



Voluntary Carbon Standard 2007.1

Project number: 8000376397 09/459

Validation Report:

Name of Validation company:	Date of the issue:
TÜV NORD CERT GmbH	November 6 th , 2009
Report Title:	Approved by:
Final Validation Report Kamiranga Ceramic Fuel Switching Project	Mr. Eric Krupp (FA)
Client:	Project Title:
Carbono Social Serviços Ambientais Ltda.	Kamiranga Ceramic Fuel Switching Project
Summary:	
The Carbono Social Serviços Ambientais Ltda has commissioned the TÜV NORD JI/CDM Certification Program to validate the project: "KAMIRANGA CERAMIC FUEL SWITCHING PROJECT" with regard to the relevant requirements of the VCS 2007.1 Standard. The project activity consists of switching non-renewable to renewable biomass fuel for end-user thermal energy generation. A risk-based approach has been followed to perform this validation. In the course of the draft validation 12 Corrective Action Requests (CARs) and 3 Clarification Requests (CLs) were raised and successfully closed. Furthermore 0 FAR was raised. The review of the project design documentation and additional documents related to baseline and monitoring methodology; the subsequent background investigation, follow-up interviews and review of comments by parties, stakeholders and NGOs have provided TÜV NORD JI/CDM CP with sufficient evidence to validate the fulfilment of the stated criteria. In detail the conclusions can be summarised as follows: - The project is in line with all relevant host country criteria (Brazil) and all relevant VCS 2007.1 Standard criteria. - The project additionality is sufficiently justified in the VCS PD. - The monitoring plan is transparent and adequate. - The calculation of the project emission reductions is carried out in a transparent and conservative manner, so that the calculated emission reductions of 351,250 t CO₂e is most likely to be achieved within the 10 years (renewable) crediting period. The conclusions of this report shows that the project, as it was described in the project documentation, is in line with all criteria applicable for the validation.	
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1 Introduction

1.1 Objective

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

- VCS 2007.1 Standard
- other relevant rules, including the host country (Brazil)
- legislation and sustainability criteria

are validated in order to confirm that the project design as documented is sound and reasonable and meets the stated requirements and identified criteria. Validation is seen as necessary to provide assurance to stakeholders on the quality of the project and its intended generation of Voluntary Carbon Units (VCUs).

1.2 Scope and Criteria

The validation scope is given as an independent and objective review of the project design, the project's baseline study and monitoring plan (based on AMS-I.E: Switch from non-renewable biomass for thermal applications by the user - Version 01, February 1st 2008 onwards), which are included in the VCS PD and other relevant supporting documents.

The items covered in the validation are described below:

- Project Description
- Project Baseline
- Monitoring Plan
- Calculation of GHG Emissions
- Environmental Impacts
- Stakeholder Consultation

1.3 VCS project Description

Located in São Miguel do Guamá, Pará State, this project comprises one enterprise, *Kamiranga Ceramic*, which produces structural ceramic devices like bricks. The project activity involves fuel switching from native firewood from Amazonian biome to sawdust to feed the ceramic kilns; thus GHG emission reduction is achieved. Others types of renewable sources of biomass can be applied during the project activity, such as elephant grass that could be cultivated in pasture or degraded areas, in which there is no vegetation to be deforested. Rice husk and açai pits are also available and can be considered as alternatives.

Before the switching of the fuel, Kamiranga Ceramic consumed 1,944 tons of native firewood per month to produce 2,400 tons of ceramic pieces per month. Until 2007, before the project activity, the ceramic used one “Paulista” Kiln and nine “Caieiras” kilns.

The ceramic owner demolished the nine “Caieiras” Kilns and built another “Paulista” and one “Hoffman” Kiln which resulted in the operation of three kilns since the beginning of 2008 with the configuration of two “Paulista” Kilns and one “Hoffman” kiln. The ceramic started its activities with the renewable biomass in January 1st, 2008. The Kamiranga Ceramic is now consuming around 334 tonnes of sawdust monthly to produce around 2,780 tonnes of ceramic pieces per month.

Due to the project activity investments were necessary to maintain the facility production, such as: new mechanical burners to feed the kilns and other equipments, construction of two new kilns and a shed to store the renewable biomass, adjustments in the old kiln entrance to adapt them for the use of renewable biomass. Staff training regarding the new fuel adoption was also required.

The project contributes to the sustainable development as due to its activity it will: diversify and improve sources of thermal energy generation, make possible new renewable biomass thermal energy generation technologies to be applied in the ceramic sector or other similar process, reuse biomass waste material, utilize renewable sources of biomass for thermal energy generation and contributes to the local biome preservation.

The estimated annual GHG emission reduction is 351,250 tCO₂e during the 10 years of the project activity, two times renewable.

1.4 Level of assurance

The validation report is based on VCS PD and documents provided by the project proponent, as well as information obtained from the on-site visit. The validation opinion is assured provided the credibility of all above.

2 Methodology

The validation of the project was carried out from July 2009 to September 2009.

Preparations: 2009-07-20 to 2009-07-26

On-site validation: 2009-07-27

(Draft) Reporting: 2009-08-20

(Final) Reporting: 2009-11-06

The validation consisted of the following three phases:

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

According to the VCS 2007.1 policy, validations shall be completed within two years of the project start date, or within 1 year of 18 November 2008, whichever is later. The

Policy announcement from the VCS Association extends this validation deadline. There it is stated that proof of contracting prior to 19 November 2008 shall be provided. The signed contract between the parts was checked and it is after to the defined date^{/PRO/} implying that no extension is applicable to this project.

2.1 Review of Document

VCS PD^{/VCS PD/} and proof of title submitted by Kamiranga Ceramic, as well as the supporting documents were reviewed. Refer to Table 5-1.

The VCS PD^{/VCS PD/} submitted by Kamiranga Ceramic and background documents related to the project design and baseline were reviewed.

Furthermore, the validation team used additional documentation by third parties like host party legislation, and technical data based on the project design provided by the company.

Afterwards, this report show the documents considered during the validation process and listed as follows:

- Documents provided by the project proponent (Table 5-1)
- Background investigations and assessment documents (Table 5-2)
- Websites consulted (Table 5-3)

2.2 Follow-up Interviews

Before and during the on-site visit on 2009-08-27, the verifier of TÜV NORD performed interviews with the project participants to confirm selected information and to resolve issues identified in the document review.

The owner of Kamiranga Ceramic and the consultants Carbono Social Serviços Ambientais Ltda were interviewed. The main topics of the interviews are summarised in Table 5-4 and the participant's information is addressed in table 5-5.

2.3 Resolution of any material discrepancy

The report includes Corrective action and Clarification Requests (CAR and CL) identified in the course of this validation.

A Corrective Action Request is established if:

- mistakes have been made in assumptions or the project documentation which directly will influence the project results,
- the requirements deemed relevant for validation of the project with certain characteristics have not been met or
- there is a risk that the project would not be registered by the UNFCCC or that emission reductions cannot be verified and certified.

A Clarification Request is issued where information is insufficient, unclear or not transparent enough to establish whether a requirement is met.

After resolution of these CARs and CLs by the project proponent the validator will issue the (final) validation report and opinion.

12 CARs and 3 CLs were found during pre-validation. Please refer to Section 3.

3 Validation Findings

3.1 Project Design

The project comprehends the use of renewable biomass instead of non-renewable sources of biomass to generate thermal energy to feed the kilns and producing ceramic devices. Prior to the project implementation the ceramic used native firewood from unsustainable production as fuel to feed its kilns that nowadays was switched to sawdust from sustainable forest management plan^{/CO/}. The ceramic will preferably apply the biomasses offered by the provider addressed in the VCS PD. In case of lack of providers for the preferred renewable biomass it may also employed other renewable biomasses from different sources as elephant grass, rice husk and açai pits.

The identified project boundary is the limits of the ceramic facility, in accordance with the applied methodology. The GHGs considered within the project boundary is the CO₂ emission from the combustion of native firewood used to occur in the baseline scenario. No other sources of GHG emission, sinks or reservoirs were identified.

Key parameters of the project are as below:

Table 3-1: Key parameters of the proposed project activity

Parameter	Value	
Average number of burning cycles: Paulista Kiln (the small one) Paulista Kiln (the big one) Hoffman Kiln	4 per month 4 per month 30 per month	
Average firing temperature of the kilns	900 °C	
Burning cycle duration (Paulista kiln)	Kiln loading	6h
	Heating cycle	40h
	Burning cycle	8h
	Cooling cycle	24h
	Downloading	6h
	Cleaning	30 min
	Total	84h30min
Kiln capacity (Paulista 1) – the small one	28,000 units	
Kiln capacity (Paulista 2) – the big one	39,000 units	
Burning cycle duration (Hoffman kiln)	Kiln loading	1 h
	Heating cycle	16 h
	Burning cycle	40 minutes
	Cooling cycle	about 3h
	Downloading	1h
	Cleaning	30 minutes
	Total	22h
Kiln capacity	51,000 per day (non-stop)	
Number of mechanic burners operating	6	

Number of 'Hoffman' kilns operating	1
Number of 'Paulista' Kiln operating	2
Production capacity	Until 2008: 2,400 tonnes of ceramic devices per month. Nowadays: 2,780 tonnes of ceramic devices per month. Weight of each piece = 1,54362 kg

Table 3-2: Project Location

Item	Project Scope
Host Country	Brazil
Region:	Pará State, North Region, Brazil
Project location address:	Kamiranga Ceramic Estrada Santa Rita da Barreira, km 4 – s/n – Zona Rural - São Miguel do Guamá – Pará - Brasil Postal Code: 68660-000
Latitude:	01 °36'53.0" S
Longitude:	47° 26'31.6" W
Telephone:	+55 (91) 3446-1206

This project does not participate in any other project emission trading program and was not rejected in other GHG programme.

This project is eligible under the VCS methodology, as long as it fulfils all applicability criteria of the methodology used. The project consists of thermal appliances (ceramic kilns) that displace the use of native firewood by introducing renewable sources of biomass as fuel for end-user energy generation. As the energy generation necessary for the ceramic pieces production occurs only in the ceramic facility, the validation team assumed that the plant is the end-user for the thermal energy generated. The native firewood utilized in the baseline scenario can be considered as non-renewable biomass as its extraction is illegal (but common practice) and no sustainable management plan is adopted. The renewable sources of biomass could be evidenced as follows in table 3-3:

Table 3-3: Type of biomass

Renewable biomass applied	Description of sustainability
Sawdust	The sawdust that may be used in the project activity is originated from sawmills industries which utilizes wood coming from sustainable forest management. As the sawdust is an industrial residue it falls therefore under the renewable biomass criteria option V of the applied methodology. Sustainability will be provided by the assurance of the quantities and origin of the sawdust used via the check of the invoices.
Biomass that may be applied	Description of sustainability

Elephant grass	This is an alternative which is seen with potential for the future. If adopted by the project activity, the elephant grass cultivation should follow sustainable management methodologies. The elephant grass will be exclusively cultivated for the purpose to supply fuel to the project activity. The ceramic owner will be responsible to maintain or to evidence the sustainability of the production. Until now the ceramic did not use elephant grass for their project. The evidence of sustainability will be provided by the assurance of the quantities and origin of the elephant grass and by the control of the quantities involved. It falls under option V of the methodology.
Rice Husk	This is another alternative which is seen with potential for the future due to the local production of rice. Rice husk is sustainable biomass because the rice production facilities require regular plantation of rice to maintain the production. Until now the ceramic did not use rice husk for their project. The evidence of sustainability will be provided by the evidences of the sustainable management origin of the rice husk and by the control of the quantities involved. It falls under option V of the methodology.
Açaí Pits	Açaí pit is another alternative as long as the state of Pará is the biggest producer of açaí (<i>Euterpe oleraceae</i>) in Brazil. The pits are easily found, especially in Belém, which is the major consumer of açaí pulp in the State of Pará. Açaí pit is sustainable biomass because açaí pulp production require regular plantation of açaí to maintain the production. The evidence of sustainability will be provided by the assurance of the quantities and origin of the açaí pits used via the check of the invoices. It falls under option V of the methodology.

There are no similar CDM projects activities in the region as could be evidenced in the UNFCCC website. Moreover the project participants could prove the use of non-renewable biomass since 31 December 1989 using survey methods. Firewood is a well known fuel used in Brazil^{WEB2/} since the colonial period^{WEB1/}. The use of native wood and its unsustainable management is the most common practice in the ceramic sector^{WEB3/}.

The project reduces the greenhouse gases (GHG) by switching from non renewable firewood as fuel to renewable biomass. It will also contribute for the sustainable development of the region. The participation is voluntary.

The emission reduction was not double counted.

Table 3-4: Timelines

Project timelines	date
First implementation of the project	2007-09-01

Project starting date (total biomass switch)	2008-01-01
Starting date of the 1 st Crediting Period	2008-01-01
End of date of the 1 st Crediting Period	2017-12-31
Total project lifetime	10 years, twice renewable (30 years)

Table 3-5: Proof of title

Project Participant	Proof of title
Kamiranga Ceramic	Sigifério Alves de Oliveira
Carbono Social Servicios Ambientais Ltda.	Contract with ceramic owner

The Validation Team raised 09 CARs and 02 CLs which were successfully closed.

General	CAR 1
Description of finding <i>Describe the finding in unambiguous style; address the context (e.g. section)</i>	According to information given during on site visit the average firing temperature is different from the information presented on VCS PD. Please correct VCS PD, table 2.
Corrective Action #1 <i>This section shall be filled by the PP. It shall address the corrective action taken in details.</i>	The average firing temperature was modified to 900°C, as informed during on site visit.
DOE Assessment #1 <i>In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.</i>	Ok. The temperature now is in accordance with the data given during on site visit.
Conclusion <i>Tick the appropriate checkbox</i>	☐ To be checked during the first periodic verification ☒ Appropriate action was taken ☒ Project documentation was corrected correspondingly ☐ Additional action should be taken ☒ The project complies with the requirements

General	CAR 2
Description of finding <i>Describe the finding in unambiguous style; address the context (e.g. section)</i>	Please include in VCS PD, Table 3, page 8, the two biomass providers presented as main providers of biomass during on site visit (Cikel and Madeportes)
Corrective Action #1 <i>This section shall be filled by the PP. It shall address the corrective action taken in details.</i>	Cikel and Madeportes were included as main providers.

General	CAR 2
DOE Assessment #1 <i>In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.</i>	Ok. The main providers were included in Table 3 of the VCS PD.
Conclusion <i>Tick the appropriate checkbox</i>	☐ To be checked during the first periodic verification ☒ Appropriate action was taken ☒ Project documentation was corrected correspondingly ☐ Additional action should be taken ☒ The project complies with the requirements

General	CAR 3
Description of finding <i>Describe the finding in unambiguous style; address the context (e.g. section)</i>	According to information given during on site visit the sawdust do not generate a big amount of ashes. It is just the opposite way. So correct the information given in VSC PD about "new employees to clean the kilns due to the high generation of ashes using sawdust".
Corrective Action #1 <i>This section shall be filled by the PP. It shall address the corrective action taken in details.</i>	This example was excluded from the VCS PD. It was also modified as a positive impact since it is just the opposite way.
DOE Assessment #1 <i>In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.</i>	Ok. The new text is correct now and in accordance with the information given during on site visit.
Conclusion <i>Tick the appropriate checkbox</i>	☐ To be checked during the first periodic verification ☒ Appropriate action was taken ☒ Project documentation was corrected correspondingly ☐ Additional action should be taken ☒ The project complies with the requirements

General	CAR 4
Description of finding <i>Describe the finding in unambiguous style; address the context (e.g. section)</i>	According to information given during on site visit the average production per cycle is different than the information presented on VCS PD. Please inform the production of each kiln (three different sizes) and recalculate the average production per cycle. Please correct VCS PD.
Corrective Action #1 <i>This section shall be filled by the PP. It shall address the corrective action taken in details.</i>	The production per burning cycle for each kiln was added in the section 1.9 and Table 2.
DOE Assessment #1 <i>In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.</i>	Ok. The information about the burning cycle was added and it is correct now.
Conclusion <i>Tick the appropriate checkbox</i>	☐ To be checked during the first periodic verification ☒ Appropriate action was taken ☒ Project documentation was corrected correspondingly ☐ Additional action should be taken ☒ The project complies with the requirements

General	CAR 5
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General	CAR 5
Description of finding <i>Describe the finding in unambiguous style; address the context (e.g. section)</i>	The number of hours spends per burning cycle of both kilns (Paulista and Hoffman) is different from the date given during on site visit. Please correct VCS PD – Section 1.9.
Corrective Action #1 <i>This section shall be filled by the PP. It shall address the corrective action taken in details.</i>	They were rechecked the numbers of hours spent per burning cycle.
DOE Assessment #1 <i>In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.</i>	Ok. The numbers of hours spent per burning cycles was added and is correct now.
Conclusion <i>Tick the appropriate checkbox</i>	☐ To be checked during the first periodic verification ☒ Appropriate action was taken ☒ Project documentation was corrected correspondingly ☐ Additional action should be taken ☒ The project complies with the requirements

General	CAR 6
Description of finding <i>Describe the finding in unambiguous style; address the context (e.g. section)</i>	Please include in VCS PD the total of cycles per kiln, per month.
Corrective Action #1 <i>This section shall be filled by the PP. It shall address the corrective action taken in details.</i>	The total of burning cycles per kiln monthly was added in section 1.9.
DOE Assessment #1 <i>In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.</i>	Ok. The information about the total cycles per kiln, per month was added and it is correct now.
Conclusion <i>Tick the appropriate checkbox</i>	☐ To be checked during the first periodic verification ☒ Appropriate action was taken ☒ Project documentation was corrected correspondingly ☐ Additional action should be taken ☒ The project complies with the requirements

General	CAR 7
Description of finding <i>Describe the finding in unambiguous style; address the context (e.g. section)</i>	Please include in VCS PD the capacity of each kiln.
Corrective Action #1 <i>This section shall be filled by the PP. It shall address the corrective action taken in details.</i>	The total of ceramic units produced per burning cycles per kiln was added in section 1.9.
DOE Assessment #1 <i>In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.</i>	Ok. The information about the units produced per kiln, per month was added and it is correct now.

General	CAR 7
Conclusion <i>Tick the appropriate checkbox</i>	☐ To be checked during the first periodic verification ☒ Appropriate action was taken ☒ Project documentation was corrected correspondingly ☐ Additional action should be taken ☒ The project complies with the requirements

General	CAR 8
Description of finding <i>Describe the finding in unambiguous style; address the context (e.g. section)</i>	Please rewrite the section 1.7 and explain better about the conditions prior to project initiation. VCS PD 1.7.
Corrective Action #1 <i>This section shall be filled by the PP. It shall address the corrective action taken in details.</i>	The section 1.7 about the conditions prior to project initiation was rewritten.
DOE Assessment #1 <i>In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.</i>	Ok. The section 1.7 of VCS PD is explaining about the prior conditions of project initiation now.
Conclusion <i>Tick the appropriate checkbox</i>	☐ To be checked during the first periodic verification ☒ Appropriate action was taken ☒ Project documentation was corrected correspondingly ☐ Additional action should be taken ☒ The project complies with the requirements

General	CAR 09
Description of finding <i>Describe the finding in unambiguous style; address the context (e.g. section)</i>	According to information given during on site visit the amount of sawdust spend monthly is bigger than the value presented in VCS PD. So correct the information given in VSC PD.
Corrective Action #1 <i>This section shall be filled by the PP. It shall address the corrective action taken in details.</i>	The amount of sawdust spend monthly was rechecked in it is in accordance to information given during on site visit.
DOE Assessment #1 <i>In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.</i>	Ok. The amount of sawdust spend monthly was informed in Table 2 and is correct now.
Conclusion <i>Tick the appropriate checkbox</i>	☐ To be checked during the first periodic verification ☒ Appropriate action was taken ☒ Project documentation was corrected correspondingly ☐ Additional action should be taken ☒ The project complies with the requirements

General	CL 1
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General	CL 1
Description of finding <i>Describe the finding in unambiguous style; address the context (e.g. section)</i>	Please include in VCS PD the total of mechanic burners operating. VCS PD 1.9.
Corrective Action #1 <i>This section shall be filled by the PP. It shall address the corrective action taken in details.</i>	There are six mechanic burners operation at Kamiranga Ceramic, which were added in section 1.9.
DOE Assessment #1 <i>In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.</i>	Ok. The information was included in the VCS PD, section 1.9.
Conclusion <i>Tick the appropriate checkbox</i>	☐ To be checked during the first periodic verification ☒ Appropriate action was taken ☒ Project documentation was corrected correspondingly ☐ Additional action should be taken ☒ The project complies with the requirements

3.2 Baseline

The proposed project used CDM approved methodology Category AMS-I.E: Switch from non-renewable biomass for thermal applications by the user - Version 01, February 1st 2008 onwards; this methodology has been select by the project developer since contemplate the switching of non renewable biomass for renewable biomass.

The baseline scenario is the continuation of the common practice in the region, which is the use of native firewood from unsustainable management to feed the ceramic kilns contributing for the deforestation of the Amazonian biome. In the past, Kamiranga Ceramic used approximately 1,944 tonnes of native firewood monthly in order to produce 2,400 tonnes of ceramic pieces monthly, according to ceramic owner experience^{/IM01/} which could be evidenced during on-site visit.

Table 3-6: Assessment of Baseline Identification

☐	Baseline is not identified
☒	Assessment of baseline see below

Baseline Alternatives identified	Inline with the Methodology?	Eliminated	Reasons for elimination / non-elimination from list of alternatives	Evidence used	DOE Assessment	
					Appropriateness of elimination	Assessment of validation team (results and means of assessment)
Native wood	☒	☐	The use of native wood is common practice in the region. Additionally it could be evidenced that the use of wood was the most important national energy source until the 70's decade, when the use of petroleum assumed the first position ^{/WEB2/} . Although, when assessing exclusively the ceramic sector, the use of wood is still the most important fuel adopted ^{/WEB3/} and its source is originated from unsustainable managed areas ^{/WEB1/} .	^{/WEB 1/} ^{/WEB 2/} ^{/WEB 3/}	☐	Checking the sources given, it was possible to verify that the use of native wood is the preferred approach and therefore could not be eliminated.
Fuel oil	☒	☒	The fuel oil was discarded as a candidate because its high price when compared with the use of wood. Despite of the fact that the fuel oil presents a higher net calorific value when compared with wood its costs for the ceramic facility are higher because of its expensive price, as shown in a reliable university study ^{/WEB4/} .	^{/WEB 4/}	☒	The reason for elimination was reviewed and, when comparing prices one can understand that cost/benefit ratio is not an advantage for the company. Furthermore the use of fuel oil would not reduce carbon emissions.

Natural gas	☒	☒	The natural gas was dis-considered as a possible baseline scenario, although there is distribution in the activity region, the inconstant distribution of natural gas, as 40% of the natural gas consumed in Brazil proceeds from Bolivia ^{/WEB5/} made the project developer exclude this possibility. Moreover the natural gas presents higher prices when compared with wood ^{/WEB6/} and its supply lacks of availability ^{/WEB7/} .	/WEB 5/ /WEB 6/ /WEB 7/	☒	The reason for elimination was reviewed and, when comparing prices one can understand that cost/benefit ratio is not an advantage for the company. Furthermore the use of natural gas would not reduce carbon emissions.
Renewable biomass	☒	☒	The use of renewable biomass in the baseline (not carried out as a VCS project) has also been addressed as one possible baseline candidate. Due to some barriers that will be explained in the next step of additionality assessment this baseline scenario can also be excluded from the list.	-	☒	Checking the assessment of barriers, the elimination is appropriate. See barrier assessment in table 3-7.

The project attends satisfactorily all the requested tests according to the V-C-S program. It is not enforced by Brazilian legislation; the barriers met were real and verified and the use of native firewood is a common practice in the ceramic sector.

Additionality

The additionality was assessed using the project test (1) of section 5.8 of the VCS 2007.1 Standard. The project activity is not mandatory by any enforced applicable federal, state and municipal law, thus passing through step 1. The implementations barriers identified were:

Table 3-7: Assessment of Barrier Analysis

☐	No barrier parameters are used for additionality justification			
☒	Assessment of barriers see below			
Kind of Barrier (invest, tech, other)	Description of Barrier	Evidence used	Assessment of validation team	
			Appropriateness of information source	Explanation of final result

Technical	Kilns adjustment to the new machineries. Use of the new mechanical burners. Using the new fuel, changing of working process Storage of the renewable biomass.	/FAE/ /DOF/ /IM01/	☒	Technical adjustments and modifications in the kilns and in the overall ceramic production could be evidenced during on-site visit and were crosschecked by invoices for the new technical equipments /FAE/. The ceramists had to learn how to manage and control the logistics for the new machinery in order to get the most efficient production. Moreover, it was necessary to train the staff responsible for the kilns feeding as well as overall operation of the ceramic. The difficulties that occurred during the switch of the biomass, as described by the PP, could be evidenced during the interviews with workers and by checking the training plans, loss of biomass and loss of production during the experimental period. As the new process is different than the baseline a technical barrier was faced by this project The technical barrier has been verified and found to be significant for the additionality of the small-scale project activity.
Financial investment costs	Kiln entrance adjustment Equipment acquisition New storage shed Maintenance costs	/FAE/	☒	All the sources of investment costs could be verified during on-site visit. All invoices have been checked by the validation team. The financial barrier due to investment cost has been validated to be true and found not to be significant for the additionality of the small-scale project activity as no financial analysis has been carried out.

The validation team believe that the most impacting barrier for the proposed project activity is the new fuel used (technical barrier) including the production difficulties experienced due to the new fuel applied, renewable biomass purchase, mechanical biomass burners acquired and uncertainties related to the renewable biomass supply due its possible upcoming demand in the future. The presented technical barrier is sufficient to properly address step 2 requests.

For the common practice analysis it was used the GHG Protocol criteria assessment. As show in VCS PD, the most common practice in the region is the use of native firewood as fuel in the ceramics sector. The data available for the common practice analyse was the same presented for the baseline identification, thus the validation assessment was carried out in the same manner. The high levels of deforestation rates in the project region^{/WEB13/} and the practices in Brazil^{/WEB1//WEB2/} and specific in the ceramic sector^{/WEB1//WEB3/} support this conclusion.

The validation team is convinced that the project is additional, as show in the comments above. However 01 CL was opened and successfully closed.

General	CL 02
Description of finding <i>Describe the finding in unambiguous style; address the context (e.g. section)</i>	Please explain about all barriers that the project faced during the implementation period. VCS PD section 2.5.
Corrective Action #1 <i>This section shall be filled by the PP. It shall address the corrective action taken in details.</i>	It was included the financial barrier, and technological barrier follows best examples from additionality tool.

General	CL 02
DOE Assessment #1 <i>In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.</i>	Ok. The information about the barriers faced by the project was added and are enough to close this CL.
Conclusion <i>Tick the appropriate checkbox</i>	☐ To be checked during the first periodic verification ☒ Appropriate action was taken ☒ Project documentation was corrected correspondingly ☐ Additional action should be taken ☒ The project complies with the requirements

3.3 Monitoring Plan

The proposed project used CDM approved methodology Category AMS-I.E: Switch from non-renewable biomass for thermal applications by the user - Version 01, February 1st 2008 onwards. The project satisfies all criteria for the applied methodology. The application of monitoring methodology was assessed as correct.

The monitoring plan provides detailed information related to the collection, archiving and monitoring of all relevant data needed to:

- Estimate or measure emissions occurring from GHG sources, sinks and reservoirs
- Determine the baseline emissions
- Estimate changes in emissions from the site

Table 3-8:

Responsibility for the Monitoring	Area
Mr. Márcio Monteiro, employee of Kamiranga Ceramic	registration monitoring measurement reporting

Table 3-9:

Parameter monitored		Description of measurement and monitoring methods.
Name	Unit	
$Q_{\text{renbiomass}}$ Amount of renewable biomass employed	tonnes per month	Will be measured by the project proponent, monthly. The parameter will be monitored through the weight indicated in the buying receipts of the renewable biomasses providers. The specific gravity of each renewable biomass can be used for unit conversion ^{/WEB11/} .
$f_{\text{NRB},y}$ Fraction of native wood used in the absence of the project activity in year y.	%	Fraction of native wood used in the absence of the project activity has been identified by 92.28 ^{/XLS1/} . The source was verified to be reliable ^{/WEB8/} . The value will be monitored yearly and checked in each verification period. This value includes also the amount of non-renewable wood saved under similar project activities in the same biome (Amazonian) ^{/XCS1/} . The sources applied are literature and project database.

PR _y Production of ceramic devices	tonnes per month	The measurement will be done by an internal control sheet monitored by the project proponent, which will be filled daily. The production is a representative sample to ensure that all appliances are still in operation ^{/IMO/} .
Origin of renewable biomass	-	Controlled annually by the ceramic owner. The project participant will only buy renewable biomass from the list of its reliable supplier. Depending on the renewable biomass type different criteria must be applied as stated in section 3.1 of this report. If the ceramic obtain their biomass from other suppliers than listed now in the PD they will check the origin of the biomass and provide evidence to the verification team.
Renewable biomass surplus	tonnes or m ³	In order to estimate the leakage emission of the renewable biomass the project participant will monitor the renewable biomass surplus in the specific region of the project activity, yearly. The measurement will be based on national and internal sources. During validation leakage could not be identified so far. According to the general guidance on leakage EB 28 a possible source of leakage is the competing use of biomass. This is the case when the project uses more than 25% of the biomass available in the region. With proper references the PP could show, that there is more than 75% of each biomass available on the marked not used for the project activity ^{/VCS PD/} .
Leakage of non-renewable biomass	tCO ₂ e	All three sources of leakage predicted in the applied methodology will be monitored, annually. It will be provided information regarding the non-renewable biomass availability in the specific project region by official statistic data and national surveys.

The QA/QC procedures of the monitored parameters are clearly described and it is considered adequate. The amount of non-renewable biomass that would be used in the absence of the project activity will be calculated according option “b” of the applied methodology. The kiln efficiency (weight of renewable biomass / weight of pieces produced) before the project implementation multiplied by the monthly production that will be reached will define the amount of non-renewable biomass that would be used in the absence of the project activity.

Table 3-9:

Fixed parameter				Description of measurement and monitoring methods.
Name	Unit	Value	/REF/	
NCV _{biomass} Net calorific value of non-renewable biomass	TJ/ton of wood	0.0182	/WEB9/	An average value from a reliable article was applied. It was considered an average of the typical Amazonian biome trees, as can be checked in the calculation spreadsheet.
ρ _{biomass} Wood specific gravity	t/m ³	0.67	/WEB9/ /XLS1/	An average value from a reliable article was applied. It was considered an average of the typical Amazonian biome trees, as can be checked in the calculation spreadsheet.
EF _{projected fossil fuel}	TCO ₂ /TJ	77.4	IPCC 2006	The official IPCC value has been applied.
BF _y	tons of wood/tons of ceramic units fired	0.81	/XCS1/	The value was adopted after the calculation of the average consumption and production of ceramic units during more than 3 years when the ceramic facilities used to consume non-sustainable wood. This value is compatible with the data acquired in other ceramics that employ the same types of kilns.

3.4 Calculation of GHG Emissions

GHG emission reduction is calculated as baseline emissions minus project emissions minus leakage emissions. As no project and leakage emissions are identified according to the applied methodology, baseline emissions are equal to the amount of emission reduction. Emission reduction is calculated through the estimate value of native wood that would be consumed in the absence of the project activity in year y (according option “b” of applied methodology as state in section 3.3 of this report) multiplied by the 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 EF of the projected fossil fuel adopted. The approach used for the emission reduction calculation was considered to be in accordance with the applied methodology.

According to the applied methodology leakage emissions regarding the project activity are to be considered. The leakage emission was assessed according to the “General guidance on leakage in biomass project activities” of Indicative Simplified Baseline and Monitoring Methodologies for Selected Small-Scale CDM Project Activity Categories. The methodology requests due to the identification of potentially significant sources of leakage emission were properly addressed in the VCS PD and its emission is considered to be zero. Using the same assumptions and considerations as for the baseline identification^{/WEB1//WEB2//WEB3//WEB5/}, it can be assumed that the most employed fuel used is the native firewood. Thus no leakage emissions due to the non-renewable biomass should be considered. Despite of that, if this source of leakage emission is assessed to be significant in the further crediting period, the baseline will be identified to neutralize the leakage emission identified. For the leakage consideration regarding the renewable source of biomass it was properly addressed in VCS PD that the biomasses supply is significantly bigger (more than 75%) than the quantity necessary for the project activity. All possible biomasses were considered in this assessment^{/BRI//WEB10/}.

The Validation Team identified, however, 3 CARs which were successfully closed.

General	CAR 10
Description of finding <i>Describe the finding in unambiguous style; address the context (e.g. section)</i>	Please, recalculate the thermal energy production indicated in the VCU Calculation Spreadsheet of the kilns considering the real number of burning cycles per year per kiln. Please correct the VCS PD accordingly.
Corrective Action #1 <i>This section shall be filled by the PP. It shall address the corrective action taken in details.</i>	The thermal energy generated by the project activity was recalculated and VCS PD was corrected accordingly.
DOE Assessment #1 <i>In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.</i>	Ok. The thermal energy generated by the project activity was recalculated and it is correct now.
Conclusion <i>Tick the appropriate checkbox</i>	☐ To be checked during the first periodic verification ☐ Appropriate action was taken ☐ Project documentation was corrected correspondingly ☐ Additional action should be taken ☐ The project complies with the requirements

General	CAR 11
Description of finding <i>Describe the finding in unambiguous style; address the context (e.g. section)</i>	Please correct the information about the burning cycles of each different types of kiln in the VCUs Estimative spreadsheet.
Corrective Action #1 <i>This section shall be filled by the PP. It shall address the corrective action taken in details.</i>	It was rechecked and thermal energy was recalculated. See CAR 10.
DOE Assessment #1 <i>In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.</i>	Ok. The information about the burning cycles of each different types of kiln was given and it is correct now.
Conclusion <i>Tick the appropriate checkbox</i>	☐ To be checked during the first periodic verification ☒ Appropriate action was taken ☒ Project documentation was corrected correspondingly ☐ Additional action should be taken ☒ The project complies with the requirements

General	CAR 12
Description of finding <i>Describe the finding in unambiguous style; address the context (e.g. section)</i>	Please correct the information about the number of burning cycles for each type of kiln in the VCUs Estimative spreadsheet.
Corrective Action #1 <i>This section shall be filled by the PP. It shall address the corrective action taken in details.</i>	It was rechecked and thermal energy was recalculated. See CAR 10
DOE Assessment #1 <i>In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.</i>	Ok. The information about the number of burning cycles for each type of kiln in the VCUs Estimative spreadsheet was given and it is correct now.

General	CAR 12
Conclusion <i>Tick the appropriate checkbox</i>	☐ To be checked during the first periodic verification ☒ Appropriate action was taken ☒ Project documentation was corrected correspondingly ☐ Additional action should be taken ☒ The project complies with the requirements

3.5 Environmental Impact

The project will use renewable biomass for its firing process. The origin of the biomass will be monitored regularly and is included in the monitoring plan. A table that shows possible negative impacts to the environment has been included to the PD. There are no additional negative environmental impacts due to the project activity expected. An EIA (*Estudo de Impacto Ambiental* – Environment Impact Assessment) is not required by the environment federal authority. All mandatory licences for the project activity were available at the time of validation^{/OL1//OL2//OL3//ML//CFEM/}.

The Validation Team identified 01 CL which was successfully closed.

General	CL 03
Description of finding <i>Describe the finding in unambiguous style; address the context (e.g. section)</i>	Please clarify the extraction of 3,600m ³ of clay when the License mentions the value of 3,000m ³ .
Corrective Action #1 <i>This section shall be filled by the PP. It shall address the corrective action taken in details.</i>	Extraction of clay is in accordance to operation license. According to the ceramic owner, the amount consumed of clay is 3000 m ³ per month instead of 3600 m ³ .
DOE Assessment #1 <i>In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.</i>	Ok. The VCS PD was corrected. The new information is in line with the license.
Conclusion <i>Tick the appropriate checkbox</i>	☐ To be checked during the first periodic verification ☒ Appropriate action was taken ☒ Project documentation was corrected correspondingly ☐ Additional action should be taken ☒ The project complies with the requirements

3.6 Comments by stakeholders

The considered stakeholders for this project activity were the ceramic sector syndicate and de ceramic facility employee. A letter was sent to the stakeholders informing about the project activity. In the ceramic facilities the letter was posted on the employee's board, which is in a visible place with high circulation of employees. However no comments were received until the end of validation time.

4 Validation conclusion

Carbono Social Serviços Ambientais Ltda. Brasil has commissioned the TÜV NORD JI/CDM Certification Program to validate the project: “KAMIRANGA CERAMIC FUEL SWITCHING PROJECT” with regard to the relevant requirements of the VCS 2007.1 Standard.

The project activity consists of switching from non-renewable to renewable biomass fuel for end-user thermal energy generation. A risk-based approach has been followed to perform this validation. In the course of the draft validation 12 Corrective Action Requests (CARs) and 3 Clarification Requests (CLs) were raised and successfully closed. Furthermore, no FARs was raised.

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

In detail the conclusions can be summarised as follows:

- The project is in line with all relevant host country criteria (Brazil) and all relevant VCS 2007.1 Standard criteria.
- The project additionality is sufficiently justified in the VCS PD.
- The monitoring plan is transparent and adequate.
- The calculation of the project emission reductions is carried out in a transparent and conservative manner, so that the calculated emission reductions of 351,250 t CO₂e is most likely to be achieved within the 10 years (renewable) crediting period.

The conclusions of this report show, that the project, as it was described in the project documentation, is in line with all criteria applicable for the validation.

Essen, 2009-11-06



Rainer Winter
TÜV NORD JI/CDM CP
Verification Team Leader

Essen, 2009-11-06



Eric Krupp
TÜV NORD JI/CDM CP
Final approval

5 References

Reference	Document
/BRI/	BRITO E.O. Estimativa da produção de resíduos na Indústria Brasileira de Serraria e Laminação de Madeira. Rev. da Madeira. v.4. n.26. 1995, pp. 34-39. – “Estimative waste production in the brazilian industries”
/CFEM/	Recibo de recolhimento do CFEM (Composição Financeira pela Exploração de Recursos Minerais) ao DNPM, quitada em 30/06/2009.
/DOF/	CIKEL Brasil Verde Madeiras Ltda. (biomass supplier) CEPROF-PA: 2443 Madeportes – Madeira Portes Ind. Comércio e Exportação Ltda. (biomass supplier) CEPROF-PA: 2443.
/ECT/	Employee’s certificates for training realized regarding process for the project activity.
/ML/	Municipal License - Validity: 31/12/2009
/OL1/	Operation License nº 2676/2009 (SEMA) Validity: 23/06/2012 Registration nº 005/2007.
/OL2/	Operation License nº 2685/2009 Validity: 10/02/2011 CEPROF: SEMA –PA – Registration nº 2443
/OL3/	Water License obtained on 13/10/2008.
/PFT/	Contract signed between Carbono Social Serviços Ambientais Ltda. and Kamiranga Ceramic stating their ownership of the project.
/PRO/	Signed BRTÜV proposal issued for the project activity. It is clear stated the date of contracting for the validation and verification process. Date 2007/12/19.
/VCS PD/	Project Design Document “Kamiranga Ceramic Fuel Project” - Version 01 – July 16 th , 2009.
/VCS PD/	Project Design Document “Kamiranga Ceramic Fuel Project” – Version 2 - August 31, 2009

Reference	Document
/VCS PD/	Project Design Document “Kamiranga Ceramic Fuel Project” – Version 2.3 – October, 27th, 2009
/WEB1/	http://www.teses.usp.br/teses/disponiveis/86/86131/tde-14052008-113901/ Website consult on 2009/04/20
/WEB2/	http://www.scielo.br/scielo.php?pid=S0103-40142007000100015&script=sci_arttext&lng=ES Website consult on 2009/04/20
/WEB3/	http://www.mme.gov.br/download.do?attachmentId=16555&download Website consult on 2009/04/20
/WEB4/	http://www.abcm.org.br/xi_creem/resumos/TE/CRE04-TE01.pdf Website consult on 2009/03/20
/WEB5/	http://www.ctgas.com.br/template02.asp?parametro=2547 Website consult on 2009/04/20
/WEB6/	http://www.dep.fem.unicamp.br/boletim/BE31/artigo.htm Website consult on 2009/04/20
/WEB7/	http://www.gasnet.com.br/novo_entrevistas.asp?cod=145 Website consult on 2009/04/20
/WEB8/	http://faculty.jsd.claremont.edu/emorhardt/159/pdfs/2006/Klink.pdf Website consult on 2009/04/20
/WEB9/	http://www.ufsm.br/cienciaflorestal/artigos/v12n1/A8V12N1.pdf Website consult on 2009/04/20
/WEB10/	http://www.ibge.gov.br/estadosat/temas.php?sigla=sp&tema=extracaovegetal2007 Website consult on 2009/04/20
/WEB11/	http://hdl.handle.net/1884/10294 Website consult on 2009/04/20
/WEB12/	KLINK, C. A. ; MACHADO, R. Conservation of the Brazilian Cerrado, Belo Horizonte, v. 1, n. 1, p. 147-155, 2005. Available at: http://faculty.jsd.claremont.edu/emorhardt/159/pdfs/2006/Klink.pdf . Website consult on May 15th, 2009
/WEB13/	< http://www.cenargen.embrapa.br/cenargenda/noticias2006/atrativos130606.pdf >

Reference	Document
	Website consult on 2009/04/20
/WEB14/	GAIDZINSKI, R. Utilização da casca de arroz como solvente alternativo para o tratamento de efluentes da Região Carbonífera Sul Catarinense. 2007. Available at: < http://www.cetem.gov.br/publicacao/serie_anais_I_jpci_2007/Roberta_Gaidzinski.pdf > Website consult on April 27th, 2009.
/WEB15/	SILVA, I. T. et al. Uso do caroço de açaí como possibilidade de desenvolvimento sustentável do meio rural, da agricultura familiar e de eletrificação rural no estado do Pará. 2004. Available at: < http://www.feagri.unicamp.br/energia/agre2004/Fscommand/PDF/Agrener/Trabalho%2059.pdf >. Website consult on April 27th, 2009
/WEB16/	IBGE. Extração vegetal e silvicultura 2007. Available at: < http://www.ibge.gov.br/estadosat/temas.php?sigla=pa&tema=extracaovegetal2007 >. Website consult on April 27th, 2009
/WEB17/	Importância Econômica do Açaí. Available at: < http://minhasfrutas.blogspot.com/2008/12/importancia-economica-do-aai.html > Website consult on 27th, 2009
/XCS1/	Calculation spreadsheet of baseline study and emission reduction Version 01.
/XCS1/	Calculation spreadsheet of baseline study and emission reduction – Version 2.
/XCS1/	Calculation spreadsheet of baseline study and emission reduction – Version 2.3.October, 27th 2009.

Table 5-2: Background investigation and assessment documents

Reference	Document
/AMS-I.E./	AMS-I.E: Switch from Non-Renewable Biomass for Thermal Applications by the User, Version 01, February 1 st , 2008.
/GHG Protocol/	GHG Protocol for Project Accounting 2005.
/IPCC-GP/	IPCC Good Practice Guidance & Uncertainty Management in National Greenhouse Gas Inventories, 2000
/IPCC/	2006 IPCC Guidelines for National Greenhouse Gas Inventories:

Reference	Document
	General Guidance and Reporting
ISO 14064-1:2006	Greenhouse gases - Part 1: Specification with guidance at the organization level for quantification and reporting of greenhouse gas emissions and removals
ISO 14064-2:2006	Greenhouse gases - Part 2: Specification with guidance at the project level for quantification, monitoring and reporting of greenhouse gas emission reductions or removal enhancements.
ISO 14064-3:2006	Greenhouse gases - Part 3: Specification with guidance for the validation and verification of greenhouse gas assertions
ISO 14065:2007	Greenhouse gases - Requirements for greenhouse gas validation and verification bodies for use in accreditation or other forms of recognition
/KP/	Kyoto Protocol (1997)
/CONAMA 279/	Resolution CONAMA 279 (2001) – Environmental National Board
/VCS/	Voluntary Carbon Standard Program Guideline 2007.1.

Table 5-3: Websites used

Reference	Link	Organization
/MCT/	http://www.mct.gov.br	Ministério da Ciência e Tecnologia – Technology and Science Department
/UNFCCC/	http://unfccc.int	United Nations Framework Convention on Climate Change
/VCS/	http://www.v-c-s.org	Voluntary Carbon Standard
/DNPM/	http://www.dnpm.gov.br	National Department of Mineral Production

Table 5-4: Interviewed persons and interview topics

Interviewed Persons / Entities	Interview topics
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Interviewed Persons / Entities	Interview topics
Mr. Sigifério Alves de Oliveira - ceramic's director and owner. Mr. Mario Monteiro da Cruz – monitoring responsible Ms. Flávia Takeuchi – Carbono Social Serviços Ambientais Ltda. Brasil Mr. Thales Andrés Carra – Carbono Social Serviços Ambientais Ltda. Brasil	▪ Desk review findings ▪ General aspects of the project ▪ Project design, Commissioning and implementation ▪ Technical equipment and operation of the project ▪ Performance of the project ▪ Involved personnel and responsibilities ▪ Training and practice of the operational personnel ▪ Implementation of the monitoring plan ▪ Monitoring and measurement equipment ▪ QA/QC Testing and calibration procedures ▪ Monitored data management ▪ Data quality, archiving and reporting procedures ▪ Data uncertainty and residual risks ▪ GHG calculation ▪ Procedural aspects of the verification

Table 5-5: List of interviewed people

Reference	Mol ¹		Name	Organization / Function
/IM01/	V	☒ Mr. ☐ Ms..	Sigifério Alves de Oliveira	Kamiranga Ceramic's director and owner
/IM01/	V	☒ Mr. ☐ Ms.	Mario Monteiro da Cruz	Kamiranga Ceramic's Monitoring responsible
/IM01/	E, V	☐ Mr. ☒ Ms.	Flávia Yumi Takeuchi	Carbono Social Serviços Ambientais Ltda. - Technical Coordinator
/IM01/	E, V	☒ Mr. ☐ Ms	Thales Andrés Carra	Carbono Social Serviços Ambientais Ltda. - Technical Analyst

¹⁾ Means of Interview: (Telephone, E-Mail, Visit)