Voluntary Carbon Standard 2007.1
Validation Report

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Validation Report:

Name of Verification company:	Date of the issue:
TÜV NORD CERT GmbH	2010-03-26
Report Title:	Approved by:
Biomass based steam generation project by Gujarat Ambuja Exports Ltd	Rainer Winter
Client:	Project Title:
Gujarat Ambuja Exports Limited (GAEL)	Biomass based steam generation project by Gujarat Ambuja Exports Ltd
Summary:	

Gujarat Ambuja Exports Limited (GAEL) has commissioned the TÜV NORD JI/CDM Certification Program (CP) to validate the project: " Biomass based steam generation project by Gujarat Ambuja Exports Ltd" with regard to the relevant requirements of the VCS, as well as criteria for consistent project operations, monitoring and reporting.

The project activity involves setting up a biomass-based boiler of capacity 30 TPH in the agro processing manufacturing facility of the project proponent. The biogas generated due to anaerobic digestion of wastewater in the plant is also co-fired along with biomass in the boiler. The project reduces green house gas emission by combusting biomass residue available in the region thereby substituting consumption of fossil fuel. Annual quantity of 559.64 TJ steam has been estimated to be produced from the project activity resulting 45523 tCO_2 of emission reduction annually.

The review of the VCS PD/PD01/PD02/ and additional documents related to baseline and monitoring methodology; the subsequent background investigation, follow-up interviews and review of comments by parties, stakeholders have provided TÜV NORD JI/CDM CP with sufficient evidence to validate the fulfilment of the stated criteria.

A risk based approach has been followed to perform this validation. In the course of the validation 27 Corrective Action Requests (CAR) and 05 Clarification Requests (CR) were raised and successfully closed out.

The validation is based on the VCS PD/PD01/PD01/, emission reduction calculation sheet/XLS1/XLS2/ proof of title, proof of right, additional documents related to baseline and monitoring methodology; the subsequent background investigation, follow-up interviews and supporting documents made available to the validates by project proponent.

As a result of the validation, the validates confirm that:

- The project fulfils criteria of VCS 2007.1 provided.
- The project additionality is sufficiently justified in the PD/PD02/.
- The monitoring plan is transparent, adequate and inline with applied baseline and monitoring methodology of ACM 0002, version-10.
- The calculation of the project emission reductions is carried out in a transparent and conservative manner, so that the calculated emission reductions of 455230 t CO2e (total) is most likely to be achieved within the 10 years fixed crediting period.
- No restrictions or uncertainties were identified related to the validation.

Work carried out by:	Number of pages:
Mr. Pankaj Patel Mr. Manoj Borekar Mr. Hemang Shah Mr. Saroj Sahoo	31

[Table of Content]

1 Introduction _____ 3
1.1 Objective _____ 3
1.2 Scope and Criteria _____ 3
1.3 VCS project Description _____ 4
1.4 Level of assurance _____ 5
2 Methodology _____ 5
2.1 Review of Document _____ 6
2.2 Follow-up Interviews _____ 6
2.3 Resolution of any material discrepancy _____ 7
3 Validation Findings _____ 8
3.1 Project Design _____ 8
3.2 Baseline _____ 10
3.3 Monitoring Plan _____ 20
3.4 Calculation of GHG Emissions _____ 24
3.5 Environmental Impact _____ 26
3.6 Comments by stakeholders _____ 26
4 Validation conclusion _____ *27*

1 Introduction

1.1 Objective

The purpose of this validation is to have an independent third party assessment of the project design. In particular the project's baseline, the monitoring plan (MP), and the project's compliance with

- The requirements of VCS 2007.1 program guidelines
- Requirements of the Approved methodology, AMS I.C version 16[1], EB-51
- To assess the project's compliance with other relevant rules, including the host country (India) legislation;
- Other relevant rules, of VCS sustainability criteria are validated in order to confirm that the project design as documented is sound and reasonable and meet the stated requirements and identified criteria. Validation is seen as necessary to provide assurance to stakeholders on the quality of the project and its intended generation of Verified emission reductions (VERs).

1.2 Scope and Criteria

The validation scope is given as an independent and objective review of the project design, the project's baseline study and monitoring plan which are included in the PD and other relevant supporting documents.

[1] In draft VCS PD, version 14 of the methodology AMS I C was used. During the course of validation, the latest version 16 was released. Thus, subsequently the VCS PD was revised and the project has been validated based on version 16 of the methodology.

The items covered in the validation are described below:

- **VCS 2007.1 & Host Country Criteria**
  - All relevant VCS 2007.1 requirements
  - Host Country requirement / criteria
- **VCS Project Description /PD/**
  - Project design
  - Project boundaries
  - Predicted project GHG emissions
- **Project Baseline**
  - Baseline methodology
  - Baseline GHG emissions
- **Project Additionality**
- **Monitoring Plan**
  - Monitoring methodology
  - Indicators/data to be monitored and reported
  - Responsibilities
- **Background investigation and follow up interviews**
- **Stakeholder Consultation**
  - Review of comments
- **Draft validation reporting with CARs & CRs, if any**
- **Final validation reporting.**

The information included in the VCS PD/PD01/PD02/ and the supporting documents were reviewed against the requirements and criteria mentioned above. The TÜV NORD JI/CDM CP has, based on the recommendations in the Validation and Verification Manual/VVM/, employed a risk-based approach in the validation, focusing on the identification of significant risks for project implementation and the generation of VERs. The validation is based on the information made available to TÜV NORD JI/CDM CP and on the contract conditions.

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

1.3 VCS project Description

The project activity involves setting up a biomass-based boiler of capacity 30 TPH in the agro processing manufacturing facility of the project proponent. The biogas generated due to anaerobic digestion of wastewater in the plant is also co-fired along with biomass in the boiler. The project reduces green house gas emission by combusting biomass residue available in the region thereby substituting consumption of fossil fuel. Annual quantity of 559.64 TJ steam has been estimated to be produced from the project activity resulting 45523 tCO_2 of emission reduction annually.

The key technical specifications of the bioler used in the project activity is as follows.

Parameter	Values
Boiler type	Semi-outdoor, Bi-drum, Water tube, AFBC boiler
Capacity	30TPH
Steam Pressure	17.5 kg/cm^2
Steam temperature	Saturated
Make	Cheema Boilers
Efficiency (with coal)	88%
Efficiency (with biomass)	80%

1.4 Level of assurance

The validation report is based on VCS Project Description/PD01/PD02/, ER calculation sheet/XLS1/XLS2/ supporting documents made available to the validator and information collected through performing interviews/IM01/IM02/ and during the on-site assessment. The validation opinion is assured provided the credibility of all above.

2 Methodology

The validation of the project was carried out in October 2009 to March 2010.

Preparations : 2009-10-01 to 2009-11-13
On-site validation : 2009-11-14
(Draft) Reporting : 2009-12-30
(Final) Reporting : 2010-03-26

The validation consisted of the following three phases:

- a desk review of the project design/PD01/PD02/ and the baseline and monitoring methodology
- follow-up interviews
- the resolution of outstanding issues and the issuance of the final validation report and opinion

2.1 Review of Document

Furthermore, the validation team used additional documentation by third parties like host party legislation, technical literature referring to the project design or to the basic conditions and technical data.

The documents those were considered during the validation process are given in chapter 5 of this report. They are listed as follows:

- Documents provided by the project proponent (Table 5.1)
- Background investigation and assessment documents (Table 5.2)
- Websites used (Table 5.3).

2.2 Follow-up Interviews

On 2009/11/14 , the TÜV NORD JI/CDM CP performed Pre validation visit with the project proponent. During this visit, as well as earlier and after, interviews with the project proponent, the consultant, project stakeholders and with local authorities had been carried out to confirm selected information and to resolve issues identified in the document review.

The key interviewee and main topics of the interviews are summarised in Table 2-1.

Table 2.1 Interviewed persons and interview topics

Interviewed Persons / Entities	Interview topics
Project proponent representatives /IM01/ Consultants /IM02/	- Chronological description of Project - Technical details of the project realisation – specification, engineering, operational life time - Equipment Performance data - Monitoring and measurement equipment - Project activity starting date/ commissioning date - Crediting period - VER allocation /ownership - Baseline study assumptions - Sustainable development issues - Analysis of Environmental Impact - Analysis of local stake holder consultation - Roles & responsibilities, competency and training of the staff members w.r.t project management, monitoring and reporting - Operational Data - technical specification, capacity, estimated life time of the project plant units - Editorial aspects of PD - Procedural aspects - Debundling aspects - Base line study, project emissions, leakage and additionality - Details of emission reduction calculation

The detailed list including the functions or designations of the interviewed persons is given in chapter 5.

2.3 Resolution of any material discrepancy

During the validation of the project some discrepancies were observed and communicated to the project proponent in the form of CARs/CRs.

In this validation 27 CARs and 05 CRs were raised. The CARs / CRs are documented in the validation report and summerised in table 2.2 below.

Table 2-2: Summary of CAR and CR issued

Validation topic [1)]	No. of CAR	No. of CR
General description of project activity (3.1) - Project boundaries - Participation requirements - Technology to be employed - Contribution to sustainable development	02	-
Project baseline (3.2) - Baseline Methodology - Baseline scenario determination - Additionality determination	15	05
Monitoring plan (3.3) - Monitoring Methodology - Monitoring of Project emissions Baseline emissions Leakage Sustainable development indicators / environmental impacts Project management planning	08	-
Emission Reduction Calculations (3.4) - Calculation of GHG emission reductions Project emissions Baseline emissions Leakage - Emission reductions	01	-
Environmental impacts (3.5)	01	-
Stakeholder Comments (3.6)	-	-
SUM	**27**	**05**

1) The letters in brackets refer to the validation protocol

For an in depth analysis/evaluation of all CARs and CRs can be referred to the below sections from 3.1 to 3.6.

3 Validation Findings

3.1 Project Design

The project entails setting up a biomass-based boiler of capacity 30 TPH in the agro processing manufacturing facility of the project proponent. The biogas generated due to anaerobic digestion of wastewater in the plant is also co-fired along with biomass in the boiler. The project reduces green house gas emission by combusting biomass residue available in the region thereby substituting consumption of fossil fuel. Annual quantity of 559.64 TJ steam has been estimated to be produced from the project activity resulting 45523 tCO_2 of emission reduction annually.

The project lifetime is 15 years. This has been confirmed from the letter provided by the boiler manufacturer/PLT/.

Project start date is 27/03/2008 – commissioning date of the boiler.

Crediting period is 10 years fixed crediting period.

Validation team has reviewed the commissioning certificate/CC/ and confirmed that the boiler was commissioned on 27/03/2008. Thus this has been considered as the start date of the project activity. The crediting period start date is 01/04/2008.

From the documents provided by the project proponent including Pollution Control Board Clearances/PCBC/, Commissioning Certificate/CC/ and purchase order/PO/ it was verified that the ownership of the proposed project activity belongs to Gujarat Ambuja Exports Limited.

As per VCS Program guidelines it was found that the proposed project activity is eligible under VCS.

Based on the review of the declaration given by the project proponent/DEC/ it is confirmed that the emission reduction is not double counted and as the project has not applied for carbon benefits under any other GHG programme nor there is no rejection history for the project activity.

Nevertheless,the following CARs were raised and closed successfully.

CAR/CR	Reference	Summary of project owner response	Revised sections (as applicabl	Conclusion
CAR 1.1 Surplus biomass resource availability in the region needs to be demonstrated as per the Guidance on "Leakage	/UNFCCC/ /EB 47, (Annex 28)	Biomass assessment report demonstrates that biomass available in surplus is 92%. Of this		The biomass resource availability report has been submitted by the project

CAR/CR	Reference	Summary of project owner response	Revised sections (as applicabl	Conclusion
in biomass project activities (Attachment C to Appendix B)" (version 3, EB 47, Annex28) para 18,		92%, only approx 0.4% will be required for the project activity. Thus this meets the requirements as per the guidance wherein the availability must be more than 25%. Biomass assessment report is being submitted to DOE for validation. Biomass assessment report has been submitted to DOE for vali-		proponent. It has been verified from the assessment report that a surplus amount of more than 92% of the biomass is available in the region. The CAR is closed.
CAR 1.2 The write up under section 1.12 of the VCS PD is not sufficient to demonstrate that the project has not created another form of environmental credit.	/PD01/ /Section 1.12/	The write up under section 1.12 of the VCS PD is modified in the revised PD. Undertaking from the client has been submitted to DOE for validation.	/PD02/ /Section 1.12/	The declaration letter submitted by the project proponent to confirm that the project has neither applied for any other environmental credit nor it has been rejected under any other GHG program has been verified by the validation team. CAR is closed

3.2 Baseline

The selected baseline and monitoring methodology is the approved small scale methodology "Thermal energy production with or without electricity" (AMS I C: Version 16: EB 51).

The project satisfies all applicability criteria for AMS I C version 16.

The selected methodology, i.e., AMS I C version 16 is correctly applied to this type of biomass based renewable project. There is no methodology deviation or revision.

The baseline calculation has been done as follows:

$$\mathbf{BE_{Thermal, CO2, y} = (EG_{Thermal, Biomass, y} / \eta_{BL, Thermal})* EF_{FF, CO2}}$$

Where,

$BE_{Thermal, CO2, y}$ = the baseline emissions from steam/heat displaced by the project activity during the year y; tCO2e

$EG_{Thermal, Biomass, y}$ = the net quantity of steam/heat supplied by the project activity through biomass during the year y; TJ

$EF_{FF, CO2}$ = The CO2 emission factor of the fossil fuel that would have been used in the baseline plant; tCO2 / TJ,

$\eta_{BL, Thermal}$ = The efficiency of the plant using fossil fuel that would have been used in the absence of the project activity

The net quantity of steam in term of TJ is calculated by multiplying the enthalpy difference between the generated steam and the feed water with the total quantity of steam generated. The enthalpy of steam during the ex-post determination of emission reduction will be calculated from the monitored value of quantity, temperature and pressure of steam and temperature of feed water.

IPCC default value for has been considered for the emission factor of the baseline fuel i.e. coal. This has been verified by the DOE from the 2006 IPCC Guidelines for National Greenhouse Gas Inventories[2] /IPCC/ and found to be correct.

Efficiency of the plant using fossil fuel that would have been used in the absence of the project activity is considered as 100%. This is the most conservative value considered for the baseline calculation and inline with the criteria outline in the methodology AMS I C, version 16.

The above calculation approach for the baseline calculation has been verified by the DOE and found to be correct and inline with the selected methodology AMS I C /AMS IC/.

[2] http://www.ipcc-nggip.iges.or.jp/public/2006gl/pdf/2_Volume2/V2_1_Ch1_Introduction.pdf

As per paragraph 33 of the methodology AMS I C, Version 16 specific energy consumption of each type of fuel to be used has been specified *ex ante* as follows:

S.r No	Fuel	Sp. Energy consumption(kJ of energy/ kJ of steam)
1	Biomass	1.25
2	Biogas	1.00
3	Coal	1.00

Nevertheless the following CAR/CR were raised and closed sauccessfully.

CAR/CR	Reference	Summary of project owner response	Revised sections (as applicabl	Conclusion
CAR 2.1 As consumption coal and biogas has been considered as the baseline scenario efficiency of the bioler run on both coal and biogas should be considered for the baseline calculation instead of only coal.	/PD01/ /Section 2.4/ /XLS1/	The boiler efficiency has been considered to be 88% (for conservative evaluation of additionality) based on the supplier information for coal combustion. Biogas is only 12% of the total energy input requirement and hence combustion of biogas won't make significant impact on overall boiler efficiency. Hence, it would be the same	/PD02/ /Section 2.4/	The supplier's information/TS/ has been checked to verify the efficiency and found to be cor- The CAR is closed.
CAR 2.2 Efficiency of the baseline units should be determined by adopting the criteria outlined under paragraph 18 of the applied methodology AMS I C, Version 16.	/PD01/ /Section 2.4/ /AMS I C, Ver 16/	Efficiency for the baseline unit is considered as 100% (default value) for emission reduction calculation, which is in accordance with para 18(c) of the methodology AMS I C, Version 16. This is most conservative.	/PD02/ /Section 2.4/	The efficiency, 100% has been considered for the baseline calculation which conservative and also inline with the paragraph 18 of the applied methodology AMS I C, Version 16. The CAR is Closed.
CAR 2.3 Specific energy con-	/PD01/ /Section 2.4/ /AMS I C,	Specific energy consumption of each type of fuel is	/PD02/ /Section 2.4 & 3.2/	The specific consumption of biomass, biogas

CAR/CR	Reference	Summary of project owner response	Revised sections (as applicabl	Conclusion
sumption of each type of fuel (biomass / fossil /) to be used in the project activity should be specified ex-ante as per paragraph 32 of the methodology AMS I C, Version 16.	Ver 16/	specified in section 2.4 & 3.2 of revised PD.	/XLS2/	has been incorporated in the Revised PD/PD02/ and Calculation sheet/XLS2/. This has been verified and found to be correct. CAR is closed.
CAR 2.4 Notation used in the table under heading "Data requirement and sources for baseline emission estimation" on page 11 under section 2.4 of the VCS PD needs to be corrected for parameter "Net energy output and Emission	/PD01/ /Section 2.4/	Notation used in the table under heading "Data requirement and sources for baseline emission estimation" on page 11 under section 2.4 of the VCS is modified in the revised VCS PD	/PD02/ /Section 2.4/	The revised VCS PD/PD02/ has been verified and found to be correct. CAR is closed.
CAR 2.5 The formula used to calculate EG Thermal, y and EG Biogas, y Under section 3.2 of the VCS PD needs to be shown in section 2.4 of the PD	/PD01/ /Section 2.4 & 3.2/	The formula used to calculate EG Thermal, y and EG Biogas, y Under section 3.2 of the VCS PD is explained in section 2.4 of the revised VCS PD	/PD02/ /Section 2.4 & 3.2/	The VCS PD/PD02/ has been revised accordingly. CAR is closed.

ADDITIONALITY:

The additionality was demonstrated in PD/PD02/ on the basis of barrier analysis mentioned in Attachment A to Appendix B of Simplified modalities and procedures for small scale project activities. Attachment A to Appendix B mentions four barriers and at least one of the mentioned barriers should be explained to show that the project activity could not be undertaken due to the barrier and that the VCS revenue would significantly act as an impetus for the project to survive.

Under barrier 1, investment barrier have been chosen to argue additionality. DOE has done thorough check of the documents submitted to cross check each claim of additionality. Interviews also were conducted to ascertain this.

Under barrier 2, technological barrier faced by the project activity due to high alkali salt and impurities content in biomass has been demonstrated by the PP. The demonstration of technological barrier has been found to be acceptable by the DOE.

Table 3.2: Additionality assessment

Step # / Barrier	Demonstration	Assessment
Barrier 1: Investment barrier :	The validation team is convinced that the project faces Investment barrier. PP has chosen average cost of steam generation with different types of fuels as financial indicator. PP has considered the all possible fuels for generation of steam in the absence of the project activity. Amongst all the fuels considered, biogas + coal has been chosen as the most possible scenario and hence as the baseline. The average cost of steam in the project scenario i.e. with Biomass has been compared with that of the average cost of steam generation in the baseline scenario i.e. with Coal. The average cost in the baseline scenario has been calculated to be 440.91 (Rs./Ton) while that of the project activity is 590.42 (Rs./Ton). DOE verified the input values used in the computation of average cost of steam generation and convinced about the input values taken and the accuracy of calculation. DOE checked the correctness of various financial parameters used with the documentary evidence submitted by the PP and also based on its sectoral and local expertise. The calculations have been checked for arithmetical accuracy and the adoption of the accepted accounting principles. The computations reveal that the average cost of steam generation in the project activity is higher than that of the baseline scenario. The robustness of this conclusion was checked by subjecting critical factors to reasonable variations. Two factors viz., cost of biomass and cost of coal have been identified as critical. These factors have been subjected to 10% variation on either side and	☐ Argument not justified ☐ Argument not convincing ☐ Argument justified but not a decisive barrier ☒ Argument justified / significant barrier

Step # / Barrier	Demonstration	Assessment
	revealed the average cost of steam generation in the project activity remains higher than that of baseline scenario.	
Barrier 2: Technological barrier	With regards to the technological barrier, the high alkali salt and impurities content in biomass is likely to affect the project activity. The reference/BAR/3 submitted by the PP to substantiate high alkali salt content and impurities present in biomass has been verified by the DOE.	☐ Argument not justified ☐ Argument not convincing ☒ Argument justified but not a decisive barrier ☐ Argument justified / significant barrier
Assessment of the validation team		☒ Project is additional ☐ Project is not additional

Nevertheless the following CARs/CRs were raised and closed successfully.

CAR/CR	Reference	Summary of project owner response	Revised sections (as applicable)	Conclusion
CAR 2.6 Operating hours of the project at 7680 hours p.a. appears to be low. The projects normally operate for 330 days, if not more.	/XLS1/	Operating hours has been corrected to 7920 as per standard practice i.e., 330 days per annum.	/XLS2/	Operating hours has been changed to 7920 hours. CAR is closed.
CAR 2.7 The inclusion of land cost in the project cost does not seem to be appropriate as it is an existing project.	/XLS1/	Land cost is excluded in the revised LUCS sheet.	/XLS2/	Land cost has been excluded. CAR is closed.
CAR 2.8 The Value of NCV for biomass and coal taken	/PD01/XLS1/	Calorific value for both biomass and coal is based on the third party laboratory	/PD02/ /Section 2.5/ /XLS2/	The Test certificates for the NCV of fuels/NTC/ considered by the PP

[3] http://www.osti.gov/energycitations/servlets/purl/791079-K0YZWO/native/791079.PDF

CAR/CR	Reference	Summary of project owner response	Revised sections (as applicable)	Conclusion
as 3000 and 4500 Kacal /kg respectively is not supported by documen-troy evidence. That apart, in the VCS PD, CV for biomass is taken at 3300. To that extent, VCS PD and worksheet differ.		test report. Copy of the same has been submitted to DOE for validation. Several test reports are available for verification. Average NCV of biomass works out is 2930 kcal/kg while the average NCV for coal is 4270. PP has used quarterly conducted biomass tests reports to cover the seasonal variations in biomass quality for a year. The same has been corrected in the revised VCS PD under section 2.5 and LUCS work sheet XLS1.		have been verified by the validation team and were found to be appropriate. CAR is closed
CAR 2.9 Though quotation is *envisaged to be submitted*, coal and biomass costs at Rs.3400 and Rs.2800 per MT respectively is very high and is not supported by DOE's experience.	/PD01/XLS1/	Cost of biomass and coal is as per respective invoices from suppliers. Again PP has used the annual average cost of biomass and coal to take care of seasonal variations, if any. Copy of the same is submitted to DOE for validation. Also biomass assessment report is being submitted to DOE for validation.	/PD02/ /XLS2/	The copy of the invoices/INV/ has been verified by the DOE and the costs considered for the calculation has been found to be correct. CAR is Closed.
CAR 2.10 The financial indicator	/PD01/ /Section 2.4/ /XLS1/	Additionality for the project activity is demonstrated as per		PP may kindly quote the relevant paragraph of Ap-

CAR/CR	Reference	Summary of project owner response	Revised sections (as applicable)	Conclusion
used to demonstrate additionality – average cost of coal+biogas and biomass+biogas expected to be consumed for generating the requisite quantity of steam over a period of 20 years - does not conform to any of the 4 financial indicators recommended in the Additionality Tool for demonstrating additionality. Since the biogas cost has been taken zero in both the alternative, essentially the cost comparison boils down to coal vs. biomass.		Attachment A of "Appendix B[4] of the simplified modalities and procedures for small-scale CDM project activities". Thus the financial indicator is in conformance with the above. Financial indicator chosen for the project activity is "Unit cost of steam generation". As per "Attachment A of Appendix B[5] of the simplified modalities and procedures for small-scale CDM project activities" para 1(a) "Investment barrier: a financially more viable alternative to the project activity would have led to higher emissions", Accordingly, average cost of steam generation has been used to demonstrate the additionality of project activity. The cost incurred is same for both baseline and project activity except for fuel cost. This is reflected in the cost of steam generation. Generation of steam through coal is finan-		pendix B, which permits demonstration of additionality using *relative average cost* of alternative fuel as financial indicator. CAR is open (19/1) The cost incurred bothh in baseline and project scenario has been verified by the DOE and found be same in both the scenarios. Thus the indicator, average cost of steam generation chosen by the PP has been conluded to be appropriate by the DOE CAR is closed.

[4] http://cdm.unfccc.int/Reference/Guidclarif/ssc/methSSC_guid05.pdf
[5] http://cdm.unfccc.int/Reference/Guidclarif/ssc/methSSC_guid05.pdf

CAR/CR	Reference	Summary of project owner response	Revised sections (as applicable)	Conclusion
		cially viable when compared to biomass route. The same is reflected by unit cost of steam generation.		
CAR 2.11 The article in the website given as reference for low bulk density and energy content of biomass barrier does not seem to mention anything about the low energy of biomass. It seems to discuss only about low bulk density of biomass and that too with respect to transportation. Since transportation cost is already taken into account in financial analysis, this does not appear to be an acceptable barrier.	/PD01/	As the argument has been accounted for in the financial analysis, the argument is not being referred to separately in the revised VCS PD.	/PD02/ /Section 2.5/	The paragraph has been removed. CAR is closed
CAR 2.12 Common practice analysis provides no information and statements have been made without any documentary evidence. The write up does not conform to Step 4 of Additionality Tool or Step 3 of Para 5.8 of VCS 2007.1.	/PD01/ /Section-2.5)	Though anecdotal information is available to PP but the same could not be found in the public domain, hence it is not being referred to in the revised PD now. The relevant section of PD has been corrected as per Attachment A to Appendix B of Simplified modalities and procedures for small scale project activities.	/PD02/ /Section 2.5/	Additionality of the project is justified based on the attachment A to Appendix B of simplified modalities and procedures. Accordingly only investment barrier is considered for additionality. The relevant section has been removed CAR is closed

CAR/CR	Reference	Summary of project owner response	Revised sections (as applicable)	Conclusion
CAR 2.13 Round trip distance given in the VCS PD (p.16) differs from the input figure given in the worksheet (Cell C4 Leakage worksheet)	/PD01/ /Section 3.2/ /XLS1/	As per EB51 annex 19, leakage has to be accounted only, if the biomass transportation distance exceeds 200km. In the project case average round trip distance of transportation is 150km which is well below 200km. Hence, leakage considered is zero.	/PD02/ /Section 3.2/, /XLS02/	Accepted CAR is closed
CAR 2.14 The web link (http://www.bharatpetroleum.com/sbu/ind_comm/gen_petroprices.asp?from=ind) provided for the price of FO in the PD (page-10,section 2.4) is not opening.	/PD01/ /Section 2.4/	The web link reference for FO price is updated in both VCS PD and LUCS sheet. As per Ministry of Petroleum, India, the cost of FO in August 2007 is Rs 21.28/l (http://petroleum.nic.in/petstat.pdf Page 27, Table -28). The same has been updated in the revised PD and excel sheet.	/PD02/ /Section 2.4/,/XLS2/	The reference provided in the revised VCD PD/PD02/ and calculation sheet/XLS2/ has been verified and found to be OK. CAR is closed
CAR 2.15 Figures pertaining to biomass consumption, CV of biomass and coal given in worksheet is at variance with figures given vide p.21 and 22 of VC PD.	/PD01/ /Section 3.3/ XLS1/	Figures pertaining to biomass consumption, CV of biomass and coal in VCS PD are made in line with worksheet.	/PD02/ /Section 3.3/ XLS2/	The figures are verified in the revised VCS PD/PD02/ and calculation shee/XLS2/ and found to be consistent. CAR is closed.
CR 2.1 O&M cost and depreciation rate have been given in the VCS PD. Since they are not used in the worksheet the objective of giving these input parameters may be explained	/PD01/ /Section-2.5)	O&M cost and depreciation rate are removed in both VCS PD and LUCS sheet.	/PD02/ /Section 2.5/, /XLS2/	The two variables have been removed. CR is closed
CR 2.2	/PD01/	Implementation of biogas plant hap-	/PD02/	Accepted;

CAR/CR	Reference	Summary of project owner response	Revised sections (as applicable)	Conclusion
The project activity is reported to have commenced on 1.4.2008. The company had addressed a letter to MNRE on 6.2.2009 on the quantity of biogas used, may be before commencing the use of biogas. In the above background, please clarify how the baseline is taken is coal + biogas.		pened prior to the start of project activity. Hence coal + biogas is the baseline for the project activity. Furthermore letter to MNRE dated 6.2.2009 is only an official intimation from MNRE for the dispersal of fund for the biomethanation plant.		CR is closed
CR 2.3 HSD price is based on a quotation supplied by Coal supplier. Please clarify whether the coal supplier is also a dealer for HSD and if not what is the sanctity of the quotation received from an agency who does not deal with it.	/XLS1/	HSD price is based on the diesel supplier quotation. The same has been modified in the revised PD and LUCS sheet.	/XLS2/	The revised VCS PD/PD02/ and the calculation sheet/XLS2/ have been verified for the same and found to be Correct. CR is closed
CR 2.4 Sensitivity analysis has been restricted to only the cost of biomass and coal. CV also plays an important role in determination of additionality. The reasons for not considering the CV as critical parameter may be explained	/PD01,Section 2.5/ /XLS1/	Cost of the fuel depends on the calorific value also. Better the CV, higher is the price of the fuel. Hence, the parameters being interdependent, CV is not tested as a parameter in the sensitivity analysis.	/PD02/Section 2.5/ /XLS2	Accepted, since in this case there are no expenses (for that matter there are no expenses at all) related to quantum of fuel consumed. CR is closed
CR 2.5 Following documents/documentary evidence should be submitted: a. Quotations and Purchase orders		The following documents have been sent to DOE. a. Quotations and Purchase orders for boiler, accessories, erection & commissioning etc		All the documents are received and verified by the DOE. The information including the input parameters considered in the VCS PD/PD02/

CAR/CR	Reference	Summary of project owner response	Revised sections (as applicable)	Conclusion
for boiler, accessories, erection & commissioning, boiler house, chimney foundation and boiler fuel yard b. Commissioning of project activity c. MNRE letter on biogas utilization d. Test report on CV of biomass and coal e. Quotation for Biomass and coal cost f. Biomass survey report g. Annual report of the company for the year ended March 31, 2008 and 2009		b. Commissioning of project activity c. MNRE Letter on biogas utilisation d. Test report on CV of biomass and coal e. Quotation for biomass and coal cost f. Biomass survey report g. Annual report 2008-09		and calculation sheet /XLS2/ are verified to be correct. CR is closed

3.3 Monitoring Plan

The Project activity will be monitored as per the methodology AMS I C, Version 16, "Thermal energy production with or without electricity"

The monitoring plan mentioned in the VCS PD /PD01/PD02/ provides detailed information related to the collection and archiving of all relevant data required for the calculation of the ex-post emission reduction, which includes:

1. Quantity of steam generated from boiler
2. Temperature of steam
3. Pressure of steam
4. Temperature of boiler feed water
5. Quantity of biogas combusted in the boiler
6. Quantity of Biomass used in the project activity
7. Quantity of Fossil fuel burned in the project activity
8. Calorific values of biogas, biomass and the fossil fuel used.

All the measuring instruments were found to be installed at plant during the site visit conducted by the DOE. The management structure for data monitoring, collection, data archiving and calibration procedure of equipments for the project activity are clearly defined in the VCS PD. The same was verified during onsite verification/IM01/IM02/ conducted by the DOE and was found to be appropriate. A monitoring team comprising of a head, a plant in charge and a shift in charge as defined in the VCS PD was also found to be in place during the onsite verification/IM01/IM02/.

Thus the monitoring procedure followed by the PP at the project site was verified to be adequate and inline with the applied methodology AMS I C/AMS I C/.

Nevertheless, the following CARs were raised and closed successfully.

CAR/CR	Reference	Summary of project owner response	Revised sections (as applicable)	Conclusion
CAR 3.1 The parameters which are to be fixed ex-ante and which are to be monitored during the crediting period need to be clearly defined in the VCS project description.	/ PD01/	Necessary changes has been done in the monitoring section of the revised VCS PD. The ex-ante parameters are included in section 3.3 of revised VCS PD.	/PD02/ Section 3.2/	The ex-ante parameters still are not specified in the revised VCS PD/PD02/. CAR is Open. (20/01) The list of ex-ante fixed parameters are verified to be incorporated inthe revised VCS PD/PD02/. CAR is closed.
CAR 3.2 The section 3.3. of the VCS PD is not filled up adequately. E.g. Value of data used is missing for all parameters except NCVbiogas, the accuracy of the meters used is not stated, also for the parameters such as quantity of steam, temperature of steam, pressure of steam, temperature of feed water the description of measurement method is not adequate.	/PD01,Section 3.3/	All necessary data are included in section 3.3 of revised VCS PD.	/PD02,Section 3.3/	The section 3,3 of the VCS PD has been revised/PD02/. CAR is closed.

CAR/CR	Reference	Summary of project owner response	Revised sections (as applicable)	Conclusion
CAR 3.3 Since enthlapy of steam and feed water are the calculated values these may be removed from the list of monitoring paramter.	/PD01,Section 3.3/	Enthalpy of steam and feed water is removed from the list of monitoring parameters in section 3.3 of revised VCS PD.	/PD02,Section 3.3/	The enthalpy of steam and feed water has been removed in the revised VCS PD/PD02/. CAR is closed.
CAR 3.4 Only unit of the parameter, $Q_{fossil, i,y}$ (quantity of fossil fuel) to be monitored should be mentioned against "Data unit" instead of "mass or volume" in section 3.3 of the VCS PD. I.e., it should be more specific that which one among the mass or volume of the parameter will be monitored.	/PD01/ Section 3.3/	Necessary changes have been done in the revised VCS PD under section 3.3.	/PD02/ /Section 3.3/	The revised VCS PD/PD02/ has been verified for the same and found to be correct. CAR is closed.
CAR 3.5 The parameter $EF_{km, CO2, y}$ (Emission factor of truck, tCO2/km) is a calculated value and not a monitored value. Thus this may be removed from the list of monitoring parameter.	/PD01/ /Section-3.3)	Leakage is considerd to be zero. Hence the parameter EFkm, CO2, y is removed from the list of monitoring parameters in section 3.3 0f revised VCS PD. Biomass is available in surplus within 50km radius from plant. The same is supported by the biomass assessment report. Biomass assessment report is being submitted to DOE for validation.	/PD02,Section 3.3/	Leakage is considered zero as per methodology AMC I C, version 16. However the proof to substantiate that the biomass will not be transported beyond a distance of 200 km for the project activity needs to be submitted to the DOE. CAR is open. (20/01) The biomass availability assessment/BRAR/ submitted by the PP has been verified and it was confirmed that there is sufficient

CAR/CR	Reference	Summary of project owner response	Revised sections (as applicable)	Conclusion
				quantity of biomass available in the region for the project activity. Thus the transportation distance of biomass for the project will not exceed 200 km. CAR is closed.
CAR 3.6 The emisssion factor EFy for the fuel which is to be used in the project activity should be specified in the table in the section 3.3. of the VCS PD.	/PD01/ /Section 3.3/	The emisssion factor EFy has been included in the revised VCS PD under section 3.3.	/PD02/ /Section 3.3/	The same has been found to be revised in the VCS PD/PD02/. CAR is closed.
CAR 3.7 The tables used for list of monitoring parameters under section 3.3 of the VCS PD/PD01/ for • Average round trip distance in a year y " AVD_y". • Quantity of bio-mass residue k transported to project site in a year y "$BE_{k,y}$". • Average truck load of trucks used in year y "TL_y". needs to be filled in an adequate manner.	/PD01/ /Section 3.3/	Necessary data are filled in section 3.3 of revised VCS PD.	/PD02,Section 3.3/	The VCS PD/PD02/ has been verified to be revised accordingly. CAR is closed.
CAR 3.8 The section 3.2 of the VCS PD/PD01/ has not been filled up adequately especially the calculation approach.	/PD01/ /Section 3.2/	Necessary changes have been done in section3.2 of VCS PD.	/PD02/ /Section 3.2/	The VCS PD/PD02/ has now been revised accordingly. CAR is closed.

CAR/CR	Reference	Summary of project owner response	Revised sections (as applicable)	Conclusion
Only the parameter 'Net Heat Generated: is explained. The same is also not explained adequately i.e. the temperature and pressure of the steam , the feed water temperature and the amount of bio gas used etc are not addressed.				

3.4 Calculation of GHG Emission Reduction

The GHG emission reduction due to the project activity will be calculated as follows:

$ER_y = BE_y – PE_y - L_y$

Where,

ER_y, Emission reduction in year, Y
BE_y, Baseline emission in year, Y
PE_y, Project emission in year, Y
L_y, Leakage emission in year Y

Baseline Emission, BE_y

The baseline emission for the project activity will be calculated as per the procedure described in section 3.2 of this report.

The quantity of steam associated with the consumption of biogas will be deducted from total quantity of steam generated by the boiler to calculate the baseline emission of the project activity.

Project Emission, PE_y

The project emission includes the emissions involves with combustion of fossil fuel in the project activity. The project emission thus is calculated as follows:

$PE_y = \Sigma FF_{i, y} X NCV_i X EF_i$

Where,

PF_y , Project emissions from on-site fossil fuel combustion in year y, tCO2e

$\Sigma FF_{i, y}$, Quantity of fossil fuel combusted in the project plant in year y, tonne

NCV_i ,Net calorific value of fossil fuel type i, TJ/tonne
EF_i,Emission factor for fuel i; IPCC default value, tCO2/ TJ

Leakage Emission, L_y

The leakage emission involves in the project activity has been considered is zero as neither any equipment is transferred from another activity nor the existing equipment is transferred to another activity. As the distance for the transportation of biomass to the project activity is less than 200 km the emission associated with this also has been considered as zero. The transportation distance has been verified from the biomass availability report/BASR/ submitted by the PP.

The above calculation approach for the GHG emission reduction has been verified by the DOE to be correct and inline with the applied small scale methodology AMS I C, Version 16.

Nevertheless, the following CAR was raised and closed successfully.

CAR/CR	Reference	Summary of project owner response	Revised sections (as applicable)	Conclusion
CAR 4.1 In section 3.2 of the VCS PD/PD01/ the value for „Average round trop distance“ is shown as 100 Km/ trip, however in teh excel sheet/XLS1/ it is shown as 150. The same needs to be corrected.	/PD01,Section 3.2/	Since the leakage is considered as zero, parameters regarding leakage calculation are removed in the revised VCS PD.	/PD02,section 3.2/ XLS2/	As the biomass transportation distance is less than 200 kM, leakage is considered as zero as per methodology AMS I C, Version 16. The VCS PD/PD02/ has been revised accordingly. CAR is closed.

3.5 Environmental Impact

As per the notification of the Ministry of Environment and Forestry (MoEF) dated 14th September, 2006/MoEFN/ the Environment Impact Assessment (EIA) of such type of projects is not required. However during site visit conducted by the DOE/IM01/IM02/ it was confirmed that the project does not have any significant impact on the local environment.

Nevertheless the following CAR was raised and closed successfully.

CAR/CR	Reference	Summary of project owner response	Revised sections (as applicable)	Conclusion
CAR 5.1 The weblink provided for the informations in section 5 of the VCS PD/PD01/ should be specified with the page/paragraph number of the documents.	/PD01,Section 5/	Points referred from the weblink is mentioned in section 5 of revised VCS PD.	/PD02,Section 5/	The page number is now mentioned in the revised VCS PD/PD02/. CAR is closed.

3.6 Comments by stakeholders

The project proponents had organized a local stakeholder consultation meeting to discuss the issues related to environmental and social impacts of the project activity and to discuss their concerns related to development and operation of the project.The local stakeholders were invited through news paper advertisement and invitation letter to seek opinion about the project. The stakeholder meeting was conducted in the industrial facility of the project proponent on 26th May 2009.Proof for local stakeholder consultation process/LSC/ including minutes of meeting of the consultation process and advertisement in local news paper submitted by project proponent was reviewed by validation team.It was evidenced from minutes of meeting of the stakeholder consulted process dated 26th May 2009 that no negative opinion was received from any of the local stake holder.

4 Validation conclusion

Gujarat Ambuja Exports Limited (GAEL) has commissioned the TÜV NORD JI/CDM Certification Program (CP) to validate the project: "Biomass based steam generation project by Gujarat Ambuja Exports Ltd" with regard to the relevant requirements of the VCS, as well as criteria for consistent project operations, monitoring and reporting.

The project activity involves setting up a biomass-based boiler of capacity 30 TPH in the agro processing manufacturing facility of the project proponent. The biogas generated due to anaerobic digestion of wastewater in the plant is also co-fired along with biomass in the boiler. The project reduces green house gas emission by combusting biomass residue available in the region thereby substituting consumption of fossil fuel. Annual quantity of 559.64 TJ steam has been estimated to be produced from the project activity resulting 45523 tCO_2 of emission reduction annually.

The review of the VCS PD/PD01/PD02/ and additional documents related to baseline and monitoring methodology; the subsequent background investigation, follow-up interviews and review of comments by parties, stakeholders have provided TÜV NORD JI/CDM CP with sufficient evidence to validate the fulfilment of the stated criteria.

A risk based approach has been followed to perform this validation. In the course of the validation 27 Corrective Action Requests (CAR) and 05 Clarification Requests (CR) were raised and successfully closed out.

The validation is based on the VCS PD/PD01/PD01/, emission reduction calculation sheet/XLS1/XLS2/ proof of title, proof of right, additional documents related to baseline and monitoring methodology; the subsequent background investigation, follow-up interviews and supporting documents made available to the validates by project proponent.

As a result of the validation, the validates confirm that:

- The project fulfils criteria of VCS 2007.1 provided.
- The project additionality is sufficiently justified in the PD/PD02/.
- The monitoring plan is transparent, adequate and inline with applied baseline and monitoring methodology of ACM 0002, version-10.
- The calculation of the project emission reductions is carried out in a transparent and conservative manner, so that the calculated emission reductions of 455230 t CO2e (total) is most likely to be achieved within the 10 years fixed crediting period.
- No restrictions or uncertainties were identified related to the validation.

Vadodara, 2010-02-05
Pankaj Patel
TÜV NORD JI/CDM Certification Program

Essen, 2010-03-26
Rainer Winter
TÜV NORD JI/CDM Certification Program

Table 5.1:Documents provided by the project proponent

Reference	Documents
/BASR/	Biomass Assessment Study Report.
/CC/	Commissioning Certificates of: 1. Boiler dated 27/03/2008 2. Biogas Digester dated 28/07/2008 3. Plant dated 26/08/2008
/DEC/	Declaration letter from PP regarding confirmation of not creating any other form of environmental credit dated 09.01.2010
/INV/	Invoices of Fuels. 1. Biomass 2. Coal 3. Diesel
/LSC/	Proof of local stakeholder consultation process: 1. Minutes of Meeting dated 26.05.2009 2. Advertisement in local newspaper dated 17/04/2009
/PD01/	Initial VCS PD dated 25/09/2009
/PLT/	Proof of project life time; Letter from boiler manufacture dated 30/11/2009
/PCBC/	Pollution Control Board Clearances: 1. PCB Clearance to establish dated 02/03/2007 2. PCB Clearance to operate dated 15/02/2008
/PD02/	Final VCS PD dated 22/01/2010
/PO/	Purchase order of the boiler dated 17/08/2007
/NTC/	NCV Test Certificates of the fuels.
/TS/	Technical specifications
/XLS1/	Initial Excel calculation sheets provided by the project participant w.r.t initial VCS PD
/XLS2/	Final Excel calculation sheets provided by the project participant w.r.t final VCS PD

Table 5.2: Background investigation and assessment documents

Reference	Document
/AMS I C/	Thermal energy production with or without electricity. (Version 16)
/TE/	Tool to calculate emission factor for an electricity system.
/CPM/	TÜV NORD JI / CDM CP Manual (incl. CP procedures and forms)
/CEA/	CO_2 Baseline Database for Indian Power Sector –User Guide, Ver 04 published by CEA.
/MoEFN/	Ministry of environment and forest notification on EIA
/TA/	Tool for the demonstration and assessment of additionality
/VVM/	CDM Validation and verification Manual (V. 01.1,EB 51,Annex-03)

Table 5.3: Websites used

Reference	Link	Organisation
/BAR/	http://www.osti.gov/energycitations/servlets/purl/791079-K0YZWO/native/791079.PDF	Energy Citations Database
/cea/	www.cea.nic.in	Central Electricity Authority, Ministry of Power, Government of India
/imef/	www.envfor.nic.in	Indian Ministry of Environment and Forest
/imp/	www.powermin.nic.in	Indian Ministry of Power
/IPCC/	2006 IPCC Guidelines for National Greenhouse Gas Inventories	Intergovernmental Panel on Climate Change.
/unfccc/	http://cdm.unfccc.int	UNFCCC
/VCS/	www.v-c-s.org	VCS website

Table 5.4: List of interviewed persons

Reference	MoI[1]		Name	Organisation / Function
/IM01/	V	☒ Mr. ☐ Ms	R.K Gupta	Gujarat Ambuja Export
/IM01/	V	☒ Mr. ☐ Ms	R.P Mathur	Gujarat Ambuja Export
/IM02/	V	☒ Mr. ☐ Ms	Chilamburaj A	EVI

[1)] Means of Interview: (**T**elephone, **E**-Mail, **V**isit)