



Voluntary Carbon Standard Version 2007 Verification Report

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Verification Report:

Name of Verification company:	Date of the issue:																																
TÜV NORD CERT GmbH	January 16 th , 2009																																
Report Title:	Approved by:																																
Final Verification Report Cerâmica Kitambar	Mr. Eric Krupp																																
Client:	Project Title:																																
Social Carbon	Kitambar Switching Fuel Project																																
Summary:																																	
Social Carbon has commissioned the TÜV NORD JI/CDM Certification Program to carry out the 1st periodic verification of the project: Kitambar Switching fuel project”, with regard to the relevant requirements for CDM 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 2007-01-01 to 2008-09-30 (including both days). In the course of the verification 8 Corrective Action Requests (CAR) and 0 Clarification Requests (CR) were raised and successfully closed. Furthermore 0 FARs are 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 ,ie, 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 1st 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:																																	
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Work carried out by:	Number of pages:																																
Plinio Makarowits de Mattos Fernando Pasquali Pacheco Alexandra Nebel Maria Carolina Cohelo	14																																

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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^{/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 Caruaru, Pernambuco state, this project comprises the enterprise, Kitambar ceramic, which produce red ceramic devices. The project activity involves fuel switching from native firewood from unsustainable management to algaroba wood coming from legal released extraction areas, cashew tree wood originated from sustainable managed firewood areas used to feed the ceramic kilns; thus GHG emission reduction is achieved. Other types of renewable sources of biomass can be applied during the project activity, as coconut husk from industrial residues, sawdust derivate from saw mill industries, sugar cane bagasse originated from sugar and alcohol mills and elephant grass coming from grassland in abandoned areas.

Before the replacement of the biomass, Kitambar produced 925,000.00 devices per month and it consumed 2,400.00 m³ of native firewood monthly in its eight "Round" kilns.

The total replacement occurred in December 2006, and now, the ceramic is using its eight "Round" kilns to produce 1,050,000.00 ceramic devices and consuming 1.714 m³ of renewable biomass (70% of algaroba wood and 30% of cashew trees) per month.

The GHG emission reduction for the considered crediting period is 73,749 tCO₂e.

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 verification of the project was carried out on November 2008.

Preparations: 2008-10-11 to 2008-10-14

On-site validation: 2008-10-15

(Draft) Reporting: 2008-11-14

(Final) Reporting: 2009-01-20

The verification consisted of the following steps:

- A desk review of the VCS PD^{/PD/} and supporting documents with the use of the relevant sections of a customised protocol according to the VCS 2007;
- 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 were used.
- Verification audit planning,
- On-Site assessment,
- Background investigation and follow-up interviews with personnel of the project developer,
- Verification reporting (Draft Verification Report and Final Verification Report).

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 issues raised during the validation process. This is the first period of verification, thus there is any pending issued from previous verification.

3.2 Project Implementation

The project consists of the fuel switching in the ceramic facility, with the substitution of unsustainable native firewood to algarroba and cashew tree wood. For the project implementation the ceramic owner had to deal with different kind of difficulties, such as:

- Technological

- Kilns adjustment – As the kilns are now fed with mechanical burners, adjustments in the kilns entrances were necessary to the correct fit of the machinery. Without the adjustments a significant lost of thermal energy would occur. The adjustments could be evidenced during the On-site visit.
 - Use of the new mechanical burners – The ceramic had to learn how to manage the new machinery to get the most efficient activity. It could be evidenced during the On-site visit that the ceramist experiences some difficulties with the equipments as maintenance and bad working when applying bigger pieces of renewable biomass. Moreover it was necessary to train the staff responsible for the kiln feeding.
 - Use of the new fuel – Until the total 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.
 - Storage of the renewable biomass – It was evidenced during On-site visit that the use of the new fuel had to be done with the proper humidity and therefore a new storage logistic was necessary. The renewable biomass has to be left drying for a certain period before its use in the process.
- Financial
- Renewable biomass purchase – The renewable biomass price is higher when compared with native firewood. The new fuel implicates in higher costs due to its transportation, storage and higher price. The native firewood price was evidenced during the On-site visit according to experience data of the ceramic owner and the renewable biomass price was checked trough the buying receipts. The transportation costs are higher when using the new fuel due to the high distance from the suppliers.
 - Kilns firing entrance adjustments – It could be checked during the On-site visit the adjustments made in the kilns for the new fuel consumption. The kilns entrances had to be rebuilt to the perfect match with the new mechanical burners.
 - Staff training courses – it was necessary to provide resources for the staff training, as it could be evidenced during the On-site visit.
 - Maintenance costs – costs related to the maintenance of the new mechanical burners acquired. It was evidenced during the On-site visit that this equipment frequently needs to be repair.
 - Electrical consumptions cost due to the new mechanical burners – before the project activity the costs with electricity consumption was smaller compared with the baseline scenario. It was evidenced through electricity consumption receipts.

During the verification a site visit was carried out. On the basis of this site visit and the reviewed project documentation it can be confirmed that w.r.t. the realized technology, the project equipments, as well as the monitoring and metering equipment, the project has been implemented and operated as described in the VCS PD and is inline with the VCS 2007 Standard.

3.3 Completeness of Monitoring

Kitambar Ceramic will be responsible for monitoring the pertinent parameters as described in VCS PD. The holes and responsibilities are clearly defined. Ms. Antônio Marcos, ceramics' owner, is responsible for monitoring the pertinent data for the project activity. The monitored parameter could be evidenced as follows:

- Amount of renewable biomass employed (tonnes) - measured by the project developer, monthly. The parameter was monitored through the buying receipts of the renewable biomasses. Data available in a monitoring spreadsheet always fed when the renewable biomass arrives at the ceramic. The specific gravity of each renewable biomass was used, when necessary, for unit conversion. The data available in the monitoring spreadsheet could be cross-checked with the energy necessary to maintain the ceramic production;
- Production of ceramic devices (units per month) - controlled by the project developer, monthly – The ceramic maintain an internal spreadsheet for the production controlling that is daily fed. It was evidenced during the On-site visit that there is an internal control for the data monitored. The assessment was verified as sufficient for the accuracy of the data;
- Renewable origin of the biomass - controlled by the project developer, annually. It was provided by the cashew tree supplier a declaration informing that its cultivation follows sustainable management methodology from EMBRAPA (Brazilian Agricultural Research Corporation's) in the culture area. The algarroba wood and coconut husk are considered renewable biomass as information provided in section 3.1 of validation report;
- Renewable biomass surplus – In order to estimate the leakage emission of the renewable biomass the project participant monitored the renewable biomass surplus in the specific region of the project activity, yearly. The measurement provides sufficient information for the leakage assessment. The surplus of renewable biomasses in the regions is much higher than the quantity necessary for the project activity, thus leakage emission can be disconsidered.
- Leakage of non-renewable biomass – All three sources of leakage predicted in the applied methodology was monitored, annually. It was presented a study indicating that 90% of the ceramics facility in the region still adopt wood from unsustainable management, thus this leakage is not considered.
- Fraction of biomass – based on studies and literature the project owner monitored the fraction of non-renewable biomass in the baseline scenario. The value of 99,7% has been confirmed by the validation team trough following source ^{/WEB8/}.

The monitoring equipments are perfectly equilibrated based on the INMETRO Standard (Brazilian institute for metrology and calibration). An internal audit will be performed twice a year to ensure that the monitoring plan is being followed according the proposed in the VCS PD.

Nevertheless 5 CARs have been opened and were successfully closed:

CAR/CR	Reference	Summary of project owner response	Revised sections (as applicable)	Conclusion
CAR 1 p wood: The sentence: "This	MR B.3.	Ok, the sentence was modified.		OK, sentence has been

CAR/CR	Reference	Summary of project owner response	Revised sections (as applicable)	Conclusion
datum will be used for the conversion “ is not understandable. The justification should be explained more precisely.				corrected. CAR closed.
CAR 2 The parameter fNRB,y needs to be included to the section parameter monitored. This should also be done in the VCS PD.	MR B.3.	fNRB,y was included as monitored parameter in VCS PD and monitoring report.		Ok, Corrections done. CAR closed.
CAR 3 Section B.4. Parameter Q renbiomass: In the table it says “total 2008”. Should be corrected to until Sept. 2008	MR B.4	Ok, it was corrected.		Correction done accordingly. CAR closed.
CAR 4 Section B.5. The precise capacity of 44.21 MW as calculated for Validation should be included	MR B.5	The thermal capacity of 44.21 MWthermal was included.		Correction done accordingly. CAR closed.
CAR 5 For QA/QC purposes the sentence: “Data will be kept for two years..., whichever occurs later” should be added to each parameter.	MR B.3	Ok, it was added to all parameters		OK, QA/AC is complete. CAR closed

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 estimate value of native wood that would be consumed in the absence of the project activity in year y (according to 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 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.

Nevertheless 3 CARs have been opened and were successfully closed:

CAR/CR	Reference	Summary of project owner response	Revised sections (as applicable)	Conclusion
CAR 6 Table 3: The parameter “Production” should be more precise e.g. “Production of ceramic devices in pieces”.	MR B.6.	Ok, the term has been modified		OK, corrections done. CAR closed.
CAR 7 Emission reductions: The standard is VCS 2007 not 2008.	MR B.6.	Ok, the VCS was renamed to 2007.		OK corrections done. CAR closed.
CAR 8 The monitoring period needs to be corrected. The same mistake appears in the Excel sheet: Cell C122: The date of monitoring period needs to be corrected.	MR B.6. Table 4	The monitoring period has been corrected in both sites.		OK, corrections done. CAR closed.

3.5 Quality of Evidence to Determine Emission Reductions

The project proponent as evidence to determine emission reductions submitted several documents. Refer to Table 5-1.

The evidences were assessed 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 erroneous procedures were clearly defined.

4 Verification Conclusion

Social Carbon has commissioned the TÜV NORD JI/CDM Certification Program to carry out the 1st periodic verification of the project: “Kitambar Switching Fuel Project”, with regard to the relevant requirements for CDM 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 2007-01-01 to 2008-09-30 (including both days).

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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.
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Emission reductions:

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2008	33.122	-	-	-	-	-	33.122
TOTAL:							73.749

Sao Paulo, 2009-01-16



Ricardo Lopes

TÜV NORD JI/CDM CP

Verification Team Leader

Essen, 2009-01-16



Eric Krupp

TÜV NORD JI/CDM CP

Final approval

5 References

Table 5-1: Documents provided by the project proponent

Reference	Document
/PD/	Project Design Document “Kitambar fuel switching project” Version 02 – December 17 th , 2008.
/XCS1/	Calculation spreadsheet of baseline study and emission reduction in “estimativas” - Version 03 – December 17 th , 2008
/XCS2/	Financial spreadsheet – Version 02 - December 17 th , 2008
/ML1/	Municipal License to Kitambar Ceramic – municipal register: 2008/002581, issued on 2008-03-29. Valid until 2009-03-29
/POL1/	Previous Operation License – Valid from 2004/6/8 to 2005/6/8
/POL2/	Previous Operation License – Valid from 2006/2/8 to 2007/2/8
/CEL/	Clay extraction license issued in 1/10/2008.
/WEB1/	Website consult – Source 17 of VCS PD: http://www.teses.usp.br/teses/disponiveis/86/86131/tde-14052008-113901/
/WEB2/	Website consult – Source 18 of VCS PD: http://www.scielo.br/scielo.php?pid=S0103-40142007000100015&script=sci_arttext&lng=ES
/WEB3/	Website consult – Source 19 of VCS PD: https://ben.epe.gov.br/BEN2007_Capitulo3.aspx
/WEB4/	Website consult – Source 27 of VCS PD: http://www.abcm.org.br/xi_creem/resumos/TE/CRE04-TE01.pdf
/WEB5/	Website consult: http://www.faunabrasil.com.br/sistema/modules/wfsection/article.php?articleid=47
/WEB6/	Website consult: http://www.aspan.org.br/
/WEB7/	Website consult – Source 20 of VCS PD: http://www.teses.usp.br/teses/disponiveis/86/86131/tde-14052008-113901/

Reference	Document
/WEB8/	http://www.cnip.org.br/planos_manejo.html
/WEB9/	http://www.mme.gov.br/download.do?attachmentId=16555&download http://www.anicer.com.br/anicer2008/index.asp?pg=institucional.asp&secao=3&categoria=60&selMenu=3

Table 5-2: Background investigation and assessment documents

Reference	Document
/AMS-I.E./	AMS-I.E: Switching Biomass for thermal applications by the user, version 01, February 1 st , 2008.
/GHG Protocol/	GHG Protocol for Project Accounting 2005.
/IPCC-GP/	IPCC Good Practice Guidance & Uncertainty Management in National Greenhouse Gas Inventories, 2000
/IPCC/	2006 IPCC Guidelines for National Greenhouse Gas Inventories: 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.

Reference	Document
AMS- I.E	AMS-I.E: Switching Biomass for Thermal Applications by the User - Version 01, February 1 st , 2008.
/PD/	Project Design Document “Kitambar fuel switching project” Version 02 – December 17 th , 2008.
/FVaIR/	Draft Validation Report, on January 15 st , 2009

Table 5-3: Websites used

Reference	Link	Organization
/MCT/	http://www.mct.gov.br	Ministério da Ciência e Tecnologia – Technology and Science Department
/VCS/	http://www.v-c-s.org	Voluntary Carbon Standard
/UNFCCC/	http://unfccc.int	United Nations Framework Convention on Climate Change
/CESP/	http://www.cesp.com.br/	São Paulo Energy Company
/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. Antônio Marcos – Kitambar Ceramic owner Mr. Marcelo Haddad CO2e 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 interview people

Reference	Mol ¹		Name	Organization / Function
/IM01/	V	☒ Mr. ☐ Ms.	Antônio Marcos	Kitambar Ceramic owner
/IM01/	E, V	☒ Mr. ☐ Ms.	Marcelo Haddad	CantorCO2e Brazil - Technical Analyst

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