PROTOCOL**

**Table 1 Mandatory Requirements for 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
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, CDM Modalities and Procedures §40a	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, CDM Modalities and Procedures §40a	OK	DNA of Thailand: Letter of Approval dated 30 January 2007 DNA of Japan: Letter of Approval dated 12 March 2007
5. The emission reductions shall 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
6. Reduction in GHG emissions shall 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. 12.5c, CDM Modalities and Procedures §43	OK	Table 2, Section B.2
7. In case public funding from Parties included in Annex I 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	Decision 17/CP.7, CDM Modalities and Procedures Appendix B, § 2	OK	The financial plans for the Project involve public funding from an Annex I country in that one of ATB's shareholders, FINNFUND, is a Finnish government-owned institution. However, the fund is not ODA.
8. Parties participating in the CDM shall designate a national authority for the CDM	CDM Modalities and Procedures §29	OK	Thailand: Office of Natural Resources and Environment Policy and Planning (ONEP) Japan: The Liaison Committee

REQUIREMENT	REFERENCE	CONCLUSION	Cross Reference / Comment
			for the Utilization of the Kyoto Mechanisms
9. The host Party and the participating Annex I Party shall be a Party to the Kyoto Protocol	CDM Modalities §30/31a	OK	Thailand ratified the Protocol 28 August 2002, Japan ratified the protocol 4 June 2002
10. The participating Annex I Party's assigned amount shall have been calculated and recorded	CDM Modalities and Procedures §31b	OK	Japan's assigned amount is 94% of the emissions in 1990.
11. The participating Annex I Party shall have in place a national system for estimating GHG emissions and a national registry in accordance with Kyoto Protocol Article 5 and 7	CDM Modalities and Procedures §31b	OK	The validation has not in detail assessed Japan's compliance with article 5 and 7 of the Kyoto Protocol. However, Japan has a national system for estimating GHG emissions and regularly submits its latest national inventory report to the UNFCCC.
12. Comments by local stakeholders shall be invited, a summary of these provided and how due account was taken of any comments received	CDM Modalities and Procedures §37b	OK	Table 2, Section G
13. Documentation on the analysis of the environmental impacts of the project activity, including transboundary impacts, shall be submitted, and, if those impacts are considered significant by the project participants or the Host Party, an environmental impact assessment in accordance with procedures as required by the Host Party shall be carried out.	CDM Modalities and Procedures §37c	OK	Table 2, Section F An EIA has been carried out and is approved.
14. Baseline and monitoring methodology shall be previously approved by the CDM Executive Board	CDM Modalities and Procedures §37e	OK	Table 2, Section B.1.1 and D.1.1. The project applies ACM0006 (version 04)
15. Provisions for monitoring, verification and reporting shall be in accordance with the modalities described in the Marrakech Accords and relevant decisions of the COP/MOP	CDM Modalities and Procedures §37f	OK	Table 2, Section D
16. Parties, stakeholders and UNFCCC accredited NGOs shall have been invited to comment on the validation requirements for minimum 30 days, and the project design document and	CDM Modalities and Procedures §40	OK	DNV published the PDD of 11 September 2006 on the DNV Climate Change web site

REQUIREMENT	REFERENCE	CONCLUSION	Cross Reference / Comment
comments have been made publicly available			( <a href="http://www.dnv.com/certification/ClimateChange">http://www.dnv.com/certification/ClimateChange</a> ) and Parties, stakeholders and NGOs were, through the UNFCCC CDM web site, invited to provide comments during the period from 12 September 2006 to 11 October 2006. No comments were received.
17. A baseline shall be established on a project-specific basis, in a transparent manner and taking into account relevant national and/or sectoral policies and circumstances	CDM Modalities and Procedures §45c,d	OK	Table 2, Section B.2
18. The baseline methodology shall exclude to earn CERs for decreases in activity levels outside the project activity or due to force majeure	CDM Modalities and Procedures §47	OK	Table 2, Section B.2
19. The project design document shall be in conformance with the UNFCCC CDM-PDD format	CDM Modalities and Procedures Appendix B, EB Decision	OK	

**TABLE 2 REQUIREMENTS CHECKLIST**

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl	Final Concl
<b>A. General Description of Project Activity</b> <i>The project design is assessed.</i>					
<b>A.1. Project Boundaries</b> <i>Project Boundaries are the limits and borders defining the GHG emission reduction project.</i>					
A.1.1. Are the project's spatial (geographical) boundaries clearly defined?	/1/	DR	The rice husk power plant and the project's spatial boundaries are clearly defined. The rice husk power plant will be built in the Pichit Province of Thailand, located on a 34 hectare site.		OK
A.1.2. Are the project's system (components and facilities used to mitigate GHGs) boundaries clearly defined?	/1/	DR	The project's system boundaries are clearly defined. GHG emission reductions are achieved from two components; 1) the electricity generated from the rice husk fuel plant replaces the same amount of Thai grid electricity mainly generated by combusting fossil fuels, and 2) the controlled combustion of rice husk in suspended-fired boilers will generate fewer CH <sub>4</sub> emissions than the open burning of the same amount of rice husk.		OK

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

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl	Final Concl
<b>A.2. Technology to be employed</b> <i>Validation of project technology focuses on the project engineering, choice of technology and competence/ maintenance needs. The validator should ensure that environmentally safe and sound technology and know-how is used.</i>					
A.2.1. Does the project design engineering reflect current good practices?	/1/	DR I	<p>The Project Design Document states that the plant will employ the most advanced technology currently available. This project is the first of its kind in Thailand using suspended fuel boiler technology.</p> <p>The EIA provides additional evidence that the project design reflects good practice.</p>		OK
A.2.2. Does the project use state of the art technology or would the technology result in a significantly better performance than any commonly used technologies in the host country?	/1/	DR I	As the Pichit project is the first of its kind in Thailand using suspended fuel boiler technology, it can be said to represent state of the art technology in Thailand.		OK
A.2.3. Is the project technology likely to be substituted by other or more efficient technologies within the project period?	/1/	DR	No. Ref. A2.1		OK
A.2.4. Does the project require extensive initial training and maintenance efforts in order to work as presumed during the project period?	/1/	DR I	The PDD states that the O&M contractor is responsible for training of plant personnel. They will also guarantee plant net power output, fuel consumption rate, availability, and emissions levels. The document does not describe the exact training procedures or management controls, but the foundation for these have been presented and discussed during the site visit.		OK
A.2.5. Does the project make provisions for meeting	/1/	DR	See A2.4		OK

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CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl	Final Concl
training and maintenance needs?					
<b>A.3. Contribution to Sustainable Development</b> <i>The project's contribution to sustainable development is assessed.</i>					
A.3.1. Is the project in line with relevant legislation and plans in the host country?	/1/	DR I	<ul style="list-style-type: none"> <li>An EIA for the proposed plant has been approved by the National Environmental Board (NEB) 20 November 2002.</li> <li>Thailand NEB regulations for thermal power plants should be followed.</li> <li>No particular technology is prescribed. Emission limits are regulated for NO<sub>x</sub> and SO<sub>2</sub>, and the approval of project EIA provides a final confirmation that these limits are met.</li> <li>The project is establishing "state of the art" practice in Thailand by the establishment of "Social Contracts" with the community where the plant will be located, and provision of funds for local environment and penalties for environmental damage. Significant effort has been placed on this in order to obtain support and understanding in communities that this is not a "pollute and run"-project.</li> </ul>		OK
A.3.2. Is the project in line with host-country specific CDM requirements?	/1/	DR I	Approval by the parties has been received.		OK
A.3.3. Is the project in line with sustainable development policies of the host country?	/1/	DR	Sustainability policies in Thailand promote the use of renewable energy and agricultural waste.		OK

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CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl	Final Concl
			Rice husk fuels represent particularly rich energy resources for Thailand and contribute towards national goals. Confirmation thereof by the Thai DNA has been provided.		
A.3.4. Will the project create other environmental or social benefits than GHG emission reductions?	/1/	DR I	<p>A summary of the project EIA has been provided to confirm this issue. The main contributor apart from GHG reductions will be an increase in employment.</p> <p>The EIA of the Phichit project was approved by the Office of Environmental Policy and Planning (OEPP) in November 2002. A significant part of the social contribution is also the social contracts established with the communities, which places obligations and penalties on the project operator during operation.</p> <p>The project will reduce the amount of rice husk disposed through dumping or burning. It will provide steam to agricultural users. Possible cement replacement by rice husk ash and employment during construction and project realisation.</p> <p>A significant portion of Thailand's water pollution problems stem from livestock and agricultural sources e.g. decomposed rice fields.</p>		OK

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CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl	Final Concl
<b>B. Project Baseline</b> <i>The validation of the project baseline establishes whether the selected baseline methodology is appropriate and whether the selected baseline represents a likely baseline scenario.</i>					
<b>B.1. Baseline Methodology</b> <i>It is assessed whether the project applies an appropriate baseline methodology.</i>					
B.1.1. Is the baseline methodology previously approved by the CDM Executive Board?	/1/	DR	<p>The project applies the consolidated baseline methodology ACM0006.</p> <p>ACM0006 has been revised and version 04 is now the version in effect. The PDD still applies version 03 and needs to be updated to reflect the latest changes made to version 03.</p>	CAR 1	OK
B.1.2. Is the baseline methodology the one deemed most applicable for this project and is the appropriateness justified?	/1/	DR	<p>The baseline methodology AM0004, which was eventually consolidated into ACM0006, was specifically developed for this project.</p> <p>The project meets all requirements for ACM0006.</p>		OK
<b>B.2. Baseline Determination</b> <i>The choice of baseline will be validated with focus on whether the baseline is a likely scenario, whether the project itself is not a likely baseline scenario, and whether the baseline is complete and transparent.</i>					
B.2.1. Is the application of the methodology and the discussion and determination of the chosen	/1/	DR	Yes		OK

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CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl	Final Concl
baseline transparent?					
B.2.2. Has the baseline been determined using conservative assumptions where possible?	/1/	DR I	CH <sub>4</sub> emissions from the controlled combustion of rice husk in the project scenario and baseline CH <sub>4</sub> emissions from the uncontrolled combustion of rice husk in the baseline scenario are determined applying IPCC default emission factors, discounted for uncertainty as required by ACM0006.		OK
B.2.3. Has the baseline been established on a project-specific basis?	/1/	DR I	A project-specific analysis of investment and technology barriers has been performed. For this project, no sufficient investment could be found because of the higher perceived risk due to dispersed rice husk supply and the introduction of a new technology.		OK
B.2.4. Does the baseline scenario sufficiently take into account relevant national and/or sectoral policies, macro-economic trends and political aspirations?	/1/	DR I	National and sectoral policies and circumstances support the project.  Through interviewing National Energy Policy Office (EPPO), the Office of Environmental Policy and Planning and the Electricity Generation Authority of Thailand (EGAT), DNV was able to verify that despite the incentives provided by EPPO subsidies and the small power producer program which guarantees purchase of most of the electricity generated, it remains difficult to develop renewable electricity generation projects in Thailand.		OK
B.2.5. Is the baseline determination compatible with the available data?	/1/ /6/	DR	The baseline is based on available data. The estimation of Thai national grid CEF is based on EGAT's information on grid fuel		OK

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CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl	Final Concl
B.2.6. Does the selected baseline represent the most likely scenario among other possible and/or discussed scenarios?	/1/	DR I	<p>patterns is in line with ACM0002.</p> <p>The project activity complies with scenario 2 of ACM0006 and, in accordance with ACM0006, the selected baseline scenarios are:</p> <ul style="list-style-type: none"> <li>• Generation of power in existing and/or new grid-connected power plants (P4).</li> <li>• The rice husk is dumped or left to decay or burned in an uncontrolled manner without utilizing it for energy purposes (B1).</li> </ul> <p>It is sufficiently demonstrated that due to the abundance of rice husk in Thailand and in the region where the project is located, uncontrolled burning or dumping of rice husk, without utilising it for energy purposes, is the predominant current practice and thus the most likely baseline scenario.</p>		OK
B.2.7. Is it demonstrated/justified that the project activity itself is not a likely baseline scenario?	/1/	DR I	<p>In accordance with ACM0006, the additionality of the project is demonstrated through the "Tool for the demonstration and assessment of additionality" /9/, which includes the following steps:</p> <p>Step 0 - Preliminary screening based on the starting date of the project activity: The start date of the project activity is 5 January, 2004, which is the date on which construction work for the Pichit plant started. Both a new methodology has been submitted (first submission in April 2003)</p>		OK

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CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl	Final Concl
			<p>and the project participants requested validation (February 2002) prior to 31 December 2005. The fact that validation was requested and a new methodology was submitted before starting construction demonstrates that the CDM was seriously considered in the decision to proceed with the project activity. The project thus fulfils the conditions to claim retroactive credits.</p> <p>Step 1 - Identification of alternatives to the project activity consistent with current laws and regulations: All relevant baseline scenario are identified in accordance with ACM0006. All identified power generation alternatives meet Thailand's legal and regulatory requirements. For rice husk, there is currently no regulation regulating the disposal method of agricultural waste.</p> <p>Step 2 - Investment analysis: Not applicable (Only Step 3 is selected).</p> <p>Step 3. Barrier analysis: Technological and investment barriers are presented in the PDD:</p> <p>Technological barriers: Technical barriers that inhibit the rice husk power technology to be implemented in absence of the project have been assessed during the validation. Thailand has no previous experience with the suspension-fire technology used in this project, and there is a lack of engineers and operating staff with experience in the technology. This represents barriers to the</p>		

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			<p>project implementation.</p> <p>Investment barriers: Through interviewing National Energy Policy Office (EPPO), the Office of Environmental Policy and Planning and the Electricity Generation Authority of Thailand (EGAT), DNV was able to verify that despite the incentives provided by EPPO subsidies and the small power producer program which guarantees purchase of most of the electricity generated, it remains difficult to develop renewable electricity generation projects in Thailand. For the project in particular, a major investment barrier has been the perceived high risk of the project. The project differs from any of a small number of undertakings hitherto seen in Thailand for rice husk power generation. Other projects have a large rice mill as a core project sponsor and rely on it for the supply of all or nearly all of the rice husk to be used at their plants. In contrast, the project sources its rice husk from a great number of smaller mills. This fuel supply arrangement is different to usual practice where a rice husk power plant has a core supplier to supply most if not all of its fuel requirements. DNV was able to confirm that this significantly increases the risk in the eyes of investors.</p> <p>The above barriers do not do not affect the alternatives to the project.</p> <p>Step 4 - Common practice analysis: The project participants have provided an</p>		

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			analysis of the power plants in Thailand that use rice husk as fuel. Since the proposed project will source its rice husk from many small suppliers and does not have a major supplier, it demonstrated that the proposed project is different to the other power plants, which are power plants owned by or attached to rice mills or other food processing plants and which thus have a single supply of rice husk.  Step 5 - Impact of CDM registration: The project participants were able to demonstrate that the CDM benefits have alleviated the above presented barriers.		
B.2.8. Have the major risks to the baseline been identified?	/1/	DR I	There are baseline risks associated with possible grid expansions by adding power capacity from Laos, Cambodia and China. These should be re-visited by the baseline re-validations.  The open burning of rice husk is implicitly assumed to continue unless legislation prohibits it or unless other uses are found. This will have to be assessed before the second crediting period.		OK
B.2.9. Is all literature and sources clearly referenced?	/1/	DR	Tables and graphics are clearly referenced.		OK
<b>C. Duration of the Project/ Crediting Period</b> <i>It is assessed whether the temporary boundaries of the project are clearly defined.</i>					
C.1.1. Are the project's starting date and operational lifetime clearly defined and reasonable?	/1/ /11/	DR I	The expected operational lifetime of the project is at least 25 years, due to a 25-year		OK

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			power purchase agreements with EGAT (Electricity Generating Authority of Thailand). The project's starting date is 5 January 2004.		
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 renewable crediting period of seven years has been selected, starting on 21 December 2005.		OK
<b>D. Monitoring Plan</b> <i>The monitoring plan review aims to establish whether all relevant project aspects deemed necessary to monitor and report reliable emission reductions are properly addressed ((Blue text contains requirements to be assessed for optional review of monitoring methodology prior to submission and approval by CDM EB).</i>					
<b>D.1. Monitoring Methodology</b> <i>It is assessed whether the project applies an appropriate baseline methodology.</i>					
D.1.1. Is the monitoring methodology previously approved by the CDM Executive Board?	/1/	DR	The project applies the consolidated baseline methodology ACM0006.		OK
D.1.2. Is the monitoring methodology applicable for this project and is the appropriateness justified?	/1/	DR	One of the changes to ACM0006 was to include 2006 IPCC emission factors. Hence, the selected CH <sub>4</sub> emission factors for controlled and uncontrolled combustion of rice husk (wood) will have to be revised. Moreover, the EB has also requested the general use of 2006 IPCC emission factors. Some of the emission factors for fossil fuels have slightly changed in the 2006 guidelines	GAR-2	OK

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CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl	Final Concl
			compared to the 1996 guidelines.		
D.1.3. Does the monitoring methodology reflect good monitoring and reporting practices?	/1/	DR	The monitoring methodology reflects good practice. The principles presented in the monitoring plan can be easily applied under the present boundaries and support verification of emission reductions from the project components. The selected methodology builds upon monitored data and will thus be sufficiently supported by monitored or recorded data if applied correctly.		OK
D.1.4. Is the discussion and selection of the monitoring methodology transparent?	/1/	DR	The discussion and selection of methodology is transparent.		OK
<b>D.2. Monitoring of Project Emissions</b> <i>It is established whether the monitoring plan provides for reliable and complete project emission data over time.</i>					
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 I	The monitoring plan includes project CO <sub>2</sub> emissions from transportation and start-up/auxiliary fossil fuel consumption, and CH <sub>4</sub> emissions from the combustion of rice husk.  Detailed algorithms used for calculation of emission reductions are presented.		OK
D.2.2. Are the choices of project GHG indicators reasonable?	/1/	DR I	The selection of the indicator for CH <sub>4</sub> emissions from rice husk combustion, i.e. the amount of rice husk combusted, is reasonable.  The selection of the indicators for CO <sub>2</sub> emissions from rice husk transportation and		OK

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			start-up/ auxiliary fuel use, i.e. the monitoring of the fuel type and fuel consumption on-site and monitor distance for off-site transports, are reasonable and in line with ACM0006.		
D.2.3. Will it be possible to monitor / measure the specified project GHG indicators?	/1/	DR I	Yes, it will be possible to monitor these indicators.		OK
D.2.4. Will the indicators give opportunity for real measurements of achieved emission reductions?	/1/	DR	The indicators give opportunity for accurately estimating project CO <sub>2</sub> emissions from transportation/ fuel use, and CH <sub>4</sub> emissions from the combustion of rice husk.		OK
D.2.5. Will the indicators enable comparison of project data and performance over time?	/1/	DR	Yes, the indicators, if implemented as described in the monitoring plan, will enable comparison of project performance over time.		OK
<b>D.3. Monitoring of Leakage</b> <i>It is assessed whether the monitoring plan provides for reliable and complete leakage data over time.</i>					
D.3.1. Does the monitoring plan provide for the collection and archiving of all relevant data necessary for determining leakage?	/1/	DR	The main source of potential leakage is that the project diverts biomass from other users and thereby increases fossil fuel use. However, the supply and demand analysis demonstrates that the current supply of rice husk by far exceeds demand. The project is hence not expected to result in significant leakage effects.		OK
D.3.2. Have relevant indicators for GHG leakage been included?	/1/	DR	To ensure that no significant leakage occurs in the future, the supply and demand analysis will be conducted annually.		OK

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CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl	Final Concl
D.3.3. Does the monitoring plan provide for the collection and archiving of all relevant data necessary for determining leakage?	/1/	DR	The total capacity of grid connected rice husk fuelled plant, rice husk required per unit capacity and the surplus of rice husk will be monitored and the data will be used to carry out a supply and demand analysis.		OK
D.3.4. Will it be possible to monitor the specified GHG leakage indicators?	/1/	DR	Official data will be used for the total capacity of grid connected rice husk fuelled plants and the surplus of rice husk.		OK
<b>D.4. Monitoring of Baseline Emissions</b> <i>It is established whether the monitoring plan provides for reliable and complete project emission data over time.</i>					
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/	DR	The monitoring plan provides for the collection and archiving of data for determining the grid electricity CO <sub>2</sub> emissions and the CH <sub>4</sub> emissions from open burning of rice husk avoided by the project.		OK
D.4.2. Is the choice of baseline indicators, in particular for baseline emissions, reasonable?	/1/	DR	<p>Grid electricity CO<sub>2</sub> emissions avoided by the project will be monitored through monitoring the amount of electricity generated by the rice husk plant multiplied with an ex-ante determined grid CEF.</p> <p>The amount of rice husk used by the project will be monitored to estimate the avoided CH<sub>4</sub> emissions from open burning of rice husk.</p>		OK
D.4.3. Will it be possible to monitor the specified baseline indicators?	/1/	DR I	Electricity generated by the project will be measured through calibrated electricity meters.		OK

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			The CEF will be established based on official data on electricity generation and fuel consumption according to generation type. This data is collected by EGAT and is publicly available.		
<b>D.5. Monitoring of Sustainable Development Indicators/ Environmental Impacts</b> <i>It is checked that choices of indicators are reasonable and complete to monitor sustainable performance over time.</i>					
D.5.1. Does the monitoring plan provide the collection and archiving of relevant data concerning environmental, social and economic impacts?	/1/	DR	Neither ACM0006 nor the Thai DNA requires the monitoring of social or environmental indicators.		OK
<b>D.6. Project Management Planning</b> <i>It is checked that project implementation is properly prepared for and that critical arrangements are addressed.</i>					
D.6.1. Is the authority and responsibility of project management clearly described?	/1/	DR I	ATB is responsible for execution of the monitoring plan. The management and operation of the project is detailed in the O&M contract.		OK
D.6.2. Is the authority and responsibility for registration, monitoring, measurement and reporting clearly described?	/1/	DR I	Responsibilities for monitoring and reporting are stated in the monitoring plan and PDD annexes. ATB will appoint a senior executive to be in charge of project monitoring, measurement and reporting. This will be further detailed in a 4-years O&M contract.		OK
D.6.3. Are procedures identified for training of monitoring personnel?	/1/	DR	No procedure has yet been developed, but the responsibility for developing and		OK

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Page A-18

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl	Final Concl
		I	establishing procedures for training of plant personnel will be detailed in a 4-years O&M contract. The content of this training was presented during the site visit, and is comprehensive and appropriate.		
D.6.4. Are procedures identified for emergency preparedness for cases where emergencies can cause unintended emissions?	/1/ /11/	DR I	Emergency preparedness is considered and will be applied by the O&M contractor. Emergencies are likely to have minor environmental impact.		OK
D.6.5. Are procedures identified for calibration of monitoring equipment?	/1/ /11/	DR I	EWE will be responsible for developing an "Equipment Calibration Procedures" booklet. The O&M contractor will be responsible for ensuring calibration be carried out as specified. Metering equipment will be sealed and both EGAT and ATB representatives need to be present before the seals can be broken.		OK
D.6.6. Are procedures identified for maintenance of monitoring equipment and installations?	/1/ /11/	DR I	Monitoring and maintenance reports will be issued monthly. It can be assumed that these implicitly will provide for identification and execution of necessary maintenance work.		OK
D.6.7. Are procedures identified for monitoring, measurements and reporting?	/1/	DR I	Responsibilities and data foundation are identified.		OK
D.6.8. 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 I	There are no explicit procedures for this, but the information is contained in tables in the PDD.		OK
D.6.9. Are procedures identified for dealing with possible monitoring data adjustments and uncertainties?	/1/	DR I	With the continuous update of the baseline emission factors, there is no need for specific identification of factors that provide		OK

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CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl	Final Concl
			for baseline updates after the first 7 year baseline validity period.		
D.6.10. Are procedures identified for review of reported results/data?	/1/	DR I	There are no explicit procedures for this, but responsibility for reporting and review of different data is stated in the MP.		OK
D.6.11. Are procedures identified for internal audits of GHG project compliance with operational requirements where applicable?	/1/	DR I	It can be questioned whether this is necessary for such a small and intimate project. The presented activities are deemed to be appropriate.		OK
D.6.12. Are procedures identified for project performance reviews before data is submitted for verification, internally or externally?	/1/	DR I	Reviews will be performed by the project management.		OK
D.6.13. Are procedures identified for corrective actions in order to provide for more accurate future monitoring and reporting?	/1/	DR I	No, not yet. This will be important for dissemination of experiences.  Monitoring errors for sold electricity are picked up by regular calibration of equipment and cross-checking invoices with EGAT's own purchase readings. Baseline uncertainties lie beyond project control, and are likely to be small or negligible.		OK

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

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl	Final Concl
<b>E. Calculation of GHG Emissions by Source</b> <i>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.</i>					
<b>E.1.Predicted Project GHG Emissions</b> <i>The validation of predicted project GHG emissions focuses on transparency and completeness of calculations.</i>					
E.1.1. Are all aspects related to direct and indirect GHG emissions captured in the project design?	/1/	DR	<p>The project in itself is assumed to generate CO<sub>2</sub> emissions equal to the absorption through re-growth of rice, as stipulated in the IPCC Guidelines. The main emissions from the project are therefore deemed CO<sub>2</sub> neutral.</p> <p>Start-up/Auxiliary fuel and transporting rice husk from rice mills to the plants by trucks and on-site transportation will produce CO<sub>2</sub> emissions. Combustion of rice husk will result in CH<sub>4</sub> emissions. These emissions are included in the project design and calculations.</p>		OK
E.1.2. Are the GHG calculations documented in a complete and transparent manner?	/1/	DR	<p>The GHG calculations are documented in a transparent manner. Detailed algorithms are presented for ex-ante emissions calculations of the off-site and on-site transport/ start-up/auxiliary fuel CO<sub>2</sub> emissions, and CH<sub>4</sub> emissions from rice husk combustion.</p>		OK

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

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl	Final Concl
			Actual methane emissions from rice husk combustion and CO <sub>2</sub> emissions from transportation on- and offsite (by fuel consumption and km/ton travelled respectively) and star-up/auxiliary fuel will be monitored ex-post through the monitoring plan.		
E.1.3. Have conservative assumptions been used to calculate project GHG emissions?	/1/	DR	Conservative assumptions have been used, where applicable.		OK
E.1.4. Are uncertainties in the GHG emissions estimates properly addressed in the documentation?	/1/	DR	Conservative assumptions have been used, where applicable, to address uncertainties.		OK
E.1.5. Have all relevant greenhouse gases and source categories listed in Kyoto Protocol Annex A been evaluated?	/1/	DR	Yes, CH <sub>4</sub> , and CO <sub>2</sub> emissions are evaluated.		OK
<b>E.2. Leakage</b> <i>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.</i>					
E.2.1. Are potential leakage effects beyond the chosen project boundaries properly identified?	/1/	DR	The main source of potential leakage is that the project diverts biomass from other users and thereby increases fossil fuel use. However, the supply and demand analysis demonstrates that the current supply of rice husk by far exceeds demand. Therefore, the project is not expected to result in significant leakage effects.		OK

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

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl	Final Concl
<b>E.3. Baseline Emissions</b> <i>The validation of predicted baseline GHG emissions focuses on transparency and completeness of calculations.</i>					
E.3.1. Have the most relevant and likely operational characteristics and baseline indicators been chosen as reference for baseline emissions?	/1/	DR	<p>The calculation of CO<sub>2</sub> emissions from replaced grid electricity is based on data contained in EGAT's Power Development Plan of 2004.</p> <p>The calculation of CH<sub>4</sub> emission from otherwise openly burned rice husk is done based on a lab analysis of the carbon fraction which is found to be 0,3713.</p>		OK
E.3.2. Are the baseline boundaries clearly defined and do they sufficiently cover sources and sinks for baseline emissions?	/1/	DR	<p>Baseline boundaries are clearly defined and cover sources in a conservative manner i.e.</p> <ul style="list-style-type: none"> <li>- emissions factor for burning of rice husk instead of decaying</li> <li>- no inclusion of potential steam delivery and fuel replacement in cement plants</li> </ul>		OK
E.3.3. Are the GHG calculations documented in a complete and transparent manner?	/1/	DR	<p>Yes. The calculations are complete and transparent.</p> <p>The combined margin emission coefficient for the Thai national electricity grid has been determined <i>ex-ante</i> in accordance with ACM0002 (version 06) as required by ACM00006. The calculations were based on electricity generation data and fuel consumption data for the years 2002-2004 provided by EGAT, the Department of Alternative Energy Development and Efficiency and the Energy Policy and</p>		OK

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



CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl	Final Concl
			<p>Planning Office. Data for the years 2002-2004 were the most recent statistics available at the time of PDD submission.</p> <p>The values used for the calculation of <math>COEF_i</math> are those established by the 2006 IPCC Guidelines for National Greenhouse Gas Inventories.</p> <p>The simple operating margin (OM) emission coefficient is calculated to be 0.60 tCO<sub>2</sub>/MWh. The BM emission factor of 0.42 tCO<sub>2</sub>/MWh was calculated based on the power plants capacity additions that comprise 20% of the system generation (in MWh) that have been built most recently. The resulting combined margin emission coefficient is 0.51 tCO<sub>2</sub>/MWh.</p>		
E.3.4. Have conservative assumptions been used when calculating baseline emissions?	/1/	DR	Conservative assumptions have been applied, where applicable.		OK
E.3.5. Are uncertainties in the GHG emission estimates properly addressed in the documentation?	/1/	DR	Yes		OK
E.3.6. Have the project baseline(s) and the project emissions been determined using the same appropriate methodology and conservative assumptions?	/1/	DR	Yes. The methodologies for calculating baseline and emission reductions are determined in a sound, conservative and transparent manner and comply with existing good practise. This is in line with ACM0006.		OK

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

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl	Final Concl
<b>E.4.Emission Reductions</b> Validation of baseline GHG emissions will focus on methodology transparency and completeness in emission estimations.					
E.4.1. Will the project result in fewer GHG emissions than the baseline scenario?	/1/	DR	The electricity produced from the rice husk power project will partly replace fossil fuel based electricity of the Thai grid and thus avoid CO <sub>2</sub> emissions. Moreover, controlled burning of rice husk in the rice husk power plant results in significant less CH <sub>4</sub> emissions than open air burning of rice husk.		OK
<b>F. Environmental Impacts</b> <i>Documentation on the analysis of the environmental impacts will be assessed, and if deemed significant, an EIA should be provided to the validator.</i>					
F.1.1. Has an analysis of the environmental impacts of the project activity been sufficiently described?	/1/ /2/ /3/	DR	The potential environmental impacts arising from the project are due to emissions of NO <sub>x</sub> /SO <sub>2</sub> particulates and fly ash and the waste water from the power generation plant. NO <sub>x</sub> /SO <sub>2</sub> emissions will be kept within the Thai standards and particulates and fly ash emissions will be controlled by an electrostatic precipitator. Waste water will be treated in a waste water treatment unit that is included in the project		OK
F.1.2. Are there any Host Party requirements for an Environmental Impact Assessment (EIA), and if yes, is an EIA approved?	/1/ /9/	DR I	The EIA for the Phichit rice husk plant was approved by the Office of Environmental Policy and Planning (OEPP) 20 November 2002.		OK

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

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl	Final Concl
F.1.3. Will the project create any adverse environmental effects?	/1/	DR I	Transport of rice husk by trucks will increase, and there will be some increase in NO <sub>x</sub> /SO <sub>2</sub> emissions. Other adverse effects, such as particulate emissions, effluent pollution and noise are also discussed in the EIA. Mitigation efforts are identified and discussed in the EIA. None of the effects can be said to be significant enough to prevent implementation of the project.		OK
F.1.4. Are transboundary environmental impacts considered in the analysis?	/1/	DR	No transboundary environmental impacts are identified and there seem to be none		OK
F.1.5. Have identified environmental impacts been addressed in the project design?	/1/	DR	The EIA does not address in detail any social impacts apart from employment. Environmental impacts are well elaborated, as well as the content of the "social contracts" with the communities.		OK
F.1.6. Does the project comply with environmental legislation in the host country?	/1/	DR I	Yes, the EIA of the Pichit rice husk plant was approved by the Office of Environmental Policy and Planning (OEPP) 20 November 2002.		OK
<b>G. Stakeholder Comments</b> <i>The validator should ensure that a stakeholder comments have been invited and that due account has been taken of any comments received.</i>					
G.1.1. Have relevant stakeholders been consulted?	/1/	DR	24 meetings have been organized from May 9, 2000 to April 5, 2002, with leaders, teachers, doctors, nurses, students, parents, etc. Local stakeholder comments are also sought in formal surveys		OK
G.1.2. Have appropriate media been used to invite	/1/	DR	Opinion surveys and public hearings have		OK

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

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl	Final Concl
comments by local stakeholders?			been used, two of the most interactive media that exist		
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/	DR	The comprehensive stakeholder consultation is not mandated under Thai law, which requires that 50% of respondents agree to a project as part of an EIA assessment. In order to be eligible for the EPPO-SPP program (Small Power Producers program from the Ministry of Energy's Energy Policy and Planning Office), 67% approval needs to be obtained.		OK
G.1.4. Is a summary of the stakeholder comments received provided?	/1/	DR	Opinion surveys showed 87% of agreement and a public hearing found 89% of approval. Opinion surveys are somewhat dated and opinions have allegedly improved in favour of the project due to public participation work ATB has carried out, particularly in the area of environmental concerns.		OK
G.1.5. Has due account been taken of any stakeholder comments received?	/1/	DR	An environmental protection guarantee and a community development fund have been established to increase the local stakeholders' approval rate. Public participation work has focused on training of local work force.		OK

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

**TABLE 3     RESOLUTION OF CORRECTIVE ACTION AND CLARIFICATION REQUESTS**

Draft report clarifications and corrective action requests by validation team	Ref. to Table 2	Summary of project participants' response	Validation team conclusion
<p>CAR 1</p> <p>ACM0006 has been revised and version 04 is now the version in effect. The PDD still applies version 03 and needs to be updated to reflect the latest changes made to version 03.</p>	B.1.1	The PDD was revised to apply version 04 of ACM0006.	<p>OK</p> <p>The PDD was revised. The CAR is closed.</p>
<p>CAR 2</p> <p>One of the changes to ACM0006 was to include 2006 IPCC emission factors. Hence, the selected CH<sub>4</sub> emission factors for controlled and uncontrolled combustion of rice husk (wood) will have to be revised. Moreover, the EB has also requested the general use of 2006 IPCC emission factors. Some of the emission factors for fossil fuels have slightly changed in the 2006 guidelines compared to the 1996 guidelines.</p>	D.1.2	The PDD was revised to apply 2006 IPCC emission factors.	<p>OK</p> <p>The final PDD applies 2006 IPCC emission factors. The CAR is closed.</p>

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## **APPENDIX B**

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### **STAKEHOLDER COMMENTS**

**Comment by:** Axel Michaelowa, Hamburg Institute of International Economics (HWWA)

**Date:** 2003-03-18

**Subject:** Comments by HWWA of 28 February 2003

**Comment:**

Bundling of several projects is unlikely to be allowed under large scale CDM rules, if already small scale CDM rules adopted by the EB do not allow bundling of small scale projects beyond the thresholds defined in the Marrakech Accords. The projects thus should be debundled.

The inclusion of rice husk burning in the project boundary does not make sense if burning shall be stopped in the project case. It should instead be included in the baseline.

The inclusion of the use of rice husk ash as blend for cement in the project boundary is not warranted. The use of rice husk ash cannot be controlled by the project participants. It should thus be treated as leakage, albeit positive one.

I do not understand the argument that diversity of rice husk supply is a negative factor for the project and thus strengthens the case for additionality. Normally, a diversified supply base enhances security of supply, particularly given the fact that there is abundance of rice husk and that it is currently treated as waste. If however project participants fear that supply may vanish due to the opening of other rice husk plants (a situation currently seen in parts of India), additionality of the project would be in doubt as it is apparently attractive to start rice husk plants.

It is very positive and should become general practice in CDM projects that the electricity baseline calculation clearly specifies that it will be regularly adjusted once reliable average emission factors for the Thai grid are published. The estimated factors are clearly conservative.

The validity of the baseline for the steam component should be at any case limited to the remaining technical lifetime of the replaced oil boilers. A discussion of the economic attractiveness of boiler replacement is missing. It may well be that the rice-husk based steam provision is much cheaper for the paper mill than the oil-based steam generation and thus baseline emissions become zero once a rice husk plant has been installed.

The validity of the rice husk burning baseline strongly depends on the economics of rice husk electricity generation. This relates to the discussion on additionality. If other rice husk projects start (which is assumed by project proponents otherwise there would not be any supply risk) then baseline emissions of rice husk burning would decrease. Project proponents should thus use a control group approach. If no rice husk plants are built in the vicinity and thus rice husk burning continues, the baseline remains as proposed. If plants are built, the proportion of husk still burnt in the fields diminishes and the baseline is reduced accordingly.

The GWP of methane under the Kyoto Protocol is fixed at 21, even though the IPCC TAR has suggested a new value of 23. Only in the second commitment period the GWP may be changed. Thus 23 has to be replaced by 21.

The cement baseline should only relate to the amount of clinker, i.e. 0.51 t CO<sub>2</sub>/t clinker. CEF energy is plant-specific but not relevant here as the project does not change any process in the

plant – the kilns still have to be operated at the same capacity. Thus the baseline is not 1 t CO<sub>2</sub>/t rice husk but only 0.51 t.

The calculation of project emissions is meticulous and conservative.

The argumentation that no leakage occurs is once again linked to the issue whether alternative uses of rice husk increase. If competition for rice husk grows, leakage will become relevant as the 25% currently used as fuel may be sold to the different power station operators.

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**Comment by:** Sitanon Jesdapipat, Centre for Ecological Economics (CEE), Chulalongkorn University

**Date:** 2003-03-04

**Subject:** Comments by CEE, Chulalongkorn University, Bangkok

**Comment:**

1. On additionality. I wonder how these project bring additionality to Thailand. I suspect that some, if not all, of them are already pipelined project under EGAT's SPP.
2. Baseline. Because of the supply mix from the grid, the baseline would have to be clearly identified, and perhaps it must not rely on one single source that is lignite. Perhaps that calculation of weighted average source of fuel in the national grid should be shown, and be used as an average national baseline, which could be applied to these projects. If take the new natural gas fuel (which is the main supply for that area) into account the measurable reduction might be rather small.
3. Participation. The current Thai laws do not require private sector projects to conduct public hearing or allow for public participation. In practice, it is useful to do so, but Thailand still lacks proper and clear mechanism to facilitate that process. I am not sure if this is an issue for the project that has to obey international guidelines. I would appreciate if anyone can assist me in clarifying this.

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## **APPENDIX C**

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### **COMPETENCE CERTIFICATES**



## CERTIFICATE OF COMPETENCE

***Einar Ternes***

Qualification in accordance with DNV's Qualification scheme for CDM/JI (ICP-9-8-i1-CDMJ1-i1)

<b>GHG Auditor:</b>	Yes		
<b>CDM Validator:</b>	Yes	<b>JI Validator:</b>	--
<b>CDM Verifier:</b>	Yes	<b>JI Verifier:</b>	--
<b>Industry Sector Expert for Sectoral Scope(s):</b>	Sectoral scope 1, 2, 3 6 & 10		
<b>Technical Reviewer for (group of) methodologies:</b>			
ACM0001, AM0002, AM0003, AM0010, AM0011, AM0012, AMS-III.G	Yes	AM0027	Yes
ACM002, AMS-IA-D, AM0019, AM0026, AM0029, AM0045	Yes	AM0028, AM0034	Yes
ACM003, ACM0005, AM0033, AM0040	Yes	AM0030	Yes
ACM0004	Yes	AM0031	Yes
ACM0006, AM0007, AM0015, AM0036, AM0042	Yes	AM0032	Yes
ACM0007	Yes	AM0035	Yes
ACM0008	Yes	AM0038	Yes
ACM0009, AM0008, AMS-III.B	Yes	AM0041	Yes
AM0006, AM0016, AMS-III.D, ACM0010	Yes	AM0034	Yes
AM0009, AM0037	Yes	AM0043	
AM0013, AM0022, AM0025, AM00379, AMS- III.H, AMS-III.I	Yes	AM0046	
AM0014	Yes	AM0047	
AM0017	Yes	AMS-II.A-F, AM0044	Yes
AM0018	Yes	AMS-III.A	Yes
AM0020	Yes	AMS-III.E, AMS-III.F	Yes
AM0021	Yes		
AM0023	Yes		
AM0024	Yes		

Høvik, 5 February 2007

**Einar Ternes**  
*Director, International Climate Change Services*

**Michael Lehmann**  
*Technical Director*



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## CERTIFICATE OF COMPETENCE

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***Mari Viddal***

Qualification in accordance with DNV's Qualification scheme for CDM/JI (ICP-9-8-i1-CDMJ1-i1

<b>GHG Auditor:</b>	Yes		
<b>CDM Validator:</b>	Yes	<b>JI Validator:</b>	Yes
<b>CDM Verifier:</b>	--	<b>JI Verifier:</b>	--
<b>Industry Sector Expert for Sectoral Scope(s):</b>	--		
<b>Technical Reviewer for (group of) methodologies:</b>			
ACM0001, AM0002, AM0003, AM0010, AM0011, AM0012, AMS-III.G	Yes		
ACM002, AMS-I.A-D, AM0019, AM0026, AM0029	Yes		

Høvik, 6 November 2006

**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-CDMJ1-i1)

<b>GHG Auditor:</b>	Yes		
<b>CDM Validator:</b>	Yes	<b>JI Validator:</b>	--
<b>CDM Verifier:</b>	Yes	<b>JI Verifier:</b>	--
<b>Industry Sector Expert for Sectoral Scope(s):</b>	Sectoral scope 1, 2, 3 & 9		
<b>Technical Reviewer for (group of) methodologies:</b>			
ACM0001, AM0002, AM0003, AM0010, AM0011, AM0012, AMS-III.G	Yes	AM0027	Yes
ACM002, AMS-I.A-D, AM0019, AM0026, AM0029, AM0045	Yes	AM0028, AM0034	Yes
ACM003, ACM0005, AM0033, AM0040	Yes	AM0030	Yes
ACM0004	Yes	AM0031	Yes
ACM0006, AM0007, AM0015, AM0036, AM0042	Yes	AM0032	Yes
ACM0007	Yes	AM0035	Yes
ACM0008	Yes	AM0038	Yes
ACM0009, AM0008, AMS-III.B	Yes	AM0041	Yes
AM0006, AM0016, AMS-III.D, ACM0010	Yes	AM0034	Yes
AM0009, AM0037	Yes	AM0043	
AM0013, AM0022, AM0025, AM00379, AMS- III.H, AMS-III.I	Yes	AM0046	
AM0014	Yes	AM0047	
AM0017	Yes	AMS-II.A-F, AM0044	Yes
AM0018	Yes	AMS-III.A	Yes
AM0020	Yes	AMS-III.E, AMS-III.F	Yes
AM0021	Yes		
AM0023	Yes		
AM0024	Yes		

Høvik, 5 February 2007

**Einar Telnes**  
Director, International Climate Change Services

**Michael Lehmann**  
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