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# VALIDATION REPORT

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## KUNAK BIO ENERGY PROJECT IN MALAYSIA

REPORT No. 2004-0528

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DET NORSKE VERITAS



## VALIDATION REPORT

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Approved by: Einar Telnes Technical Director	Organisational unit: DNV Certification, International Climate Change Services
Client: Danish Energy Management	Client ref.: Henrik Rytter Jensen

DET NORSKE VERITAS AS

DNV Certification

Veritasveien 1,  
1322 HØVIK, Norway  
Tel: +47 67 57 99 00  
Fax: +47 67 57 99 11  
http://www.dnv.com  
Org. No: NO 945 748 931 MVA

## Summary:

DNV Certification has validated the Kunak Bio Energy Project in Malaysia, on the basis of UNFCCC criteria for CDM projects, 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 regarding Small-scale projects. 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, the project's baseline and monitoring plan, 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 "Kunak Bio Energy Project", as described in the revised project design documentation of November 2005, meets all relevant UNFCCC requirements for the CDM and all relevant host country criteria and correctly applies the baseline and monitoring methodology AMS-I.D. DNV thus requests the registration of the "Kunak Bio Energy Project" as a CDM project activity.

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Work carried out by: Haefeli Susanne, Michael Lehmann, Thivakaran Narayanan, Hao Xiang Jiang			
Work verified by: Einar Telnes			
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## ***Abbreviations***

CDM	Clean Development Mechanism
CAR	Corrective Action Request
CEF	Carbon Emission Factor
CER	Certified Emission Reduction
CO <sub>2</sub>	Carbon dioxide
CO <sub>2</sub> equ	Carbon dioxide equivalent
DEM	Danish Energy Management
DNV	Det Norske Veritas
DNA	Designated National Authority
DoE	Department of Environment
EFB	Empty fruit bunch
EIA	Environmental Impact Assessment
EPC	Engineering, Procurement & Construction
GHG	Greenhouse gas(es)
IPCC	Intergovernmental Panel on Climate Change
IPP	Independent Power Producer
KP	Kyoto Protocol
MOSTE	Ministry of Science, Technology and Environment
MP	Monitoring Plan
NGO	Non-governmental Organisation
ODA	Official Development Assistance
PDD	Project Design Document
PTM	Pusat Tenaga Malaysia (Malaysia Energy Centre)
REPA	Renewable Energy Purchase Agreement
SREP	Small Renewable Energy Programme
TNB	Tenaga Nasional Berhad
UNFCCC	United Nations Framework Convention for Climate Change
GWP	Global Warming Potential



## 1 INTRODUCTION

Danish Energy Management (hereafter called DEM) has commissioned DNV Certification Ltd to validate the Kunak Bio Energy Project in Malaysia (hereafter called “the project”). This report summarises the findings of the validation of the project, performed on the basis of UNFCCC criteria for CDM projects, as well as criteria given to provide for consistent project operations, monitoring and reporting.

The validation team consisted of the following personnel:

Haefeli Susanne	DNV Oslo	Team Leader, GHG auditor
Hao Xiang Jiang	DNV China	GHG auditor
Thivakaran Narayanan	DNV Kuala Lumpur	GHG auditor
Michael Lehmann	DNV Oslo	GHG auditor, energy sector expert
Einar Telnes	DNV Oslo	Technical verifier

### 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, the Monitoring Plan (MP), and the project's compliance with relevant UNFCCC and host country 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).

UNFCCC criteria refer to the Kyoto Protocol criteria for the CDM, the CDM rules and modalities as agreed in the Marrakech Accords, the simplified modalities and procedures for small-scale CDM project activities and relevant decisions by the CDM Executive Board.

### 1.2 Validation 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 requirements, UNFCCC rules and associated interpretations. 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 DEM. However, stated requests for clarifications and/or corrective actions may provide input for improvement of the project design.

### 1.3 The Kunak Bio Energy Small Scale Project

The objective of this small-scale CDM project activity is to install a power generation plant at the TSH Kunak Palm Oil Mill and utilise biomass waste, mainly consisting of empty fruit bunches as fuel for the plant and export the electricity to the local grid.

The power generation capacity of the plant is 14 MW<sub>e</sub>. In house power demand for the mill is 4 MW<sub>e</sub>, resulting in 10 MW<sub>e</sub> generation capacity for electricity exports to the local electricity grid. The project has a Renewable Electricity Purchase Agreement (REPA) with the local electricity



provider Sabah Electricity Sdn. and intends to supply a minimum of 64 000 MWh per year for 21 years.

The project is located within the premises of the TSH Kunak Palm Oil Mill, located 28km from Kunak town. The Palm Oil Mill is considered a medium size mill with a fresh fruit bunch (FFB) throughput of 45 t/h i.e. 225 000 t/year. The total GHG emission reductions are estimated to be 358 400 t CO<sub>2</sub>eqv over the first crediting period of 7 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 Kunak Bio Energy Project 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.



<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 corrective action requests and requests for clarifications</b>	<b>Ref. to Table 2</b>	<b>Summary of project participants' response</b>	<b>Final 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 for the Kunak Bio Energy Project /1/ submitted by DEM and the response to comments received by stakeholders during the public stakeholder comments period /2/ were assessed during the validation.



## 2.2 Follow-up Interviews

In the period of 19-20 May 2004, interviews were held with Malaysian stakeholders to confirm selected information and to resolve issues identified in the protocol. Representatives of the Malaysian DNA /7/ and THS Bio-Energy /8/ were interviewed. The main topics of the interviews are summarised in Table 1.

**Table 1 Interview topics**

Interviewed organisation	Interview topics
TSH Bio-Energy	<ul style="list-style-type: none"> <li>➤ Project's environmental additionality as mandated in Article 12 of the Kyoto Protocol (Investment barriers, technological barriers and barriers due to prevailing practice)</li> <li>➤ Project technology: energy output, experience with biomass boiler technology and provisions for technology and capacity transfer, including training of local employees</li> <li>➤ Biomass availability</li> <li>➤ Environmental impacts and planned measures to mitigate environmental impacts</li> <li>➤ Consultation with local stakeholders</li> <li>➤ Emergency procedures/corrective actions, i.e. provisions to mitigate emergencies, i.e. fire, procedures for corrective actions and project performance reviews</li> <li>➤ Renewable Electricity Purchase Agreement</li> </ul>
Ministry of Science, Technology, and Environment (MOSTE) – Designated National Authority (DNA)	<ul style="list-style-type: none"> <li>➤ Criteria for approval of energy-related CDM projects</li> <li>➤ CDM project criteria by Malaysia</li> <li>➤ Sustainable development criteria</li> <li>➤ Incentives for renewable energy projects under the Small Renewable Energy Power Programme (SREP)</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.

To guarantee the transparency of the validation process, the concerns raised by DNV and the response provided by the project participants are documented in Table 3 of the Validation Protocol in Appendix A to this report.





### 3 VALIDATION FINDINGS

The findings of the validation are stated in the following sections. The validation criteria (requirements), the means of verification and the results from validating the identified criteria are documented in more detail in the protocol in Appendix A. The findings relate to the project design as documented and described in the project design documents submitted to DNV in November 2005.

#### 3.1 Participation Requirements

The project participants is the TSH Bio-Energy Sdn Bhd. The Party involved, i.e. Malaysia as host Part, meets the requirements to participate in the CDM. No Annex I Party is yet defined.

A Letter of Approval from the Malaysian DNA has been received /3/.

#### 3.2 Project Design

The project involves the construction of a power plant with approximately 14 MW<sub>e</sub> gross generating capacity which will generate electricity by utilisation of biomass, i.e. mainly empty fruit bunches (EFB), shells and fibres. Being a renewable energy project activity with an output capacity of less than 15 MW<sub>e</sub>, the project qualifies as a small-scale CDM project activity according to category (i) defined in paragraph 6, subparagraph (c) of decision 17/CP.7 on the modalities and procedures for the CDM. The total boiler capacity of 84 MW<sub>th</sub> exceeds eligibility threshold for combined heat and power (cogeneration) system of 45 MW<sub>th</sub>. The validation confirmed that there is a biomass power plant at the Kunak Palm Oil mill that produces steam and electricity for on-site use. The project will substitute the current production of steam and electricity of the old cogeneration plant and in addition generate excess electricity to be supplied to the grid. Hence, the "cogeneration" part of the project is identical to the baseline and emission reductions will only be claimed for electricity that is supplied to the grid. Moreover, only part of the steam generated by the boilers will be used to produce electricity. The CDM project is thus only the generation of electricity and not the cogeneration of steam and electricity. As such, it is DNV's opinion that only the 15 MW<sub>e</sub> threshold applies and the project is thus eligible as small-scale CDM project activity.

The project design engineering reflects good practice. While the project technology is proven and currently available in the international market, the project will be one of the first to use it in Malaysia. The project will hence result in technology and capacity transfer.

Social and other environmental effects than the reduction of GHG emissions are described. By promoting renewable energy and by using biomass residues from the palm oil industry, the project will contribute to sustainable development in Malaysia. It is demonstrated that the project is in line with the set of national criteria for small-scale CDM projects in the Energy Sector prepared by Malaysia. Formal confirmation with regard to the project's contribution to sustainable development by the Malaysian DNA has been obtained.

The validation did not reveal any information that indicates that the project can be seen as a diversion of ODA funding towards Malaysia.



### 3.3 Project Baseline

A simplified baseline methodology may be used for small-scale CDM project activities if the project participants are able to demonstrate that the project activity would otherwise not be implemented due to the existence of barriers. DNV Certification has consequently investigated the investment barrier, technological barrier and the barrier due to prevailing practice.

While most palm oil mills burn palm fibre and shell to produce steam and electricity for internal use, the empty fruit bunches (EFB) are not currently being used as a fuel the production of surplus energy that can be supplied to the grid is not common practise. The project will be one of the first in Malaysia to utilise EFB as fuel to generate electricity and to export electricity to the grid. The combustion of EFB requires advanced boiler technology, which is currently not employed in Malaysia.

Due to the existence of barriers for the proposed project technology, the project activity does not represent a likely baseline scenario. In addition to these barriers of technology and prevailing practise, it is demonstrated and confirmed during the interview that there is also an investment barrier. It is confirmed that the Internal Rate of Return (IRR) including electricity sales and without CERs is not financially attractive compared to similar investments in Malaysia. The project will hence result in emission reductions that are additional to any that would otherwise occur.

The project will be connected to the Sabah East Coast Grid, which is currently supplied by 100% diesel or fuel oil fired power plants. It is considered that all or some of these units will be in operation for at least the crediting period and that the project activity will displace diesel fired units throughout the crediting period. The project thus qualifies for the standardized emission coefficient of 0.8 kgCO<sub>2</sub>eqv/kWh, as prescribed in Table I.D.1 in Appendix B of the simplified modalities and procedures for small-scale CDM project activities. The baseline is therefore the kWh supplied to the local grid multiplied by the carbon emission coefficient.

### 3.4 Monitoring Plan

The project applies the simplified monitoring methodology proposed for *Renewable Electricity Generation for a Grid* project activities under Category I.D.1 in Appendix B of the simplified modalities and procedures for small-scale CDM project activities.

The monitoring methodology will provide for real measurements of achieved emission reductions as the electricity generated by the biomass power plant and supplied to the East Coast grid will be monitored directly and in the interest of both THS and Sabah Electricity Sdn.

Detailed responsibilities and authorities for project management, monitoring procedures and QA/QC procedures have been presented and verified during interviews with THS Bio-Energy /8/.

### 3.5 GHG Emission Accounting

The calculations are transparently documented. Project emissions are considered zero in line with the IPCC guidelines which stipulate that biomass combustion is climate change neutral.

It is demonstrated that the emissions from the present transportation of empty fruit bunches are higher than they will be once the project is implemented.



For project activities using biomass, leakage must be considered. There is an abundant supply of biomass from the TSH palm oil mill and, if necessary, from other neighbouring mills. The project is thus not likely to result in biomass scarcity which could cause other biomass users to switch to other fuels (leakage effects).

### **3.6 Environmental Impacts**

According to the Malaysian regulations renewable energy projects are not required to prepare an Environmental Impact Assessment. However, the project must comply with the environmental regulations of the country and obtain the necessary approvals both before commissioning and during operation of the project.

Environmental impacts are briefly described in the PDD and have been extensively discussed during the interviews with the Malaysian DNA /7/ and THS Bio-Energy /8/. It is DNV Certification's opinion that any adverse environmental impacts are sufficiently taken into account by the project proponent.

### **3.7 Comments by Local Stakeholders**

A consultation process with relevant agencies and local level, and Ministry of Science, Technology and Environment and Ministry of Energy, Communications and Multimedia has been conducted.

Five comments have been received during the consultation process. Based on the correspondence there are no significant concerns.

Local stakeholders such as nearby habitants have not been consulted. However, as the project is located in an industrial area and there are no direct affected neighbours (the nearest town is Kunak, which is located 28 km from the project site), the consultation process with relevant agencies and Ministries only is deemed sufficient and in line with Malaysian requirements on local stakeholder consultation.



#### 4 COMMENTS BY PARTIES, STAKEHOLDERS AND NGOS

According to the modalities for the validation of CDM projects, the validator shall make publicly available the project design document and receive, within 30 days, comments on the validation requirements from Parties, stakeholders and UNFCCC accredited Non-governmental Organisations (NGO) and make them publicly available.

The PDD of April 2004 was made publicly available on [www.dnv.com/certification/climatechange](http://www.dnv.com/certification/climatechange) and Parties, stakeholders and NGOs were through the CDM website invited to provide comments during the period 7 May until 6 June 2004.

Four comments were received. All comments are reproduced in unedited form in Appendix B. In summary, the comments addressed the following issues:

- Inclusion of emission related to the transport of biomass
- Sustainable development criteria
- Environmental impact assessment
- Public consultation
- Additionality
- Eligibility as small-scale CDM project activity with regard to the threshold of 45 MW<sub>th</sub> for biomass combined heat and power (co-generation) systems.

DEM provided a response /2/ to the above comments, which is given in Appendix C.

The comments and DEM's response were considered during the validation and the validation findings in chapter 3 of this report demonstrate that all issues raised by stakeholders were duly taken into account.



## 5 VALIDATION OPINION

*Det Norske Veritas Certification Ltd has validated the Kunak Bio Energy Project in Malaysia. The validation was performed on the basis of UNFCCC criteria, as well as criteria given to provide for consistent project operations, monitoring and reporting. UNFCCC criteria refer to the Kyoto Protocol criteria for the CDM, the CDM rules and modalities as agreed in the Marrakech Accords, the simplified modalities and procedures for small-scale CDM project activities and relevant decisions by the CDM Executive Board.*

*The project will generate electricity utilising biomass residues, i.e. empty fruit bunches, fibers and shells and will supply electricity to the Sabah East Coast Grid. With a generation capacity of 14 MW<sub>e</sub> the project qualifies as a small-scale CDM project activity according to category (i) defined in paragraph 6(c) of decision 17/CP.7 of the Marrakech Accords.*

*The project design is sound and the project will introduce state of the art technology developed in Denmark, resulting in technology and capacity transfer to Malaysia.*

*Social and environmental impacts of the project have been addressed and sufficient measures are identified to reduce adverse environmental effects, such as air emissions, noise and waste disposal. By promoting renewable energy and by using biomass residues from the palm oil industry, the project will contribute to Malaysia's sustainable development.*

*The host-Party is Malaysia and the project participant is TSH Bio-Energy Sdn Bhd. The host-Party, Malaysia, fulfills the participation criteria and has approved the project and authorized the project participant. A Letter of Approval has been received by the Malaysian DNA, including a confirmation that the project assists in achieving sustainable development. No Annex I Party is yet defined. The validation did not reveal any information that indicates that the project can be seen as a diversion of ODA funding towards Malaysia.*

*The project will be connected to the Sabah East Coast Grid, which is currently supplied by 100% diesel generated power from existing power plants. The baseline is thus the kWh generation by the bio-energy plant and exported to the electricity grid multiplied by the carbon emission coefficient of 0.8 kg CO<sub>2</sub>eqv/kWh, as prescribed in Table I.D.1 in Appendix B of the simplified modalities and procedures for small-scale CDM project activities.*

*By displacing fossil fuel-based electricity with electricity generated from a renewable source, 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. An analysis of relevant barriers demonstrates that the proposed project is not a likely baseline scenario and emission reductions are hence additional to any that would occur in its absence.*

*The monitoring plan sufficiently specifies the monitoring requirements of the main project indicators. Detailed responsibilities and authorities for project management, monitoring procedures and QA/QC procedures are in place.*

*A local consultation process with relevant agencies and ministries has been conducted and due account was taken of the comments received. Parties, stakeholders and NGOs were invited to provide comments and all issues raised by stakeholders were taken into account during the validation.*



*In summary, it is the validation team's opinion that the "Kunak Bio Energy Project", as described in the project design documentation of November 2005, meets all relevant UNFCCC requirements for the CDM and correctly applies the approved baseline and monitoring methodology AMS-I.D. Hence, DNV requests the registration of the "Kunak Bio Energy Project" as a CDM project activity.*

## REFERENCES

### Category 1 Documents:

Documents provided by DEM that relate directly to the GHG components of the project. These have been used as direct sources of evidence for the validation conclusions.

- /1/ Danish Energy Management: *Project Design Document (PDD) for Small-Scale CDM Activity – kunak Bio energy project. April 2004 and revised version of November 2005.*
- /2/ Response to comments received by stakeholders during the period of call for inputs (7 May – 6 June, 2004), by Henrik Rytter Jensen, Danish Energy Management
- /3/ Malaysian DNA, *Letter of Approval*, 21 February 2005.

### Category 2 Documents:

Background documents related to the design and/or methodologies employed in the design or other reference documents. Where applicable, Category 2 documents have been used to check project assumptions and confirm the validity of information given in the Category 1 document.

- /4/ IPCC: *Good Practise Guidance and Uncertainty Management in National Greenhouse Gas Inventories*. 2000
- /5/ International Emission Trading Association (IETA) & Prototype Carbon Fund (PCF): *Validation and Verification Manual*. [www.vvmanual.info](http://www.vvmanual.info)
- /6/ Appendix B of the simplified modalities and procedures for small-scale CDM project activities: *Indicative simplified baseline and monitoring methodologies for selected small-scale CDM project activity categories*. Version 06: 30 September 2005.

### Organisation/Persons interviewed:

- /7/ Malaysian Designated National Authority for CDM, Ministry of Science, Technology and the Environment, 19 May 2004, Putrajay, Malaysia:
  - Mr Nadzri Yahya, Head of DNA
- /8/ TSH Bio-Energy, 20 May 2004, Jalan, Malaysia:
  - Mr Abdul Rahim Yahya (Asst. General Manager, Corporate Finance & Planning)
  - Mr. Frederick Tan (Director, Operations & Planning)
  - Mr. Eugene Ding (Manager, Corporate Affairs)
  - Mr. Mohamand Adan Yusof of Mensilin Holdings Sdn. Bhd. (consultant)



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## **APPENDIX A**

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### **SMALL-SCALE CDM VALIDATION PROTOCOL FOR THE KUNAK BIO ENERGY PROJECT**



**Table 1 Mandatory Requirements 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	No Annex I Party yet defined.	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, Simplified Modalities and Procedures for Small Scale CDM Project Activities §23a	OK	Table 2, Section A.3 Formal confirmation by the Malaysian DNA has been obtained
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 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	<del>CL-1</del> OK	The project is formally approved by Malaysian DNA.
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. Potential public funding for the project from Parties in Annex I shall not be a diversion of official development assistance	Marrakech Accords (Decision 17/CP.7)	OK	The validation did not reveal any information that indicates that the project can be seen as a diversion of ODA funding towards Malaysia.

Requirement	Reference	Conclusion	Cross Reference/Comment
8. Parties participating in the CDM shall designate a national authority for the CDM	Marrakesh Accords (CDM modalities§ 29)	OK	Malaysia: Ministry of Science, Technology and Environment (MOSTE)
9. The host country shall be a Party to the Kyoto Protocol	Marrakesh Accords (CDM modalities§ 30)	OK	Malaysia ratified the Kyoto Protocol on 4 September 2002.
10. The participating Annex I Party's assigned amount shall have been calculated and recorded	CDM Modalities and Procedures §31b	No Annex I Party defined	
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	No Annex I Party defined	
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 conforms to the Small Scale CDM Project Design Document version 02 of 08 July 2005.
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 and B.1
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	OK	Table 2, Section F. No EIA is required according to the Malaysian regulations

Requirement	Reference	Conclusion	Cross Reference/Comment
	Activities §22c		for renewable energy projects. However, the project must comply with the environmental regulations of the country.
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 has been published on 7 May 2004 on <a href="http://www.dnv.com/certification/Climat eChange">http://www.dnv.com/certification/Climat eChange</a> . Parties, stakeholders and NGOs were through the CDM website invited to provide comments until 6 June 2004 on the validation requirement. 4 comments have been received. These have been taken into account in the validation.

**Table 2 Requirements Checklist**

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
<b>A. Project Description</b> The project design is assessed.					
<b>A.1. Small scale project activity</b> 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/ /6/	DR	The project is a renewable energy project that produces electricity for an electricity grid system by combustion of biomass fuel, i.e. waste from palm oil mills. The electricity generating capacity to be installed is 14 MW <sub>e</sub> , does not exceed the threshold of 15 MW <sub>e</sub> .  It remains to be clarified whether the project is a combined heat and power (cogeneration) system not exceeding the 45 MW <sub>thermal</sub> .	<del>CL-2</del>	OK
A.1.2. The small scale project activity is not a debundled component of a larger project activity?	/1/	DR	The project 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 I	The project qualifies for category I.D. of the Appendix B of the simplified modalities and procedures for small-scale CDM project activities		OK

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
<b>A.2. Project Design</b> 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/ /6/	DR I	The project is located within the premises of the TSH Kunak Palm Oil Mill, 28km from Kunak, State of Sabah, Malaysia. The project site is of approximately 2,16 hectares.		OK
A.2.2. Are the project's system (components and facilities used to mitigate GHG's) boundaries clearly defined?	/1/ /6/	DR, I	The project comprises the biomass power plant, including the fuel preparation system, the fuel storage building and the dewatering facility.		OK
A.2.3. Does the project design engineering reflect current good practices?	/1/ /6/	DR I	The boiler is an efficient boiler with guaranteed energy conversion efficiency of 85%.		OK
A.2.4. Will the project result in technology transfer to the host country?	/1/ /6/	DR I	<p>The project is the first of its kind in Malaysia utilising a high pressure boiler fired with shells, fibres and EFB. The technology is not readily available in Malaysia.</p> <p>The boiler will be manufactured through a joint venture between a local and a Danish company. Only parts of the boiler will be manufactured in Denmark, the rest will be manufactured in Malaysia. The assembly will take place in Malaysia supervised by the Danish partner.</p>		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/ /6/	DR I	<p>The project will require more skilled staff than the existing plant. The current workforce will be trained to operate the new plant and new qualified staff will be employed.</p> <p>Training needs should be further clarified.</p>	<del>CL3</del>	OK

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
<b>A.3. Contribution to Sustainable Development</b> 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/ /6/	DR I	<ul style="list-style-type: none"> <li>- The power plant will be equipped with latest and efficient technology</li> <li>- The project will lead to reduction of waste from the empty fruit bunches</li> <li>- The total number of local staff is expected to increase.</li> </ul>		OK
A.3.2. Will the project create any adverse environmental or social effects?	/1/ /6/	DR I	The PDD does not mention adverse environmental or social effects.	<del>CL</del> 4	OK
A.3.3. Is the project in line with sustainable development policies of the host country?	/1/ /2/ /6/	DR I	<p>The Malaysian Government has formulated a set of sustainable development criteria for SSC projects within the energy sector.</p> <p>Details on the project's compliance with the national criteria were described in the Response to stakeholder comments.</p> <p>An official letter by the Malaysian DNA confirming the project's contribution to sustainable development has not yet been obtained.</p>	<del>CAR</del> 4	OK
A.3.4. Is the project in line with relevant legislation and plans in the host country?	/1/ /6/	DR I	<p>The project is in line with relevant Malaysian legislation.</p> <p>Evidence of application of Early Site Assessment was provided in the form of the Department of Energy's reply. In the reply, the Department of Energy lays out several conditions (including emissions limits, noise control, waste management, ash management etc). All of this</p>		OK

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
			will be verified by the DoE prior to commissioning of the plant.		
<b>B. Project Baseline</b> 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>B.1. Baseline Methodology</b> 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	Yes, one of the approaches given for category I.D small-scale project activities is selected, i.e. paragraph 28 of appendix B of the simplified modalities and procedures for small-scale CDM project activities.		OK
B.1.2. Is the baseline methodology applicable to the project being considered?	/1/	DR	Yes, it can be demonstrated that all generators of the grid use exclusively fuel oil and/or diesel oil and hence the standard grid factor of 0.8 kgCO <sub>2</sub> equ/kWh given in Table I.D.1 of the appendix B of the simplified modalities and procedures for small-scale CDM project activities applies.		OK

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
<b>B.2. Baseline Determination</b> 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/ /2/ /6/	DR  I	It is demonstrated that the project faces technology and investment barriers.  While palm oil mill waste like fibres and shells are generally utilised by palm oil mills to satisfy the palm oil mill's demand for electricity and steam, the utilisation of EFB (requires dewatering unit) and the production of surplus energy that can be supplied to the grid is not common practise. The project will be among the first projects utilising EFB and to export excess electricity to the grid.  The investment barrier needs further evidence in the form of either an IRR or NPV analysis.	CL-5	OK



CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
B.2.2. Are relevant national and/or sectoral policies and circumstances taken into account?	/1/ /5/ /6/	DR I	The small scale renewable energy programme (SREP), a government initiated programme to facilitate the implementation of 500 MW renewable power capacities in Malaysia is taken into account. The programme was launched on 11th May 2001 and there is as per today (3 years after the start of the programme 6 licenses approved under the programme, whereof two projects is under implementation. One of the obstacles for the programme is that there is no special funding, co-financing or "low interest" finance available for the programme. With only few licenses approved and fewer utilised the SREP can not be considered as a sufficient incentive to remove the barriers faced by such projects.		OK
B.2.3. Is the baseline selection compatible with the available data?	/1/	DR	The standard grid factor of 0.8 kgCO <sub>2</sub> equ/kWh given in Table I.D.1 of the appendix B of the simplified modalities and procedures for small-scale CDM project activities is selected.		OK
B.2.4. Does the selected baseline represent the most likely scenario describing what would have occurred in absence of the project activity?	/1/ /5/	DR I	Currently, only one other project is burning empty fruit bunches to generate electricity and nothing seems to point towards state or other incentives pushing for the alternate use of this special waste from palm oil generation.		OK
<b>C. Duration of the Project / Crediting Period</b> 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/	DR	The project activity is expected to be operational on 1st August 2004 and the expected operational		OK

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
			lifetime of the project is 21 years, which is equal to the electricity purchase agreement entered with the electricity distribution company.		
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	The 7 years renewable crediting period is selected starting on 1 January 2005.		OK
<b>D. Monitoring Plan</b> The monitoring plan review aims to establish whether all relevant project aspects deemed necessary to monitor and report reliable emission reductions are properly addressed.					
<b>D.1. Monitoring Methodology</b> 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	The monitoring methodology for category I.D of Appendix B of the simplified modalities and procedures for small-scale CDM project activities are selected.		OK
D.1.2. Is the monitoring methodology applicable to the project being considered?	/1/	DR	Yes.		OK
D.1.3. Is the application of the monitoring methodology transparent?	/1/	DR	The monitoring of the electricity supplied to the grid is straight forward.		OK
D.1.4. Will the monitoring methodology give opportunity for real measurements of achieved emission reductions?	/1/	DR	Direct monitoring of the electricity supplied to the East Coast Grid.		OK

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
<b>D.2. Monitoring of Project Emissions</b> It is established whether the monitoring plan provides for reliable and complete project emission data over time.					
D.2.1. Are the choices of project emission indicators reasonable?	/1/	DR	Project emissions are considered as zero as biomass is climate change neutral according to the IPCC good practice guidance for national greenhouse gas inventories		OK
<b>D.3. Monitoring of Leakage</b> It is assessed whether the monitoring plan provides for reliable and complete leakage data over time.					
D.3.1. If applicable, are the choices of leakage indicators reasonable?	/1/ /2/ /6/	DR  I	<i>See E.2.1</i>	<del>CAR-2</del>	OK
<b>D.4. Monitoring of Baseline Emissions</b> It is established whether the monitoring plan provides for reliable and complete project emission data over time.					
D.4.1. Is the choice of baseline indicators, in particular for baseline emissions, reasonable?	/1/	DR	The project can apply the default value of 0.8 kgCO <sub>2</sub> equ/kWh times the electricity supplied to the grid by the project.		OK

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
<b>D.5. Project Management Planning</b> 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/ /6/	DR, I	The details of monitoring, maintenance, verification of exported electricity have been verified during the interviews		OK
D.5.2. Is the authority and responsibility for registration monitoring measurement and reporting clearly described?	/1/ /6/	DR, I	<i>Idem</i>		OK
D.5.3. Are procedures identified for training of monitoring personnel?	/1/ /6/	DR, I	The monitoring of the electricity is straight forward and already done by THS		OK
D.5.4. Are procedures identified for emergency preparedness for cases where emergencies can cause unintended emissions?	/1/	DR	No such emergency situation is likely to occur.		OK
D.5.5. Are procedures identified for calibration of monitoring equipment?	/1/ /6/	DR, I	The small renewable energy purchase agreement between the local grid operator and THS is detailed and explicit about all details regarding QM/QA.		OK

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
<b>E. Calculation of GHG emission</b> 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.					
<b>E.1. Project GHG Emissions</b> The validation of predicted 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	Because project uses biomass as fuel, the CO <sub>2</sub> emissions are considered neutral to climate change and must hence not be reported.		OK
<b>E.2. Leakage</b> 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.					
E.2.1. Are leakage calculation required for the selected project category and if yes, are the relevant leakage effects assessed?	/1/ /2/ /6/	DR  I	The project claims no significant leakage effects as a result of the project. In the case of biomass projects, leakage effects must be considered. The abundant availability of biomass needs to be demonstrated. Furthermore, the emissions from transportation of the biomass to the project site need to be evaluated regarding their significance.	<del>CAR-2</del>	OK

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
<b>E.3. Baseline GHG Emissions</b> The validation of predicted baseline GHG emissions focuses on transparency and completeness of calculations.					
E.3.1. Are the baseline emissions boundaries clearly defined and do they sufficiently cover sources for baseline emissions?	/1/	DR	The baseline emission boundary comprises the East Coast Grid.		OK
E.3.2. Are all aspects related to direct and indirect baseline emissions captured in the project design?	/1/ /6/	DR, I	During the interview the generation mix in the East Coast Grid has been verified, hence the standardized grid factor applies.		OK
<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 case?	/1/	DR	The emission reductions are obtained by avoidance of emissions in the existing fossil fuel based electricity system by supplying renewable based electricity to the electricity system.. 51 200 t CO <sub>2e</sub> from year 2005 to 2011 are expected to be reduced annually		OK
<b>F. Environmental Impacts</b> 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/ /6/	DR, I	The project is not required to prepare an Environmental Impact Assessment.		OK
F.1.2. Does the project comply with environmental legislation in the host	/1/	DR	During the interview the evidence of application of Early Site Assessment in form of the	CL4	OK

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
country?	/6/	I	Department of Energy's reply has been verified. The Department of Energy will conduct the verification against the requirements such as noise control and waste management before the project commissioning. This needs further clarifications		
F.1.3. Will the project create any adverse environmental effects?	/1/ /2/ /6/	DR  I	No adverse environmental effects have been identified in the PDD. This needs further clarification. The following adverse environmental effects have been identified and are being managed by THS: - liquid effluent - solid waste generation - air emissions - noise	<del>CL</del> 4	OK
F.1.4. Have environmental impacts been identified and addressed in the PDD?	/1/ /2/ /6/	DR  I	<i>idem</i>	<del>CL</del> 4	OK
<b>G. Comments by Local Stakeholder</b> Validation of the local stakeholder consultation process.					
G.1.1. Have relevant stakeholders been consulted?	/1/ /2/	DR	A consultation process with relevant agencies and Ministries has been conducted. However, local stakeholders such as nearby habitants should be consulted as well.	<del>CAR</del> 3	OK
G.1.2. Have appropriate media been used to invite comments by local stakeholders?	/1/ /2/	DR	Consultations have been sought via presentations for relevant committees and the Energy CDM		OK

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
			Secretariat.		
G.1.3. Is a summary of the comments received provided?	/1/	DR	Five comments have been received.		OK
G.1.4. Has due account been taken of any comments received?	/1/	DR	All comments have been duly taken into account		OK



**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 owner response	Validation team conclusion
<b>CAR 1:</b> The Malaysian DNA has not yet finally confirmed that the project contributes to sustainable development.	A.3.3	The DNA agrees that in principal the project in line with the Malaysian sustainable development priority.	OK. A Letter of Approval from Malaysian DNA has been received, confirming that the project contributes to sustainable development.
<b>CAR 2:</b> The abundant availability of biomass needs to be demonstrated.  Furthermore, the emissions from transportation of the biomass to the project site need to be evaluated regarding their significance.	D.3.1	The requirement of biomass can be supplied by THS's own sites in case the nearby neighbours are not able to deliver the empty fruit bunches cost-efficiently.  The present emissions from transportation of empty fruit bunches are higher than they will be once the project is implemented.	OK. It has been confirmed that prior to project commencement, the palm oil production process generates waste products which need to be shipped out to the plantations. With project implementation, the quantity of waste products required to be shipped to plantations will be reduced, resulting in lower transport emissions than in the baseline.
<b>CAR 3:</b> Local stakeholders such as nearby habitants should be consulted as well.	G.1.1	The project is located in an industrial area and there are no directly affected neighbours. The nearest town is Kunak, which is located 28 km from the project site, and will not have any direct impact from the project.	OK
<b>CL 1:</b> It remains to clarified whether the Danish	Table 1	The Danish Energy Management is not a CDM project participant. This has been corrected in the revised PDD of	OK

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

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Draft report clarifications and corrective action requests by validation team	Ref. to Table 2	Summary of project owner response	Validation team conclusion
Energy Management is a CDM project participant. If yes, approval by the Danish DNA is also required.		November 2005.	
<p><b>CL 2:</b></p> <p>It remains to be clarified whether the project is a combined heat and power (cogeneration) system not exceeding the 45 MW<sub>thermal</sub>.</p>	A.1.3	<p>In the Kunak Bio Energy project the boiler exceeds this size (the total thermal capacity of the boiler is 80 t/h, 50 bar, 402 degree C., which is around 84 MW<sub>th</sub>), but it can be questioned whether the project is a cogeneration project under the normal definition.</p> <p>The project is a special case as there is a cogeneration plant in the Kunak Palm Oil mill already - producing steam and power on biomass. Therefore the extraction of steam and generation of power for the Palm oil mill in the new project is to substitute the current production of steam and power on the old energy plant. Hence the "cogen" part of the project is baseline and there will be no CO<sub>2</sub> reduction as we substitute biomass with biomass.</p> <p>The new project is different from the old cogen plant as we have a condensing turbine with steam extraction. The CDM project is only to supply electricity to the grid system. This power is produced by high pressure steam entering the turbine and at the exit it will go to the cooling tower - which is not cogeneration mode as the heat is not recovered for the process purposes. In other words the supply of electricity is generated by traditional electricity generation where the heat is discharged.</p> <p>We could also have kept the existing plant in operation to produce steam and power and then installed a fully condensing turbine, with no steam extraction for the sole purpose of producing electricity. But this would require</p>	<p>OK. Sufficient arguments that the Kunak Bio Energy Project is eligible as small-scale CDM project activity are provided. The CDM project will only claim credits for electricity that is supplied to the grid, as the "cogeneration" part of the project is identical to the baseline. Moreover, only part of the steam generated by the boilers will be used to produce electricity. The CDM project is thus only the generation of electricity and not the cogeneration of steam and electricity. As such, it is DNV's opinion that only the 15 MW<sub>e</sub> threshold applies and the project is thus eligible as small-scale CDM project activity.</p>

Draft report clarifications and corrective action requests by validation team	Ref. to Table 2	Summary of project owner response	Validation team conclusion
		more maintenance than the selected configuration.	
<b>CL 3:</b> Does the project make provisions for meeting training and maintenance needs?	A.2.5	There will be a 10 day training seminar for the local staff.	OK
<b>CL 4:</b> The PDD does not mention adverse environmental or social effects.	A.3.2 F.1.2	The following adverse effects are identified and being managed according to Malaysian environmental standards: <ul style="list-style-type: none"> <li>- liquid effluent treatment facility</li> <li>- solid waste disposal procedures</li> <li>- air emission control</li> <li>- noise control</li> </ul>	OK
<b>CL 5:</b> The investment barrier needs further evidence in the form of either an IRR or NPV analysis	B.2.1	The IRR including selling the electricity is not very high compared to similar investments in Malaysia.	OK: The IRR analysis presented to DNV Certification demonstrates that the project IRR without CER revenue is not attractive.

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