

# RENEWAL OF CREDITING PERIOD REPORT

## Kamiranga Ceramic Fuel Switching Project



Document prepared by Earthood Services Private Limited

|                      |                                          |
|----------------------|------------------------------------------|
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| <b>Version</b>       | 1                                        |
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|                            |                                                                                                                                                                                                                           |
|----------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Report Title</b>        | Renewal of Crediting Period Report – Kamiranga Ceramic Fuel Switching Project                                                                                                                                             |
| <b>Client</b>              | Sustainable Carbon – Projetos Ambientais Ltda.                                                                                                                                                                            |
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| <b>Prepared By</b>         | Earthood Services Private Limited                                                                                                                                                                                         |
| <b>Contact</b>             | 424A, Tower B3, Spaze I-Tech Park, Sector 49, Sohna Road, Gurgaon-122018, India<br><a href="mailto:kaviraj.singh@earthood.in">kaviraj.singh@earthood.in</a><br><a href="http://www.espl-india.com">www.espl-india.com</a> |
| <b>Approved By</b>         | Kaviraj Singh                                                                                                                                                                                                             |
| <b>Work Carried Out By</b> | Marcelo Sebben (Team Leader)<br>Sergio Cruz (Technical Reviewer)                                                                                                                                                          |

**Summary:****Brief summary of the project activity**

The project activity involves fuel switching from native firewood from Amazon biome to sawdust, *açaí* pits, Brazilian nut husks, wood residue and wood from forest management. Thus, GHG emission reduction is achieved.

The project applies the CDM approved methodology AMS-I.E – Switch from Non-Renewable Biomass for Thermal Applications by the User – version 07.0.

**Scope of validation**

Sustainable Carbon – Projetos Ambientais Ltda. has contracted the ESPL to conduct the validation of the renewal of crediting period of the project “Kamiranga Ceramic Fuel Switching Project”, with regard to the requirements of VCS Version 3.

The scope of the revalidation is to establish that:

- the proposed project activity complies with the corresponding registered VCS-PD and the latest version of the renewed VCS-PD;
- the proposed project activity complies with all relevant VCS rules and requirements. The VCS renewal of crediting period was based on the updated VCS-PD, estimated emission reduction calculation spreadsheet, information from current validated VCS-PD and supporting documents made available to the ESPL by the project participants;
- the proposed monitoring plan complies with all requirements of applied methodology.

**Conclusion**

ESPL has performed the validation of the renewal of crediting period of the project “Kamiranga Ceramic Fuel Switching Project”, with VCS Project ID 197.

As outcomes of this validation, the validation team confirms that:

- the latest available VCS-PD template has been applied;
- the original baseline is still valid as it is given by the applied methodology;
- the project additionality remains valid for the renewal of the crediting period as per section 3.8.5, paragraph 1 of the VCS Standard version 3.7. No regulatory surplus has been identified. The project is in accordance with all applicable regulations and legislations;
- the project description is in accordance with the characteristics identified on site;
- the monitoring plan is adequate to the project activity and is in accordance with the applied methodology;
- at this 2<sup>nd</sup> crediting period, the project activity is likely to achieve the estimated of **29,828 tCO<sub>2</sub>e** per year.

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## 1 INTRODUCTION

### 1.1 Objective

Sustainable Carbon – Projetos Ambientais Ltda. has contracted ESPL to conduct the validation of the renewal of crediting period for the VCS project activity “Kamiranga Ceramic Fuel Switching Project” for the period from 01/01/2018 to 31/12/2027 (including both days).

### 1.2 Scope and Criteria

The scope of the validation of the renewal of crediting period is to establish/verify that:

- the project is in accordance with requirements of the VCS Standard – version 3.7;
- the update of the applied methodology is in accordance with CDM small scale methodology AMS-I.E – version 07.0;
- the validation of the renewal of crediting period is in accordance with requirements of CDM methodological tool “Assessment of the validity of the original / current baseline and update of the baseline at the renewal of the crediting period” – version 3.0.1;

The validation of the renewal of crediting period is based on the registered VCS-PD, revised VCS-PD and estimated GHG emission reduction calculations.

### 1.3 Level of Assurance

The validation of the renewal of crediting period aims to achieve a reasonable level of assurance.

### 1.4 Summary Description of the Project

The project activity involves fuel switching from native firewood from Amazon biome to sawdust, açaí pits, Brazilian nut husks, wood residue and wood from forest management in Kamiranga at the city of São Miguel do Guamá, State of Pará, Brazil. Thus, GHG emission reduction is achieved.

The project is listed at VCS and can be accessed by the following link:

[http://vcsprojectdatabase.org/#/project\\_details/197](http://vcsprojectdatabase.org/#/project_details/197)

## 2 VALIDATION PROCESS

### 2.1 Method and Criteria

The validation of the renewal of crediting period process is conducted as per internal CDM Quality Manual and in accordance with criteria laid down by VCS. It includes the following steps:

- contract with PP for the scope and appointment of validation team and technical review team;
- completeness check of VCS-PD;
- desk review of VCS-PD and estimated GHG emission reduction calculations;
- physical on-site inspection by validation team;
- follow up activities e.g., interviews;
- reporting and closure of findings (CARs/CLs/FARs) and preparation of draft validation report;
- independent technical review of the draft validation report and final/revised documentation (e.g., VCS-PD, corresponding estimated ER calculations sheet and evidences);
- issuance of the final validation report to contracted PP (or authorized representatives).

### 2.1.2 Sampling approach

No sampling plan has been used to conduct the validation of the renewal of the crediting period of this project activity.

## 2.2 Document Review

A desk review was conducted by the validation team that included:

- a review of the data and information presented to assess its completeness;
- a review of the registered VCS-PD, revised VCS-PD, estimated GHG emission reduction calculations, the applied methodology including applicable tool(s) and, where applicable, the applied standardized baseline;
- supporting documents.

A complete list of documents/evidences reviewed is included as Appendix I.

## 2.3 Interviews

| #  | Interviewee |            |                    | Date       | Subject                                               | Team member    |
|----|-------------|------------|--------------------|------------|-------------------------------------------------------|----------------|
|    | Last name   | First name | Affiliation        |            |                                                       |                |
| 1. | Fernandes   | Nonato     | Kamiranga          | 25/04/2018 | Project activity management, operation and monitoring | Marcelo Sebben |
| 2. | Moura       | Gleidson   | Kamiranga          | 25/04/2018 | Social Carbon                                         | Marcelo Sebben |
| 3. | Suzuki      | Fernanda   | Sustainable Carbon | 25/04/2018 | Project activity monitoring<br>Excel calculations     | Marcelo Sebben |

## 2.4 Site Inspections

| Duration of on-site inspection: 25/04/2018 |                                                                                                                                     |                     |            |                |
|--------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------|---------------------|------------|----------------|
| #                                          | Activity performed on-site                                                                                                          | Site location       | Date       | Team member    |
| 1.                                         | Opening Meeting                                                                                                                     | São Miguel do Guamá | 25/04/2018 | Marcelo Sebben |
| 2.                                         | Implementation and operation of project activity as per registered PD/previous verifications.                                       | São Miguel do Guamá | 25/04/2018 | Marcelo Sebben |
| 3.                                         | Management and monitoring procedures followed at project site.                                                                      | São Miguel do Guamá | 25/04/2018 | Marcelo Sebben |
| 4.                                         | Physical inspection of the project activity: site visit and interview of monitoring personnel.                                      | São Miguel do Guamá | 25/04/2018 | Marcelo Sebben |
| 5.                                         | Verification checklist: compliance of monitoring procedures followed at project site with registered PD and monitoring methodology. | São Miguel do Guamá | 25/04/2018 | Marcelo Sebben |

|     |                                                                                                                                                                                                          |                     |            |                |
|-----|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|------------|----------------|
| 6.  | Management and operational system: documentation, allocation of responsibilities, qualification and training, data recording & archiving, internal audit and management review and emergency procedures. | São Miguel do Guamá | 25/04/2018 | Marcelo Sebben |
| 7.  | Review of estimated ER calculations in accordance with applied methodology and relevant tools.                                                                                                           | São Miguel do Guamá | 25/04/2018 | Marcelo Sebben |
| 8.  | Review of monitored data and relevant document in accordance with registered monitoring plan and applied monitoring methodology.                                                                         | São Miguel do Guamá | 25/04/2018 | Marcelo Sebben |
| 11. | Presentation of findings                                                                                                                                                                                 | São Miguel do Guamá | 25/04/2018 | Marcelo Sebben |
| 12. | Closing meeting                                                                                                                                                                                          | São Miguel do Guamá | 25/04/2018 | Marcelo Sebben |

## 2.5 Resolution of Findings

The findings may be of following types: CAR – Corrective Action Request, CL – Clarification Request and FAR – Forward Action Request.

During the present revalidation, all findings raised were successfully closed.

The list of findings and their resolution are presented at Appendix III of this report.

### 2.5.1 Forward Action Requests

No FAR were raised.

## 3 VALIDATION FINDINGS

### 3.1 Project Details

The project activity involves fuel switching from native firewood from Amazon biome to sawdust, *açaí* pits, Brazilian nut husks, wood residue and wood from forest management in Kamiranga Ceramic at the city of São Miguel do Guamá, State of Pará, Brazil. Thus, GHG emission reduction is achieved.

Some of the characteristics of the project activity are described below:

- Project Proponents: Cerâmica Kamiranga Industria e Comercio Ltda and Sustainable Carbon – Projetos Ambientais Ltda.;
- Project Category: project ( $\leq 300,000$  tCO<sub>2</sub>e/y);
- Estimated GHG emission reductions: 29,828 tCO<sub>2</sub>e per year and 298,280 tCO<sub>2</sub>e over the entire crediting period;
- Methodology: AMS-I.E – Switch from non-renewable biomass for thermal applications by the user – version 07.0;
- Start Date: 01/09/2007 – date on which the project proponent began employing renewable biomass as fuel;
- Crediting Period: 2nd crediting period from 01/01/2018 to 31/12/2027 – 10 years – renewable;

- Project Location: Kamiranga Ceramic – Estrada Santa Rita da Barreira, s/nº - km 04 - Zona Rural, São Miguel do Guamá - Pará, Brazil, Postal Code: 68660-000– geographical coordinates (SAD69): 1°36'53.0"S and 47°26'31.6"W / Meridian Convergence: 0° 4' 7.9";
- Conditions prior to project initiation: use of native wood without sustainable management;
- Compliance with applicable laws, statutes and other regulatory frameworks: project is in accordance to the CONAMA Resolution # 237/97, which establishes that clay extraction activities and ceramic production must be supported by specific licenses, such as operational license, clay extraction license and environmental licenses (refer to the licenses at Appendix I);
- Project ownership: Cerâmica Kamiranga Indústria and Comercio Ltda is the project owner evidenced by the Operational License<sup>5/</sup>;
- Emissions trading programs and other binding limits: GHG emission reductions generated by the project are not included in an emissions trading program or any other mechanism that includes GHG allowance trading;
- Other forms of environmental credit sought or received and eligible to be sought or received: the project has not received nor sought any other form of environmental credit;
- Participation under other GHG programs: the project does not participate in any other GHG program. Nevertheless, SocialCarbon methodology is being applied in order to improve long term sustainability conditions;
- Rejection by other GHG programs: the project was not rejected under any other GHG programs.
- Technical Data: 4 "Paulista" kilns (with two chambers each) and 1 Hoffmann kiln.

The overall description in the VCS-PD is accurate, complete, and provides an understanding of the nature of the project.

## 3.2 Application of Methodology

### 3.2.1 Title and Reference

The applied methodology is the approved CDM methodology AMS-I.E – Switch from non-renewable biomass for thermal applications by the user – version 07.0.

### 3.2.2 Applicability

The project activity applies technology that displaces use of non-renewable biomass by renewable energy for the ceramic.

No double counting of emission reductions is envisaged in the project activity.

The total thermal energy output of the project equipment does not exceed 45 MW.

### 3.2.3 Project Boundary

The project boundary is the physical geographical site of the use of biomass.

### 3.2.4 Baseline Scenario

The baseline scenario is still valid for this next crediting period and it is given by the applied methodology: "the use of fossil fuels for meeting similar thermal energy needs".

Thus, as per VCS Standard, paragraph 2) b. "the GHG emissions associated with the original baseline scenario shall be reassessed using the latest version of the CDM Methodological tool "Assessment of the validity of the original/ current baseline and update of the baseline at the renewal of the crediting period".

Step 1: Assess the validity of the current baseline for the next crediting period

*Step 1.1: Assess compliance of the current baseline with relevant mandatory national and/or sectoral policies:* the current baseline scenario complies with all relevant mandatory national/sectoral legislation. It can be evidenced by operational licenses which are currently valid<sup>105/</sup>

*Step 1.2: Assess the impact of circumstances:* the baseline scenario identified at the validation of the project activity was the continuation of the current practice without any investment, which would be the scenario in the absence of the project activity.

*Step 1.3: Assess whether the continuation of use of current baseline equipment(s) or an investment is the most likely scenario for the crediting period for which renewal is requested:* the baseline scenario identified at the validation of the project activity was the continuation of use of the current equipment without any investment. However, during the previous crediting period, the PP installed 2 new Paulista Kilns. This installation would also occur in the absence of project activity and moreover, the baseline scenario for these new kilns would be the same: use of native wood.

*Step 1.4: Assessment of the validity of the data and parameters:* the parameters fixed in the previous crediting period remain fixed for the 2<sup>nd</sup> crediting period. The exceptions are:

- The update of the parameter  $EF_{\text{projected fossil fuel}}$  to the values presented in the new methodology
- The inclusion of the parameter  $EF_{\text{CO}_2, f}$  (Default CO<sub>2</sub> emission factor for freight transportation activity f) as the applied version of the methodology considers Project emission due to freight transportation above 200km distant.
- Parameter  $NCV_{\text{biomass}}$  (Net calorific value of non-renewable woody biomass that is substituted) is now a monitored parameter as per the applied methodology (AMS-I.E – version 07.0).

Thus, the fixed parameters are as follows:

- $EF_{\text{projected fossil fuel}}$  (Emission factor for the substitution of non-renewable woody biomass by similar consumers): 81.6 tCO<sub>2</sub>/TJ;
- $\rho_{\text{wood}}$  (Specific gravity of non-renewable wood): 0.67 ton/m<sup>3</sup>;
- $BF_y$  (Consumption of non-renewable biomass per tons of ceramic devices produced in year y):
  - 0.81 ton of wood / ton of devices
- $EF_{\text{CO}_2, f}$  (Default CO<sub>2</sub> emission factor for freight transportation activity f) as per the Methodological tool “Project and leakage emissions from transportation of freight” – 01.1.0.
  - 129 g CO<sub>2</sub>/t km for heavy vehicles
  - 245 g CO<sub>2</sub>/t km for light vehicles

The application of Steps 1.1 and 1.2 above confirmed that the current baseline scenario remains valid. The application of steps 1.3 and 1.4 above confirms that the new equipment has been installed and fixed parameters were changed or included due to the circumstances presented above.

As there are parameters that were updated for the 2<sup>nd</sup> crediting period, Step 2 is assessed below:

Step 2: Update the current baseline and the data and parameters

*Step 2.1: Update the current baseline:* baseline emissions were updated taking into account the fixed parameters informed above. Moreover, the calculation of the baseline emissions took into consideration monitored data from previous crediting period.

*Step 2.2: Update the data and parameters:* all fixed parameters were duly discussed in the step 1.4 above. The changes occurred in parameter  $EF_{\text{projected fossil}}$ , updated as per applied methodology,  $NCV_{\text{biomass}}$  (considered now a monitored parameter as per applied methodology) and parameter

$EF_{CO2,f}$ , which was included in accordance with the new version of the applied methodology. All will remain fixed for the 2<sup>nd</sup> crediting period. Regarding the monitored parameters,  $NCV_{biomass}$  was included and parameters  $D_{f,m}$  and  $FR_{f,m}$  were also included due to the project emissions from freight transportation.

### 3.2.5 Additionality

A full assessment of additionality is not required during the renewal of crediting period. Thus, the project remains additional. The project activity is not mandated by any law, statute or other regulatory framework, or for UNFCCC non-Annex I countries, any systematically enforced law, statute or other regulatory framework. No Laws that give comparative advantage to more emissions-intensive technologies or activities relative to less emissions-intensive technologies or activities are applied. Information was duly checked by validation team.

### 3.2.6 Quantification of GHG Emission Reductions and Removals

All the equations to calculate the ERs are in accordance with the applied methodology and VCS-PD.

**The baseline emissions ( $BE_y$ ) are calculated as follows:**

$$BE_y = B_y \times f_{NRB,y} \times NCV_{biomass} \times EF_{projected\_fossil\_fuel}$$

Where:

|                                  |                                                                                                     |
|----------------------------------|-----------------------------------------------------------------------------------------------------|
| $BE_y$ :                         | Baseline emissions during the year y in tCO <sub>2</sub> e;                                         |
| $B_y$ :                          | Quantity of woody biomass that is substituted or displaced in tons;                                 |
| $f_{NRB,y}$ :                    | 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/ton;                                             |
| $EF_{projected\_fossil\_fuel}$ : | Emission factor for the projected fossil fuel consumption in the baseline in tCO <sub>2</sub> e/TJ. |

$B_y$  is calculated from the thermal energy generated in the project activity (option d).

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

Where:

|                |                                                                                        |
|----------------|----------------------------------------------------------------------------------------|
| $HG_{p,y}$ :   | Quantity of thermal energy generated by the renewable energy in the project in year y; |
| $\eta_{old}$ : | Efficiency of the system being replaced                                                |

$HG_{p,y}$  is calculated as follows:

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

Where:

|         |                                                                                                         |
|---------|---------------------------------------------------------------------------------------------------------|
| $SGE$ : | Specific energy, which has to be generated in the process to produce a certain amount of ceramic units; |
|---------|---------------------------------------------------------------------------------------------------------|

$PR_y$ : Amount of product produced in year  $y$

$\eta_{old}$  is calculated as follows:

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

Where:

$SFE$ : Specific fuel energy needed for the process to produce a certain amount of ceramic units

And  $SFE$  is calculated as follows:

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

Where:

$BF_y$ : Consumption of non-renewable biomass per ton of ceramic units fired in year  $y$

Therefore, using the equations above:

$$B_y = PR_y \times BF_y$$

**The project emissions ( $PE_y$ ) are calculated as follows:**

As per the Methodological tool “Project and leakage emissions from biomass” – version 04.0, a small scale project activity can neglect emissions from energy consumption associated with processing of biomass residues and can neglect emissions of the transportation of biomass if the distance is less than 200 km.

Thus, as the present project activity is small scale:

- emissions from energy consumption associated with processing of biomass residues are neglected;
- emissions of the transportation of biomass are neglected when distance is less than 200 km and they are accounted in cases where distance is more than 200 km, in which case it will be monitored, in accordance with option B of the Methodological tool “Project and leakage emissions from transportation of freight” – version 01.1.0, as follows:

$$PE_{TR,m} = \sum_f D_{f,m} \cdot FR_{f,m} \cdot EF_{CO2,f} \cdot 10^{-6}$$

Where:

$PE_{TR,m}$ : Project emissions from road transportation of freight monitoring period  $m$ ;

$D_{f,m}$ : Return trip road distance between the origin and destination of freight transportation activity  $f$  in monitoring period  $m$ ;

$FR_{f,m}$ : Total mass of freight transported in freight transportation activity  $f$  in monitoring period  $m$ ;

$EF_{CO2,f}$ : Default CO2 emission factor for freight transportation activity  $f$ ;

- f*: Freight transportation activities conducted in the project activity in monitoring period *m*

#### The leakage emissions ( $LE_y$ ):

No leakage is considered for this kind of project as all three possible sources of leakage are demonstrated at the PD, in accordance with the applied “General guidance on leakage in biomass project activities”:

- the amount of native firewood from sustainable management plan, *açaí* pits, Brazilian nut husks, wood residue and wood from forest management necessary to provide thermal energy for the project activity represent a non-representative quantity of these kind of biomasses, which avoids the possibility of leakage;
- the project is expected to decrease the use of non-renewable biomass by similar users, especially due to the incentive of carbon credits;
- there is no transference of equipment.

Therefore, according to the applied methodology the **Emission Reductions** are calculated as follows:

$$ER_y = BE_y - PE_y - LE_y$$

Where:

- $ER_y$ : Emission reductions in year *y*;  
 $BE_y$ : Baseline reductions in year *y*;  
 $PE_y$ : Project reductions in year *y*;  
 $LE_y$ : Leakage reductions in year *y*.

Thus, it can be concluded that:

- all relevant assumptions and data are listed in the project description, including their references and sources;
- all data and parameter values used in the project description are considered reasonable in the context of the project;
- all estimates of the baseline emissions can be replicated using the data and parameter values provided in the project description;
- the quantification of GHG emission reductions were determined in accordance with applied methodology.

### 3.2.7 Methodology Deviations

No methodology deviation was observed in the course of this validation of renewal of crediting period.

### 3.2.8 Monitoring Plan

The monitored parameters of the project activity are:

- $PR_y$ : Production of ceramic units;
- $NCV_{biomass}$ : Net calorific value of non-renewable woody biomass that is substituted;

- $Q_{renbiomass}$ : Amount of renewable biomass utilized;
- *Origin of Renewable Biomass*;
- *Leakage of non-renewable biomass*;
- $f_{NRB,y}$ : Fraction of woody biomass used in the absence of the project activity in year  $y$  that can be established as non-renewable biomass using survey methods or government data or approved default country specific fraction of non-renewable biomass values available on the CDM website;
- *Renewable biomass surplus*;
- $D_{f,m}$ : Return trip road distance between the origin and destination of freight transportation activity  $f$  in monitoring period  $m$ ;
- $FR_{f,m}$ : Total mass of freight transported in freight transportation activity  $f$  in monitoring period  $m$ .

The monitored parameters are in accordance with applied methodology and tools.

### 3.3 Non-Permanence Risk Analysis

Not applicable to this stage of the project activity.

## 4 SAFEGUARDS

### 4.1 No Net Harm

The burning of the biomasses emits particulate material and CO<sub>2</sub> identified as negative impact. This also occurs when using fossil fuel. Nevertheless, as they are renewable biomasses, they have carbon neutral lifecycle.

All ashes resulting from the burning are incorporated into the clay used as thermal insulator in the kilns entrance.

Thus, the negative impacts caused by the project activity are being mitigated.

### 4.2 Environmental Impact

The environmental impacts of the project activity are positive:

- improvement to soil conditions because of the vegetation conservation;
- GHG emission reduction;
- preservation of groundwater quality;
- preservation of the water cycle renewal
- no more use a polluting residues as fuel for energy production;
- biodiversity preservation

### 4.3 Local Stakeholder Consultation

The formal local stakeholder consultation was carried out during the validation of the crediting period. Regarding communication with stakeholders, the project participant has a good relationship with local community and has open channels in order to receive comments from local stakeholders. Thus, the project activity has a stakeholder communication access in place and working.

#### 4.4 Public Comments

According to the validation report and registered VCS-PD, no comments were raised during the local stakeholder consultation

### 5 VALIDATION CONCLUSION

ESPL, contracted by Sustainable Carbon – Projetos Ambientais Ltda., has performed the independent validation of the renewal of crediting period of the project “Kamiranga Ceramic Fuel Switching Project”, with VCS Project ID 197.

ESPL commenced the validation based on the baseline and monitoring methodology AMS-I.E – version 07.0, the registered VCS-PD – version 2.3 (from previous crediting period) and ending with final VCS-PD – version 5 (for the new crediting period).

ESPL’s validation approach is based on the understanding of the risks associated with reporting the project activity, estimates of GHG emission data and the controls to be implemented to mitigate these. ESPL planned and performed the validation by obtaining evidence, other information and explanations that ESPL considered necessary to give reasonable assurance that the estimated GHG emission reductions are fairly to be achieved.

The validation team confirms, based on final revised VCS-PD, that:

- the original baseline scenario is still valid as it is given by the applied methodology;
- the project additionality remains valid for the renewal of the crediting period as per section 3.8.5, paragraph 1 of the VCS Standard version 3.7. No regulatory surplus has been identified. The project is in accordance with all applicable regulations and legislations;
- the project description is in accordance with the characteristics identified on site;
- the monitoring plan is adequate to the project activity and is in accordance with the applied methodology;
- at this 2<sup>nd</sup> crediting period, the project activity is likely to achieve the estimated of 29,828 tCO<sub>2</sub>e per year and 298,280 tCO<sub>2</sub>e for the entire crediting period.



**Kaviraj Singh**  
**Managing Director**

**14/06/2018**

## APPENDIX I: REFERENCES

| No. | Title                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | References                                                                                |
|-----|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|
| 1.  | <u>Methodology</u><br>AMS-I.E – Switch from non-renewable biomass for thermal applications by the user                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | version 07.0                                                                              |
| 2.  | <u>Tools</u> <ul style="list-style-type: none"> <li>- Assessment of the validity of the original/current baseline and update of the baseline at the renewal of the crediting period</li> <li>- Methodological tool: Project and leakage emissions from biomass</li> <li>- Methodological tool “Project and leakage emissions from transportation of freight”</li> <li>- Methodological tool “Calculation of the fraction of non-renewable biomass”</li> </ul>                                                                                                                                                 | version 03.0.1<br>version 04.0<br>version 01.1.0<br>version 01.0                          |
| 3.  | <u>Biomass</u><br>Records of biomass purchase from the previous crediting period                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | -                                                                                         |
| 4.  | <u>Production</u><br>Records of production by type of ceramic devices from the previous crediting period                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | -                                                                                         |
| 5.  | <u>Licenses</u> <ul style="list-style-type: none"> <li>- Environmental License # 032/2016 – Production of ceramic pieces – Municipality of São Miguel do Guamá. Environmental Secretariat - SEMMA</li> <li>- Environmental License # 033/2016 – extraction of clay – Municipality of São Miguel do Guamá. Environmental Secretariat - SEMMA</li> <li>- Dispense of water grant Request Protocol issued by Environment and Sustainability Secretariat from State of Para – SEMAS/PA.</li> <li>- Conformity License # 04289 – factory operation – City Hall of Sao Miguel do Guamá for the year 2018</li> </ul> | Validity: 13/12/2020<br>Validity: 14/12/2020<br>Issue: 23/02/2018<br>Validity: 31/12/2018 |
| 6.  | VCS-PD – registered                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | version 2.3 – 27/10/2009                                                                  |
| 7.  | VCS-PD – draft                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | version 03 – 10/04/2018                                                                   |
| 8.  | VCS-PD – Revised                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | version 4 – 24/05/2018                                                                    |
| 9.  | VCS-PD – final                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | version 5 – 12/06/2018                                                                    |
| 10. | VCU estimates Spreadsheet – draft                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | version 3                                                                                 |
| 11. | VCU estimates Spreadsheet – final                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | version 5                                                                                 |
| 12. | VCS – Standards Version 3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Version 3.7                                                                               |
| 13. | IPCC publications                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | <a href="http://www.ipcc-nggip.iges.or.jp">www.ipcc-nggip.iges.or.jp</a>                  |
| 14. | UNFCCC                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | <a href="http://cdm.unfccc.int">http://cdm.unfccc.int</a>                                 |
| 15. | VCS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | <a href="http://www.v-c-s.org/">http://www.v-c-s.org/</a>                                 |

**APPENDIX II: ABBREVIATIONS**

| <b>Abbreviations</b>   | <b>Full texts</b>                                                     |
|------------------------|-----------------------------------------------------------------------|
| <b>BE</b>              | Baseline Emission                                                     |
| <b>CA</b>              | Corrective Action / Clarification Action                              |
| <b>CAR</b>             | Corrective Action Request                                             |
| <b>CDM</b>             | Clean Development Mechanism                                           |
| <b>CO<sub>2</sub></b>  | Carbon dioxide                                                        |
| <b>CO<sub>2</sub>e</b> | Carbon dioxide equivalent                                             |
| <b>CL</b>              | Clarification Request                                                 |
| <b>DOE</b>             | Designated Operational Entity                                         |
| <b>ER</b>              | Emission Reduction                                                    |
| <b>ESPL</b>            | Earthood Services Private Limited                                     |
| <b>FAR</b>             | Forward Action Request                                                |
| <b>GHG</b>             | Greenhouse gas(es)                                                    |
| <b>MP</b>              | Monitoring Plan                                                       |
| <b>MR</b>              | Monitoring Report                                                     |
| <b>PA</b>              | Project Activity                                                      |
| <b>PE</b>              | Project Emission                                                      |
| <b>PP</b>              | Project Participant                                                   |
| <b>QA/QC</b>           | Quality Assurance / Quality Control                                   |
| <b>SEMA</b>            | Secretariat of Environment of the Municipality of São Miguel do Guamá |
| <b>SEMMAS</b>          | Department of the Environment of the State of Pará                    |
| <b>UNFCCC</b>          | United Nations Framework Convention on Climate Change                 |
| <b>VCS</b>             | Verified Carbon Standard                                              |
| <b>VCS-PD</b>          | VCS – Project Description                                             |
| <b>VCU</b>             | Verified Carbon Unit                                                  |
| <b>XLS</b>             | Emission Reduction Calculation Spread Sheet                           |

## APPENDIX III: FINDINGS

Table 1. CL from this validation

|                                                                                                                                                                                                                                                              |    |                    |     |                         |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|--------------------|-----|-------------------------|
| <b>CL ID</b>                                                                                                                                                                                                                                                 | 01 | <b>Section no.</b> | 3.1 | <b>Date:</b> 30/04/2018 |
| <b>Description of CL</b>                                                                                                                                                                                                                                     |    |                    |     |                         |
| In Sections 1.8 it is not explained the equipment that are installed under the project activity, and if new equipment has been installed during the 1 <sup>st</sup> crediting period and if the parameter BFy remains unaltered.                             |    |                    |     |                         |
| <b>Project participant response</b>                                                                                                                                                                                                                          |    |                    |     | <b>Date:</b> 24/05/2018 |
| The equipment installed under the project activity were described at section 1.8. Considering that the efficiency of the new kilns are exactly the same of the validation's kilns the BFy remained unaltered                                                 |    |                    |     |                         |
| <b>Documentation provided by project participant</b>                                                                                                                                                                                                         |    |                    |     |                         |
| VCS-PD version 4                                                                                                                                                                                                                                             |    |                    |     |                         |
| <b>DOE assessment</b>                                                                                                                                                                                                                                        |    |                    |     | <b>Date:</b> 31/05/2018 |
| It is now clear in the VCS-PD that there are equipment installed under the previous crediting period. However, the installed kilns (two Paulista) are similar to the other Paulista existing. Thus, it is reliable that the parameter BFy remains unaltered. |    |                    |     |                         |
| <b>CL is closed</b>                                                                                                                                                                                                                                          |    |                    |     |                         |

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |    |                    |     |                         |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|--------------------|-----|-------------------------|
| <b>CL ID</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 02 | <b>Section no.</b> | 3.1 | <b>Date:</b> 30/04/2018 |
| <b>Description of CL</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |    |                    |     |                         |
| In Section 2.2 of the VCS-PD, not clear information has been provided in this section considering that several ceramics are registered under VCS, especially when it is said that "There are no similar registered project activities in the region of the project activity once Sustainable Carbon - Projetos Ambientais LTDA made a research and did not find any registered small-scale CDM Project. Therefore, the proposed project activity is not saving the non-renewable biomass accounted for by the other registered project activities" |    |                    |     |                         |
| <b>Project participant response</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |    |                    |     | <b>Date:</b> 24/05/2018 |
| Considering that the methodology AMS-I.E.: Switch from Non-Renewable Biomass for Thermal Applications by the User – Version 07, valid from 22-July-16 to 31-October-17 refers only CDM projects, these were the ones searched at the region, disregarding projects registered at voluntary market.                                                                                                                                                                                                                                                 |    |                    |     |                         |
| <b>Documentation provided by project participant</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |    |                    |     |                         |
| VCS-PD version 4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |    |                    |     |                         |
| <b>DOE assessment</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |    |                    |     | <b>Date:</b> 31/05/2018 |
| The project proponents have been following the applied methodology where it is said that there is not CDM projects in the region.                                                                                                                                                                                                                                                                                                                                                                                                                  |    |                    |     |                         |
| <b>CL is closed</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |    |                    |     |                         |

|                                                                                                                                                                                                                                                             |    |                    |       |                         |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|--------------------|-------|-------------------------|
| <b>CL ID</b>                                                                                                                                                                                                                                                | 03 | <b>Section no.</b> | 3.2.6 | <b>Date:</b> 30/04/2018 |
| <b>Description of CL</b>                                                                                                                                                                                                                                    |    |                    |       |                         |
| In Section 2.3 of the VCS-PD, project emissions from transportation have not being considered                                                                                                                                                               |    |                    |       |                         |
| <b>Project participant response</b>                                                                                                                                                                                                                         |    |                    |       | <b>Date:</b> 04/05/2018 |
| The project emissions from transportation was included at section 2.3. It is worth to mention that during the first crediting period the project emission was not considering to the calculation and all parameters related will be monitoring from now on. |    |                    |       |                         |
| <b>Documentation provided by project participant</b>                                                                                                                                                                                                        |    |                    |       |                         |

|                                                                                                                                    |                         |
|------------------------------------------------------------------------------------------------------------------------------------|-------------------------|
| VCS-PD version 4                                                                                                                   |                         |
| <b>DOE assessment</b>                                                                                                              | <b>Date:</b> 28/05/2018 |
| Project emissions from freight transportation have now being considered in section 2.3 of the VCS-DD<br><b><u>CL is closed</u></b> |                         |

|                                                                                                                                                                                                        |    |                    |       |                         |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|--------------------|-------|-------------------------|
| <b>CL ID</b>                                                                                                                                                                                           | 04 | <b>Section no.</b> | 3.2.4 | <b>Date:</b> 30/04/2018 |
| <b>Description of CL</b>                                                                                                                                                                               |    |                    |       |                         |
| Section 4.1 parameter EF <sub>CO2,f</sub> as per applied tool, this default value may use a value for heavy vehicles or light vehicles. It is not clear the reason of only heavy vehicles are applied. |    |                    |       |                         |
| <b>Project participant response</b>                                                                                                                                                                    |    |                    |       | <b>Date:</b> 24/05/2018 |
| The default value for light vehicles was included.                                                                                                                                                     |    |                    |       |                         |
| <b>Documentation provided by project participant</b>                                                                                                                                                   |    |                    |       |                         |
| VCS-PD version 6 from 24/05/2018                                                                                                                                                                       |    |                    |       |                         |
| <b>DOE assessment</b>                                                                                                                                                                                  |    |                    |       | <b>Date:</b> 31/05/2018 |
| Values have been informed as per applied tool "Project and leakage emissions from transportation of freight Version 01.1.0"                                                                            |    |                    |       |                         |
| <b><u>CL is closed</u></b>                                                                                                                                                                             |    |                    |       |                         |

|                                                                                                                                                                                                                                                                                                                                                                                                                                               |    |                    |     |                         |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|--------------------|-----|-------------------------|
| <b>CL ID</b>                                                                                                                                                                                                                                                                                                                                                                                                                                  | 05 | <b>Section no.</b> | 3.1 | <b>Date:</b> 30/04/2018 |
| <b>Description of CL</b>                                                                                                                                                                                                                                                                                                                                                                                                                      |    |                    |     |                         |
| ER calculations: tab thermal energy: values applied in the probable scenario are not clear                                                                                                                                                                                                                                                                                                                                                    |    |                    |     |                         |
| <b>Project participant response</b>                                                                                                                                                                                                                                                                                                                                                                                                           |    |                    |     | <b>Date:</b> 04/05/2018 |
| First, it was surveyed the biomass with potentials of use in the region considering the historical consumption of the ceramics with projects and bibliographical survey. Than the probable scenario was calculate based on an inverse calculation.<br>The total energy generated during the first crediting period was utilized to obtain the quantity of each potential biomass that would be necessary to generate that same energy amount. |    |                    |     |                         |
| <b>Documentation provided by project participant</b>                                                                                                                                                                                                                                                                                                                                                                                          |    |                    |     |                         |
| VCU PD_Calculation_Kamiranga_v.6.xls                                                                                                                                                                                                                                                                                                                                                                                                          |    |                    |     |                         |
| <b>DOE assessment</b>                                                                                                                                                                                                                                                                                                                                                                                                                         |    |                    |     | <b>Date:</b> 28/05/2018 |
| The information provided in the excel spreadsheet is now clear and correct.                                                                                                                                                                                                                                                                                                                                                                   |    |                    |     |                         |
| <b><u>CL is closed</u></b>                                                                                                                                                                                                                                                                                                                                                                                                                    |    |                    |     |                         |

**Table 2. CAR from this validation**

|                                                                                                                                                                                                                                |    |                    |       |                         |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|--------------------|-------|-------------------------|
| <b>CAR ID</b>                                                                                                                                                                                                                  | 01 | <b>Section no.</b> | 3.2.4 | <b>Date:</b> 30/04/2018 |
| <b>Description of CAR</b>                                                                                                                                                                                                      |    |                    |       |                         |
| Steps 1.4 and 2.1 of the tool "Assessment of the validity of the original /current baseline and update of the baseline at the renewal of the crediting period" have not been correctly discussed in Section 2.4 of the VCS-PD. |    |                    |       |                         |
| <b>Project participant response</b>                                                                                                                                                                                            |    |                    |       | <b>Date:</b> 24/05/2018 |
| Step 1.4. the description was adjusted to be in accordance with the renewal scenario.<br>Step 2.1. was adjusted to be in accordance with the renewal scenario.                                                                 |    |                    |       |                         |
| <b>Documentation provided by project participant</b>                                                                                                                                                                           |    |                    |       |                         |

|                                                                                                                                                                                                                                                                                                              |                         |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|
| VCS-PD version 4                                                                                                                                                                                                                                                                                             |                         |
| <b>DOE assessment</b>                                                                                                                                                                                                                                                                                        | <b>Date:</b> 31/05/2018 |
| <p>The validation team assessed the answers to the finding as following:</p> <p>Step 1.4. the data and parameter were duly updated for the next crediting period.</p> <p>Step 2.1. baseline emissions were updated. Information was correctly informed in the VCS-PD.</p> <p><b><u>CAR is closed</u></b></p> |                         |

|                                                                                                                                                                                                                                                                                                                                                                        |    |                    |       |                         |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|--------------------|-------|-------------------------|
| <b>CAR ID</b>                                                                                                                                                                                                                                                                                                                                                          | 02 | <b>Section no.</b> | 3.2.4 | <b>Date:</b> 30/04/2018 |
| <b>Description of CAR</b>                                                                                                                                                                                                                                                                                                                                              |    |                    |       |                         |
| <p>Section 4.2. It is not clear why the value of the parameter <math>f_{NRB}</math> is not consistent with the same parameter used in the latest monitoring period (6 MP) considering that the determination of this parameter in both situations (last MP and renewal of CP) are contemporaneous.</p>                                                                 |    |                    |       |                         |
| <b>Project participant response</b>                                                                                                                                                                                                                                                                                                                                    |    |                    |       | <b>Date:</b> 24/05/2018 |
| <p>The latest monitoring period utilized the methodology AMS-I.E.: Switch from Non-Renewable Biomass for Thermal Applications by the User – Version 01, valid from 01/02/2008 to 08/04/2010 to calculate the <math>f_{NRB}</math>, on the other hand, the renewal utilized methodological tool “Calculation of the fraction of non-renewable biomass” version 01.0</p> |    |                    |       |                         |
| <b>Documentation provided by project participant</b>                                                                                                                                                                                                                                                                                                                   |    |                    |       |                         |
| <p>“Methodological tool “Calculation of the fraction of non-renewable biomass” version 01.0”</p> <p>" VCU PD_Calculation_Kamiranga_v.4.xls"</p>                                                                                                                                                                                                                        |    |                    |       |                         |
| <b>DOE assessment</b>                                                                                                                                                                                                                                                                                                                                                  |    |                    |       | <b>Date:</b> 31/05/2018 |
| <p>The calculation methodological tool has change from the latest crediting period to this proposed new crediting period. The calculation was based on the methodological tool “Calculation of the fraction of non-renewable biomass” version 01.0.</p> <p>The calculations have been carried out as per applied tool.</p> <p><b><u>CAR has been closed</u></b></p>    |    |                    |       |                         |

**Table 3. FAR from this validation**

Not applicable for this validation.

## APPENDIX IV: COMPETENCE OF TEAM MEMBERS AND TECHNICAL REVIEWERS

| Competence Statement |                                                                     |      |            |
|----------------------|---------------------------------------------------------------------|------|------------|
| Name                 | Marcelo Sebben                                                      |      |            |
| Country              | Brazil                                                              |      |            |
| Education            | M.Sc. (Sustainable Energy System)<br>B. Eng. (Chemical Engineering) |      |            |
| Experience           | 12.5 Years                                                          |      |            |
| Field                | Chemical process industry, CDM, Energy, Climate Change              |      |            |
| Approved Roles       |                                                                     |      |            |
| Team Leader          | Yes                                                                 |      |            |
| Validator            | Yes                                                                 |      |            |
| Verifier             | Yes                                                                 |      |            |
| Methodology Expert   | Yes (ACM0001, ACM0002, ACM0006, AM0065, AMS ID)                     |      |            |
| Local expert         | Brazil, Chile, Honduras                                             |      |            |
| Financial Expert     | Yes                                                                 |      |            |
| Technical Reviewer   | Yes                                                                 |      |            |
| TA Expert            | Yes (TA 1.1, 1.2, 5.1, 13.1)                                        |      |            |
|                      |                                                                     |      |            |
| Reviewed by          | Abhishek Mahawar                                                    | Date | 01/03/2018 |
| Approved by          | Ashok Kumar Gautam                                                  | Date | 01/03/2018 |

| Competence Statement |                                                 |      |            |
|----------------------|-------------------------------------------------|------|------------|
| Name                 | Sergio Bonanno Cruz                             |      |            |
| Country              | Brazil                                          |      |            |
| Education            | Post Graduate Diploma in Environment            |      |            |
| Experience           | 25 Years                                        |      |            |
| Field                | Environmental Law, CDM, Energy, Climate Change  |      |            |
| Approved Roles       |                                                 |      |            |
| Team Leader          | Yes                                             |      |            |
| Validator            | Yes                                             |      |            |
| Verifier             | Yes                                             |      |            |
| Methodology Expert   | Yes (ACM0001, ACM0002, AM0026, ACM0006, AMS ID) |      |            |
| Local expert         | Brazil, Chile                                   |      |            |
| Financial Expert     | Yes                                             |      |            |
| Technical Reviewer   | Yes                                             |      |            |
| TA Expert            | Yes (TA 1.2, 13.1)                              |      |            |
|                      |                                                 |      |            |
| Reviewed by          | Abhishek Mahawar                                | Date | 01/03/2018 |
| Approved by          | Ashok Kumar Gautam                              | Date | 01/03/2018 |