

# KAMIRANGA CERAMIC FUEL SWITCHING PROJETO VERIFICATION REPORT

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

|                      |                                                 |
|----------------------|-------------------------------------------------|
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|                            |                                                                                                                                                                                                                         |
|----------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Report Title</b>        | Verification Report for <i>Kamiranga Ceramic Fuel Switching Project</i>                                                                                                                                                 |
| <b>Client</b>              | Sustainable Carbon – Projetos Ambientais Ltda                                                                                                                                                                           |
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## Summary:

### A brief description of the verification and the project

The project activity is the project of *Kamiranga Ceramic* which is a ceramic company located in São Miguel do Guamá municipality in the State of Pará, north of Brazil. The ceramic company produces structural ceramic pieces such as bricks mainly for the regional market in Belém and for the northeast region of the state.

The objective of the implementation of this project activity in the ceramic is to stop using the native wood, which is a non-renewable fuel, and completely substitute it with renewable biomasses to feed their kilns and fire their ceramic units, so that they can minimize environmental impacts related to the native wood deforestation and consumption.

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

## **The purpose and scope of verification**

IBOPE has performed the 5<sup>th</sup> periodic verification of the project: “*Kamiranga* Ceramic Fuel Switching Project” according to the Verified Carbon Standard – VCS Version 3. This verification covers the period from 01 May 2012 to 30 September 2013.

The project was validated under VCS 2007.1 by Designated Operational Entity TÜV Nord Cert GmbH, which also verified the first period verification from January 01<sup>st</sup> 2008 to June 30<sup>th</sup> 2009. The second and third period verification from July 1<sup>st</sup>, 2009 to January 31<sup>st</sup> 2010 and February 1<sup>st</sup> 2010 to February 28<sup>th</sup> 2011 were verified as per VCS 2007 and performed by Bureau Veritas Certification Holding SAS. The fourth verification period from 1<sup>st</sup> of March 2011 until 30<sup>th</sup> of April 2012 was carried out by TÜV Rheinland China Ltda.

The verification includes confirming the implementation of the monitoring plan of the VCS PD and the application of the CDM small scale methodology “AMS-I.E.: Switch from Non-Renewable Biomass for Thermal Applications by the User”, version 01.

## **The method and criteria used for verification**

The verification team has reviewed the Monitoring Report against the criteria established in the VCS Version 3 Program Guide and the CDM Validation and Verification Standard. In line with the criteria included in the VCS Version 3 Program Guide, the verification is meant to ensure that the reported emission reductions are real, measurable, transparent and conservative.

The verification consisted of a desk review and an on-site visit (December 10<sup>th</sup>, 2013) where interviews with the key personnel from the project company *Kamiranga* Ceramic 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 11 (eleven) findings, which were all listed in Appendix A. They have all been attended and closed.

## **Any uncertainties associated with the verification**

There are no uncertainties associated with this verification.

## **Summary of the verification conclusion**

The Monitoring Report is considered to be in compliance with VCS Program Guide, the approved methodology AMS I.E (version 01) and the Monitoring Plan presented in the Project Description.

During the monitoring period from 01 May 2012 to 30 September 2013 the project generated the following GHG emission reductions: **56,243** tCO<sub>2</sub> equivalents.

IBOPE does not take any responsibility towards the issuance and utilization of the emission reductions hereby verified and certified. Request for issuance of VCUs shall be made by the project proponent to an approved VCS Program Registry based on the requirements set out under the most recent version of the VCS Program Guidelines clause on VCS Registration. The verification of reported emission reductions is based on the information made available to us and the engagement conditions detailed in this report. IBOPE cannot guarantee the accuracy or correctness of this information. Hence, IBOPE cannot be held liable by any party for decisions made or not made based on this report.

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## 1 INTRODUCTION

### 1.1 Objective

Sustainable Carbon – Projetos Ambientais LTDA has commissioned IBOPE to verify the 5th periodic verification of the emission reductions reported for the VCS “*Kamiranga Ceramic Fuel Switching Project*” with regard to the relevant requirements for VCS program as per the Verified Carbon Standard Version 3.

The objective of the the 5th 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 as well as with the Monitoring Manual. 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 off 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 from 01 May 2012 to 30 September 2013, 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 Version 3 requirements, UNFCCC rules and associated interpretations. The verification is based on validated project design document including baseline calculations.

The main scopes of this verification are:

- Verify whether the emission reductions generated by the project are in line with the VCS Verification Protocol 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.

In particular, the project baseline, monitoring plan and the project compliance with relevant applicable protocols and criteria (i.e. UNFCCC, VCS, host Party and others) are to be validated in order to confirm that the project design, as documented, is sound and reasonable and meets the applicable criteria.

The correct application of the CDM small scale methodology: “AMS-I.E.: Switch from Non-Renewable Biomass for Thermal Applications by the User” v.1 was already validated by TÜV Nord Cert GmbH, documented in its Validation Report of 06/11/2009.

An explicit review of the validation and its underlying assumptions made and conclusion of TÜV Nord Cert GmbH are not scope of this verification.

### 1.3 Level of Assurance

As the VCS Version 3 recognizes verified emission reductions, IBOPE has focused on providing a reasonable level of assurance that the emission reduction calculation methodology is appropriate and correctly applied, and 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, on site 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

*Kamiranga Ceramic* which is a ceramic company located in *São Miguel do Guamá* municipality in the State of *Pará*, north of Brazil. The ceramic company produces structural ceramic pieces such as bricks mainly for the regional market in *Belém* and for the northeast region of the state.

During the onsite visit carried out on December 10th, 2013 it was possible to assess that the *Kamiranga Ceramic* produces ceramic devices in two *Paulista* kilns and one Hoffman kiln, which were described in the VCS PD, and also in two new *Paulista* kilns that were not mentioned in the VCS PD.. It was confirmed through interviews onsite.

The fuel switching project in *Kamiranga Ceramic* is reducing greenhouse gases by substituting the native firewood by renewable biomasses for thermal energy generation used on the ceramic firing process. The sawdust, originated in legal reforestation areas, is a renewable biomass that presents a shorter renewal cycle when compared to the native firewood cycle, which is a non-renewable biomass and is not being used in the project activity. The açaí pits are residues generated by local industries.

The fuel switch was only feasible when considering the income derived from the commercialization of the carbon credits, since it was unattractive due to the high investments for the adaptation of machineries to the new biomass, and other barriers. Due to the project activity, a set of adaptations were necessary, such as alterations in the furnaces and other machineries, so the ceramic can operate with the renewable biomasses properly. In addition, the climate conditions at the Amazonian biome such as high relative humidity constitute a huge problem for drying the biomasses.

## 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 Version 3 requirements. IBOPE has, based on the recommendations in the Validation and Verification Standard, employed a risk-based approach in the verification, 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 02.0                                              |
| / 2/ UNFCCC, CDM small scale methodology “AMS-I.E.: Switch from Non-Renewable Biomass for Thermal Applications by the User”, version 01. |
| / 3/ VCS PD registered, Version 2.3 – October 27 <sup>th</sup> , 2009                                                                    |
| / 4/ VCS Validation Report - TÜV NORD CERT GmbH - November 6 <sup>th</sup> , 2009                                                        |
| / 5/ VCS Verification Report - TÜV NORD CERT GmbH - November 6 <sup>th</sup> , 2009                                                      |
| / 6/ VCS Verification Report - Bureau Veritas Certification Holding SAS - June 4 <sup>th</sup> , 2010                                    |
| / 7/ VCS Verification Report - Bureau Veritas Certification Holding SAS - August 23 <sup>rd</sup> , 2011                                 |
| /8/ VCS Verification Report – TÜV Rheinland China Ltda – November 13 <sup>th</sup> , 2012                                                |
| /9/ VCS Monitoring Report – First Draft - Version 1 - October 18 <sup>th</sup> , 2013                                                    |
| /10/ VCS Monitoring Report - Last version - Version 2 – December 11 <sup>th</sup> , 2013                                                 |
| / 11/ Emission Reductions Calculation - Spreadsheet “VCS MR Calculation Kamiranga_period 04_01 03 11 30 04 2012_v01.0.xlsx”              |
| /12/ Emission Reductions Calculation - Spreadsheet “VCS MR Calculation Kamiranga_period 04_01 03 11 30 04 2012_v02.0.xlsx”               |

### 2.3 Interviews

The verification team has performed an on-site visit on December 10<sup>th</sup>, 2013 during which the operations of the ceramic were reviewed. During the visit the verification team conducted interviews with the following representatives of the project company *Kamiranga Ceramic* and the Sustainable Carbon – *Projetos Ambientais Ltda* who prepared the VCS PD and the VCS Monitoring Report:

- Mr. *Sigifério Alves de Oliveira*, Director and owner of *Kamiranga Ceramic*.
- Mr. *Gleydson Moura*. Administrative Auxiliary, monitoring data responsible of *Kamiranga Ceramic*.
- Mr. *Thiago de Avila Othero*, technical coordinator of Sustainable Carbon – *Projetos Ambientais Ltda*.

The monitoring report was completed by *Marcelo Hector Sabbagh Haddad*, *Camila Vaccari*, *Mariana Fieri*, *Larissa Tega da Fonseca* and *Thiago de Avila Othero*, from *Sustainable Carbon – Projetos Ambientais LTDA*.

## 2.4 Site Inspections

An on-site inspection was conducted on December 10th, 2013 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 are 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. In order to ensure transparency a verification protocol is customized for the project. The protocol shows in transparent manner criteria (requirements), means of verification and their results against the identified criteria.

Findings established during the verification can either be seen as a non-fulfillment of CDM criteria and VCS Version 3, or where a risk to the fulfillment of project objectives is identified. Corrective action requests (CAR) issued where mistakes have been made with a direct influence on project results. Moreover, clarifications (CL) were requested where additional information is needed to fully clarify an issue.

During the course of this Verification, it was checked that all of the data from the spreadsheet was backed up by solid proof via receipts in the case of purchases of burning material or process logs for the production of ceramic pieces. The calculations of emission reductions were revised and proofed. In any of the cases, there were no discrepancies or mistakes found. Minor mistakes were found in the calculation spreadsheet, however it did not affect the numerical outcome. Hence, several non-conformities were raised, which were all attended.

This verification came out with 11 (eleven) findings – 9 (nine) corrective action request and 2 (two) clarification request, which were all listed in Appendix A. They have all been attended and closed.

#### **2.5.1 Forward Action Requests**

Not applicable.

#### **2.6 Eligibility for Validation Activities**

Not applicable.

### **3 VALIDATION FINDINGS**

Not applicable.

#### **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**

Not applicable.

#### **3.4 Grouped Project**

Not applicable.

## 4 VERIFICATION FINDINGS

### 4.1 Project Implementation Status

The project consists in fuel switching, substitution of native wood for renewable biomasses to generate thermal energy, feeding the kilns and fire the ceramic units from the *Kamiranga Ceramic*, according to the VCS PD.

During the on-site visit, it was physically observed and documented by the verification team that renewable biomasses such as sawdust and açai pits have been employed on the kilns of the *Kamiranga Ceramic* for energy supply.

The project implementation status has follows:

|                                                    |                                                                                                                                                      |
|----------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------|
| Start date                                         | September 1 <sup>st</sup> , 2007                                                                                                                     |
| First crediting period (10 years, twice renewable) | January 1 <sup>st</sup> , 2008 to December 31 <sup>st</sup> , 2017<br>Total Emission Reductions estimated for the period: 351,250 tCO <sub>2</sub> e |
| 1 <sup>st</sup> Periodic Verification              | January 1 <sup>st</sup> , 2008 to June 30 <sup>th</sup> , 2009<br>Emission Reductions: 48,068 tCO <sub>2</sub> e                                     |
| 2 <sup>nd</sup> Periodic Verification              | July 1 <sup>st</sup> , 2009 to January 31 <sup>st</sup> , 2010.<br>Emission Reductions: 21,063 tCO <sub>2</sub> e                                    |
| 3 <sup>rd</sup> Periodic Verification              | February 1 <sup>st</sup> , 2010 to February 28 <sup>th</sup> , 2011<br>Emission Reductions: 34,045 tCO <sub>2</sub> e                                |
| 4 <sup>th</sup> Periodic Verification              | March 1 <sup>st</sup> , 2011 to April 30 <sup>th</sup> , 2012<br>Emissions Reductions: 35,270 tCO <sub>2</sub> e                                     |

There are no remaining issues from previous validation and verifications.

The monitored period for this verification process comprises from 01 May 2012 to 30 September 2013. The production of the monitored period was 56,243 tonnes of ceramic units. The verification team checked the process log sheet that contains production data from each kiln matches the given data on the spreadsheet for calculation of emissions reductions.

Since the third monitoring period, *Kamiranga Ceramic* has constructed two new *Paulista* kilns that were not mentioned in the VCS PD. One of the kilns was built during the monitored period which corresponds to the period from 01/02/2010 to 28/02/2011. Thus, the production of this new kiln was excluded from the third monitoring period since it was not possible to perform the additionality assessment due to the lack of

data. There was made a request of clarification for this point, since it was not clear how the additionality could be extended to the new kilns.

In the last monitoring period the construction of the second new *Paulista* Kiln was concluded. As the ceramic company always used exclusively renewable biomass in these new kilns, during the current monitoring period was performed the additionality assessment in order to include the production provided by these new kilns. The additionality assessment (for both new *Paulista* kilns) was validated based on assessing the comparison made between the cost of energy generated on the baseline scenario of *Kamiranga* Ceramic and at the current monitoring period, detailed in Table 01 of VCS MR. The verification team was able to verify that all assumptions have been used in a proper manner, thus it is consistent to affirm that the project is still additional.

All of the operational and environmental licenses were checked that they still are valid and that the production of ceramic pieces does not exceed these permits. All of the before was found in order and therefore no questions appointed.

## 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 “AMS-I.E.: Switch from Non-Renewable Biomass for Thermal Applications by the User”, version 01.

The emission reduction is calculated as baseline emissions (BE<sub>y</sub>) minus project emissions (PE<sub>y</sub>) minus leakage emissions (LE<sub>y</sub>). Since no project and leakage emissions are identified according to the applied methodology, baseline emissions are equal to the amount of emission reduction.

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

$$B_y = PR_y \times BF_y$$

Where:

|                        |                                                                                                                                                   |
|------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------|
| ER <sub>y</sub>        | = Emission reductions during the year y in tCO <sub>2e</sub>                                                                                      |
| f <sub>NRB,y</sub>     | = Fraction of biomass used in the absence of the project activity in year y that can be established as non renewable biomass using survey methods |
| NCV <sub>biomass</sub> | = Net calorific value of the non-renewable that is substituted (IPCC default for wood fuel, 0.015 TJ/tonne)                                       |
| B <sub>y</sub>         | = Quantity of biomass that is substituted or displaced in tonnes                                                                                  |
| PR <sub>y</sub>        | = Number of ceramic pieces produced per month                                                                                                     |
| BF <sub>y</sub>        | = Tonnes of wood per thousand of pieces produced                                                                                                  |

The calculations presented on the spreadsheet are right and therefore the emissions reductions are to be considered generated through the quantity of biomass that is substituted or displaced in tonnes of ceramic units multiplied by fraction of non-renewable biomass (wood) used in the absence of the project

activity in year *y* multiplied by net calorific value of non-renewable biomass multiplied by the emission factor for the projected fossil fuel consumption in the baseline. Some minor formatting mistakes were found on the spreadsheet, which were all corrected. These never affected the numerical outcome.

#### **4.3 Quality of Evidence to Determine GHG Emission Reductions and Removals**

*Kamiranga Ceramic* has adequate monitoring mechanisms and uses the required parameters to monitor on a monthly basis. This was verified during the on-site visit when the plant records were verified to assess the correctness of the reported data.

The amount of renewable biomass employed assessed by personally reviewing all the receipts and invoices of biomass received by the ceramic from their sources.

The production of ceramic units per month was assessed by personal review of the internal control sheets used by *Kamiranga Ceramic*, which are organized per month and daily filled according to data based on ceramic units burned in the kilns.

The Emission Reductions have been correctly calculated in line with VCS v.3 requirements. There are no non-conformities raised for these issues.

#### **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

IBOPE has undertaken the 5<sup>th</sup> Verification for the *Kamiranga Ceramic Fuel Switching Project* in Brazil on the basis of VCS Version 3 and UNFCCC criteria for the CDM under the methodology AMS I.E Version 1, as well as criteria given to provide for consistent project operations, monitoring and reporting.

IBOPE concludes that during the period of May 1<sup>st</sup> 2012 and September 30<sup>th</sup> 2013 the above described project has fulfilled all the requirements to produce emissions reductions on the total of **56,243 tCO<sub>2</sub> eq.**

The project is implemented as planned and described in the registered VCS Project Design. 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 to be considered as closed.

Verification period: From 1<sup>st</sup> -may-2012 to 30<sup>th</sup> -September-2013

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

| Year         | Baseline emissions or removals (tCO <sub>2</sub> e) | Project emissions or removals (tCO <sub>2</sub> e) | Leakage emissions (tCO <sub>2</sub> e) | Net GHG emission reductions or removals (tCO <sub>2</sub> e) |
|--------------|-----------------------------------------------------|----------------------------------------------------|----------------------------------------|--------------------------------------------------------------|
| 2012         | 27,403                                              | 0                                                  | 0                                      | 27,403                                                       |
| 2013         | 28,840                                              | 0                                                  | 0                                      | 28,840                                                       |
| <b>Total</b> | 56,243                                              | 0                                                  | 0                                      | 56,243                                                       |

## APPENDIX A: VERIFICATION PROTOCOL

**Table 1: Check list**

| Verification Requirement                                                                                                                                          | Reference | IBOPE Assessment                                                                                                                                          | Conclusion |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|------------|
| 1. Physical Data                                                                                                                                                  |           |                                                                                                                                                           |            |
| 1.1 Is the project activity in an existing facilities or utilizing existing equipments? Has the physical site inspection been carried out by the assessment team? | VVS       | OK                                                                                                                                                        | OK         |
| 1.2 Does the description of the VCS project activity as contained in the VCS PD sufficiently cover all relevant elements accurately?                              | VVS       | OK                                                                                                                                                        | OK         |
| 1.3 Is all information provided consistent and in compliance with the actual situation or planning?                                                               | VVS       | OK                                                                                                                                                        | OK         |
| 1.4 Does the VCU's obtained for the monitoring period within the limit of estimate in the registered VCS PD? Is the claimed VCU's justifiable?                    | VVS       | Please clarify the process taken to validate the additionality and the consistence of the new kilns added to the project after the validation process. CI | OK         |
| 2. Monitoring and Methodology                                                                                                                                     |           |                                                                                                                                                           |            |
| 2.1 Do the project participants possess ownership or licenses which will allow the implementation of the project at that site / those sites?                      | VVS       | OK                                                                                                                                                        | OK         |

|                                                                                                                                                                                                                                                                                                                                                                                               |     |    |    |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|----|----|
| 2.2 Does the MR correctly describe the project boundary, including the physical delineation of the project activity included within the project boundary for the purpose of calculating project and baseline emissions for the VCS project activity?                                                                                                                                          | VVS | OK | OK |
| 2.3 Does the monitoring plan comply with the requirement of the applied methodology?                                                                                                                                                                                                                                                                                                          | VVS | OK | OK |
| 2.4 Is the authority and responsibility of project management clearly described?                                                                                                                                                                                                                                                                                                              | VVS | OK | OK |
| 2.5 In case the implemented monitoring plan defers from the monitoring methodology, has any requests for revision to or deviation from the monitoring methodology been officially communicated to the VCS Accreditation Body?<br>Reference:<br>< <a href="http://cdm.unfccc.int/EB/033/eb33rep.pdf">http://cdm.unfccc.int/EB/033/eb33rep.pdf</a> >, §84, §58<br>§ 193 of CDM Project Standard | VVS | OK | OK |
| 2.6 Was the monitoring equipment for baseline emission parameters controlled and monitoring results recorded as per approved frequency?                                                                                                                                                                                                                                                       | VVS | OK | OK |
|                                                                                                                                                                                                                                                                                                                                                                                               |     |    |    |
| 3. Calculations                                                                                                                                                                                                                                                                                                                                                                               |     |    |    |
| 3.1 Are the steps taken and equations applied to calculate emission reductions comply with the requirements of the selected baseline and monitoring methodology?                                                                                                                                                                                                                              | VVS | OK | OK |

|                                                                                                                                                                               |     |                                                                                 |    |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|---------------------------------------------------------------------------------|----|
| 3.2 Are the equations and parameters in the VCS PD have been correctly applied as per those provided in the selected approved methodology?                                    | VVS | OK                                                                              | OK |
| 3.4 Are the steps and equations applied to calculate project emissions in compliance with the requirements of selected baseline and monitoring methodology?                   | VVS | OK                                                                              | OK |
| 3.5 Have all the calculations related to the leakage emissions been carried according to the formulae and methods described in the registered VCS PD and applied methodology? | VVS | Please correct the amount of sawdust utilized during the monitoring period. CAR | OK |
| 4. Parameters                                                                                                                                                                 |     |                                                                                 |    |
| 4.1 Are all values used in the VCS MR correct in the context of the VCS project activity;                                                                                     | VVS | OK                                                                              | OK |
| 4.2 Are all baseline emission parameters monitored and updated in accordance with monitoring plan, monitoring methodology and relevant CDM EB decisions?                      | VVS | OK                                                                              | OK |

**Table 2: Non-conformities**

| No. | Type of request | Observation                                                                                                                                                                                                                            | Summary of project owner response                                                                                                           | Verification team conclusion                                                    |
|-----|-----------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------|
| 1.  | CAR             | In the “VCS MR Kamiranga_period 05_01 05 12_30 09 2013_v01.1”, please correct the number of some pages in the Table of Contents.                                                                                                       | The number of pages was updated in the Table of Contents of the VCS MR Report, version 02.                                                  | The Table of Contents was updated by the Project Proponent. This CAR is closed. |
| 2.  | CAR             | In the “VCS MR Kamiranga_period 05_01 05 12_30 09 2013_v01.1”, please correct the order of the Tables. There is no Table 1 in the MR. Correct the text accordingly. In addition, please, correct the text where Table 01 is mentioned. | The order of the Tables was corrected in the VCS MR Report version 02. In addition, the text where Table 01 is mentioned was also excluded. | Ok. This CAR is closed.                                                         |
| 3.  | CAR             | In the “VCS MR Kamiranga_period 05_01 05 12_30 09 2013_v01.1”, Section 1.3 – Project Proponent, please correct the telephone and email from the organization <i>Cerâmica Kamiranga Indústria e Comércio LTDA</i> .                     | The telephone and email from the organization <i>Cerâmica Kamiranga Indústria e Comércio LTDA</i> was corrected in the VCS MR version 02.   | Ok. This CAR is closed.                                                         |
| 4.  | CAR             | In the “VCS MR Kamiranga_period 05_01 05 12_30 09 2013_v01.1”, section 4.3 - Leakage Emissions, please correct the amount of sawdust utilized by the ceramic during the monitoring period.                                             | The amount of sawdust utilized by the ceramic during the monitoring period was corrected in the VCS MR Report version 02.                   | Ok. This CAR is closed.                                                         |
| 5.  | CAR             | In the “VCS MR Kamiranga_period 05_01 05 12_30 09 2013_v01.1”, page 28, Table                                                                                                                                                          | Ok. It was corrected in the VCS MR Report                                                                                                   | Ok. This CAR is closed.                                                         |

|     |     |                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                    |                                                                                                                                   |
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|     |     | 4, please correct the unit “tones” to “tonnes”.                                                                                                                                                                                                                                                                                                       | version 02.                                                                                                                                                                        |                                                                                                                                   |
| 6.  | CAR | In the “VCS MR Kamiranga_period 05_01 05 12_30 09 2013_v01.1”, Table 5, please correct the unit for the parameter PRy. The correct is “tonnes” and not “units”.                                                                                                                                                                                       | The unit of the parameter Pry was corrected to “tonnes” in the Table 5 of the VCS MR Report version 02.                                                                            | Ok. This CAR is closed.                                                                                                           |
| 7.  | CAR | In the tab “5th period VCUs Calculations” of the “VCS MR Calculation Spreadsheet Kamiranga_v.1.1” the comments on cell C82:83, C85 e C87 are not in accordance to the information described in the Section 1.1 of the VCS MR Report version 1.1. Please correct the information on the Calculation Spreadsheet to be consistent to the VCS MR Report. | The content on Cells C82:83, C85 e C87 of the VCS MR Calculation Spreadsheet version 02 was corrected according to the information on Section 1.1 of the VCS MR Report version 02. | Information on Cells C82:83, C85 e C87 of the Calculation Spreadsheet now is consistent to the VCS MR Report. This CAR is closed. |
| 8.  | CAR | In the tab fNRB,y of the “VCS MR Calculation Spreadsheet Kamiranga_v.1.1” the web link on Cell D38 could not to be checked. Please update to a functional reference.                                                                                                                                                                                  | The web link was updated on Cell D38 of the VCS MR Calculation Spreadsheet version 02.                                                                                             | The web link on Cell D38 was checked and works properly. CAR is closed.                                                           |
| 9.  | CAR | There is no internet link for the reference on cell D19 of the “VCS MR Calculation Spreadsheet Kamiranga_v.1.1” fNRBy tab, and it could not be checked.                                                                                                                                                                                               | A web link with the reference of Normative Instruction, nº 6 of 2006 was added in the comment of cell D19 of the fNRBy tab, on VCS MR Calculation Spreadsheet version 02.          | The web link on Cell D19 was checked and works properly. CAR is closed.                                                           |
| 10. | CL  | Please clarify the process taken to verify the additionality and the consistence of the new kilns added to the project after the                                                                                                                                                                                                                      | To verify the additionality of the new kilns added to the project during the last monitoring period, a comparison was made between the                                             | This point was clarified. CL is closed.                                                                                           |

|  |  |                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |  |
|--|--|---------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
|  |  | validation process. | <p>cost of energy generated on the baseline scenario of <i>Cavalcante Ceramic</i> and at the current monitoring period of <i>Kamiranga Ceramic</i><sup>1</sup>.</p> <p>The cost of non-renewable wood was updated according to local surveys in the Third Monitoring Report of <i>Cavalcante Ceramic</i>, a ceramic company that is located on the same city of <i>Kamiranga</i> and which is also involved in a fuel switching project with Sustainable Carbon. A conservative correction factor was applied annually for 2012 to the cost of the non-renewable biomass, in order to account for general price increases due to inflation.</p> <p>Through this analysis, it can be observed that the non-renewable biomass is more financially attractive than using the renewable biomasses currently employed by the project activity: sawdust and <i>açaí</i> pits.</p> <p>With the project activity's implementation, the fuel spending has increased. Comparing the cost per energy generated, <i>Kamiranga ceramic</i> spent more by acquiring renewable biomass than if continuous using non-renewable wood. Therefore, the operation of the new kilns with renewable biomass, shows to be less financially attractive due to the fact</p> |  |
|--|--|---------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|

<sup>1</sup> The cost of non-renewable wood was taken from the Third Monitoring Report from *Cavalcante Ceramic* due to lack of data regarding the cost of non-renewable wood in the baseline of *Kamiranga Ceramic*. *Cavalcante Ceramic* is also located in São Miguel do Guamá and operated under similar market conditions.

|     |    |                                                                                                                                                                                                       |                                                                                                                                                     |                        |
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|     |    |                                                                                                                                                                                                       | that the use of renewable biomass is more expensive than using non-renewable wood.                                                                  |                        |
| 11. | CL | There is an incomplete table in the Cell K90 on tab “5th period - VCUs Calculations” of the “VCS MR Calculation <i>Kamiranga_period 05_01 05 12_30 09 2013_v01.1</i> ”. Please explain its relevance. | This table refers to the last Monitoring Period of Kamiranga Project. Therefore, it was excluded from the VCS MR Calculation Kamiranga, version 02. | OK. This CL is closed. |