



Voluntary Carbon Standard Version 2007.1

Verification Report No. 8000371391 10/444

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Final Verification Report Gomes de Mattos Ceramic Fuel Switching Project	Mr. Eric Krupp (FA)																								
Client:	Project Title:																								
Carbono Social Serviços Ambientais Ltda.	Gomes de Mattos Ceramic Fuel Switching Project																								
Summary:																									
Carbono Social Serviços Ambientais Ltda. has commissioned the TÜV NORD JI/CDM Certification Program to carry out the 2nd periodic verification of the project "Gomes de Mattos Ceramic Fuel Switching Project", with regard to the relevant requirements for VCS project activities. The project reduces GHG emissions due to switching non-renewable to renewable biomass fuel for end-user thermal energy generation. This verification covers the period from 2009-05-01 to 2009-12-31 (including both days). In the course of the verification 01 Corrective Action Request (CAR) and 07 Clarification Requests (CL) were raised and successfully closed. Furthermore 01 Forward Action Request (FAR) is raised to improve the monitoring system in the future. The verification is based on the draft monitoring report, revised monitoring report, the monitoring plan as set out in the VCS PD, the validation report, emission reduction calculation spreadsheet and supporting documents made available to the TÜV NORD JI/CDM CP by the project participant. As a result of this verification, the verifier confirms that: - all operations of the project are implemented and installed as planned and described in the validated project design document; - the monitoring plan is in accordance with the applied approved CDM methodology, AMS-I.E: Switch from Non-Renewable Biomass for Thermal Applications by the User - version 01, February 1st 2008 onwards; - the installed equipment essential for measuring parameters required for calculating emission reductions are calibrated appropriately; - the monitoring system is in place and functional. The project has generated GHG emission reductions. As the result of the 2nd periodic verification, the verifier confirms that the GHG emission reductions are calculated without material misstatements in a conservative and appropriate manner. TÜV NORD JI/CDM CP herewith confirms that the project has achieved emission reductions in the above mentioned reporting period as follows: <table border="1"> <thead> <tr> <th>Emission reductions</th><th>CO₂ [t CO₂]</th><th>CH₄ [t CH₄]</th><th>N₂O [t N₂O]</th><th>HFCs [t HFC]</th><th>PFCs [t PFC]</th><th>SF₆ [t SF₆]</th><th>Sum [t CO₂e]</th></tr> </thead> <tbody> <tr> <td>2009</td><td>28,117</td><td>-</td><td>-</td><td>-</td><td>-</td><td>-</td><td>28,117</td></tr> <tr> <td>TOTAL</td><td></td><td></td><td></td><td></td><td></td><td></td><td>28,117</td></tr> </tbody> </table>		Emission reductions	CO ₂ [t CO ₂]	CH ₄ [t CH ₄]	N ₂ O [t N ₂ O]	HFCs [t HFC]	PFCs [t PFC]	SF ₆ [t SF ₆]	Sum [t CO ₂ e]	2009	28,117	-	-	-	-	-	28,117	TOTAL							28,117
Emission reductions	CO ₂ [t CO ₂]	CH ₄ [t CH ₄]	N ₂ O [t N ₂ O]	HFCs [t HFC]	PFCs [t PFC]	SF ₆ [t SF ₆]	Sum [t CO ₂ e]																		
2009	28,117	-	-	-	-	-	28,117																		
TOTAL							28,117																		
Work carried out by:	Number of pages:																								
Inga Köster (TL) Sergio Cruz (T) Gilberto Andrade (TM) Ricardo Lopes (TM) Alexandra Nebel (TR) Jochen Schubert (TR)	25																								

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1 Introduction

1.1 Objective

The purpose of this verification, by independent checking of objective evidence, is as follows:

- to verify that the project is implemented as described in the project design document;
- to confirm that the monitoring system is implemented and fully functional to generate voluntary carbon units (VCUs) without any double counting, and
- to establish that the data reported are accurate, complete, consistent, transparent and free of material error or omission by checking the monitoring records and the emissions reduction calculation.

1.2 Scope and Criteria

The verification of this VCS project is based on the VCS project description^{/VCS PD/}, the monitoring report^{/MR/}, supporting documents made available to the verifier and information collected through performing interviews and during the on-site assessment. Furthermore publicly available information was considered as far as available and required.

The TÜV NORD JI/CDM CP has employed a risk-based approach in the verification, focusing on the identification of significant risks and reliability of project monitoring and generation of emission reductions.

1.3 VCS project Description

Located in Crato, state of Ceará, this project comprises Gomes de Mattos Ceramic, which produces structural ceramic devices like bricks with 8 and 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.

Since before the project, Gomes de Mattos Ceramic has been using two “*Hoffman*” kilns and one “*Câmara*” kiln to produce ceramic devices for the local market. The fuel employed in the firing process before the replacement of the biomass 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 three kilns.

The total replacement occurred in May 2006, and now, Gomes de Mattos Ceramic is consuming a monthly average of 105 tons of wood from management areas (eucalyptus), 968 tons of native wood from management areas, 615 tons of algaroba wood and 159 tons of babaçu coconut husk to maintain an average monthly production of 5,930 tons of ceramic pieces, 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, adjustments in the kilns entrance before adapted to the native firewood fuel, construction of a shed to store the renewable biomass and staff training regarding to the new fuel adoption.

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, contributes to the local biome preservation and increasing the job opportunities in the local community.

The GHG emission reduction for the considered crediting period is **28,117 tCO₂e**^{/XLS/}.

1.4 Level of assurance

The verification report is based on VCS PD, Monitoring report, supporting documents made available to the verifier and information collected through performing interviews and during the on-site assessment. The verification opinion is assured provided the credibility of all above.

2 Methodology

The second verification of the project was carried out from April 19th, 2010 to October 25th, 2010.

Preparations: 2010-04-19 to 2010-04-21

On-site validation: 2010-04-22

Draft Reporting: 2010-05-10

Final Reporting: 2010-10-25

The verification consisted of the following steps:

- a desk review of the VCS PD^{/VCS PD/} and supporting documents with the use of the relevant sections of a customised protocol according to the VCS 2007.1;
- a desk review of the Monitoring Report^{/MR/} and additional supporting documents which the client submitted. The relevant sections of the above mentioned customised protocol according to the VCS 2007.1 were used;
- verification audit planning;
- on-site assessment;
- background investigation and follow-up interviews with personnel of the project developer;

The criteria of this verification include the relevant rules and steps as set out in the VCS.

3 Verification Findings

3.1 Remaining issues, including any material discrepancy, from previous validation

There are no pending CARs and CLs issued in the course of the validation and first verification that still need to be properly addressed to get closed.

3.2 Project Implementation

The project consists of a fuel switch from non-renewable biomass to renewable biomass in the ceramic facility. The use of non-renewable native wood will be substituted by renewable biomass of different kinds as can be seen in the table below.

Table 3-1: Type of biomass

Renewable biomass applied	Description of sustainability
Babaçu coconut husk	The coconut husk employed in the project activity is an agro industry residue that does not have an appropriate destination. It is an abundant product in the region. As it is an industrial residue it falls therefore under option V of the applied methodology.
Wood from management areas	This type of biomass will be purchased from authorized providers and each invoice shall be followed by state environmental agency authorization. A license for the management area was sent and checked by the validation team proving that the area follows management issues. Sustainability will be provided by the assurance of the quantities and origin of the wood used via the check of the invoices. As it is a forest biomass resulted for a management area, it falls therefore under option I from the applied methodology.
Biomass that may be applied	Description of sustainability
Algaroba wood	The utilization of algaroba is in accordance with option IV of the applied methodology since it is considered a biomass residue due its competitive characteristics. A research made by EMBRAPA, which encompass states from northeast region of Brazil, confirmed that algaroba is characterized as an invasive exotic plant due to its fast expansion, so its exploitation is stimulated by the government. Its vegetative growth character ensures the renewability of the plant.
Cashew tree pruning	Cashew is a very important cultivation in the northeast of Brazil, contributing for the economy because of the cashew nuts. The cultivation of the cashew request continuous cut of the cashew tree,

	compounding a considerable amount of residues. The use of the residues as firewood is allowed by Brazilian government. As it is a woody biomass and only the one originated from the croplands area are utilized. Moreover, the cashew trees areas follows sustainable management practices, according to its cultivation and harvest techniques, where the pruning of cashew trees is necessary in order to allow an appropriate formation of the tree and maintaining favorable conditions for the next harvest period. This way, in cashew cultivation undesirable branches must be cut from cashew trees. Besides, Brazilian production presents the tendency of increasing so far, carried by the new technologies utilized and the higher national and international demand of cashew nuts. This way, the Brazilian sources of residues from cashew trees will increase following the its production.
Municipal garden residues	They are considered renewable biomass according to option V of methodology definition of renewable biomass: "The biomass is the non-fossil fraction of an industrial or municipal waste". Since it's a municipal waste from the city of Crato, where the ceramic is located.
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. Sustainability will be provided by the assurance of the quantities and origin of the sawdust used via the check of the invoices. As the sawdust is an industrial residue it falls therefore under option V of the applied methodology.
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 y the control of the quantities involved.

Table 3-2: Afforestation Wood Supplier

Name of supplier	Evidence of sustainability of afforestation wood
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Fazenda Pau D'Arco	Document of Forest Origin (DOF) issued by IBAMA, certifying the origin of renewable native wood ^{/BIO/} .
Fazenda Canabrava	Document of Forest Origin of the State of Ceará (DOFCE) issued by SEMACE, certifying the origin of renewable native wood ^{/BIO/} .

For the project implementation the ceramic owner had to deal with different kind of difficulties, such as:

Table 3-3: 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 equipment Use of the new mechanical burners Using the new fuel, changing of working process Elaboration of the Sustainable Forest Management Plan	/FAE/ /ECT/ /IM01/	☒	The machineries needed some adjustments in order to use the new biomasses, fuels that are uncommonly employed for the initial purpose of the machines. 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/}. With the use of mechanic burners, the employees do not have near contact to kiln entrances. In addition to the alterations in the machineries, the kilns sustained some adaptations due to the new fuel implemented and to work in accordance with the mechanic burners, the adaptations include: kiln entrances needed to be reduced and ash-pit of the furnace had to be closed. Furthermore, the fuel substitution represented some weeks more to get adapted to the burn with the new biomasses, and get the final product with the same quality than in the baseline scenario. Thus, 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 elaboration of the Sustainable Forest Management Plan 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. The technical barrier has been verified and found to be significant for the additionality of the small-scale project activity.
Financial variable costs	Renewable biomass purchase Electrical consumptions cost due to the new mechanical burners	/ECR/	☒	As it is clear indicated in the VCS PD and the financial spreadsheet, the variable cost of the renewable biomass is higher than the natural firewood in the region, as was previous practiced by the ceramic. The new fuel implicates in higher costs. The electrical consumptions cost was evidenced though electricity consumption. This barrier 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.
Financial investment costs	Kiln entrance adjustment Equipment acquisition New storage shed Maintenance costs	/FAE/	☒	All the three 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.

Other	Risks of the project Increasing price for biomass	/FAE/	☒	The use of wood from areas without sustainable forest management is a traditional and well-known process, the fact of which presented a risk to the ceramic with the implementation of the fuel switching project, since the introduction of a previously unknown type of fuel and machines added a significant amount of insecurity to the production process. 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 of the renewable biomass will increase. This barrier has been validated to be true but found not to be significant for the additionality of the small-scale project activity.
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During the 2nd verification period, a site visit was carried out. On the basis of this site visit and the reviewed project documentation could be confirmed that the realized technology has been implemented and operated as described in the Monitoring Report and are in line with the VCS 2007.1 Standard.

It was confirmed that the actual project activity was implemented in accordance with the validated VCS PD.

During the Verification, 01 CAR and 01 CL were recorded and successfully closed. Also, 01 FAR was raised and shall be checked at the next verification:

Finding	CAR 01		
Classification	☒ CAR	☐ CL	☐ FAR
Description of finding <i>Describe the finding in unambiguous style; address the context (e.g. section)</i>	At the front page of the Monitoring Report – version 1, please correct the following items: a. the name of the project is not in accordance with the one at the VCS PD – Gomes de Mattos Ceramic Fuel Switching Project. b. the monitoring period is not correct.		
Corrective Action #1 <i>This section shall be filled by the PP. It shall address the corrective action taken in details.</i>	The items were corrected as asked by the Validation Team.		
DOE Assessment #1 <i>The assessment shall encompass all open issues. In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.</i>	The front page has been corrected and the name “Gomes de Mattos Ceramic Fuel Switching Project” is now in accordance with the VCS-PD and the monitoring period is accurate. <u>CAR is closed</u>		
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		

Finding	CL 01		
Classification	☐ CAR	☒ CL	☐ FAR
Description of finding <i>Describe the finding in unambiguous style; address the context (e.g. section)</i>	Please, provide a soft copy of all following documents for general clarifications and to strengthen some information: a. Environmental / Operating Licenses; b. Clay extraction license; c. Records of monthly consumption of clay.		
Corrective Action #1 <i>This section shall be filled by the PP. It shall address the corrective action taken in details.</i>	All documents and records will be sent to the Verification Team.		
DOE Assessment #1 <i>The assessment shall encompass all open issues. In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.</i>	a. The environmental license is out of date (2009-05-21) and is not valid for the monitoring period. Please, provide an updated operational license. b. Please, it is also necessary to provide the operating license issued by the City Hall of Crato. c. The clay extraction license has been provided and is valid. d. The records of monthly consumption of clay have been provided but they are unreadable. Please provide new version of the records. <u>CL remains open</u>		
Corrective Action #2 <i>This section shall be filled by the PP. It shall address the corrective action taken in details.</i>	a. The documents necessary to provide this information are being sent as required. b. It will be sent as requested d. The records of monthly consumption of clay are being sent and are now readable.		
DOE Assessment #2 <i>The assessment shall encompass all open issues. In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.</i>	a. The environmental license is out of date (2009-05-21) and a request for new one was presented on 2009-04-27, before the expiration date. SEMACE still did not issue a new license. So, FAR 01 was raised. b. The operating license issued by the City Hall of Crato was presented and is valid. c. The records of the monthly provisions of clay for the months of February, March and April, have not been presented. Please, provide them. <u>CL remains open</u>		
Corrective Action #3 <i>This section shall be filled by the PP. It shall address the corrective action taken in details.</i>	c. It is being sent as requested.		
DOE Assessment #3 <i>The assessment shall encompass all open issues. In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.</i>	The records of the monthly provisions of clay for the months of February, March and April, have been presented and the documents and report are consistent. <u>CL is closed</u>		

Finding	CL 01
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

Finding	FAR 01
Classification	☐ CAR ☐ CL ☒ FAR
Description of finding <i>Describe the finding in unambiguous style; address the context (e.g. section)</i>	A request for a renewal of the environmental license was done on 2009-04-27, but the environmental authority – SEMACE – did not issue a new license until now. The license issued by SEMACE shall be requested during the first verification to ensure that the project complies with all environmental requirements.
Proposed Corrective Action #1 <i>This section shall be filled by the PP. It shall address the proposed corrective action in details.</i>	A request for a renewal was done on 2009-04-27. As soon as the license is issued by SEMACE, it will be available to the verification team.
DOE Assessment #1 <i>The assessment of the proposed corrective action. In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.</i>	Proposed action accepted
Conclusion <i>Tick the appropriate checkbox</i>	☒ To be checked during the third periodic verification ☐ Appropriate action was taken ☐ Project documentation was corrected correspondingly ☐ Additional action should be taken ☐ The project complies with the requirements

3.3 Completeness of Monitoring

The monitoring has been carried out in accordance with the VCS 2007.1 standard. The responsibilities identified during the validation have been confirmed and all parameters to be monitored have been verified and crosschecked.

During the Verification, 06 CLs were recorded and successfully closed, as indicated below:

Finding	CL 02
Classification	☐ CAR ☒ CL ☐ FAR

Finding	CL 02
Description of finding <i>Describe the finding in unambiguous style; address the context (e.g. section)</i>	In Section B.4. of the MR, monitored parameter “$\Lambda_{NRB,y}$”: - please, give the source of the information that there is forest management plan in 0.11% of the caatinga; - please it is necessary to provide the source of data of other ceramics to reach the total amount of used wood. - the area of indigenous land shall be included in the parameter value of “$\Lambda_{NRB,y}$” as sustainable used land. Please, revise Section B.4 and excel spreadsheet.
Corrective Action #1 <i>This section shall be filled by the PP. It shall address the corrective action taken in details.</i>	- It will be sent to the Validation Team. - A commentary was added at Excel Spreadsheet Λ_{NRB} tab providing this information. - It was revised and corrected as required in both Excel and Word documents. Both documents were updated with indigenous land for the “$\Lambda_{NRB,y}$” parameter.
DOE Assessment #1 <i>The assessment shall encompass all open issues. In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.</i>	- A source for the figure 0.11% has been added as footnote 7; - The data of other ceramics has been referenced at Excel spreadsheet; - The section has been properly revised and the area of indigenous land was included in the parameter value of “$\Lambda_{NRB,y}$” as sustainable used land. <u>CL is closed</u>
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

Finding	CL 03
Classification	☐ CAR ☒ CL ☐ FAR
Description of finding <i>Describe the finding in unambiguous style; address the context (e.g. section)</i>	In Section B.4. of the MR, monitored parameter “$Q_{renbiomass}$”, please provide the records of all types of biomass, by supplier and by month.
Corrective Action #1 <i>This section shall be filled by the PP. It shall address the corrective action taken in details.</i>	It will be sent to the Validation Team.

Finding	CL 03
DOE Assessment #1 <i>The assessment shall encompass all open issues. In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.</i>	a. the records (DOFs) for native wood for the month of September have been provided. Please provide the records for native wood for other months of the monitoring period and clarify what unit "st" stands for; b. the records of babaçu coconut husk presented do not have an specific quantity. Please, provide clear records; c. please provide the records of all other used biomass (eucalyptus and algaroba wood); d. if sawdust, cashew tree residues and urban tree pruning will not be considered any more, please remove them from the table of monitored parameter " $Q_{renbiomass}$ " and from all the calculations (Excel spreadsheets).
Corrective Action #2 <i>This section shall be filled by the PP. It shall address the corrective action taken in details.</i>	a. It will be provided as required. St' means 'sterile cubic meters' b. All documents are being sent in order to state its quantity c. It will be sent as required. d. It was updated and all data was removed as required.
DOE Assessment #2 <i>The assessment shall encompass all open issues. In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.</i>	a. The presented DOFs are consistent with the tables presented at excel spreadsheet. b. The provided receipts of babaçu coconut husk are consistent with the tables presented at excel spreadsheet. c. The provided receipts of algaroba wood and eucalyptus are consistent with the amount presented at excel spreadsheet. d. The items have been removed from the table of monitored parameter " $Q_{renbiomass}$ " and all calculations have been revised. <u>CL is closed</u>
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

Finding	CL 04
Classification	☐ CAR ☒ CL ☐ FAR
Description of finding <i>Describe the finding in unambiguous style; address the context (e.g. section)</i>	In Section B.4. of the MR, the monitored parameter " PR_y ": a. please check the figures to make it totally in accordance with the calculation of the production presented in Excel Spreadsheet, Production tab, paying attention with the roundings and English format for the numbers; b. please, provide all the production records by month and by type of device.

Finding	CL 04
Corrective Action #1 <i>This section shall be filled by the PP. It shall address the corrective action taken in details.</i>	It was corrected as requested.
DOE Assessment #1 <i>The assessment shall encompass all open issues. In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.</i>	a. the figures have been revised and are now in accordance with the calculation; b. it have been provided the production records for the months: May, July, August and September. Please provide the records for all the other months of the monitoring period by type of device. <u>CL remains open</u>
Corrective Action #2 <i>This section shall be filled by the PP. It shall address the corrective action taken in details.</i>	b. It will be sent as required.
DOE Assessment #2 <i>The assessment shall encompass all open issues. In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.</i>	The records of production for November and December presented at excel spreadsheet are not consistent with the records of production presented. Please, revise both months. <u>CL remains open</u>
Corrective Action #3 <i>This section shall be filled by the PP. It shall address the corrective action taken in details.</i>	It was revised and updated as required.
DOE Assessment #3 <i>The assessment shall encompass all open issues. In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.</i>	At section B.4 of the MR, the monitored parameter "PR _y " has been accordingly revised and the documents have been properly presented. <u>CL is closed</u>
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

Finding	CL 05
Classification	☐ CAR ☒ CL ☐ FAR
Description of finding <i>Describe the finding in unambiguous style; address the context (e.g. section)</i>	During the site visit it was evidenced the use of sawdust and native wood as biomass. Please clarify the traceability providing the Forest Origin Document (DOF) for these biomasses that were used during the monitoring period from each supplier.
Corrective Action #1 <i>This section shall be filled by the PP. It shall address the corrective action taken in details.</i>	The evidences of native wood are being sent. In the case of sawdust, since its traceability could not be proved it was discounted from the total credits generated. The calculation was done based on the percentage of thermal energy that this kind of biomass provides which corresponds to 2.2% of the total energy produced, then it was added to the NRB tab of the excel spreadsheet to fulfil the calculations.

Finding	CL 05
DOE Assessment #1 <i>The assessment shall encompass all open issues. In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.</i>	a. the DOFs for native wood for the month of September was provided. Please provide the DOFs for native wood used during the monitoring period; b. please, provide documents or declarations that states that all the supplied eucalyptus wood, algaroba wood and babaçu coconut husk come from legalized plantations that obey the requirements for cutting and pruning; c. if sawdust will not be considered any more, please remove it from the table of monitored parameter “Renewable Biomass Surplus” and from all the calculations (Excel spreadsheets); d. Please include Eucalyptus wood at the table of monitored parameter “Renewable Biomass Surplus”. <u>CL remains open</u>
Corrective Action #2 <i>This section shall be filled by the PP. It shall address the corrective action taken in details.</i>	a. It will be provided as required. b. In the case of Babaçu coconut it is a residue of other plantation that would exist regardless of the project activity. Also archive “IN 08 DE 24 DE AGOSTO 2004.pdf” that will be sent, attests the legalization of such kind of plantations in the state of Ceará, since Algaroba and Eucalyptus are exotic species in the region and according to Art 1° and Art 5° they do not require other types of documents. Thus invoices are enough to prove that the plantations are legal. c. It was removed as required. d. It was included as required.
DOE Assessment #2 <i>The assessment shall encompass all open issues. In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.</i>	a. Refer to CL 3 above. b. The babaçu coconut husk is a residue. Nevertheless, just renewable wood can be considered as biomass in the scope of the project and “Instrução Normativa nº 8” just states that the cut of the eucalyptus and algaroba wood is legal. Please, it is necessary to evidence that the eucalyptus and algaroba wood come from legalized plantations with a management plan as “Instrução Normativa nº 8” does not evidence this; c. Section has been properly revised. d. Section has been properly revised. <u>CL remains open</u>
Corrective Action #3 <i>This section shall be filled by the PP. It shall address the corrective action taken in details.</i>	The eucalyptus and algaroba wood were removed from the MR and the production was multiplied by 72% to guarantee that only renewable biomass was used to maintain the production.

Finding	CL 05
DOE Assessment #3 <i>The assessment shall encompass all open issues. In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.</i>	The ceramic was not able to prove the origin of the algaroba and eucalyptus wood used as biomass, so they were removed from the MR. Then, the calculations are: . consumption of renewable native wood in the monitoring period: $7,747 \text{ t} \times 0.019175 \text{ TJ/t} = 148.55 \text{ TJ} / 0.005 \text{ TJ/t ceramic} = 29,709 \text{ t}$ (ceramics produced with renewable native wood); . consumption of babaçu coconut husk in the monitoring period: $1,276 \text{ t} \times 0.017549 \text{ TJ/t} = 22.39 / 0.005 \text{ TJ/t ceramic} = 4,478 \text{ t}$ (ceramics produced with renewable babaçu coconut husk). Total ceramics produced with renewable biomasses = 34.187 t. So, it was evidenced that 72% of the total production was considered now as result of the use of renewable biomass with traceable origin and the emission reduction calculations have been properly revised and are consistent with the MR.. <u>CL is closed</u>
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

Finding	CL 06
Classification	☐ CAR ☒ CL ☐ FAR
Description of finding <i>Describe the finding in unambiguous style; address the context (e.g. section)</i>	In Section B.4. of the MR, monitored parameter “Renewable Biomass Surplus”, please revise: a. the use of the word “Harvest” and why the figures are from August/2009 or August/September or 2008/2009; b. the figure for Urban Tree Pruning which is missing.
Corrective Action #1 <i>This section shall be filled by the PP. It shall address the corrective action taken in details.</i>	a. It was corrected as requested. b. Urban Tree Pruning was removed from the monitoring period, due to the fact that this biomass does not have a representative value compared to other biomasses and also because it was discounted from the crediting period in the same way as sawdust was. Representing less than 0.01% of the total amount of biomass used.
DOE Assessment #1 <i>The assessment shall encompass all open issues. In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.</i>	a. The word “Harvest” was substituted by “Biomass”, which is much more appropriate. b. The biomass Urban Tree Pruning has been removed from the table and from the calculation by PP’s choice, so the figure is not necessary any more. <u>CL is closed</u>

Finding	CL 06
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

Finding	CL 07
Classification	☐ CAR ☒ CL ☐ FAR
Description of finding <i>Describe the finding in unambiguous style; address the context (e.g. section)</i>	In Section B.6. of the MR, please clarify why it is used the data from Curitiba about Urban Tree Pruning, since the project is in Ceará and apparently there are no similarities between the regions.
Corrective Action #1 <i>This section shall be filled by the PP. It shall address the corrective action taken in details.</i>	Urban Tree Pruning was removed from the monitoring period, due to the fact that this biomass does not have a representative value compared to other biomasses and also because it was discounted from the crediting period. Representing less than 0.01% of the total amount of biomass used. This way the reference is no longer considered useful.
DOE Assessment #1 <i>The assessment shall encompass all open issues. In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.</i>	The biomass Urban Tree Pruning has been removed from the table and from the calculation by PP's choice, so the reference is no longer necessary. <u>CL is closed</u>
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

Table 3-3: Responsibilities

Responsibility for the Monitoring	Area
Mr. Ronaldo Sampaio Gomes de Mattos – Gomes de Mattos Ceramic Owner	registration monitoring measurement reporting

Table 3-4: Data and parameters monitored

Parameter monitored				Description of measurement and monitoring methods	/REF/ for cross-
Name	Unit	Value	/REF		

			/ MR		check
$Q_{\text{renbiomass}}$ Amount of renewable biomass employed	Tons	From 05/2009 to 12/2009: . Renewable native wood: 7,746.64; . Babaçu coconut husk: 1,275.95.	/B.4/	Will be 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.	/BIO/ /OSV/
ΔNRB_y Fraction of native wood used in the absence of the project activity	Percentage	99.3%	/B.4/	Fraction of native wood used in the absence of the project activity has been identified by 99.5%. The source could be verified with to be reliable. 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) ^{XLS/} . The sources applied are literature and project database.	/OSV/
PR_y Tons of ceramic devices	Tons of pieces	From 05/2009 to 12/2009: 34,187.45	/B.4/	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/} .	/OSV/
Origin of renewable biomass	N/A	as verified on site visit	/BIO/ /OSV/	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 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. To prove the origin of eucalyptus and pinus wood an environmental licence indicating the sustainability of the forest management has been provided.	/BIO/ /OSV/
Renewable biomass surplus	tons or m ³	Babaçu coconut husk 324,966 t; . Wood from mgt areas: 134,667 t;	/B.4/	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	/MR/

				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	0,0	/B.4/ /B.6/	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.	/FAE/ /BIO/

The monitoring equipments are controlled based on common industrial practice of the ceramic sector. An internal verification was performed to ensure that the monitoring plan is being followed accordingly with the proposed procedure stated in the VCS PD. The use of the internal procedures was checked.

3.4 Accuracy of Emission Reduction Calculations

The approved CDM baseline and monitoring methodology Category AMS-I.E: Switch from non-renewable biomass for thermal applications by the user - Version 01, February 1st 2008 onwards, is applied to the project activity.

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 estimated 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 stated 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 the 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.

It was verified in the course of this verification that the above mentioned methodology has been correctly and accurately applied in calculating the total emission reductions and the emission reduction calculation is accurate and conservative.

3.5 Quality of Evidence to Determine Emission Reductions

The project proponent as evidence of the calculations required to determine the emission reductions submitted several documents in addition to those collected during the On-Site Visit. Refer to Table 5-1.

The evidences were assessed and considered as of sufficient quantity and appropriate quality.

3.6 Management and Operational System

The management and operational system of the project is suitable.

An operational structure was established with responsibilities identified.

Staff training plan was clear; training records were available.

The quality management and the procedures to address errors and non-conformances were clearly defined^{/VCS PD/}.

4 Verification Conclusion

Carbono Social Serviços Ambientais Ltda. has commissioned the TÜV NORD JI/CDM Certification Program to carry out the 2nd periodic verification of the project “Gomes de Mattos Ceramic Fuel Switching Project”, with regard to the relevant requirements for VCS project activities. The project reduces GHG emissions due to switching non-renewable to renewable biomass fuel for end-user thermal energy generation. This verification covers the period from 2009-05-01 to 2009-12-31 (including both days).

In the course of the verification 01 Corrective Action Request (CAR) and 07 Clarification Requests (CL) were raised and successfully closed. Furthermore 01 Forward Action Request (FAR) is raised to improve the monitoring system in the future. The verification is based on the draft monitoring report, revised monitoring report, the monitoring plan as set out in the VCS PD, the validation report, emission reduction calculation spreadsheet and supporting documents made available to the TÜV NORD JI/CDM CP by the project participant.

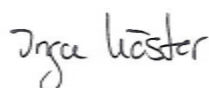
As a result of this verification, the verifier confirms that:

- all operations of the project are implemented and installed as planned and described in the validated project design document;
- the monitoring plan is in accordance with the applied approved CDM methodology, AMS-I.E: Switch from Non-Renewable Biomass for Thermal Applications by the User - version 01, February 1st 2008 onwards;
- the installed equipment essential for measuring parameters required for calculating emission reductions are calibrated appropriately;
- the monitoring system is in place and functional. The project has generated GHG emission reductions.

As the result of the 2nd periodic verification, the verifier confirms that the GHG emission reductions are calculated without material misstatements in a conservative and appropriate manner. TÜV NORD JI/CDM CP herewith confirms that the project has achieved emission reductions in the above mentioned reporting period as follows:

Emission reductions	CO2 [t CO2]	CH4 [t CH4]	N2O [t N2O]	HFCs [t HFC]	PFCs [t PFC]	SF6 [t SF6]	Sum [t CO2e]
2009	28,117	-	-	-	-	-	28,117
TOTAL							28,117

Essen, 2010-10-25



Inga Köster
TÜV NORD JI/CDM CP
Verification Team Leader

Essen, 2010-10-25



Eric Krupp
TÜV NORD JI/CDM CP
Final approval

5 References

Table 5-1: Documents provided by the project proponent

Reference	Document
/BIO/	- Receipt and invoices of biomass; - Document of Forest Origin (DOF) issued by IBAMA, certifying the origin of renewable native wood; - Document of Forest Origin of the State of Ceará (DOFCE) issued by SEMACE, certifying the origin of renewable native wood. -
/ECR/	Electric consumptions receipts checked during on-site visit. It could be evidenced that the electric consumption and costs are higher than before of the project activity.
/ECT/	Employee's certificates for training realized regarding process for the project activity.
/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 – issued by Crato City Hall – Date: 2009/01/26 – valid until 2009/12/31, renovated in 2010/03/31 – valid until 2010/12/31
/MR/	Monitoring Report “Gomes de Mattos Ceramic Fuel Switching Project” – versions 01, 02, 03, 04, 05 and 06 – Dates: from 2010/03/02 to 2010-10-22
/OL1/	Operation License – issued by SEMACE (Environmental Administration of the State of Ceará) – # 694/2008 – valid until 2009/05/21. Renovation request # 08676661-9 – Date: 2009/04/27
/OL2/	Operation License for Clay Extraction – issued by SEMACE (Environmental Administration of the State of Ceará) – # 11/2009 – Date: 2009/02/13 – valid until 2010/01/12. Renovation protocol # 08676709-7 – Date: 2009/05/08
/OL3/	Operation License for Burning Forestry Products – issued by SEMACE (Environmental Administration of the State of Ceará) – # 103/2008. Renovation protocol Nº 08676662-7 – Date: 2009/04/27
/OSV/	Information/Observation during on-site visit including ceramic devices production and renewable biomasses used. Appropriate records retained by the verification team as evidences of the on-site visit.

Reference	Document
/PRO/	Signed BRTÜV proposal # 10VCSBR020013 issued for the project activity. It is clear stated the date of contracting for the verification process. Date: 2010/02/11
/VCS PD/	VCS Project Description “Gomes de Mattos Ceramic Fuel Switching Project” – version 05 – May 27 th , 2009
/XLS/	MR Calculation spreadsheet – versions 01, 02, 03, 04, 05 and 06

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.
/CONAMA 279/	Resolution CONAMA 279 (2001) – Environmental National Board
/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: 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)

Reference	Document
/VCS/	Voluntary Carbon Standard Program Guideline 2007.1.

Table 5-3: Websites used

Reference	Link	Organization
/DNPM/	http://www.dnpm.gov.br	National Department of Mineral Production
/EMBRAPA/	http://www.embrapa.br/	Brazilian Agricultural Research Corporation
/IBAMA/	http://www.ibama.gov.br	Brazilian Institute of Environmental and Renewable Natural Resources
/MCT/	http://www.mct.gov.br	Brazilian Ministry of Technology and Science
/SEMACE/	http://www.semace.ce.gov.br/#	Superintendence of Environment of the State of Ceará
/UNFCCC/	http://unfccc.int	United Nations Framework Convention on Climate Change
/VCS/	http://www.v-c-s.org	Voluntary Carbon Standard

Table 5-4: Interviewed persons and interview topics

Interviewed Persons / Entities	Interview topics
Mr. Ronaldo S. Gomes de Mattos / Gomes de Mattos Ceramic	- 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
Ms. Ana Cláudia V. Santos / Gomes de Mattos Ceramic	
Mr. José Ailton Morelli Porfírio / Gomes de Mattos Ceramic	

Interviewed Persons / Entities	Interview topics
Mr. Bruno de Almeida / Gomes de Mattos Ceramic Mr. Marcelo Haddad / Carbono Social Serviços Ambientais Ltda. Mr. Ailton L. Silva / SENAI and Carbono Social Serviços Ambientais Ltda.	- 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 S. Gomes de Mattos	Gomes de Mattos Ceramic / Owner
/IM01/	V	☐ Mr. ☒ Ms.	Ana Cláudia V. Santos	Gomes de Mattos Ceramic / Assistant
/IM01/	V	☒ Mr. ☐ Ms.	José Ailton Morelli	Gomes de Mattos Ceramic / Assistant
/IM01/	V	☒ Mr. ☐ Ms.	Bruno de Almeida	Gomes de Mattos Ceramic / Safety Technician
/IM02/	V	☒ Mr. ☐ Ms.	Marcelo Haddad	Carbono Social Serviços Ambientais Ltda. /
/IM02/	V	☒ Mr. ☐ Ms.	Ailton L. Silva	SENAI and Carbono Social Serviços Ambientais Ltda. / Technical Advisor

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