



Voluntary Carbon Standard 2007.1

Project number: OS 5836 09/177

Validation Report:

Name of Validation company:	Date of the issue:
TÜV NORD CERT GmbH	May 27 th , 2009
Report Title:	Approved by:
Final Validation Report Gomes de Mattos Ceramic	Mr. Eric Krupp (FA)
Client:	Project Title:
Carbono Social Serviços Ambientais Ltda.	Gomes de Mattos Ceramic Fuel Switching Project
Summary:	
The Carbono Social Serviços Ambientais Ltda has commissioned the TÜV NORD JI/CDM Certification Program to validate the project: "GOMES DE MATTOS 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 29 Corrective Action Requests (CARs) and 9 Clarification Requests (CRs) were raised and successfully closed. 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 283,420 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 Crato, Ceará State, this project comprises one enterprise, *Gomes de Mattos Ceramic*, which produces structural ceramic devices like bricks with 8 orifices, bricks with 6 orifices, small flagstone and roof tiles. The project activity involves fuel switching from native firewood from Caatinga biome to wood from sustainable forest management plan areas, sawdust, Algaroba wood, residues from cashew tree and babaçu coconut husk; thus GHG emission reduction is achieved. Other types of renewable sources of biomass can be applied during the project activity, such as municipal garden's residues and elephant grass provided from management areas.

Before the replacement of the biomass, Gomes de Mattos Ceramic utilized two Hoffman kilns and one "Câmara" to produce ceramic devices for the local market. The fuel

employed in the firing process was fossil fuel, mainly heavy oil. Due to the reduction of fossil fuel availability and the increase of prices, the fuel was gradually substituted by native wood. It was utilized 1,900 m³ of native wood monthly to feed the two “Hoffman” kilns and one “Câmara” kiln.

The total replacement occurred in May 2006, and now, *Gomes de Mattos Ceramic* was consuming 18 tonnes of wood from management areas (*Eucalyptus*), 563 tonnes of native wood from management areas, 128 tonnes of *Algaroba* wood, 5 tonnes from *Babaçu* coconut husk, 105 tonnes of cashew tress residues and 5 tonnes of sawdust monthly of each biomass to maintain the produce of 1,478,000 pieces per month, using the same kilns with some modifications.

Due to the project activity investments were necessary to maintain the facility productions, such as: new mechanical burners to feed the kilns and other equipments, adjustments in the kilns entrance before adapted to the native firewood fuel and construction of a shed to store the renewable biomass.

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 28,342 tCO₂e during the 10 years of the project activity, two years 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 on November 2008 until May 2009.

Preparations: 2008-10-06 to 2008-10-07

On-site validation: 2008-10-08

(Draft) Reporting: 2009-04-29

(Final) Reporting: 2009-05-25

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 prior to the defined date^{/PRO/}.

2.1 Review of Document

VCS PD^{/VCS PD/} and proof of title submitted by Gomes de Mattos Ceramic, as well as the supporting documents were reviewed.

The VCS PD^{/VCS PD/} submitted by Gomes de Mattos 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 October 08th, 2008, the verifier of TÜV NORD performed interviews with the project participants to confirm selected information and to resolve issues identified in the document review.

Gomes de Mattos Ceramic's owners and Carbono Social Serviços Ambientais Ltda. consultants 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 CR) 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 CRs by the project proponent the validator will issue the (final) validation report and opinion.

29 CARs and 9 CRs 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 wood from sustainable forest management plan, sawdust, Algaroba wood, residues from cashew tree and babaçu coconut husk. The ceramic will preferably apply the biomasses offered by the provider addressed in the VCS PD, but, in case of lack of providers, it may also employ other renewable biomasses sources as municipal garden's residues and elephant grass.

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	10 per month per kiln	
Average firing temperature of the kilns	900 °C	
Burning cycle duration	Kiln loading	24h
	Burning cycle	16h
	Cooling cycle	24h
	Pieces storage, kiln cleaning and preparation for next cycle	8h
	Total	72h
Kiln capacity	50,000.00 pieces/kiln	
Number of mechanic burners operating	2	
Number of 'Hoffman' kilns operating	2	
Number of 'Câmara' Kiln operating	1	
Production capacity	1,478,000 pieces per month	

Table 3-2: Project Location

Item	Project Scope
Host Country	Brazil
Region:	South region of Ceará State, Brazil
Project location address:	GOMES DE MATTOS CERAMIC

	Rodovia CE, 55 Km 06, Bairro Sítio Quebra Crato -Ceará - Brasil Postal Code: 63105-330
Latitude:	7°10'36.50" S
Longitude:	39° 24'49.23" W
Telephone:	+55 (88) 3521-6580

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, so 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:

- Babaçu coconut husk – it is a fruit provinent from Babaçu palm which is a Brazilian's native specie. The almond, that is the part more used of the babaçu coconut, represents only 7% of the weigh of the coconut^{/WEB10/}, and the rest (husk) is residues that can be use as fuel. In Ceará state the production of this almond is 358 tonnes per year^{/WEB11/}, generating 4,756 tonnes of residue (husk) per year.
- Cashew tree wood – it is a very important cultivation in the northeast of Brazil, contributing for the economy because of the cashew nuts, and the cultivation of the cashew request continuous cut of the cashew tree^{/WEB12/}, compound a considerable amount of residues. The use for the residues as firewood is allowed by Brazilian's government.
- Elephant grass – if adopted by the project activity its cultivations will 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 a sustainable management production. Until now the ceramic did not use elephant grass for their project. A detailed justification on sustainability will be provided, when it will be adopted first during a verification period.
- Garden's residues – if adopted by the project, it will use residues that are left in open dumps or landfills, being your use as fuel a considerate destination for this kind of residues, that is usually left in open dumps or landfills.
- 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 of the applied methodology.
- Wood from management areas – the native wood (and Eucalyptus too) used in the project is prominent from management areas provided of a management plan, and Ceará state has ones of the largest production among Brazilian's state^{/WEB13/}.

- Algaroba wood – is a tropical tree legume fairly common in the semi arid region of Brazil^{/SIL/}. Its use is very common in the region as firewood in the industries and its legal extraction from IBAMA^{/WEB9/}, because it is considered as an invasive plant, so its exploitation is stimulate by the government.

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 project duration is: 10 years, twice renewable.

Crediting period is: 2006/05/01 – 2016/04/30 (full substitution of the biomass)

Project start date is 2006/04/01 (first substitution of the biomass)

Gomes de Mattos Ceramic and Carbono Social Serviços Ambientais Ltda. have ownership of the proposed project. Proof of title was submitted to the validation team.

The emission reduction was not double counted.

However, 13 CARs and 5 CRs were raised and successfully closed.

CAR/CR	Reference	Summary of project owner response	Revised sections (as applicable)	Conclusion
CAR 1 In all documents (PD and MR) the standard is VCS 2007.1 instead of 2007 only.	VCS PD and MR	It was corrected.	All VCS PD.	Ok, it was changed to VCS 2007 to 2007.1 in all documents.
CAR 2 Tables 1, 12 and 13 ER and project period does not mach with the VCU spreadsheet.	VCS PD Items 1.3, 4.2, 4.4 and VCU spreadsheet	The correct period starts in May, 2006. It was corrected	VCU spreadsheet and Tables 1, 12 and 13s of VCS PD	Ok, tables 1, 13 and 14 were correct accordingly VCU spreadsheet.
CAR 3 Please, put only one coordinate for latitude and longitude for the geographical location.	VCS PD Section 1.5	One coordinate was established. The project geographical location is 7°10'36.50" S ; 39°24'49.23"	VCS PD Section 1.5	Ok, it was correct. CAR is closed.

CAR/CR	Reference	Summary of project owner response	Revised sections (as applicable)	Conclusion
		W.		
CAR 4 Project Start Date and Date of Terminating the Project are different. 7 and 1.6.	VCS PD Items 1.6 and 7	PP Response 1 The project start date was corrected in item 7. The correct start date is in April, 2006 when the project started substitution of the biomass.	Item 7.	Not ok. Terminating date is still different.
		PP Response 2 The project date of terminating date was corrected.	Item 1.6 and 7.	Ok, both Terminating date are the same now.
CAR 5 Why does the project start date is 3 years before crediting period starting date?	VCS PD Section 1.6 and 7	PP Response 1 Because CGM ceramic had some complication to approve their management plans (Fazenda Pau Darco , Fazenda Cana Brava and Fazenda Boqueirão). The main problem was the long period that the government entities responsible for	VCS PD Section 1.6 and 7	The justification for the crediting period starting date being 3 years after the project start date it is ok. But once it was not sent the management plan to the validation team, it must be sent some DOFs of the beginning of

CAR/CR	Reference	Summary of project owner response	Revised sections (as applicable)	Conclusion
		licensing the management plan in Cear� state took to analyse and approve the management plans.		the project activity to comprove the management plan exists since the crediting period start date.
		PP Response 2 DOFs from the beginning of the project are being sent to the validation team.	VCS PD Section 1.6 and 7	Ok, DOFs were sent to the validation team, so it could be conclude that there is a management plan for the afforestation area.
CAR 6 The 5 th paragraph must be corrected. Phrase "1,900 m ³ of ceramic devices to maintain the production..." is wrong.	VCS PD Item 1.9	It was corrected.	VCS PD Item 1.9	Ok, the phrase was correct for "1,900 m ³ of native wood was acquired". CAR is closed.
CAR 7 A table informing the consumption and production before and after project implementation must be included	VCS PD Section 1.9	The table was added. It is the table 4	VCS PD Item 1.9	Ok, the table informing the production and biomass consumption s was added. CAR

CAR/CR	Reference	Summary of project owner response	Revised sections (as applicable)	Conclusion
				is closed.
CAR 8 The hours of the burning cycle is different in the PD and in the calculation of Thermal Energy for the kilns. In the first, the total is 72 hours, and in the second is 144 hours. Please correct.	VCS PD Item 1.9 and Thermal Energy Calculation	The Calculation of thermal Energy for the kilns was correct. The burn cycles has 72 hours.	Thermal Energy Calculation	Ok, the hours of the burning cycle was correct in Thermal Energy for the kilns. CAR is closed.
CAR 9 The main biomass employed must be clarified.	VCS PD Item 1.9	It was clarified. The following statement was added: "The present project aims to use 100% of renewable biomass mainly native wood from sustainable management areas, Algaroba wood and residues from cashew trees"	VCS PD Item 1.9	Ok, the mainly biomass employed in the project activity was clarified. CAR is closed.
CAR 10 How many years have the ceramic used native wood?	VCS PD Items 1.11 and 1.12	The ceramic have used non-renewable wood since 1995. It was clarified in the VCS PD.	VCS PD Items 1.11 and 1.12	Ok, it was correctly informed that the ceramic have used native wood during eleven years since start of the ceramic

CAR/CR	Reference	Summary of project owner response	Revised sections (as applicable)	Conclusion
				production.
CAR 11 Please add full companies names (<i>"razão social"</i>)	VCS PD Item 1.15	It was corrected.	VCS PD Item 1.15	Ok, full names companies was added. CAR is closed.
CAR 12 In economic item, change the phrase: "Carbon credits will make the project feasible", because this assumption needs to be evidenced by financial analysis. Please refer instead to the high investment costs.	VCS PD Item 1.16	It was displaced as required.	VCS PD Item 1.16	Ok, the phrase was correctly modified. CAR is closed.
CAR 13 Please send us the contract between Carbono Social Serviços Ambientais and CGM Ceramic.		The contract will be provided for the validation team.		Ok, the contract was sent to the validation team. The proof of title has been evidenced.
CR 1 In the baseline consumption is mentioned the use of 12,000 m ³ of native wood annually, in opposite, in the on site visit, was observed the use of 1,900 m ³ of native wood monthly, what	VCS PD Item 1.7	It was corrected all the calculations. The wood consumption considered was the same observed in the on site visit.	VCS PD Item 1.7	Ok, the value is correct now and could be crosschecked by the production of bricks in the ceramic. All calculations

CAR/CR	Reference	Summary of project owner response	Revised sections (as applicable)	Conclusion
would be an average of 22,800 m ³ of non renewable biomass per year. Please clarify and correct all calculations.				were done accordingly.
CR 2 The biomass consumption per chamber cycle is 13.54 of what? Tonnes or m ³ of what kind of biomass?	VCS PD Item 1.9	The correct is and it was changed into 32.13m ³ and it was added. This value refers to the total of Native biomass.	VCS PD Item 1.9	Ok, the value was correctly informed. CR is closed.
CR 3 Clarify how many units of each final product are produced	VCS PD Item 1.9	It was clarified.	VCS PD Item 1.9	Ok, the quantity of each product produced was clarified. CR is closed.
CR 4 Explain what Social Carbon Methodology is.	VCS PD Item 1.13	An explanation was added	VCS PD Item 1.13	Ok, the explanation was correctly added.
CR 5 Give the exact crediting period of this project under Q27 standard.	VCS PD Item 1.13	Gomes de Mattos Ceramic Fuel Switching Project is only under VCS 2007.1 and there is no period under Q27. It was corrected	VCS PD Item 1.13	Ok, Q27 Standard mention was excluded from PDD.

Minor changes:

- In item 1.6, change the dates form for month/day/year.
- In the first line of the last paragraph of item 1.7, take off the word sawdust.
- In item 1.11, the last line of Availability of the renewable biomasses is incomplete.
- In item 1.15, change CE for Ceará and SP for São Paulo.

Minor changes were done accordingly.

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 Caatinga biome. In the past, Gomes de Matos Ceramic used approximately 1,900 m³ of native firewood monthly in order to produce 1,478,000 of ceramic pieces monthly, according to ceramic owner experience^{/IM01/} which could be evidenced during on-site visit. From this total production, 869,003 are bricks with 8 orifices (its weight is 2.2 kg), 343,103 are bricks with 6 orifices (its weight is 1.6 kg), 185,529 are small flagstones (its weight is 2.2 kg) and 80,365 are roof tiles (its weight is 1.0 kg). Thus, CGM produces 2,949 tonnes of ceramic devices monthly. Such data make possible to calculate the efficiency factor of native wood consumption per tonnes of pieces (0.64m³ of wood / tonnes of ceramic pieces). Applying this efficiency factor, the identified native firewood consumption in the baseline scenario is 1,887.36 m³ for the ceramic facility per month.

The baseline identification was assessed considering the data made available to the validation team. The most possible baseline scenarios would be the use of wood, fuel oil and natural gas respectively and renewable biomass (without VCS project activity), as information checked in the Brazilian Energy Balance in the ceramic sector for the year 2007^{/WEB3/}. 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/}. 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/}.

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.

Due to information above, the most possible identified and only remaining baseline scenario to occur in the absence of the project activity would be the use of wood.

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/}. Thus, the use of non-sustainable firewood in the identified baseline scenario was properly assessed.

With the identified kiln efficiency utilizing native firewood the consumption of native firewood that would occur in the absence of the project activity, based on the actual production of the ceramic, could be identified. Therefore the validation team concludes that the identified baseline scenario could be properly assessed and it was correctly identified.

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 very common in the ceramic sector.

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:

- Technological
 - Kilns adjustment – adjustments in the kilns entrances were necessary to the correct fit of the machinery, they needed to be reduced, and the ash-pit of the furnace had to be closed. Without the adjustments a significant lost of thermal energy would occur. The adjustments could be evidenced during the On-site visit as well as invoices and sales receipts^{/FAE/}
 - Sustainable Forest Management Plan – A management plan had been elaborate for the areas that supply renewable wood to the ceramic. The elaboration of these plans requires an intensive study involving the correct species to be planted, the cutting tree periods, the amount allowed to be cut, etc, demonstrating the real need of technical information and specialized professionals to execute these procedures^{/DOFs/}.
 - Use of the new fuel – During the fuel switching the ceramic facility had to deal with the difficulty of establishing the total amount of new fuel necessary to get the proper kiln temperature. Due to this reason the ceramic pieces get cracked or altered its final colour. It was evidenced that the ceramic production decays significantly during the initial fuel switching period^{/IM01/}.

The technical barrier has been validated and found to be significant for the additionality of the small-scale project activity.

- Financial (investment costs)
 - Kilns firing entrance adjustments – Although the price for the kilns adjustments are small it is also considered as a barrier^{/FAE/}.
 - Equipment acquisition – 2 mechanic burners, pyrometers, thermocouples, computers for control, cables, switchers and plug were acquired by the ceramic, that besides this investments costs that are costs with its maintenance^{/FAE/}.
 - New storage shed – a shed was constructed in order to store the biomass and keep it dry (mainly sawdust and babaçu coconut husk)^{/FAE/}.

The financial barrier due to investment cost has been validated to be true but found not to be significant for the additionality of the small-scale project activity as no financial analysis has been carried out.

Another barrier has been addressed that might be faced in the future:

- Increase in the renewable biomass price due the upcoming demand – As the use of renewable biomasses in the ceramic sector is an innovation the future demand of these fuels is difficult to foresee. Although there is currently a great amount of these biomasses available, there is a possibility that the prices will increase.

This barrier related to the price has been validated to be true but found not to be significant for the additionality of the small-scale project activity.

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

For the common practice analyse 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/} supports this conclusion.

The validation team is convinced that the project is additional, as show in the comments above. However 4 CARs and 3 CRs were opened and successfully closed.

CAR/CR	Reference	Summary of project owner response	Revised sections (as applicable)	Conclusion
CAR 14 Please, put a reference for the inconstant distribution of natural gas in the 2 nd paragraph after table 5 and for the information about the “Hoffman” kiln efficiency in the last paragraph.	VCS PD Item 2.4	It was added this sentence and the respective reference: “the inconstant distribution of natural gas, as 40% of the natural gas consumed in Brazil proceeds from Bolivia made the project developers not to trust in this	Item 2.4	Ok, in both information were added a reference.

CAR/CR	Reference	Summary of project owner response	Revised sections (as applicable)	Conclusion
		fuel"		
CAR 15 The invoices of shed construction, 40,000.00 and 2,634.00 BRL were not sent to the validation team.	VCS PD Item 2.5 and Financial Costs Calculation	PP Response 1 The invoices of shed construction are not available, so it was used the value of IBGE – average costs of civil construction in the state of Ceará available at http://www.ibge.gov.br/home/economia/indicadores/precos/sinapi/sinapi_200703_1.shtm . It was all corrected	Item 2.5	Not ok, the value of IBGE is from 2007, and not 2006, when the shed was constructed.
		PP Response 2. It was recalculated using the value of IBGE – average costs of civil construction in the state of Ceará of May 2006. Available at: ftp://ftp.ibge.gov.br/Precos_Custos_e_Indices	VCS PD Item 2.5 and Financial Costs Calculation	Ok, the reference and the value of May 2006 were correct. CAR is closed.

CAR/CR	Reference	Summary of project owner response	Revised sections (as applicable)	Conclusion
		_da_Construca o_Civil/Fascicul o_Indicadores_ IBGE/		
CAR 16 The burning cycle total hour is wrong in cell B24. It is not only 72 hours, so all calculation about the Thermal Energy is wrong. Please correct.	XCS Thermal Energy Calculation	It was changed but, the final value of the Thermal Energy is still the same.	XCS Thermal Energy Calculation	Ok, this was correct, but please, refer to CAR
CAR 17 The price of electric energy informed in the financial costs is wrong. In the reference the price is 0,47723 BRL/kwh, and not 23,86 BRL/kwh as calculate in VCS PD.	XCS Financial Costs	Such Table was removed.	XCS Financial Costs	Once the electric costs and the biomass costs were not higher than before the project implementation, the exclusion of the variable cost table was correctly done. Therefore the financial barrier is not longer valid. CAR is closed.

CAR/CR	Reference	Summary of project owner response	Revised sections (as applicable)	Conclusion
CR 6 Why is mention about Tocantins region once the project is in Ceará state?	VCS PD Item 2.2	It was corrected	VCS PD Item 2.2	Ok, it was corrects now. CR is closed.
CR 7 Clarify what are the finals products of the product activity, because there are mistakes between items in VCS PD. In case of being more than one final product, calculations for each kind of product must be considered, once kiln efficiency will be different.	VCD PD Items 2.5 and 1.9	The final products were clarified. The efficiency was displaced. Now the efficiency value is given in m3 of wood per tonnes of product. The weight of each kind of product was clarified in VCS PD as well.	VCD PD Items 2.5 and 1.9	Ok, it was clarified that the ceramic produces bricks with 8 orifices, bricks with 6 orifices, small flagstones and roof tiles. And was also clarified how was calculate the kiln efficiency.
CR 8 In item 2.4 is informed that there is distribution of natural gas in the region, and in item 2.5, Common practice item 5, this information is negative. Please, clarify this mistake.	VCS PD Items 2.4 and 2.5	It was changed	Section 2.5 VCS PD Items 2.4 and 2.5	Ok, the mistake was corrected. CR is closed.

Minor change

- In item 2.2, in 5th paragraph, in the line before the last, change the word “de” for the.
- Put the comment of cell F17 in cell F15, in financial costs spreadsheet.
- Put the day of the website consultant in cell D8 in financial costs spreadsheet.

Minor changes were done correctly.

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

The parameters to be monitored it will be responsibility of Mr. Edilberto da Silva Rocha, Gomes de Matos Ceramic's director. He will be responsible for registration, monitoring, measurement and reporting.

Parameters that will be monitored:

- Amount of renewable biomass employed (tonnes per month) - measured by the project developer, monthly. The parameter will be monitored through the weight indicated in the buying receipts of the renewable biomasses providers. These values will be crosschecked with internal records on biomass they received. The specific gravity of each renewable biomass can be used for unit conversion^{/WEB14/}.
- Fraction of native wood used in the absence of the project activity has been identified by 96.7%. The source could be verified with to be reliable^{/WEB15/}. The value will be monitored yearly in each verification period. This value includes also the amount of non-renewable wood saved under similar project activities in the same biome (Caatinga)^{/XCS1/}.
- Production of ceramic devices (tonnes) - controlled by the project developer, monthly – The ceramic maintain an internal spreadsheet for the production controlling that is fed daily. The QAQC procedure consists of a rigorous register of the daily production. The ceramic must have an internal control of the production for the internal financial balance^{/IM01/}.
- Origin of the Renewable biomass - controlled by the ceramic owner, annually. 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 state 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 m³) – 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 (tCO₂e) – 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 was 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 (quantity of renewable biomass / thousands of pieces) before the project implementation multiplied by the monthly production will reach to the amount of non-renewable biomass that would be utilized.

The fixed parameters for the project activity are:

- NCV non-renewable biomass (TJ/ton of wood) – an average value from a reliable article was applied. It was considered an average of the typical Caatinga biome trees, as can be checked in the calculation spreadsheet^{/WEB16/}.
- Wood specific gravity (t/m³) – an average value from an article was applied. It was considered an average of the typical Caatinga biome trees, as can be checked in the calculation spreadsheet^{/WEB16/}.
- EF projected fossil fuel (t CO₂/TJ) – As show above, the most probable fossil fuel in the absence of wood it would be the heavy oil. IPCC 2006 value was applied.
- BFy tonnes of wood per thousand of devices – Value adopted from ceramic owner experience. This value is in accordance with other ceramics with the same fuel and kiln used.

Besides of that, 9 CARs and 1 CR were raised and successfully closed.

CAR/CR	Reference	Summary of project owner response	Revised sections (as applicable)	Conclusion
CAR 18 Parameter fNRB the origin of the data is not acceptable only by literature. There should also be data monitored by PP be mentioned. And inform the frequency that the parameter will be monitored.	VCS PD Item 3.2	It was added the source is also from bibliography. The information about the project proponent monitored data and the monitoring frequency of fNRB parameter.	VCS PD Item 3.2	Ok, it was added information regarding the data and the frequency of the parameter.
CAR 19 fNRB: cell D50, 51 E 52 the unit is not %. Please correct.	VCU spreadsheet	These values are correct and do not need to be changed.	VCU spreadsheet	Sorry for the mistake, the unit really doesn't need be changed. CAR is

CAR/CR	Reference	Summary of project owner response	Revised sections (as applicable)	Conclusion
				closed.
CAR 20 In Qrenbiomass parameter, the Coconut husk amount (60 tonnes per year) is different for informed in Financial Costs Calculation (143 per month, which would be 1,716 tonnes per year). Please correct the mistake.	VCS PD Item 3.3 and Financial costs Calculation	The value in the Financial Costs spreadsheet was changed according to the PDD.	Financial costs Spreadsheets	Ok, the value in the financial spreadsheet was correctly changed for 5 tonnes/month. CAR is closed.

CAR/CR	Reference	Summary of project owner response	Revised sections (as applicable)	Conclusion
CAR 21 The declaration from the provider that evidence the sustainable use of the Algaroba tree was not sent to the validation team, even the management plan to comprove the origin of the Native wood from reforested areas and Eucalyptus wood from forest management were sent.	VCS PD Item 3.3	PP Response 1 The algaroba wood does not need to have its sustainable use proved. For the origin of the renewable Native wood, three examples of DOFs were sent to the validation team. As stated in the VCS PD: “The factors which contribute most to the expansion of Algaroba uses, as firewood in these industries sectors, were its wide availability in the region and its legal release extraction from IBAMA . This way, in order to control the decrease of biologic diversity in Caatinga biome, which has been occasioned from Algaroba’s genre invasion, the government started to stimulate the Algaroba exploration in order to avoid	VCS PD Item 3.3	Once Algaroba wood is considered a residue according to the methodology, it is not necessary to comprove its sustainable use. But from Native wood from reforested areas and Eucalyptus wood it is not ok. The documents were sent to the validation team. But the provider informed here in the report was not mentioned in VCS PD and the managemnt plan validation it is not updated, as informed in the website. It should be provided a list with all biomass providers, including

CAR/CR	Reference	Summary of project owner response	Revised sections (as applicable)	Conclusion
		it's noxious effects" The following source shows the management plan of FAZ. TABOQUINHA that is the eucalyptus provider of the CGM ceramic "http://www.cnip.org.br/pmfs_arquivos/PE.htm"		the percentage and kind of biomass that is bought.

CAR/CR	Reference	Summary of project owner response	Revised sections (as applicable)	Conclusion
		PP Response 2 Despite of the fact all the biomasses utilized in this project activity being renewable, CGM ceramic was not able to provide evidences in order to prove all the licences of the farm were the Eucalyptus wood is originated from it will be discounted from the total CO₂e. In order to execute this calculation the percentage of total Eucalyptus wood consumption will be included in the parameter fNRB. For the origin of the renewable Native wood, three examples of DOFs were sent to the validation team. Moreover, a table containing all CGM's biomass providers was added to "biomass providers" spread sheet.		Once there is not how to prove the origin of the Eucalyptus, it is correct your discount from the total CO₂e. About the management plan for the native species, please consider CAR 5. The providers table must be included in the VCS PD.

CAR/CR	Reference	Summary of project owner response	Revised sections (as applicable)	Conclusion
		PP Response 3. CAR 5 was responded and besides a table with all biomass providers were added to the VCS PD.		Ok, a table with all biomass providers was correctly added in the VCS PD. CAR is closed.
CR 9 It was informed that CGM ceramic employed 12,000 tonnes of native wood per year (1,000 tonnes per month) and not 880 tonnes as informed in calculation. So, the value of 0.595 tones of native wood to produce a thousand of ceramic devices is wrong too. Please correct all and correct BFy parameter too.	VCS PD Section 3.3	All the calculations were corrected. It's all in accordance	Financial Costs Spreadsheet VCS PD sections: -2.5(Financial Barrier) -Section 3.2 -Section 4.2 -Section 3.3	This CR is closed, but, see CAR 25.
CAR 22 Recheck the fNRB, once the value is higher than the informed in other	VCS PD Section 3.3	The value was rechecked. Please see CAR 21		Ok, fNRB value was rechecked and recalculated

CAR/CR	Reference	Summary of project owner response	Revised sections (as applicable)	Conclusion
project (99.4%).				. All calculation are correct and the CAR is closed.
CAR 23 The biomass specific gravity and NCVbiomass for wood from Caatinga biome is different from other project in the same biome.	VCS PD Section 3.3	The values are demonstrated on the spreadsheet called "native species considered"	VCS PD Section 3.3	Ok, it was considered the Kitambar project for model of native species considered from Caatinga biome. Once this project was already approved by the validation team, it is correct use the same values for specific gravity and NCVbiomass for wood from Caatinga biome. CAR is closed.
CAR 24 It must be informed only one unit for BFy.	VCS PD Section 3.3, 2.5, 1.9, 3.2 and 4.1	Now its informed just one unit for BFy.	VCS PD Section 3.3, 2.5, 1.9, 3.2 and 4.1	Ok, the unit of m³ of wood per tonnes of ceramic devices is the only applied in the project document. CAR is closed.

CAR/CR	Reference	Summary of project owner response	Revised sections (as applicable)	Conclusion
CAR 25 Before, BFy was calculated per 1478 ceramic devices, and now that is in tonnes, it is considered all the production, what doubled the emission reduction. It must be corrected.	VCS PD Section 3.3	No corrections are need.	VCS PD Section 3.3	This CAR is not applicable anymore, once it was a mistake from the validation team.
CAR 26 A comment must be inserted in Origin of Renewable biomass parameter.	VCS PD Section 3.3	It was added as required.	VCS PD Section 3.3	Ok, the comment was correctly added. CAR is closed.

Minor change

- Item 3.3, Renewable Biomass Surplus parameter, in Description of measurement methods and procedures to be applied, change the word internal for international.

Minor change was done accordingly.

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//WEB8/}.

However, 2 CARs were raised and successfully closed..

CAR/CR	Reference	Summary of project owner response	Revised sections (as applicable)	Conclusion
CAR 27 There is no reference for information that says that Brazilian's government allows the use of cashew tree residues as firewood. In 2 nd paragraph of cashew tree.	VCS PD Item 4.2	This reference was added: "http://tribunadonorte.com.br/motorresn/noticias.php?id=83885"	VCS PD Item 4.2	Ok, the reference was correctly added.
CAR 28 The ERY, total value in the 3 rd paragraph is different from the table and from VCU Estimative. Please correct.	VCS PD Items 4.2, 4.4 and VCU Estimative	It was corrected as stated in CR 09	VCS PD Items 4.2, 4.4 and VCU Estimative	Ok, this CAR is closed. But see CAR 25.

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/}.

3.6 Comments by stakeholders

The considered stakeholders for this project activity were the local governments, the ceramic sector association and the employees. It was sent a letter informing the stakeholder about the project, but until the end of VCS PD, no comments were received.

CAR/CR	Reference	Summary of project owner response	Revised sections (as applicable)	Conclusion
CAR 29 It must be informed if the letter sent to the Stakeholders had any answer (negative or positive) about the project.	VCS PD Item 6	The following table was inserted: "No outcomes were received until the end of the VCS PD elaboration."	VCS PD Item 6	Ok, it was informed that there is no answer from the stakeholders on the stakeholder letter. CAR is closed.

4 Validation conclusion

Carbono Social Serviços Ambientais Ltda. Brasil has commissioned the TÜV NORD JI/CDM Certification Program to validate the project: "GOMES DE MATOS 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 29 Corrective Action Requests (CARs) and 9 Clarification Requests (CRs) were raised and successfully closed.

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 283,420 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, 2009-05-27



Inga Nagel
TÜV NORD JI/CDM CP
Verification Team Leader

Essen, 2009-05-27



Eric Krupp
TÜV NORD JI/CDM CP
Final approval

5 References

Table 5-1: Documents provided by the project proponent

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”
/DOF/	Forest Origin Document from the management areas.
/FAE/	Financial assessment evidences. Please refer to invoice receipts for the assessment of the pertinent financial data used in the financial spreadsheet calculation.
/ML/	Municipal License to Gomes de Mattos Ceramic – municipal register:140114, issued on 2008-01-14. Valid until 2008-12-31.
/OL1/	Operational License # 173/2008. Processo SEMACE 2007-016888/TEC/RENLO. # SPU 07436356-5. Issued on 2008-05-26. Valid until 2009-06-26.
/OL2/	Operational License # 173/2008. Processo SEMACE 2007-016888/TEC/RENLO. # SPU 07436356-5. Issued on 2008-05-26. Valid until 2009-06-26.
/PFT/	Contract signed between Carbono Social Serviços Ambientais Ltda. Brasil and Gomes de Matos 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 2008/07/29
/SIL/	Silva, C. G. M, Melo Filho, A. B., Pires, E. F., Stamford M. Physicochemical and microbiological characterization of mesquite flour (<i>Prosopis juliflora</i> (Sw.) DC).Ciênc. Tecnol. Aliment., Campinas, 27(4): 733-736, out.-dez. 2007.
/SL/	Sanitary License 026 – valid: 2007-12-31 (City hall license)
/VCS PD/	Project Design Document “Gomes de Matos Ceramic Fuel Switching Project” - Version 05 – May 27th, 2009.
/WEB1/	Website consult on 2009/04/29 http://www.teses.usp.br/teses/disponiveis/86/86131/tde-14052008-

Reference	Document
	113901/
/WEB2/	Website consult on 2009/04/29 http://www.scielo.br/scielo.php?pid=S0103-40142007000100015&script=sci_arttext&lng=ES
/WEB3/	Website consult on 2009/04/29 https://ben.epe.gov.br/BEN2007_Capitulo3.aspx .
/WEB4/	Website consult on 2009/04/29 http://www.abcm.org.br/xi_creem/resumos/TE/CRE04-TE01.pdf
/WEB5/	Website consult on 2009/04/29 http://ecen.com/eee51/eee51p/gn_bolivia.htm
/WEB6/	Website consult on 2009/04/29 http://www.dep.fem.unicamp.br/boletim/BE31/artigo.htm
/WEB7/	Website consult on 2009/04/29 http://www.gasnet.com.br/novo_entrevistas.asp?cod=145
/WEB8/	Website consult on 2009/04/29 http://sistemasdeproducao.cnptia.embrapa.br/
/WEB9/	Website consult on 2009/04/29 http://www.ibama.gov.br
/WEB10/	Website consult on 2009/04/29 http://libdigi.unicamp.br/document/?code=vtls000348640
/WEB11/	Website consult on 2009/04/29 http://www.ibge.gov.br/estadosat/temas.php?sigla=ce&tema=extracao vegetal2007
/WEB12/	Website consult on 2009/04/29 http://sistemasdeproducao.cnptia.embrapa.br/FontesHTML/Caju/Cultivo doCajueiro/tratosculturais.htm
/WEB13/	Website consult on 2009/04/29 http://www.ibge.gov.br/estadosat/temas.php?sigla=ce&tema=extracao vegetal2007
/WEB14/	Website consult on 2009/04/29 Sawdust: http://www.cca.org.nz/pdf/Masses.pdf Residues from cashew trees:

Reference	Document
	LORENZI, H. Árvores Brasileiras: Manual de Identificação e Cultivo de Plantas Arbóreas Nativas do Brasil, vol.1. 4.ed. Nova Odessa, SP: Instituto Plantarum, 2002. Babaçu coconut husk: http://www.ipef.br/publicacoes/scientia/nr34/cap04.pdf Algaroba wood: http://www.cnpf.embrapa.br/publica/boletim/boletarqv/bolet45/pag-99_106.pdf Wood from forest management areas (eucalyptus): http://www.ipef.br/publicacoes/scientia/nr23/cap08.pdf
/WEB15/	Website consult on 2009/04/29 http://www.cnip.org.br/planos_manejo.html
/WEB16/	Website consult on 2009/04/29 http://www.renabio.org.br/arquivos/p_poder_lignocelulosicos_11107 http://www.scielo.br/pdf/rarv/v30n2/a18v30n2.pdf
/WL/	Water License was required on 2008-10-07, and will be issued in 30 days
/XCS1/	Calculation spreadsheet of baseline study and emission reduction Version 04 – May 25th, 2009.
/XCS2/	Gomes de Matos Ceramic Financial Costs – version 04, May 25th 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

Reference	Document
	Greenhouse Gas Inventories, 2000
/IPCC/	2006 IPCC Guidelines for National Greenhouse Gas Inventories: 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
Mr. Ronaldo Sampaio Gomes de Mattos - ceramic's director. Ms. Flávia Geane Mendonça – monitoring responsible ceramic. Ms. Flávia Takeuchi – Carbono Social Serviços Ambientais Ltda. Brasil Mr. Cézar Braga Alves - 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..	Ronaldo Sampaio Gomes de Mattos	Gomes Mattos Ceramic's director
/IM01/	V	☐ Mr. ☒ Ms.	Flávia Geane Mendonça	Gomes Mattos Ceramic
/IM01/	V	☐ Mr. ☒ Ms.	Flávia Yumi Takeuchi	Carbono Social Serviços Ambientais Ltda. - Technical Analyst
/IM01/	V	☒ Mr. ☐ Ms	Cézar Braga Alves	Carbono Social Serviços Ambientais Ltda.

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