LUCEVANS CERAMIC FUEL SWITCHING PROJECT VERIFICATION REPORT

Document Prepared by IBOPE Instituto Brasileiro de Opinião Pública e Estatística Ltda.

Project Title	Lucevans Ceramic Fuel Switching Project
Version	1
Report ID	00072-2013

Report Title	Lucevans Ceramic Fuel Switching Project Verification Report
Client	Sustainable Carbon – Projetos Ambientais Ltda
Pages	34
Date of Issue	3rd December 2014
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Summary:

A brief description of the verification and the project

The project activity promotes a fuel switch at Lucevans ceramic industry, located in the municipality of Panorama, State of São Paulo, in the southeast region of Brazil, that produce structural ceramic devices like bricks, mainly for supply the local market of Panorama and the State of São Paulo.

The project activities consists on stop utilizing native wood, a non-renewable fuel, and fully substitute it with renewable biomass, specifically sawdust and sugarcane bagasse, available in the region for effective generation of thermal energy for captive consumption, feeding Lucevans kilns and firing its ceramic units. In the baseline scenario, ceramic company utilized native wood from the Cerrado biome. This non-renewable woody biomass is not originated in areas with reforestation activities or with sustainable management practices.

This fuel switching project is reducing greenhouse gas (GHG) emissions through the substitution of non-renewable woody biomass for renewable biomasses to generate thermal energy.

The proposed project started the fuel switch in July 2007; the initial of project activities was on 1st September 2007. The project crediting period is 10 years, i.e., from 1st September 2007 to 31st August 2017, twice renewable.

The purpose and scope of verification

IBOPE has performed the verification of the project: "Lucevans Ceramic Fuel Switching Project" according to the Verified Carbon Standard – VCS Standard, version 3.4. This verification covers the period from 01 January 2010 to 28 February 2014.

The verification includes confirming the implementation of the monitoring plan of the VCS PD and the application of the CDM small scale methodology Category AMS-I.E.: Switch from Non-Renewable Biomass for Thermal Applications by the User – Version 1.

The method and criteria used for verification

The verification team has reviewed the Monitoring Report against the criteria established in the VCS Program Guide Version 3.5 and the VCS Validation and Verification Manual. In line with the criteria included in the VCS Program Guide Version 3.5, the verification is meant to ensure that the reported emission reductions are real, measurable, permanent, additional, independently audited, unique, transparent and conservative.

The verification consisted of a desk review and an on-site visit (22th May 2014) where interviews with the key personnel from the project company Lucevans ceramic industry and the PD developer Sustainable Carbon – Projetos Ambientais Ltda were conducted. The verification team also confirmed that the monitoring procedures were correctly applied and the emission reductions were correctly

calculated.

The number of findings raised during verification

This verification came out with 15 (fifteen) findings, which were all listed in APPENDIX A: Non-Conformities. They have all been attended and closed. Amongst them, this verification came out with 1 (one) Forward Action Request which shall be attended.

Any uncertainties associated with the verification

During verification, IBOPE Team has raised an indicative of necessity to prove the origin of renewable biomass utilized in the production process of Lucevans ceramic industry. Please refer to Section 4 of this document in order to check uncertainty pointed out.

Summary of the verification conclusion

The Monitoring Report is considered to be in compliance with VCS Program Guide Version 3.5, the approved methodology Category AMS-I.E.: Switch from Non-Renewable Biomass for Thermal Applications by the User – Version 1, and the Monitoring Plan presented in the Project Description.

During the monitoring period from 01 January 2010 to 28 February 2014, the project generated the following GHG emission reductions: **42,145** tCO_2 equivalents.

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1 INTRODUCTION

1.1 Objective

Sustainable Carbon – Projetos Ambientais LTDA has commissioned IBOPE to verify the 3rd periodic verification of the emission reductions reported for the VCS "Lucevans Ceramic Fuel Switching Project" with regard to the relevant requirements for VCS program as per the VCS Standard, version 3.4.

The objective of the 3rd periodic verification is to verify that the actual monitoring systems and procedures are in compliance with the monitoring system and procedures described in the Monitoring Plan that is presented in the PD. In addition, the periodic verification evaluates the greenhouse gas (GHG) emissions data presented in the Monitoring Report and expresses a conclusion about whether the presented GHG emissions data is free of material misstatements and sufficiently supported by evidence.

1.2 Scope and Criteria

The verification comprises a review of the monitoring report over the monitoring period 01 January 2010 to 28 February 2014, based on the registered Project Description (PD) in part of the project design, monitoring parameters, monitoring plan, emission reduction calculation, monitoring methodology and all related evidences provided by project participant. Those documents have been reviewed and verified against VCS Standard, version 3.4, UNFCCC rules and associated interpretations.

The main scopes of this verification are:

- Verify whether the emission reductions generated by the project are in line with the VCS Standard, version 3.4, applicable methodology and the information provided by the project participants contains all the necessary information to evidence the project's compliance with all criteria in the VCS.
- Verify that the project has been implemented as described in the Project Design (PD) during the verification period.
- Confirm that the monitoring plan was implemented and fully functional to generate voluntary emission reductions (VCU) without any double counting during the whole verification period.
- Give a conclusion whether reported data are accurate, complete, consistent, and transparent, with a high level of assurance and free of material error or misstatement.

The correct application of the CDM small scale methodology: "Category AMS-I.E.: Switch from Non-Renewable Biomass for Thermal Applications by the User – Version 1" was already carried out. An explicit review of the validation and its underlying assumptions made and its conclusion are not scope of this verification.

1.3 Level of Assurance

As the VCS Standard, version 3.4 recognizes verified emission reductions, IBOPE has focused on providing a reasonable level of assurance that emission reduction calculation methodology is appropriate and correctly applied, also that emission reductions have been accurately monitored. The implementation can be considered sustainable and no indications were observed leading to the assumption of high risks beyond common project specific challenges in relation to the likelihood of continual removal of GHG emission reduction through the project. This judgment is based on the document review, onsite checks and consistency checks.

In the case it is required, IBOPE may discount verified emission reductions or requests a discount of these by using conservative assumptions for uncertainties in emission reduction calculations that cannot be fully quantified or that cannot give a desired level of assurance. For verifying/certifying VCUs, the desired level of assurance was based on the combined quantitative assessment of the accuracy of monitoring project performance and the identification of material risks.

1.4 Summary Description of the Project

The project activity promotes a fuel switch at Lucevans Ceramic industry, located in the municipality of Panorama, State of São Paulo, in the southeast region of Brazil, which produces structural ceramic units, particularly ceramic bricks, mainly for supply the local market of Panorama and the State of São Paulo.

In the baseline scenario, the ceramic company utilized native wood. This type of wood is considered a non-renewable woody biomass, once it is not originated in areas with reforestation activities or with sustainable management practices. Thus, the purpose of project activity is to utilize renewable biomass available in region for effective generation of thermal energy for captive consumption.

The production process of Lucevans Ceramic Company utilized three “Round Kiln”, with openings utilized to burn fuel (sawdust/wood chips) and cook products, during all verified monitoring period. The emission reductions due to the switching of non-renewable fuel (non-renewable wood) to renewable biomasses resulted in **42,145 tCO2e** during the monitoring period from 01 January 2010 to 28 February 2014.

The proposed project started the fuel switch in July 2007; the initial of project activities was on 1st September 2007. The project crediting period is 10 years, i.e., from 1st September 2007 to 31st August 2017, twice renewable.

2 VERIFICATION PROCESS

2.1 Method and Criteria

The verification is based on validated project description including baseline and monitoring report. These documents are reviewed against VCS Standard, version 3.4. IBOPE has employed a risk-based approach in the verification, based on the recommendations in the Validation and Verification Standard, focusing on the identification of significant risks and reliability of project monitoring and generation of emission reductions.

The verification includes the next steps: desk review of the project design documents and monitoring report; on-site visit and follow-up interviews and resolution of outstanding issues and the issuance of the final verification report and opinion.

2.2 Document Review

The following table outlines the documentation reviewed during the verification process.

/1/ UNFCCC, Clean Development Mechanism Validation and Verification Standard, Version 7.0
/2/ UNFCCC, CDM small scale methodology “Category AMS-I.E.: Switch from Non-Renewable Biomass for Thermal Applications by the User – Version 1”.
/3/ VCS PD registered, Version 4 – 27th March 2009
/4/ VCS Verification Report – 1st Verification – 31st March 2009
/5/ VCS Verification Report – 2nd Verification – 13th July 2010
/6/ VCS Monitoring Report – 1st period – Version 4 – 27th March 2009
/7/ VCS Monitoring Report – 2nd period – Version 5 – 7th July 2010
/8/ VCS Monitoring Report – 3rd period (current version) – Version 3 – 1st December 2014
/9/ VCS MR Calculations Lucevans__01_01_2010_ 28 02 2014_v1
/10/ VCS MR Calculations Lucevans__01_01_2010_ 28 02 2014_v2
/11/ VCS MR Calculations Lucevans__01_01_2010_ 28 02 2014_v3
/12/ Cer Lucevans planilha de monitoramento 2010
/13/ Cer Lucevans planilha de monitoramento 2011
/14/ Cer Lucevans planilha de monitoramento 2012
/15/ Cer Lucevans planilha de monitoramento 2013

/16/ Cer Lucevans planilha de monitoramento 2014
/17/ VCS Validation Report – 25th March 2009

2.3 Interviews

IBOPE has performed an on-site visit on 22th May 2014 during which the operations of Lucevans ceramic were reviewed. During the visit the verification team conducted interviews with the following representatives of the project company Lucevans and the Sustainable Carbon – Projetos Ambientais Ltda who prepared the VCS PD and the VCS Monitoring Report.

- Ms. Vanda do Amaral Miquelotti, director and owner
- Ms. Eliana Carla Miqueloti, monitoring data responsible;
- Mr. Dênis Gonçalves dos Santos, technical analyst of Sustainable Carbon – Projetos Ambientais Ltda.

The monitoring report was completed by Dênis Gonçalves dos Santos, Marcelo Hector Sabbagh Haddad and Thiago de Avila Othero, from Sustainable Carbon – Projetos Ambientais LTDA.

2.4 Site Inspections

An on-site inspection was conducted on 22th May 2014 with the purpose to clarify whether the project had been carried out as described in the VCS PD, assessment of documents and interview people in order to verify the project conditions. The main verification topics during the site visit include, but were not limited to:

- On-site assessment to confirm whether all relevant equipment are installed and works as described in the registered VCS PD;
- The operating staff was interviewed and observed in order to check the risks of inappropriate operation and data collection procedures;
- Information process for generating, aggregating and reporting the selected monitored parameters were reviewed;
- The monitoring processes, routines and documentations were audited to check their proper application;
- The monitoring data were checked completely.

The on-site visit at the ceramic confirmed that the monitoring and reporting is carried out consistently and in line with established procedures and as per the requirements of the monitoring plan mentioned in the registered VCS PD.

2.5 Resolution of Findings

This process is aimed at resolving any outstanding issues which need to be clarified prior to the IBOPE conclusion on the project design and monitoring results. Findings established during the verification can either be seen as a non-fulfillment of CDM criteria and VCS Standard, version 3.4.

IBOPE shall raise a Corrective Action Request (CAR) if one of the following situations occurs:

a) Non-compliance with the monitoring plan or methodology are found in monitoring and reporting and has not been sufficiently documented by the project participants, or if the evidence provided to prove conformity is insufficient;
b) Modifications to the implementation, operation and monitoring of the registered project activity has not been sufficiently documented by the project participants;
c) Mistakes have been made in applying assumptions, data or calculations of emission reductions that will impact the quantity of emission reductions;
d) Issues identified in a FAR during validation to be verified during verification or previous verification(s) have not been resolved by the project participants.

IBOPE shall raise a Clarification Request (CL) if information is insufficient or not clear enough to determine whether the applicable CDM requirements have been met.

IBOPE shall raise a Forward Action Request (FAR) during verification if the monitoring and reporting require attention and/or adjustment for the next verification period.

During the course of this Verification, it was checked that all of the data from the spreadsheet was backed up by solid proof via invoices and receipts in the case of purchases of burning material for the production of ceramic pieces.

The calculations of emission reductions were revised and proofed:

- CAR 6 request action in which led to modification on parameter PR_y which is essential to the calculation of emission reductions. The discrepancy or mistake found was corrected and reviewed by project developer from findings opened by IBOPE, then finally closed.

This verification came out with 15 (fifteen) findings – 11 (eleven) corrective action request and 3 (three) clarification request, which were all listed in APPENDIX A: Non-Conformities. They have all been

attended and closed. Additionally, the verification came out with 1 (one) Forward Action Request (FAR) which shall be monitored onward.

2.5.1 Forward Action Requests

This verification came out with 1 (one) Forward Action Request (FAR) which shall be monitored onward, and are presented in APPENDIX A: Non-Conformities

2.6 Eligibility for Validation Activities

Not applicable.

3 VALIDATION FINDINGS

3.1 Participation under Other GHG Programs

Not applicable.

3.2 Methodology Deviations

There were no methodology deviations during this monitoring period.

3.3 Project Description Deviations

The VCS PD version 4 states that project proponent shall maintain a control of evidences of amount of biomass utilized in production process, referring to the $Q_{renbiomass}$ parameter. As also requested for this 3rd MR and evidenced by complying with monitoring plan checked in MR, project proponent maintains registers of receipts and invoices of purchasing of biomass. As the amount of biomass purchased directly influences the financial obligations of ceramic industry, by remunerating suppliers with amount of biomass purchased, this is considered a reliable source of data.

IBOPE hereby confirmed that the deviations are appropriately described and justified, and verified that this deviation has no impact in the applicability of the methodology, additionality, and the appropriateness of the baseline scenario. Moreover, the project remains in compliance with the VCS rules.

3.4 Grouped Project

Not applicable.

4 VERIFICATION FINDINGS

4.1 Project Implementation Status

Material discrepancies

The project consists in fuel switching, substitution of native wood for renewable biomasses to generate thermal energy, feeding the kilns and firing the ceramic units from Lucevans ceramic industry, according to the VCS PD. During the on-site visit, it was physically observed and documented by the verification team that renewable biomass such as sawdust/wood chips has been employed in the kilns of Lucevans to energy supply.

Thus, IBOPE hereby verified that there are no extra material discrepancies between project implementation and the project description.

Implementation Status of Monitoring Plan

Lucevans ceramic industry applies the monitoring plan in accordance what is preconized in 3rd MR and VCS PD version 4. Additionally to issues below, the Verification Team has raised CAR 8 in order to correct issue found in Monitoring Plan of 3rd MR, which was attended and closed.

- **$Q_{renbiomass}$ and PR_y**

  $Q_{renbiomass}$ and PR_y were verified by IBOPE Verification Team and crosschecked according to information presented and verified procedures during site visit, such as invoices and receipts of biomass input purchase and production control notebooks and archives.

  CAR 5 and CAR 6 has raised issues against these parameters and were closed during Verification.

- **Origin of renewable biomass**

  IBOPE Verification Team has crosschecked affirmation from MR monitoring plan, VCS PD version 4 and Category AMS-I.E.: Switch from Non-Renewable Biomass for Thermal Applications by the User – Version 1.

  Thus, CL 1 was opened and also has demanded proof of origin from biomass suppliers by presenting invoices and documents from tracking of supply chain from sawdust and its origin. As sugarcane bagasse was already viewed and proved as renewable in accordance with VCS PD, VCS MR and CDM Definition of Renewable Biomass (EB23; Annex 18), it was not considered in this statement. Please refer to Section 4.3 for specific considerations regarding origin of renewable biomass parameter.

Moreover, in order to maintain conservativeness and accuracy of project activities, FAR 1 has been opened and shall be monitored onwards.

- **Renewable biomass surplus and Leakage of non-renewable biomass**

  According to the 3rd MR, Section 4.3 refers to parameters at Section 3.2, where it describes how parameter is referred and calculated. Please consider the following statement from 3rd MR:

  > Sawdust/Wood Chips: "*The production of wood generates a large amount of residues, which can be reused to generate thermal energy*"; "*[…] the production of log of wood and firewood in the State of São Paulo and Mato Grosso do Sul totalizes 32.3 millions of m³ of wood, which will generate more than 7.1 millions of m³ of residues, considering that around 22% of this total will generate sawdust"*; "*The project activity employed approximately an average 4,104.36 tons or 7,674,619 m³ per year which represent less than 1% of the total of residues generated in both States*".
  >
  > Sugarcane Bagasse: "*[…] one ton of sugar cane produces about 140 kilograms of sugar cane bagasse and finally 90% of this amount can be used to energy production*"; "*[…] the amount of sugar cane bagasse generated in the year of 2008/2009 was 48,481,015 tons, thus, the amount that could be used to energy production was 48,481,020 tons. The consumption of sugar cane bagasse by this project activity was 97.47 tons per year, which represented less than 1% of the total of sugar cane bagasse produced in the year of 2008/2009*".

  Leakage is to be considered as 0 (zero), as conclusion of 3rd MR. Nevertheless, CAR 9, CL 2 and CL 3 were raised in order to correct issues found in 3rd MR, which were attended and closed.

  Hence, parameter above mentioned was demonstrated to be correctly calculated and data utilized to base it has been presented by 3rd MR in accordance with requirements from Category AMS-I.E.: Switch from Non-Renewable Biomass for Thermal Applications by the User – Version 1. Moreover, parameter has utilized the *General guidance on leakage in biomass of Indicative Simplified Baseline and Monitoring Methodologies for Selected Small-Scale CDM Project Activity Categories*.

- $f_{NRB,y}$

  Parameter above mentioned was demonstrated to be correctly calculated and referred. Data utilized to base it has been presented by 3rd MR in accordance with requirements from Category AMS-I.E.: Switch from Non-Renewable Biomass for Thermal Applications by the User – Version 1.

Material discrepancies between the actual monitoring system, and the monitoring plan set out in the project description and the applied methodology

IBOPE has conducted an analysis of actual monitoring plan from 3rd MR and monitoring plan from VCS PD version 4, considering requirements from Category AMS-I.E.: Switch from Non-Renewable Biomass for Thermal Applications by the User – Version 1.

- Thermal energy: It was requested two clarifications by CL 2 and CL3, which were rectified and then closed.

It has been demonstrated that project developer has carried out a satisfactory monitoring of data, jointly with project proponent by leading an assessment of data generated from production process and purchase of biomass, in a real time register technology from internet clouding storage service, what has been proofed as useful, functional and reliable to project activities.

Please refer to Section 4.3 for specific considerations regarding origin of renewable biomass parameter.

Other project trading program, environmental credit or GHG program

IBOPE hereby verifies that project is not applicable to other emissions trading program or any other mechanism that includes GHG allowance trading and any other form of environmental credit. The project has not participated or been rejected under any other GHG programs.

Local regulations and permits

According to the VCS PD, in order to the project is in accordance with local laws, it must run with licenses under valid time. During the on-site visit, the verification team checked the environmental license and clay extraction license and they were valid during this monitored period, confirming the project compliance with the local laws.

4.2 Accuracy of GHG Emission Reduction and Removal Calculations

The verification team has checked the emission reduction calculation and confirmed that the Baseline Emissions have been calculated according to the formulas in the PD and following the approved CDM

baseline and monitoring methodology "Category AMS-I.E.: Switch from Non-Renewable Biomass for Thermal Applications by the User – Version 1".

The emission reduction is calculated as baseline emissions (BE_y) minus project emissions (PE_y) minus leakage emissions (LE_y). Since no project and leakage emissions are identified according to the applied methodology, baseline emissions are equal to the amount of emission reduction.

Baseline emissions

$$\mathbf{ER_y = B_y \times f_{NRB,y} \times NCV_{biomass} \times EF_{projected\_fossilfuel}}$$

ER_y: Emission reductions during the year y in tCO_2e;

B_y: Quantity of biomass that is substituted or displaced in tonnes of ceramic units;

$f_{NRB,y}$: Fraction of non-renewable biomass (wood) used in the absence of the project activity in year y;

$NCV_{biomass}$: Net calorific value of non-renewable biomass in TJ/tonne;

$EF_{projected\ fossil\ fuel}$: Emission factor for the projected fossil fuel consumption in the baseline in tCO_2e/TJ[1];

B_y is determined using option (b) of the applied methodology, as follows:

Calculated from the thermal energy generated in the project activity as:

$$\mathbf{B_y = \frac{HG_{p,y}}{\eta_{old} \times NCV_{biomass}}}$$

Where:

$HG_{p,y}$: Quantity of thermal energy generated by the renewable energy in the project in year y in TJ;

η_{old}: Efficiency of the system being replaced.

$$\mathbf{HG_{p,y} = SGE \times PR_y}$$

Where:

[1] The fossil fuel likely to be used by similar consumers is taken the IPCC default value of residual fossil fuel.

SGE: Specific energy which has to be generated in the process to produce a certain amount of ceramic devices in TJ/thousands of ceramic devices;

PR_y: Production of ceramic pieces in thousands of ceramic devices;

$$\eta_{old} = \frac{SGE}{SFE}$$

Where:

SFE: Specific fuel energy needed for the process to produce a certain amount of ceramic devices in TJ/thousands of ceramic devices;

$$SFE = BF_y \times NCV_{biomass}$$

Where:

BF_y: Consumption of non-renewable biomass (tonnes) per thousand of ceramic devices produced per year;

Using the Equations 3, 4 and 5 in the Equation 1 it results to:

$$B_y = PR_y \times BF_y$$

Spreadsheet VCS MR Calculations Lucevans__01_01_2010_ 28 02 2014_v3 was verified and calculations were assessed by comparing Category AMS-I.E.: Switch from Non-Renewable Biomass for Thermal Applications by the User – Version 1, monitored data available and validation fixed parameters.

Validation fixed parameters

The validation fixed parameters were rechecked in order to verify its level of conformity with current scenario of project activities. Its applicability to calculation spreadsheets available were rechecked, such as appropriateness, conservativeness and accuracy. IBOPE consider it as sufficient and right, with no actions required from values assessed. However, CAR 4 was opened, and correspond to a minor action required, from completeness of information stated in VCS 3rd MR, then amended and closed.

Monitored parameters

The steps taken from Category AMS-I.E.: Switch from Non-Renewable Biomass for Thermal Applications by the User – Version 1 were compared from each and every version generated by any response of finding rounds[2]. As follows:

- $Q_{renbiomass}$ parameter required action of change by reflecting request of CAR 5;
- PR_y parameter required action of change by reflecting request of CAR 6;

Calculations

The calculations presented on the spreadsheet are right and therefore the emissions reductions are to be considered generated through Category AMS-I.E.: Switch from Non-Renewable Biomass for Thermal Applications by the User – Version 1. Although calculation are right, CAR 10 was opened in order to correct issues found in text and tables from Section 4.4 of 3rd VCS MR.

4.3 Quality of Evidence to Determine GHG Emission Reductions and Removals

Lucevans has adequate monitoring mechanisms and uses the required parameters to monitor on a monthly basis. Moreover, project participant and project developer have presented all information required to verify parameters monitored in accordance with PD.

- $Q_{renbiomass}$

  Data was presented by the following spreadsheets:
  - *VCS MR Calculations Lucevans__01_01_2010_ 28 02 2014_v3;*
  - *Cer Lucevans planilha de monitoramento 2010;*
  - *Cer Lucevans planilha de monitoramento 2011*
  - *Cer Lucevans planilha de monitoramento 2012;*
  - *Cer Lucevans planilha de monitoramento 2013;*
  - *Cer Lucevans planilha de monitoramento 2014.*

  All data informed in that spreadsheet above mentioned were crosschecked with regular stored data from invoices and receipts of biomass purchase during site visit. Data has demonstrated to be solid and exact; however CAR 5 was raised.

- PR_y

[2] For more information please refer to APPENDIX A: Non-Conformities;

PR_y data was presented by the following spreadsheets:

- *VCS MR Calculations Lucevans__01_01_2010_ 28 02 2014_v3;*
- *Cer Lucevans planilha de monitoramento 2010;*
- *Cer Lucevans planilha de monitoramento 2011*
- *Cer Lucevans planilha de monitoramento 2012;*
- *Cer Lucevans planilha de monitoramento 2013;*
- *Cer Lucevans planilha de monitoramento 2014.*

During site visit PR_y was crosschecked with regular production process register of data from production of pieces. Data has demonstrated to be solid and exact; however CAR 6 was raised.

- Origin of renewable biomass

  The origin of renewable biomass was crosschecked by IBOPE, by raising CL 1, in order to request, from project proponent and project developer, the proof of tracking of biomass suppliers, aiming to determine the origin of renewable source utilized.

  Sawdust

  Documentation presenting traceability of biomass purchased by Lucevans ceramic industry has been presented, demonstrating that biomass probably comes from residual from processing of wood which origins probably from forestry products, such as eucalyptus and pinus cultivated in regional area of Panorama municipality and other cities in its surroundings. Invoices were presented containing data from where residue is probably originated (Lucevans ceramic suppliers), also the probable origin of wood product purchased by main Lucevans ceramic suppliers. It is considered as an extra evidence that residue biomass are probably originated from wood products which are produced in reforested areas.

  However, it was evidenced, during verification, that parameter origin of renewable biomass, in which shall be monitored by project proponent and project developer, interfering directly in the project activities context, has presented a difference between the total amount of biomass utilized, as renewable biomass, and the totality in which can be proved or tracked as from renewable sources, such as defined by VCS PD[3] and VCS MR.

[3] VCS PD states the following at Section 3.3, page 30: "*This information will be given by the biomasses providers. The guarantee of acquiring sawdust/wood chips from renewable wood will be achieved by invoices from the providers, as well as the sawdust and wood chips will be tracked until its afforestation origin*".

According to what CL 1 request, origin of renewable biomass shall be proved or at least tracked. The following concepts were determined by project developer in order to set the renewability status of biomass:

- Proved: A biomass is considered proved when it is possible to track and prove that the biomass is renewable – proof shall be available as evidence to Verification Team;
- Tracked: A biomass is considered tracked when it is possible to track that the provider is located in an area that common practice is the utilization of reforestation trees – proof of common practice shall be demonstrated as evidence to Verification Team.

Considering above definition, it was determined that: 22.25% of biomass utilized by ceramic industry is proved; 76.69% of biomass utilized by ceramic industry is tracked; 1.06% of biomass cannot be stated as tracked or proved.

Hence, IBOPE has undertaken that 98.94% of biomass is probably[4] renewable and can be proved or tracked since its source. The remaining 1.06% cannot be determined as probably renewable.

Finally, FAR 1 was raised and shall be continuously monitored onwards, in order to maintain origin of renewable biomass under rigorous control of project activities. Jointly responsible for this monitoring are the project proponent and the project developer, players of Lucevans Ceramic Fuel Switching Project.

Limitations of Verification Body: IBOPE states that origin of renewable biomass was requested in order to comply with requirements of Category AMS-I.E.: Switch from Non-Renewable Biomass for Thermal Applications by the User – Version 1, VCS PD version 4 and current MR version 3 statements. IBOPE disclosure from origin of renewable biomass shall not be undertaken as a strict proof of origin, because of limitation of actions to verify origin of renewable biomass utilized. These limitations are mainly the following:

- Unavailability to visit and carry out verification of origin of renewable biomass;
- Limitation of Category AMS-I.E.: Switch from Non-Renewable Biomass for Thermal Applications by the User – Version 1 to determine the level of engagement and

[4] IBOPE statement of probability of renewability of biomass shall be deemed as the best efforts carried out in order to determine level of assurance of renewability of biomass, considering its sources, traceability and limitations of Category AMS-I.E.: Switch from Non-Renewable Biomass for Thermal Applications by the User – Version 1. Probability of renewability of biomass shall not be undertaken, under any circumstances, as a statement of truth of condition of renewability of biomass from IBOPE assessment.

monitoring from project proponent and project developer to execute project activities, regarding origin of renewable biomass;

Finally, IBOPE made its best efforts to determine the highest level of proof of origin of renewable biomass utilized by Lucevans ceramic in its project activities. IBOPE concludes that origin of renewable biomass, according to CL 1 raised and data presented, are probably originated at a renewable source, in which were not confirmed by site visit inspection at upstream process of life cycle supply chain of Lucevans ceramic furnishers of burning material.

- Renewable biomass surplus

  Renewable biomass surplus were crosschecked, then CAR 7 was opened, amended and closed in order to attend to Category AMS-I.E.: Switch from Non-Renewable Biomass for Thermal Applications by the User – Version 1.

- Leakage of non-renewable biomass and fNRB.y

  Information about leakage were checked from the presented MR and evidences from scientific paper and articles, such as official statistical data from regional and national surveys were reviewed and demonstrate a satisfactory basis of data. Data has demonstrated to be solid and exact.

Complying with this situation, the Emission Reductions have been correctly calculated in line with VCS Standard, version 3.4 requirements.

4.4 Non-Permanence Risk Analysis

IBOPE conducted a risk analysis during the Contract Review phase, before finish the Verification process and considers the risk rating acceptable.

5 VERIFICATION CONCLUSION

The verification team of IBOPE has performed the 3rd Verification for the Lucevans Ceramic Fuel Switching Project on the basis of VCS Standard, version 3.4 and UNFCCC criteria for the CDM, as well as criteria given to provide for consistent project operations, monitoring and reporting.

IBOPE concludes that during the period of 01 January 2010 to 28 February 2014 the above described project has fulfilled all the requirements to produce emissions reductions on the total of **42,145** tCO2 eq.

The monitoring plan is in place and the project is generating GHG emission reductions. IBOPE concludes that the project is implemented and operated as planned and described in the registered VCS Project Design.

The monitoring system is in place and functional. The project has generated GHG emission reductions.

It is the opinion of IBOPE that this verification job is to be considered as closed.

Verification period: From 01 – January – 2010 to 28 – February – 2014.

Verified GHG emission reductions and removals in the above verification period:

Year	Baseline emissions or removals (tCO_2e)	Project emissions or removals (tCO_2e)	Leakage emissions (tCO_2e)	Net GHG emission reductions or removals (tCO_2e)
2010	10,629			10,629
2011	10,386			10,386
2012	9,943			9,943
2013	9,628			9,628
2014	1,559			1,559
Total	**42,145**			**42,145**

APPENDIX A: Non-Conformities

ITEM 1	CAR 1.
REFERENCE	Table of Contents
ROUND	1st
CAR/CL	Please maintain uniformity of font and format of table of contents.
CLIENT ANSWER	Font and format of table of contents were unified.
REVISED SECTION	Table of contents.
CONCLUSION	Opened in 1st round; Closed in 2nd round.

ITEM 2	CAR 2.
REFERENCE	Monitoring Report: Section 1.1: Summary Description of the Implementation Status of the Project
ROUND	1st
CAR/CL	According to the VCS Monitoring Report Template v3.3, this section should include: • Brief information about the equipment; • The relevant implementation dates (e.g., dates of construction, commissioning, and continued operation periods); Please confirm whether project is monitored by SOCIALCARBON Standard. In case of not applicability please review this statement.
CLIENT ANSWER	• A brief information about the equipment was made on section 1.1 • The relevant implementation dates were made available on section 1.1
REVISED SECTION	Section 1.1
CONCLUSION	Opened in 1st round; Closed in 2nd round.

ITEM 3	CAR 3.
REFERENCE	Monitoring Report: Section 1.6
ROUND	1st
CAR/CL	According to the VCS Monitoring Report Template v3.3, this section should include the Section 1.6 Project Location, which is not currently presented. Please include Section 1.6.
CLIENT ANSWER	The section 1.6 Project Crediting period was included.
REVISED SECTION	Section 1.6, 1.7, 1.8, 1.9
CONCLUSION	Opened in 1st round; Closed in 2nd round.

ITEM 4	CAR 4.
REFERENCE	Monitoring Report: Section 3.1: Data and Parameters Available at Validation
ROUND	1st
CAR/CL	**$NCV_{biomass}$** *Source of Data:* Please indicate an available link to the reference presented, where current on is a bad link. **$\rho_{biomass}$** *Source of Data:* Please indicate an available link to the reference presented, where current one is a bad link. *Comments:* Please indicate any comment if applicable, or set it as not applicable. **BF_y** *Justification of choice of data or description of measurement methods and procedures applied:* According to the VCS Monitoring Report Template v3.3, this section should include a better description of the choice of data source. Moreover, the data is identical in same table rows and seems that paragraph has not been finished ("ceramics that employ the same …"). *Comments:* The text "pieces54" refers to a footnote from the VCS PD. Please refer it properly.
CLIENT ANSWER	The source of data of the NCV biomass and pwood were updated in the MR; A better description of Justification of choice of data or description of measurement methods and procedures applied was made; Specifically regarding the BFy parameter, the data was corrected and the paragraph was completed.
REVISED SECTION	Section 3.1
ROUND	2nd

CAR/CL	**$NCV_{biomass}$** *Source of Data:* Pay attention to the format and cleanliness of the document. **BF_y** *Comments:* The text "pieces54" refers to a footnote from the VCS PD. Please refer it properly.
CLIENT ANSWER	The format of the document on section Source of Data of NC biomass was corrected. In the parameter By the text ''pieces 54'' was referred properly as can be observed on footnote 3
REVISED SECTION	Section 3.2 NCVbiomass and Bfy
CONCLUSION	Opened in 1st round; Maintained open in 2nd round; Closed in 3rd round.

ITEM 5	CAR 5.
REFERENCE	Monitoring Report: Section 3.2: Data and Parameters Monitored
ROUND	1st
CAR/CL	**$Q_{renbiomass}$** *Source of data:* Please provide reference of the assumed value (0.29 tonne/m³) of peanut shell specific gravity. *Value monitored*: During site visit values of $Q_{renbiomass}$ were checked and some inconsistencies were found (values in spreadsheet presented are different from the real consumption). In order to reflect the good presentation of data please review the inconsistencies found, mainly the following dates of the cross-checking: • Biomass from 2010: None of the invoices from sawdust were accounted; • Biomass from 2011: None of the invoices from sawdust were accounted; • Biomass from 2012: The verification team has verified the consumption of bamboo chips in referred year 2012. Please provide evidence of this consumption. • Biomass from 2012: The whole invoices of sugarcane bagasse were not presented. Please provide evidences of sugarcane bagasse consumption. • 02/08/2012: There is a registry of sawdust, however it is peanut shell. Any changes eventually made in spreadsheet should reflect in $Q_{renbiomass}$ table at Section 3.2, 4.3 (Leakage and Thermal Energy) and table presented in Appendix. Please correct term Annex to Appendix in table.
CLIENT ANSWER	• The biomass from 2010 was accounted on version 2 • The biomass from 2011 was accounted on version 2 • The consumption of bamboo chips was not accounted because it was just a test made in 2012 (the ceramic company has not used this biomass since 2012), and the ceramic owner does not intend to use it again. • The invoices of sugarcane bagasse were sent to verification team. • 02/08/2012 The registry was corrected for peanut shell
REVISED SECTION	Section 3.2 Q renbiomass, Section 4.3 Leakage and Thermal energy and Table presented un Appendix.
ROUND	2nd
CAR/CL	**$Q_{renbiomass}$**

	Please consider revising values from table, since some of them seems to be wrong, as follows: **Period\Biomass** / **Sugar cane bagasse (tons)** / **Peanut shell (tonnes)** / **Sawdust (tonnes)** **Total 2010** / **0.00** / **1,355.26** / **2,601.73** **Total 2011** / **0.00** / **1,172.50** / **1,226.05** **Total 2012** / **406.14** / **2,020.60** / **0.00** **Total 2013** / **0.00** / **1,396.00** / **1,669.50** **Total 2014** / **0.00** / **160.00** / **488.25** Please consider revising all other Sections of MR in which $Q_{renbiomass}$ influence or it is presented.
CLIENT ANSWER	The values of Qrenbiomass were corrected, the correct values were updated in in all sections of Monitoring Report in which it influence or is presented.
REVISED SECTION	Section 3.2 Qrenbiomass, Section 4.1, Section 4.3 Appendix I
CONCLUSION	Opened in 1st round; Maintained open in 2nd round; Closed in 3rd round.

ITEM 6	CAR 6.
REFERENCE	Monitoring Report: Section 3.2: Data and Parameters Monitored and VCS MR Calculations Lucevans__01_01_2010_ 28 02 2014_v1 spreadsheet
ROUND	1st
CAR/CL	**PR_y** *Value monitored*: According to spreadsheet available (*Cer Lucevans planilha de monitoramento 2014*) to cross checking, value of PRy reported to January and February 2014 are likely wrong. Please review it. Section 4.4 and VCS Calculation spreadsheet should be also reviewed.
CLIENT ANSWER	The values of Pry reported to January and February were updated in VCS Calculation spreadsheel, In addition the section 3.2 Pry, section 4.3 Leakage and section 4.4 Net GHG Emission Reduction and Removals were updated.
REVISED SECTION	Section 3.2; Section 4.3; Section 4.4 and VCS MR Calculations Lucevans.
ROUND	2nd
CAR/CL	The values of PR_y presented from January and February of 2014 in calculation spreadsheet do not match with values reported in monitoring spreadsheet. Calculation spreadsheet and values from PR_y and ER_y from MR should also be reviewed. As follows: **2014** — **January**: 588,830; **February**: 536,720 Please consider revising all other Sections of MR in which PR_y influence or it is presented.
CLIENT ANSWER	The values of PRy of January and February of 2014 were corrected. The correct values were updated in all sections of Monitoring Report in which it influence or is presented.
REVISED SECTION	Section 3.2 PRy,Section 4.1 and Section 4.4
CONCLUSION	Opened in 1st round; Maintained open in 2nd round; Closed in 3rd round.

ITEM 7	CL 1
REFERENCE	Monitoring Report: Section 3.2: Data and Parameters Monitored and Site Visit
ROUND	1st

CAR/CL	**Origin of renewable biomass** *Description of measurement methods and procedures to be applied:* According to statement of VCS PD version 3, "*renewable wood will be achieved by invoices from the providers, as well as the sawdust and wood chips will be tracked until its afforestation origin*". Thus, Verification Team requires the proof of origin of renewable biomass since data presented are mainly provided by receipts of purchase of biomass what cannot directly determine the origin of the renewable biomass. *QA/QC procedures to be applied*: The definition of renewable biomass is undertaken as the option V of AMS-I.E version 1, and VCS PD states that "*Sawdust, wood chips, peanut shells and sugar cane bagasse are all industries residues coming from large scale reforestation or agroindustrial projects*". Please submit proof that renewable biomass, mainly from sawdust from 2012 onwards, utilized are coming from industrial residues.
CLIENT ANSWER	The proof of origin of renewable biomass was sent to DOE.
REVISED SECTION	-
ROUND	2nd
CAR/CL	**Origin of renewable biomass** *Description of measurement methods and procedures to be applied:* Please describe better the concept adopted to define the parameters proved and tracked. Besides, please clarify how MARIA ASSUNTI MAINARDI ME was set out as tracked and O R DOS SANTOS PIRATININGA ME as proved.
CLIENT ANSWER	Maria Assunta Mainardi ME is a company that has for the main activity sawmilling and planing of wood. The company is located in Agua Clara, Mato Grosso do Sul, where the common practice is reforestation of exotic species for commercial purpose, therefore this provider is registered as tracked, because it was possible to track the biomass from the origin. O R DOS SANTOS PIRATININGA ME is the supplier that provides to Geron M which is the ceramic directly provider and it was set out as proved because it was presented a official document that determines that O R DOS SANTOS PIRATININGA ME is responsible for the reforestation.
REVISED SECTION	Section 3.2 Origin of renewable biomass.
CONCLUSION	Opened in 1st round; Maintained open in 2nd round. Closed in 3rd round.

ITEM 8	**CAR 7.**
REFERENCE	Monitoring Report: Section 3.2: Data and Parameters Monitored
ROUND	1st

CAR/CL	**Renewable biomass surplus** *Value monitored*: In order to maintain the better description as possible, please provide updated data from sugarcane bagasse and wood residues surplus, if available. Moreover, please consider replicating the data presented in VCS PD version 3.
CLIENT ANSWER	During this monitoring period from 2010 to 2014, the ceramic industry utilized only biomasses that were already described in the VCS PD v.04. According to CDM General guidance on leakage in biomass project activities v.3 (http://cdm.unfccc.int/methodologies/SSCmethodologies/approved/history/c_leak_biomass/guid_biomass_v03.pdf), section 18, the project participant shall evaluate ex ante if there is a surplus of the biomass in the region of the project activity, which is not utilized. Therefore, the renewable biomass surplus values were not updated from the values presented in the VCS PD v.04.
REVISED SECTION	Section 3.2 Renewable biomass surplus, Section 4.3 Leakage
CONCLUSION	Opened in 1st round; Closed in 2nd round.

ITEM 9	**CAR 8.**
REFERENCE	Monitoring Report: Section 3.3: Monitoring Plan
ROUND	1st
CAR/CL	According to VCS Monitoring Report Template v3.3, Monitoring Plan should better describe the issues related to: • The methods used for generating/measuring, recording, storing, aggregating, collating and reporting the data on monitored parameters. Please describe how the measures are taken, such as the following parameters $Q_{renbiomass}$, PR_y, *origin of renewable biomass, renewable biomass and leakage of fossil fuel*. Sampling approach: How the parameter of weight of each piece (in tons) of ceramic products was measured should be better described in order to maintain transparency of data.
CLIENT ANSWER	The Monitoring Plan was reviewed. More information were included regarding the origin of renewable biomass, the measurement of production pieces by the ceramic factory, and the sources of leakage predicted by the applied methodology.
REVISED SECTION	Section 3.3
CONCLUSION	Opened in 1st round; Closed in 2nd round.

ITEM 10	CL 2
REFERENCE	Monitoring Report: Section 4.1: Baseline Emissions and VCS MR Calculation Lucevans_01_01_2010_ 28 02 2014_v1 spreadsheet
ROUND	1st
CAR/CL	Please clarify if the generation of thermal energy is less than 45MWthermal in accordance with Type I Small Scale Project Activities.
CLIENT ANSWER	It was made clear in section 4.1 that the generation of thermal energy is less than 45 MWthermal
REVISED SECTION	Section 4.1
ROUND	2nd
CAR/CL	The values presented in first paragraph of Section 4.1 are likely wrong. Please review it.
CLIENT ANSWER	The values were corrected to the same values presented on VCS MR Calculation Lucevans.
REVISED SECTION	Section 4.1
CONCLUSION	Opened in 1st round; Maintained open in 2nd round; Closed in 3rd round.

ITEM 11	CAR 9.
REFERENCE	Monitoring Report: Section 4.3: Leakage
ROUND	1st
CAR/CL	• **Sawdust/Wood chips** Footnote 5 and 6 does not refer anything. Please correct it to an available reference. • **Sugarcane Bagasse** First paragraph informs the following: "Only in the state of São Paulo, there are located more than 40% of this total. Each plant produces around 1.5 million tonnes of cane yearly." Please refer it properly since link is broken or is corrupted. It is not possible to crosscheck data from Table 3 because referenced link does not lead to objective webpage with data. Please present data and adjust link. Moreover, please adjust Table 3 in a good visual and reading format (numbers and text are badly distributed). Footnote 10 informs position of production of sugar cane (in tons) on May 16th 2009. It should be available to all year of 2009. Please clarify it. • **Peanut Shell** Footnote 14 does not lead to a valid webpage. Please correct it. • Table 5 sets out information about PR_y, $Q_{renbiomass}$ and thermal energy primarily. Please inform in table the amount of time checked, thus providing enough data to remake calculation process. • Nevertheless, consider CAR 7 with updated data for the demonstration of leakage for sawdust and sugarcane bagasse in current MR. • Last paragraph of Section states that project is under the SOCIALCARBON methodology, however project does not follow SOCIALCARBON requirements. Please correct it.
CLIENT ANSWER	• **Sawdust/Wood chips** Footnote 5 and 6 were corrected to one footnote 5 which is correct • **Sugare cane bagasse** The first paragraph was removed, because the information is not relevant. The value of sugar cane production was updated for all year of 2009, and a available reference link was included;

	In addition, the total of months monitored were included. The leakage section was revised with these reviewed values. Moreover the values from years 05/06, 06/07, 07/08 were updated in table 3. • **Peanut Shell** Footnote 14 was corrected to one available link. However due to some changes this footnote was changed for 17 • The total amount of time checked was informed in the table 5 • The demostration of leakage was updated considering CAR 7 • The last paragraph was corrected
REVISED SECTION	Section 4.3 Leakage
CONCLUSION	Opened in 1st round; Closed in 2nd round.

ITEM 12	**CL 3**
REFERENCE	Monitoring Report: Section 4.3: Leakage and VCS MR Calculation Lucevans_01_01_2010_ 28 02 2014_v1 spreadsheet
ROUND	1st
CAR/CL	According to calculation of VCS MR Calculation Lucevans _01_01_2010_ 28 02 2014_v1 spreadsheet, thermal energy utilized per ton of pieces produced (TJ/thousand of pieces) is 12,22% lower than thermal energy initially presented by VCS PD. Please clarify this distortion on thermal energy, since thermal energy is utilized to cross check the use of renewable biomass.
CLIENT ANSWER	After the changes due the CAR 5 the thermal energy was changed and turned to be higher than the predicted by VCS PD.
REVISED SECTION	-
ROUND	2nd
CAR/CL	Please consider revising this statement since $Q_{renbiomass}$ parameter has changed.
CLIENT ANSWER	The thermal energy continues to be higher than predicted by VCS PD.

REVISED SECTION	-
CONCLUSION	Opened in 1st round; Maintained open in 2nd round; Closed in 3rd round.

ITEM 13	**CAR 10.**
REFERENCE	Monitoring Report: Section 4.4: Net GHG Emissions Reductions and Removals
ROUND	1st
CAR/CL	Table 6 should include the total of *Baseline emissions or removals, Project emissions or removals, Leakage emissions and Net GHG emission reductions or removals* of all years monitored at the end of the table. Please correct it.
CLIENT ANSWER	It was included the total of baseline emissions or removals, project emissions or removals, leakage emissions and Net GHG emission reductions or removals of all years monitored.
REVISED SECTION	Section 4.4 Net GHG Emissions Reductions and Removals.
ROUND	2nd
CAR/CL	• As parameter PR_y has changed, please consider revising Section 4.4 of MR; • Table 6 and 7 has values of ER_y wrong in the sum of each year, and additionally the final sum of ER_y generated. Please review it.
CLIENT ANSWER	Section 3.2 pry and section 4.4 were revised. Table 6 and 7 were correctly, the sum of each year and the total sum of ERy were updated
REVISED SECTION	Section 3.2 and 4.4
CONCLUSION	Opened in 1st round; Maintained open in 2nd round; Closed in 3rd round.

ITEM 14	**CAR 11.**
REFERENCE	Monitoring Report: All Document
ROUND	2nd
CAR/CL	Please revise all dates of footnote referred and consulted, since it seems to be not updated.
CLIENT ANSWER	All dates of when the footnotes were consulted were revised
REVISED SECTION	Footnotes

CONCLUSION	Opened in 2nd round; Closed in 3rd round.

ITEM 15	**FAR 1**
REFERENCE	Monitoring Report: Section 3.2: Data and Parameters Monitored and Site Visit
ROUND	2nd round
CAR/CL	The parameter *origin of renewable biomass* shall be onward continuously monitored in order to prove the origin of renewable biomass utilized by ceramic industry. However, for the next monitoring period the project developer shall determine the most applicable presentation format (e.g. documents, scientific papers, sectorial studies) to prove the origin of renewable biomass, in order to guarantee a continuous assessment of the relevant suppliers of Lucevans industry project activities.
CLIENT ANSWER	The parameter origin of renewable biomass will be continuously monitored in order to prove the origin of renewable biomass utilized by the ceramic factory.
REVISED SECTION	-
CONCLUSION	Opened in 2nd round.