



## **RESPONSE TO POINTS RAISED DURING REQUEST FOR REVIEW**

**Subject:** Request for review – Request for registration 6971 Methane Recovery in Wastewater Treatment and Utilization for Electricity Generation at Saremas 1 Palm Oil Mill, Sarawak, Malaysia

Bureau Veritas Certification had performed the validation of the CDM Project 6971 - "Methane Recovery in Wastewater Treatment and Utilization for Electricity Generation at Saremas 1 Palm Oil Mill, Sarawak, Malaysia". Subsequently, there was a Request for Review in which 04 points were raised. Bureau Veritas Certification would like to provide its responses to the issues raised as given below.

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*1. The DOE has validated that AMS I.C, version 19 is applicable to the energy generation component of the project activity, which is the generation of electricity from biogas to displace electricity produced from diesel engines in the baseline. However, according to paras. 1 and 2 of AMS I.C, version 19, the methodology comprises renewable energy technologies that supply users with thermal energy that displaces fossil fuel use, including biomass-based cogeneration systems. The DOE is requested to further explain how it has validated the applicability of the methodology AMS I.C to the project activity, including the appropriateness of the continuation of the diesel generator operation for electricity generation as the baseline scenario for the energy generation component of the project activity and the corresponding baseline emissions from the use of fossil fuels for electricity generation to meet the electricity demand of the project owner. Please refer to VVM v1.2 paragraphs 68, 81-82 and 89.*

### **Response:**

The proposed CDM project activity involves on-site use of biogas to generate electricity in gas engine. The gas engines are Four stroke, sparkplug ignited, water cooled, electric mixer, with turbocharger and intercooler. In such gas engines, the electricity is produced via first internal combustion of biogas to generate thermal energy that gets converted to mechanical energy and then it is converted to electricity in the same system. This was validated by the validation team by using Technical Specification provided by the Technology provider Shengli Oilfield Shengli Power Machinery Group Company Ltd.

Further, the Biogas generated from the POME is considered to be the renewable energy in the host country, Malaysia. This is evident from the "CDM Information Handbook" issued by the Ministry of Natural Resources and Environment (which is also DNA of the host country). The DNA has also issued a letter of approval considering the Biogas from POME as renewable energy source. The project activity also applied SSC methodology AMS III H, version 16 (for other component of the project i.e. in Phase I), which states in para 3 (a) "The recovered biogas may also be utilized for Thermal or mechanical, *electricity energy generation directly*". The biogas is recovered from the measure covered under AMS III H, version 16. As per para 4 of AMS III H, *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*. Thus, the project participant has applied the AMS I C, version 19 for electricity generation using Biogas recovered from the treatment of the POME. Based on a review of various Type I methodologies, it is apparent that none of these, except AMS I.C, version 19, includes applicability for recovery of biomass/biogas to generate electricity exclusively for onsite consumption or consumption by other facilities without connection to an external grid. This situation is covered only in para 3(b) in AMS I.C, version 19.

The PDD has been revised to explain these details on the applicability of AMS I C, version 19 in conjunction with AMS III H, version 16.

The baseline scenario for the energy generation component of the project activity is validated by the Validation team and details of validation are provided in the validation report section 3.6.3. In the pre-project scenario, PP has two means of Electricity generation to cater the Electricity demand of Captive grid distributing electricity to Palm Plantation, Housing colony and Palm oil mill. During site visit validation Team confirmed that PP has

1. Three Biomass based co-gen plants with Turbines (1600 KW X 02 + 900 KW X01)
2. Two Diesel Generators (320 KW X02)

Biomass based Turbines are operated whenever Palm Oil mill is in operation and there're is a full load requirement of thermal energy as well electrical energy. The biomass is available to PP from the palm oil mill itself as a byproduct of mill operation. On an average palm oil mill operates for 12-14 Hrs a day and for remaining period of the day electrical demand is mainly for palm plantation and housing colony along with nominal partial load of oil mill which is catered by DG sets. Validation team has confirmed this by reviewing Production records, Diesel Generator and Biomass based turbine operation records.

The proposed project activity is having 0.5 MW only and hence is not able to replace its full load requirement of Palm oil mill. Thus in case of the non-operating period of Palm oil mill, project activity will replace the operations of Diesel generator Sets. Further it may be noted that the biomass based co-generation plant is not feasible to operate when Palm oil mill is not in operation considering no requirement of thermal energy in process and low requirement of electrical energy. Moreover in such scenario biomass is also required to be procured from outside.

PP has provided energy generation records for one year period (September 2009 – August 2010). Based on the data it was confirmed that the Energy Generation using Biomass Based turbines is 5,066,360 KWh and energy generation using Diesel Generators is 492,030 KWh, which is hardly 8.85% of total electricity generation during said period. Based on the records during this period it is evident that the operating hours of DG sets is 8.6 hrs / Day on an average and hence the electricity requirement in non-operating duration of palm oil is 159 – 200 KW on an average.

Thus the project activity is meant to replace Diesel Generator Set operations only and hence the validation team accepted baseline scenario as use of Diesel Generator Set Electricity generation.

It may be noted that there will be sufficient POME available for the methane generation continuously even though mill operation hours are 12-14 hours in a day. This is due to the high retention time required for the anaerobic digestion. As per the design of Anaerobic Digester it is confirmed that 11.63 days retention time for 2 digesters and 6.46 Days for 3<sup>rd</sup> digester.

Based on the information provided by PP in the PDD Section A.2 (refer point 3 ), Section B.4, Annex 3 and observations during site visit Validation team confirmed that the Baseline scenario which is identified by the PP is correct and is in accordance with the Approved methodology AMS I.C Version 19 para 16.

*2. In the baseline emission calculation "Baseline emissions from discharge of treated effluent to aerobic ponds (BE<sub>ww,discharge,y</sub>)", due to one-year historical data of Palm Oil Mill is not available, as per AMS-III.H version 16 paragraph 27 b, measurement by project proponent(s) in the 10 days measurement campaign (12/10/2010-21/10/2010) on the existing project site are used for the baseline emission estimation. According to AMS III.H, para 27b, concerning measurement campaign, it states that: "The measurements should be undertaken during a period that is representative for the typical operation conditions of the systems and ambient conditions of the site (temperature, etc)". However, in the PDD and the Validation Report, the PP/DOE did not provide justification on how the measurement period is considered to be representative as per AMS III.H version 16. The DOE is requested to further provide justification on how it has validated that the measurement period is representative for the baseline*

*emission calculation (BE<sub>ww</sub>, discharge, y) as per AMS III.H version 16. Please refer to VVM v1.2 para 89.*

**Response:**

PDD – page 33: “.....The measurement was undertaken during the period that was representative for the typical operation conditions of the systems and ambient conditions of the site (temperature, etc).....”. Based on the palm oil mill production records for past one year, the DOE has confirmed that the campaign period falls within a period representative of operations at the mill that directly correlates with wastewater generation. The ambient weather conditions were confirmed based on information provided at <http://www.world-climates.com/city-climate-miri-malaysia-asia/>. This is also mentioned at footnote 7 in Table 3 of the PDD.

During site visit, the validation team has cross checked that the Monitoring campaign is the representative of the typical operational conditions of the system and it was validated using Mill Production Records showing FFB Crushing and Palm Crude Production Details, P& ID Document for Palm Oil Mill With Capacity and Palm Oil mill Effluent Generation Data, however it was not exclusively reported in the main validation report. Now the Validation Report Section 3.6.3 is updated and provided details how validation team confirmed that the Measurement campaign is representative of the operational conditions and ambient conditions. Please refer below paragraph reproduced based on the Validation Report.

*Further according to para 27(b) of AMS III.H For wastewater treatment plant that has been operating for at least three years and if one year of historical data is not available, then PP can use either option (a) or option (b). To determine the Baseline emission PP has selected Option (b), which requires an ex ante measurement campaign shall be implemented to determine the required parameters (COD removal efficiency, specific energy consumption and specific sludge production). The measurement campaign shall be implemented in the baseline wastewater systems i.e. Anaerobic Lagoon System for at least 10 days.*

*PP has carried out an ex ante measurement campaign for 10 days starting from 12/10/2010 till 21/10/2010 to obtain data on various important parameters i.e Flow, Total solids, COD, BOD, Oil & grease, COD Removal efficiency etc. for the baseline scenario, a third party analysis reports were submitted by PP to Validation team. Validation team verified analysis report and compared these values with publically available information on waste water characteristics of Palm Oil Mill and found conservative. During validation, team also cross checked Mill Production Records showing FFB Crushing and Palm Crude Production Details & P& ID Document for Palm Oil Mill with Capacity during above said measurement campaign and found that there is no abnormality reported in the production level, mill was running at its regular capacity and Waste water generation data is found correct using Palm Oil mill Effluent Generation Data hence Validation team has confirmed that measurement campaign has been undertaken during a period that is representative for the typical conditions of the mill operations. Validation team has cross checked Ambient conditions prevailing at the time of measurement campaign and found that the ambient temperature is almost constant and observed to be in the average range of 23°C (Min) to 31°C (Max) for entire Month. This was confirmed using website [www.wunderground.com](http://www.wunderground.com).*

*PP has used Average Values from the 10 Day measurement campaign after multiplying by 0.89 to account uncertainty range (30% - 50 %), which is found in accordance with Para 27(b) of the Approved Methodology AMS III.H, Version 16. Hence Validation Team confirms that Baseline Emission calculated by PP is conservative.*

*3. The PDD uses the “Tool to determine project emissions from flaring gases containing methane” version 1. This version of the tool is not valid since 20/07/2012. However, the request for registration of the project activity was submitted on 10/08/2012. The DOE shall ensure that the latest valid version of “Project emissions from flaring” tool at the time of submitting the request for registration is used. Please refer to VVM v1.2 para. 67.*

**Response:**

As per EB68 report, Page 17 of 30, para 92, it is clearly mentioned that - For all revised methodologies and tools that were approved by the Board at this meeting, the DOEs may upload not later than 20 March 2013 (24:00 GMT) for registration the PDDs of project activities in which the previous version of an approved methodology or an approved tool has been applied, in accordance with paragraph 36 of the "Procedure for the submission and consideration of requests for revision of approved baseline and monitoring methodologies and tools for large-scale CDM project activities". Hence "Tool to determine project emissions from flaring gases containing methane" version 1 could be used until March 2013 for submission for registration.

*4. The monitoring parameter "end-use of final sludge" shall be included in the monitoring plan, in compliance with the methodology AMS III.H version 16. Please refer to VVM v1.2 paragraph 124.*

**Response:**

The PDD has been updated in section B.7.1 and Annex 4 to include monitoring of "end-use of final sludge" in the monitoring plan.

<b>Data / Parameter:</b>	$S_{final,y}$
Data unit:	T
Description:	End-use of the final sludge.
Source of data to be used:	The Value is the estimated value based on the design calculations provided by the technology provider and assumptions are. Designed Treated Dried Sludge Removal Qty. = 11.4 M3/Day Density of Sludge = 1.1 tons/ m3 Total Qty of Sludge generating per annum = 11.4 X 1.1 X 365 Days Total Qty of Sludge generating per annum = 4577 Tons / annum Measurements by project proponent(s) during ex- post scenario
Value of data	4577 Tons/Annum
Description of measurement methods and procedures to be applied:	Quantity of sludge removal and disposal for soil application in the plantations will be measured through weighing and recording. The weighing will be conducted prior to disposal to the plantations using a weighing bridge located at the palm oil mill.
QA/QC procedures to be applied:	The records of measurement and disposal will be verified within 3 days of measurement by the plant manager. Any deviation from the measurement and disposal processes will be recorded by the plant manager in the field log book.
Any comment:	-

Validation Report Section 3.8 is now updated with the monitoring parameter End-Use of the final sludge ( $S_{final,y}$ ).

Validation team has interpreted the applicability of Approved methodology AMS I.C, Version 19 as mentioned above under point 1, however if EB has a different opinion we would like to withdraw AMS I.C Component from the project activity.

We hope you will find above responses in accordance with completeness points raised.

Yours faithfully



Ram M. Desai

Local Product Manager – Climate Change Service (SEA Region)

T: (65) 6419 7841 | F : (65) 62752776 | Email: [ram.desai@sg.bureauveritas.com](mailto:ram.desai@sg.bureauveritas.com) HP: (65) 92479165

Bureau Veritas Certification (Singapore) Pte Ltd | [www.bureauveritas.com](http://www.bureauveritas.com)

1 Maritime Square, #09-66 Lobby C, HarbourFront Centre, Singapore 099253