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Validation Report

Project Title:

Methane Capture and Utilization Project at Melewar Palm Oil Mill, Malaysia

Report No. : SQAS-CDM- EP10850003
Date : 27 September 2012

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Date of first issue: 20 March 2012	**Project No.:** SQAS-CDM- EP10850003
Approved by: Parama Iswara Subramaniam	**Project title :** Methane Capture and Utilization Project at Melewar Palm Oil Mill, Malaysia
Client: Perenia Pty Ltd	**Designated Operational Entity:** SIRIM QAS International Sdn. Bhd.

Summary:
SIRIM QAS International Sdn. Bhd. has performed a validation of the "Methane Capture and Utilization Project at Melewar Palm Oil Mill, Malaysia", based on the Kyoto Protocol requirements, UNFCCC rules and associated interpretations. The validation is not meant to provide any consulting towards the project participants. However, stated requests for clarifications and/or corrective actions may provide input for improvement of the project design.

The validation consisted of three phases; i) a document review of the project design documents and preparation of validation protocol, ii) on-site visit to the project activity and interviews with project developer and project consultant, and, iii) resolution of outstanding issues and the issuance of final validation report and opinion.

The project is aiming to reduce GHG emissions by capturing anthropogenic methane emissions from the palm oil mill anaerobic effluent treatment ponds and utilizing it to generate electricity in the biogas engine. Any excess biogas will be utilized in the biomass boiler or flared in an enclosed flare. The total emission reductions from the project are estimated to be on the average of 44,715 tCO_2e per year over the selected 10 year crediting period.

The overall validation process, from contract review to the validation report and opinion was conducted using SIRIM QAS Intl.'s internal procedures. The first output of the validation process was a list of corrective action requests, clarification requests and a forward action request (CAR, CL and FAR), presented in Table 3 of Appendix A of this report. As a result of the findings of the validation, the PDD was revised by the client. The latest version of the PDD[2] is version 2.4 dated 24/07/2012.

In summary, it is SIRIM QAS Intl.'s opinion that the proposed CDM project activity correctly applies the baseline and monitoring methodology applied for the project activity and meets the relevant UNFCCC requirements for the CDM and the relevant host country criteria.

Report No.: SQAS-CDM- EP10850003		
Report title: Methane Capture and Utilization Project at Melewar Palm Oil Mill, Malaysia		
Work carried out by:		
Sew Shuh Ping	: Validation Team Leader	
Hafriazhar Mohd. Mokhtar	: Validation Team Member	
Azhar Abdul Raof	: Validation Team Member	
Work reviewed by	: Dr. Chen Sau Soon	
Date of this revision : 27 September 2012	Rev. No.: 2.0	Number of pages: 48

Indexing terms
Climate Change, Kyoto Protocol
Small Scale Project Validation
Clean Development Mechanism

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Abbreviations

AMS	Approved Methodology for Small scale CDM Project Activities
BOD	Biological Oxygen Demand
CAR	Corrective Action Request
CDM	Clean Development Mechanism
CFE	Capture Efficiency of the Biogas Recovery Equipment
CER	Certified Emission Reductions
CH_4	Methane
CL	Clarification Request
CO_2	Carbon Dioxide
CO_2e	Carbon Dioxide Equivalent
COD	Chemical Oxygen Demand
CSTR	Continuous-flow stirred tank reactor
DOE	Designated Operational Entity
DNA	Designated National Authority
EB	Executive Board
ER	Emission Reduction
ERPA	Emission Reduction Purchase Agreement
FFB	Fresh Fruit Branch
GHG	Greenhouse gas(ses)
GSP	Global Stakeholders Consultation Process
GWP	Global Warming Potential
IPCC	Intergovernmental Panel on Climate Change
IRR	Internal Rate of Return
LoA	Letter of Approval
Melewar	Melewar Properties Sdn. Bhd.
MOC	Modalities of Communication
MoV	Means of Verification
MPOB	Malaysia Palm Oil Board
MP	Monitoring Plan
ODA	Official Development Assistance
Perenia	Perenia Pty Ltd
PDD	Project Design Document
PKS	Palm Kernel Shell
POME	Palm Oil Mill Effluent
PP	Project Proponent/ Project Participant
QA/QC	Quality Assurance/Quality Control
SIRIM QAS Intl.	SIRIM QAS International Sdn Bhd
UNFCCC	United Nations Framework Convention on Climate Change
VVM	Validation and Verification Manual version 1.2
AMS	Approved Methodology Small Scale

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1.0 INTRODUCTION

Perenia Pty Ltd had engaged SIRIM QAS International Sdn Bhd to perform validation of the "Methane Capture and Utilization Project at Melewar Palm Oil Mill, Malaysia" in Lahad Datu, Sabah, East of Malaysia (hereafter called "the project activity").

This report summarizes the findings of the validation of the project, performed on the basis of CDM Validation and Verification Manual 01.2 (VVM)/6/ and related UNFCCC criteria for CDM, as well as criteria given to provide for consistent project operations, monitoring and reporting. UNFCCC criteria refer to the Kyoto Protocol criteria, the CDM rules and modalities as agreed in the Bonn Agreement, the Marrakech Accords and the CDM Executive Board's decisions.

1.1 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 stated requirements and 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 scope of the validation is defined as an independent and objective review of the project design document, the project's baseline study and monitoring plan and other relevant documents. The information in these documents is reviewed against Kyoto Protocol requirements, the CDM modalities and procedures as agreed in the Marrakech Accord, and the relevant decisions by the CDM Executive Board, including the approved baseline and methodology AMS.III.H (version 16) and the relevant tools.

SIRIM QAS Intl. has, based on the recommendations in the VVM (Version 01.2)/6/ employed a risk-based approach in the validation, focusing on the identification of significant risks for project implementation and the generation of CERs.

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

1.3 Validation Team

The following validation team was assigned to carry out the validation of the project:

Name	Involvement						
	Validation team leader	Validation team member	Technical Expert	Others (to specify)	Desk review	On-site audit	Sectoral competence
Sew Shuh Ping	√				√	√	

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Hafriazhar Mohd. Mokhtar		√			√	√	√
Azhar Abdul Raof		√			√	√	√

Sew Shuh Ping, the validation team leader, holds a bachelor degree in Chemical Engineering and Master of Science in Environmental Engineering. He has been trained in the CDM validation and verification processes and is a qualified CDM lead auditor. He is also a qualified ISO 14001 lead auditor.

Hafriazhar Mohd. Mokhtar is a Chemical Engineer by qualification. He has several years of direct work experience in the palm oil milling including the operation of the wastewater treament plant. He has been trained in the CDM validation and verification processes, and is a qualified CDM auditor. He is also a qualified ISO 14001 auditor.

Azhar Abdul Raof is a Chemical Engineer by qualification. He has extensive experience in the area of wastewater treatment technology including the anaerobic waste treatment processes in the palm oil industries. He has been trained in the CDM validation and verification processes, and is a qualified CDM auditor.

1.4 **Technical reviewer :** Dr. Chen Sau Soon

Dr. Chen Sau Soon has been with SIRIM Berhad for about 30 years working as a researcher in the areas of metalworking, chemical technology and environment and energy. In the field of environmental and energy technology, she has implemented various projects in the area of biotechnology and physicochemical technology for hazardous waste treatment, wastewater treatment and waste management technologies, environmental and health risk assessment, cleaner technology, life cycle assessment, and renewable energy generation. Her latest projects cover sustainable production and consumption approaches, biogas from anaerobic fermentation of organic wastewater, biological deodourisation and photocatalytic treatment.

2.0 METHODOLOGY

The SIRIM QAS Intl. validation process consists of the following phases:

i) a document review of the project design documents and preparation of validation protocol;
ii) on-site visit to the project activity and interviews with the project developer and project consultant; and
iii) resolution of outstanding issues and the issuance of final validation report and opinion

In order to ensure transparency, a validation protocol was customized for the project according to the VVM (Version 01.2)[6]. The protocol describes criteria (requirements), means of verification and the results from the validating the identified criteria, in a transparent manner. The validation protocol serves the following purposes :

- it organizes, details and clarifies the requirements that 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 below in Figure 1.

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Figure 1 : Validation protocol tables

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

Validation Protocol Table 2 : Requirements Checklist			
Checklist question	Means of verification (MoV)	Comment	Draft and/or final conclusion
The various requirements in Table 2 are linked to checklist questions the project should meet. The checklist is organised in seven sections. Each section is further sub-divided. The lowest level constitutes a checklist question.	Explains how conformance with the checklist question is investigated. Examples of means of verification are document review (DR) or interview (I). N/A means not applicable.	The section is used to elaborate and discuss the checklist question and/or the conformance to the question. It is further used to explain the conclusions reached.	This is either acceptable based on evidence provided (OK), or a CAR due to non-compliance with the checklist question or CL when the validation team has identified a need for further clarification.

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

The completed validation protocol of the project activity is enclosed in Appendix A of this report. Findings established during the validation were classified as non-fulfillment of validation protocol criteria or where risks to the fulfillment of project objectives were identified. Corrective Action Request (CAR) was issued, where:

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

The validation team also raised "Clarification" (CL), where additional information was needed to fully clarify an issue, and "Forward Action Request"(FAR) for issues related to project implementation that require review during the first verification of the project activity

2.1 Document review of PDD and other documents

The PDD version 1/1/ submitted by the client and additional documents related to the project design and baseline were reviewed as an initial step of the validation process. The subsequent step involved the identification of corrective action requests, clarification requests and forward action requests (CAR, CL and FAR) which are presented in Table 3 of Appendix A of this report.

As a result of these findings, the PDD was revised by the client. A complete list of all documents and records reviewed is as attached in Section 6.0 of this report. The PDD format was found to be compliant with the relevant CDM requirements and guidelines provided by the UNFCCC. The most recent version of the CDM-SSC-PDD version 3 template was used.

Major changes between the PDD version 1/1/ published for the global stakeholder comment period and the final version/2/ submitted for registration:

- Included additional assessment on paragraph 27 (a) and (c) of AMS-III.H (version 16) in the determination of the baseline emission in Section B.4. of PDD;
- Corrected 10 days COD measurement campaign date of sampling to 12/08/2011-25/08/2011 as reflected in the effluent test reports/40/ in Section B.4. of PDD;
- Corrected start date of the project from 04/08/2011 to 05/08/2011 in Section B.5. of PDD, which was the date when PP signed the letter of offer by technology provider/36/;
- Corrected T_{flare} "Description of measurement methods and procedures to be applied:" and "QA/QC procedures to be applied:" has been edited as per "Tool to determine project emissions from flaring gases containing Methane" in Section B.7.1 of PDD;
- In Section A.2 and Table B.4, Section B.4 of the PDD, revised the FFB processing rate to 384,000 tonnes/year as in approval processing capacity by Malaysian Palm Oil Board/17/;
- Included justification on the emission from processing, transportation and application or disposal of waste products in Section B.3 of PDD;
- Revised description on sustainable development policies in Section A.2 of PDD, to be appropriate to the objectives of National Green Technology Policy objectives/23/ and Malaysia CDM criteria/24/;
- Corrected the reference for footnote 13 from average temperature to local average temperature in Sabah/63/ in Section B.2. of PDD;
- Revised part of the description in Table B.2, project scenario item 2(c) to match the requirement of paragraph 2(c), AMS-III.H (Version 16) in Section B.2. of PDD;
- Revised diesel emission factor (EF) of electricity from diesel engines as in "Tool to calculate baseline, project and/or leakage emissions from electricity consumption" (Version 01, EB39). In "Project activity emission from fuel consumption ($PE_{power,y}$)", Section B.6.1. of PDD;
- Deleted "$MD_y = [Q_{biogas,\ combusted} \times fm_{CH4,RG} \times CFE_{ww} \times GWP_{CH4}] + [TM_{RG,h} \times \eta_{flare,h} \times$

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GWP_{CH4}]" in "Emission Reductions" Section B.6.1, PDD;

- Updated Section D.1. of PDD on the positive impacts by the project activity;
- In Section B.5 of the PDD, the investment analysis was revised to include description of alternative baseline scenario;
- Inclusion of the biomass boiler system in the project activity along with enclosed flare system in the project boundary under Section B.3. of PDD;
- Inclusion of sensitivity analysis for PKS used in biomass boiler in the investment analysis Section B.5 of PDD; and
- Changed the diesel consumption from historical data to projected value to reflect FFB processing capacity approved by MPOB used, in Section B.5. of PDD.

A complete list of all documents and records reviewed is as attached in Section 6.0 of this report.

2.2 Follow-up interviews

SIRIM QAS Intl. conducted audit at PP's office on 20-21 February 2012 and visited the project site on 24 February 2012, to confirm selected information and to resolve issues identified in the document review. The table below provides a list of all persons interviewed and the main topics covered.

NAME	ORGANISATION	TOPICS
Ms. Jeyashri Kisna Ms. Shukriah Rosdi Ms. Bhavna Khandhar	Perenia Pty Ltd	• General information about the project & the PDD • Financial analysis, Project barriers and additionality • Stakeholder consultation • Baseline determination • Training requirements, • Monitoring and management • Project planning and design • Financial analysis, project barrier and additionality • Potential risk and emergency procedure • Relevant legal approvals • Environmental impacts & sustainable development
Mr. Chan Chor Laup Mr. Tay Chwee Leong Mr. Selva Nathan	Melewar	• Relevant legal approvals • Monitoring and management • Local stakeholders consultation meeting • Training requirements • Project planning and design
Mr. Leong Seow Sum Mr. S.H. Mislin SH Bakir Mr. Jukalun Bongos	GS Supply Sdn. Bhd. Village head Mukim Paris FFB supplier	• Local stakeholders consultation meeting

2.3 Resolution of Clarification Requests and Corrective Action Requests

The objective of this phase of the validation was to resolve the request for corrective actions and clarifications and any other outstanding issues which needed to be clarified prior to SIRIM QAS Intl.'s positive conclusion on the project design. Six (6) Corrective Action Requests (CARs), twenty (20) Clarification Requests (CLs) raised by SIRIM QAS Intl. were resolved through communication between the client and SIRIM QAS Intl.'s validation team. One (1) FAR related to procedures needed for the operation of the project activity was also raised. In order to ensure the transparency of the validation process, the concerns raised and responses that had been given are summarized in Section 3 of this report and documented in more details in the Table 3 of the validation protocol in Appendix A. All the corrective actions have been incorporated into the PDD version 2.4 dated 24 July 2012/2/, ER calculation spreadsheet/26/ version 02.3 dated 25 June 2012 and FM spreadsheet/49/ version 02.3 dated 24 August 2012.

2.4 Internal quality control

SIRIM QAS Intl. has established an internal quality control process. A Technical Reviewer is appointed to review the final draft validation report. The comments made by the Technical Reviewer are taken into consideration and incorporated in the final report.

The final report (after resolutions of all findings) is then submitted to the CDM Quality Manager for review and approval.

3.0 VALIDATION FINDINGS

This section summarizes the main issues that were found during the validation process. A detailed listing of all findings is available in Table 2 and 3 of the validation protocols (Appendix A of this report).

3.1 Participation requirements

The project participants are Melewar Properties Sdn. Bhd. of Malaysia, and Perenia Pty Ltd of Australia. Malaysia, as the host party, and Australia, as the Annex 1 party, meet the requirements to participate in the CDM. Malaysia ratified the Kyoto Protocol on 4 September 2002 while Australia on 12 December 2007. The ratification dates to Kyoto Protocol were further confirmed in the UNFCCC website (http://maindb.unfccc.int/public/country.pl?country=MY and http://maindb.unfccc.int/public/country.pl?country=AU).

The Letter of Approval (LoA) from the DNA of Malaysia was issued on 14/08/2012/75/ while the LoA from the DNA of Australia was issued on 23/07/2012/76/. Both LoAs were provided to the validation team by the Perenia. The validation team had further obtained confirmation through emails/77/&/78/ from the representatives of the DNA of both the countries on the issued LoAs. The validation team does not doubt the authenticity of the LoAs.

The LoA issued by the DNA of Malaysia was reviewed and deemed appropriate in confirming the following:

- Malaysia is party to the Kyoto Protocol;
- CDM is a voluntary participation,
- The proposed project will assist in Malaysia's sustainable development;
- the project title is in line with the title mentioned under section A.1 of the PDD.

The LoA issued by the DNA of the Australia affirms that Australia:

- has ratified the Kyoto Protocol on 12 December 2007;

- approves voluntary participation in this proposed CDM activity;
- authorizes Perenia Pty. Ltd. as a participant of the proposed CDM project activity;
- the project title is in line with the title mentioned under section A.1 of the PDD.

The validation team has confirmed that the LoAs have met the requirements of para 45-48 of the VVM (version 1.2).

During the on-site validation, the Letters of Approval (LoA) from the DNA of both countries have yet to be obtained. CAR 1 was raised on the issue and is subsequently closed. Details of the findings and the resolutions are as in Table 3 of Appendix A of this report.

3.2 Modalities of Communication

A statement of Modalities of Communication (MoC)/88/ with the EB and UNFCCC secretariat has also been issued and signed by authorized persons of both project participants. The MoC is found to be appropriate as it has clearly defined the responsible parties for communicating with EB and UNFCCC secretariat regarding the issuance of CER of the proposed CDM project. The latest template of the MoC was used, i.e. version 01.4, dated 25 July 2011.

During the validation, CAR 4 was raised to request for the signed MoC. Details of the findings and the resolutions are as in Table 3 of Appendix A of this report.

3.3 Project Design Document

The project document uses the latest CDM-SSC-PDD template version 3 which is currently applicable. The corresponding sections of the PDD were correctly filled and followed the guidelines specified in CDM-SSC-PDD version 5, dated 14 September 2007.

3.4 Description of Project Activity

"Methane Capture and Utilization Project at Melewar Palm Oil Mill, Malaysia" (hereafter referred to as the project activity) is a methane capturing and utilizing project developed by Melewar Properties Sdn. Bhd. The project is located in the premises of Melewar Palm Oil Mill, a palm oil mill owned by Melewar Properties Sdn. Bhd., at 1.6km off the 45km Lahad Datu Sandakan Highway, Sabah, East of Malaysia. The GPS coordinates of the project activity are 5° 16' 17" North and 118° 3' 7" East (N 5.271389, E 118.051944). These coordinates has been cross checked with http://mapper.acme.com/[79] and was found to be correct. The mill has a processing capacity of 384,000 tons of fresh fruit bunches (FFB) per year. This is based on the licensed[17] issued by the Malaysian Palm Oil Board to the palm oil mill.

The processing of fresh fruit bunches (FFB) into crude palm oil and palm kernels, generates large amounts of organic rich wastewater known as the palm oil mill effluent (POME) which is currently treated in the open anaerobic ponds system. The anaerobic treatment process produces large amounts of methane which is freely released to the atmosphere. The aim of the project is to reduce GHG emissions from the current open ponds system where the anaerobic decay of organic matter in the ponds resulted in the production of biogas containing methane, continuously emitted into the atmosphere.

The proposed CDM project activity involves the installation of new closed tank anaerobic digester equipped with a biogas capture and collection system. The project activity will replace the existing anaerobic ponds in the wastewater treatment system. The captured biogas will be used as fuel in the biogas engine to generate electricity. Any excess biogas will be utilized as fuel in the biomass boiler or combusted in an enclosed flare system. However, the biogas utilisation will not be

included in the project activity and will not be considered in the emissions reduction calculation.

In the baseline scenario, POME is treated through a series of open anaerobic and aerobic ponds wastewater treatment system without biogas recovery system, while electricity is generated primarily from biomass-based boilers and diesel gensets as back-up.

In the proposed project activity, all of the six open anaerobic ponds will be replaced with two new units of first stage anaerobic digester (AD) tank with fixed roof and one unit of second stage AD tank/sedimentation tank with floating roof. These series of AD tanks will be fully equipped with biogas capture and collection system. The treated POME from the anaerobic digester system will overflow to the existing aerobic ponds, settling pond and subsequently to the existing effluent polishing plant, prior to discharge to plantation for irrigation/18/. The sludge from the anaerobic digester tanks will be sent to an aerobic composting plant/7/ near to the mill.

The generated biogas will be captured and treated in the desulphurisation plant before being used as fuel in the biogas engine for electricity generation. The generated electricity will be used for the project activity auxiliary/60/ and any excess will be sent to back to mill and for other uses. Any excess biogas will be used in the biomass boiler or flared in an enclosed flaring system. However, the scope of biogas utilisation will not be included in the project activity and was not considered in the emissions reduction calculation.

Detailed documents/3//4//5//13//16/ relating to the design of the project activity were provided to the validation team. Based on these documents the following was confirmed:

Technical Specification : Anaerobic Digester Tank System		
Technology provider	:	Watermech Engineering Sdn. Bhd./3/
Quantity	:	Two units of first stage anaerobic digester (AD) tank with fixed roof and one unit of second stage AD tank/sedimentation tank with floating roof.
Capacity	:	6100m^3 per tank for the first stage AD, and 3200 m^3 for the second stage AD.
COD removal efficiency of the system	:	80%/16/

Technical Specification : Flare system/4//5//13/		
Technology provider	:	Watermech Engineering Sdn. Bhd.
Quantity	:	1 unit of enclosed flare system
Capacity	:	1200m^3 / hour of biogas

At the time of the on-site validation, the construction of the project activity is still in the early stage of earthworks and this progress is consistent with the project implementation schedule/81/. The proposed project activity qualifies as a CDM Small Scale Project as defined in paragraph 6 (c) of decision 17/CP.7 on the modalities and procedures for the CDM. The project will result in emission reductions that are less than the threshold value of 60kt CO_2e per annum as defined in AMS III.H (Version 16). The discussions on the applicability of the methodology as presented in Section B.2 of the PDD were also found correct.

The project activity is not a debundled component of a larger project activity as there is no registered small-scale CDM project activity or an application to register another small-scale CDM

project activity with the same project participant in the same project category and technology/measure within the previous two years and whose project boundary is within 1 km of the project boundary of the proposed small-scale project activity at the closest point. Hence this project activity is not a de-bundled component of any other project activity of the same PP in accordance with "Guidelines on assessment of debundling for SSC project activities" (EB54, Annex 13).

The project is internally funded/8//9/. ODA does not contribute to the financing of the project. The operational lifetime of the project activity is estimated to be 15 years. This is based on the documents provided by the technology provider, Watermech Engineering Sdn. Bhd/10/.

The approval for project activity for effluent treatment plant construction by Department of Environment obtained on 24 May 2012 for 100 tonnes per-hour/82/ mill processing capacity.

In accordance with paragraph 64 of the VVM (version 1.2), the validation team hereby confirms that the project descriptions and project design in PDD are accurate and complete based on the document review, on-site inspection, physical verification and Interviews conducted.

In this section, five clarification requests were raised as follows:

- CL 1 - on the contribution of ODA to the financing of the project;
- CL 4 - on the document required for the design of digester tanks system, enclosed flare system and biogas engine system;
- CL 5 - Clarification on sustainable development policies in section A.2 of PDD.
- CL 14 - on the need to confirm that the composting plant will be under aerobic condition;
- CL 20 - on the biomass boiler system which was included in the project boundary in the later part of validation process.

Details of the findings and the resolutions are as in Table 3 of the Appendix A of this report.

3.5 Baseline and Monitoring Methodology

The project applies the approved baseline and monitoring methodology of AMS-III.H (version 16, EB 58) 'Other Project Activities: Methane recovery in wastewater treatment'/11/. This methodology is valid at the time of submission to registration in line with paragraph 14 of EB 48 Annex 60.

The PDD also refers to the following tools which are applicable to the project activity:

- "Tool to determine project emissions from flaring gases containing methane" (Version 1, EB 28)/12/
- "Tool to calculate baseline and project and/or leakage emissions from electricity consumption" (version 01, EB 39)/29/.

The validation team agreed with the application of the approved baseline methodologies for the project activity. The methodology and tools applied in the proposed project activity are confirmed to be the latest version as available from the UNFCCC website.

3.5.1 Applicability of the Selected Methodology

The project fulfills the applicability of AMS III.H (Version 16) as follow:

#	Applicability criteria for AMS-III.H (version 16)	Justification
1	This methodology comprises measures that recover biogas from biogenic organic matter in	The validation team confirmed that the proposed project activity involves the

	wastewater by means of one, or a combination, of the following options:	introduction of an anaerobic digester tank system equipped with methane
	a) Substitution of aerobic wastewater or sludge treatment systems with anaerobic systems with biogas recovery and combustion; b) Introduction of anaerobic sludge treatment system with biogas recovery and combustion to a wastewater treatment plant without sludge treatment c) Introduction of biogas recovery and combustion to a sludge treatment system d) Introduction of biogas recovery and combustion to an anaerobic wastewater treatment system such as anaerobic reactor, lagoon, septic tank or an on-site industrial plant; e) Introduction of anaerobic wastewater treatment with biogas recovery and combustion, with or without anaerobic sludge treatment, to an untreated wastewater stream; f) Introduction of a sequential stage of wastewater treatment with biogas recovery and combustion, with or without sludge treatment, to an anaerobic wastewater treatment system without biogas recovery (e.g. introduction of treatment in an anaerobic reactor with biogas recovery as a sequential treatment step for the wastewater that is presently being treated in an anaerobic lagoon without methane recovery).	capture and collection system without sludge treatment. The sequential stage wastewater treatment in the form of closed tank anaerobic digesters will be installed to replace the existing system anaerobic open ponds, which does not have biogas recovery. This was evident in documents reviewed related to design[/3//4//5//13/]. Therefore, the project activity complies with option (f).
2	In cases where baseline system is anaerobic lagoon the methodology is applicable if: a) The lagoons are ponds with a depth greater than two meters, without aeration. The value for depth is obtained from engineering design documents, or through direct measurement, or by dividing the surface area by the total volume. If the lagoon filling level varies seasonally, the average of the highest and lowest levels may be taken; b) Ambient temperature above 15°C, at least during part of the year, on a monthly average basis; c) The minimum interval between two consecutive sludge removal events shall be 30 days.	Based on the drawing provided for the existing POME treatment system[/14/] it was confirmed that the existing wastewater treatment system which consists of 6 anaerobic open ponds are more than 2 meters depth and without aeration. All the ponds are with depth of 4.25m to 4.5m The temperature in Malaysia and in particular Lahad Datu where the project site is located is always above 15°C. This was validated from the website[/63/]. The last desludging of accumulated solids in the wastewater treatment ponds was carried out in 2008. This was based on the evidence of written

		permission from the Department of Environment[/35/]. From the interviews conducted, it was further confirmed that
		the desludging of the ponds was carried out at intervals of more than 30 days.
3	The recovered biogas from the above measures may also be utilized for the following applications instead of combustion/flaring: a) Thermal or mechanical, electrical energy generation directly; b) Thermal or mechanical, electrical energy generation after bottling of upgraded biogas, in this case additional guidance provided in Annex 1 shall be followed; c) Thermal or mechanical, electrical energy generation after upgrading and distribution, in this case additional guidance provided in Annex 1 shall be followed: (i) Upgrading and injection of biogas into a natural gas distribution grid with no significant transmission constraints; or (ii) Upgrading and transportation of biogas via a dedicated piped network to a group of end users; or (iii) Upgrading and transportation of biogas (e.g. by trucks) to distribution points for end users. d) Hydrogen production; e) Use as fuel in transportation applications after upgrading	The recovered biogas will be utilised in the biogas engine and biomass boiler for electricity generation for the mill and project activity use. Hence, paragraph 3(a) of AMS-III.H is applicable. This was evident in documents related to the design[/3//13//15/].
4	If the recovered biogas is used for project activities covered under paragraph 3 (a), that component of the project activity can use a corresponding methodology under Type I.	The recovered biogas will be used to generate electricity for its auxiliary consumption. However, PP intended not to claim any emission reductions from generation of renewable energy, thus methodologies under type I are not applicable.
5	For project activities covered under paragraph 3 (b), if bottles with upgraded biogas are sold outside the project boundary, the end-use of the biogas shall be ensured via a contract between the bottled biogas vendor and the end-user. No emission reductions may be claimed from the displacement of fuels from the end use of bottled biogas in such situations. If however the end use of the bottled biogas is included in the project boundary and is monitored during the crediting period CO_2 emissions avoided by the displacement of fossil fuel can be claimed under the corresponding Type I methodology,	It was confirmed through the document review[/3//4//5//7//13//15/] and site visit that the project does not involve any bottling of biogas.

	e.g. AMS-I.C 'Thermal energy production with or without electricity'.	
6	For project activities covered under paragraph 3 (c) (i), emission reductions from the displacement of the use of natural gas are eligible under this methodology, provided the geographical extent of the natural gas distribution grid is within the host country boundaries.	From the review of the project document[/3//4//5//7//13//15/] and on-site validation, it was confirmed that the project does not involve any distribution of methane to a gas distribution grid.
7	For project activities covered under paragraph 3 (c) (ii), emission reductions for the displacement of the use of fuels can be claimed following the provision in the corresponding Type I methodology, e.g. AMS-I.C.	From the review of the project document[/3//4//5//7//13//15/] and on-site validation, it was confirmed that the project does not involve any distribution of methane via a dedicated piped network to a group of end users.
8	In particular, for the case of 3 (b) and (c) (iii), the physical leakage during storage and transportation of upgraded biogas, as well as the emissions from fossil fuel consumed by vehicles for transporting biogas shall be considered. Relevant procedures in paragraph 11 of Annex 1 of AMS-III.H 'Methane recovery in wastewater treatment' shall be followed in this regard.	From the review of the project document[/3//4//5//7//13//15/] and on-site validation, it was confirmed that the project does not involve distribution of methane to other users.
9	For project activities covered under paragraph 3 (b) and (c), this methodology is applicable if the upgraded methane content of the biogas is in accordance with relevant national regulations (where these exist) or, in the absence of national regulations, a minimum of 96% (by volume).	From the review of the project document[/3//4//5//7//13//15/] and on-site validation, it was confirmed that the project does not involve any bottling and distribution of methane to other users.
10	If the recovered biogas is utilized for the production of hydrogen (project activities covered under paragraph 3 (d)), that component of the project activity shall use the corresponding methodology AMS-III.O 'Hydrogen production using methane extracted from biogas'.	From the review of the project document[/3//4//5//7//13//15/] and on-site validation, it was confirmed that the project does not involve any production of hydrogen.
11	If the recovered biogas is used for project activities covered under paragraph 3 (e), that component of the project activity shall use corresponding methodology AMS-III.AQ 'Introduction of Bio-CNG in road transportation'.	From the review of the project document[/3//4//5//7//13//15/] and on-site validation, it was confirmed that the project does not involve any use of methane as a fuel in transportation applications.
12	New facilities (Greenfield projects) and project activities involving a change of equipment resulting in a capacity addition of the wastewater or sludge treatment system compared to the designed capacity of the baseline treatment system are only eligible to apply this methodology if they comply with the relevant requirements in the 'General	The project activity is not a Greenfield project and does not involve a change in equipment resulting in a capacity addition of wastewater treatment system. The on-site visit to the wastewater treatment plant confirmed that the closed tank anaerobic digesters will be installed as a sequential

	guidelines to SSC CDM methodologies'. In addition the requirements for demonstrating the remaining lifetime of the equipment replaced, as described in the general guidelines shall be followed.	treatment step prior to the inlet of the existing baseline pond system. Therefore, paragraph 12 of AMS-III.H. is not applicable to this project activity.
13	The location of the wastewater treatment plant as well as the source generating the wastewater shall be uniquely defined and described in the PDD.	The location of the wastewater treatment plant has been uniquely defined in Section A.4.1.4 of the PDD. This was further confirmed by validation team during the site visit to the project site.
14	Measures are limited to those that result in aggregate emissions reductions of less than or equal to 60 $ktCO_2$ equivalent annually from all Type III components of the project activity.	The estimated emission reductions are 44,715 tCO_2e per annum as demonstrated in Section B.6.3, which is lower than the 60$ktCO_2e$ thresholds

The validation team hereby confirms that the selected baseline and monitoring methodology AMS.III.H (version 16) was previously approved by the CDM Executive Board, and is applicable to the project activity, which complies with all the applicability conditions therein. This is in compliance with paragraph 76 of VVM (version 1.2).

In this section, two clarification requests (CL 4 and CL 6) were raised as follow :

- CL 4 - requesting PP to provide all documents relating to the designs of the project activity
- CL 6 – Some inaccurate information provided in the justification for the applicability of the methodology and the evidence that there will be no CER claimed from the renewable energy component.

Details of the findings and the resolutions are as in Table 3 of the Appendix A.

3.5.2 Project Boundary

As per paragraph 15 of the applied methodology AMS-III.H (version 16), the project boundary is *the physical, geographical site where the wastewater takes place, in the baseline and project situations. It covers all facilities affected by the project activity including sites where processing, transportation and application or disposal of waste products as well as biogas takes place. The treatment systems not affected by the project activity shall be described in the PDD, but emissions from those sections do not have to be accounted for in the baseline and project emission calculations.*

From the discussion with PP and from the visit to the project site, the delineation of the project boundary as stated in section A.4.1.4 of PDD[/2/] is correct. The project boundary includes anaerobic digester tank system, the existing aerobic ponds treatment system, biogas capturing and cleaning system, biogas engine, combustion of the biogas at the palm oil mill boiler, enclosed flare system and the on-site aerobic compost plant.

The combustion of biogas in the gas engine and biomass boiler was correctly included in the project boundary system. It is also confirmed that the utilization of the biogas is not included as project activity and emission reduction as per-type I; renewable energy projects was not claimed.

Based on drawing[/13/] approved by Department of Environment Malaysia[/82/]on 24/05/2012 for the project activity implementation, it is confirmed that the project activity alters the baseline treatment system by introducing anaerobic digester tank system at the upstream of existing wastewater treatment system i.e. after the acidification ponds. The anaerobic digester tank system will replace

the use of existing anaerobic open ponds. It is further confirmed that there is no modification for existing aerobic ponds and it will remain to operate the same as in baseline scenario. It is also verified from the drawing[/13/] approved by Department of Environment[/82/] that the inflow COD into in project activity is the same as in baseline.

The project boundary was assessed by conducting physical site inspection, interviews and reviewing supporting document on the design of the project[/3//4//5//7//13/]. From the assessment, the validation team confirmed that the identified boundary and the selected sources and gases as documented in PDD are justified for the project activity. Methane (CH_4) is indicated as the main source of the baseline emissions, which is correct as per the project activity and the applicable methodology. The validation of the project activity did not reveal other greenhouse gas emissions occurring within the proposed CDM project activity boundary as a result of the implementation of the proposed project activity which are expected to contribute more than 1% of the overall expected average annual emission reduction, which are not addressed by AMS-III.H. (version 16).

In this section, CL 3 was raised as follow :

- Site where processing, transportation and application or disposal of waste products as takes place was not explained.
- PP did not give assessment and identification of the systems affected by the project activity to indicate that the treatment systems (lagoons, reactors, digesters, etc.) that will be covered and/or equipped with biogas recovery by the project activity, will continue to operate with the same quality of feed inflow, volume (retention time), and temperature (heating), may be considered as not affected i.e. the methane generation potential remains unaltered.

Details of the findings and its resolutions are as in Table 3 of Appendix A of this report.

3.5.3 Baseline Identification

In accordance to AMS-III.H (Version 16), it is required that an ex-ante assessment and identification of the systems affected by the project activity be undertaken. The assessment is done to identify any systems which are not affected by the proposed project activity, and hence excluded from baseline and project emission calculations.

In the absence of the project activity, the wastewater from the palm oil mill would continue to be treated using the existing practice of open anaerobic ponds where methane generated as a result of anaerobic degradation of biogenic materials, would have escaped into the atmosphere. It was also verified that presently no regulatory or contractual requirements that enforces implementation of a specific wastewater treatment technology, such as anaerobic digester or aerobic treatment system at palm oil processing plants for effluent treatment. Malaysian regulation allows utilization of open lagoon systems for wastewater treatment in the palm oil industry as per requirement in Environmental Quality (Prescribed) (Crude Palm Oil) Regulations 1977[/28/].

The initial approval by Department of Environment for effluent treatment plant is based on 80 tonnes per-hour FFB processing capacity mill[/18/]. The open ponds system without methane recovery is able to treat the wastewater and meet the current environmental standards[/28/] which specified that the final discharge of the treated POME shall be within 50 mg BOD/litre[/18/]. The status of compliance of the discharges is reported to the local Department of Environment on a quarterly basis. It has been confirmed that based on the result of the analysis conducted for the final discharge of the mill, the results were all within the limit [/37/]. Currently, there is no discharge standard for COD.

There are no policies or legislation that prevents the existing open ponds system from continuing operation. There are no existing, pending or planned national regulatory requirements that govern the GHG emissions from agro-industry operations (specifically palm oil mill processing activities). With the above justifications, it is the validation team's opinion that the treatment of wastewater from the palm oil mill in the open anaerobic ponds without methane recovery is the baseline scenario for the project activity.

No alternative scenarios are considered in the identification of the most reasonable baseline scenario according to the approved methodology.

The baseline scenario for this project has been identified as the continuation of the current treatment of the wastewater from palm oil mill (POME) in the open ponds system without the biogas recovery system. This was confirmed during an on-site visit to the project site. The existing open ponds treatment system consists of six sequential anaerobic and five aerobic ponds, two settling ponds and one polishing plant before discharged to the plantation for land irrigation/18/. Sludge accumulated in the ponds is desludged periodically to avoid siltation problems/35/ and sent to the plantation for soil application.

From the review of the existing treatment plant drawing/14/, it can be confirmed that the anaerobic ponds have depth of more than two (2) meters without any aeration system, thus a methane correction factor (MCF) of 0.8 for anaerobic deep has been applied based on MCF values as stated in table III.H.1, AMS IIIH (Version 16). The aerobic ponds are with depth of 1.5 – 3.0 m and settling ponds are with depth of 1.5 m; are aerobically well managed and actively aerated/14/.

As the ponds are aerobically well managed, thus a MCF value of zero has been applied. The drawing/14/ dated 17 July 2006 approved by the Department of Environment Malaysia/18/ further confirms that dimension of the treatment ponds as tabled below, are correctly applied in the PDD/37/.

Baseline open ponds

Pond Name	Depth (m)	MCF factor used as per AMS-III.H ver16
Anaerobic Pond 1 (A1)	4.25	0.8
Anaerobic Pond 2 (A2)	4.25	0.8
Anaerobic Pond 3 (A3)	4.25	0.8
Aerobic Pond 1 (A4)	1.85	0.0
Aerobic Pond 2 (A5)	3.0	0.0
Aerobic Pond 3 (A6)	1.50	0.0
Settling Pond (A7)	1.50	0.0
Primary Anaerobic Pond (B1)	4.50	0.8
Primary Anaerobic Pond (B2)	4.50	0.8
Secondary Anaerobic Pond (B3)	4.50	0.8
Aerobic Pond 1 (B4)	1.85	0.0
Aerobic Pond 2 (B5)	3.0	0.0
Settling Pond (B6)	1.5	0.0

It was confirmed that the COD removal efficiency in the baseline scenario was determined from a 10-day measurement campaign[/40/]. The detailed efficiency calculation in ER calculation spreadsheet[/37/] is checked and confirmed to be correct. It is also confirmed at site that the mill was operating in normal condition from 12 August 2011-25 August 2011 based on FFB production records[/40/]. The uncertainty factor of 0.89 was multiplied to the average COD values from the measurement campaign as stipulated in paragraph 27(b) of methodology AMS IIIH (version 16). The calculated COD removal efficiency using anaerobic ponds in the baseline scenario is 96.64%.

It is further confirmed from drawings[/14/] that the aerobic pond and settling pond in the baseline scenario will also remain in the project activity. PP has correctly applied COD removal efficiency for aerobic ponds as 72.19%[/37/]. The PP also has correctly identified that higher COD inflow to aerobic ponds in the project activity compared to baseline system and accounted it in the calculation of baseline and project emissions in the PDD[/37].

In palm oil mill, it is conventional to use steam turbine generator with the availability of free biomass as the source of fuel for the boilers. The validation team able to confirm during the site audit[/] that the power supply to the mill and existing wastewater treatment system is supplied mainly by mill's biomass boiler with total turbine capacity of 2,750 kW[//98/]. This source of power is also backed-up with three units of diesel generator; for start-up, shut down or emergencies with generation capacity of 300 kW for two units and 608 kW[/99/] as per written approval[/38/] provided by PP. This is further verified with historical electricity generation data for the period of January 2011 to December 2011. The calculated proportion of electricity generated by biomass turbine compared diesel engines is confirmed at 88.64% and 11.36% respectively[/39/].

In the validation of this section, three clarifications were raised as follow:

- CL 6: Clarification on the description of acidification process at the acidification pond in Section A.4.2, the reference for footnote 8, part of the description in Table B.2, and demonstration for no CER claimed on the renewable energy by biogas engine
- CL 11: Requested supporting documents for the baseline power that was generated by three biomass boilers and three units of backup diesel generator set.

Details of the findings and its resolutions are as in Table 3 of Appendix A of this report.

3.6 Additionality

According to Attachment A of Appendix B of the simplified modalities and procedures for CDM small scale project activities, the proposed project activity is considered additional if it can be demonstrated *that the project activity would not have occurred anyway due to at least one of the following barriers: (a) investment barriers; (b) technological barrier; (c) barrier due to prevailing practice; and (d) other barriers.*

For this project activity, the additionality has been demonstrated through:

- General Guidelines to SSC CDM methodologies [/21/]
- Attachment A to Appendix B of "Simplified modalities and procedures for small-scale Clean Development Mechanism project activities" [/22/].

Section B.5 of the PDD had demonstrated that the project had applied a barrier analysis from the "Attachment A of Appendix B" of the simplified modalities and procedures for small-scale CDM project activities. PP had chosen to demonstrate the additionality through investment barrier.

3.6.1 Prior Consideration of the CDM

Starting Date:

As per the CDM Guidance (Glossary of CDM Terms, ver. 06)/64/, the start date shall be considered to be the earliest date at which either the implementation or construction or real action of a CDM project activity begins. For this project activity, the start date was taken as 05 August 2011, following the date of signing the "Letter of Acceptance of Offer" 36/ by the PP. With the issuance of the letter, PP had committed to expenditures related to the implementation of the project. Hence, the start date was in accordance with the "Glossary of CDM Terms" /64/, and fulfills the requirements of paragraph 99 of VVM (version 1.2)/6/.

This is deemed acceptable as the earliest of financial commitment decision for the project activity , i.e. the project site clearing and earthwork was signed in 3rd November 2011/93//94/. The validation team also able to confirm at site inspection that only the land clearance work been carried out at the project site during the time of visit.

Prior Consideration of the CDM:
As per the "Guidelines on the demonstration and assessment of prior consideration of the CDM", version 04 (EB 62, Annex 13), for project activity with a start date after 2nd August 2008, project participant to notify the UNFCCC secretariat and the Host Party DNA in writing of the commencement of the project activity and of their intention to seek CDM status.

It was noted that the 'Prior Consideration of the CDM Form'/41/ was sent to UNFCCC secretariat through email/42/ on 21 October 2011 and a letter to the DNA of Malaysia on 15 November 2011/43/. The records of this communication were made available to the validation team. The notification was made within six months of the project activity start date. Validation team has checked the letter and found it to be appropriate. It was further cross checked and confirmed from the UNFCCC website (http://cdm.unfccc.int/Projects/PriorCDM/notifications/index_html).

The chronicle events for CDM consideration is listed in Table B.5, Section B.5 of PDD and a summary as below:

Event	Date
Board approving development of the proposed project activity as a CDM project. The minutes reflecting the discussion and decision were provided/9/.	14/04/2011
Term sheet signed between Perenia and Melewar on the purchase of CERs/44/	10/06/2011
PP Signed "Letter of Acceptance of Offer" with Watermech Engineering Sdn. Bhd /36/	05/08/2011
ERPA signed between Perenia and Melewar/45/	18/10/2011
Prior consideration notification posted on UNFCCC website/42/	21/10/2011
Response received from UNFCCC/42/	21/10/2011
Prior consideration sent out to Malaysian DNA for the proposed biogas activity/43/	21/10/2011
Local Stakeholder Consultation Meeting/30/, /31/, /32/, /33/, /34/,/59/	09/11/2011
Response received from Malaysian DNA/43/	15/12/2011
Webhosting of the PDD	07/01/2012

From the time of the decision of the board meeting to develop the project activity, to the time of the web hosting of PDD is less than 2 years. Hence, it is concluded that continuing and real actions were taken to secure CDM status for the project activity This is in line with the Guidelines on the demonstration and assessment of prior consideration of CDM Version 03/55/.

In this section, the following findings were raised:

- CAR 5 – the start date indicated in the PDD not consistent with the date of signing the letter of acceptance.
- CL 12 - on the authenticity of the signature of the representative of the PP who signed the letter of acceptance of offer issued by technology provider

Details of the findings and the resolutions are as attached in Table 3 of Appendix A of this report.

3.6.2 Investment Analysis

The baseline scenario for the project activity is continuation operation of the existing open pond treatment system without methane recovery and combustion. There is no existing, pending, or planned national, state, or local regulatory requirements that govern GHG emissions from wastewater treatment operations. The baseline option (business as usual) is financially attractive because it represents the lowest cost option but results in continual methane emission to atmosphere, The existing open pond wastewater treatment concept used by the palm oil mill is able to treat the POME to meet the discharge limit set by the Department of Environment. The Department of Environment continues to approve/28//18/ open pond wastewater treatment systems whether for new mills or upgraded mills since this method is the most economical to operate and is able to meet the discharge limits.

"Non-binding best practice examples to demonstrate additionality for SSC project activities" (EB 35, Annex 34)/46/ was used as guide in selection of barriers to demonstrate additionality. Since the project activity will only receive revenue in the form of fuel saving, PP applied benchmark analysis with national accounting practices and standards for the project's investment analysis. The latest version of "Guidelines on the Assessment of Investment Analysis"/47/ was used in the analysis.

Benchmark Analysis

The PP used the benchmark analysis to determine whether or not the project activity is economically or financially less attractive than other alternatives.

The benchmark selected is the default expected return on equity of 10.9% for 'Waste Handling and Disposal' (Group 1, Sectoral Scope 13) in the Host Country, Malaysia as defined in the "Guidelines on the Assessment of Investment Analysis" (EB 62, Annex5)/47/ is applied. This was found to be in accordance with the requirement specified in paragraph 15 of the Guideline/47/. As described in the PDD, the investment for the implementation of this project is considered to be the most significant barrier to project scenario, both during implementation and in the operation. This is in-line with the applicable CDM regulation - Appendix B of the simplified modalities and procedures for small-scale CDM project activities - Attachment A to Appendix B/22/.

According to paragraph 6 of the Guideline/47/, the input values used in all investment analysis should be valid and applicable at the time of the investment decision. The key assumptions in validating the appropriateness and justification for each parameters are tabulated below:

<table>
<tr><th>Parameters</th><th>Justifications</th></tr>
<tr><td>Total project cost of RM17,002,050</td><td>As per the Guideline on the Assessment of Investment Analysis/47/, the project cost should correspond with the date of investment decision/36/. It has been confirmed that the total project cost has been determined primarily based on proposal from technology provider/15/ and for earthworks/65/ and piling works/66/ from contractor. The proposal included the cost for the supply, construction and installation of the main equipment and the monitoring equipment as following:

<table>
<tr><th>Capital Cost</th><th>Proposed Cost /15/,/65/,/66/ (RM)</th><th>Actual Cost /36//93//94/ (RM)</th></tr>
<tr><td>Earthworks for Biogas site</td><td>548,249</td><td>388, 296. 28</td></tr>
<tr><td>Piling work for Biogas site</td><td>586,560</td><td>481,280</td></tr>
<tr><td>Construction of Biogas Plant (Including civil & mechanical)</td><td>13,913,600</td><td>13,538,000</td></tr>
<tr><td>Electrical work from Mill to Biogas Plant</td><td>408,000</td><td>-</td></tr>
<tr><td>Contingencies</td><td>1,545,641</td><td>-</td></tr>
<tr><td>Total Overall Capital Expenditure</td><td>17,002,050</td><td>14,407,576.28</td></tr>
</table>

It is validated that the capital cost used is reasonable and almost 85% of total CAPEX has already been incurred by PP for project implementation. The signed letter of contract acceptance with technology provider for construction of biogas plant/93//94/ confirms the major initial cost is RM 13,538,000. The pending costs for overall project execution i.e. installation of the biogas plant at project site and electrical are justifiable since the costs are incurred progressively during project work. The contingency cost of 10% which is taken from publically available source/74/ is acceptable. A sensitivity analysis on the project cost was carried out. Based on this analysis/49/, the project is not additional even if the project has a zero capital cost.

The estimated CAPEX is found reasonable compared to other registered CDM projects as indicated in Figure 3.</td></tr>
</table>

<table>
<tr><td></td><td>During validation process, it was anticipated that there may be a future provision for the project proponent to combust the biogas in a new biomass boiler or modify the existing biomass boiler with biogas burner. The cost for biomass boiler system was not included in the investment analysis because the decision on the biomass boiler system was made only after the date of investment decision. The cost of biomass boiler system had not been included with the argument that the equity IRR was not able to meet the benchmark of 10.9% even without that component.</td></tr>
</table>

<table>
<tr><td></td><td>The exclusion of biomass boiler from the CAPEX is found reasonable as inclusion of biomass boiler will further elevate the capital cost and lower the IRR. Additionally, PKS is available freely as a waste product in the mill. The PKS does not have any commercial sales values as the mill is located in remote location and would incur high transportation cost. Hence, the validation team concluded that this is conservative.</td></tr>
<tr><td>Operation and maintenance cost (O&M cost) of RM895,682</td><td>The O&M cost consists of salaries, accommodation and maintenance costs. The structure of these costs are as presented in the Financial Module spreadsheet/49/. The salaries of workers and staff, quoted in the financial analysis were estimated based on company salary rates. The number of staff required for the plant operations was based on PP's experience in operation of palm oil mill and the technology provider's advice. The twenty staff/73/ was considered reasonable as the plant will be operating in three shifts, 24 hours per day. The salary range applied has been cross checked with the 'Employment Outlook and Salary Guide, Malaysia'/89/ and found to be within the range specified in the guide.

<table>
<tr><th colspan="2">Overall Expenditure</th></tr>
<tr><th>Account Description</th><th>Cost (RM)</th></tr>
<tr><td>Workers Salary</td><td>117,102</td></tr>
<tr><td>Staff Salary</td><td>34,113</td></tr>
<tr><td>Workers Accommodation</td><td>11,900</td></tr>
<tr><td>Staff Accommodation</td><td>1,600</td></tr>
<tr><td>General Charges</td><td>54,067</td></tr>
<tr><td>Plant Machinery Upkeep (5% of Biogas Plant Capex)</td><td>676,900</td></tr>
<tr><td>Total Overall Expenditure</td><td>895,682</td></tr>
</table>

The salaries of workers and staff, quoted in the financial analysis were estimated based on company salary rates. The rates are found reasonable in accordance to publically available source/89/ on salary market in Malaysia. The number of staff required for the plant operations was based on PP's experience in operation of palm oil mill and technology provider advice. The nine staffs were considered reasonable as the plant will be operating in three shifts, 24 hours per day. The total accommodation cost for the staffs is estimated at MYR 13, 500 per year, or approximately USD 375 per-month is found reasonable as the project operates continuously for 24 hours per day and the mill is located in a remote location. The general charges were validated against the mill accounts ledger for additional expenses incurred for staffs' e.g. medical costs, insurance, provident funds, bonuses, etc. and found reasonable. The maintenance cost of 5% was based on estimation by technology provider/27/. This estimate is reasonable compared to public available source/100/ that conclude 5% as an average for annual operating and maintenance cost of a biogas plant. All these</td></tr>
</table>

	information were provided during the investment decision making time. All of this information was provided during the investment decision making time. The O&M cost is approximately 5.3% of the total cost, which was considered conservative and this was also found to be consistent with standard practice[/73] in estimating the annual maintenance cost. In conclusion, the budgeted costs submitted, it is deemed reasonable and appropriate.
Diesel consumption displaced of 442,817 liters/year	The volume of diesel consumption that would be displaced is based on the maximum historical diesel consumption data[/86/] from July 2010 – Jun 2011. The highest consumption is for the period of July 2010 – Jun 2011 = 295,211 liters/year for mill FFB processing capacity = 326,694 ton/year for the same period[/87/]. A conservative 50% increment (or 442,817 liters/year) in diesel consumption was used in the projection of FFB processing capacity for project activity of 384,000 ton/year. This assumption is deemed to be conservative as the diesel consumption incremental should be ~18% increase from existing 295,211 liters/year if the mill's FFB processing capacity increases from 326,694 ton/year to 384,000 ton/year.
Diesel Cost of 2.815 RM/liter	The diesel cost was based on PP's actual invoices[/57/]. The price used was based on highest purchase price of diesel during the period in July 2010 – Jun 2011[/56/]. The diesel price was realistic and conservative since it was based on most recent highest price in the preceding year[/56/] and it is supported by the invoices[/57/].
Income tax rate: 25%	The income tax rate was based on Lembaga Hasil Dalam Negeri Malaysia (the Malaysian Inland Revenue Board); (http://www.hasil.gov.my/goindex.php?kump=5&skum=2&posi=5&unit=1&sequ=1)
General Plant and Equipment Depreciation 15 years	The validation team confirmed that the general plant and equipment depreciation of 15 years was based on the "Malaysian Accounting Standards Board, based on Property, Plant & Equipment, paragraph 50-62 of the Financial Reporting Standards, FRS 116" (http://www.masb.org.my/index.php?option=com_content&view=article&id=142:frs116-pg4&catid=6:masb-exclude-private) and the equipment life time designed by technology provider[/10/].
Initial allowance for General Plant and Equipment 20%	The validation team confirmed that initial allowance rate for General Plant and Equipment was based on Lembaga Hasil Dalam Negeri Malaysia (Malaysia Inland Revenue Board) under category of plant and machinery; http://www.hasil.gov.my/goindex.php?kump=5&skum=1&posi=6&unit=1&sequ=1
Annual allowance for General Plant and	The validation team confirmed that annual allowance rate for General Plant and Equipment was based on Lembaga Hasil

Equipment 14%	Dalam Negeri Malaysia (Malaysia Inland Revenue Board) under category of plant and machinery; http://www.hasil.gov.my/goindex.php?kump=5&skum=1&posi=6&unit=1&sequ=1
Fair Value = 0	The fair value of the equipment was justified and applied according to paragraph 3 & 4, "Guidelines on the Assessment of Investment Analysis" (Version 05; EB 62). With initial allowance of 20% and annual allowance of 14%, the fair value will be considered zero at the end of the project life span of 15 years, which is in line with the equipment lifetime assured by technology provider/10/. The application of zero value at the end of the project lifetime is reasonable as the system is not transferable and does not have any ability to generate any revenue independently.
Sale price of Palm Kernel Shell (PKS) at RM80/ton	The price of the PKS was based on PP's actual PKS quotation/68/ which was submitted to the validation team. The sales price of PKS was based on the Letter of Offer for PKS Purchase by Chin Wood Industries Sdn. Bhd. to Carotino Palm Oil Mill (the mill which is owned by the same group), dated 15/06/2012/68/. The sales price used was not at the time of investment decision because PP had never sold it before, and at the project site, PKS cannot be sold as the mill is located in a remote location which will incur high transportation cost. The publically available reference/61/ on PKS price is RM 70/ton. Hence the price of RM80/ ton was considered reasonable. The price of PKS is also found reasonable compared to other registered CDM projects as indicated in Figure 2. Since this parameter was decided after the investment decision time, a separate financial spreadsheet on the inclusion of this parameter was established A sensitivity analysis was carried out. It was established that even with the increment of +650% of the price, the IRR without the CDM revenue was still below the selected benchmark and with that, it can be concluded that the applied price can be considered as appropriate and acceptable
Amount of PKS Displaced by Biogas 7,009 ton/year	The amount of PKS displaced was calculated based on the PKS production and the estimated biogas generation. It was assumed 6% by weight of the 384,000 tonnes/year tonnages of fresh fruit bunches (FFB) consumed is PKS. The validation team confirmed that formula in the spreadsheet/69/ in estimating PKS was correct as the following publicly available values used was appropriate: 1. 6% PKS/ FFB was derived from public references/70/ 2. PKS Net Calorific Value of 15.90 GJ/ton correctly converted from 3.800Kcal/Kg/71/ to GJ/Ton 3. Methane Net Heating Value 11946 kcal/kg = 50,016 kJ/kg = 50 MJ/kg, http://www.engineeringtoolbox.com/gross-net-

	heating-values-d_420.html

Calculation and conclusion

The IRR calculations over 15 years of operation period were provided in a spreadsheet[/39/]. With the above input values, the project activity without the CER revenue was demonstrated to have a non-significant return (i.e. the equity IRR is a negative value compare to the benchmark default expected return on equity, of 10.9% for 'Waste Handling and Disposal' (Group 1, Sectoral Scope 13)) in the Host Country, Malaysia as defined in the Guidelines[/43/] on the Assessment of Investment Analysis version 05, EB 62 Annex 5).

It is also noted that the cost comparison is not straightforward considering the availability of different types of treatment technologies in the market, ranging from a simple covered lagoon to more complex technologies such as actively managed pond/tank system, and each mill would have different treatment requirements. Additionally some systems only requires modification of existing systems (i.e. open ponds/tanks to covered ponds/tanks) while some involve introduction of a new treatment system.

The validation team further compares the critical parameters such as the CAPEX, PKS price, diesel price and ratio of O&M/investment cost amongst the registered projects in the host country Malaysia for the period of 2009 – 2011 as below :

Figure 3: Comparison of Capital Expenditure, PKS price, diesel price and ratio of O&M/investment cost amongst the similar recently registered projects

Project	UNFCCC Refe-rence	PKS Cost (RM/t)	Diesel Price (RM/l)	Ratio O&M to CAPEX (%)	Technology
Prolific Yield Palm Oil Mill	4285		-	5.72%	Digester tank
KDC Mill 1 and Mill 2 Biogas Project	3639	130	1.70	5.56%	CSTR
Felda Chalok and Jerangau Barat Biogas Project (Chalok)	2651	60	2.08	6.46%	Retrofit-ted from the existing change
Felda Chalok and Jerangau Barat Biogas Project (Jerangau)	2651	60	2.09	6.24%	Retrofit-ted from the existing change

It is noted that the project capital investment varies significantly for new projects and retrofitted projects. The cost of project activity is within the range of other registered new projects. Thus, based on Figure 3, it can be established above that the financial input parameters for the project activity are reasonable and conservative.

The IRR calculations over 15 years of operation[/10/] period were provided in a spreadsheet[/49/].

With the above input values, the project activity without the CER revenue was demonstrated to have a non-significant return (i.e. the equity IRR is a negative value compare to the benchmark default expected return on equity, of 10.9% for 'Waste Handling and Disposal' (Group 1, Sectoral Scope 13)) in the Host Country, Malaysia as defined in the Guidelines/47/ on the Assessment of Investment Analysis version 05, EB 62 Annex 5) The resulting IRR and the values used are all in real terms excluding inflation and the computed IRR is post-tax.

IRR without CDM	Benchmark
Negative value	10.9%

From the above, it can be seen that without CDM the IRR calculations showed negative value, which justified that the project as being not attractive financially.

Sensitivity Analysis

In accordance with paragraph 20 and 21 of the Guidelines on the Assessment of Investment Analysis, PP has performed a sensitivity analysis on the parameters which have a bearing of 20% or more on either the project costs or the project revenues. The parameters identified are the project capital cost, O&M cost, diesel price and PKS price.

The results of the sensitivity analysis are as presented in the Table below:

Parameters	% of variation	IRR	Remarks
Project capital cost	- 100%	0%	Not applicable
O&M Cost	- 100%	0.8%	Not applicable
Diesel price	204%	10.9%	Benchmark IRR
PKS price	575%	10.9%	Benchmark IRR

The Financial analysis/49/ shows that the project activity is not attractive and project is not additional even if the initial CAPEX investment is reduced to zero. The diesel cost savings are negligible as electricity is primarily generated from biomass which is available at no cost. Additionally, it is unlikely that the price of diesel will be increased to RM 8.56 as price for diesel is a government controlled price as established by the Ministry of Domestic Trade and Consumer Affairs/96/

The combustion of biogas in the biomass boiler and its installation cost was not accounted in the financial analysis for investment decision. However, an additional sensitivity analysis was conducted (with complete financial model) to demonstrate the scenario if there is no electricity generation and all the generated biogas is combusted in the biomass boiler. This will potentially displace palm kernel shell (PKS) utilization and gives sales revenue for the mill. In this scenario, as all the generated biogas is consumed in the biomass boiler, no displacement of diesel will be accounted. Thus, revenue from diesel saving is zero.

Based on sensitivity analysis, the PKS price will need to increase up to RM 540/ton to hit the benchmark. This is unlikely to happen as the cost is too high for 3rd party purchase and the mill location is isolated. The final sales price of PKS is also determined by transport and handling cost. From cross-check in public domain, the 3rd party sales price by brokers is approximately USD 67 (RM 213) FOB (freight on board) delivery /97/. The listed sales price is higher as it is inclusive of handling and transportation costs wherelse the PKS cost estimated in project activity is based on ex-mill. This clearly shows that the project is not attractive even if the PKS sales price increases.

Based on the investment analysis and sensitivity analysis carried out, it is concluded that the

project activity is unlikely to be the most financially attractive condition using default return on equity of 10.9% for 'Waste Handling and Disposal' (Group 1, Sectoral Scope 13) in the Host Country, Malaysia as defined in the "Guidelines on the Assessment of Investment Analysis version 05 (EB 62 Annex 5) is applied.

In summary, the proposed project could be considered as unlikely to be the most financially attractive option by applying the investment analysis and sensitivity analysis according to VVM (version 01.2) paragraph 111.

During the validation of this section, one CAR and one CL were raised as follow:

- During the validation of the spreadsheet, the validation team detected discrepancies in the submitted spreadsheets for investment calculations/48/. In response to the CAR raised (CAR 2), the depreciation was added back to net profit in equity IRR calculation. This is in compliance with the Malaysian Income Tax Act 1967/50/. The validation team also confirmed that Malaysian tax and accounting standard and regulations/51/,/52/,/53/,/54/ was applied in the cash flow analysis.
- CL 8 was raised for PP to clarify on some components of capital cost: earth work for biogas site, piling for biogas site, diesel price, and salaries, Insurance & medical costs. PP was able to provide adequate evidence in supporting the cost in the investment analysis spreadsheet.
- CL 20 was raised for the PP to clarify the additional of the biomass boiler system in the project activity along with enclosed flare system in project boundary and sensitivity analysis regarding PKS for the biomass boiler. PP has provided justification of the PKS price and performed sensitivity analysis to conclude the additionality on the PKS price.

3.7 Monitoring Plan

The monitoring plan presented in the PDD complies with the requirement of the methodology AMS-III.H (version 16, EB 58) 'Methane recovery in wastewater treatment'/11/, "Tool to determine project emissions from flaring gases containing methane", (version 01, EB 28) and "Tool to calculate baseline, project and/or leakage emissions from electricity consumption" (Version 01, EB39). The validation team has checked all the parameters presented in the monitoring plan of the latest version of the PDD/2/ against the requirement of the methodology; no deviation relevant to the project activity were found.

The monitoring methodology has been described and applied in a transparent way which will give opportunity for real measurements of emission indicators and emission reductions can be calculated out of the measured parameters. PP has described in section B.7.2 of the PDD the overall monitoring plan with regards to the following:

- The authority and responsibility of the project operational and management structure for monitoring
- The hierarchy of the responsible authority with delegated responsibilities for the registration of monitoring measurement and reporting
- The flow of day-to-day operation including the records handling
- The calibration of all monitoring equipment according to the manufacturer's recommendation or at least once in three years to ensure accuracy of measurement

During the validation, one clarification (CL 16) was raised to clarify the combustion efficiency of the gas engine, description for $PE_{s,final,y}$ in Section B.6.1., and project emission due to transportation of sludge to compost plant. Details of the findings and its resolutions are as in Table 3 of Appendix A of this report.

3.7.1 Parameters determined ex-ante

The following parameters were available during validation :

Parameter	Value applied	Description
$MCF_{ww,treatment,BL}$	0.8	Methane correction factor for the baseline anaerobic wastewater treatment system. Default value for anaerobic deep pond specified in Table III.H.1 of AMS-III.H. version 16 is used.
$MCF_{ww,treatment,aerobic}$	0.0	Methane correction factor for the baseline aerobic wastewater treatment system. Default value for aerobic treatment, well managed specified in Table III.H.1 of AMS-III.H. version 16 is used.
$\eta_{COD,BL}$	97%	COD removal efficiency of the baseline treatment system, determined as per the paragraphs 26, 27 or 28 in AMS-III.H (version 16). The data[/40/] for COD was based on 10-day measurement campaign.
$\eta_{COD,\ PJ,aerobic}$	72%	COD removal efficiency of the baseline aerobic treatment system, determined as per the paragraphs 26, 27 or 28 in AMS-III.H (version 16). The data[/40/] for COD was based on 10-day measurement campaign.
$B_{o,ww}$	$0.25tCH_4$/ tCOD	Methane producing capacity of the wastewater. Default value specified in AMS-III.H version 16 is used.
UF_{BL}	0.89	Model correction factor to account for model uncertainties in the baseline emission calculations. Default value specified in AMS-III.H version 16 is used.
$MCF_{ww,treatment,PJ}$	0.8	Methane correction factor for project activity equipped with biogas recovery in the year y. Default value specified in in Table III.H.1 of AMS-III.H version 16 is used.
$MCF_{ww,treatment,PJ,aerobic}$	0.0	Methane correction factor for project activity not equipped with biogas recovery in the year, y. Default value specified in in Table III.H.1 of AMS-III.H version 16 is used.
$MCF_{ww,BL,discharge}$, $MCF_{ww,PJ,discharge}$	0.0	Methane correction factor of baseline and project wastewater treatment system sent to plantation for irrigation purpose in the year y. Default value specified in in Table III.H.1 of AMS-III.H version 16 is used.
GWP_{CH4}	$21tCO_2e$/ tCH_4	Global Warming Potential (GWP) of methane. IPCC default value specified in AMS III.H version 16.
UF_{PJ}	1.12	Model correction to account for model uncertainties. Default value specified in AMS-III.H version 16 is used.
CFE_{ww}	0.9	Capture efficiency of the biogas recovery equipment in the wastewater treatment system. Default value specified in AMS-III.H version 16 is used.

It was confirmed that the *ex-ante* values for methane correction factor, methane producing capacity and uncertainty factor above were based on the Table III.H.1 of AMS-III.H (version 16). The COD removal efficiency for baseline treatment system is based on the sample COD analysis results of 10-days measurement campaign carried out from 12/08/2011-25/08/2011[/40/]. In the baseline scenario, methane is emitted from the treatment of POME in the anaerobic ponds. In accordance to paragraph 26 and 27 of AMS-III.H., the baseline emission is determined from the COD removal efficiency of the wastewater treatment system through the lower of the measurement campaign from a minimum 10 days in a typical period prior to the project implementation (option b).

3.7.2 Parameters determined ex-post

The baseline and project emissions parameters that are to be monitored ex-post are indicated in Section B.7.1. of the PDD and as follow :

Parameter (unit)	Description	Source of data	QA/QC applied
$Q_{ww,i,y}$ (m^3/month)	Flow of wastewater entering anaerobic digester system of the project activity	Measured continuously (at-least hourly) using calibrated cumulative flow meters	Calibration will be done according to manufacturer specifications, or at least once in three years
$COD_{ww,untreated,y}$ (tCOD/m^3)	COD of wastewater entering the anaerobic digester system	COD samples will be tested every two weeks by accredited laboratory.	Samples and measurement will ensure a 90/10 confidence and precision level
$COD_{ww,treated,y}$ (tCOD/m^3)	COD of wastewater exiting the anaerobic digester system	COD samples will be tested every two weeks by accredited laboratory.	Samples and measurement will ensure a 90/10 confidence and precision level
$COD_{ww,discharge,PJ,y}$ (tCOD/m^3)	COD of wastewater leaving the final discharge point	COD samples will be tested every two weeks by accredited laboratory.	Samples and measurement will ensure a 90/10 confidence and precision level
$BG_{burnt,y}$ (Nm^3)	Amount of biogas fuelled or flared in year y	Calculated as the sum of $BG_{fuelled,y}$ and $BG_{flared,y}$	
$BG_{fuelled,y}$ (Nm^3)	Amount of biogas fuelled in the gas engine and/or boiler in year y	Measured continuously using flowmeter	Calibration will be done according to manufacturer specifications, or at least once in three years
$BG_{flared,y}$ (Nm^3)	The quantity of biogas flared in the project activity in the year y	Measured continuously using flowmeter	Calibration will be done according to manufacturer specifications, or at least once in three years

$w_{CH4,y}$ (%)	Methane content in the biogas in year y	Measured continuously using gas analyzer	Calibration will be done according to manufacturer specifications, or at least once in three years
T_{flare} (^{0}C)	Temperature in the exhaust gas of the flare	Measured using thermocouple Type N	Thermocouples will be replaced or calibrated annually
$\eta_{flare,h}$ (%)	Flare efficiency in hour *h*	Calculated	Default flare efficiency of 90% for enclosed flare is applied.
$S_{lfinal,PJ,y}$	End use of the final sludge from the digester system	Monitoring records of the end use of sludge	In any event of removal of sludge and soil application, the process will be monitored to ensure the conditions are aerobic.

The GHG indicators, parameters, monitoring methods, frequencies and the measurement equipment were considered to be reasonable and appropriate. The information for each parameter regarding the sources of data, measurement methods, calibration procedures, responsible personnel, measurement interval and QA/QC procedures were adequately described as per the guidelines for completing the SSC-PDD.

The project will be equipped with a monitoring system. The monitoring system was reviewed by the validation team through document review and interviews with relevant personnel. This information together with the physical inspection of the project site allowed the validation team to conclude that the proposed monitoring plan defined in the PDD is feasible within the project activity and the PP should be able to implement the monitoring as planned. The monitoring data will be archived electronically and be kept for two years after the end of the last crediting period. Details of the data to be collected and frequency of data recording were also described in the monitoring plan.

During the validation of this section, one CAR and one CL were raised as follow:

- CAR 6 was raised on the monitoring of T_{flare} against *"Tool to determine project emissions from flaring gases containing Methane"*
- CL 13 was raised to request PP to clarify how the samples and measurements for: all the CODs to ensure the 90/10 confidence/precision level are met, and some abbreviation/ symbols used were not found in the AMS-III.H Table III.H.2

3.8 Calculation of GHG Emissions

During the on-site audit, it was confirmed that details of direct and indirect emissions discussed in the PDD were appropriate and covers all aspects of the project activity. The validation team confirmed that details of direct and indirect emissions discussed in the PDD were appropriate and covered all aspects of the project activity. Methane (CH_4) and carbon dioxide (CO_2) emissions have been considered as the GHG emissions.

The validation team has assessed the calculations of the project emissions, baseline emissions, and leakage and emission reductions. It was confirmed that the calculation for emission reductions are in accordance with the methodologies AMS-III.H (version 16). The parameters and formulae presented in the PDD and CER spreadsheet[/1//2/25//26/], as well as other applicable documents has been compared with the information and requirements presented in the methodology and respective tools.

The assumptions and data used to determine the emission reductions are listed in the PDD and all the sources have been checked and confirmed. Based on the information reviewed, it can be confirmed that the sources used are correctly quoted and interpreted in the PDD. The values presented in the PDD are considered reasonable based on the documentation and references reviewed, as well as, the result of the interviews. The baseline methodology has been correctly applied according to requirements. The estimate of the baseline emissions can be confirmed as the same that have been replicated by the audit team using the information provided. Detailed information on the validation of the parameters used in the equations can be found in Appendix A.
The validation team has assessed the calculations of the project emissions, baseline emissions, and emission reductions. It was confirmed that the calculation for the emission reductions is in accordance with methodology AMS III.H (Version 16).

In the validation of this section, the following findings were raised:

- CL 18: clarification on the use of equation in page 29, PDD version 1[/1/]
- CL 20: clarification on the biomass boiler system in the project activity along with enclosed flare system in project boundary

Details of the findings and the resolutions are as in Table 3 of Appendix A of this report.

3.8.1 Baseline Emissions

In accordance with equation (1) in paragraph 18 of AMS-III.H. (version 16), the baseline emissions are calculated based on the following formula:

$$BE_y = \{BE_{power,y} + BE_{ww,treatment,y} + BE_{s,treatment,y} + BE_{ww,dischage,y} + BE_{s,final,y}\}$$

Where,

BE_y	Baseline emissions in year *y* (tCO_2e)
$BE_{power,y}$	Baseline emissions from electricity or fuel consumption in year *y* (tCO_2e)
$BE_{ww,treatment,y}$	Baseline emissions of the wastewater treatment systems affected by the project activity in year *y* (tCO_2e)
$BE_{s,treatment,y}$	Baseline emissions of the sludge treatment systems affected by the project activity in year *y* (tCO_2e)
$BE_{ww,discharge,y}$	Baseline methane emissions from degradable organic carbon in treated wastewater discharged into sea/river/lake in year *y* (tCO_2e).
$BE_{s,final,y}$	Baseline methane emissions from anaerobic decay of the final sludge produced in year *y* (tCO_2e)

Applicability of baseline emissions

Emissions	Remarks/ Justification
$BE_{power,y}$	Not applicable as in the *ex-ante* baseline emissions calculation, BE_{power} was considered as zero as the electricity consumed for the baseline wastewater treatment is supplied by the electricity generated by steam powered turbine generated from biomass boiler. This was confirmed during the on-site audit

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	and review of the electricity license issued by the Malaysia Energy Commission[38] and power generation data history[39]. Thus, in the *ex-ante* baseline emissions calculation, the $BE_{power,y}$ was considered as zero.
$BE_{ww,treatment,y}$	Applicable as this is the major component in the generation of biogas from the anaerobic wastewater treatment system in the baseline.
$BE_{s,treatment,y}$	Not applicable as the baseline scenario does not involve the use of a sludge treatment system. The validation team confirmed this in the license issued by the Department of Environment for the operation of the Melewar Palm Oil Mill[18]
$BE_{ww,discharge,y}$	Not applicable as the baseline scenario involves well-managed wastewater discharge for plantation irrigation purpose. This requirement is one of conditions in the license issued by the Department of Environment for the operation of the Melewar Palm Oil Mill[18]
$BE_{s,final,y}$	Not applicable as in the baseline scenario the sludge removed as from the anaerobic open ponds was sent to the plantation for soil applications. The validation team confirmed that this is one of conditions in the license issued by the Department of Environment for the operation of the Melewar Palm Oil Mill[18] and the approval for desludging[35].

Therefore, the baseline emission is as follow:

$BE_y = BE_{ww,treatment,y}$

For the calculation of the $BE_{ww,treatment,y,}$ equation (2) in paragraph 20 of AMS-III.H. was applied. The baseline emissions for the wastewater treatment system, $BE_{ww,treatment,y}$ consist of the anaerobic and aerobic conditions. From the review of the existing POME treatment system drawing[14] and the on-site audit, it can be confirmed that the aerobic ponds are with depth range between 1.5 to 3.0m and they are aerated and well managed[14]. The MCF value as per Table III.H.1, the MCF value is zero. Hence, the baseline emission from the aerobic ponds is zero. All other assumptions were mainly made based on default values. As an example, the methane producing capacity of the wastewater $B_{o,ww}$ = 0.25 which is derived from the IPCC default value as provided in AMS-III.H Version 16[11] is considered as conservative assumptions.

For the calculation of the $BE_{ww,treatment,y,}$ equation (2) in paragraph 20 of AMS-III.H. was applied.

$$BE_{ww,treatment,y} = \sum_i (Q_{ww,i,y} * COD_{\inf low,i,y} * \eta_{COD,BL,i} * MCF_{ww,treatment,BL,i}) * B_{o,ww} * UF_{BL} * GWP_{CH4}$$

Where,

$Q_{ww,\ i,y}$	is the volume of wastewater treated in baseline wastewater treatment system i in year y (m^3).
$COD_{\inf low,i,y}$	Chemical oxygen demand of the wastewater inflow to the baseline anaerobic treatment system in year y (t/m^3).
$\eta_{COD,BL,i}$	COD removal efficiency of the baseline treatment system i. determine as the paragraphs 26, 27 or 28 of AMS III.H version 16.
$MCF_{ww,\ treatment,\ BL}$	Methane correction factor for baseline wastewater treatment systems i (value as in Table III.H.I of AMS III.H version 16

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$B_{o,ww}$	Methane producing capacity of the wastewater (IPCC value of 0.25 $kgCH_4$/ kgCOD)
UF_{BL}	Model correction factor to account for model uncertainties (0.89)
GWP_{CH4}	Global Warming Potential for methane (value of 21)

The key data used in calculations of the *ex-ante* baseline emissions are as below table. For full details refer to Section B.4 of PDD.

Parameter	Value	Justification
$Q_{ww,\ i,y}$	249,600 m^3/year	This parameter was estimated based on the mill processing capacity multiplied with an effluent conversion factor. The projected FFB value was based on the maximum allowable FFB processing capacity at 384,000 tonnes/year authorized by MPOB license /17/. Furthermore, from the assessment done on the historical processed FFB records /19/, it was noted that the highest FFB processed was during the period from July 2008 to June 2009 which was 363,821 tonnes/year.. This confirms that the determination of the projected FFB value is conservative and acceptable. The determination of the annual FFB processing hours was based on the historical records of three years data from July 2008 until June 2011 with the average 5,744 hours of operation /19/. The mill processing capacity was based on the licensed issued by the Malaysian Palm Oil Board /17/ to the mill. This is appropriate as the mill has been designed to comply with this regulatory requirement. Depending on the FFB availability, the mill can only process up to that limit. An effluent conversion factor of 0.65 m^3 of POME for each tonne of FFB processed was used. This factor was based on a publication /20/. This factor was accepted by the validation team as through research in various publications /80//91//92/, the reported values were ranging from 0.5 to 0.7m^3/tonne of FFB. As explained in Section 3.5.3, the volume of wastewater treated in the baseline and project wastewater systems is based on processing capacity of FFB per year /19/ multiplied with amount of wastewater produced (m^3) per tonne of FFB /20/
$COD_{\inf low,i,y}$	0.05536 tonnes/m^3	The COD value was based on a 10-days measurement campaign /40/ of the wastewater entering the baseline wastewater system. In accordance with paragraph 27, the average values determined during this campaign were multiplied by 0.89 to account for the uncertainty.

$\eta_{COD,BL,i}$	96.64%	The COD removal efficiency was calculated based on the difference of COD $_{inflow}$ and $COD_{outflow}$. Over the total $COD_{inflow.}$ The value for $COD_{outflow}$ was based on a 10-day measurement campaign[40] of wastewater leaving the baseline wastewater treatment system. In accordance with paragraph 27, the average values determined during this campaign were multiplied by 0.89 to account for the uncertainty.

The COD of the wastewater was based on a 10-days measurement campaign as there were no history records on the monitoring of this parameter prior to the project implementation. There was no regulatory limit provided in the conditions set by the Department of Environment[18] for the wastewater discharge. The current environmental standards[28] only specifies that the final discharge of the treated POME shall be within 50 mg BOD/litre[18]. Hence, the use of the measurement campaign which is also in accordance with paragraph 27 is acceptable. Default values from the IPCC 2006 and from AMS III.H, where applicable were also used in the calculations. These values were selected based on the methodology requirements and found to be correctly applied.

The validation team has reviewed the respective documents submitted and deemed appropriate. The values applied are conservative and plausible.

With the above input values and the relevant default values, the ex-ante BE_y which was calculated as:

BE_y (tCO_2e) = $BE_{ww,treatment,y}$
= 49,915 tCO_2e/yr

In this Section, one CAR (CAR 3) and three CLs (CL 2, CL 10 and CL 15) were raised as follow :

- CAR 3 - PP had not demonstrated how paragraph 27 (a) and (c) of AMS-III.H were assessed in the determination of the baseline emission.
- CL 2 - the processing rate of FFB estimated and used (Table B.4. of PDD) in ex ante estimation of ER was not consistent with the historical data, Malaysia Palm Oil Board approval and Department of Environment approval.
- CL 10 - the wastewater generation factor ($0.65m^3$/tonne FFB) used to determine POME generation rate, $Q_{ww,y}$ was referred to other country.
- CL 15 - the measurement/ sampling points for $Q_{ww,i,y}$, $COD_{inflow,i,y}$ were not indicated in the Figure B.2 & B.3 of PDD.

Details of the findings and the resolutions are as in Table 3 of Appendix A of this report.

3.8.2 Project Emissions

All aspects related to direct and indirect project emissions have been taken into consideration in the calculation. It was confirmed during the site audit that all aspects of direct PE have been included in the calculation with relevant GHG i.e. CH_4 and CO_2 and its sources, wastewater from palm oil mill were evaluated.

Referring to the formula in AMS-III.H version 16, the project emissions for the project activity are calculated as follows:

The project emission is determined based on the formula in paragraph 29 of AMS III.H. (version 16):

$$PE_y = \{PE_{power,y} + PE_{ww,treatment,y} + PE_{s,treatment,y} + PE_{ww,discharge,y} + PE_{s,final,y} + PE_{fugitive,y} + PE_{biomass,y} + PE_{flaring,y}\}$$

Where :

PE_y	Ex-ante project activity emissions due to methane recovery in the year y (tCO_2e).
$PE_{power,y}$	CO_2 emissions from electricity or fuel consumption by the project activity (tCO_2e).
$PE_{ww,treatment,y}$	Methane emissions from wastewater treatment systems affected by the project activity and not equipped with biogas recovery in the project scenario (tCO_2e).
$PE_{s,treatment,y}$	Methane emissions from sludge treatment systems affected by the project activity and not equipped with biogas recovery in the project situation (tCO_2e).
$PE_{ww,discharge,y}$	Methane emissions on account of inefficiency of the project activity wastewater treatment systems and presence of degradable organic carbon in treated wastewater (tCO_2e).
$PE_{s,final,y}$	Methane emissions from the decay of the final sludge generated by the project activity treatment system (tCO_2e).
$PE_{fugitive,y}$	Methane fugitive emissions due to inefficiencies in capture systems (tCO_2e).
$PE_{flaring,y}$	Methane emissions due to incomplete flaring (tCO_2e).
$PE_{biomass,y}$	Methane emissions from biomass stored under anaerobic conditions which would not have occurred in the baseline situation (tCO_2e).

Applicability of project emissions

Emissions	Remarks/ Justification
$PE_{power,y}$	Not applicable as in the project activity, the main source of the electricity for the auxiliary equipment will be from the biogas engine and the biomass boiler. In the event that the biogas engine generates electricity lesser that the requirement for power of the auxiliary equipment, the remaining requirement will be supplied by the biomass boilers from the Mill. PP had carried out an analysis in the event that the back-up diesel generator set is used (i.e. during start up, shut down and emergency situation), the amount of CO_2 emitted from the fossil fuel was less than 1% of baseline emission based on the mill electricity supply history/39/. The validation team also confirmed that the Emission Factor for diesel = 1.3 tCO_2/MWh is a conservative default value as per 'Option B2, Page 8 of "Tool to calculate baseline, project and/or leakage emissions from electricity consumption" Version 01, EB39. The validation team also confirmed that auxiliary power consumption/60/ for the project activity was provided by technology provider. Hence, it can be concluded that $PE_{power,y}$ is zero
$PE_{ww,treatment,y}$	Not applicable. From the project design/15/ and approval by the Department of Environment/82/ for the construction and operation of the new wastewater treatment plant (i.e. the project activity) it can be confirmed that there will be no more anaerobic open ponds system. Only digester tanks and other

	aerobic treatment system will be in place. The project activity will not change the operational characteristic of the aerobic ponds system. Hence, $PE_{ww,treatment,y}$ is zero.
$PE_{s,treatment,y}$	Not applicable as the project activity does not involve any sludge treatment system.
$PE_{ww,discharge,y}$	Not applicable as in the project activity, treated wastewater is discharge to the plantation for irrigation purpose. This requirement is one of conditions in the license issued by the Department of Environment for the operation of the Melewar Palm Oil Mill[/82/]. Hence, $PE_{ww,discharge,y}$ is zero.
$PE_{s,final,y}$	Not applicable as in the project activity, sludge is composted[/7/] and used for soil application under aerobic condition in the nearby plantation. The validation team confirmed that this is one of conditions in the license issued by the Department of Environment for the operation of the Melewar Palm Oil Mill[/82/] . Hence, $PE_{s,final,y}$ is zero.
$PE_{fugitive,y}$	Applicable. The emission due to inefficiency of capture system in anaerobic digesters will contribute to methane emission to the atmosphere.
$PE_{flaring,y}$	Applicable. The emission due to incomplete flaring system will contribute to methane emission to the atmosphere. For *ex-ante* estimation, this emission is assumed to be zero. However, for *ex-post* estimation, in the case when flaring system is activated, such emissions will be accounted accordingly and will be calculated in accordance with the Tool to determine project emissions from flaring gases containing methane" (Version 1, EB28) for an enclosed flaring system.
$PE_{biomass,y}$	Not applicable as no storage of biomass involved in the project activity, this is confirmed by the validation team during site visit, process diagram review, and interview the project proponent. Hence $PE_{biomass,y}$ is zero.

Hence, for *ex-ante* project emissions the following applied:

$$PE_y = PE_{fugitive,y} + PE_{flarey}$$

For the calculation of the $PE_{fugitive,y}$, equation (9) in paragraph 30 of AMS-III.H. (version 16) was applied. The calculations were found documented in a complete and transparent manner, and parameters validated as following:

Parameter (unit)	Value	Description	Justification of value applied
UF_{PJ}	1.12	Model correction factor to account for model uncertainties	Default value provided in AMS-III.H. Ver 16.

$COD_{removed,PJ}$	0.04429	The chemical oxygen demand removed by the project wastewater treatment system (System-biogas) which is equipped with biogas recovery digester in year y.	Based on 10 days COD measurement campaign. The COD testing was carried out by an accredited laboratory[/40/]
$MCF_{ww,treatment,PJ}$	0.8	Methane correction factor for project wastewater treatment system (System-biogas) which is equipped with biogas recovery digester.	Default value as per AMS IIIH (version 16) Table III.H.1. IPCC default values for anaerobic reactor without methane recovery.
CFE_{ww}	0.9	Capture efficiency of the biogas recovery equipment in the wastewater treatment systems	Default value as per AMS IIIH (version 16).
GWP_{CH4}	21	Global Warming Potential of methane	Default value as per AMS IIIH (version 16)
h	5744	Hours of operation per year (h/y)	Based on Mill's historical processing data (July 2008 - June 2011)[/19/].
$TM_{RG,h}$	0.00	Mass flow rate of methane in hour h (kg/h)	No biogas flared for ex-ante estimation
$\eta_{flare,h}$	0.9	Flare efficiency in hour y	Design specification document[/4//5/] by Watermech

For PE_{flarey}, the equation as defined in the tool for flaring[/12/] is used :

$$PE_{flare} = \sum_{h=1}^{h} TM_{RG,h} * (1-\eta_{flare,h}) * (GWP_{CH4}/1000)$$

Where:

PE_{flare}	Project emission from flaring of methane in the residual gas in year y
$TM_{RG,h}$	Mass flow rate of methane in hour h
$\eta_{flare,h}$	Flare efficiency in hour h
GWP_{CH4}	Global warming potential of methane

The mass flow rate of methane is estimated as following:

$$\mathbf{TM_{RG,h}} = \mathbf{FV_{RG,h} * fv_{CH4,RG,h} * \rho_{CH4,n}}$$

Where

$FV_{RG,h}$	Volumetric flow rate of the residual gas in dry basis at normal conditions in hour h (m^3/h)
$fv_{CH4,RG,h}$	Volumetric fraction of methane in the residual gas on dry basis in hour h
$\rho_{CH4,n}$	Density of methane at normal conditions (0.716)

For *ex-ante* $PE_{flae,y}$, since in the project activity flaring is only used during emergency situation, the

estimation as 'zero' is found to be appropriate.

The calculations were found in compliance with existing good practice. The calculations as described in Section B.6.3 of the PDD were found complete according to the methodologies chosen. The actual calculations done in the Excel spread sheet[/26/] was found accurate with correct formula accordingly.

The *ex-ante* PE_y result as calculated is as follows:

PE_y (tCO_2e) = $PE_{fugitive,y}$ + $PE_{flaring,y}$
= 5,200 + 0 (ex-ante estimation)
= 5,200 tCO_2e/yr

In this section, CL 17 was raised on the following :

- Emission Factor (EF) of electricity from Diesel engines and auxiliary power consumption for project

Details of the findings and the resolutions are as in Table 3 of Appendix A of this report.

3.8.3 Leakage Emissions

There is no leakage in the project activity as the technology used will not involve equipment transferred from another project activity or the existing equipment transferred to another project activity.

3.8.4 Emission Reductions

In accordance with paragraph 32 of AMS.III.H (version 16), for the determination of the *ex-ante* emission reductions, equation 14 shall be used as follow

$ER_{y,ex\ ante} = BE_{y,ex\ ante} - (PE_{y,ex\ ante} + LE_{y,ex\ ante})$

where,

$ER_{y,ex\ ante}$	*ex- ante* emission reduction in year y (tCO2e)
$LE_{y,ex\ ante}$	*ex-ante* leakage emissions in year y (tCO2e) = 0 for no transfer of equipment from another project activity
$PE_{y,ex\ ante}$	*ex- ante* project emissions in year y calculated as paragraph 29 of AMS III.H version 16 (tCO2e)
$BE_{y,ex\ ante}$	*ex-ante* baseline emissions in year y calculated as paragraph 18 of AMS.III.H version 16 (tCO2e)

The validation team has assessed the calculations of the project emissions, baseline emissions, leakage and emission reductions in the ER spreadsheet[/25//26/]. The parameters and equations presented in the PDD, as well as other applicable documents, have been compared with the information and requirements presented in the methodology AMS-III.H (version 16) and the related tool. Since most estimates for the prognosis of emission reductions were derived from accepted international sources and justified values, it is reasonable to assume that they are accurate and deemed to be conservative.

Based on the input values, the annual *ex- ante* GHG emissions reduction over the crediting period are estimated to be :

$ER_{y,ex\ ante} = BE_{y,ex\ ante} – (PE_{y,ex\ ante} + LE_{y,ex\ ante})$

= 49,915 tCO2e/yr – (5,200 + 0) tCO2e/yr
= 44,715 tCO2e/yr

This estimated emission reductions will be imposed over a fixed crediting period of 10 years. All estimates of the baseline emissions can be replicated using the data and parameter values provided in the revised PDD. For conservativeness, the final value of BE_y has been rounded down and PE_y has been rounded up by the PP. This is deemed appropriate by the validator. Detailed information on the validation of the parameters used in the equations is as in Table 2 of Appendix A of this report.

For *ex post* emissions reduction, according to paragraph 33 of AMS.III.H (version 16), it shall be based on the lowest value of the following:

i) the amount of biogas recovered and fuelled or flared (MD_y) during the crediting period, that is monitored *ex post*;
ii) Ex post calculated baseline, project and leakage emissions based on actual monitored data for the project activity.

In accordance with paragraph 34 of AMS.III.H (version 16), formula in equation 15 is to be applied as follow :

$$ER_{y,ex\text{-}post} = \min ((BE_{y,ex\text{-}post} – PE_{y,ex\text{-}post} – LE_{y,ex\text{-}post}), (MD_y – PE_{power,y} – PE_{biomass,y} - LE_{y,ex\text{-}post}))$$

Where:

$ER_{y,ex\text{-}post}$	Emission reductions achieved by the project activity based on monitored values for year y (tCO2e)
$BE_{y,ex\text{-}post}$	Baseline emissions calculated using ex post monitored values (tCO2e)
$PE_{y,ex\text{-}post}$	Project emissions calculated using ex post monitored values (tCO2e)
MD_y	Methane captured and destroyed/gainfully used by the project activity in year y (tCO2e)

In case of flaring /combustion, MD_y will be measured using the conditions of the flaring process in accordance with AMS-III.H. (Version 16, EB 58), paragraph 35, as follows:

$$MD_y = BG_{burnt,y} * w_{CH4,y} * D_{CH4} * FE * GWP_{CH4}$$

Where:

$BG_{burnt,y}$	Biogas flared/combusted in year y (m^3)
$w_{CH4,y}$	Methane content in the biogas in the year y (volume fraction)
D_{CH4}	Density of methane at the temperature and pressure of the biogas in the year y (tonnes/m^3)
FE	Flare efficiency in year y (fraction). In the case that biogas is destructed for gainful purpose, e.g., fed to the engine, an efficiency of 100% is to be applied

In the proposed project activity, biogas will be typically combusted in the gas engines. Excess biogas will be utilized in the biomass boiler system. A default value of 100% flare efficiency will be used for biogas combusted in gas engines or biomass boiler system.The determination of the ex-post emission reductions has been included in the PDD.

The use of Excel spreadsheets for the calculation of GHG emissions has been verified by the validation team. Melewar CER spreadsheet[/25//26/] were referred to in the calculation of ER. All changes to the figures resulting from the comments made in CARs and CLs have been rectified accordingly. The revised Melewar CER spreadsheet [/26/] has been checked. The figures and data were revised accordingly in the revised PDD[/2/] and the spreadsheets. The calculations of the

project baseline emissions and project emissions were found to be reasonable and transparently carried out.

In line with the requirement in para 92 of the VVM, the validation team cross-checked the emissions reduction calculation process against all reference data sources and the requirements of the methodology and the tool. It is confirmed that:

a) All data sources and assumptions and data used by the project participants are listed and referenced in the PDD, ;
b) All documentation used by project participants as the basis for assumptions and source of data is correctly quoted and interpreted in the PDD;
c) All values used in the PDD are considered reasonable in the context of the proposed CDM project activity;
d) The baseline methodology has been applied correctly to calculate project emissions, baseline emissions, leakage and emission reductions;
e) All estimates of the baseline emissions can be replicated using the data and parameter values provided in the PDD and the financial spreadsheet.

3.9 Environmental Impacts

No significant environmental impacts are expected from the project activity. The validation team has reviewed the Environmental Quality (Prescribed Activities)(Environmental Impact Assessment) Order 1987/27/, and confirms that the activities are not listed in the list of 'Prescribed Activities'. A confirmation letter from the Department of Environment/90/ that no EIA is required for this project activity has been obtained

Ultimately, the project is not expected to create any adverse environmental effects except for some minor impacts during construction period. Identified minor impacts such as dust and noise would be brief and limited within the vicinity of the palm oil mill. However, the locality of the palm oil mill is in the sub-urban area while the nearest residence area is the staff quarters within the plantation estate. The possibilities of exposure to the identified minor impacts would be low and brief.

3.10 Crediting Period

The PP had selected a fixed ten(10)-year crediting period starting from 01 January 2013 or on the date of registration of the project activity, whichever is later.

3.11 Comments by Local Stakeholders

A formal consultation process with local stakeholders was held on 9 November 2011 at De Leon Hotel, in Lahad Datu, Sabah, East of Malaysia. Invitations to the local stakeholders to the consultation were made through advertisements in Utusan Borneo and Daily Express/30/ from 25 – 27 October 2011. For the government agencies, local authorities, suppliers, contractors, neighbouring plantation, mills and village representatives, invitation letters were sent on 25 October 2011/31/. The meeting was attended by a total of 51 participants which included representatives from the Department of Safety & Health, local authorities, local residents, non-governmental organizations, suppliers and contractors. This was evident through the signed attendance list/32/, photographs/59/ and Interview of several local residents.

During the consultation process, the participants were briefed on the CDM and the project activity/33/. Apart from the open forum with the participants, the participants comments were recorded and summarized/34//59/. There were no adverse comments received. Comments received

at the meeting were mainly concerns on the safety of biogas in the system and PP responded by providing details on the safety features built into the system. PP also presented a clear and concise briefing of CDM and its benefits. A summary of the comments and responses are provided in Section E of the PDD.

In general, it can be concluded that the communication method was appropriate as invitations were made through both public media as well as personal invitations. The local stakeholder consultation process had covered most of the stakeholders and it can be concluded that the stakeholders have been adequately consulted on the proposed CDM project. Hence, the consultation process was adequately performed according to the CDM requirements.

4.0 COMMENTS BY PARTIES, STAKEHOLDERS AND NGOs

SIRIM QAS Intl. published the first version of the PDD/1/ on UNFCCC's website on 07 January 12 - 05 February 12. The PDD is available at http://cdm.unfccc.int/Projects/Validation/DB/Q7ZJ50AP8LNZTITKPDU9JL8U0C1WTY/view.html.
No comments were received.

5.0 VALIDATION OPINION

SIRIM QAS Intl. has performed a validation of the proposed CDM project "Methane Capture and Utilization Project at Melewar Palm Oil Mill, Malaysia" on the basis of UNFCCC criteria for the CDM and host Party criteria as well as criteria given to provide for consistent project operations, monitoring and reporting. The project is located at 1.6km off the 45km Lahad Datu Sandakan Highway, Sabah, Malaysia with GPS coordinates of 5° 16' 17" North and 118° 3' 7" East.

The project participants are Melewar Properties Sdn. Bhd. of Malaysia and Perenia Pty Ltd. of Australia. Malaysia, as the host party, and Australia, as the Annex 1 country, meet the requirements to participate in the CDM. The LoA issued by the DNA of Malaysia/75/ has confirmed that the project will assist in achieving sustainable development. The DNAs of both parties have approved the project and have authorized the project participants to request the project to be considered for registration with the UNFCCC.

The project is aiming to reduce the GHG emissions by capturing and utilizing the methane in the biogas that would have been emitted to the environment from the open ponds anaerobic treatment system. The project activity involves the installation of new closed tank anaerobic digesters equipped with a biogas capture and collection system. The captured biogas will be used as fuel in the biogas engine to generate electricity. Any excess biogas will be utilized in the biomass boiler or combusted in and enclosed flare system. The project will reduce GHG emissions by capturing this methane and combusting it in the biogas engine, boiler or flare.

The project applies AMS-III.H "Methane recovery in waste water treatment" (version 16). The demonstration of the applicability of the methodology and the determination of the baseline was justified. It was demonstrated that the project is not likely the baseline scenario. Emission reductions from the project are hence additional to any that would occur in the absence of the project activity.

The project will result in the reduction of GHG emissions that is real, measurable and gives long-term benefits and that are additional to what would have occurred in the absence of the project. Given that the project is implemented as designed, the project is likely to achieve the estimated

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amount of emission reductions as specified in the final version of PDD. The total emission reductions from the project are estimated to be 447,157 tCO_2e over the selected 10 year crediting period. The proposed CDM project is eligible as a type III small-scale CDM project activity as the emission reductions is below 60 $ktCO_2e$ per year.

The monitoring plan is in line with the approved monitoring methodology AMS-III.H "Methane recovery in waste water treatment" (version 16). The plan adequately addresses all necessary information for monitoring and reporting of emissions reductions due to the project activity. Responsibilities and authorities for project management, monitoring and reporting, and the data quality control and quality assurance procedures have been described in the PDD. These procedures will be implemented before the start of the crediting period.

There is no requirement for an EIA by the host country[/27/.] The project is not likely to create any significant adverse environmental impacts. The project activity has obtained approval from Department of Environment[/90/]. Hence the project complies with the applicable environmental regulations in Malaysia

In summary, it is the opinion of SIRIM QAS International's that the proposed project "Methane Capture and Utilization Project at Melewar Palm Oil Mill, Malaysia", as described in the project design document, version 2.4 dated 24 July 2012, meets all relevant UNFCCC requirements for the CDM, and correctly applies the approved methodology AMS-III.H (Methane recovery in wastewater treatment" (version 16). As such SIRIM QAS Intl. recommends the registration of the project as a CDM project activity.

Prepared by :	Approved by:
(Sew Shuh Ping) Validation Team Leader	(Parama Iswara Subramaniam) DOE Representative

6.0 REFERENCES

Information Reference List

Ref. No.	Document or Type of Information
/1/	Project Design Document, version 1, dated 9 December 2011
/2/	Project Design Document, version 2.4, dated 24 July 2012
/3/	POME Biogas-Capture Anaerobic Digester System & Process Design by Watermech Engineering Sdn. Bhd.
/4/	Melewar Enclosed Flare System Drawing
/5/	Melewar Enclosed Flare System Specification
/6/	CDM Validation and Verification Manual 01.2
/7/	PW Biotech Composting Plant Operating Manual
/8/	Letter of Confirmation of Non-ODA supporting Methane Capture & Utilization Project by Mill Director
/9/	Minute of Board Meeting 14/4/2011 - approving development of the proposed project activity as a CDM project
/10/	Watermech Engineering Sdn. Bhd; Life Span, Operation & Maintenance Cost of Equipment
/11/	AMS-III.H 'Other Project Activities: Methane recovery in wastewater treatment' ,version 16, EB 58
/12/	Tool to determine project emissions from flaring gases containing methane, Version 1, EB 28
/13/	Biogas Plant Layout Drawing
/14/	Melewar Palm Oil Mill layout plan for effluent ponds and effluent tertiary treatment plant
/15/	Watermech Engineering Sdn. Bhd. Quotation on Melewar Biogas Capture Anaerobic Digester Tanks System and Power Generation
/16/	COD Removal Efficiency from technology provider
/17/	Melewar Palm Oil Mill Processing Capacity License by Malaysian Palm Oil Board 13/10/2011
/18/	Melewar Operating license from Department of Environment dated 14/4/2011
/19/	FFB processing history data 2008, 2009 & 2011
/20/	LudinN, Bakri MM, HashimM, SawillaB, MenonN, MokhtarH. "Palm Oil Biomass for Electricity Generation in Malaysia"; 2004.p.1–6. Pusat Tenaga Malaysia, Malaysia Palm Oil Board, SIRIM Berhad
/21/	General Guidelines to SSC CDM methodologies (version 17, EB 61, Annex 21)
/22/	Attachment A to Appendix B of the simplified modalities and procedures for small scale CDM project activities (version 8, EB 63, Annex 24)
/23/	Malaysia National Green Technology Policy
/24/	Malaysia DNA CDM criteria
/25/	06 01 12 Melewar CER Estimate spreadsheet
/26/	25 06 12 Melewar CER _Version 02.3
/27/	Environmental Quality (Prescribed Activities)(Environmental Impact Assessment) Order 1987
/28/	Environmental Quality (Prescribed)(Crude Palm Oil) Regulations 1977
/29/	Tool to calculate baseline and project and/or leakage emissions from electricity consumption" (version 01, EB 39)
/30/	Stakeholder Consultation notice in 'Utusan Borneo' and 'Daily Express' dated 25, 26 & 27 October 2010
/31/	Stakeholder Consultation Invitation Letter to Government agencies, local authorities and neighbours.
/32/	Attendance list for Open Forum for Stakeholder Consultations on CDM Project
/33/	Local Stakeholder Consultation Presentation
/34/	Questions & Answer Session Stakeholder Consultation, De Leon Hotel, 09th November 2011

/35/	Written Approval to desludge Melewar Palm Oil Mill effluent treatment ponds by Department of Environment in 2008
/36/	"Letter of Acceptance of Offer" from Watermech Engineering Sdn. Bhd.
/37/	Melewar BOD results 2008 -2011
/38/	Malaysia Energy Commission license for electricity supply and consume 6//6/2011
/39/	2008-2011 Historical Power Generation Turbine and Genset
/40/	Effluent Laboratory test result for POME dated August, 2011
/41/	Prior Consideration of the CDM Form
/42/	Email notification to UNFCCC Secretariat on intention to start CDM project & their Response
/43/	Email notification to Malaysia DNA on intention to start CDM project & their Response
/44/	Term sheet signed between Perenia and project proponent 10/6/2011
/45/	ERPA signed between Perenia Pty Ltd & Melewar Properties Sdn Bhd
/46/	Non-binding best practice examples to demonstrate additionality for SSC project activities; EB 35, Annex 34
/47/	"Guidelines on the Assessment of Investment Analysis" (Version 05; EB 62)
/48/	06 02 12 Melewar Financial Module
/49/	24 08 12 Melewar FM - Version 02.3
/50/	Malaysian Income Tax Act 1967; *http://www.agc.gov.my/Akta/Vol.%202/Act%2053.pdf*
/51/	Malaysia Tax Rate from Lembaga Hasil Dalam Negeri Malaysia; http://www.hasil.gov.my/goindex.php?kump=5&skum=2&posi=5&unit=1&sequ=1
/52/	General Plants and Equipment Depreciation; Malaysian Accounting Standards Board, based on paragraph 50-62 of the Financial Reporting Standards, FRS 116 http://www.masb.org.my/index.php?option=com_content&view=article&id=142:frs116-pg4&catid=6:masb-exclude-private
/53/	Initial Allowances: General Plants and Equipment; http://www.hasil.gov.my/goindex.php?kump=5&skum=1&posi=6&unit=1&sequ=1
/54/	Annual Allowances: General Plants and Equipment; http://www.hasil.gov.my/goindex.php?kump=5&skum=1&posi=6&unit=1&sequ=1
/55/	Guidelines on the demonstration and assessment of prior consideration of CDM Version 03
/56/	Melewar Diesel Purchased Price 2010 - 2011
/57/	Diesel Purchased Invoices
/58/	Melewar FFB Processing Record 15 – 25-August-2011
/59/	Photograph of Local Stake Holder Consultation 9th November 2011 at De Leon Hotel, in Lahad Datu, Sabah, Malaysia
/60/	Auxiliary power consumption for Melewar Project by Watermech Engineering Sdn. Bhd.
/61/	Anders Evald and others, "Renewable Energy Resources", February, 2005, Integrated Resource Planning
/62/	GLOBAL TRADE RESOURCES (M) SDN BHD website Palm Kernel Shell PKS price http://globaltraderesources.trustpass.alibaba.com/product/104821914-101707192/Palm_Kernel_Shell_PKS.html?tracelog=ggsotherproduct2#productDetailpageLocation
/63/	http://www.worldweatheronline.com/Lahad-Datu-weather-averages/Sabah/MY.aspx
/64/	Glossary of CDM Terms Version 06.0

/65/	Melewar Biogas Earthwork Quotation 5 April 2011
/66/	Melewar Biogas Piling Quotation 4 April 2011
/67/	J.C. Chang Group Melewar Biogas Plant Overhead Cost Estimation
/68/	Letter of Offer for PKS Purchase by Chin Wood Industries S/B to Carotino Palm Oil Mill, dated 15/06/2012
/69/	Melewar Biogas_Analysis spreadsheet
/70/	Page 277, Palm Kernel Shell (PKS) is More Than Biomass for Alternative Fuel After 2005 by Mohammad Dit . Proceedings of the PIPOC 2007 International Palm Oil Congress (Chemistry & Technology)
/71/	PKS Net Calorific Value; http://www.palmkernelshell.com/index.html
/72/	Melewar FM - Biogas to Boiler spreadsheet
/73/	J.C. Chang, Melewar Palm Oil Mill Worker Checkroll Schedule for Biogas Plant
/74/	Goodman & Hastak, 'Infrastructure Planning Handbook' – "Typical Contingency Factors for Buildings and Civil Works", "Typical Contingency Factors Applied to Field Cost"
/75/	Letter of Approval from the DNA of Malaysia dated 14/08/2012
/76/	Letter of Approval from the DNA of Australia dated 23/07/2012
/77/	LoA confirmation email from Environmental Management and Climate Change Division, Ministry of Natural Resources and Environment Malaysia through email dated 15/08/2012
/78/	LoA confirmation email from Department of Climate Change and Energy Efficiency, Australia dated 17/08/2012
/79/	http://mapper.acme.com/
/80/	"Pollution control technologies for the treatment of palm oil mill effluent (POME) through end-of-pipe processes" by Ta Yeong Wu a, Abdul Wahab Mohammadb, Jamaliah Md. Jahim b, Nurina Anuar (Journal of Environmental Management 91 (2010) 1467e1490).
/81/	Melewar Palm Oil Mil Biogas Plant Project Implementation Schedule / Actual Progress
/82/	Written approval from Department of Environment for Biogas Plant and New cooling pond/ acidification pond dated 24/05/2012
/83/	Rupani, P.F., Pratap Singh, R., Ibrahim, M.H. and Esa, N., "*Review of Current Palm Oil Mill Effluent (POME) Treatment Methods: Vermicomposting as a Sustainable Practice*", World Applied Sciences Journal 10(10): 1190-1201, 2010
/84/	Sulaiman, F., Abdullah, N., Gerhauser, H. and Sharrif, A., "*Palm Oil Biomass for Electricity Generation in Malaysia*", Journal of Physical Science, Vol. 21(1), 67–77, 2010
/85/	Statistik Penjanaan Tenaga Electrik Bulanan (Monthly Report on Electricity Energy Generation Statistic) March, April & May 2012 reported to Energy Commission of Malaysia, Sandakan, Sabah.
/86/	Melewar Palm Oil Mill Diesel Consumption (Litres) January 2008 – December 2011
/87/	Melewar Palm Oil Mill FFB Processed Record July 2008 – September 2011
/88/	Signed Modalities of Communication dated 15/08/2012
/89/	http://eprise6.kellyglobal.net/res/content/my/services/en/docs/my_salary_guide2011_2012.pdf
/90/	Letter from the Department of Environment confirming no EIA requirement for the project activity dated 29 May 2012
/91/	"Effects of palm oil mill effluent (POME) anaerobic sludge from 500 m3 of closed anaerobic methane digested tank on pressed-shredded empty fruit bunch (EFB) composting process" (African Journal of Biotechnology Vol. 9(16), pp. 2427-2436, 19 April, 2010)
/92/	"Treatability of Palm Oil Mill Effluent (POME) using Black Liquor in an Anaerobic Treatment Processing" by LING YU LANG Thesis submitted in fulfilment of the requirements for the degree of Master of Science July 2007

/93/	Agreement for earthwork at Melewar biogas plant dated 3 November 2011
/94/	Agreement for piling works at Melewar biogas plant dated 3 November 2011
/95/	http://www.indexmundi.com/malaysia/inflation_rate_(consumer_prices).html
/96/	http://www.statistics.gov.my/portal/index.php?option=com_content&view=article&id=1382&Itemid=111&lang=en
/97/	http://globaltraderesources.trustpass.alibaba.com/product/104821914-101707192/Palm... 13/6/2012
/98/	Approvals from Department of Environment for Boiler no.1, no. 2 and no.3
/99/	Approvals from Department of Environment for Diesel Engine no. 1 and no.2
/100/	A Technical and Economic Analysis of Heat and Power Generation from Biomethanation of Palm Oil Mill Effluent by B.G.Yeoh, SIRIM (page 20-70)

APPENDIX A
VALIDATION PROTOCOL
Project No. SQAS-CDM-EP10850003

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

REQUIREMENT	REFERENCE	COMMENT	CONCLUSION
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	Section A.3 – Party included in Annex 1 is Australia, who ratified Kyoto Protocol on 12th Dec 2007, and entered into force in 11 Mar 2008.	OK
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 VVM para 45 & 126	Section A.3 – Malaysia as Non-Annex I party. Malaysia ratified to the Kyoto Protocol on 4 September 2002.	OK
3. The project shall assist non-Annex I Parties in contributing to the ultimate objective of the UNFCCC	Kyoto Protocol Art. 12.2. VVM para 45	Confirmation of non-Annex 1 Party had yet to be obtained.	~~CAR 1~~ OK
4. The project shall have written approval of voluntary participation from the designated national authorities of each party involved	Kyoto Protocol Art. 12.5a, Simplified Modalities and Procedures for Small Scale CDM Project Activities §23a VVM para 53	LoAs for host countries have not obtained for both DNAs: Malaysia (Ministry of Natural Resources and Environment Conservation and Environmental Management Division), Australia (Department of Climate Change and Energy Efficiency).	~~CAR 1~~ OK

REQUIREMENT	REFERENCE	COMMENT	CONCLUSION
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	The monitoring plan provided in the PDD was based on AMS-III.H. (Version 16; EB 58). The monitoring of the methane in the biogas by direct measurement of methane concentration and flow, which is either used for gas engine fuel or flared.	OK
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	The investment analysis was conducted for the project activity, but there was no description on the alternative financially more viable alternative to the project activity that would led to higher emission, and its analysis	~~CL 7~~ OK
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) VVM para 47	No public funding for this project as stated in section A.4.4 and Annex 2 of the PDD. Project proponent to provide supporting document for the claim.	~~CL 1~~ OK
8. Parties participating in the CDM shall designate a national authority for the CDM	Marrakesh Accords (CDM modalities§ 29) VVM para 45	Malaysia's DNA : Ministry of Natural Resources and Environment (MNRE)	OK
9. The host country shall be a Party to the Kyoto Protocol	Marrakesh Accords (CDM modalities§ 30)	Yes, Malaysia ratified the protocol on 4 September 2002.	OK

REQUIREMENT	REFERENCE	COMMENT	CONCLUSION
	VVM para 60		
10. 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	The proposed project activity met the eligibility criteria for small scale CDM project activities set out in § 6 (c) (iii) of the Marrakesh Accords, which is "Other project activities that both reduce anthropogenic emissions by sources and that directly emit less than 60 kilotonnes of carbon dioxide equivalent annually". This project was not a de-bundled component of a larger project activity since: • There is only one of two of the project participants is the same; • No the project activity registered within the previous 2 years; and • No other project boundary is within 1 km of the project boundary of the proposed small-scale activity at the closest point.	OK

REQUIREMENT	REFERENCE	COMMENT	CONCLUSION
11. 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 VVM para 60	The simplified baseline and monitoring methodology for that project used is AMS-III.H (ver 16, EB58) "***Methane recovery in wastewater treatment***" Refer to Table B.1 and B.2, Section B.2.	OK
12. 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 VVM para 40, 41 & 42	PDD was uploaded on 6th of January, 2011. The global stake holder comment process from 07 Jan 12 - 05 Feb 12, and no comments received.	OK

Table 2 Requirements Checklist

CHECKLIST QUESTION	VVM 1.2	MoV*	COMMENTS	Draft Concl.	Final Concl.
A. Project Description					
A.1. Small scale project activity It is assess whether the project qualifies as small scale CDM project activity.					
A.1.1. Does the project qualify as a small scale CDM project activity as defined in paragraph 6 (c) of decision 17/CP.7 on the modalities and procedures for the CDM?	VVM para 136 (a)	DR	Yes. The project qualified as a small scale CDM project activity. The amount CER from methane capture and utilised from the project activity is 40,757 tCO2e annually, which is less than 60 kt CO2 equivalent annually from all Type III components of the project activity as specified in paragraph 14, AMS-III.H. version 16. *To verify the baseline of project activity and progress status of project activity on site visit.*		
		SV/I	Through the site visit, reviewing the mill FFB processing history, Department of Environment approval, Malaysia Palm Oil Board license, technical design drawing of wastewater treatment system and interview with engineering consultant, it was found that the processing rate of FFB estimated and used (Table B.4. of PDD) in ex ante estimation of CER was inconsistent with the historical data, Malaysia Palm Oil Board approval and Department of Environment approval, hence volume of wastewater was not representative in the calculation.	~~CL 2~~	OK
A.1.2. Does proposed project activity conform to one of the project categories defined for small scale CDM project activities?	VVM para 136 (b)	DR	The proposed project activity conforms to one of the project categories defined for small scale CDM project activities, i.e. Type III: Other projects that both reduce anthropogenic emissions by sources and directly emit less than 60kilo tonnes of carbon dioxide equivalent		

CHECKLIST QUESTION	VVM 1.2	MoV*	COMMENTS	Draft Concl.	Final Concl.
			annually. *Required further discussion at site.*		
		SV/I	Yes. The project activity involves the introduction of an anaerobic digester tank system equipped with methane capture and collection system without sludge treatment. The baseline comprises anaerobic open ponds which does not have biogas recovery. The estimated methane capture and utilize is 40,757 CO2e annually. It is confirm that the project activity reduces anthropogenic emissions (methane) by sources and directly emit less than 60 kilo tonnes of carbon dioxide equivalent annually. However, the estimation for the amount of methane capture is not representative because the estimation of annual FFB is not consistence with historical data and approvals. Refer to A.1.1.	~~CL 2~~	OK
A.1.3. The small scale project activity is not a debundled component of a larger project activity?	VVM para 136 (c)	DR	Yes. As stated in Section A.4.5 of PDD, the project activity is claimed not a debundled component of a larger project activity. (Version 03) Based on "Guidelines on Assessment of Debundling for SSC Project Activities" version 3, this project was not a de-bundled component of a larger project activity since: • There is only one of two of the project participants is the same; • No the project activity registered within the previous 2 years; and • No other project boundary is within 1 km of the project boundary of the proposed small-scale activity at the closest point.		

CHECKLIST QUESTION	VVM 1.2	MoV*	COMMENTS	Draft Concl.	Final Concl.
			Required further discussion at site.		

CHECKLIST QUESTION	VVM 1.2	MoV*	COMMENTS	Draft Concl.	Final Concl.
		SV/I	Yes. It was confirmed at the site and verifying the GPS coordinates that although there are project activities: "Methane Capture and Utilization Project at Carotino Palm Oil Mill, Malaysia" and "Methane Capture and Utilization Project at Asia Palm Oil Mill, Malaysia" which is under validation and global stakeholder comment, and under different project proponent or entities (with similar share owners) but the nearest distance between any of mentioned locations is about 26Km (more than 1Km), as the result the project is not a debundle component of a larger project activity.	OK	OK
A.1.4. Is an analysis of the environmental impacts of the project activity required by the host country?	VVM para 136 (d)	DR	There is no requirement to carry out environmental impacts assessment on the project activity under Host Party requirement, Environmental Quality (Prescribed Activities) (Environmental Impact Assessment) Order 1987. Refer to Section D of the PDD and Section E of this checklist.	OK	OK
A.2. Project Design & Project Description					
A.2.1. Is the PDD in accordance with the applicable CDM requirements for completing the PDD?	VVM para 56	DR	Yes, latest format CDM-SSC-PDD, version 3, version 03 was used. And the simplified baseline and monitoring methodology for that project used is AMS-III.H (ver 16, EB58) "***Methane recovery in wastewater treatment***" was applied. Refer to Table B.1 and B.2, Section B.2.	OK	OK

CHECKLIST QUESTION	VVM 1.2	MoV*	COMMENTS	Draft Concl.	Final Concl.
A.2.2. Is the description of the proposed CDM project activity as contained in the PDD sufficiently cover all relevant elements, accurate and provides the reader with a clear understanding of the nature of the proposed CDM project activity.	VVM para 59	DR	Yes. The description of the proposed CDM project activity as contained in Section A.2. of the PDD sufficiently cover all relevant elements, accurate and provides the reader with a clear understanding of the nature of the proposed CDM project activity. The Section A.2 describes existing baseline scenario, POME is treated via a series of open anaerobic ponds, while electricity is generated primarily from biomass based boilers. While the proposed CDM project activity involves the installation of a new covered anaerobic digester tank system equipped with methane capture and collection system to replace existing open anaerobic ponds. Methane captured from the anaerobic digester system will be transferred to a biogas engine system for electricity generation. Excess biogas will be flared or sent to biomass boiler.	OK	OK
A.2.3. The description in the PDD reflects the proposed CDM project activity for the following types of CDM project activities unless other means are specified in the methodology a) Large scale projects; b) Non-bundled small scale projects with emission reductions exceeding 15,000 tonnes per year; c) Bundled small scale projects, each with emission reductions not exceeding 15,000 tonnes per year; in such case the number of physical site visits may however be based on sampling, if the	VVM para 60	DR	The proposed CDM project is a) Not a Large scale project, which is stated in Section A.4.2. of PDD b) Non-bundle small scale project, but with emission reductions more than 15,000 tonnes per year, explained in Section A.4.5. of PDD as non-bundle small scale project (A.1.3. of this checklist too), and the emission is 40,757 TonCO2e per year, explained in Section A.4.3. of PDD). c) Not a bundle small scale project as explained in Section A.4.5. of PDD (refer to A.1.3. of this checklist too).	OK	OK

CHECKLIST QUESTION	VVM 1.2	MoV*	COMMENTS	Draft Concl.	Final Concl.
sampling size is appropriately justified through statistical analysis.					
A.2.4. For other individual proposed small scale CDM project activities with emission reductions not exceeding 15,000 tonnes per year, was a physical site inspection conducted?	VVM para 61	DR SV/I	The emission reductions for this small scale activity is exceeding 15,000 tonnes, but less than 60,000tonnes per year (still can be classified as a small scale project as in EB Decision 1/CMP.2 28 (c)). The validation team has conducted a physical site inspection on 24, February 2012 and confirmed the proposed CDM project activity.	OK	OK
A.2.5. For all other proposed CDM project activities not referred to in paragraphs 59 – 61, was a physical site inspection conducted? And justify if a physical site inspection is not undertaken.	VVM para 62	DR, SV/I	The emission reductions for this small scale activity is exceeding 15,000 tonnes, but less than 60,000tonnes per year (still can be classified as a small scale project as in EB Decision 1/CMP.2 28 (c)). The validation team has conducted a physical site inspection on 24, February 2012 and confirmed the proposed CDM project activity.	OK	OK
A.2.6. Is the proposed CDM project activity involves the alteration of an existing installation or process? If yes, project description clearly states the differences resulting from the project activity compared to the pre-project situation?	VVM para 63	DR	The proposed CDM project activity does not involves alteration of an existing installation or process. The proposed project activity involves the installation of a new covered anaerobic digester tank system equipped with methane capture and collection system to replace existing open anaerobic ponds. Methane captured from the anaerobic digester system will be transferred to a biogas engine system for electricity generation. This has been described in the Section A.2. of PDD. *Required further discussion at site.*		
		SV/I	Actual design engineering for digester tanks system, enclosed flare system and biogas engine system was not prepared during the site visit.	~~CL 4~~	OK

CHECKLIST QUESTION	VVM 1.2	MoV*	COMMENTS	Draft Concl.	Final Concl.
B. Baseline and monitoring methodology					
B.1. Applicability of the selected methodology to the project activity					
Is the methodology correctly quoted and applied, and consistent with the actual text of the applicable version of the methodology available on the UNFCCC CDM website.	VVM para 70	DR	Yes. The methodology was correctly quoted and applied, and consistent with the actual text of the applicable version of the methodology available on the UNFCCC CDM website, AMS-III.H. version 16, provided for the relevant project category, where methane from wastewater treatment is recovered. *Required further discussion at site.*		
		SV/I	Along with site visit, the validation team reviewed engineering design and discussed with technology provider and project proponent, it was confirmed that the baseline is open ponds treatment system, where POME is treated in sequential anaerobic and aerobic open ponds without methane recovery. This is correctly quoted and applied, and consistent with the actual text of the applicable version of the methodology available on the UNFCCC CDM website, AMS III.H. version 16, as paragraph 1 (f), where an introduction of a sequential stage of wastewater treatment with biogas recovery and combustion, with or without sludge treatment, to an anaerobic wastewater treatment system without biogas recovery (e.g. introduction of treatment in an anaerobic reactor with biogas recovery as a sequential treatment step for the wastewater that is presently being treated in an anaerobic lagoon without methane recovery).	OK	OK

<table>
<tr><th>CHECKLIST QUESTION</th><th>VVM 1.2</th><th>MoV*</th><th>COMMENTS</th><th>Draft Concl.</th><th>Final Concl.</th></tr>
<tr><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>B.1.1. Have the project participants shown that the project activity meets each of the applicability conditions of the approved methodology or any tool or other methodology component referred to therein?.</td><td>VVM para 71</td><td>DR</td><td>Yes. The project activity, will replace the sequential anaerobic ponds from wastewater treatment system without biogas recovery system (baseline scenario). The proposed project activity involves the introduction of an anaerobic digester tank system equipped with methane capture and collection system without sludge treatment.

Therefore Type III – Other Project Acitivity AMS-III.H. Methane recovery in wastewater treatment is applicable.

However, Section B.2 Justification of the choice of the project category of the PDD version 1 will be further verified during site visit.

Required further discussion at site.</td><td></td><td></td></tr>
<tr><td></td><td></td><td>SV/I</td><td>Yes. The baseline methodology applicable to the project was considered, where the methane from the anaerobic open ponds is to be captured and utilized. This meet conditions in AMS-III.H. version 16:

Applicability conditions for AMS-III.H.
<table><tr><th></th><th>AMS-III.H.</th><th>Applica-bility</th><th>Justification</th></tr><tr><td>1.</td><td>This methodology comprises measures that recover biogas from biogenic organic matter in wastewater by means of one, or a combination, of the following options:</td><td></td><td></td></tr><tr><td>1 (f)</td><td>Introduction of a sequential stage of wastewater treatment with biogas recovery and combustion, with or without sludge treatment, to an anaerobic wastewater treatment system without</td><td>Yes</td><td>The project activity is to introduce a sequential biogas digester tanks system that will recovery methane</td></tr></table></td><td>~~CL 6~~</td><td>OK</td></tr>
</table>

CHECKLIST QUESTION	VVM 1.2	MoV*	COMMENTS				Draft Concl.	Final Concl.
				biogas recovery (e.g. introduction of treatment in an anaerobic reactor with biogas recovery as a sequential treatment step for the wastewater that is presently being treated in an anaerobic lagoon without methane recovery).		(biogas) and combustion, with aerobic sludge treatment system. The description of acidification process at the acidification pond in Section A.4.2, (2) Technology of the small-scale project activity of PDD version 1.0, was not found in the Figure A.2		
			2	In cases where baseline system is anaerobic lagoon the methodology is applicable if:	Yes	The baseline system is anaerobic lagoon		
			2 (a)	The lagoons are ponds with a depth greater than two meters, without aeration. The value for depth is obtained from engineering design documents, or through direct measurement, or by dividing the surface area by the total volume. If the lagoon filling level varies seasonally, the average of the highest and lowest levels may be taken;	Yes	The anaerobic lagoons are ponds with depth of 4.25m and 4.5m. The value for the depth is obtained from engineering drawing.		
			2 (b)	Ambient temperature above 15ºC, at least during part of the year, on a monthly average basis;	Yes	The average temperature of the year on monthly basis is greater than 15ºC on monthly average. However, the reference for footnote 8 is average temperature for whole Malaysia, not local average temperature at Sabah.		

CHECKLIST QUESTION	VVM 1.2	MoV*	COMMENTS				Draft Concl.	Final Concl.
			2 (c)	The minimum interval between two consecutive sludge removal events shall be 30 days.	Yes	The last desludging done for the wastewater treatment system is in 2008. However part of the description in Table B.2, project scenario item 2(c) was not corresponded to the requirement		
			3	The recovered biogas from the above measures may also be utilised for the following applications instead of combustion/flaring: (a) Thermal or mechanical, electrical energy generation directly;	Yes	The recovered biogas from the project activity will be utilising for electrical energy generation directly.		
			4	If the recovered biogas is used for project activities covered under paragraph 3(a), that component of the proposed project activity can use a corresponding methodology under type I.	No	The project proponent The recovered biogas is used to electricity generated its auxiliary consumption. The project proponent will not claim any emission reductions from generation of renewable energy. Thus methodologies under type I are not applied. However, project proponent will has to demonstrate that no CER will be claimed.		
			13	The location of the wastewater treatment plant shall be uniquely defined as well as the source generating the wastewater and described in the PDD.	Yes	The location of the wastewater treatment plant is uniquely defined by it GPS coordinate (refer to		

CHECKLIST QUESTION	VVM 1.2	MoV*	COMMENTS	Draft Concl.	Final Concl.
			section A.2.1.) and the source of wastewater is only from the Melewar Palm Oil Mill. It is well described in Section A.4.1.4 and B.3.		
B.1.2. Has the choice of methodology justified in the PDD and the each applicability conditions of the methodology or tool being justified? (cross check the PDD against the other sources to confirm that the project activity meets the applicability conditions of the methodology)	VVM para 71	DR	The application of the baseline methodology was discussed in section B.4. of PDD. Since the wastewater treatment plant has been operating for more than three year, and there is no one year history data available the project proponent is using *ex ante* measurement campaign in determining baseline emissions using equation 1 in AMS-III.H (version 16). However, to be in line with AMS-III.H (Version 16; EB58), the project proponent did not show how paragraph 27 (a) and (c) were assessed in the determination. *To be further discussed at site.*		
		SV/I	1. The 10 days measurement campaign result under normal operation from 12th August – 21st August 2011 confirmed and correctly applied. And uncertainty factor 0.89 was multiply to average values from the measurement campaign. However, the project proponent did not show how paragraph 27 (a) and (c) of AMS-III.H were assessed in the determination of the baseline emission. 2. Value used for average processing rate of FFB per year(tonnes/year) was inconsistence with historical data and approvals. Refer to A.1.1.	~~CAR 3~~ ~~CL 2~~	Ok

CHECKLIST QUESTION	VVM 1.2	MoV*	COMMENTS	Draft Concl.	Final Concl.
			3. The “Melewar CER Estimation” spreadsheet, in “FFB” sheet, the “Source” claim on the mill expension FFB source was incorrect.	~~CL 9~~	

CHECKLIST QUESTION	VVM 1.2	MoV*	COMMENTS	Draft Concl.	Final Concl.
B.2. Project boundary					
B.2.1. Has the PDD correctly describe the project boundary, including the physical delineation of the proposed CDM project activity included within the project boundary for the purpose of calculating project and baseline emissions for the proposed CDM project activity?	VVM para 78	DR	The project activity:.The project is located at at 1.6 km off the 45 km Lahad Datu – Sandakan Highway, Lahad Datu, Sabah in East Malaysia. The GPS coordinates of the project activity are: 5° 16' 17" N, 118° 3' 7" E. As describe in Section A.4.1.4 of the PDD. Refer to Section B.3 of the PDD. The PP has defined the project boundary according to AMS.III.H, which clearly defined the project's system components and facilities i.e. the project boundary is the physical, geographical site where the wastewater and sludge treatment takes place, in the baseline and project situations. It covers the existing open pond treatment system and the new anaerobic digester tank system, biogas desulphurisation system, biogas engine and enclosed flare system and sludge treatment plant, and biomass boiler system as in Figure B.2. However the PDD did not explained on the processing, transportation and application or disposal of sludge. *To verify further at site on the information provided in Figure B.3.1, Section B.3 of the PDD.*		

CHECKLIST QUESTION	VVM 1.2	MoV*	COMMENTS	Draft Concl.	Final Concl.
		SV/I	The GPS coordinates in of the project activity is correctly defined as verified in http://mapper.acme.com/. The entire project's system (components and facilities used to mitigate GHG's) were in place as defined in the PDD, Figure B.2: Proposed project activity boundary. The project boundary is the physical, geographical site where the wastewater and sludge treatment takes place, in the baseline and project situations, except: 1. Site where processing, transportation and application or disposal of waste products as takes place was not explained. 2. Project proponent did not give assessment and identification of the systems affected by the project activity to indicate that the treatment systems (lagoons, reactors, digesters, etc.) that will be covered and/or equipped with biogas recovery by the project activity, will continue to operate with the same quality of feed inflow, volume (retention time), and temperature (heating), may be considered as not affected i.e. the methane generation potential remains unaltered.	~~CL 3~~	OK
B.2.2. Are all sources and GHGs required by the methodology have been included within the project boundary?	VVM para 79	DR	All the relevant greenhouse gases and sources have evaluated in Section B.6.1. of PDD. The only greenhouse gas is methane captured from anaerobic digester tank system. *Required further discussion at site.*		
		SV/I	The greenhouse gas is methane captured digester tank system. However, greenhouse gas result from transportation of sludge to composting plant was not evaluated.	~~CL 16~~	OK

CHECKLIST QUESTION	VVM 1.2	MoV*	COMMENTS	Draft Concl.	Final Concl.
B.3. Baseline Identification					
B.3.1. 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?	VVM para 81	DR	As stated in Section B.5 of the PDD, Investment barrier was used to prove the additionality of the project. The investment analysis was carried out for the project activity; however, there was no clearly description on financially more viable alternative to the project activity would have led to higher emission (attachment A to Appendix B version 8, Annex 24, EB63). *To be further discussed at site.*		
		SV/I	1. The investment analysis was conducted for the project activity, but there was no description on the alternative financially more viable alternative to the project activity that would led to higher emission, and its analysis (refer to paragraph 19, Guidelines on The Assessment of Investment Analysis, Annex 5 EB 62).	~~CL 7~~	OK
			2. The investment analysis demonstrated in the "Melewar Financial Module" spreadsheet – cash flow analysis did not add back to net profits for the purpose of calculating the financial indicator (refer to paragraph 5, Guidelines on The Assessment of Investment Analysis, Annex 5 EB 62).	~~CAR 2~~	OK
			3. The cost was unable to justify in in the financial module spreadsheet: a. Capital cost: earth work for biogas site, piling for biogas site do able to provide supporting evidence b. Diesel price was not conservative enough. c. Salaries, Insurance & Medical Costs	~~CL 8~~	OK

CHECKLIST QUESTION	VVM 1.2	MoV*	COMMENTS	Draft Concl.	Final Concl.
B.3.2. Is selected methodology requires use of tools to establish the baseline scenario? If yes, has the application of the tools been followed?	VVM para 82	DR	No. The selected methodology, Other Project Acitivity AMS-III.H. does not require use of tools to establish the baseline scenario.	OK	OK
B.3.3. Are relevant national and/or sectoral policies and circumstances taken into account?		DR	There is no national and / or sectoral policy Refer to A.3.3. and A.3.4. *To be further discussed at site.*		
		SV/I	The project proponent description on sustainable development policies in section A.2 of PDD version 1, was not quite matching the objectives of National Green Technology Policy objectives and host country national CDM criteria.	~~CL 5~~	OK
B.3.4. If the methodology requires several alternative scenarios to be considered in the identification of the most reasonable baseline scenario, has it been determined based on financial expertise and local and sectoral knowledge, determine whether all scenarios that are considered by the project participants and are supplementary to those required by the methodology, are reasonable in the context of the proposed CDM project activity and that no reasonable alternative scenario has been excluded.	VVM para 83	DR	The methodology, Type III – Other Project Activity AMS-III.H. Methane recovery is selected for this proposed CDM project activity. The methodology does require several alternative scenarios to be considered in the identification of the most reasonable baseline scenario.	OK	OK

CHECKLIST QUESTION	VVM 1.2	MoV*	COMMENTS	Draft Concl.	Final Concl.
B.3.5. Are the documents and sources referred to in the PDD are correctly quoted and interpreted?. Has a cross check of the information provided in the PDD with other verifiable and credible sources, such as local expert opinion, if avaialble been carried out?	VVM para 84	DR	The application of the baseline methodology was discussed in section B.4. of PDD. Since the wastewater treatment plant has been operating for more than three year, and there is no one year history data available the project proponent is using *ex ante* measurement campaign in determining baseline emissions using equation 1 in AMS-III.H (version 16). However, to be in line with AMS-III.H (Version 16; EB58), the project proponent did not show how paragraph 27 (a) and (c) were assessed in the determination. *To be further discussed at site.*		
			1. The 10 days measurement campaign result under normal operation from 12th August – 21st August 2011 confirmed and correctly applied. And uncertainty factor 0.89 was multiply to average values from the measurement campaign. However, the project proponent did not show how paragraph 27 (a) and (c) of AMS-III.H were assessed in the determination of the baseline emission. 2. Value used for average processing rate of FFB per year(tonnes/year) was inconsistence with historical data and approvals. Refer to A.1.1. 3. The "Melewar CER Estimation" spreadsheet, in "FFB" sheet, the "Source" claim on the mill expension FFB source was incorrect.	~~CAR 3~~ ~~CL 2~~ ~~CL 9~~	OK

CHECKLIST QUESTION	VVM 1.2	MoV*	COMMENTS	Draft Concl.	Final Concl.
B.3.6. Are relevant national and/or sectoral policies and circumstances taken into account?	VVM para 85	DR	Refer to B.3.3	~~CL 5~~	OK
B.3.7. Has the PDD provides a verifiable description of the identified baseline scenario, including a description of the technology that would be employed and/or the activities that would take place in the absence of the proposed CDM project activity?	VVM para 86	DR	Section B.4 of PDD provides verifiable description of the identified baseline scenario, including a description of the technology that would be employed and/ or the activities that would take place in the absence of the proposed CDM activity. The selected baseline represents the most likely scenario that would have occurred in the absence of the project activity, which is, POME from The Mill would continue to be treated in the existing open pond treatment system. *To be further discussed at site.*		
		SV/I	Yes. The selected baseline represent the most likely scenario describing what would have occurred in absence of the project activity, because open pond treatment system are still in excellent operational condition, the technology is proven, and capable of sustaining treating the POME in meeting the discharge requirement. This is confirmed that the description in Section B.4 of PDD is verifiable.	OK	OK
B.4. Algorithms and/or formulae used to determine emission reductions					
B.4.1. Determine whether the equations and parameters in the PDD have been correctly applied by comparing them to those in the selected approved	VVM para 90	DR	The equations and parameters in the PDD been correctly applied comparing them to selected approved methodology AMS-III.H, Methane Recovery in Wastewater Treatment version 16. The methodology does not provide options for equations or parameters. Equations applied are:		

CHECKLIST QUESTION	VVM 1.2	MoV*	COMMENTS	Draft Concl.	Final Concl.
methodology. If the methodology provides for selection between different options for equations or parameters, the validation team shall confirm that adequate justification has been provided (based on the choice of the baseline scenario, context of the proposed CDM project activity and other evidence provided) and that the correct equations and parameters have been used, in accordance with the methodology selected.			Baseline Emission: $BE_y = \{BE_{power,y} + BE_{ww,treatment,y} + BE_{s,treatment,y} + BE_{ww,discharge,y} + BE_{s,final,y}\}$ Project Emisson: $PE_y = \{PE_{power,y} + PE_{ww,treatment,y} + PE_{s,treatment,y} + PE_{ww,discharge,y} + PE_{s,final,y} + PE_{fugitive,y} + PE_{biomass,y} + PE_{flaring,y}\}$ The emission reduction will be based on following equation: $ER_{y,ex\text{-}post} = min\ ((BE_{y,ex\text{-}post} - PE_{y,ex\text{-}post} - LE_{y,ex\text{-}post}), (MD_y - PE_{power,y} - PE_{biomass,y} - LE_{y,ex\text{-}post}))$ as in AMS-III.H version 16. As per AMS-III.H.(Version 16, EB 58), paragraph 31, there is no leakage expected from proposed project activity as the technology and equipment used is not transferred from another activity. *Required further discussion at site.*		
		SV/	**a)** However, PDD did not provide further explanation on the how the equation (page 29 of PDD) below was derived and to be used: $\mathbf{MD_y = [Q_{biogas,\ combusted} \times fm_{CH4,RG} \times CFE_{ww} \times GWP_{CH4}] + [TM_{RG,h} \times \eta_{flare,h} \times GWP_{CH4}]}$ b) Melewar CER spreadsheet, under "input data sheet", "Inputs for Project Activity Power Generation System" (row 36), does this data use in the project?	~~CL 18~~	OK
B.4.2. Verify the justification given in the PDD for the choice of data and parameters used in the equations.	VVM para 91	DR	The available data and parameters used in baseline emission are: $BE_y = \{BE_{power,y} + BE_{ww,treatment,y} + BE_{s,treatment,y} + BE_{ww,discharge,y} + BE_{s,final,y}\}$ Where: Baseline emission | value | Justification		

CHECKLIST QUESTION	VVM 1.2	MoV*	COMMENTS	Draft Concl.	Final Concl.

$BE_{power,y}$	0	Wastewater treatment system affected by project activity biogas recovery will continue to operate from the Mill biomass boiler. Thus, the baseline electricity consumption.
$BE_{ww,treatment,y}^{*}$		The aerobic ponds operate in aerobic conditions; pond A4, A6 & B4 are less than 2m, while A5 & B5, with 3m depth are well aerated by diffusers. Hence, MCF = 0 for all aerobic ponds.
$BE_{treatment,s,y}$	0	as there is no sludge treatment in the baseline scenario.
$BE_{ww,discharge,y}$	0	as the final treated wastewater is used in plantation irrigation.
$BE_{s,final.y}$	0	as sludge removed from the anaerobic open ponds was sent to the plantation for soil application.

*While for the anaerobic ponds the baseline formula used is:

$$BE_{ww,treatment,y} = \sum_{i} (Q_{ww,i,y} * COD_{inflow,i,y} * \eta_{COD,BL,i} * MCF_{ww,treatment,BL,i}) * B_{o,ww} * UF_{BL} * GWP_{CH4} Q_{ww,y}$$

$BE_{ww,treatment,y}$	Value & Justification
$Q_{ww,y}$	derived from FFB processing rate multiply by POME generation rate obtained from external reference (Frank Schudardt, et. al., 'Effect of New Palm Oil Mill Processes on the EFB and POME Utilization', Journal of Palm Oil Research, (Special Issue – October 2008), Page 118).
$COD_{inflow,j,y}$	Obtained from 10 days measurement campaign with adjusted to uncertainty factor 0.89 stated in the paragraph 27 (b), AMS-III.H.

CHECKLIST QUESTION	VVM 1.2	MoV*	COMMENTS	Draft Concl.	Final Concl.

$\eta_{COD,BL,i}$	is calculated from the 10 days measurement campaign, where $\eta_{COD,BL,i} = (COD_{inflow,y} - COD_{outflow,y})/COD_{inflow,y}$.
$MCF_{ww,treatment,BL,i}$	is correctly applied from the AMS-III.H Table III.H.1.
$B_{o,ww}$	0.25 $kgCH_4/kgCOD$ as in AMS-III.H paragraph 20
UF_{BL}	0.89 as in AMS-III.H paragraph 20
GWP_{CH4}	21 as in AMS-III.H paragraph 20

Above information is explained in Section B.6. of PDD

The direct and indirect project emissions been analysed based on:

$$PE_y = \{PE_{power,y} + PE_{ww,treatment,y} + PE_{s,treatment,y} + PE_{ww,discharge,y} + PE_{s,final,y} + PE_{fugitive,y} + PE_{biomass,y} + PE_{flaring,y}\}$$

And the only project emission that will occurred is from $PE_{fugitive,y} = PE_{fugitive,ww,y,}$ which is the fugitive emissions through capture inefficiencies in the anaerobic digester tank system.

Project emission	value	Justification
$PE_{power,y}$	0	The auxiliary power consumption for project activity is sourced from electricity generated from biogas engine, in the event the biogas engine generated electricity is lesser than auxiliary power consumption, the remaining electricity will be supplied by the biomass boilers from Mill.
$PE_{ww,treatment,y}$	0	Methane emissions from wastewater treatment systems affected by the proposed project activity, and not equipped with biogas recovery in the project situation, because Wastewater treatment systems (aerobic ponds) affected by the project activity that are not equipped with biogas

CHECKLIST QUESTION	VVM 1.2	MoV*	COMMENTS	Draft Concl.	Final Concl.

		recovery, will continue be operate the same way as in the baseline scenario and the MCF = 0, for aerobic treatment well managed ponds (Table III.H.1). The implementation of the project activity does not change the operational characteristics of the aerobic ponds
$PE_{s,treatment,y}$	0	Sludge from the wastewater ponds will be used in aerobic land application.
$PE_{ww,discharge,y}$	0	The final treated effluent is channel for land irrigation
$PE_{s,final,y}$	0	Sludge removed from the anaerobic digester and used for land application. Land application of fertilizer qualifies as aerobic conditions.
$PE_{fugitive,y}$		$PE_{fugitive,y} = PE_{fugitive,ww,y} + PE_{fugitive,s,y}$; where $PE_{fugitive,s,y} = 0$ since sludge will be used for land aerobic application. $PE_{fugitive,ww,y} = (1\text{-}CFE_{ww}) * MEP_{ww,treatment,y} * GWP_{CH4}$
$PE_{biomass,y}$	0	No storage of biomass involved in the project activity
$PE_{flare,y}$		Methane emissions due to incomplete flaring, by using equation from the "Tool to determine project emissions from flaring gases containing methane" (Version 1, EB28) for an enclosed flaring system: $PE_{flare} = \sum_{h=1}^{8760} TM_{RG,h} \times (1 - \eta_{flare,h}) \times \left(\frac{GWP_{CH4}}{1000}\right)$ However, in normal operation, biogas will be fuelled in the gas engines. Only, in emergency situations biogas will be flared. While in gas engine, the biogas considered 100% combusted.

$PE_y = PE_{fugitive,ww,y} = (1\text{-}CFE_{ww}) * MEP_{ww,treatment,y} * GWP_{CH4}$

CHECKLIST QUESTION	VVM 1.2	MoV*	COMMENTS	Draft Concl.	Final Concl.
			$PE_{fugitive,ww,y}$ — Value & Justification CFE_{ww} — Capture efficiency of the biogas recovery equipment in the wastewater treatment systems (a default value of 0.9 shall be used), as in AMS-IIIH ver. 16 paragraph 30 (a). $MEP_{ww,treatment,y}$ — $=Q_{ww,y} * B_{o,ww} * * \sum_k COD_{removed,PJ} * MCF_{ww,treatment,PJ,k}$ Where, $Q_{ww,y}$= Volume of wastewater treated in project wastewater treatment system (System-Aerobic) in year,y. $B_{o,ww}$= 0.25 $kgCH_4/kgCOD$ as in AMS-III.H paragraph 20. UF_{PJ} = Model correction factor to account for model uncertainties =1.12 as in AMS-III.H paragraph 30 (a). $MCF_{ww,treatment,PJ,k}$ = Methane correction factor for project wastewater treatment system (System-biogas) which is equipped with biogas recovery digester. (not equipped with biogas recovery) (MCF values as per Table III.H.1) = 0.8 GWP_{CH4} — 21 as in AMS-III.H paragraph 20 *The accuracy credibility of the information and data to be verified at site.*		
			1. The value for average FFB processing rate was inconsistence with historical data and approval. Refer to A.1.1.	~~CL 2~~	OK
			2. The factor (0.65m3/tonne FFB) used to determine POME generation rate, $Q_{ww,y}$ was refer to value from other country.	~~CL 10~~	OK
			3. There was no document to support claimed (page 17, PDD	~~CL 11~~	OK

CHECKLIST QUESTION	VVM 1.2	MoV*	COMMENTS	Draft Concl.	Final Concl.
			version 1) the baseline power was generated by three biomass boilers and three units of backup diesel generator set.		
			4. The baseline indicators were verified, however all the measurement/ sampling points for $Q_{ww,i,y}$, $COD_{inflow,I,y}$ were not indicated in the Figure B.2 & B.3 of PDD.	~~CL 15~~	OK
			5. Following values were correctly used and applied: a. $\square_{COD,BL}$ is determined from 10 days measurement campaign, which factored in 0.89 uncertainty. b. $\mathbf{MCF}_{ww,treatment,BL}$ is 0.8 for anaerobic ponds more than 3m depth (from Table III.H.1. IPCC default values of AMS-III.H) c. $\mathbf{B}_{o,ww}$ = 0.25 kg CH4/kg COD from IPCC, $\mathbf{UF}_{BL}$ = 0.89 from AMS-III.H, $\mathbf{GWP}_{CH4}$=21		
			6. Most aspects related to direct and indirect project emissions was captured in the project design, except following: a. The project proponent has not furbished the document to claim 100% combustion efficiency of biogas in the gas engine b. Description for $\mathbf{PE}_{s,final,y}$ in Section B.6.1. page 27 and Section B.7.1. page 42 is slight different. c. The project emission due to transportation of sludge to composting plant was not explained in PDD	~~CL 16~~	OK

<table>
<tr><th>CHECKLIST QUESTION</th><th>VVM 1.2</th><th>MoV*</th><th>COMMENTS</th><th>Draft Concl.</th><th>Final Concl.</th></tr>
<tr><td>B.4.3. If data and parameters will not be monitored throughout the crediting period of the proposed CDM project activity but have already been determined and will remian fixed throughout the crediting period, validation team shall assess all data sources and assumptions are apporiate and calculations are correct, applicable to the proposed project activity and will result in a conservative estimate of emission reductions.</td><td>VVM para 91</td><td>DR</td><td>The data and parameters that will not be monitored throughout the crediting period of the proposed CDM project activity but have already been determined and will remain fixed are:

<table>
<tr><td>Baseline emission:</td><td>Value & Justification</td></tr>
<tr><td>$MCF_{ww,treatment,BL,i}$</td><td>is correctly applied from the AMS-III.H Table III.H.1.</td></tr>
<tr><td>$B_{o,ww}$</td><td>0.25 $kgCH_4$/kgCOD as in AMS-III.H paragraph 20</td></tr>
<tr><td>UF_{BL}</td><td>0.89 as in AMS-III.H paragraph 20</td></tr>
<tr><td>GWP_{CH4}</td><td>21 as in AMS-III.H paragraph 20</td></tr>
</table>

<table>
<tr><td>Project emission
$PE_{fugitive,ww,y}$</td><td>Value & Justification</td></tr>
<tr><td>CFE_{ww}</td><td>Capture efficiency of the biogas recovery equipment in the wastewater treatment systems (a default value of 0.9 shall be used), as in AMS-IIIH ver. 16 paragraph 30 (a).</td></tr>
<tr><td>$MEP_{ww,treatment,y}$</td><td>$=Q_{ww,y} * B_{o,ww} * * \sum_k COD_{removed,PJ} * MCF_{ww,treatment,PJ,k}$
Where,
$Q_{ww,y}$= Volume of wastewater treated in project wastewater treatment system (System-Aerobic) in year,y.
$B_{o,ww}$= 0.25 $kgCH_4$/kgCOD as in AMS-III.H paragraph 20.
UF_{PJ} = Model correction factor to account for model uncertainties =1.12 as in AMS-III.H paragraph 30 (a).</td></tr>
</table>
</td><td></td><td></td></tr>
</table>

<table>
<tr><th>CHECKLIST QUESTION</th><th>VVM 1.2</th><th>MoV*</th><th>COMMENTS</th><th>Draft Concl.</th><th>Final Concl.</th></tr>
<tr><td></td><td></td><td></td><td>
<table>
<tr><td></td><td>$MCF_{ww,treatment,PJ,k}$ = Methane correction factor for project wastewater treatment system (System-biogas) which is equipped with biogas recovery digester. (not equipped with biogas recovery) (MCF values as per Table III.H.1) = 0.8</td></tr>
<tr><td>GWP_{CH4}</td><td>21 as in AMS-III.H paragraph 20</td></tr>
</table>

The conservative assumptions have been used, since value in calculation of the project emission was obtained from public published figures, IPCC value and manufacturer specification.

Required further discussion at site.</td><td></td><td></td></tr>
<tr><td></td><td></td><td>SV/I</td><td>Project proponent was unable to substantiate document or evidence to support the claim in PDD page 25:
1. Emission Factor (EF) of electricity from Diesel engines
2. Auxiliary power consumption for project</td><td>~~CL 17~~</td><td>OK</td></tr>
<tr><td>B.4.4. If data and parameters will be monitored on implementation and hence become available only after validation of the project activity, the validation team shall confirm that the estimates provided in the PDD for these data and parameters are reasonable.</td><td>VVM para 91</td><td>DR</td><td>The data and parameters that will be monitored on the implementation and hence become available only after validation of the project activity and that been estimated in the PDD are given in Table B.4. of PDD:

<table>
<tr><td>Data and parameters that will be monitored on the implementation and hence become available only after validation of the project activity</td><td>Estimation</td></tr>
<tr><td>1. $\mathbf{Q}_{ww,y}$, The flow of wastewater</td><td>FFB Production x POME generation rate</td></tr>
</table>
</td><td></td><td></td></tr>
</table>

CHECKLIST QUESTION	VVM 1.2	MoV*	COMMENTS	Draft Concl.	Final Concl.
			FFB production = Melewar Palm Oil Mill Processing Capacity License by Malaysian Palm Oil Board (MPOB) POME generation = Frank Schudardt, et. al., 'Effect of New Palm Oil Mill Processes on the EFB and POME Utilization', Journal of Palm Oil Research, (Special Issue – October 2008), Page 118.		
			2. $COD_{ww,untreated,y}$, $COD_{ww,treated,y}$, $COD_{ww,discharge,PJ,y}$ The chemical oxygen demand of the wastewater before and after the treatment system affected by the project activity.	Measurement campaign was undertaken for 10 normal operation days from 12th August - 21st August 2011.		
			Required further discussion at site.		
		SV/I	1. The processing rate of FFB estimated and used (Table B.4. of PDD) in ex ante estimation of CER was inconsistent with the historical data, Malaysia Palm Oil Board approval and Department of Environment approval, hence volume of wastewater was not representative in the calculation.	~~CL 2~~	OK
B.5. Additionality of a project activity					
B.5.1. Has the PDD describe how the proposed CDM project activity is additional?	VVM Para 94	DR	The Section B.5. of PDD describes the additionality of the proposed CDM activity: Annex 24, EB63 Attachment A to Appendix B (version 08) of The Simplified modalities and procedures for small-scale CDM project activities was used to analysis the additionality. According to the Attachment A to Appendix B, project participants shall provide an explanation to show that the project activity would not have occurred		

CHECKLIST QUESTION	VVM 1.2	MoV*	COMMENTS	Draft Concl.	Final Concl.
			anyway due to at least one of the barriers stated. The project participant decided to use investment barrier in the demonstration of additionality. *Required further discussion at site.*		
		SV/I	The investment analysis was conducted for the project activity, but there was no description on the alternative financially more viable alternative to the project activity that would led to higher emission, and its analysis (refer to paragraph 19, Guidelines on The Assessment of Investment Analysis, Annex 5 EB 62).	~~CL 7~~	OK
B.5.2. Has the PP provide reliable, credible data, rationales, assumptions, justifications and documentation in the PDD to support the demonstration of additionality?	VVM Para 95	DR	PP has not provided reliable, credible data, rationales, assumptions, justifications and documentation in the PDD to support the demonstration of additionality. *Refer to B.3.1.*	~~CAR 2~~ ~~CL 7~~ ~~CL 8~~	OK
B.5.3. The validation team shall consider tools and documents provided by the CDM Executive Board to demonstrate the additionality of proposed CDM project activities, as well as specific complementary or alternative requirements included in approved CDM methodology.	VVM para 96	DR	The additionality has been established based on Attachment A to Appendix B of 4/CMP.1 Annex II, a simplified baseline and monitoring methodology listed in Appendix B used for a small-scale CDM project activity. The project participant decided to use investment barrier in the demonstration of additionality.	OK	OK
B.5.4. Prior consideration of the clean development mechanism					
B.5.4.1. Is the start date of the project activity reported in the PDD in accordance with the Glossary	VVM Para	DR	The starting date of the project is 4th of August, 2011 (acceptance of "Letter of Offer" from technology provider by project proponent) as stated in Section C.1.1 of the PDD		

CHECKLIST QUESTION	VVM 1.2	MoV*	COMMENTS	Draft Concl.	Final Concl.
of CDM terms?	99		The operational lifetime is 15 years as stated in Section C.1.2 of the PDD. *Required further discussion at site:* 1) *the evident to support the use of the project starting date and operational lifetime* 2) *the evident of CDM consideration.*		
			1) The project proponent has not provide MoC for validation 2) The Letter of offer by technology provider is 4th of August, 2011 however the project proponent accepted it on 5th of August. 3) The authenticity of signature by project proponent was unable to verify in the letter of offer by technology provider during site visit	~~CAR 4~~ ~~CAR 5~~ ~~CL 12~~	OK
B.5.4.2. Determine whether it is a new project activity (a project activity with a start date on or after 02 August 2008) or an existing project activity (a project activity with a start date before 02 August 2008).	VVM para 100	DR	The proposed CDM project activity is a new project activity, where the start date of the project is 04 August 2011, in Section C.1.1. of PDD. (after 02 August 2008), *Required further discussion at site.*		
		SV/I	The starting date of the project is 4th of August, 2011 (acceptance of "Letter of Offer" from technology provider by project proponent) as stated in Section C.1.1 of the PDD. The Letter of offer by technology provider is 4th of August, 2011 however the project proponent accepted it on 5th of August.	~~CAR 5~~	OK
B.5.4.3. In case of new project activity has the PP provided the following:	VVM para 101		OK. The proposed CDM project actity The starting date of the project activity is 4-August, 2011 after 2 August, 2008 and before the global stakeholder consultation 6 January 2012). PP has informed the host Party Malaysia DNA on 21-October, 2011 and UNFCCC on 21-	OK	OK

CHECKLIST QUESTION	VVM 1.2	MoV*	COMMENTS	Draft Concl.	Final Concl.
• informed the host Party DNA and the UNFCCC secretariat in writing of the commencement of the project activity and of their intention to seek CDM status? • has such a notification been provided by the project participants within six months of the project activity start date?			October, 2011 (form F-CDM Prior Consideration) have been informed in writing of the project's intention to seek CDM status. Such a notification has been provided by PP well within six month of the project activity start date.		
B.5.4.4. For an existing project activity, for which the start date is prior to the date of publication of the PDD for GSCP, the validation team shall assess the PP's prior consideration of the CDM through document reviews and shall satisfy following requirements: a) Evidence that must indicate that awareness of the CDM prior to the project activity start date, and that the benefits of the CDM were a decisive factor in the decision to proceed with the project. Evidence to support this would include, inter alia, minutes and/or notes	VVM para 102	DR	Not applicable. The proposed CDM project activity is not an existing project activity because the start date is after 2 August, 2008.	OK	

CHECKLIST QUESTION	VVM 1.2	MoV*	COMMENTS	Draft Concl.	Final Concl.
related to the consideration of the decision by the Board of Directors, or equivalent of the PP, to undertake the project as a proposed CDM project activity..					
b) reliable evidence (Evidence to support this should include, inter alia, contracts with consultants for CDM/PDD/methodology services, Emission Reduction Purchase Agreements or other documentation related to the sale of the potential CERs (including correspondence with multilateral financial institutions or carbon funds), evidence of agreements or negotiations with a DOE for validation services, submission of a new methodology to the CDM Executive Board, publication in newspaper, interviews with DNA, earlier correspondence on the project with the DNA					

CHECKLIST QUESTION	VVM 1.2	MoV*	COMMENTS	Draft Concl.	Final Concl.
or the UNFCCC secretariat.					
B.5.5. Identification of alternatives					
B.5.5.1. Has the PDD included list of alternatives and ensure that the following are addressed: • The list of alternatives includes as one of the options that the project activity is undertaken without being registered as a proposed CDM project activity;	VVM para 106		PP demonstrated that the proposed project activity is not financially attractive by benchmark analysis has been conducted, claimed to be according to the requirements of the "Guidelines on the Assessment of Investment Analysis" (Version 05; EB 62), however there was no clear description on the list of alternatives. *Refer to B.3.1.*	~~CL 7~~	OK
• The list contains all plausible alternatives that the DOE, on the basis of its local and sectoral knowledge, considers to be viable means of supplying the outputs or services that are to be supplied by the proposed CDM project activity; • The alternatives comply with all applicable and enforced legislation.			*Refer to above*		
B.5.6. Investment Analysis					

CHECKLIST QUESTION		VVM 1.2	MoV*	COMMENTS	Draft Concl.	Final Concl.
B.5.6.1.	If investment analysis has been used to demonstrate the additionality of the proposed CDM project activity, the PDD shall provide evidence that the project proposed CDM project activity would not be: • The most economically or financially attractive alternative; or • Economically or financially feasible	VVM para 108	DR/ SV/ I	PP has used investment analysis to demonstrate the additionality of the proposed CDM project activity as in established based on Annex 24 Attachment A of Appendix B (Version 08) EB65. The financial indicator is equity IRR benchmarking against equity IRR from 'Waste Handling and Disposal' (Group 1, Sectoral Scope 13) in the Host Country, Malaysia as defined in the Annex 5 GUIDELINES ON THE ASSESSMENT OF INVESTMENT ANALYSIS (Version 05) EB 62, Paragraph 8. However, the result of the financial analysis would not able to show that the project proposed CDM project activity not : • The most economically or financially attractive alternative; or • Economically or financially feasible Since no discussion on the other alternative in the analysis.	~~CL 7~~	OK
B.5.6.2.	Has the PP demonstrate the investment analysis using the following approaches: a) The proposed CDM project activity would produce no financial or economic benefits other than CDM-related income and document the costs associated with the proposed CDM project activity and the alternatives identified and demonstrate that there is at least one alternative which is less costly than the proposed CDM project activity;	VVM para 109	DR	The PP demonstrated the investment analysis using the following approaches: c) The proposed CDM project activity is less economically or financially attractive than at least one other credible and realistic alternative; However other credible and realistic alternative was not described in the PDD.	~~CL 7~~	OK

CHECKLIST QUESTION	VVM 1.2	MoV*	COMMENTS	Draft Concl.	Final Concl.
d) The proposed CDM project activity is less economically or financially attractive than at least one other credible and realistic alternative; e) The financial returns of the proposed CDM project activity would be insufficient to justify the required investment					
B.5.6.3. Has the PP's apply the latest version of the Guidance on the Assessment of Investment Analysis as provided by the CDM Executive Board and with other relevant guidance including the latest guidelines on plant load factors guidelines for the reporting and validation of plant load factors in the PDD?	VVM Para 110	DR	OK. PP has applied the latest version of the Guidance on the Assessment of Investment Analysis as provided by the CDM Executive Board (EB 62, Annex 5), and other relevant guidance including the latest guidelines Annex 24 Attachment A of Appendix B (Version 08) EB65. Plant load factors guidelines for the reporting and validation of plant load factors is not applicable for this project.	OK	OK
B.5.6.4. Has PP provided authentic, accurate and suitable sources for all parameters and assumptions used in calculating the relevant financial indicator?	VVM Para 111 (a)	DR	The following parameters and assumptions used in calculating the relevant financial indicators was not able to justify: a. Capital cost: earth work for biogas site, piling for biogas site do able to provide supporting evidence b. Diesel price was not conservative enough. c. Salaries, Insurance & Medical Costs	~~CL 8~~	OK
B.5.6.5. The validation team shall cross-check the parameters	VVM	DR	The relevant evidences for cross check have not been provided. Refer CL 8	~~CL 8~~	OK

CHECKLIST QUESTION		VVM 1.2	MoV*	COMMENTS	Draft Concl.	Final Concl.
	against third-party or publicly available sources, such as invoices or price indices.	Para 119 (b)				
B.5.6.6.	The validation team shall review feasibility reports, public announcement and annual financial reports related to the proposed CDM project activity and the project participants.	VVM Para 111 (c)	DR	Not applicable. PP has not referred to feasibility reports, public announcement and annual financial reports for the proposed CDM project activity		
B.5.6.7.	Assess the correctness of computations carried out and documented by the PP.	VVM para 111 (d)	DR	PP has provided the calculation of investment analysis in spreadsheet "Melewar Financial Module". The validation team confirmed that the computations carried out in the spreadsheet were correct except the cash flow analysis, which is highlighted in Section B.3.1. of this checklist.	~~CAR 2~~	OK
B.5.6.8.	Has PP carried out the sensitivity analysis to determine what conditions variations in the result would occur, and the likelihood of these conditions?	VVM para 111 (e)	DR	OK. PP has carried out the sensitivity analysis to determine conditions variations in the result would occur and the likelihood of these conditions.	OK	OK
B.5.6.9.	Is the type of benchmark applied suitable for the type of financial indicator presented?	VVM para 112 (a)	DR	OK. The benchmark is against equity IRR from 'Waste Handling and Disposal' (Group 1, Sectoral Scope 13) in the Host Country, Malaysia as defined in the Annex 5 GUIDELINES ON THE ASSESSMENT OF INVESTMENT ANALYSIS (Version 05) EB 62, Paragraph 8. The type of benchmark applied is suitable for the type of financial indicator presented, i.e. equity IRR as financial indicator,	OK	OK
B.5.6.10.	Is the risk premiums applied in	VVM	DR	OK. The benchmark, i.e. equity IRR applied reflect the risks associated	OK	OK

CHECKLIST QUESTION		VVM 1.2	MoV*	COMMENTS	Draft Concl.	Final Concl.
	determining the benchmark reflect the risks associated with the project type or activity?	para 112 (b)		with the project type because it was obtained from Annex 5 GUIDELINES ON THE ASSESSMENT OF INVESTMENT ANALYSIS (Version 05) EB 62, Paragraph 8, where the risk premium for the host country is estimated using Moody's rating for the host country as a proxy for this risk.		
B.5.6.11.	Determine whether it is reasonable to assume that no investment would be made at a rate of return lower than the benchmark by, for example, assessing previous investment decisions by the project participants involved and determining whether the same benchmark has been applied or if there are verifiable circumstances that have led to a change in the benchmark.	VVM para 112 (c)	DR	As this is the first project activity by the PP, this is not relevant / applicable.	OK	OK
B.5.6.12.	In cases where the PP rely on values from Feasibility Study Reports (FSR) that are approved by national authorities for proposed CDM project activity, please ensure that : a) The FSR has been the basis of the decision to proceed with the investment in the project, i.e. that the period of time between the finalization of the FSR and the	VVM para 113	DR	Not applicable. The proposed CDM project activity did not have Feasibility Study Reports (FSR). This section is not applicable.		

CHECKLIST QUESTION	VVM 1.2	MoV*	COMMENTS	Draft Concl.	Final Concl.
investment decision is sufficiently short for the DOE to confirm that it is unlikely in the context of the underlying project activity that the input values would have materially changed;					
b) The values used in the PDD and associated annexes are fully consistent with the FSR, and where inconsistencies occur the DOE should validate the appropriateness of the values;			Not applicable		
c) On the basis of its specific local and sectoral expertise, confirmation is provided, by cross-checking or other appropriate manner, that the input values from the FSR are valid and applicable at the time of the investment decision.			Not applicable		
B.5.7. Barrier analysis					
B.5.7.1. Does the proposed CDM project activity faces barriers	VVM para	DR	Not applicable. PP did not apply barrier analysis on the proposed CDM project activity because it is an option for small scale CDM project		

CHECKLIST QUESTION		VVM 1.2	MoV*	COMMENTS	Draft Concl.	Final Concl.
	that a) Prevent the implementation of this type of proposed CDM project activity; b) Do not prevent the implementation of at least one of the alternatives.	115		activity, project participants shall provide an explanation to show that the project activity would not have occurred anyway due to at least one of the following barriers: (under Attachment A of Appendix B (Version 08), Annex 24, EB 63, paragraph 1.)		
B.5.7.2.	Issues that have a clear direct impact on the financial returns of the project activity cannot be considered barriers and shall be assessed by investment analysis. This does not refer to either: a) Risk related barriers, for example risk of technical failure, that could have negative effects on financial performance; or b) Barriers related to the unavailability of sources of finance for the project activity	VVM para 116		Not applicable		
B.5.7.3.	Has the PDD provide the evidence to determine whether the barriers listed in the PDD are real and	VVM para 117		Not applicable		

CHECKLIST QUESTION		VVM 1.2	MoV*	COMMENTS	Draft Concl.	Final Concl.
	whether it is assessed by means of available evidence and/or interviews with relevant individuals (including members of industry associations, government officials or local experts if necessary) that the barriers listed in the PDD exist?	(a)				
B.5.7.4.	Are the existence of barriers substantiated by independent sources of data such as relevant national legislation, surveys of local conditions and national or international statistics?	VVM Para 117 (a)		Not applicable		
B.5.7.5.	Determine whether the barriers prevent the implementation of the project activity but not the implementation of at least one of the possible alternatives	VVM para 117 (b)		Not applicable		
B.5.8.	Common practice analysis					
B.5.8.1.	Assess whether the geographical scope (e.g. the defined region) of the common practice analysis is appropriate for the assessment of common practice related to the project	VVM para 120 (a)	DR	Not applicable. PP did not apply common practice analysis on the proposed CDM project activity because it is an option for small scale CDM project activity, project participants shall provide an explanation to show that the project activity would not have occurred anyway due to at least one of the following barriers: (under Attachment A of Appendix B (Version 08), Annex 24, EB 63, paragraph 1.)		

CHECKLIST QUESTION		VVM 1.2	MoV*	COMMENTS	Draft Concl.	Final Concl.
	activity's technology or industry type. For certain technologies the relevant region for assessment will be local and for others it may be transnational/global. If a region other than the entire host country is chosen. Please explain why this region is ore appropriate.					
B.5.8.2.	Using official sources and local and industry expertise, determine to what extent similar and operational projects (e.g. using similar technology or practice), other than CDM project activities, have been undertaken in the defined region;	VVM Para 120 (b)		Not applicable		
B.5.8.3.	If similar and operational projects, other than CDM project activities, are already widely observed and commonly carried out in the defined region, assessed whether there are essential distinctions between the proposed CDM project activity and the other similar activities.	VVM Para 120 (c)		Not applicable		

<table>
<tr><th>CHECKLIST QUESTION</th><th>VVM 1.2</th><th>MoV*</th><th>COMMENTS</th><th>Draft Concl.</th><th>Final Concl.</th></tr>
<tr><td>C. Monitoring Plan</td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>C.1.1. Has the PDD include a monitoring plan that is in accordance with the approved monitoring methodology applied to the proposed CDM project activity?</td><td>VVM para 122</td><td>DR</td><td>Yes. The PDD section B.7. and Table B.7.1. included a monitoring plan that is in accordance with the approved monitoring methodology, AMS-III.H version 16 which is applied to the proposed CDM project activity.</td><td>OK</td><td>OK</td></tr>
<tr><td>C.1.2. Has the monitoring plan includes all relevant parameters required by the selected methodology?</td><td>VVM para 122 (a)</td><td>DR</td><td>The monitoring plan was inline with selected baseline monitoring methodology, AMS-III.H ver. 16, paragraph 37, Table III.H.2: The PDD section B.7. and Table B.7.1. “Parameters for monitoring during the crediting period” where:
<table>
<tr><th>AMS-III.H</th><th>PDD monitoring methodology</th></tr>
<tr><td>1. $\mathbf{Q}_{ww,y}$, The flow of wastewater
Monitored continuously (at least hourly measurements are undertaken, if less,
confidence/precision
level of 90/10 shall be attained)
Measurements are undertaken using flow meters</td><td>Flow of wastewater will be measured continuously using calibrated cumulative flow meters; data will be recorded monthly. Data will be kept electronically in a systematic and transparent manner during crediting period and two years after crediting period.</td></tr>
<tr><td>2. $COD_{ww,untreated,y}$, $COD_{ww,treated,y}$, $COD_{ww,discharge,PJ,y}$
The chemical oxygen</td><td>$\mathbf{COD}_{inflow,y}$, $\mathbf{COD}_{ww,treated,PJ,y}$, $\mathbf{COD}_{ww,discharge,PJ,y}$
5 COD samples will be tested every quarter according to national or</td></tr>
</table></td><td></td><td></td></tr>
</table>

CHECKLIST QUESTION	VVM 1.2	MoV*	COMMENTS		Draft Concl.	Final Concl.
			demand of the wastewater before and after the treatment system affected by the project activity. Samples and measurements shall ensure a 90/10 confidence/precision level	international standards. The average of the COD measurement readings will be used.		
			$S_{l,pj,y}$, $S_{final,pj,y}$ Amount of dry matter in the sludge. If the methane emissions from anaerobic decay of the final sludge are to be neglected because the sludge is controlled combusted, disposed of in a landfill with methane recovery, or used for soil application, then the end-use of the final sludge will be monitored during the crediting period.	$\mathbf{S}_{l.,disposal,y}$ End use of final sludge from the digester system. The sludge removed periodically from the digester will be sent to composting plant and eventually to the palm plantation as soil application and applied in a thin layer under aerobic conditions. Records of when sludge is removed, and where the sludge is applied to will be kept.		
				$\mathbf{BG}_{burnt,y}$ Calculated as the sum of $\mathbf{BG}_{fuelled,y}$ and $\mathbf{BG}_{flared,y}$ $\mathbf{BG}_{fuelled,y}$ is amount of biogas fuelled in the gas engine in year,y; while $\mathbf{BG}_{flared,y}$ is amount of biogas flared in year,y Both biogas flow, temperature and pressure will be measured		

CHECKLIST QUESTION	VVM 1.2	MoV*	COMMENTS		Draft Concl.	Final Concl.
			the separation.	continuously using calibrated volumetric flow meters, and a cumulative normalised flow (Nm3) of the biogas will be calculated continuously by a flow meter or flow calculator. The normalised flow will be recorded at least monthly		
			5. $w_{CH4,y}$ Methane content in biogas in the year y Measured with a continuous analyser or, alternatively, with periodical measurements at a 90/10 confidence/precision level. The methane content measurement will be carried out close to a location in the system where a biogas flow measurement takes place	$w_{CH4,y}$ Measured with a continuous analyser or, alternatively, with periodical measurements at a 90/10 confidence/precision level. The methane content measurement will be carried out close to a location in the system where a biogas flow measurement takes place		
			6. T, Temperature of the biogas 7. P, Pressure of the biogas If the biogas flow meter employed measures flow, pressure and temperature and displays or outputs the normalised flow of biogas, then there is no need for separate monitoring of pressure and temperature of the biogas	Refer to no. 4 above.		

CHECKLIST QUESTION	VVM 1.2	MoV*	COMMENTS		Draft Concl.	Final Concl.
			8. The flare efficiency As per the "***Tool to determine project emissions from flaring gases containing Methane***". Regular maintenance shall be carried out to ensure optimal operation of flares: In case of enclosed flares and use of the default value for the flare efficiency, the flare efficiency in the hour *h* ($\eta_{flare,h}$) is: • 0% if the temperature in the exhaust gas of the flare (T_{flare}) is below 500 °C for more than 20 minutes during the hour *h*. • 50%, if the temperature in the exhaust gas of the flare (T_{flare}) is above 500 °C for more than 40 minutes during the hour *h*, but the manufacturer specifications on proper operation of the flare are not met at any point in time during the hour h. • 90%, if the temperature in the exhaust gas of the flare (T_{flare}) is above 500	$\eta_{flare,h}$ The flare efficiency is correctly defined as in "Tool to determine project emission from flaring gases containing Methane" Annex 13 EB 28		

CHECKLIST QUESTION	VVM 1.2	MoV*	COMMENTS	Draft Concl.	Final Concl.
			°C for more than 40 minutes during the hour h and the manufacturer specifications on proper operation of the flare are met continuously during the hour *h*.		
			9. T_{flare} Temperature in the exhaust gas of the flare. Measure the temperature of the exhaust gas stream in the flare by a Type N thermocouple. A temperature above 500"C indicates that a significant amount of gases are still being burnt and that the flare is operating.	**T_{flare}** This parameter will be measured continuously, whenever the flare is in operation. Temperature of exhaust gas stream in the flare will be measured by a thermocouple.	
			To further discuss at the site for detail of each parameters monitored.		
		SV/I	1. For T_{flare} , the "Description of measurement methods and procedures to be applied", and "QA/QC procedures to be applied" defined in PDD did not comply to *"Tool to determine project emissions from flaring gases containing Methane"* 2. The project proponent did not clarify how the samples and measurements for: $COD_{inflow,y}$, $COD_{ww,treated,PJ,y}$, $COD_{ww,discharge,PJ,y}$ to ensure a 90/10confidence/precision level. 3. Abbreviation/ symbols used: $S_{l.,disposal,y}$, $COD_{inflow,y}$, & , $COD_{ww,treated,PJ,y}$ was not found in the AMS-III.H Table III.H.2	~~CAR 6~~ ~~CL 13~~	OK
C.1.3. Has the monitoring plan contains all necessary parameters that they are clearly described and	VVM para 122	DR	The monitoring plan described in PDD section B.7. and Table B.7.1. "Parameters for monitoring during the crediting period"was in line with selected baseline monitoring methodology, AMS-III.H ver. 16,		

CHECKLIST QUESTION	VVM 1.2	MoV*	COMMENTS	Draft Concl.	Final Concl.
that the means of monitoring described in the plan complies with the requirements of the methodology?	(a)		paragraph 37, Table III.H.2. *To further discuss at the site for detail of each parameters monitored.*		
		SV/I	The monitoring plan contains all necessary parameters that they are clearly described and that the means of monitoring described in the plan, however discrepancy found as highlighted in Section C.1.2. above. *Refer to C.1.2.* Final sludge from the digester system is send to composting plant and eventually to the palm plantation as soil application under aerobic conditions However project proponent did not explain project emission for the processing and transportation the sludge.	~~CAR 6~~ ~~CL 13~~ ~~CL 14~~	OK
C.1.4. Are the monitoring arrangements described in the monitoring plan are feasible within the project design?	VVM para 122 (b)	DR	The monitoring arrangements described in Section B.7.2. of PDD. The arrangement includes the organization and management of the monitoring activities, training, quality assurance and quality control, emergency preparedness & uncertainty in data and data management. *To further discuss at the site*		

CHECKLIST QUESTION	VVM 1.2	MoV*	COMMENTS	Draft Concl.	Final Concl.
		SV/I	The project requires extensive initial training for operation and maintenance of the project. All persons that are involved with monitoring for CDM purposes shall also receive appropriate CDM training. It will be verify during verification.	FAR 1	FAR 1
C.1.5. Are the means of implementation of the monitoring plan, including the data management and quality assurance and quality control procedures sufficient to ensure that the emission reductions achieved by/resulting from the proposed CDM project activity can be reported ex post and verified.	VVM para 122 (b)	DR	The means of implementation of the monitoring plan, including the data management and quality assurance, and quality control procedures was described in the Section B.7.2. of PDD. Data monitored for CDM purposes will be recorded at the appropriate frequency by the project proponent. Shift supervisor, plant operator and engine driver will be responsible for ensuring data recording; Mill Assistant/Plant Technician is responsible for collection of wastewater samples for the purpose of the COD measurement campaigns and completeness and reliability of the data. While Mill Manager will be responsible for managing the collection, storage, and archiving of all pertinent CDM data and records. The mill manager will prepare Emission Reduction Report to CDM Project Coordinator for final analysis and approval. All such data will be archived electronically. All data required for verification and issuance will be retained for at least two years following the end of the crediting period or the last issuance of project CERs, whichever occurs later. For quality assurance, a Quality Assurance Officer will undertake regular internal audits of the project and ensure compliance with Company Quality Assurance Procedures. Section B.7.2. of PDD identified the day-to-day records handling including collecting, storing, and archiving of all pertinent CDM data		

CHECKLIST QUESTION	VVM 1.2	MoV*	COMMENTS	Draft Concl.	Final Concl.
			and records. All data will be archived electronically and backed-up. All data required for verification and issuance will be retained for at least two years following the end of the crediting period or the last issuance of project CERs, whichever occurs later. Procedure for dealing with possible monitoring data adjustments and uncertainties described under "Uncertainty in Data and Data Management" of Section B.7.2. of PDD. *Required further discussion at site.*		
		SV/I	1. All monitoring equipment not install and not decided yet hence procedure for day-to-day records handling was not ready yet 2. Procedure for dealing with possible monitoring data adjustments and uncertainties was not ready because all monitoring equipment not install decided yet. 3. Project proponent has not decided on the internal audit procedure of GHG project compliance with operational requirements. 4. The project proponent has not decided on the procedure for project performance review. 5. The project proponent has not decided on the procedure for corrective action.	FAR 1	FAR 1
D. Local stakeholder consultation					
D.1.1. Have relevant stakeholders been consulted?	VVM Para 128	DR	Refer to Section E of the PDD. Local stakeholders' consultation was conducted on 9th of November 2011 at De Leon Hotel, Lahad Datu, Sabah. Participants are evident in the attendance list, included project participant, village head, suppliers, neighbouring mills representative, MPOB officer and estate		

CHECKLIST QUESTION	VVM 1.2	MoV*	COMMENTS	Draft Concl.	Final Concl.
			representatives. *To talk with local stakeholder and review evidence during site visit*		
		SV/I	Interview with the local stakeholder and reviewing the attendance list, presentation material, questionnaire was available to proof local stakeholders' consultation was held on 9th of November, 2011.	OK	OK
D.1.2. Have comments by local stakeholders that can reasonably be considered relevant for the proposed CDM project activity, have been invited?	VVM para 129 (a)	DR SV/I	Yes. The comments by local stakeholders that can reasonably be considered relevant for the proposed CDM project activity have been invited. The stakeholders and their comment were summarized in Section E.2 of the PDD.	OK	OK
D.1.3. Is the summary of the comments received as provided in the PDD complete?	VVM para 129 (b)	DR	Yes, summary of the comments was documented in Section E.2. of the PDD. *Required further discussion at site*		
		SV/I	The comments by the stakeholder in the consultation meeting were recorded in the questionnaire. The summary of comment received reproduced in the Section E.2. of the PDD	OK	OK
D.1.4. Have the project participants taken due account of any comments received and described this process in the PDD?	VVM para 129 (c)	DR/ SV/I	Yes. The main consent from the stakeholder is the safety of biogas tank system. Project proponent explained the build in safety feature of the system such as flame arrester, elevated pipeline, and maintaining positive system pressure. All the due action was summarized in the Section E.2. of the PDD too.	OK	OK
E. Environmental impacts					
E.1.1. Does host country legislation require an analysis of the environmental impacts of the project activity?	VVM para 131	DR	No environmental impacts assessment required for such project under Environmental Quality (Prescribed Activities) (EIA) Order 1987. *Required further discussion at site*		

CHECKLIST QUESTION	VVM 1.2	MoV*	COMMENTS	Draft Concl.	Final Concl.
		SV/I	No. The project activity does not prescribed activities under Environmental Quality (Prescribed Activities)(EIA) Order 1987, hence not requires an analysis of the environmental impacts of the project activity	OK	OK
E.1.2. Does the project comply with environmental legislation in the host country?	VVM para 132	DR	*Required further discussion at site*		
		SV/I	Yes. The project complies with the environmental legislation in the host country; Department of Environment license for the mill was renewed annually, and next expiry date will be on 30 June 2012. As for the project activity, the approval from is still under application before construction of the project. The positive impacts was correct on the improvement of local odour, but reducing the emission of GHG on per MWh basis was no accurate, since the mill power supply is from own biomass boiler and turbine	~~CL 19~~	OK

Table 3 Resolution of Corrective Action and Clarification Requests

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in Table 1 & 2	Summary of project owner response	Validation team conclusion
CAR 1 The Letters of Approval from the DNA of Malaysia and the Annex I party have yet to be obtained.	Table 1, No.3 & 4	**Response 1 & 2:** Letter of Approval (LoA) from Malaysian DNA and Australian DNA is still pending. **Response 3:** Letter of Approval (LoA) from Malaysian DNA and Australian DNA submitted to validation team as following: Attachment: *<Melewar_Annex 1 Approved LoA>* *<Melewar_Host Approved LoA>*	Response 1 & 2 Still pending Response 3 The LoA issued by the DNA of Malaysia was reviewed and deemed appropriate in confirming the following: • Malaysia is party to the Kyoto Protocol; • CDM is a voluntary participation, • The proposed project will assist in Malaysia's sustainable development; • the project title is in line with the title mentioned under section A.1 of the PDD. The LoA issued by the DNA of the Australia affirms that Australia: • has ratified the Kyoto Protocol on 12 December 2007; • approves voluntary participation in this proposed CDM activity; • authorizes Perenia Pty. Ltd. as a participant of the proposed CDM project activity; • the project title is in line with the title mentioned under section A.1 of the PDD.

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in Table 1 & 2	Summary of project owner response	Validation team conclusion
			Conclusion: CAR 1 closed
CAR 2 The investment analysis demonstrated in the "Melewar Financial Module" spreadsheet – cash flow analysis did not add back to net profits for the purpose of calculating the financial indicator (refer to paragraph 5, Guidelines on The Assessment of Investment Analysis, Annex 5 EB 62).	Table 2. B.3.1. B.5.2. B.5.6.7.	Paragraph 5 of Guidelines on The Assessment of Investment Analysis, Annex 5 EB 62 states the following: *"Depreciation, and other non-cash items related to the project activity, which have been deducted in estimating gross profits on which tax is calculated, should be added back to net profits for the purpose of calculating the financial indicator (e.g. IRR, NPV). Taxation should only be included as an expense in the IRR/NPV calculation in cases where the benchmark or other financial indicator is intended for post-tax comparisons."* The Melewar Financial Module is developed as per-above guideline. The cash flow was calculated based on net profit plus depreciation. According to Malaysian Income Tax Act 1967, Section 39 (1)(e)(ii); depreciation is not allowed for deduction in tax computation due to its classification under qualifying expenditure (Capital Allowances) in Schedule 3 of the Act. Thus, capital allowances approach has been used for tax computation purpose. However, the depreciation has been deducted for net profit computation	*Response 1* The cash flow analysis has been revised to include net profit plus depreciation as shown in the spreadsheet "29 03 12 Melewar FM - Version 02.1" according to the national accounting practise. *Conclusion: CAR 2 closed*

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in Table 1 & 2	Summary of project owner response	Validation team conclusion
		purpose only. The summary of net profit and cash flow formula can be summarized as follows: **Net Profit =** Revenue – Expense – Depreciation – Tax & Interest **Cash Flow =** Net Profit + Depreciation = Revenue – Expense – Tax & Interest The cash flow formula clearly indicates that depreciation was not accounted in the cash flow calculation as it is not an actual expense incurred and also to prevent double counting of the capital cost for the IRR computation. *<Ref: Income Tax Act 1967 (http://www.agc.gov.my/Akta/Vol.%202/Act%2053.pdf>* Attachment: *<29 03 12 Melewar FM - Version 02.1>*	
CAR 3 The 10 days measurement campaign result under normal operation from 12th August – 21st August 2011 confirmed and correctly applied. And uncertainty factor 0.89 was multiply to average values from the measurement campaign. However, the	Table 2 B.1.2. B.3.5.	In the updated PDD, the 10 days measurement campaign under normal operation sampling data was indicated correctly. The date of sampling was recorded as 13th August - 21st August 2011 in the PDD instead of 12/08/2011-25/08/2011 as reflected in the	*Response 1* The justification was accepted since the important parameter, COD was not measured prior to project activity as it is not a requirement by Department of Environment of Malaysia.

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in Table 1 & 2	Summary of project owner response	Validation team conclusion
project proponent did not show how paragraph 27 (a) and (c) of AMS-III.H were assessed in the determination of the baseline emission.		analysis reports. The dates were corrected accordingly in the updated PDD. The following text was added to updated PDD: *There are no other types of data available that can be used to determine COD removal efficiency as indicated in paragraph 27 (a).* *Based on the existing Compliance Schedule issued by Department of Environment, the only effluent parameter to be monitored is BOD of the final discharge. Thus, the mill did not monitor effluent COD in the past and could not provide any data for validation purpose.* Attachment: *< Melewar_Department of Environment Licence>* *Comparison of baseline emissions between Para. 27 (a) and Para. 27 (b) cannot be made since there is no other types of data available that can be used to determine COD removal efficiency as in paragraph 27 (a). Thus results obtained from measurement campaign in paragraph 27 (b) has been adopted.*	*Conclusion: CAR 3 closed*

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in Table 1 & 2	Summary of project owner response	Validation team conclusion
CAR 4 The project proponent has not provide MoC for validation	Table 2 B.5.4.1.	**Response 1 & 2 :** The MOC document is pending **Response 3:** The MOC document is submitted to validation team Attachment: <MOC_Melewar>	*Response 1 & 2* Still pending *Response 3* The copy MoC dated 15/08/2012 was forwarded. F-CDM-MOC Version 01.4 template dated 25/07/2011 was used *Conclusion: CAR 4 closed*
CAR 5 The starting date of the project was not same as date of acceptance by the project proponent in the Letter of Offer by technology provider	Table 2 B.5.4.1. B.5.4.2.	The date of signing by PP is 05/08/2011, while the letter itself was dated as 04/08/2011. The date the letter signed will be used as project start date, as from that days onwards the agreement became valid. DAttachment: *< MPOM – "Letter of Acceptance" with Watermech Sdn. Bhd.>*	*Response 1* OK. The starting date of the project was corrected to 05/08/2011, the date the Letter of Offer was signed and accepted by project proponent. *Conclusion: CAR 5 closed*

<table>
<tr><th>Draft report clarifications and corrective action requests by validation team</th><th>Ref. to checklist question in Table 1 & 2</th><th>Summary of project owner response</th><th>Validation team conclusion</th></tr>
<tr>
<td><u>CAR 6</u>
For T_{flare} , the “Description of measurement methods and procedures to be applied”, and “QA/QC procedures to be applied” defined in PDD did not comply to “Tool to determine project emissions from flaring gases containing Methane”</td>
<td>Table 2
C.1.2.
C.1.3.</td>
<td>In the Section B.7.1 of updated PDD, T_{flare} has been edited as per “Tool to determine project emissions from flaring gases containing Methane” as following:

<table>
<tr><td>Description of measurement methods and procedures to be applied:</td><td>Measure the temperature of the exhaust gas stream in the flare by a Type N thermocouple. A temperature above 500 ºC indicates that a significant amount of gases are still being burnt and that the flare is operating.</td></tr>
<tr><td>QA/QC procedures to be applied:</td><td>Thermocouples should be replaced or calibrated every year.</td></tr>
</table>
</td>
<td>Response 1
The updated T_{flare}, section “B.7.1 Data and parameters monitored” of PDD version 2.1 was confirmed correct and complied to “Tool to determine project emissions from flaring gases containing Methane”

<u>Conclusion: CAR 6 closed</u></td>
</tr>
<tr>
<td><u>CL 1</u>
The project proponent has to provide supporting document on the claim that no public funding for this project.</td>
<td>Table 1, No.7</td>
<td>“No public funding for this project” statement was added to Annex 2.
The supporting document on the claim that no public funding for this project is available:

Attachment:
<MPSB-Confirmation of Non-Oda supporting Methane Capture & Utilization Project >

Response 2:</td>
<td>Response 1
The funding declaration letter was verified. However:
1. no date available in the declaration letter
2. the claim should be supported by source of funding document.

Response 2
1. The supporting document was accepted by the validation team.

2. Document <Board approving</td>
</tr>
</table>

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in Table 1 & 2	Summary of project owner response	Validation team conclusion
		1. The supporting document on the claim that no public funding for this project was revised by PP to include the date document is prepared. 2. The board decision (14/04/2011) for project financing is based on internal equity as the project proponent has financial strength to finance the project. The parent company, JC Chang (Private) Limited owns and manages ~ 100,000 acres of oil palm plantations and Melewar Properties Sdn. Bhd is a part of subsidiary of the group. However, the project activity is still at initial stage and actual fund source for overall project implementation financing could not be finalized at this stage. Attachment: *<Confirmation of Non-Oda supporting Methane Capture & Utilization Project _Revised>* *<Board approving development of the proposed project activity as a CDM project>*	*development of the proposed project activity as a CDM project >* is not found in the "supporting document" folder *Response 3* 2. <Board approving development of the proposed project activity as a DM project)> found in the "supporting document" folder supported the project proponent claim on no public funding for this project. *Conclusion: CL 1 closed*

<table>
<tr><th>Draft report clarifications and corrective action requests by validation team</th><th>Ref. to checklist question in Table 1 & 2</th><th>Summary of project owner response</th><th>Validation team conclusion</th></tr>
<tr>
<td><u>CL 2</u>
It was found that the processing rate of FFB estimated and used (Table B.4. of PDD) in ex ante estimation of CER was inconsistent with the historical data, Malaysia Palm Oil Board approval and Department of Environment approval, hence volume of wastewater was not representative in the calculation.</td>
<td>Table 2
A.1.1.
A.1.2.
B.1.2.
B.3.5.
B.4.2.
B.4.4.</td>
<td>The summary of historical FFB processed from year 2008 - 2011 is as following:

<table>
<tr><th>Year</th><th>Total FFB Processed (tonnes/y)</th></tr>
<tr><td>July 2008 – Jun 2009</td><td>363,821</td></tr>
<tr><td>July 2009 – Jun 2010</td><td>332,5181</td></tr>
<tr><td>July 2010 – Jun 2011</td><td>326,694</td></tr>
</table>

The historical FFB processed in the mill has not exceeded the MPOB limit.

The approved processing limit by Malaysian Palm Oil Board (MPOB) is 384,000 tonnes/year. For conservativeness, the FFB processed amount used for project activity is referenced to the MPOB approved limit.

Although the approved capacity by Department of Environment is 100 ton/hr, it is based on machinery capacity and does not represent actual mill FFB processing capacity. The mill is unlikely to process more than 384,000 tonnes per/year due to MPOB license compliance.</td>
<td>Response 1
The processing rate of FFB was revised to 384,000 tonnes/year which is the maximum limit approved by Malaysian Palm Oil Board, while the past three years history data shows that the processing limit did not exceed 384,000 tonnes/ year.

The validation team confirmed that Table B.4. of PDD version 2.1 revised to 384,000 tonnes/year. FFB processing capacity as well as all the BE calculation and CER calculation in spreadsheet “06 01 12 Melewar CER _Version 02.1” revised accordingly too.

<u>Conclusion: CL 2 closed</u></td>
</tr>
</table>

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in Table 1 & 2	Summary of project owner response	Validation team conclusion
		In the updated PDD and Melewar CER spread sheet, the FFB processed amount has been edited from initial estimation of 350,000 tFFB/y to MPOB license capacity of 384,000 tFFB/y. Thus, the volume of wastewater treated has changed. Based on the changes, the ER has increased from initial 40,757 tCO_2/y to 44,716 tCO_2/y. Attachment: *<FFB Historical for Melewar>* *< _Melewar_MPOB Licence>* *< Melewar_DOE License>* *<06 01 12 Melewar CER _Version 02.1>*	
CL 3 1) Site where processing, transportation and application or disposal of waste products as takes place was not explained. 2) Project proponent did not give assessment and identification of the systems affected by the project activity to indicate that the treatment systems (lagoons, reactors, digesters, etc.) that will be covered and/or equipped with biogas recovery by the project activity, will continue to operate with the same quality of feed inflow, volume (retention time), and temperature (heating), may be	Table 2 B.2.1.	1. The following text added to Section B.3 of updated PDD to include the site where waste products treatment takes place: *As per paragraph 15 of AMS-III.H. (Version 16; EB58), the project boundary is the physical, geographical site where the wastewater treatment and sludge treatment takes place in the baseline and project scenario. It also covers all facilities affected by the project activity including sites where processing, transportation and application or disposal of waste*	*Response 1* 1. The physical boundary of the project activity was updated to comply with AMS-III.H. version 16, paragraph 15 of Section B.3 of updated PDD version 2.1. However, the emission from processing, transportation and application or disposal of waste products was not mentioned in the PDD. 2. The project proponent identified the systems affected by the proposed project activity i.e. the five anaerobic ponds, where they will be replaced by enclosed anaerobic digester tanks

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in Table 1 & 2	Summary of project owner response	Validation team conclusion
considered as not affected i.e. the methane generation potential remains unaltered.		*products as well as biogas takes place.* *For the proposed project activity, the project boundary encompasses the existing open pond treatment system and the new anaerobic digester tank system, on-site facilities of sludge treatment, biogas desulphurisation system, biogas engine and enclosed flare system.* Attachment: *< General Specification of System & Project Process Flow by Watermech > < Catalogues from PW Biotech> < Composting from PW Biotech>* 2. The following text was added in the updated in Section B.3. PDD: *The treatment system affected by the project activity is categorized as System-Biogas & System-Aerobic (Figure B.2).* *The inflow COD into System-Biogas in project activity is the same as in baseline System- Anaerobic (Figure B.3). However the COD removal efficiency differs in the baseline scenario and project activity. COD removal efficiency using anaerobic ponds in baseline scenario is 97% and the COD removal efficiency in project activity using new anaerobic digesters*	system. The digester tanks systems will not alter the feed inflow, volume and temperature of the POME. The difference in the COD removal efficiency was taken into account in the BE & PE calculation as in the spreadsheet "*06 01 12 Melewar CER _Version 02.1*". The validation team confirmed the clarification was addressed in Section B.3. of PDD version 2.1. *Response 2* 1. Please include your justification into Section B.3 of PDD on the emission from processing, transportation and application or disposal of waste products was not mentioned. *Response 3* 1. The justification on the emission from processing, transportation and application or disposal of waste products was included in the Section B.3. of PDD and accepted by the validation team. *Conclusion: CL 3 closed*

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in Table 1 & 2	Summary of project owner response	Validation team conclusion
		is 80%. Thus, the COD loading to System-aerobic from project activity will be relatively higher than baseline scenario. *The COD removal efficiency for System-Aerobic in baseline scenario and project activity is same at 72% as the same ponds were used for both scenarios. However, the COD inflow to System-Aerobic in project activity will be higher; changing the characteristic of treated water from the digester system flowing to the existing aerobic ponds, settling ponds and polishing plant.* *Therefore, the operation of the baseline system will be affected by the proposed project activity and in accordance with AMS-III.H (Version 16; EB58) emissions from affected open ponds will be accounted for in the calculation of baseline and project emissions.* **Response 2:** 2. *The methodology AMS-III.H (Version 16; EB58) does not require* assessment of project emissions due to processing or transport of sludge (the only waste product). Only project emissions due to application of sludge are	

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in Table 1 & 2	Summary of project owner response	Validation team conclusion
		considered. Project emissions due to processing of sludge: *Sludge is not processed* Project emissions due to transport of sludge: *In the baseline scenario, sludge is periodically removed from the anaerobic open lagoons and sent to the plantation for soil application under aerobic conditions.* *In the project activity, sludge will be composted with Empty Fruit Bunches within the plant vicinity itself. Therefore there are no incremental transport or project emissions due to transport of sludge in the project activity. Transport of compost is not out of project boundary and not associated with the project activity.* Project emissions from application of sludge ($PE_{s, final ,y}$); *The composting process is maintained at aerobic condition with continuous turning and blowers are installed for proper aeration purposes*. *According to Paragraph 29 methodology AMS-III.H (Version 16; EB58), as sludge is used for soil application in aerobic conditions in the project activity, $PE_{s,final ,y}$ shall be neglected, and the final disposal shall*	

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in Table 1 & 2	Summary of project owner response	Validation team conclusion
		be monitored during the crediting period to ensure: *Methane correction factor of the disposal site that receives the final sludge in the project situation,* $MCF_{s,PJ,final} = 0$ *Thus, in Section B.7.1. of PDD, end use of final sludge from the digester system* $S_{final\ PJ,y}$ *is monitored to ensure sludge is applied in a thin layer to ensure aerobic & well managed condition is maintained as described in Table IIIH.1 (paragraph 21) of the methodology.* **Response 3 :** The following text added in Section B.3 added to Section B.3 to justify emission from processing, transportation and application or disposal of waste products was excluded as project emission: *There are no additional project emissions from sludge processing as the sludge is not processed in baseline and project. There is no incremental transport or project emissions due to transportation of sludge from Anaerobic Digester system to Compost plant and the composted sludge is applied as fertilizer at the plantation within the project boundary. The end use of sludge application will be monitored to ensure aerobic and well managed condition is maintained. Thus, the project emission from the processing, transportation and*	

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in Table 1 & 2	Summary of project owner response	Validation team conclusion
		application or disposal of sludge is negligible and not accounted as project emissions.	
CL 4 The document evidence for its actual digester tanks system, enclosed flare system and biogas engine system was not prepared during the site visit.	Table 2 A.2.6.	The specification the enclosed digester tank system, enclosed flare general specification and gas engine specification has been provided to validation team Attachment: *< Watermech Quotation - MOM>* *< Enclosed Flare System Specification>* *<Melewar Enclosed Flare System Drawing>* **Response 2:** < Watermech Quotation – MOM> reflects to initial quotation from Watermech. The biogas engine type and model for project activity is yet to be finalized. Based on the methane availability @ 2,229 tCH_4/y; the project activity could generate electricity at the range of 1.89 MWe at 35% electrical efficiency and 2.16 MWe at 40% electrical efficiency. Thus, the PDD mentions that the biogas engine system will have total generation capacity of up to 2.20 MW. **Response 3:**	*Response 1* The validation team confirmed that the document evidence for the actual digester tanks system, enclosed flare system and biogas engine system was provided. However, in the < Watermech Quotation – MOM> page 26 of 52, the biogas engine capacity quoted is 2.0 MW not 2.2MW as stated in the PDD. *Response 2* 1. Please provide the evidence and the basis on electrical efficiency claimed (35% & 40%) 2. The Quotation is based on 2.0MW biogas engine. Please provide revised quotation for biogas engine of 2.2MW. *Response 3* 1. The supporting document and justification was adequate and confirmed by the validation team that the efficiency of biogas engine is 35% (can be up to 40% for other manufacturer's make). And no CERs will be claimed from the utilization of biogas (refer to item 4, CL 6)

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in Table 1 & 2	Summary of project owner response	Validation team conclusion
		As described in Response 2, there is no finalization of biogas engines procurement till to date. Electrical efficiency of biogas engine was estimated based on different types of gas engines & its performance in general and not a final decision by PP: Attachment: a. Shendong Gas Genset 500GF1-1RZ with electrical efficiency @ 35% & 500 kWe electrical output as given by technologist Watermech: *<Page 26Watermech Quotation – MOM>* *< Power Generation Information>* *<Page 10, Shendong Gas Engine Brochure >* b. JenbacherJMS 312 GS-B.L with electrical efficiency @ 39.7% & 625 kWe electrical output: *<http://www.cogeneration.com.ua/img/zstored/J312V21_en.pdf>* c. Guascor SFGLD 360 with electrical efficiency @ 38.7% & 630 kW engine power: *<Guascor_Engine Spec Sheet>* Thus, 35% - 40% was estimated as the possible range of electricity generation efficiency from biogas	2. Justification accepted since higher capacity biogas engine requires higher price, the investment analysis will lead to less favourable IRR. Hence revised quotation is not required for this project activity. *Conclusion: CL 4 closed*

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in Table 1 & 2	Summary of project owner response	Validation team conclusion
		engines for project activity. The following text deleted from Section A.4.2 (2) of PDD: *"The biogas engine system will have total generation capacity of up to 2.20 MW"* 2. There is no finalization of biogas engines procurement. Additionally Paragraph 3 of methodology AMS III H version 16 only stipulates that the recovered biogas needs to be combusted/ flared or utilised. The project activity meets the above criteria. The biogas engine output is not related to project activity or methodology requirement as there is no CERs or electricity sales revenue claimable from project for electricity generation. Additionally, the cost of gas engines used for board decision (financial analysis) is referenced to 4 units of 500 kWe biogas engines (total 2.0 MW). This cost is more conservative compared to higher capacity gas engines; which indirectly has higher cost & contributes to lesser attractive	

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in Table 1 & 2	Summary of project owner response	Validation team conclusion
		IRR. Thus, a revised quotation for biogas engines is not required at this stage.	
CL 5 The project proponent description on sustainable development policies in page 4, section A.2 of PDD version 1, was not quite matching the objectives of National Green Technology Policy objectives and host country national CDM criteria.	Table 2 B.3.3. B.3.6.	Description on sustainable development policies in page 4, section A.2 was rephrased as following: *The project activity contributes towards sustainable development of the agricultural sector in the region and will increase reuse of wastes from palm oil processing. The project activity contributes the National Green Technology Policy, assists towards sustainable development of the Host Country and in line with the four key policy pillars:* http://www.greentechmalaysia.my/index.php/green-technology/green-technology-policy/national-green-techology-policy.html The 4 pillars of National Green Technology Policy were cross checked and found consistent. **Response 2:**	*Response 1* The validation team confirmed that consistency found in with project activity against four pillars of National Green Technology Policy and five National CDM Criteria. (Please add comment in the column beside for the CDM criteria too). Response 2 The validation team confirmed that consistency found in with project activity against four pillars of National Green Technology Policy and five National CDM Criteria. *Conclusion: CL 5 closed*

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in Table 1 & 2	Summary of project owner response	Validation team conclusion
		The following text has been added in the updated PDD to describe further on the project supports national sustainability criteria : *The project activity is also in line with the National CDM Criteria as following:* *Criterion 1:* *Project supports towards achieving sustainable development (social, economic, energy and environmental), benefitting the sector concerned and the economy as a whole. The project utilizes at biogas for energy utilisation;* *Criterion 2:* *Annex 1 Party for this project has been identified upfront;* *Criterion 3:* *The project leads to adoption of local technology with higher energy efficiency and increases the deployment of energy resources in the palm oil mil. The project activity also enhances the indigenous capacity of Malaysians to apply, develop and implement environmentally sound technology that leads to less carbon intensive emission;* *Criterion 4*: *Voluntary participation of the project owner in view of its long term benefits for mitigations of climate change. Reductions in emissions that are additional to any that*	

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in Table 1 & 2	Summary of project owner response	Validation team conclusion
		would occur in the absence of the certified project activity. *Criterion 5:* *Project owner is a locally incorporated company and has the ability to implement and finance the project.* <*http://cdm.greentechmalaysia.my/cdm-malaysia/cdm-criteria.aspx>*	
CL 6 1. The description of acidification process at the acidification pond in Section A.4.2, (2) Technology of the small-scale project activity of PDD version 1.0, was not found in the Figure A.2 2. The reference for footnote 8 is average temperature for whole Malaysia, not local average temperature at Sabah. 3. Part of the description in Table B.2, project scenario item 2(c) was not corresponded to the requirement of paragraph 2(c), AMS-III.H version 16. 4. Project proponent will has to demonstrate that no CER will be claimed on the renewable energy by biogas engine.	Table 2 B.1.1.	1. The text "acidification pond" was corrected to "buffer pond" in Section A.4.2 (2) of updated PDD to reflect the correct pond name. Figure A.2 represent the actual ponds involved in POME treatment process. 2. The temperature & source of reference footnote 8 has been replaced to reflect the average temperature of project site as following: *"Sandakan, Borneo, Malaysia average temperature is 26.8 °C (80°F)".* *http://www.climatetemp.info/malaysia/sandakan-borneo.html* 3. Description Table B.2, project scenario item 2(c) in updated PDD been corrected as following: Deleted text "*The loading rate of COD is above 0.1 kg COD.m^3.day^{-1} (see Section B4)*"	*Response 1* 1. OK. The correction in Section A.4.2 (2) of updated PDD version 2.1 accepted. 2. OK. The footnote 8 was now refer to footnote 13, is updated to local average temperature of the project activity site. 3. The validation team confirmed that the description in Table B.2, project scenario item 2(c) in updated PDD version 2.1 been corrected, and irrelevant statement was deleted. 4. OK. The validation team confirmed the statement on no CER will be claimed from the renewable energy by biogas engine as stated in the Table B.2, project scenario item 4 of PDD version 2.1. *Conclusion: CL 6 closed*

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in Table 1 & 2	Summary of project owner response	Validation team conclusion
		as it does not reflect item 2 (c) requirement. 4. Statement to demonstrate that no CER will be claimed on the renewable energy by biogas engine is available in Table B.2, project scenario item 4 of PDD.	
CL 7 The investment analysis was conducted for the project activity, but there was no description on the alternative financially more viable alternative to the project activity that would led to higher emission, and its analysis (refer to paragraph 19, Guidelines on The Assessment of Investment Analysis, Annex 5 EB 62).	Table 1 no.6 Table 2 B.3.1. B.5.1. B.5.2. B.5.5.1. B.5.6.1. B.5.6.2.	The methodology or guidelines do not require assessments of other alternatives that lead to higher emissions. The methodology is applicable to measures specified under paragraph 1 (f) and 2 of the methodology. The baseline is the continuation of the existing system. Included the following text in the updated PDD: *The baseline scenario for the project activity is continuation operation of the existing open pond treatment system without methane recovery and combustion.* The project was analysed in accordance to Paragraph 7 of General Guidelines to SSC CDM Methodologies (Version 17, EB 61) and Paragraph 19 "Guidelines on the Assessment of Investment Analysis" (Version 05; EB 62). Related text was added to updated	*Response 1 & 2* PP has not described any investment barrier in the investment analysis, and the result of analysis in Section B.3. of PDD version 2.2 *Response 3* The alternative scenario was described and justified in the Section B.5 PDD. *Conclusion: CL 7 closed*

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in Table 1 & 2	Summary of project owner response	Validation team conclusion
		PDD as following: *The proposed project was assessed based on Attachment A to Appendix B (Version 8.0, EB 63) of the simplified modalities and procedures for small-scale CDM project activities. The additionality of the proposed project is demonstrated and assessed by the "Investment Barrier" via investment analysis. It does not apply examples of barrier analysis as described in the "Guidelines for objective demonstration and assessment of barriers" EB50, Annex 13.* *Additionally, according to "Non-binding best practice examples to demonstrate additionality for SSC project activities" (EB 35, Annex 34): Best practice examples include but are not limited to, the application of investment comparison analysis using a relevant financial indicator, application of a benchmark analysis or a simple cost analysis (where CDM is the only revenue stream such as end-use energy efficiency). It is recommended to use national or global accounting practices and standards for such an analysis.* *Since the project activity will receive revenue from fuel saving, benchmark analysis is selected for the project's*	

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in Table 1 & 2	Summary of project owner response	Validation team conclusion
		financial analysis. **Response 2:** The text in Section B.5. of PDD is consistent with methodology and does not require use of barrier analysis as described in the "Guidelines for objective demonstration and assessment of barriers" EB50, Annex 13. **Response 3:** The following text has been inserted to Section B.5. of updated PDD to describe the investment barrier in the investment analysis, and the result of analysis: i) Description of Investment Barrier in the Investment Analysis: ***Investment Barrier Analysis*** *The baseline scenario for the project activity is continuation operation of the existing open pond treatment system without methane recovery and combustion. The baseline option (business as usual) is financially attractive because it represents the lowest cost option but led to higher CO_2 emission to atmosphere. The following section explains on how the proposed project activity would not have occurred in the absence of the CDM due to the presence of an investment barrier.*	

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in Table 1 & 2	Summary of project owner response	Validation team conclusion
		ii) Results of Analysis ***Summary*** *In conclusion, the project will never become financially attractive when the key parameters fluctuate within a reasonable range. The project activity would not have occurred without CDM revenues due to the financially unattractiveness (investment barrier). Therefore, the project activity is additional.*	
CL 8 The following cost was unable to justify in in the financial module spread-sheet: 1. Capital cost: earth work for biogas site, piling for biogas site do able to provide supporting evidence 2. Diesel price was not conservative enough. 3. Salaries, Insurance & Medical Costs	Table 2 B.3.1. B.5.2. B.5.6.5.	a) The estimated cost is realistic as till to date the mill has spent the following : i). Earthwork: RM 388,296.28 vs. estimated RM548, 249. There is still pending cost for road construction etc. from biogas plant to mill. ii) Piling work: RM 481,280 vs. estimated RM 580,561. On-going work at site. Attachment: *<: Melewar Earthwork Contract Agreement>* *< MOM - Piling Agreement>* b) The highest purchase price of diesel @ RM2.815/liter was used in the updated PDD and Carotino FM Version 02.1. Associated changes in IRR and Sensitivity analysis reflected in the update PDD.	*Response 1* a) Capital cost: 1) Earth work in the contract provided is RM 388,296.28 not RM 396,171 b) Please provide justification evidence for both pending cost and estimated cost for earth work and piling work c) Diesel unit price in PDD ver. 2.1, "Table B.6: Key Financial Inputs" RM 2.8. And this is not Carotino FM d) OK. Detail of the overall expenditure breakdown was provided and accepted. *Response 2* a) The Earthwork cost has been revised to RM 388,296.28 b) The pending cost for i. Earthwork from <MOM - Kong Wuii Keong Quotation> is quotation dated 5/4/2011, while *< Melewar Earthwork Contract*

<table>
<tr><th>Draft report clarifications and corrective action requests by validation team</th><th>Ref. to checklist question in Table 1 & 2</th><th>Summary of project owner response</th><th>Validation team conclusion</th></tr>
<tr><td></td><td></td><td>Document made available @ Dropbox:
<Document 1.10 Mill Diesel Cost_Melewar>
< Document 1.10 MPOM - Invoices>

c) The document on O&M expenditures with justification is made available to validation team. The summary of cost is as following:

<table>
<tr><th colspan="2">Overall Expenditure</th></tr>
<tr><th>Account Description</th><th>Cost (RM)</th></tr>
<tr><td>Workers Salary</td><td>117,102</td></tr>
<tr><td>Staff Salary</td><td>34,113</td></tr>
<tr><td>Workers Accommodation</td><td>11,900</td></tr>
<tr><td>Staff Accommodation</td><td>1,600</td></tr>
<tr><td>General Charges</td><td>54,067</td></tr>
<tr><td>Plant Machinery Upkeep (5% of Capex)</td><td>676,900</td></tr>
<tr><td>Total Overall Expenditure</td><td>895,682</td></tr>
</table>

*Note: Insurance & Medical costs are included in General Charges.
The O&M cost details edited in Melewar FM Version 02.1 & updated PDD based on available data source.

Document made available @ Dropbox:
<Document 1.22 MOM - Operational Cost></td><td>Agreement> is the final contract signed by PP and contractor. Please clarify how the pending cost from the quotation was comparable to final agreement.
ii. Piling work from <Melewar Biogas Plant Piling Quotation> is quotation dated 4/4/2011, while < MOM - Piling Agreement> is final agreement signed by both PP and contractor. And the bill of quantities is exactly same with the quotation except the price. Please clarify how the pending cost from the quotation was comparable to final agreement.
c) The validation team confirmed Diesel unit price in Melewar PDD ver. 2.2, “Table B.6: Key Financial Inputs” and Melewar FM Version 2.2 was corrected to RM 2.815. Associated changes in IRR and Sensitivity analysis reflected in the update PDD and FM.

Response 3
b) The pending cost was justifiable since the cost was based on progressive of the project work and agreement was only part of the whole earth work and</td></tr>
</table>

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in Table 1 & 2	Summary of project owner response	Validation team conclusion
		<Document 1.22 MOM - Life Span and Maintenance Cost> **Response 2 :** a. 1. The earth work in the contract is RM 388,296.28 and not RM 396,171. The text above edited accordingly. Quotations from contractors for works related to earth work and piling work which is pending to be contracted is attached to justify that the estimated cost in the financial model is conservative. The final cost is determined by external factors e.g. weather, soil type. *<MOM - Kong Wuii Keong Quotation>* *<Melewar Biogas Plant Piling Quotation>* b. Diesel unit price in Melewar PDD ver. 2.2, "Table B.6: Key Financial Inputs" and Melewar FM Version 2.2 was corrected to RM 2.815. Associated changes in IRR and Sensitivity analysis reflected in the update PDD and FM. *< MPOM – Diesel Invoices>* *<21 05 12 Melewar FM Version 02.2>* **Response 3 :**	pilling cost. *Conclusion: CL 8 closed*

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in Table 1 & 2	Summary of project owner response	Validation team conclusion
		b) i. The pending cost from the quotation <*MOM - Kong Wuii Keong Quotation*> is not comparable to final agreement < *Melewar Earthwork Contract Agreement*> as the final agreement is part (a fraction) of overall earthwork contract. As explained in Response 1 & 2, there are still pending earthworks to be contracted and will be awarded along the project development stages. The final earthwork cost could be similar or higher than quoted value. b) ii. The bill of quantities in the quotation <*Melewar Biogas Plant Piling Quotation*> and contract < *MOM - Piling Agreement*> are not the same. The contracted piling quantity is half of the quantity stated in the quotation. The contract has included an additional 752 points of 200 mm sq. x 3 m piling. A note is added in the contract: “Additional length per point shall be based on actual driving of pile on site”. As the piling work is on-going, the final use of piling points cannot be quantified at this stage.	

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in Table 1 & 2	Summary of project owner response	Validation team conclusion
CL 9 The "Melewar CER Estimation" spread-sheet, in "FFB" sheet, the "Source" claim on the mill expansion FFB source was incorrect.	Table 2 B.1.2. B.3.5.	In the updated spread sheet the "FFB sheet" was deleted. The processed amount was corrected to 384,000 referencing to approval in MPOB license in "Input Data Sheet". Attachment:: *<29 03 12 Melewar FM - Version 02.1>*	*Response 1* The validation team confirmed revised CER calculation spreadsheet that PP deleted the FFB sheet, and revised the FFB to processing capacity to 384,000 tonnes/ year. *Conclusion: CL 9 closed*
CL 10 The wastewater generation factor (0.65m3/tonne FFB) used to determine POME generation rate, $Q_{ww,y}$ was refer to value from other country.	Table 2 B.4.2.	Edited the reference of wastewater generation factor (0.65m^3/tonne FFB) to local source. Attachment: *<NA Ludin et. Al, 'Palm Oil Biomass for Electricity Generation in Malaysia', Page 6 >*	*Response 1* The reference *<NA Ludin et. Al, 'Palm Oil Biomass for Electricity Generation in Malaysia', Page 6 >* quoted wastewater generation factor used. *Conclusion: CL 10 closed*
CL 11 There was no document to support claimed (page 17, PDD version 1) the baseline power was generated by three biomass boilers and three units of backup diesel generator set.	Table 2 B.4.2.	In the updated PDD, the diesel engine capacity has been corrected from 600 kW (1 units) to 608 kW (1 unit) to reflect the actual rating capacity. Approval Certificates from Jabatan Alam Sekitar (JAS) for installation of the three units of biomass boilers and three units of back-up diesel generator set is provided to Validation team: Document made available @ Dropbox: *Folder Document 1.9 Boiler and Genset < Melewar_Boiler No.1>*	*Response 1* 1) Please provide evidence supporting the electricity generation for three biomass boilers were quoted in the boiler steam capacity. 2) The validation team confirm the three back-up diesel generator sets capacity is correct. *Response 2* The historical data from 2008 until 2011 showed total biomass boiler turbine and back-up diesel generator sets generated power was below Energy Commission allowable capacity.

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in Table 1 & 2	Summary of project owner response	Validation team conclusion
		< Melewar_Boiler No.2> *< Melewar_Boiler No.3>* *< Melewar_Genset No.1>* *< Melewar_Genset No.1>* **Response 2 :** Historical electricity generation data from year 2008 – 2011 from the biomass boiler turbines has been provided to Validation team. *< Historical Power Generation Turbine and Genset_2 >* Text in the updated PDD rephrased to indicate the total approved installed electricity generation capacity by Energy Commission: *"The total biomass boilers turbines and three units of back-up diesel engines have a total capacity of 4,037 kW."*	*Conclusion: CL 11 closed*
CL 12 The authenticity of signature by project proponent was unable to verify in the letter of offer by technology provider	Table 2 B.5.4.1.	The Letter of Acceptance was signed by Mr. Chang Teck Mack, one of the Melewar Properties S/B Director. This is an initial document and not a valid contract. The project owner haven't signed contract to award Watermech Engineering as technology provider till to date. Document made available @ Dropbox: *< Form 49, 9, 11>*	*Response 1* Please provide confirmation letter by company secretary that information in the < Form 49, 9, 11> is current, and the specimen signature of Mr. Chang Teck Mack. *Response 2* The validation team confirmed the authenticity of signature by project proponent was unable to verify in the

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in Table 1 & 2	Summary of project owner response	Validation team conclusion
		< MPOM - Letter of Acceptance> **Response 2 :** Confirmation "Certify as True" from company secretary, Mr. Tay Kay Beng is provided for the following documents: i. Form 49, 9, 11 to show the documents are the current documents for the company ii. Validation of Mr. Chang Teck Mack signature in The Letter of Acceptance. *< Form 49, 9, 11_Certified true>* *< MPOM - Letter of Acceptance _Certified true>*	letter of offer by technology provider *Conclusion: CL 12*
CL 13 1. The project proponent did not clarify how the samples and measurements for: $COD_{inflow,y}$, $COD_{ww,treated,PJ,y}$, $COD_{ww,discharge,PJ,y}$ to ensure a 90/10 confidence/precision level. 2. Abbreviation/ symbols used: $S_{l.,disposal,y}$, $COD_{inflow,y}$, & , $COD_{ww,treated,PJ,y}$ was not found in the AMS-III.H Table III.H.2	Table 2 C.1.2. C.1.3.	1. Samples and measurements for $COD_{inflow,y}$, $COD_{ww,treated,PJ,y}$, $COD_{ww,discharge,PJ,y}$ to ensure a 90/10 confidence/precision level was determined according to Para. 96 – 109, Best Practices Examples focusing on Sample Size and Reliability Calculations (Version 01.0, Annex 6, EB67) The appropriate sample size was estimated based on ex-ante 10 days measurement campaign. The calculation is reflected in the CER spread-sheet; tab:	*Response 1* 1. The calculation of sampling size is found correct, where the sampling size of 20 is more that 90/10 confidence/ precision level. But, in <06 01 12 Melewar CER _Version 02.1>, calculated sampling size at Point A is 9, not 6. 2. The validation team confirmed that abbreviation/ symbols used in the PDD version 2.1 was corrected in accordance to AMS-III.H Table III.H.2. *Response 2* The validation team confirmed the value

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in Table 1 & 2	Summary of project owner response	Validation team conclusion
		"90-10 Point A", $COD_{inflow,y}$ = 9 "90-10 Point B", $COD_{ww,treated,PJ,y}$ = 16 "90-10 Point C", $COD_{ww,discharge,PJ,y}$ = 15 The following text added in updated PDD: *Samples and measurement shall ensure a 90/10 confidence precision level.* Attachment: *<21 05 12 Melewar CER _Version 02.2>* 2. In updated PDD, abbreviation/symbols in accordance to AMS-III.H Table III.H.2 of the methodology as following: $COD_{ww,untreated,y}$, $COD_{ww,treated,y}$ & $S_{final,PJ,y.}$ **Response 2 :** The appropriate sample size as reflected in <06 01 12 Melewar CER Version 02.1> for Point A is 9. The figure is corrected in the updated PDD and text above corrected to "90-10 Point A", $COD_{inflow,y}$ = 9 Based on Paragraph 109 of Best Practices Examples focusing on Sample Size and Reliability Calculations (Version 01.0, Annex 6, EB67) samples will be taken every	of sampling size for Point A been updated. *Conclusion: CL 13 closed.*

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in Table 1 & 2	Summary of project owner response	Validation team conclusion
		two weeks to achieve the statistically representative 90/10 level.	
CL 14 Final sludge from the digester system is send to compost plant and eventually to the palm plantation as soil application under aerobic conditions. However project proponent did not explain project emission for the processing and transportation the sludge.	Table 2 C.1.3.	The processing of sludge at the composting plant is maintained at aerobic condition with continuous turning & blowers are installed for proper aeration purposes. It is unlikely that the sludge will decompose in anaerobic process. Thus, the project emission is estimated as zero. The transportation of compost formed from sludge is similar to mill baseline practice of sludge disposal in the plantation after desludging process. Thus there no additional transport incurred for sludge transportation. Attachment: *< Composting from PW Biotech>* *<Desludging Approvals from Department of Environment >*	*Response 1* The validation team confirmed, during site visit, that the composting plant will operate in aerobic condition with the turners and blower installed to provide the aeration. While the transportation of the composted material to plantation will not incur any additional emission since the baseline of the sludge transportation is normal practise. *Conclusion: CL 14 closed*
CL 15 The baseline indicators were verified, however all the measurement/ sampling points for $Q_{ww,i,y}$, $COD_{inflow,I,y}$ were not indicated in the Figure B.2 & B.3 of PDD.	Table 2 B.4.2.	The measurement point for $COD_{inflow,i,y}$ is indicated as Sampling Point A in Figure B.3. The baseline indicators $Q_{ww,i,y}$, $COD_{inflow,i,y}$ are indicated and described in Table B.4. All the proposed measurement and sampling points for project activity	*Response 1* All the measurement/ sampling points for $Q_{ww,i,y}$, $COD_{inflow,I,y}$ was updated in the PDD version 2.1 *Conclusion: CL 15 closed*

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in Table 1 & 2	Summary of project owner response	Validation team conclusion
		has been updated in Figure B4.	
CL 16 1. The project proponent has not furbished the document to claim 100% combustion efficiency of biogas in the gas engine 2. Description for $PE_{s,final,y}$ in Section B.6.1. page 27 and Section B.7.1. page 42 is slight different. 3. The project emission due to transportation of sludge to composting plant was not explained in PDD	Table 2 B.2.2. B.4.2.	1. Paragraph 35 of methodology AMS IIIH (Version 16) clearly stipulates that flare efficiency for biogas combusted for gainful purposes e.g. fed to an engine, an efficiency of 100% may be applied. 2. Corrected text describing $PE_{s,final,y}$ in Section B.6.1 to match Section B.7.1. 3. In the project activity, the sludge from biogas plant will be composted with Empty Fruit Bunches in Composting Plant before transported to plantation as fertilizer. The composting processing reduces moisture in sludge, thus the volume of sludge transported to plantation is lesser than in baseline. Additionally the Composting Plant is located within the mill vicinity; less than 250m radius from the biogas plant. Thus the CO_2 emission from the incremental transportation is zero and therefore are not accounted for as project emissions.	*Response 1* 4. PP has chosen to use 100% efficiency as recommended in the paragraph 35 of AMS-III.H. version 16. 5. The corrected text for $PE_{s,final,y}$ was updated in Section B.6.1. of PDD version 2.1. 6. The justification for emission from the transportation of the sludge to composting accepted since the quantity is less than baseline and distance is less than 250m. *Conclusion: CL 16 closed*
CL 17 Project proponent was unable to substantiate document or evidence to support the claim in PDD page 25: 1. Emission Factor (EF) of electricity	Table 2 B.4.3.	: 1. The project emission from electricity and fuel used by the	*Response 1* 1. The "Tool to calculate baseline, project and/or leakage emissions from electricity consumption"

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in Table 1 & 2	Summary of project owner response	Validation team conclusion
from Diesel engines 2. Auxiliary power consumption for project		project activities, $PE_{power,y}$ is determined as per "Tool to calculate baseline, project and/or leakage emissions (Version 01, EB39)". The main source of auxiliary electricity for the project activity is from the biogas engine itself. Only during emergencies, a small portion of total electricity generated by the mill will be used for project activity. There is no dedicated diesel engine for project activity solely, so "'Tool to calculate project or leakage CO_2 emissions from fossil fuel combustion (Version 02, EB41)' is not appropriate for $PE_{power,y}$ estimation. As described in the PDD, the mill depends on an off-grid captive power plant for electricity generation. The primary source of electricity for the mill is biomass boiler system and being a renewable source, the emission factor for electricity generated from biomass turbine is zero. Approximately 11.36% (based on historical data Jan 2010 – Dec 2010) of total electricity	(Version 01, EB39) was correctly applied and the history data use for both electricity generation and diesel consumption war revised to the same time period. 2. The project auxiliary power consumption was revised to estimation based on the project equipment listing, in the PDD Version 2.2 Section B.6.1. *Conclusion: CL 17 closed.*

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in Table 1 & 2	Summary of project owner response	Validation team conclusion
		consumed by the mill uses diesel. The emission factor for diesel is 1.3 tCO_2/Mwh; a default value as stated in Option B2, Page 8 of Tool to calculate baseline, project and/or leakage emissions from electricity consumption (Version 01, EB39). 2. Information for the project auxiliary power consumption is provided to Validation team. Some of the equipments does not operate continuously, thus the net electricity consumed by system is ~ 230 kW. Additionally, the figures are not final as the final contract has not been signed. The auxiliary power will be measured ex-post. Attachment: *< MPOM_Diesel Consumption>* *< Historical Power Generation Turbine and Genset (Jul10-Jun11)>* *< Auxiliary Power Generation Information>*	
CL 18 3. PDD did not provide further explanation on the how the equation (page 29 of PDD) below was derived and to be used:	Table 2 B.4.1.	1. In the updated PDD, the equation been deleted as the equation is not reflected in methodology	*Response 1* 1. The validation team confirmed the equation was deleted from the PDD. 2. Please provide document evidence

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in Table 1 & 2	Summary of project owner response	Validation team conclusion
$MD_y = [Q_{biogas,\ combusted} \times fm_{CH4,RG} \times CFE_{ww} \times GWP_{CH4}] + [TM_{RG,h} \times \eta_{flare,h} \times GWP_{CH4}]$ 4. Melewar CER spreadsheet, under "input data sheet", "Inputs for Project Activity Power Generation System" (row 36), does this data use in the project?		AMS IIIH. 2. The "Inputs for Project Activity Power Generation System" indicates calculation on generated methane used for gas engine combustion and amount of excess methane flared. Thus it is important to determine $PE_{flare,y}$. **Response 2 :** 2a. The biogas engines finalization is still pending. The proposed biogas engine model is 500GF1-1RZ. The recommended electrical efficiency of the biogas engine by Watermech is 35%. Attachment: *<Page 26, Watermech Quotation – MOM>* *<Shendong-Gas-Generator-4-500GF1-1RZ-Biogas-Gensets>* *< Power Generation Information>* 2b. As explained in CL4, based on the methane availability @ 2,229 tCH_4/y; the project activity could generate electricity at the range of 1.89 MWe at 35% electrical efficiency and 2.16 MWe at 40% electrical efficiency. Thus, the PDD mentions that the biogas engine system will have total	for: a. Electrical efficiency of biogas engine b. Installed biogas engine capacity (refer to CL4) c. $PE_{flare,y}$ = 0 for ex ante calculation. In ex-post calculation, $PE_{flare} = \sum_{h=1}^{8760} TM_{RG,h} * (1-\eta_{flare,h}) * (GWP_{CH4}/1000)$, $TM_{RG,h}$ = Mass flow rate of methane. Please clarify how is the information in "Inputs for Project Activity Power Generation System" is used, and describe it in PDD since it is important to determine PE_{flare}. d. How is the value of data for $BG_{fuelled,y}$ in page 43, Section B.7.1 of PDD version 2.1 been determined. *Response 2* ***2a.*** The electrical output of the biogas engine recommended by technology provider is 4 units of 500kW biogas engine which does not correspond to 2.2MWh in the proposed project activity. And there is no evidence of 35% electricity efficiency in the document provided. PP is using 40% (instead of 35%) in the estimating of the biogas engine capacity (refer to CL 4). ***2b.*** refer to 2a and CL4.

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in Table 1 & 2	Summary of project owner response	Validation team conclusion
		generation capacity of up to 2.20 MW. However biogas engines finalization is still pending. Thus the installed capacity of biogas engines could not be finalized at this stage. Additionally biogas utilisation will not be included in the project activity and not considered in the emissions reduction calculation. 2c. For ex-post, mass flow rate of methane, $TM_{RG,h}$ are can be calculated from moinitored parameter in Section B.7.1, $BG_{flared,y}$ & $w_{CH4,y}$. Both parameters are monitored continuously, thus the following formula can be computed to determine $PE_{flare,y}$. The following formula is added in Section B.6.1 of updated PDD to explain how the mass of methane flared is estimated: The mass flow rate of methane is estimated as following: $TM_{RG,h} = FV_{RG,h} * fv_{CH4,RG,h} * \rho_{CH4,n}$ Where: $FV_{RG,h}$ Volumetric flow rate of the	***2c.***, Please clarify how "input data sheet", "Inputs for Project Activity Power Generation System" (row 36) in Melewar CER spreadsheet, is the information in "Inputs for Project Activity Power Generation System" is used determine ex post PE_{flare} and $TM_{RG,h} = FV_{RG,h} * fv_{CH4,RG,h} * \rho_{CH4,n}$ ***2d.*** OK. The value of date for $BG_{fuelled,y}$ in page 43, Section B.7.1 of PDD been detailed in the spreadsheet and revised correctly in the PDD version 2.2. *Response 3* 2a. & b. Refer to CL 4 #1: The supporting document and justification was adequate and confirmed by the validation team that the efficiency of biogas engine is 35% (can be up to 40% for others manufacturer's make). And there is no CER will be claimed from the utilizing of biogas (refer to item 4, CL 6). 2c. The information in the "Inputs for Project Activity Power Generation System" in spreadsheet is justifiable to be included, and it will be used to estimate ex-ante methane generation. *Conclusion: CL 18 closed*

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in Table 1 & 2	Summary of project owner response	Validation team conclusion
		residual gas in dry basis at normal conditions in hour h (m^3/h) $fv_{CH4,RG,h}$ Volumetric fraction of methane in the residual gas on dry basis in hour h $\rho_{CH4,n}$ Density of methane at normal conditions (0.716) Any comment section for table for **$BG_{flared,y}$ & $w_{CH4,y}$** in Section B.7.2 is added with information –"Data used to calculate $FV_{RG,h}$ & $fv_{CH4,RG,h}$" 2d. During the project activity, amount of biogas fuelled in the biogas engines, fuelled in the biomass boiler system and flared in the enclosed flare system will be monitored separately by flowmeters. For ex-ante estimation, all biogas generated is assumed to be combusted in gas engines. The value was estimated as following: $BG_{fuelled,y}$ = Methane produced (kg/y) / Methane density (kg/Nm^3) / Methane composition in biogas (%) = 2,229 tCH_4/y * 1,000 kg/t /0.716 kg/m^3 /65%	

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in Table 1 & 2	Summary of project owner response	Validation team conclusion
		= 4,788,499 Nm^3/y Detailed calculation is available @ cell B47, Input Sheet of CER spread sheet. Attachment: *<21 05 12 Melewar CER_Version 02.2>* **Response 3:** 2 a. & b. Paragraph 3 of methodology AMS III H version 16 stipulates that the recovered biogas needs to be combusted/flared or utilised. The project activity meets the above criteria. The biogas engine output is not related to project activity or methodology requirement as there is no CERs or electricity sales revenue claimable from project for electricity generation. Please refer to CL 4 (1) on the justification of electrical efficiency of gas engines. As the selection of gas engines are still pending, the actual capacity and efficiency is unknown. 2 c. The information in “Inputs for Project Activity Power Generation System” in spread	

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in Table 1 & 2	Summary of project owner response	Validation team conclusion
		sheet is used for ex-ante estimation of total methane & biogas generation only. During ex-post, there is continuous monitoring of $BG_{flared,y}$ and $w_{CH4,y}$ in project activity; as stated in Section B.7.2 of PDD. At any given hour, data can be extracted for: 1. Biogas flared at flaring system; $BG_{flared,hr} = FV_{RG,h}$ (volumetric flow rate of the residual gas in dry basis at normal conditions in hour h (m^3/h)). 2. Methane content in biogas $w_{CH4,hr} = fv_{CH4,RG,h}$ (volumetric fraction of methane in the residual gas on dry basis in hour h) 3. Default value for Methane Density, ρ_{CH4} = 0.716 kg/m^3 @ normal condition as stated in "Tool to determine project emissions from flaring gases containing methane" (EB 28, Annex 13) Thus, referring to the above; $TM_{RG,h} = FV_{RG,h} * fv_{CH4,RG,h} * \rho_{CH4,n}$ = 1 * 2 * 3.	

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in Table 1 & 2	Summary of project owner response	Validation team conclusion
		The calculated $\mathbf{TM_{RG,h}}$ will be used to calculate $\mathbf{PE_{flare}}$ using formula indicated in tab "AMS III.H.PE cell 90 in Melewar CER spread-sheet. The detailed calculation will be reflected in Monitoring Report.	
CL 19 The positive impacts was correct on the improvement of local odour, but reducing the emission of GHG on per MWh basis was no accurate, since the mill power supply is from own biomass boiler and turbine.	Table 2 E.1.2.	In the updated PDD, the following phrase has been deleted as the sentence does not represent the project activity. ***Deleted text:*** *"and reduces the carbon intensity of the Malaysian national grid by reducing the emission of GHGs on per MWh basis across the entire grid*.	*Response 1* Irrelevant sentence was deleted from the PDD. *Conclusion: CL 19 closed*
CL 20 1. Additional of the biomass boiler system in the project activity along with enclosed flare system in project boundary, Section B.3. of PDD version 2.1. However, no justification was made on the changes, the investment analysis was not revised accordingly. 2. In Section B.5, Table B.7 of PDD version 2.2, sensitivity analysis included new parameter: PKS selling price, the PKS price used was not at time of decision making		1. The investment decision for project activity was made based on installation of anaerobic digester system c/w biogas engines and enclosed flare system. The combustion of biogas in biomass boiler and the associated capital cost was not included in the project costing at the time of investment decision making. However, the project proponent might have a future provision to	Response 1 1. The validation team agreed on the justification that the cost of biomass boiler was not included in the investment analysis based on conservativeness, that any further increase in project cost will deteriorate project equity IRR, and make the project unattractive. 2. The validation team confirmed that there was no reference PKS sales price available during the decision making time since PP never sell PKS. All PKS was kept for internal

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in Table 1 & 2	Summary of project owner response	Validation team conclusion
		incorporate biogas combustion in new biomass boiler/modify existing biomass boiler with biogas burner. Thus, the biomass boiler was included in project boundary. The cost related to biomass boiler cannot be added to investment analysis according to the "Guidelines for assessment on investment analysis" as input values used in all investment analysis should be valid and applicable at the time of the investment decision taken by the project participant. Additionally inclusion of cost related to biomass boiler will escalate the project capital cost (CAPEX). Thus, with additional CAPEX, the IRR would only go down further. The following text is added in the Section B.3 of PDD version 2.3 to describe further on inclusion of biomass boiler in project boundary: *"The combustion of biogas in the biomass boiler and its installation cost was not accounted in the financial analysis for investment decision. However, the*	use in its existing biomass boilers. Based on the public available data price of USD67 (RM213)ton PKS and offer price of RM80 from local market showed that the price was conservative. The validation team also confirmed PKS price against another public reference (Renewable Energy Resources by Anders Evald and others, Integrated Resource Planning, February 2005) was RM70/ton. As the result the PKS price used in sensitivity analysis was acceptable. *Conclusion: CL 20 closed*

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in Table 1 & 2	Summary of project owner response	Validation team conclusion
		biomass boiler was included within the project boundary as a future provision if the project proponent decides to use biogas in new biomass boiler or modify existing biomass boiler with biogas burner." Attachment: *< Watermech Quotation – MOM>* *< Board Meeting - (b) Presentation>* *<25 05 12 Melewar FM - Version 02.3>* 2. The project activity is designed to generate electricity for mill and downstream uses (default scenario). PKS value and its displacement were not included in the project activity investment decision making. However, a separate additionality analysis was done to evaluate the scenario if there is no electricity generation and all the generated biogas is combusted in the biomass boiler. This will potentially displace palm kernel shell (PKS) utilization and gives sales revenue for the mill. As the mill never sold its PKS in the past, PKS sales price was not available for reference. Carotino mill received a market offer of RM	

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in Table 1 & 2	Summary of project owner response	Validation team conclusion
		80/ton for potential PKS sales (15/06/2012). The Financial Model analysis shows that the project activity is not attractive and project is not additional even if all the generated biogas is used to displace PKS. Based on sensitivity analysis, the PKS price will need to increase up to RM 540.00/ton to hit the benchmark. This is unlikely to happen as the cost is too high for 3rd party purchase and the mill location is isolated. The final sales price of PKS is also determined by transport and handling cost. The available PKS sales prices by mills in the public domains are outdated and the 3rd party sales price by brokers is approximately USD 67 (RM 213) FOB (freight on board) delivery. This clearly shows that the project is not attractive even if PKS sales price increase. The following text is added in the Section B.5 of PDD version 2.3 @ sensitivity analysis discussion: *The combustion of biogas in the biomass boiler and its installation cost was not*	

<table>
<tr><th>Draft report clarifications and corrective action requests by validation team</th><th>Ref. to checklist question in Table 1 & 2</th><th>Summary of project owner response</th><th>Validation team conclusion</th></tr>
<tr><td></td><td></td><td>accounted in the financial analysis for investment decision. However, an additional sensitivity analysis was conducted (with complete financial model) to demonstrate the scenario if there is no electricity generation and all the generated biogas is combusted in the biomass boiler. This will potentially displace palm kernel shell (PKS) utilization and gives sales revenue for the mill.

Table B.7 was updated as following:

<table>
<tr><th>Scenario</th><th>Change at Which Scenario Hits Benchmark</th><th>Percentage Change at Which Scenario Hits Benchmark</th><th>Likelihood of Occurring</th></tr>
<tr><td>Saving from using 100% generated methane to Displace Palm Kernel Shell (PKS)</td><td>PKS cost increase over the years from RM 80 to RM 540</td><td>575%</td><td>It is extremely unlikely that the cost of PKS purchase price will increase by 575% to hit the benchmark as the mill is located in a remote location</td></tr>
</table>
</td><td></td></tr>
</table>

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in Table 1 & 2	Summary of project owner response	Validation team conclusion
		<table><tr><td></td><td></td><td></td><td>and this will incur high transportation cost.</td></tr></table> Attachment: *<25 06 12 Melewar FM - Biogas to Boiler>* *<25 06 12 Melewar_Biogas to Boiler Analysis>* *<Document Letter of Offer_PKS>* *<Globaltraderesources>*	
<u>FAR 1</u> 1. To verify the training for all persons that are involved with the monitoring for CDM purposes 2. Procedure for training of monitoring personnel not established yet. 3. All monitoring equipment not install and not decided yet hence procedure for day-to-day records handling was not ready yet 4. Procedure for dealing with possible monitoring data adjustments and uncertainties was not ready because all monitoring equipment not install decided yet 5. Project proponent has not decided on the internal audit procedure of GHG project compliance with operational requirements. 6. The project proponent has not decided on the procedure for project performance	Table 2 C.1.4. C.1.5.	The relevant training and procedures as outlined in FAR 1 will be provided to verification DOE during the 1st Verification.	*Response 1* The procedures and its implementation will be verified during the first verification. *<u>Conclusion : FAR 1 open</u>*

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in Table 1 & 2	Summary of project owner response	Validation team conclusion
review. 7. The project proponent has not decided on the procedure for corrective action.			

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APPENDIX B
AUDITOR'S CERTIFICATE

SIRIM QAS INTERNATIONAL

Sijil
Certificate

This is to certify that

SEW SHUH PING

has been qualified as

LEAD AUDITOR
FOR
CDM VALIDATION AND VERIFICATION SCHEME

in accordance with the relevant provisions of SIRIM QAS International's CDM procedure

Sectoral Scopes No. : 1 – Energy industries (renewable/non-renewable sources)

TA 1.1 – Thermal energy generation from fossil fuel and biomass including thermal electricity from solar (COMPLEX).

Parama Iswara Subramaniam
Chairman
Auditor Evaluation Panel
Management System Certification Department
SIRIM QAS International Sdn. Bhd.

Qualification Date : **13 April 2011**

SIRIM QAS INTERNATIONAL

Sijil
Certificate

This is to certify that

HAFRIAZHAR MOHD MOKHTAR

has been qualified as

AUDITOR
FOR
CDM VALIDATION AND VERIFICATION SCHEME

in accordance with the relevant provisions of SIRIM QAS International's CDM procedure

Sectoral Scopes No. : 1 – Energy industries (renewable/non-renewable sources)

TA 1.1 – Thermal energy generation from fossil fuel and biomass including thermal electricity from solar (COMPLEX)

TA 1.2 – Energy generation from renewable energy sources.

Sectoral Scopes No. : 13 – Waste handling and disposal

TA 13.1 – Waste handling and disposal.

Parama Iswara Subramaniam
Chairman
Auditor Evaluation Panel
Management System Certification Department
SIRIM QAS International Sdn. Bhd.

Qualification Date : **20 October 2011**

SIRIM QAS INTERNATIONAL

Sijil
Certificate

This is to certify that

AZHAR ABDUL RAOF

has been qualified as

AUDITOR
FOR
CDM VALIDATION AND VERIFICATION SCHEME

in accordance with the relevant provisions of SIRIM QAS International's CDM procedure

Sectoral Scopes No. : 1 – Energy industries (renewable/non-renewable sources)

TA 1.2 – Energy generation from renewable energy sources.

Sectoral Scopes No. : 13 – Waste handling and disposal

TA 13.1 – Waste handling and disposal.

Parama Iswara Subramaniam
Chairman
Auditor Evaluation Panel
Management System Certification Department
SIRIM QAS International Sdn. Bhd.

Qualification Date : **13 April 2011**