

KITAMBAR SWITCHING FUEL PROJECT



Document Prepared By Sustainable Carbon – Projetos Ambientais Ltda

Project Title	Kitambar Switching Fuel Project
Version	03.1
Report ID	VCS Monitoring Period 04 / SOCIALCARBON Report Point 03
Date of Issue	18-August-2014
Project ID	33
Monitoring Period	01-March-2012 to 31-May-2014 (VCS Monitoring Period) 01-March-2012 to 30-June-2014 (SCR Monitoring Period)
Prepared By	Sustainable Carbon – Projetos Ambientais Ltda.
Contact	Rua Doutor Bacelar, 368 Conjunto 131 Vila Clementino - São Paulo, SP CEP: 04026-001 Brazil T: +55 (11) 2649-0036 F: +55 (11) 2649-0042 victor.moller@sustainablecarbon.com beatriz@sustainablecarbon.com

Table of Contents

1	Project Details	4
1.1	Summary Description of the Implementation Status of the Project	4
1.2	Sectoral Scope and Project Type	5
1.3	Project Proponent	5
1.4	Other Entities Involved in the Project	6
1.5	Project Start Date	6
1.6	Project Crediting Period	7
1.7	Project Location	7
1.8	Title and Reference of Methodology	7
1.9	Other Programs	8
2	Implementation Status	8
2.1	Implementation Status of the Project Activity	8
2.2	Deviations	10
2.2.1	Methodology Deviations	10
2.2.2	Project Description Deviations	11
2.3	Grouped Project	14
3	Data and Parameters	14
3.1	Data and Parameters Available at Validation	14
3.2	Data and Parameters Monitored	17
3.3	Data Monitored for SOCIALCARBON	27
3.4	Monitoring Plan	35
4	Quantification of GHG Emission Reductions and Removals	36
4.1	Baseline Emissions	36
4.2	Project Emissions	39
4.3	Leakage	39
4.4	Net of GHG Emission Reductions and Removals	48
5	SOCIALCARBON RESULTS	51
5.1	Results	51
5.1.1	Social Resource	51
5.1.2	Human Resource	53
5.1.3	Financial Resource	57
5.1.4	Natural Resource	59
5.1.5	Biodiversity/Technology Resource	61

5.1.6	Carbon Resource	64
5.2	Analysis of Results	66
5.2.1	Current Performance	66
5.2.2	Historical Performance	67
5.2.3	Performance Hexagon	69
5.3	Prospect Status	69
5.3.1	Achieved Prospects	69
5.3.2	Not Achieved Prospects	71
5.3.3	Identified Prospects	72
Appendix 1: Amount of renewable biomass consumed per month on <i>Kitambar</i> ceramic		74

1 PROJECT DETAILS

1.1 Summary Description of the Implementation Status of the Project

This project activity was developed by Carbono Social Serviços Ambientais LTDA. (Social Carbon Company), which has changed its company name to Sustainable Carbon – Projetos Ambientais LTDA.

The project activity is the project of *Kitambar Ceramic*, which is a red ceramic company located in Caruaru municipality, in the State of *Pernambuco*, in the northeast of Brazil. The ceramic company produces bricks and roof tiles, destined mainly for the regional market in *Pernambuco*.

The objective of this project activity in the ceramic is to stop using non-renewable native wood, which is a non-renewable fuel, and completely substitute it with renewable biomasses to feed their kilns. These measures can minimize the environmental impacts related to the native wood deforestation and consumption.

This fuel switching project is reducing the greenhouse gas (GHG) emissions through the substitution of native wood for renewable biomasses to generate thermal energy. It was concluded that this is feasible when considering the income derived from commercializing the resulting carbon credits. This move was originally unattractive due to the high investment costs of the adaptation of machineries to the new biomass and other barriers. In opposition to the identified baseline, the project activity generates thermal energy without causing deforestation and uses abundant renewable biomass.

Kitambar Ceramic Company utilized eight “Round Kiln” during all this monitoring period (2012 to 2014). Each one can produce 42,000 devices per cycle. During this monitoring period, Kitambar Ceramic factory started using new equipments - a wood shredder and a dosing machine which makes the right dosage of biomass. These equipments improve the efficiency of the factory at the same time that they reduce the physical efforts made by the employees. These equipments were purchased on 13/07/2011, but only became operational during this monitoring period.

The emission reductions due to the switching of non-renewable fuel (non-renewable wood) to renewable biomasses were equal to **106,462 tCO₂e** during the monitoring period from 01-March-2012 to 31-May-2014. The contribution to sustainability is being monitored applying the SOCIALCARBON® Standard, which is based on six main resources: Technology; Natural; Financial; Human; Social and Carbon Resources.

The project provided improvements in each of the six resources listed above. The factory shows commitment with the local community and does monthly donations to ICIA - Childhood Cancer of Agreste Institute. Regarding the environmental aspects, the ceramic factory possesses all the legal documents and operational licenses. The factory was involved in some programs promoted by ANICER to evaluate the environmental practices. One of them was the João de Barro Award and another one was the participation in the program called “Sustainable Ceramic Factory is more life” This program was created to promote the sustainability in the red ceramic factories through a set of actions.

1.2 Sectoral Scope and Project Type

The project is associated to the following scope, as per UNFCCC definitions:

1 - Energy industries (renewable - / non-renewable sources);

This is not an AFOLU project. This is not a grouped project.

1.3 Project Proponent

The project proponents contributed to the current report by assigning the following roles and responsibilities to:

Organization name	Cerâmica <i>Kitambar</i> Artefatos de Cerâmica Ltda
Contact person	<i>Mr. Antônio Marcos Tavares Barbosa</i> and <i>Mr. Severino Francisco Torres</i>
Title	<i>Mr. Antônio Marcos Tavares Barbosa</i> , Director and owner: Information about the ceramics, detailed information on process and production lines, environmental challenges, technological challenges, research and development history, ceramics devices market challenges. <i>Mr. Severino Francisco Torres</i> , Quality Controller, responsible for monitoring data: General data and information on inputs and outputs of the ceramic industry, detailed information on the acquisition of renewable biomasses and how this data is kept by the controller's office.
Address	Rodovia BR 232, Km 136, Distrito Industrial Caruaru - <i>Pernambuco</i> – Brazil Postal code: 55.000-000
Telephone	Ceramic phone number: +55 (81) 3722-7777
website	http://www.kitambar.com.br

As the project authorized contact, Sustainable Carbon was given the responsibility of preparing the present project report and to accompany the proponents until the end of the crediting period.

Organization name	Sustainable Carbon – Projetos Ambientais Ltda
Role in the project	Project developer, Project participant and Project idealizer.

Contact person	Beatriz Rovere Dênis Gonçalves dos Santos Larissa Tega da Fonseca Marcelo Hector Sabbagh Haddad Mariana Fieri Thiago de Ávila Othero Victor Oliveira Moller
Title	Beatriz Rovere: Technical analyst Dênis Gonçalves dos Santos: Technical analyst Larissa Tega da Fonseca: Technical analyst Marcelo Hector Sabbagh Haddad: Technical coordinator Mariana Fieri: Technical coordinator Thiago de Ávila Othero: Technical coordinator Victor Oliveira Moller : Technical analyst
Address	R. Doutor Bacelar. 368 – Conj. 131 – Vila Clementino Postal Code: 04.026-001 São Paulo – SP. Brazil
Telephone	+55 11 2649 0036
Email	beatriz@sustainablecarbon.com denis@sustainablecarbon.com larissa@sustainablecarbon.com marcelo@sustainablecarbon.com mariana@sustainablecarbon.com thiago.othero@sustainablecarbon.com victor.moller@sustainablecarbon.com

1.4 Other Entities Involved in the Project

No other entity is involved in this project activity.

1.5 Project Start Date

According to version 02 of the VCS PD¹, project start date was defined as 01-December-2006. On this date, the project began reducing or removing GHG emissions, i.e. the ceramic started using renewable biomass as fuel.

The start date of Kitambar's SOCIAL CARBON project was defined as 01-July-2007, in the SOCIALCARBON Point Zero report. According to the SOCIALCARBON Standard version 5.0, the

¹ Document available at: <http://mc.markit.com/br-reg/public/project.jsp?project_id=100000000000032>. Last on: 01/05/2012.

time period considered in the SOCIALCARBON Report must overlap the period considered by the offset accounting standard monitoring report by at least 50%.

1.6 Project Crediting Period

The crediting period for this project started on 01-January-2007 and ends on 31-December-2016.

VCS project crediting period: 10 years, two times renewable.

1.7 Project Location

According to the applied methodology, the project boundaries for the project are the physical, geographical areas of the renewable energy generation, thus, the ceramic limits. Kitambar ceramic is located in Brazil, in the State of Pernambuco, which is indicated in Figure 01. The project site has the following postal address:

Kitambar Ceramic

Rodovia BR 232, Km 136, Distrito Industrial

Caruaru - Pernambuco –
Brazil

Postal code: 55.000-000

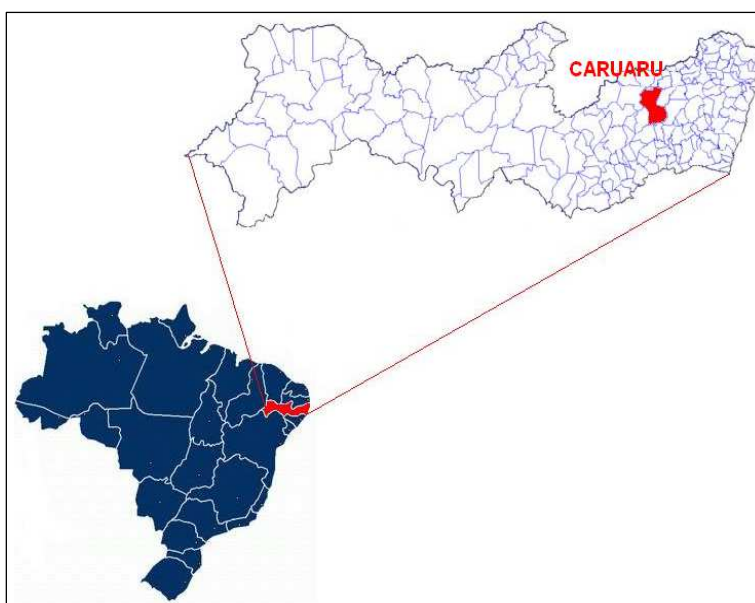


Figure 1. Geographic location of the city of the project activity that has the following coordinates in Pernambuco State: Caruaru: 8° 16' 58" S and 35° 58' 33" W.

1.8 Title and Reference of Methodology

The project applies a small scale methodology approved under the Clean Development Mechanism, as follows:

Category AMS-I.E.: Switch from Non-Renewable Biomass for Thermal Applications by the User – Version 01, valid from 01/02/2008 to 08/04/2010². This category comprises small thermal appliances that displace the use of non-renewable biomass by introducing new renewable energy end-user technologies. SOCIALCARBON indicators applied to the project: Brazilian Red Ceramic factories Indicators. Version 1.1 September, 2013.

1.9 Other Programs

- Emission Trading Programs and Other Binding Limits: The project activity is not included in an emission trading program or any other mechanism that includes GHG allowance trading.
- Other Forms of Environmental Credit: The project activity is not creating any other form of environmental credit under any specific program.
- Participation under Other GHG Programs: The project activity is not registered under any other GHG program.

2 IMPLEMENTATION STATUS

2.1 Implementation Status of the Project Activity

The VCS PD was validated by the Designated Operational Entity TÜV Nord Cert GmbH and this present monitoring report will be verified by Instituto Brasileiro de Opinião Pública e Estatística Ltda (IBOPE).

The project has been fully operational since the starting date of the crediting period. This means the ceramic is operating using exclusively renewable biomass, thus mitigating their baseline emissions.

As described on the VCS PD version 02, the production process at *Kitambar* Ceramic encompasses eight “Round kilns” in order to burn the fuel and fire the ceramic units, which are mainly used in the construction sector. The “Round kilns” at Kitambar Ceramic have capacity for approximately 42,000 ceramic units per burning cycle, depending on the kind of the products that are fired, and approximately 28 burning cycles are done per month. The drying process occurs in a semi-continuous dryer which reuses the heat provided by the kilns to dry the ceramic units. In case no heat is being provided by the kilns, there is a separated furnace supplied only with renewable biomass.

Table 1. Emission reductions verified in the last monitored periods

1° Monitoring Period	Emission Reduction (tCO ₂ e)	
	January to December of 2007	40,627
	January to September of 2008	33,122

² This version of the methodology is available at:

<http://cdm.unfccc.int/UserManagement/FileStorage/CDM_AMSP4VBB05G54RXDE9KQ6FJWMGHZLHFA5>. Last visit on: 01/05/2012.

Total in the period		73,749
2° Monitoring Period	October to December of 2008	10,203
	January to November of 2009	36,988
Total in the period		47,191
3° Monitoring Period	December of 2009	3,801
	January to December of 2010	47,039
	January to December of 2011	47,025
	January to February of 2012	8,020
Total in the monitoring period		105,885

As renewable biomasses, *Kitambar* Ceramic employs *Algaroba* wood, cashew tree residues³, forest residues (sawdust and MDF) and Native Wood from forest management areas.

During the last period analyzed, which corresponds to the 3rd period, from 01-December-2009, to 29-February-2012, verified by Bureau Veritas Certification Brazil, the ceramic factory has utilized Coconut Husk as renewable biomass. However, in the current period, the ceramic factory did not utilize coconut husk, instead it used native wood from forest management areas as renewable biomass. An analysis (regarding the current monitoring period) was made to ensure that this situation does not impact in the project additionality. As a result, the cost per energy generated by the new biomass is higher than the cost per energy generated in the baseline scenario. The graphic below summarize the situation of the current period and the impact in the project additionality.

The cost of non-renewable wood was updated utilizing a conservative correction factor applied to the cost of the non-renewable biomass in 2006, in order to account for general price increases due to inflation. The annual rate of increase applied on the current monitoring period was 6.50%⁴.

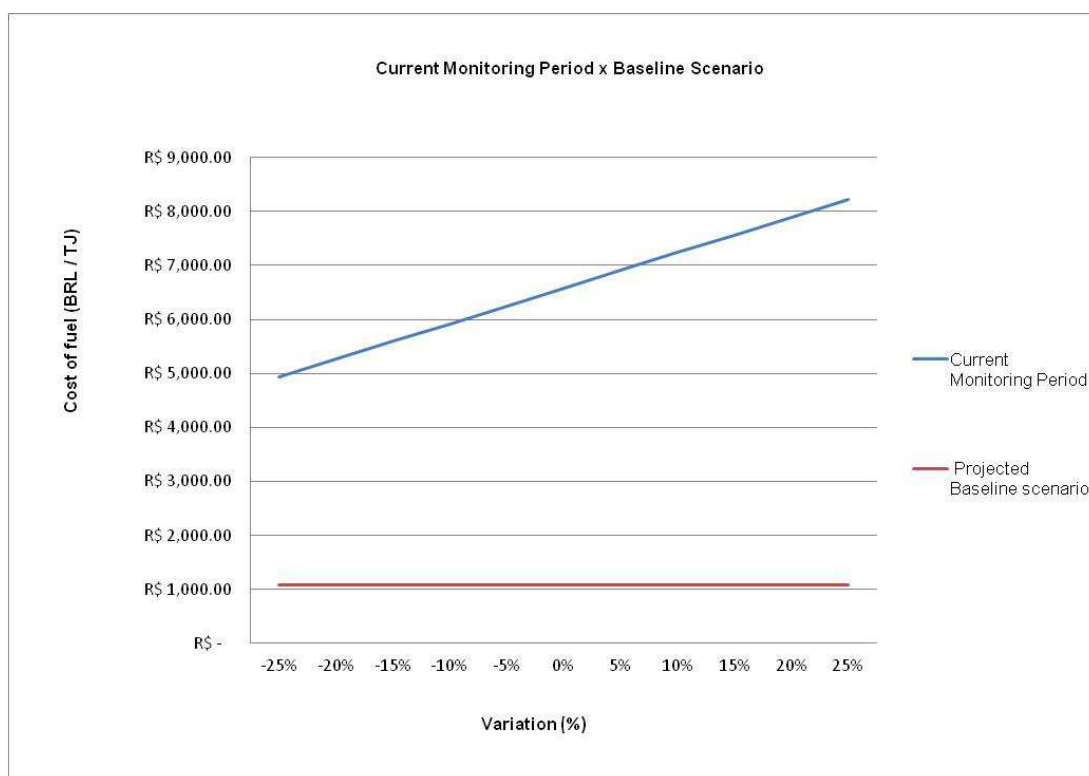
The Figure 2 below displays the comparison of cost of delivered heat at the projected baseline scenario and at the current monitoring period. It can be observed that the non-renewable biomass is financially more attractive than using the renewable biomass. With the project activity's implementation, the fuel spending has increased, as can be verified at the Figure below. Comparing the cost per energy generated, *Kitambar* ceramic industry spent with renewable biomass BRL 6,577.97 per TJ generated during the monitoring period against BRL 1,078.89 per TJ that could be expected in case non-renewable wood was applied (projected baseline scenario for 2014, considering a conservative correction of 6.50% annually). The operation with renewable

³ The cashew tree's pruning occurs due to its fructification, which happens more intensely in new branches.

⁴ It was considered an annual increase of 6.5% once it was the highest inflation rate evidenced between 2004 and 2013. Available at: < <http://exame.abril.com.br/economia/noticias/veja-a-trajetoria-da-inflacao-nos-ultimos-meses-e-anos>>. Last visited on August, 12st 2014.

biomass appears to be less financially attractive since it is more expensive than non-renewable wood.

Figure 2. Cost of renewable biomass per energy generated at the baseline scenario and at the current monitoring period



In the current period, Kitambar started some important actions regarding the social and environmental aspects, such as: a partnership with SESI to provide an educational program – EJA Educational Program for Youth and Adults, for the employees. The factory also initiated a partnership with the NGO Caatinga Association, to protect the armadillo, which is endangered species in the region.

All the benefits regarding social and environmental aspects are described in the section 5.1.

2.2 Deviations

2.2.1 Methodology Deviations

There were no methodology deviations during this monitoring period.

2.2.2 Project Description Deviations

The registered VCS PD version 02 establishes that the project proponent (meaning the ceramic owner) would measure the amount of renewable biomasses used (parameter $Q_{\text{renbiomass}}$). However, during the entire monitored period, this parameter was monitored through all the receipts and invoices of biomass received by the ceramic industries. This means the amount of renewable biomass is measured by each provider and controlled by the ceramics owners, by storing receipts and invoices.

This approach was chosen considering that it is the responsibility of the provider to measure the amount of biomass, since this information needs to be available in the sale invoice or receipt. As this information is used for commercial purposes (to calculate due financial compensations), it is considered that data from the suppliers are a reliable source for this parameter.

Moreover, the registered VCS PD v.5 did not consider the conversion factor from stereo meter (m^3 stereo) to cubic meter (m^3) for the amount of renewable biomass that arrives in volume units (parameter $Q_{\text{renbiomass}}$). Therefore, in this Monitoring Report, the values presented in the table $Q_{\text{renbiomass}}$ of the VCS PD (section 3.3) for cashew wood, Algaroba wood and native wood from management areas were corrected, according to the conversion factors presented in the section 3.2 of this Monitoring Report, table $Q_{\text{renbiomass}}$.

In the current period, the ceramic factory started using native wood from forest management areas as renewable biomass. The native wood from forest management areas is a biomass composed of firewood that is produced in existing areas of native forest where sustainable management techniques are applied. These techniques aim to ensure sustainable exploitation of wood, ensuring the conservation of areas and carbon stocks. This biomass is considered renewable according option I from CDM definition of renewable biomass (Annex 18 of the 23rd Report from the Executive Board), as soon as it fits all the assumptions below:

The biomass is originating from land areas that are forest where:

- (a) The land area remains a forest; and
- (b) Sustainable management practices are undertaken on these land areas to ensure, in particular, that the level of carbon stocks on these land areas does not systematically decrease over time (carbon stocks may temporarily decrease due to harvesting); and
- (c) Any national or regional forestry and nature conservation regulations are complied with.

According to the IBAMA Normative Instruction N° 112 from August 21st, 2006⁵, the entrepreneur who uses raw material from native forests is obliged to use the DOF (Forest Origin Documents) to control the origin, transport, and storage of forest products and by-products. Therefore, to use

⁵ BRASIL. INSTRUÇÃO NORMATIVA IBAMA N° 112, DE 21 DE AGOSTO DE 2006. Available at: <http://www.cetesb.sp.gov.br/licenciamentoo/legislacao/federal/inst_normativa/2006_Instr_Norm_IBAMA_112.pdf>. Last visited on: 23/07/2014.

firewood obtained from native forests in a sustainable manner, it is necessary to use the DOF, which is required by national law. This requirement it is not enforced namely due to the lack of control, and constitutes the baseline scenario, as described in Section B.5. During the project, however, all firewood used will have DOF, thus demonstrating that it is sustainable.

Furthermore, the other renewable biomasses likely to be used by the project, such as residues from cashew tree, algaroba wood and forest residues, do not require documents for residues, since they do not fall under the forest by-products definition of IBAMA Normative Instruction N° 112/06.

The forest management in the Caatinga biome is one of the main options to ensure the sustainable biomass production for energy use, as well as for other basic needs of the populations and productive activities in the Northeast of Brazil. Due to the semi-arid climate of the caatinga biome, the vegetation is composed of medium and small size trees, shrubs; with many cactuses and thorny Bromeliaceae in the driest sites. The dominant physiognomy is a dry and low forest. Most plants lose their leaves during the long dry season, giving the Caatinga a meager aspect. However, its primary productivity is very high during the rainy season, when vigorous plant growth offers a wide variety of forage, flowers, fruits and wood.

The sustainable forest management plan can be organized into three stages: firstly, the division of the property in exploitable areas and areas of permanent preservation that are inaccessible to exploitation. The second stage is the planning of roads that connect the area with the primary roads. In the third stage, the allocated area is divided for exploration in blocks in order to sustain forest exploitation annually⁶.

In the Caatinga biome, the forest management is based on a monocyclic system, with an estimated rotation of 12 to 15 years. The exploration is done by clear cutting in annual plots. The cut is made near the tree's base in order to allow its regeneration by sprouts. When recovered, i.e. after 12 to 15 years, the vegetation reaches similar diversity levels. By this system, the estimated production of a forest management plan is about 40.5 m³ / ha. The estimated annual productivity (also known as mean annual increment) of managed forest is about 3 m³ / ha / year, so at the end of 12 to 15 years, the previously exploited 40.5 m³ have already recovered, closing the cycle⁷. The area in the Caatinga biome with sustainable forest management plans more than doubled between 2005 to 2010, showing a trend toward consolidation of forest management as

⁶ AMARAL, P. et al. Floresta para Sempre: um Manual para Produção de Madeira na Amazônia. Belém: Imazon, 1998. pp. 130. Available at: <http://www.bibliotecaflorestal.ufv.br/bitstream/handle/123456789/3942/Livro_Floresta-para-Sempre-Um-Manual-para-a-Produ%C3%A7%C3%A3o-de-Madeira-na-Amaz%C3%B4nia_IMAZON.pdf?sequence=1>. Last visit on: 24-July-2014.

⁷ BRASIL. Ministério do Meio Ambiente (MMA). Subsídios para a elaboração do plano de ação para a prevenção e controle do desmatamento na Caatinga. Brasília: MMA, 2011c. 128 p. Available at: <http://www.mma.gov.br/estruturas/168/_arquivos/diagnostico_do_desmatamento_na_caatinga_168.pdf>. Last visit on: August 06th, 2014

an alternative for sustainable use in the biome, particularly in a region that has high dependence on forest biomass for energy generation⁸.

The use of forest management doesn't affect the applicability of the project, according the methodology AMS-IE, as this is made for projects that use renewable biomass, including woody biomass. The availability of this biomass on the project region is assessed on Section 4.3.

During the monitored period, the Kitambar Ceramic started using new production processes: a new biomass shredder and a new biomass feeder. These two processes have increased the energy efficiency and decreased consumption of the biomass. The first process, a new biomass shredder, decreases the particle size and increased the burning area of the biomass⁹. The second process, a new biomass feeder, increased the efficiency on biomass handling, decreasing the amount of biomass needed to the burning in the furnace¹⁰. Therefore, the thermal energy utilized per thousand of pieces produced in this monitoring period was lower than thermal energy presented in VCS PD.

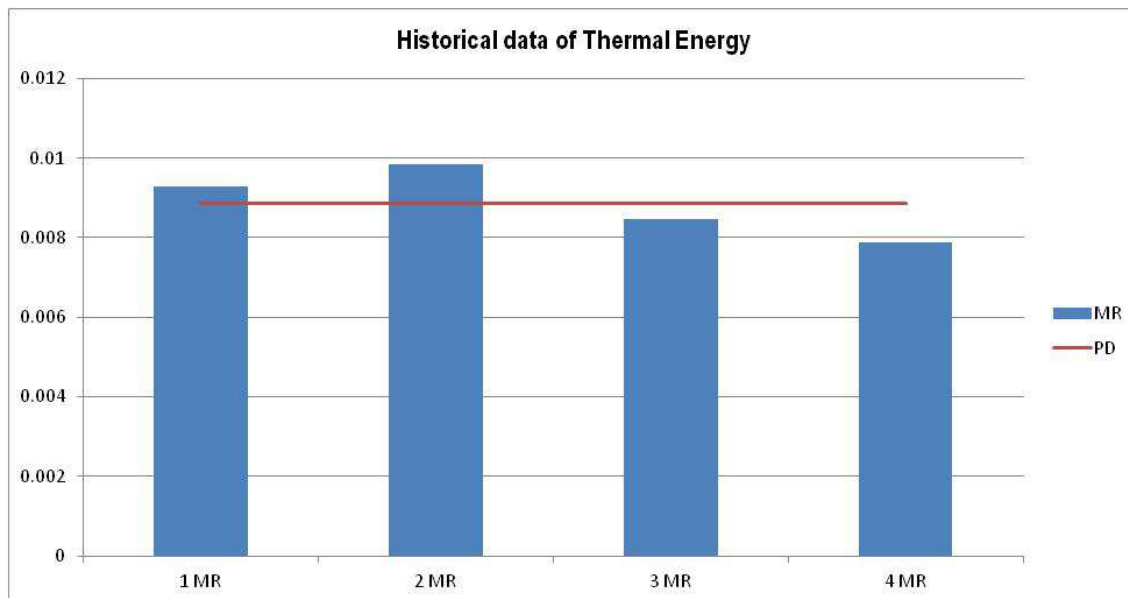
The analyses of data on historical thermal energy from Kitambar Ceramic since its first monitoring period demonstrates the increased energy efficiency after introduction of the two process, The graph below shows the amount of energy needed to produce one thousand ceramic pieces on Kitambar Ceramic (measured on TJ per thousand pieces).

⁸ AMARAL, P. et al. Floresta para Sempre: um Manual para Produção de Madeira na Amazônia. Belém: Imazon, 1998. pp. 130. Available at: <http://www.bibliotecaflorestal.ufv.br/bitstream/handle/123456789/3942/Livro_Floresta-para-Sempre-Um-Manual-para-a-Produ%C3%A7%C3%A3o-de-Madeira-na-Amaz%C3%B4nia_IMAZON.pdf?sequence=1>. Last visit on: 24-July-2014.

⁹ According to Ribeiro, M.J.P.M., Abrantes, J.C.C. Moagem em moinho de bolas: estudo de algumas variáveis e otimização energetic do processo. Cerâmica Industrial, 6 (2) Março/Abril, 2001. Information is available on page 7, paragraph first paragraph.. Available at: < http://www.ceramicaindustrial.org.br/pdf/v06n02/v6n2_1.pdf> Visited in: 07/08/2014.

¹⁰ According to Guia Técnico ambiental da Indústria de Cerâmica Vermelha. Information is available on page 26, third paragraph. Available at: <http://www7.fiemg.com.br/Cms_Data/Contents/central/Media/Documentos/Biblioteca/PDFs/FIEMG/MeioAmbiente/2014/CartilhasPublica%C3%A7%C3%B5es/Cartilha-Cer-mica.pdf> Visited in: 18/08/2014

Graph 1: Historical data of Thermal Energy



2.3 Grouped Project

Not applicable. This is not a grouped project.

3 DATA AND PARAMETERS

3.1 Data and Parameters Available at Validation

Data Unit / Parameter:	$EF_{\text{projected fossil fuel}}$
Data unit:	tCO ₂ /TJ
Description:	CO ₂ Emission factor of residual fuel oil
Source of data:	IPCC 2006 Guidelines for National Greenhouse Gas Inventories. Available at: < http://www.ipcc-nggip.iges.or.jp/public/2006gl/pdf/2_Volume2/V2_2_Ch2_Stationary_Combustion.pdf >. Page 2.18. Table 2.3. IPCC. Last visit on: 01/05/2012.
Value applied:	77.4 tCO ₂ /TJ
Justification of choice of data or description of measurement methods and	In the baseline scenario, the fossil fuel that would probably be consumed in the absence of native wood without sustainable forest management would be the heavy oil. This fuel is more expensive than wood, however it can be a more plausible substitute of wood than natural gas due to

procedures applied	the risks involving natural gas distribution.
Purpose of the data:	The fossil fuel likely to be used by similar consumers is taken from the IPCC default value of residual fossil fuel. This parameter was used to calculate baseline emissions from the use of the fossil fuel that would be used in the baseline scenario, in the absence of non-renewable wood.
Any comment:	Applicable for stationary combustion in the manufacturing industries and construction.

Data Unit / Parameter:	NCV_{non-renewable wood}
Data unit:	TJ/tonne of wood
Description:	Net Calorific Value of non-renewable wood
Source of data:	Brazilian study carried out with <i>Caatinga</i> wood: QUIRINO, W. F. et al. Poder Calorífico da Madeira e de Resíduos Lignocelulósicos . Biomassa & Energia, v.1, n.2, p. 173-182, 2004. Available at: < http://www.renabio.org.br/06-B&E-v1-n2-2004-173-182.pdf >. Last visit on: 05/08/2014. OLIVEIRA, E. et al. Estrutura anatômica da madeira e qualidade do carvão de Mimosa tenuiflora (Willd.) Poir. Revista Árvore, Viçosa-MG, v.30, n.2, p.311-318, 2006. Available at: < http://www.scielo.br/pdf/rarv/v30n2/a18v30n2.pdf >. Last visit on: 17/06/2014
Value applied:	0.019
Justification of choice of data or description of measurement methods and procedures applied	This value provided the energy generated by the amount of wood that would be used in the absence of the project.
Purpose of the data:	Calculation of baseline emissions. This value provides the energy generated by the amount of wood that would be used in the absence of the project. It differs from the IPCC value because represents the net calorific value of the local biome
Any comment:	The species used to calculate the average value are typical trees of <i>Caatinga</i> Biome that are usually utilized as fuel in the ceramic industries of the region. IPCC default values shall be used only when country or project specific data are not available or difficult to obtain, according to "Guidance on

	IPCC default values" (Extract of the report of the twenty-fifth meeting of the Executive Board, paragraph 59).
--	--

Data Unit / Parameter:	ρ_{wood}
Data unit:	tonne/m ³
Description:	Specific gravity of non-renewable wood
Source of data:	Brazilian studies carried out with <i>Caatinga</i> wood: - 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. - QUIRINO, W. F. et al. Poder Calorífico da Madeira e de Resíduos Lignocelulósicos. Biomassa & Energia, v.1, n.2, p. 173-182, 2004. Available at: < http://www.renabio.org.br/06-B&E-v1-n2-2004-173-182.pdf >. Last visit on: 05/08/2014. - IPCC: Intergovernmental Panel on Climate Change. Orientación del IPCC sobre las buenas prácticas para UTCUTS - chapter3 – Table 3A.1.9-2. - OLIVEIRA, E. et al. Estrutura anatômica da madeira e qualidade do carvão de Mimosa tenuiflora (Willd.) Poir. Revista Árvore, Viçosa-MG, v.30, n.2, p.311-318, 2006. Available at: <http://www.scielo.br/pdf/rarv/v30n2/a18v30n2.pdf>. Last visit on: 05/08/2014. -IBAMA – Madeiras Brasileiras. <https://web.archive.org/web/20091226033704/http://www.ibama.gov.br/lpf/madeira/caracteristicas.php?ID=195&caracteristica=139>. Last visit on: 05/08/2014.
Value applied:	0.88
Purpose of the data:	Calculation of baseline emissions. The amount of wood used in the baseline was measured by volume units, so this data was used to the unity conversion.
Any comment:	The species used to calculate the average value are typical trees of <i>Caatinga</i> Biome that are usually utilized as fuel in the ceramic industries of the region.

Data Unit / Parameter:	BF_y
------------------------	--------

Data unit:	Tonnes of wood per thousands of ceramic devices produced per year
Description:	Consumption of non-renewable biomass per thousand of ceramic devices produced per year
Source of data:	Historical data from ceramic owner
Value applied:	2.28
Justification of choice of data or description of measurement methods and procedures applied	The value was acquired through the average consumption and production of ceramic devices during the years when the ceramic used to consume non sustainable wood. This value is in accordance with the data acquired in other ceramics that employ the same type of kilns. The value is employed to calculate the real amount of wood displaced to maintain the ceramic production in the baseline scenario.
Purpose of the data:	Calculation of baseline emissions. The value is utilized to calculate the real amount of wood displaced to maintain the ceramic production in the baseline scenario. This value is in accordance with the data acquired in other ceramics that employ the same type of kilns.
Any comment:	The value was acquired through the average consumption and production of ceramic devices during the years when the ceramic used to consume non-renewable wood.

3.2 Data and Parameters Monitored

Data Unit / Parameter:	$Q_{renbiomass}$
Data unit:	Tonnes per month
Description:	Amount of renewable biomasses
Source of data:	Measured by the biomass providers and controlled by the ceramic owner. The registered VCS PD v.02 establishes that the ceramic owner would measure this parameter; however, during the entire monitored period, this parameter was monitored through all the receipts and invoices of biomass received by the ceramic industry.
Description of measurement methods and procedures to be applied:	The amount of biomass was monitored in accordance to the weight or volume described in the receipts from the providers. For cashew wood, Algaroba and Native Wood from forest management areas, the values in the receipts are described in m ³ . However, a conversion factor from mst (m ³ stereo) to m ³ had to be applied, since the ceramic owners confirmed

	measurements were actually made in m³ stereo. Moreover, the registered VCS PD v.5 did not consider the conversion factor from m³ stereo to m³ for the amount of renewable biomass that arrives in m³ stereo unit (parameter Qrenbiomass). Therefore, in this Monitoring Report, the values presented in the table Qrenbiomass of the VCS PD (section 3.3) for cashew wood and algaroba wood were corrected, according to the conversion factors presented in the section 4.3 of this Leakage, table 4. To demonstrate that native wood from forest management areas is renewable it is necessary the use of DOF (Forest Origin Document), that proves the regular origin of the biomass. Besides that, the Sustainable Management Plans ensure that the native wood is taken from land areas with sustainable management practices.										
Frequency of monitoring/recording:	Monthly										
Value monitored:	Total amount of biomasses consumed during all months of the monitoring period (in tonnes): <table data-bbox="721 1046 1316 1413"> <thead> <tr> <th>Biomass</th><th>Amount of biomass consumed (tonnes)</th></tr> </thead> <tbody> <tr> <td><i>Algaroba</i> Wood</td><td>10,581.65</td></tr> <tr> <td>Cashew Tree Residues</td><td>19.32</td></tr> <tr> <td>Forest Residues</td><td>1,933.58</td></tr> <tr> <td>Native Wood from forest management areas</td><td>369.70</td></tr> </tbody> </table> More detailed information is available in Appendix 1.	Biomass	Amount of biomass consumed (tonnes)	<i>Algaroba</i> Wood	10,581.65	Cashew Tree Residues	19.32	Forest Residues	1,933.58	Native Wood from forest management areas	369.70
Biomass	Amount of biomass consumed (tonnes)										
<i>Algaroba</i> Wood	10,581.65										
Cashew Tree Residues	19.32										
Forest Residues	1,933.58										
Native Wood from forest management areas	369.70										
Monitoring equipment:	No monitoring equipment is used to determine this parameter										
QA/QC procedures to be applied:	Amount of biomass was checked according to receipts of purchase. The energy balance was verified according to the amount of biomass applied. The thermal energy generated with the use of <i>Algaroba</i> wood, cashew tree residues, forest residues (sawdust and MDF) and native wood from forest management areas per thousands of ceramic devices produced during the current monitoring period was compared to the VCS PD. The thermal energy generated per thousand of ceramic units produced at <i>Kitambar</i> Ceramic on the monitored period was lower than the estimated in the VCS PD. Differences are likely caused by energy efficiency gains.										
Purpose of the data	This parameter was used to : Compare the total energy produced in the current monitoring										

	period to the thermal energy that would be necessary according to the VCS PD estimates (QA/QC table); b. Demonstrate that the Project fits in small scale category (<45MWth/year); c. Calculation of leakage emissions due to competing use of biomass.																
Calculation method:	The energy generated by the amount of renewable biomass during the current monitoring period was calculated based on the Net Calorific Value of each biomass, as can be seen on the VCS MR Calculation spreadsheet. Receipts registered on "stereo" as unit of measure were converted to "m³" using the Conversion Factors below <table border="1"> <thead> <tr> <th colspan="2">Conversion factor from "m³ stereo" to "m³"</th></tr> </thead> <tbody> <tr> <td><i>Algaroba</i> and Cashew tree wood</td><td>0.3745</td></tr> <tr> <td><i>Native Wood from forest management areas</i></td><td>0.3388</td></tr> </tbody> </table> The amount of biomasses was monitored in accordance to the weight or volume described in the receipts from the providers. The values in the receipts may be described in m³, therefore it is necessary the conversion to tonnes through the specific gravity of each biomass. The specific gravity values of the renewable biomasses utilized in this project are: <table border="1"> <thead> <tr> <th>Biomass</th><th>Specific gravity (tonne/m³)</th></tr> </thead> <tbody> <tr> <td><i>Algaroba</i> Wood</td><td>0.836</td></tr> <tr> <td>Cashew tree residues</td><td>0.42</td></tr> <tr> <td>Forest Residues</td><td>0.35</td></tr> <tr> <td>Native Wood from forest management areas</td><td>0.88</td></tr> </tbody> </table> Source of data: - <i>Algaroba</i> wood: PEREIRA, J. C. D.; LIMA, P. C. F. Comparação da Qualidade da Madeira de seis Espécies de Algarobeira para a Produção de Energia. Colombo: Embrapa Florestas, 2002. p. 99-107. Available at:	Conversion factor from "m ³ stereo" to "m ³ "		<i>Algaroba</i> and Cashew tree wood	0.3745	<i>Native Wood from forest management areas</i>	0.3388	Biomass	Specific gravity (tonne/m ³)	<i>Algaroba</i> Wood	0.836	Cashew tree residues	0.42	Forest Residues	0.35	Native Wood from forest management areas	0.88
Conversion factor from "m ³ stereo" to "m ³ "																	
<i>Algaroba</i> and Cashew tree wood	0.3745																
<i>Native Wood from forest management areas</i>	0.3388																
Biomass	Specific gravity (tonne/m ³)																
<i>Algaroba</i> Wood	0.836																
Cashew tree residues	0.42																
Forest Residues	0.35																
Native Wood from forest management areas	0.88																

	<http://www.cnpf.embrapa.br/publica/boletim/boletarqv/bolet45/pag-99_106.pdf>. Last visit on: 01/05/2012. - Cashew tree residues and Native Wood from manamegent areas: 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. - Forest residues : PINHEIRO, G. F.; RENDEIRO, G.; PINHO J. T. Densidade Energética de Resíduos Vegetais. 2006. Available at: <http://www.ufpa.br/gedae/images/Art.Gedae/58.pdf>. Last visit on: 22/07/2014. - Native Wood from forest management areas: - The same applied in pbiomass. - According to Table 13, section 5.3.3.7, of the Boqueirão Forest Management Plan. The conversion factor was calculated according to the average of the plots described in this table. Algaroba and Cashew tree wood (conversion factor): FERRAZ, Douglas Galvão. Inventário Florestal de Três Fragmentos com Candeia (<i>Eremanthus erythropappus</i>) no Município de Itajubá - MG. 2008. 26 f. Monografia (Conclusão de Curso) - Curso de Gestão Ambiental, Escola Agrotécnica Federal, Inconfidentes-mg, 2008. Available at: <http://docs.google.com/viewer?a=v&q=cache:mNfJBYKgNNMJ:www.ifs.ifsuldeminas.edu.br/pesquisas/TCC/TCC_Douglas.pdf+conver%C3%A7ao+mst+m3&hl=pt-BR&gl=br&pid=bl&srcid=ADGEESiMIDtbGvrwKnI888t-ddbzBkGnc2hYaTXhq3GtXUOg1wbAbYIk1f2UWWhdIIHsWCyfyYtfFgNboU_qeG8hcJf5fAzliJjIjP3Z451eltDC6xOwmnW_X7D6HN69DDfUPbjq60wes&sig=AHIEtbTwzpj3zy7n6nlZFDM3-djyemLmDg>. Last visit on: July 22th, 2014.
Any comment:	As stated in the VCS PD, the providers listed in the PD are only a few of those that work for the ceramic; nevertheless, it does not exclude the possibility of buying biomass from others. Data will be kept for two years after the end of the crediting period or the last issuance of carbon credits for this project activity, whichever occurs

	later.
--	--------

Data Unit / Parameter:	PR _y																																					
Data unit:	Unity of ceramic pieces																																					
Description:	Production of ceramic devices																																					
Source of data:	Controlled by the project developer																																					
Description of measurement methods and procedures to be applied:	This parameter is monitored by the project developer (the ceramic owner). The amount was acquired by counting the total production of the period considered. Values used for the calculations are taken from production control documents. Data is aggregated on a monthly and yearly basis. Measurements are done by an internal control sheet monitored by the project proponent.																																					
Frequency of monitoring/recording:	Monthly																																					
Value monitored:	<table><tr><th colspan="2">Period</th><th>PR_y - Production (ceramic units)</th></tr><tr><td rowspan="11">2012</td><td>March</td><td>1,225,250</td></tr><tr><td>April</td><td>1,089,150</td></tr><tr><td>May</td><td>1,165,500</td></tr><tr><td>June</td><td>1,050,500</td></tr><tr><td>July</td><td>1,222,730</td></tr><tr><td>August</td><td>1,454,900</td></tr><tr><td>September</td><td>924,780</td></tr><tr><td>October</td><td>1,171,700</td></tr><tr><td>November</td><td>1,226,200</td></tr><tr><td>December</td><td>1,253,200</td></tr><tr><td>Total 2012</td><td>11,783,910</td></tr><tr><td rowspan="5">2013</td><td>January</td><td>1,344,100</td></tr><tr><td>February</td><td>1,079,500</td></tr><tr><td>March</td><td>1,181,400</td></tr><tr><td>April</td><td>1,307,700</td></tr><tr><td>May</td><td>1,336,950</td></tr></table>	Period		PR _y - Production (ceramic units)	2012	March	1,225,250	April	1,089,150	May	1,165,500	June	1,050,500	July	1,222,730	August	1,454,900	September	924,780	October	1,171,700	November	1,226,200	December	1,253,200	Total 2012	11,783,910	2013	January	1,344,100	February	1,079,500	March	1,181,400	April	1,307,700	May	1,336,950
Period		PR _y - Production (ceramic units)																																				
2012	March	1,225,250																																				
	April	1,089,150																																				
	May	1,165,500																																				
	June	1,050,500																																				
	July	1,222,730																																				
	August	1,454,900																																				
	September	924,780																																				
	October	1,171,700																																				
	November	1,226,200																																				
	December	1,253,200																																				
	Total 2012	11,783,910																																				
2013	January	1,344,100																																				
	February	1,079,500																																				
	March	1,181,400																																				
	April	1,307,700																																				
	May	1,336,950																																				

			June	952,000	
			July	1,140,800	
			August	1,217,100	
			September	826,100	
			October	1,246,700	
			November	1,185,500	
			December	1,306,600	
			Total 2013	14,124,450	
		2014	January	1,225,100	
			February	1,189,300	
			March	1,201,100	
			April	1,093,760	
			May	1,361,200	
			Total 2014	6,070,460	
Monitoring equipment:	No monitoring equipment is used to determine this parameter. Production is counted by trained personnel on <i>Kitambar</i> ceramic.				
QA/QC procedures to be applied:	Data concerning <i>PR_y</i> measurement points are from an internal control documents used by <i>Kitambar</i> Ceramic. These documents are organized per month and daily filled according to data based on ceramic units burned in the kilns.				
Purpose of the data	This parameter is used to calculate baseline emissions and the total energy produced in the current monitoring period in order to compare to the thermal energy necessary in the VCS PD (QA/QC table).				
Calculation method:	The ceramic industry has an internal control of the quantity of ceramic units produced. It was rechecked according to the biomass employed in the ceramic kilns.				
Any comment:	Data will be kept for two years after the end of the crediting period or the last issuance of carbon credits for this project activity, whichever occurs later.				

Data Unit / Parameter:	Origin of renewable biomass
Data unit:	Not applicable
Description:	Renewable origin of the biomass
Source of data:	Controlled by the project developer

Description of measurement methods and procedures to be applied:	This information was given by the biomasses providers. The guarantee of acquiring renewable wood was achieved by invoices from the providers. As stated in the section 2.2, the biomasses (Algaroba wood, cashew tree, native wood from management areas and forest residues) are considered renewable as fulfilling the options described in the methodology applied. According to the IBAMA Normative Instruction Nº 112 from August 21st, 2006¹¹, the entrepreneur who uses raw material from native forests is obliged to use the DOF (Forest Origin Documents) to control the origin, transport, and storage of forest products and by-products. Furthermore, the other renewable biomasses used by the project, such as residues from cashew tree, algaroba wood and forest residues, do not require documents for residues, since they do not fall under the forest by-products definition of IBAMA Normative Instruction Nº 112/06. Forest residues are acquired from suppliers near the Project site. These suppliers provided evidences of the origin of biomass through the receipts and invoices acquisition. In addition, part of the suppliers (representing 60% of the sawdust's suppliers) were interviewed by phone. All suppliers interviewed acquire either Medium Density Fiberboard (MDF) from large industries in the Southeast region of Brazil or wood from forest plantations of exotic species (such as Pinus trees) sourced from the Southeast region of Brazil¹². Both these biomasses are considered renewable. MDF boards are typically produced in line with sustainable production standards, such as the Forest Stewardship Council (FSC). Forest plantations are subject to forest management techniques.
Frequency of monitoring/recording:	Annually
Value monitored:	Not applicable.
Monitoring equipment:	No monitoring equipment was used to determine this parameter.
QA/QC procedures to be applied:	The biomass is considered renewable as it is according to the definition given by the applied methodology.
Purpose of the data	Not directly applied for the calculation. This parameter is used to guarantee that the amount of biomass acquired by the project proponent has a renewable origin. It is also necessary to comply with procedures

¹¹ BRASIL. INSTRUÇÃO NORMATIVA IBAMA Nº 112, DE 21 DE AGOSTO DE 2006. Available at: <http://www.cetesb.sp.gov.br/licenciamentoo/legislacao/federal/inst_normativa/2006_Instr_Norm_IBAMA_112.pdf>. Last visited on: 23/07/2014.

¹² Evidences to such statement were made available to the verification team.

	required by the methodology AMS-I.E, Version 01.
Calculation method:	Not applicable
Any comment:	All the renewable biomasses utilized are in accordance with definitions of renewable biomass set in the applied methodology. Data will be kept for two years after the end of the crediting period or the last issuance of carbon credits for this project activity, whichever occurs later.

Data Unit / Parameter:	Renewable biomass surplus																							
Data unit:	tonnes or m³																							
Description:	Amount of renewable biomass available																							
Source of data:	Monitored																							
Description of measurement methods and procedures to be applied:	It was used to calculate the leakage of renewable biomass. The sources of leakages predicted in “General guidance on leakage in biomass project activities” of Indicative Simplified Baseline and Monitoring Methodologies for Selected Small-Scale CDM Project Activity Categories, were monitored. The measurement of the leakage was based in national and international articles and database every monitoring period. The sources provided information about the biomass availability in the project activity's region. The bibliographic references are described on the section 4.3 “Leakage”.																							
Frequency of monitoring/recording:	Annually																							
Value monitored:	<table><tr><td></td><td>Biomass surplus</td><td>Surplus</td><td></td></tr><tr><td></td><td>Algaroba wood in m³ (2007/2008)</td><td>2,500,000</td><td></td></tr><tr><td></td><td>Cashew tree residues in m³ (2012)</td><td>44,156</td><td></td></tr><tr><td></td><td>Native wood from management areas in m³ (2012)</td><td>1,151,920</td><td></td></tr><tr><td></td><td>Forest Residues in m³ (2007/2008)</td><td>319,891.88</td><td></td></tr></table> Detailed information in Section 4.3.:“Leakage”.					Biomass surplus	Surplus			Algaroba wood in m³ (2007/2008)	2,500,000			Cashew tree residues in m³ (2012)	44,156			Native wood from management areas in m³ (2012)	1,151,920			Forest Residues in m³ (2007/2008)	319,891.88	
	Biomass surplus	Surplus																						
	Algaroba wood in m³ (2007/2008)	2,500,000																						
	Cashew tree residues in m³ (2012)	44,156																						
	Native wood from management areas in m³ (2012)	1,151,920																						
	Forest Residues in m³ (2007/2008)	319,891.88																						
Monitoring equipment:	No monitoring equipment is used to determine this parameter.																							
QA/QC procedures to	Data available regarding the ceramic industries fuel consumption was																							

be applied:	employed to monitor the leakage
Purpose of the data	Calculation of leakage emissions due to competing use of biomass.
Calculation method:	The amount of biomass used by the project activity in each year of the crediting period is compared to total biomass available, as estimated on the VCS PD.
Any comment:	Data will be kept for two years after the end of the crediting period or the last issuance of carbon credits for this project activity, whichever occurs later.

Data Unit / Parameter:	Leakage of non-renewable biomass
Data unit:	tCO ₂ e
Description:	Leakage resulted from the non-renewable biomass
Source of data:	Monitored
Description of measurement methods and procedures to be applied:	The three sources of leakages predicted in the applied methodology were monitored. Scientific articles, official statistical data, regional and national surveys were provided in order to ensure that there was no leakage from non-renewable biomass (or to estimate the leakage). Please see Section 4.3: "Leakage".
Frequency of monitoring/recording:	Annually
Value monitored:	0
Monitoring equipment:	No monitoring equipment is used to determine this parameter.
QA/QC procedures to be applied:	Data available regarding the ceramic industries fuel consumption were utilized to monitor the leakage.
Purpose of the data	Calculation of leakage emissions. This parameter is used to evaluate if there is any source of indirect emission related to non-renewable biomass. If applicable, leakage emissions are used to adjust emission reductions resulting from the project.
Calculation method:	Not applicable.
Any comment:	Data will be kept for two years after the end of the crediting period or the last issuance of carbon credits for this project activity, whichever occurs later.

Data Unit / Parameter:	$f_{NRB,y}$
Data unit:	Percentage

Description:	Fraction of biomass (wood) used in the absence of the project activity in year y that can be established as non-renewable biomass using survey methods
Source of data:	Survey methods
Description of measurement methods and procedures to be applied:	Before the project activity, wood from areas without forest management was offered with low prices and high viability to the ceramics owner. Thus, the totality of fuel employed in the baseline scenario is from non-renewable origin. According to Associação Plantas do Nordeste (APNE, 2012) article "Plantas de Manejo Sustentado na Caatinga". Available at: http://www.cnip.org.br/planos_manejo.html. Last visited on 23/07/2014, the area of Caatinga with sustainable use corresponds to 340,000 ha¹³. Besides that, according to Geographic and Statistic Brazilian Institute (IBGE), the approximate area of Caatinga biome is 844,453 km², which means 84,445,300 ha. Therefore, the oercentage of wood with sustainable use in Caatinga Biome is around 0.4%¹⁴ two sheets were made to calculate the amount of wood consumed. The first one encompasses the amount of wood consumed by the ceramics located at the Caatinga biome. The other sheet calculates the amount of wood consumed regarding only Kitambar Ceramic. Dividing these values by the total of wood available, it was achieved the amount of renewable biomass that has been saved by all the project activities or only by Kitambar project, respectively¹⁵. Afterwards, summing each value with the sustainable use areas defined by APNE (2012), two fraction of renewable biomass were acquired. Finally, each value was subtracted from 100% to achieve the $f_{NRB,y}$. Therefore, it was taken the smaller value in order to be more conservative. These sheets are available at the VCU Estimates spreadsheet.
Frequency of monitoring/recording:	Annually

¹³ According to Associação Plantas do Nordeste 2012. Available at: http://www.cnip.org.br/planos_manejo.html. Last visited on: 24/07/2014.

¹⁴ According Geographic and Statistic Brazilian Institute (IBGE), 2012. Available at: <http://www.ibge.gov.br/home/presidencia/noticias/21052004biomashtml.shtm>. Last visited on: 24/07/2014.

¹⁵ According to data from project activities elaborated by Sustainable Carbon – Projetos Ambientais LTDA.

Value monitored:	99.3%
Monitoring equipment:	No monitoring equipment is used to determine this parameter.
QA/QC procedures to be applied:	The monitoring of this parameter was based in national and international articles and database every monitoring period. The sources provided information about the sustainable use of Caatinga biome. Wood saved from projects developed by Sustainable Carbon in the same biome and that have applied the same methodology was considered in this fraction¹⁶. CDM or VCS registered projects were also included in this fraction if placed in the same region and using the same methodology. Moreover the amount of non-renewable biomass applied in the project activity were monitored monthly and were considered in the value of $f_{NRB,y}$ parameter.
Purpose of the data	This parameter is used to calculate Baseline emissions. The $f_{NRB,y}$ determines the fraction of biomass (wood) used in the absence of the project activity that can be established as non-renewable biomass.
Calculation method:	The values from wood residues should be determined <i>ex ante</i> ¹⁷ . Detailed information in Section 4.3 - Leakage.
Any comment:	Data will be kept for two years after the end of the crediting period or the last issuance of carbon credits for this project activity, whichever occurs later.

3.3 Data Monitored for SOCIALCARBON

Indicator	Diversity
Data unit	Percentage %
Description	Evaluates the employment opportunities provided by the ceramic industry to historically excluded social groups, such as: women, ex-convicts, the elderly, the indigenous, the illiterate and the disabled.
Source of data	RAIS (Annual Report of Social Information) and CAGED (General Register of Employed and Unemployed)
Description of methods to collect information and procedures to be	Application of a questionnaire and an interview with the responsible for the ceramic factory.

¹⁶ Document available at: < http://mer.markit.com/br-reg/public/index.jsp?entity=project&sort=project_name&dir=ASC&start=0&acronym=&limit=15&name=sustainable+carbon&standardId > Last visit on: 24/07/2014.

¹⁷ According to CDM General guidance on leakage in biomass project activities, version 3. Available at: <http://cdm.unfccc.int/methodologies/SSCmethodologies/approved/history/c_leak_biomass/guid_biomass_v03.pdf>. Last visited on: 28/07/2014.

applied	
Purpose of the data	To demonstrate the indicator performance
Comments	No comments.

Indicator	Community development
Data unit	N/A
Description	Evaluates the existence of management practices that contribute to local community development.
Source of data	Documents such receipts, invoices, pictures, agreements, correspondences, signed statement, on site visit, among others.
Description of methods to collect information and procedures to be applied	Application of a questionnaire and an interview with the responsible for the ceramic factory.
Purpose of the data	To demonstrate the indicator performance
Comments	No comments.

Indicator	Employee satisfaction surveys
Data unit	N/A
Description	Evaluates existing systems for employee feedback (questions, suggestions and complaints) and the measures taken in response to the feedback to make improvements.
Source of data	Documents such attendance list, receipts, invoices, pictures, agreements, correspondences, signed statement, on site visit, among others.
Description of methods to collect information and procedures to be applied	Application of a questionnaire and an interview with the responsible for the ceramic factory.
Purpose of the data	To demonstrate the indicator performance
Comments	No comments.

Indicator	Additional employee benefits
Data unit	N/A
Description	Evaluates the additional benefits provided to employees. Benefits required by law are not considered.

Source of data	Documents such receipts, invoices, pictures, agreements, correspondences, signed statement, on site visit, among others.
Description of methods to collect information and procedures to be applied	Application of a questionnaire and an interview with the responsible for the ceramic factory.
Purpose of the data	To demonstrate the indicator performance
Comments	No comments.

Indicator	Health and safety practices
Data unit	N/A
Description	Evaluates the existing health and safety practices in the factories, including the distribution and supervised use of PPE (Personal Protective Equipment) by all employees as well as health and safety programs. Mandatory Programs: PPRA: Program for Prevention and Environmental Risks; PCMSO: Program for Controlling Medical and Occupational Health and CIPA: Internal Commission for Accident Prevention. Complementary programs: PPR: Respiratory Protection Program; PPRPS: Program for Protection from risks in presses and Similar and PCA: Hearing Conservation Program.
Source of data	All the documents listed above and other documents such attendance list ,receipts, invoices, pictures, agreements, correspondences, signed statement, on site visit, among others.
Description of methods to collect information and procedures to be applied	Application of a questionnaire and an interview with the responsible for the ceramic factory.
Purpose of the data	To demonstrate the indicator performance
Comments	No comments.

Indicator	Training and capacity building programs
Data unit	N/A
Description	Evaluates whether the factory encourages and invests in the professional development of its employees.
Source of data	Documents such certificates, licenses, attendance list,

	receipts, invoices, pictures, agreements, correspondences, signed statement, on site visit, among others.
Description of methods to collect information and procedures to be applied	Application of a questionnaire and an interview with the responsible for the ceramic factory.
Purpose of the data	To demonstrate the indicator performance
Comments	No comments.

Indicator	Biomass supply
Data unit	tonnes or m ³
Description	Evaluates the type, source and quantity of renewable biomass used as fuel, as well as the profile of suppliers.
Source of data	Invoices and receipts
Description of methods to collect information and procedures to be applied	Application of a questionnaire and an interview with the responsible for the ceramic factory.
Purpose of the data	To demonstrate the indicator performance
Comments	No comments.

Indicator	Planning and control
Data unit	N/A
Description	Evaluates the existence of financial planning and controls in regards to carbon credits sold by factory.
Source of data	Invoices, receipts, spreadsheet, among others.
Description of methods to collect information and procedures to be applied	Application of a questionnaire and an interview with the responsible for the ceramic factory.
Purpose of the data	To demonstrate the indicator performance
Comments	No comments.

Indicator	Carbon credit investments
Data unit	N/A
Description	Evaluates whether proceeds from the sale of carbon credits was invested in factory improvements or activities that benefit the local community.

Source of data	Invoices, receipts, spreadsheet, among others.
Description of methods to collect information and procedures to be applied	Application of a questionnaire and an interview with the responsible for the ceramic factory.
Purpose of the data	To demonstrate the indicator performance
Comments	No comments.

Indicator	Environmental management
Data unit	N/A
Description	Evaluates initiatives and structured/certified environmental management systems in regards to managing waste, water, air, soil, energy and nature conservation.
Source of data	Documents such certificates, licenses, receipts, invoices, pictures, agreements, signed statement, on site visit, among others.
Description of methods to collect information and procedures to be applied	Application of a questionnaire and an interview with the responsible for the ceramic factory.
Purpose of the data	To demonstrate the indicator performance
Comments	No comments.

Indicator	Brazilian environmental legislation
Data unit	N/A
Description	Evaluates whether the factory has a water grant (for those making use of a well or pond), federal technical registry, operating license and license for clay extraction and is in compliance with the conditions established by the documents. It also evaluates the promotion and fulfillment of agreements with local stakeholders.
Source of data	All the licenses and documents listed above and on site visit.
Description of methods to collect information and procedures to be applied	Application of a questionnaire and an interview with the responsible for the ceramic factory.
Purpose of the data	To demonstrate the indicator performance
Comments	No comments.

Indicator	Voluntary environmental initiatives
Data unit	N/A
Description	Evaluates voluntary environmental initiatives that improve or establish new environmental assets and services, as well as those that raise environmental awareness of workers, their families and the surrounding community.
Source of data	Documents such certificates, attendance list, licenses, receipts, invoices, pictures, agreements, signed statement, on site visit, among others.
Description of methods to collect information and procedures to be applied	Application of a questionnaire and an interview with the responsible for the ceramic factory.
Purpose of the data	To demonstrate the indicator performance
Comments	No comments.

Indicator	Technological advances to improve efficiency of the production process
Data unit	N/A
Description	Evaluates the general condition of infrastructure and machinery/equipment used in the production process, in regards to the following: - Brick drying methods: The factory possesses a dryer that recycles the heat from kilns or a small drying furnace. - Efficiency of kilns: The factory utilizes continuous furnaces (ex: hoffman, mobile, tunel) or the factory uses intermittent kilns, but which are adapted to improve their efficiency. - Kiln temperature control: The factory keeps a record of thermocouples or uses digital controls. - Kiln feeds: The factory feeds kilns using automatic or semi-automatic equipment. - Production: The factory control and records production at different stages of the production process (eg sales, Ceramic devices that enter in the kiln). - Infrastructure: During the period analysed, infrastructural improvements in the factory were carried out, for instance: construction/renovation of toilets, refectory, cloakroom lecture hall, among others.

Source of data	Documents such certificates, licenses, receipts, invoices, pictures, agreements, on site visit, among others.
Description of methods to collect information and procedures to be applied	Application of a questionnaire and an interview with the responsible for the ceramic factory.
Purpose of the data	To demonstrate the indicator performance
Comments	No comments.

Indicator	Technological advances to improve the general conditions of the working environment
Data unit	N/A
Description	Evaluates the following general conditions of the working environment: cleanliness, noise, heat, lighting and appropriate signage. - Cleanliness: There is not excess dust and debris (ex: broken bricks and iron) around the factory. - Noise: The factory applies programs for noise control that comply with legislation. - Heat: The factory uses equipment to reduce employee exposure to heat (eg. fans, exhaust, etc). - Lighting: The factory uses equipment to maintain a well-lit working environment (ex: translucent tiles, LED or mercury lamps, etc). - Appropriate signage: ✓ Warning signs indicating danger, or caution; ✓ Warning signs indicating inflammable liquids; ✓ Warning signs encouraging PPE use; Signs identifying and indicating location of fire fighting equipment.
Source of data	Documents such certificates, licenses, receipts, invoices, pictures, agreements, on site visit, among others.
Description of methods to collect information and procedures to be applied	Application of a questionnaire and an interview with the responsible for the ceramic factory.
Purpose of the data	To demonstrate the indicator performance
Comments	No comments.

Indicator	Product quality
-----------	------------------------

Data unit	N/A
Description	Evaluates whether the quality of the products was evaluated during the time period analyzed.
Source of data	Documents such certificates, licenses, on site visit, among others.
Description of methods to collect information and procedures to be applied	Application of a questionnaire and an interview with the responsible for the ceramic factory.
Purpose of the data	To demonstrate the indicator performance
Comments	No comments.

Indicator	Stakeholder consultation
Data unit	N/A
Description	Evaluates the existence of a stakeholder consultation system (local community, workers, suppliers, local authorities, civil society organizations, and other social parties involved).
Source of data	Documents such attendance list, pictures, agreements, signed statement, minutes, among others.
Description of methods to collect information and procedures to be applied	Application of a questionnaire and an interview with the responsible for the ceramic factory.
Purpose of the data	To demonstrate the indicator performance
Comments	No comments.

Indicator	Green marketing
Data unit	N/A
Description	Evaluates whether the factory has marketing strategies geared towards selling their products based on highlighting socio-environmental practices.
Source of data	Documents such receipts, invoices, pictures, agreements, media material, signed statement, on site visit, among others.
Description of methods to collect information and procedures to be applied	Application of a questionnaire and an interview with the responsible for the ceramic factory.
Purpose of the data	To demonstrate the indicator performance

Comments	No comments.
----------	--------------

Indicator	Project performance
Data unit	N/A
Description	Evaluates the factory's perception about the results of the project, considering the generation and sale of carbon credits and also external aspects of project.
Source of data	Interview and on site visit.
Description of methods to collect information and procedures to be applied	Application of a questionnaire and an interview with the responsible for the ceramic factory.
Purpose of the data	To demonstrate the indicator performance
Comments	No comments.

3.4 Monitoring Plan

The monitoring is done with the aim of determining the most approximate quantity of non-renewable wood that, in the absence of the project, would be used in the ceramics' kilns and consequently the amount of GHG that would be emitted in tonnes of CO₂e. Section 3.2 describes data and parameters monitored, as well as the procedures involved on the monitoring plan. Section 3.3 describes the data and parameters monitored by the SOCIALCARBON Report.

Ceramic personnel are responsible to monitor the operating conditions on the factory, including the amount of renewable biomass consumed and the monthly production of ceramic devices (parameters $Q_{renbiomass}$ and PR_y). Ceramic personnel are also responsible to store invoices, receipts of sales and other documents related to purchase or acquisition of biomass.

Ceramic personnel register monitoring data regarding parameters $Q_{renbiomass}$ and PR_y on electronic spreadsheets, which are shared with Sustainable Carbon team using a internet cloud service. This gives Sustainable Carbon real time access to monitoring data.

Sustainable Carbon is responsible to assess if the biomasses are from renewable origin, to evaluate if there is a surplus of renewable biomass and to calculate emission reductions, including an assessment of leakage emissions and the determination of parameter $f_{NRB,y}$.

In the current monitoring period Sustainable Carbon performed an analysis to verify if biomass and production data were being correctly filled in the monitoring spreadsheets.

Analysis on production data is performed by a series of comparisons between different measurement points of production (molding machine, kiln loading and kiln unloading) to detect inconsistencies or suspicious data. Analysis on biomass data is performed by a series of comparisons between the amount of biomass and the cost over months to identify inconsistencies or unexpected variations in these parameters.

Sustainable Carbon is responsible for providing the required guidance to the ceramic factory, to evaluate biomass and production data, in order to minimize errors, including assisting the ceramic in case the person in charge of the project monitoring is replaced.

The origin of renewable biomass is given by the biomass providers. The guarantee of acquiring cashew wood, algaroba wood and forest residues (sawdust) is achieved by invoices from the providers and native wood from management areas is achieved by DOF (Forest Origin Documents). The amount of biomasses is monitored in accordance to the weight or volume described in the receipts from the providers. In addition, Sustainable Carbon has interviewed a sample of providers of forest residues (sawdust) to assess the origin of such biomass, as described in the section 3.2.

The amount of products produced per year is acquired by counting the total production. The measurement is made by an internal control sheet monitored by the project proponent, which controls the amount of ceramic units that enter in the molding machine.

The three sources of leakages predicted in the applied methodology are monitored. Scientific articles official statistical data regional and national surveys are provided in order to ensure that there is no leakage from non-renewable biomass (or to estimate the leakage). Based on this information, Sustainable Carbon is responsible to assess if the biomasses are from renewable origin, to evaluate if there is a surplus of renewable biomass and to calculate emission reductions, including an assessment of leakage emissions and the determination of parameter $f_{NRB,y}$. Sustainable Carbon also assists the Ceramic personnel to double check the monitored data on biomass consumption and ceramic devices production.

Non-conformities identified in the double check procedures are clarified between Sustainable Carbon technical team and the monitoring responsible on the ceramic during site visits for data collection, by reassessing existing documents and sources of information.

The responsible for the monitoring plan are *Mr. Severino Francisco Torres* and *Mr. Antônio Marcos Tavares Rocha* from *Kitambar* ceramic, Sustainable Carbon technical team (including those members described on Section 1.3) was also involved in the project monitoring.

4 QUANTIFICATION OF GHG EMISSION REDUCTIONS AND REMOVALS

4.1 Baseline Emissions

Baseline emissions are estimated following procedures of the applied methodology: AMS-I.E.: Switch from Non-Renewable Biomass for Thermal Applications by the User – Version 01, valid from 01/02/2008 to 08/04/2010¹⁸. The project activity in this monitoring period (27 months) generated 111.81 TJ per year. Converting this number to MWh, it was generated 31,058.72 MWh

¹⁸ Available at: <

https://cdm.unfccc.int/filestorage/C/D/M/CDM_AMSP4VBBO5G54RXDE9KQ6FJWMGHZLHFA5/AMS_I.E_ver01.pdf?t=aXd8bjl4dTJ6fDAkfBoiBTCShj_AZn9inzkN>. Last visit on: 07/08/2014.

per year, which corresponds to the use of 3.55 MW_{thermal} on average of the kilns capacity during the monitored period, which is less than the limits of 45 MW_{thermal} for Type I Small scale project activities.

Baseline emissions

$$ER_y = B_y \times f_{NRB,y} \times NCV_{biomass} \times EF_{projected_fossilfuel} \quad (\text{Equation 01})$$

Where:

ER_y : Emission reductions during the year y in tCO₂e

B_y : Quantity of biomass that is substituted or displaced in tonnes

$f_{NRB,y}$: Fraction of non-renewable biomass (wood) used in the absence of the project activity in year y

$NCV_{biomass}$: Net calorific value of non-renewable biomass in TJ/tonne

$EF_{projected_fossil\ fuel}$: Emission factor for the projected fossil fuel consumption in the baseline in tCO₂/TJ¹⁹.

B_y is determined using the option:

Calculated from the thermal energy generated in the project activity as:

$$B_y = \frac{HG_{p,y}}{\eta_{old} \times NCV_{biomass}} \quad (\text{Equation 02})$$

Where:

$HG_{p,y}$: Quantity of thermal energy generated by the renewable energy in the project in year y in TJ.

η_{old} : Efficiency of the system being replaced

$$HG_{p,y} = SGE \times PR_y \quad (\text{Equation 03})$$

Where:

SGE: Specific energy which has to be generated in the process to produce a certain amount of ceramic devices in TJ/thousand of ceramic device.

PR_y : Amount of product produced in year y in thousand of ceramic devices

$$\eta_{old} = \frac{SGE}{SFE} \quad (\text{Equation 04})$$

Where:

¹⁹ The fossil fuel likely to be used by similar consumers is taken the IPCC default value of residual fossil fuel.

SFE: Specific fuel energy needed for the process to produce a certain amount of ceramic devices in TJ/ thousand of ceramic device

$$SFE = BF_y \times NCV_{biomass} \quad (\text{Equation 05})$$

Where:

BF_y: Amount of native firewood needed to produce a certain amount of product in tonnes/thousand of ceramic devices

Using the Equations 3, 4 and 5 in the Equation 1, it results to:

$$B_y = PR_y \times BF_y \quad (\text{Equation 06})$$

As shown in the calculations above, the η_{old} and the NCV biomass are not required to calculate the Emission Reductions, thus they were excluded.

The exact production (PR_y) was monitored by the project proponent based on data from ceramic units burned in the kilns. Data is aggregated on a monthly and yearly basis. Measurements are done by an internal control sheet monitored by the project proponent.

The value of BF_y was determined through historical consumption of non-renewable biomass by the ceramic. It was calculated by dividing the monthly consumption of each kiln at the baseline from the monthly production of each kiln at the baseline, in thousands of pieces.

Baseline emissions during the monitored period are summarized in the following table:

Table 2. Baseline emissions for Kitambar ceramic

Year	Month	Baseline emissions (tCO ₂ e)
2012	March	4,079
	April	3,626
	May	3,880
	June	3,497
	July	4,071
	August	4,844
	September	3,079
	October	3,901
	November	4,082
	December	4,172
	Total 2012	39,231
2013	January	4,475
	February	3,594
	March	3,933
	April	4,353
	May	4,451

	June	3,169
	July	3,798
	August	4,052
	September	2,750
	October	4,150
	November	3,947
	December	4,350
	Total 2013	47,022
2014	January	4,078
	February	3,959
	March	3,999
	April	3,641
	May	4,532
	Total 2014	20,209
Total in the monitoring period		106,462

4.2 Project Emissions

The applied methodology does not include any source of project emissions.

4.3 Leakage

Leakage is estimated as 0 (zero) tCO₂e during the entire monitoring period.

The Category AMS-I.E predicts the following possible three sources of leakage:

A) If the project activity includes substitution of non-renewable biomass by renewable biomass, leakage in the production of renewable biomass must be considered.

The leakage from biomass projects, like this project activity, should also be estimated according to the "General guidance on leakage in biomass project activities" (attachment C of appendix B) of Indicative Simplified Baseline and Monitoring Methodologies for Selected Small-Scale CDM Project Activity Categories, which identifies different emission sources based on the type of biomass considered (described in the table below).

Table 3. Sources of leakage according to the type of the biomass

Biomass Type	Activity/ Source	Shift of pre project activities	Emissions from biomass generation/ cultivation	Competing use of biomass
Biomass from		-	-	X

forests	Existing forests			
	New forests	X	X	-
Biomass from croplands or grasslands (woody or non-woody)	In the absence of the project the land would be used as a cropland/wetland	X	X	-
	In the absence of the project the land will be abandoned	-	X	-
Biomass residues or waste	Biomass residues or wastes are collected and use.	-	-	X

Observing table 3, the possible sources of leakage of the present project activity is the competing use of *Algaroba* wood, cashew tree residues, forest residues (sawdust and MDF) and native wood from management areas. All of these biomasses have enough availability as showed below demonstrating the lack of leakage for each biomass.

Algaroba wood

According to Silva (2007)²⁰, *Algaroba*²¹ (*Prosopis juliflora* (Sw.) D.C.) is a tropical tree legume fairly common in the semi-arid region of Brazil, which thrives in dry environments where other plants would hardly survive.

At the beginning of 1940's, this specie was introduced in the Northeast region of Brazil with the aim of providing food to animals and to be utilized for reforestation actions. However, currently, due to its competitive skills, *Algaroba* spreads through several regions of Brazilian semi-arid areas²².

A research made by EMBRAPA²³, which encompass the States of *Pernambuco* and *Bahia*, affirmed that *Algaroba* is characterized as an invasive exotic plant due to its fast expansion, which causes many environmental impacts²⁴. This source stated that there were several centers of

²⁰ Silva, C. G. M, Melo Filho, A. B., Pires, E. F., Stamford M. Physicochemical and microbiological characterization of mesquite flour (*Prosopis juliflora* (Sw.) DC). Ciênc. Tecnol. Aliment., Campinas, 27(4): 733-736, out.-dez. 2007.

²¹ Algaroba may also be known as mesquite

²² EMBRAPA, Projeto vai definir manejo para evitar invasão da Algaroba no ambiente semi-árido. Available at: <<http://www.embrapa.gov.br/imprensa/noticias/2002/agosto/bn.2004-11-25.4648301041/>>. Visited in: 14th December, 2008.

²³ EMBRAPA is the Brazilian Agricultural Research Corporation's which its mission is to provide feasible solutions for the sustainable development of Brazilian agribusiness through knowledge and technology generation and transfer.

²⁴ Araujo, J. L. P., Correia, R. C., Araujo, E. P., Lima, P. C. F. Cadeia Produtiva da Algaroba no Pólo de Produção da Bacia do Submédio São Francisco. EMBRAPA. Petrolina -PE – Brazil.

Algaroba operation highlighting the San Francisco Basin, which is comprised for many municipalities from the states of *Bahia* and *Pernambuco*, including this project region. Besides, *Algaroba* presents a considerable capacity of regeneration and dispersal²⁵, which means that the plant does not die, it sprouts again stead.

The research's author reported that wood from *Algaroba* exploration on San Francisco Basin is mainly commercialized as fuel for industries of vegetable oil, leather, ceramic and bakeries. On the other hand, *Algaroba* wood is not sold for stake²⁶, pegs and poles uses. *Algaroba* firewood is produced by the harvest of *Algaroba* trees occurring in certain areas. This is performed either by the land owner or by the biomass suppliers. In both cases, biomass suppliers purchase nearly all the wood harvested, leaving a small amount for the land owners to use as fenceposts.

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 IBAMA²⁷.

Furthermore, this research showed that *Algaroba* is not used as a unique source of fuel for thermal energy generation in these industries sectors, e.g. corresponding only for 30% of the fuel's source in bakeries of the region studied.

The same research estimated that in the Northeast semi-arid region there were about 500 hundreds hectares spread through every type of its region land. Moreover, according to EMBRAPA (1992)²⁸, wood's production by *Algaroba* is at least 5 m³/ha/year. The production of *Algaroba* wood in the project's region is about 2,500 thousands of m³ per year. In this monitoring period *Kitambar* Ceramic consumed approximately 5,625.54 m³ of *Algaroba* wood per year, which represented less than 1% of the total.

Therefore, this kind of fuel does not encompass any type of leakage since there is current a great amount of these renewable biomasses available locally as described before.

Algaroba forest areas are usually not subject to formal forest management techniques, but left largely unmanaged between harvests. It is important to notice that there are no national or regional forest or nature conservation regulations applicable to *Algaroba* forests, since this is an exotic species.

²⁵ EMBRAPA, Projeto vai definir manejo para evitar invasão da *Algaroba* no ambiente semi-árido. Available at: <<http://www.cpatsa.embrapa.br:8080/noticias/noticia17.html>>. Visited in: 21th July, 2014.

²⁶ Heavy pole to which cattle is tied.

²⁷ IBAMA (Brazilian Institute for Environment and the Renewable Natural Resource) is the environmental agency of Brazil affiliated with Ministry of Environment. The main missions of IBAMA are: Environmental Protection, Environmental Licensing, Environmental Quality and Sustainable Use of Forest Management and Animal Resources. More information about IBAMA is available at: <www.ibama.gov.br>.

²⁸ EMBRAPA, Comunicado Técnico Nº, Nov/92, p.1-2. Available at: <http://www.cpatsa.embrapa.br/public_eletronica/downloads/COT51.pdf>. Last visit on: 01/05/2012.

However, it can be considered that sustainable management practices are undertaken on these land areas to ensure, in particular, that the level of carbon stocks on these land areas does not systematically decrease over time. This is so because Algaroba has a strong capacity of regeneration, vigorously sprouting after harvest. The sprouts grow very fast, and quickly accumulate wood, thus maintaining the carbon stocks even if no formal forest management techniques are applied. Therefore, Algaroba firewood could be considered a renewable biomass in accordance with option I from CDM definition of renewable biomass is available on Annex 18 of the 23rd Report from the Executive Board.

Cashew tree wood residues

Since *Kitambar* Ceramic utilizes wood residues from cashew trees, it is important to analyze the cashew scenario within Brazilian borders. The cashews cultivation is extremely important to Brazilian economy, where it is responsible for generate 150 million dollars per year. The cashew production is important especially in the northeast region, representing about 95% of Brazilian's cashew production. Besides, cashew production is responsible for generating job opportunities for 35,000 fieldworkers, 15,000 in the manufacturing process and 200,000 indirect job opportunities. The Brazilian production achieved 143,000 tonnes of cashew-nuts in 2005 spread in an area of 650,000 hectares²⁹.

Besides, Brazilian's production presents the tendency of increasing so far, carried by the new technologies utilized and the higher national and international demand of cashew nuts³⁰. This way, the Brazilian sources of residues from cashew trees will increase following the Brazilian production, due the fact that cashew cultivation request continuous cut of cashew trees. The cut of cashew trees is necessary in order to allow an appropriate formation of the tree and maintaining favorable conditions for the next harvest time. This way, in cashew cultivation must be cut undesirable branches of the cashew trees³¹. Moreover, dry branches on the ground compound a considerable amount of residues from cashew trees cultivation.

Sustainable Carbon has assessed the availability of residues from cashew tree as part of a voluntary carbon project located in Ceará. Such assessment included interviews with biomass experts and producers, and was independently assessed by a third party consultant, by the DOE responsible for the project verification and finally by the Gold Standard Secretariat.

²⁹ According with EMBRAPA (Brazilian Agricultural Research Corporation's). Available at: <<http://sistemasdeproducao.cnptia.embrapa.br/FontesHTML/Caju/CultivodoCajueiro/index.htm>>. Last visit on: 01/05/2012.

³⁰ Agência PRODEC. **Cadeia produtiva do caju no Nordeste brasileiro**. 2008. Available at: <<http://www.agenciaprodetec.com.br/prosa-a-verbo/186--cadeia-produtiva-do-caju-no-nordeste-brasileiro-.html>>. Last visit on: 24-July-2014.

³¹ According with EMBRAPA (Brazilian Agricultural Research Corporation's). Available at: <<http://sistemasdeproducao.cnptia.embrapa.br/FontesHTML/Caju/CultivodoCajueiro/tratosculturaais.htm>>. Last visit on: 01/05/2012.

An expert interviewed as part of such study informed cashew trees yield either 7m³ or 25m³ of wood residues per hectare of cultivated area per year³². The difference is related to the type of cashew tree cultivated. The *Cajueiro Anão Precoce*, a subtype of cashew tree developed by Embrapa (Brazilian Agricultural Research Corporation) yields better production of both cashew nuts and cashew fruit and requires significantly less pruning. According to the expert, this subtype yields only 7m³ of residues per hectare per year, while regular cashew trees cultivated in Brazil yield 25m³ per hectare per year, on average.

Hence, data on cultivated area of cashew tree were utilized to estimate the availability of this type of biomass, as available on table below. On this table, the low availability scenario considers *Cajueiro Anão Precoce* represents 100% of cultivated area, the High availability scenario considers only regular cashew trees are cultivated and the conservative scenario considers 50% of each type are cultivated. Such scenario is considered conservative since the cultivation of *Cajueiro Anão precoce* is still not a common practice in the Brazilian Northeast.

Table 1. Availability assessment of residues from cashew tree

Availability assessment from residues of cashew tree					
State	Year	Cultivated area (hectares)	Availability of residues from cashew tree		
			Low availability scenario	High availability scenario	Conservative scenario
			m ³	m ³	m ³
Pernambuco	2012	6,305 ³³	44,156	157,625	100,800
Project use (% of availability)	2012		0.10%	0.03%	0.045%

Since the Project used around 46 m³ of residues from cashew tree in 2012, the project use of this type of biomass was around 0.03% to 0.1% of total biomass available in Pernambuco State during the crediting period, depending on the availability scenario considered.

The cashew tree pruning is considered renewable according to option II from CDM definition of renewable biomass, which is available on Annex 18 of the 23rd Report from the Executive Board³⁴, as soon as it fits all the assumptions below:

“The biomass is woody biomass and originates from croplands and/or grasslands where:

(a) The land area remains cropland and/or grasslands or is reverted to forest; and

³² Please view document in PDF “*Questinário sobre disponibilidade de biomassas renováveis*”, page 10, paragraph 3th

³³ According to Geographic and Statistic Brazilian Institute (IBGE). Available at: < <http://www.ibge.gov.br/estadosat/temas.php?sigla=pe&tema=lavourapermanente2012>>. Last visit on: 07/08/2014

³⁴ CDM. Definition of renewable biomass. Available at: < http://cdm.unfccc.int/EB/023/eb23_repan18.pdf>. Last visit on: 07-Aug-2014

(b) Sustainable management practices are undertaken on these land areas to ensure in particular that the level of carbon stocks on these land areas does not systematically decrease over time (carbon stocks may temporarily decrease due to harvesting); and

(c) Any national or regional forestry, agriculture and nature conservation regulations are complied with."

Residues from cashew trees fit all the three options above since just residues from the croplands area are utilized, i.e. the area remains a cropland with the use of the biomass. Moreover, the areas where the cashew trees are grown are subject to sustainable management practices, using 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 period³⁵. This way, in cashew cultivation must be cut undesirable branches of the cashew trees.

Besides, Brazilian's production presents the tendency of increasing so far, carried by the new technologies utilized and the higher national and international demand of cashew nuts³⁶. This way, the Brazilian sources of residues from cashew trees will increase following the Brazilian production, due the fact that cashew cultivation requests it.

Forest Residues

Forest Residues are also a likely fuel to be used for the ceramic devices burning. The production of wood generates a large amount of residues, which can be reused to generate thermal energy, considering that around 22% of the wood produced will generate sawdust³⁷. The production of wood in the state of *Pernambuco* was of 1,454,054 m³³⁸ in 2007. Thus, the production of sawdust is around 319,891.88 m³ per year.

In this monitoring period *Kitambar* ceramic utilized 2,455.33 m³ per year of sawdust and MDF which represented less than 1% of the biomass availability in the state of Pernambuco. This way, this renewable biomass does not have potential to generate leakage emissions due to its high availability.

The forest residues (sawdust) are considered renewable according to option V of methodology definition of renewable biomass: "The biomass is the non-fossil fraction of an industrial or municipal waste".

³⁵ According with EMBRAPA (Brazilian Agricultural Research Corporation's). Available at: <<http://sistemasdeproducao.cnptia.embrapa.br/FontesHTML/Caju/CultivadoCajueiro/tratosculturaais.htm>>. Last visit on: 01-May-2012.

³⁶ Agência PRODEC. **Cadeia produtiva do caju no Nordeste brasileiro**. 2008. Available at: <<http://www.agenciaprodetec.com.br/prosa-a-verbo/186--cadeia-produtiva-do-caju-no-nordeste-brasileiro-.html>>. Last visit on: 24-July-2014.

³⁷ BRITO EO. 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.

³⁸ According to Geographic and Statistic Brazilian Institute (IBGE). Available at: <<http://www.ibge.gov.br/estadosat/temas.php?sigla=pe&tema=extracaovegetal2007>>. Last visit on: 01/05/2012.

Native wood from management areas

This biomass is composed of firewood that is produced in existing areas of native forest where sustainable management techniques are applied. These techniques aim to ensure sustainable exploitation of wood, ensuring the conservation of areas and carbon stocks.

The sustainable forest management plan can be organized into three stages: firstly, the division of the property in exploitable areas and areas of permanent preservation that are inaccessible to exploitation. The second stage is the planning of roads that connect the area with primary roads. In the third stage, the allocated area is divided for exploration in blocks in order to sustain forest exploitation annually³⁹. Furthermore, the minimum requirements of the management plan are defined by Article 31 of Brazilian Law 12.651/2012, law about protect of native vegetation.⁴⁰

In regard to wood from areas with sustainable forest management plan, Sustainable Carbon has developed a methodology that assesses the availability and surplus of Caatinga firewood from forest management plans. This assessment was done for the certification of a project located in Buenos Aires/PE, which in the same region of Kitambar Ceramic (both sites are approximately 150 Km apart, but source their biomass from similar regions). Therefore, conclusions from this assessment are considered relevant to the native wood from forest management areas consumed by Kitambar Ceramic⁴¹.

According to the methodology applied, the effective capacity of a managed forest to sustain a certain level of harvest depends on its growth rate, indicated by the Mean Annual Increment (MAI). This value represents the mean rate of harvestable growth of wood that is expected to occur in the managed area and consists of measuring the harvestable stock by an inventory and dividing this value by the number of years in the cutting cycle.

However, this methodology does not take into consideration two facts that in practice increase the standing stock in the coupes not yet harvested.

- The trees keep growing after the inventory is made so that their volume and mass will continuously increase. Thus, in every coupe of the cutting series the forest will be older and more heavily stocked than it was at the time of the inventory;

³⁹ AMARAL, P. et al. **Floresta para Sempre**: um Manual para Produção de Madeira na Amazônia. Belém: Imazon, 1998. pp. 130. Available at: <http://www.bibliotecaflorestal.ufv.br/bitstream/handle/123456789/3942/Livro_Floresta-para-Sempre-Um-Manual-para-a-Produ%C3%A7%C3%A3o-de-Madeira-na-Amaz%C3%B4nia_IMAZON.pdf?sequence=1>. Last visit on: 24-July-2014.

⁴⁰ BRASIL. Lei nº. 12.651, de 25 de maio de 2012. Dispões sobre a proteção da floresta nativa. **Diário Oficial [da] República Federativa do Brasil, Brasília, DF, 28 de mai. 2012.** Available at: <http://www.planalto.gov.br/ccivil_03/_ato2011-2014/2012/lei/l12651.htm>. Last visited on: 28/05/2012.

⁴¹ Evidences to such statement were made available to the verification team.

- New trees grow in the not harvested coupes along the same time series, adding new biomass to the standing stock.

When these two factors are considered it is evident that the standing stock in the not harvested coupes is dynamic and grows along the cutting cycle, which means an increasing harvestable stock can be expected along a coupes series.

Thus, it can be stated that the growth of trees in the not harvested coupes originates increases in the standing stock along the cutting cycle, which results in average 27% higher than the starting stock as calculated by the forest inventory. Furthermore, in most cases, a lapse of one year occurs between the inventory is made and a Forest Management Plan (FMP) is approved, and frequently another year passes until the FMP starts to harvest the first coupe. Based on that, it is reliable to state that a surplus of biomass exists, since the average stock of harvestable firewood along the cutting cycle of FMPs in Pernambuco State is at least 25% higher than the estimate in the Forest Inventory and the corresponding cutting authorizations issued by Pernambuco State authority (Agência Estadual de Meio Ambiente - CPRH).

In order to evaluate the surplus availability of wood from sustainable forest management areas, a comparison was performed between the effective annual availability of firewood and the amount of native firewood provided with Forest Origin Document (in Portuguese, DOF - Documento de Origem Florestal), in the state of Pernambuco in the year 2012. The annual availability of native wood data was based on the Forest Management Plans in the State of Pernambuco, registered by the Environmental Authority of Pernambuco State, CPRH. In addition, the effective available firewood was calculated considering the increase of 27% in the standing stock along the cutting cycle.

Comparing the effective available amount of firewood and the amount of wood provided by Forest Origin Documents, the verified surplus of wood from management plans was of 154.17% in 2012. This value determines that the availability of wood from sustainable forest management serves local consumers, with significant surplus in the State of Pernambuco. This data demonstrates effective availability of 480,504 stereo meters of wood per year against total annual consumption of 189,049 stereo meters, which represents firewood surplus of 154% for Pernambuco in year 2012. This is the outcome of the quantitative analysis reported by Brazilian Environmental Authorities, which are the responsible to control the annual availability of wood and its consumption through Forest Origin Documents. It is important to note that there are some barriers to the commercialization of wood from management areas, such as distance from centers of consumption and the low price of the firewood from deforestation, causing an unfair competition.

In conclusion, the official data showed a large surplus of native wood from management plans in 2012. Hence, Sustainable Carbon considers that data indicates there is abundant firewood in the project region to avoid possibility of competing uses of biomass due to the project implementation.

The complete methodology and source of the official data provided by Environmental Authority of Pernambuco State will be made available to the verification team and the GS Secretariat

B) Leakage relating to the non-renewable biomass shall be assessed from ex-post surveys of users and areas from where biomass is sourced.

The following potential sources of this type of leakage could be identified:

- Use/diversion of non-renewable biomass saved under the project activity by non-project households/users who previously used renewable energy sources. If this leakage assessment quantifies an increase in the use of non-renewable biomass used by the non-project households/users attributable to the project activity then baseline is adjusted to account for the quantified leakage.
- Use of non-renewable biomass saved under the project activity to justify the baseline of other project activities can also be potential source of leakage. If this leakage assessment quantifies a portion of non-renewable biomass saved under the project activity that is used as the baseline of other project activity then baseline is adjusted to account for the quantified leakage.
- Increase in the use of non-renewable biomass outside the project boundary to create non-renewable biomass baselines can also be potential source of leakage. If this leakage assessment quantifies an increase in use of non-renewable biomass outside the project boundary then baseline is adjusted to account for the quantified leakage

The carbon credits incomes stimulate the use of renewable biomass to other ceramic companies presenting a huge possibility for sustainable development in the region. Therefore, the sources of leakages mentioned above are not applicable as the project activity does not displace the use of renewable biomass of a non-project user, due to the likely decrease in the use of non-renewable biomass in the region and there is current great amount of renewable biomasses available locally as described before. The non-renewable biomass employed which would be employed in this project activity is not being saved for other project activity, since other ceramics were already consuming wood from non sustainable forest management (common practice).

The project will contribute to reduce the use of non-renewable biomass, especially due to the incentive of carbon credits. Therefore, it can be concluded that this source of leakage, until the date of this monitoring report, is not considered for this project activity. This leakage was monitored in order to guarantee the project conservativeness.

C) If the equipment is transferred from another activity or if the existing equipment is transferred to another activity, leakage is to be considered.

The leakage is not applicable for this project activity as there was no transference of equipment, in spite of new equipments had to be acquired.

Due to all the explanations described above, the present project activity does not encompass any type of leakage.

Table 5. Production – Q_{renbiomass} - QA/QC Procedure

	VCS PD	Monitoring Period
Production (thousand of ceramic pieces)	28,350.00	31,978.82
Algaroba Wood Consumption (tonnes)	9,417.73	10,581.65
Cashew Tree Residues Consumption (tonnes)	1,819.77	19.32
Coconut husk (tonnes)	2,313.90	0.00
Forest Residues (tonnes)	0.00	1,933.58
Native wood from management plan Consumption (tonnes)	0.00	369,70
Thermal Energy (TJ)	251.58	251.79
Thermal energy per thousand of pieces produced (TJ/thousand of pieces)	0.008874	0.007874

As can be verified on Table 5, the thermal energy generated with the use of *Algaroba*, cashew tree residues, forest residues and native wood from management areas per thousands of ceramic devices produced during the current monitoring period was 11% lower to the VCS PD version 02. This difference is likely caused by energy efficiency gains.

Therefore, based on Category AMS-I.E: Switch from Non – Renewable Biomass for Thermal Application by the User (Version 01, valid from 01/02/2008 to 08/04/2010) this project activity contributes to sustainable development, once the ceramic company is using renewable biomass and applying the SOCIALCARBON methodology.

4.4 Net of GHG Emission Reductions and Removals

Table below summarizes the emission reductions for this monitoring period⁴².

⁴² Emission reductions are equal to the baseline emissions, since there are no project emissions according to the applied methodology and since leakage emissions are estimated at zero tCO₂e.

Table 6. Emission reductions for the monitoring period.

Period		PR _y - Production (ceramic units)	B _y (tons)	ER _y (tCO ₂ e)
2012	March	1,225,250	2,794	4,079
	April	1,089,150	2,483	3,626
	May	1,165,500	2,657	3,880
	June	1,050,500	2,395	3,497
	July	1,222,730	2,788	4,071
	August	1,454,900	3,317	4,844
	September	924,780	2,108	3,079
	October	1,171,700	2,671	3,901
	November	1,226,200	2,796	4,082
	December	1,253,200	2,857	4,172
	Total 2012	11,783,910	26,867	39,231
2013	January	1,344,100	3,065	4,475
	February	1,079,500	2,461	3,594
	March	1,181,400	2,694	3,933
	April	1,307,700	2,982	4,353
	May	1,336,950	3,048	4,451
	June	952,000	2,171	3,169
	July	1,140,800	2,601	3,798
	August	1,217,100	2,775	4,052
	September	826,100	1,884	2,750
	October	1,246,700	2,842	4,150
	November	1,185,500	2,703	3,947
	December	1,306,600	2,979	4,350
	Total 2013	14,124,450	32,204	47,022
2014	January	1,225,100	2,793	4,078
	February	1,189,300	2,712	3,959
	March	1,201,100	2,739	3,999
	April	1,093,760	2,494	3,641
	May	1,361,200	3,104	4,532
	Total 2014	6,070,460	13,841	20,209

Total in the monitoring period	31,978,820	72,911.71	106,462
---------------------------------------	-------------------	------------------	----------------

Table 7. Emission reductions for the monitoring period.

Year	Baseline emissions or removals (tCO₂e)	Project emissions or removals (tCO₂e)	Leakage emissions (tCO₂e)	Net GHG emission reductions or removals (tCO₂e)
2012	39,231	0,00	0,00	39,231
2013	47,022	0,00	0,00	47,022
2014	20,209	0,00	0,00	20,209
Total in the Monitoring Period	106,462	0,00	0,00	106,462

5 SOCIALCARBON RESULTS

5.1 Results

5.1.1 Social Resource

Indicator	Diversity																			
Description	Evaluates the employment opportunities provided by the ceramic industry to historically excluded social groups, such as: women, ex-convicts, the elderly, the indigenous, the illiterate and the disabled.																			
Situation	According to dates collected from the RAIS – Annual Report of Social Information, there were 45 people working in the ceramic factory during the period analyzed. <table><tr><th>Excluded social groups</th><th>Number of workers</th></tr><tr><td>Women employees</td><td>2</td></tr><tr><td>Senior employees</td><td>2</td></tr><tr><td>Disabled employees</td><td>-</td></tr><tr><td>Ex-convicts employees</td><td>-</td></tr><tr><td>Illiterate employees</td><td>2</td></tr><tr><td>Indigenous employees</td><td>-</td></tr></table> The table above shows that 13% of the employees are from minority groups.						Excluded social groups	Number of workers	Women employees	2	Senior employees	2	Disabled employees	-	Ex-convicts employees	-	Illiterate employees	2	Indigenous employees	-
Excluded social groups	Number of workers																			
Women employees	2																			
Senior employees	2																			
Disabled employees	-																			
Ex-convicts employees	-																			
Illiterate employees	2																			
Indigenous employees	-																			
There are currently no employees at the factory from minority groups and there are no plans to hire minorities	There are currently no employees from minority groups, but the factory has made plans to hire minorities.	Less than 15% of employees belong to a minority group.	Between 15 ≤ 30% of employees are from minority groups.	More than 30% of employees are from minority groups.	In addition to more than 30% of employees being minorities, the factory presents initiatives or combat forms of discrimination.															
Score	3 (three)																			
Prospects	There are currently no foreseen improvements.																			

Indicator	Community Development				
Description	Evaluates the existence of management practices that contribute to local community development.				
Situation	Kitambar does monthly donations to ICIA (Instituto do Câncer Infantil do Agreste – Chilhood Cancer of Agreste Institute). The ceramic factory also helps this institution with construction materials, always when it's necessary. Besides that, Kitambar used to contribute with donations to a recovery center for drugs addicts, however since the last monitoring period this center had to leave the property where they were installed and the institution ended its activities. The factory helped a religious center, called Diocese de Caruaru – Paróquia de São Caetano during this period, achieving the perspective stated in the last Social Carbon Report. Kitambar also has a partnership with the Federal Institution of Education, Science and Technology of Pernambuco – IFPE, to provide supervised internship to students from this institution. This partnership aims to prepare students for work, developing their skills. This partnership shows that the factory is formally involved and contributes with the development and implementation of social benefits in the community.				
The factory has no initiatives/activities planned that benefit the local community.	The factory responds to occasional (not continuous) requests for assistance.	The factory supports community members or civil society organizations : - Regularly: one per month; OR - Significant: at least 10 different parties were benefited.	In addition to scenario 3, the factory lends out equipment, space and/or provides manpower for activities that benefit the local community.	The factory is formally involved in the development and implementation of social and/or environmental projects in partnership with public entities and/or civil society organizations .	In addition to scenario 5, the factory has formalized planning in order to maximize their contribution to local community development, through survey with the community, establishing new partnerships, etc.
Score	5 (five)				
Prospects	There are currently no foreseen improvements.				

Indicator	Employee satisfaction surveys				
Description	Evaluates existing systems for employee feedback (questions, suggestions and complaints) and the measures taken in response to the feedback to make improvements.				
Situation	The ceramic factory promotes meetings with the employees every two months. During the meetings the employees' opinions are evaluated. One of the last suggestions made by the employees and implemented by the factory was the renovation in the bathrooms.				
Lack of a consultation system for employee feedback.	There are attempts to implement an employee consultation system but it is not being properly utilized. Example: There is a suggestion box, but employees do not use it.	The system for employee Consultation is being utilized, but is limited to a suggestion box	In addition to scenario 3, the factory has implemented or is currently implementing one or more suggestions made by employees.	The factory promotes periodic satisfaction surveys among employees. Example: monthly meetings, book for documenting information, etc	In addition to scenario 5, the factory has stipulated targets and timelines for solutions to employee complains
Score	5 (five)				
Prospects	For the next monitoring period the owner intends to record all employees' meeting through a minute.				

5.1.2 Human Resource

Indicator	Additional employee benefits
Description	Evaluates the additional benefits provided to employees. Benefits required by law are not considered.
Situation	Beside the fixed salary, the company offers some benefits employees, such as: - Food Staples every month; - Saturday Off: The company granted the employee's request of having the Saturdays off; - Fraternization Party at the end of 2012; - Health insurance: the company pays 50% of the employee Health Insurance; - Life Insurance for all employees; - Commission based on production: except for the administration, cleaning and

	maintenance staffs, all employees receive commission for every thousand pieces produced; - Transportation: the company provides round trip transportation for employees between the city of São Caetano and the work. São Caetano is the city where almost all employees live; this place was chosen by the employees. - Meals: currently the company can't provide meals to all employees, due to the high value of these meals. Therefore, the company offers lunch to some of the employees, such as office workers, maintenance workers, machine operators and managers. For the others employees, the factory provides the place to have the meals and also provides one employee to cook and prepare the meals.				
The factory offers no additional benefits to employees.	Some employees receive an additional benefit.	All employees receive sporadic additional benefits, independent of frequency.	All employees receive an additional benefit monthly.	All employees receive more than one additional benefit monthly.	All employees receive more than one additional benefit monthly and there are also award programs based on merit.
Score	6 (six)				
Prospects	There are currently no foreseen improvements.				

Indicator	Health and safety practices
Description	Evaluates the existing health and safety practices in the factories, including the distribution and supervised use of PPE (Personal Protective Equipment) by all employees as well as health and safety programs. Note: Mandatory Programs: - PPRA: Program for Prevention and Environmental Risks. - PCMSO: Program for Controlling Medical and Occupational Health. - CIPA: Internal Commission for Accident Prevention. Required for factories with more than 20 employees. Complementary programs: - PPR: Respiratory Protection Program. - PPRPS: Program for Protection from risks in presses and Similar. - PCA: Hearing Conservation Program.
Situation	The ceramic factory has CIPA – Internal Commission for Accident Prevention – during the CIPA the company promotes speeches, training programs and internal communication about health and safety practices.

	The ceramic has PCMSO (Programa de Controle Médico de Saúde Ocupacional – Program of Medical Control and Occupation Health) and PPRA (Programa de Prevenção e Redução de Acidentes – Program for Prevention and Reduction of Accidents). They also hired an intern who studies work safety who is responsible for all the health and security issues. The company offers all the personal protective equipments necessary for the workers to carry on their activities with safety and there is internal control of the IPEs use. Besides that, Kitambar initiate a partnership with Sesi to provide labor gymnastics to the employees. They are discussing the details and probably in the next months the activities will start.				
There is no control of PPE distribution. None of the health and safety programs required by law are being implemented.	PPE distribution is being controlled OR there is at least one health and safety program required by law being implemented.	The factory meets all legal requirements.	The factory meets all legal requirements and: (a) penalizes employees who do not properly use the PPE and/or (b) has signs encouraging the use of PPE in the factory and/or (c) The factory promotes lectures and events addressing issues related to health and safety in the workplace.	In addition to scenario 4, the factory contracts or has a technical professional or safety engineer on staff to ensure best practices in the company.	In addition to scenario 5, the factory develops complementary programs such as PPR, PPRPS and PCA; and/or The factory encourages physical activity or conducts activities for disease prevention.
Score	5 (five)				
Prospects	For the next monitoring period, the company intends to initiate labor gymnastics to encourages and improve the physical activity of the employees.				

Indicator	Training and capacity building programs
-----------	--

Description	Evaluates whether the factory encourages and invests in the professional development of its employees				
Situation	During the period analyzed Kitambar offered several courses to employees, such as: NR10 (Regulatory Norma): Safety Electricity Installations – Edmilson Andre da Silva Diagnostics, Development and Implementation of NR 12 – Aiane Karine Francisco de Assis de Costa Edmilson Andre da Silva Electrical Controls – Leandro Aguiar de Gois Technological innovation – Administrative and operation staff – among 10 people Lecture about PSQ Qualification – among 10 people from the operational and administrative staff. Besides that, Kitambar in partnership with Sesi initiated an educational program – EJA Educação de Jovens e Adultos (Educational Program for Youth and Adults). The factory provides the place to study – a class inside the company and the classes are given by Sesi professionals. Currently there are 10 employees having the classes. The owner, Mr. Antonio Marcos, states that he is really happy and proud of this educational program.				
The company has not invested in lectures nor professional training courses for staff.	The factory organized occasional lectures.	Training courses were offered to individual employees, but not to all employees.	In addition to item 3, the individual employees who were contemplated by the training courses replicate the knowledge via lectures to other employees; and/or Regular lectures were offered to employees (at least two per semester).	In addition to scenario 4, the factory has an internal campaign to encourage employees to complete their high school education; and/or The factory promotes a literacy program for youth and adults	In addition to scenario 5, the Ceramic factory has established a strategic plan regarding training and capacity building programs.

Score	5 (five)
Prospects	There are currently no foreseen improvements.

5.1.3 Financial Resource

Indicator	Biomass supply					
Description	Evaluates the type, source and quantity of renewable biomass used as fuel, as well as the profile of suppliers.					
Situation	Currently the ceramic factory uses four types of biomass: algarroba wood, cashew tree residues, forest residues and native wood from forest management. The factory has total control of the source and amount of renewable biomass used and more than 50% are from native wood with sustainable management.					
The factory has no control of the source and amount of biomass used; and/or the factory is using non-renewable fuel in the production process.	The factory only has partial control of the source and amount of biomass used	The factory has total control of the source and amount of renewable biomass used, however 100% of the biomass comes from renewable wood.	The factory has total control of the source and amount of renewable biomass used and less than 50% of the fuel is coming from agro-industrial waste.	The factory has total control of the source and amount of renewable biomass used and more than 50% of the fuel is coming from agro-industrial waste.	he factory has total control of the source and amount of renewable biomass used and 100% of the fuel is coming from agro-industrial waste.	
Score	4 (four)					
Prospects	There are currently no foreseen improvements.					

Indicator	Planning and Control					
Description	Evaluates the existence of financial planning and controls in regards to carbon credits sold by factory.					
Situation	The factory has organized controls of the income received from carbon credit sales, but control of the destination for proceeds is partial.					
The factory has no organized controls of the income	The factory has partial control of the income received from	The factory has organized controls of the income	The factory has organized controls of the income	The factory has organized controls of the income	The factory has organized controls of the income	

received from carbon credit sales nor the destination for proceeds.	carbon credit sales and the destination for proceeds.	received from carbon credit sales, but control of the destination for proceeds is partial.	received from carbon credit sales, as well as of the destination for proceeds. However, the factory presents no future planning.	received from carbon credit sales, as well as of the destination for proceeds. However, the factory presents incomplete f	received from carbon credit sales, as well as of the destination for proceeds. The factory presents satisfactory future planning (timeline, budget, responsible involved and benefits).
Score	3 (three)				
Prospects	For the next monitoring period the company intends to maintain an organized control of the destination for proceeds.				

Indicator	Carbon credit Investments				
Description	Evaluates whether proceeds from the sale of carbon credits was invested in factory improvements or activities that benefit the local community				
Situation	More than 100% of the income generated by carbon credit sales was invested the factory and in the community development.				
The income generated by carbon credit sales was not invested in the factory nor in the community, or there are no organized controls of the allocation of proceeds.	Less than 20% of the income generated by carbon credit sales was invested the factory or in the community development.	Between 20 and 40% of the income generated by carbon credit sales was invested the factory or in the community development	Between 40 and 60% of the income generated by carbon credit sales was invested the factory or in the community development.	Between 60 and 80% of the income generated by carbon credit sales was invested the factory or in the community development.	Between 80 and 100% of the income generated by carbon credit sales was invested the factory or in the community development.
Score	6 (six)				
Prospects	There are currently no foreseen improvements.				

5.1.4 Natural Resource

Indicator	Environmental Management					
Description	Evaluates initiatives and structured/certified environmental management systems in regards to managing waste, water, air, soil, energy and nature conservation. Note: the use of renewable fuel shall not be deemed an initiative, since it is a prerequisite for becoming a carbon project.					
Situation	The ceramic factory shows some initiatives regarding environmental management: - Waste: the factory generates a small quantity of waste. The unburned residues are returned into the clay mixture and reused in the production process. The discarded ceramic goods are reused to repair roads; the ashes generated by Kitambar's production are used to seal the kiln doors; The materials, such gloves and EPIs, contaminated with oil are collected by a company who treats these materials. - Air: Kitambar has annual reports that monitor the atmospheric emissions, done by Sesi (Serviço Social da Indústria – Social Service from Industry). Also, Kitambar ceramic factory is participating in a program called “<i>Cerâmica Sustentável é + vida</i>” (Sustainable Ceramic Factory is more life) developed by Anicer (National Ceramics Factories Association) in partnership with Sebrae (Brazilian Service in support of Micro and Small Enterprises). This program was created to promote the sustainability in the red ceramics factories through a set of actions. A consultant from Anicer visited Kitambar to evaluate aspects such as the kilns energy efficiency, the amount of clay used in the production process, the clay extracting area, compliance with environmental regulations, among others. For more information please access: http://www.anicer.com.br/index.asp?pg=institucional_direita.asp&secao=17&ex=3 The ceramic was also involved in another program promoted by ANICER: The João de Barro Award – this award is an initiative of Anicer to recognize and highlight institutions that have contributed with innovative actions and practices, improving and development the sector. Kitambar won the João de Barro award during the 42º National Meeting of the Ceramic Factories. For more information, please access: http://www.anicer.com.br/encontro43/index.php/premio-joao-de-barro/o-premio/					
There are no Environmental management initiatives.	There are up to two specific initiatives to prevent/reduce	There are more than two initiatives to prevent / reduce	In addition the scenario 3, the factory is structuring an	The factory has implemented a formal environmental	The factory's environmental management system has been certified by a	

	the main environmental impacts caused by the ceramic factory.	the main environmental impacts caused by ceramic factory	environmental management system in the company.	management system.	third party.
Score	2 (two)				
Prospects	There are currently no foreseen improvements.				

Indicator	Brazilian environmental legislation				
Description	Evaluates whether the factory has a water grant (for those making use of a well or pond), - federal technical registry, operating license and license for clay extraction and is in compliance with the conditions established by the documents. It also evaluates the promotion and fulfillment of agreements with local stakeholders.				
Situation	The ceramic is in conformity with the environmental laws and possesses: - License for clay extraction nº 05.13.07.002943-2, issued by the CPRH, the Environmental Agency of Pernambuco expiring on July 29th, 2014. - License from the Departamento Nacional de Produção Mineral, DNPM nº 840.089/2002, valid until July 23rd, 2022. - Operation License nº 05.13.09.003481-2, issued by the CPRH, the Environmental Agency of Pernambuco, expiring on September 10th, 2014. - Federal Technical Registry issued by IBAMA (Instituto Brasileiro do Meio Ambiente e dos Recursos Naturais Renováveis - Brazilian Institute of Environment and Natural Resources) valid until July 12th, 2014. - The ceramic uses water from the public supply and also buys water from a company that has the operational license nº 18.13.11.005066-2 issued by the CPRH and valid until December 3rd, 2015. The water is transported by trucks.				
The factory does not possess any of the following: -operating license -license for clay extraction -water grant - federal technical registry	The factory only possesses two of the following: -operating license -license for clay extraction -water grant - federal technical registry	The factory only possesses three of the following: -operating license -license for clay extraction -water grant - federal technical registry	The factory possesses all of the following: -operating license -license for clay extraction -water grant - federal technical registry However, they do not meet all the	All licenses are up to date and all conditions established by them are being met.	In addition to the previous scenario, the factory collaborates with public administration and/or civil society organizations for cooperation with environmental

			conditions established by them.		l projects.
Score	5 (five)				
Prospects	There are currently no foreseen improvements.				

Indicator	Voluntary environmental initiatives				
Description	Evaluates voluntary environmental initiatives that improve or establish new environmental assets and services, as well as those that raise environmental awareness of workers, their families and the surrounding community.				
Situation	The Kitambar owner initiated a partnership with the NGO Caatinga Association in the program called “Programa Eu Protejo o Tatu-Bola” (I protect the armadillo) during this period. This association protects the armadillo, which is endangered species in the region. This initiative extends the benefits beyond the community members, since the armadillo is an endemic specie that has been suffering the hunting and the deforestation in the Caatinga biome. For more information about the program and the NGO, please access: http://www.acaatinga.org.br/index.php/nossas-aco-es/salveotatubola/				
The factory is not involved in voluntary environmental initiatives.	The factory has implemented only one internal environmental initiative. Example: Planting ten tree saplings on factory grounds.	The factory has implemented more than one internal initiative or is showing continuity for an existing Initiative. Example: Periodic planting of saplings on factory grounds.	The factory has implemented more than one initiative or ongoing initiative whose benefits extend to workers families.	In addition to the previous scenario, the benefits of the initiatives also extend to community members.	In addition to the previous scenario, the factory promotes voluntary environmental initiatives with civil society organizations and/or public administration.
Score	6 (six)				
Prospects	Until 2017 Kitambar ceramic factory intends to complete the prospect regarding the donation of seedlings to recover riparian at Tacaimbo city.				

5.1.5 Biodiversity/Technology Resource

Indicator	Technological advances to improve efficiency of the production process
-----------	---

Description	Evaluates the general condition of infrastructure and machinery/equipment used in the production process, in regards to the following: - Brick drying methods: The factory possesses a dryer that recycles the heat from kilns or a small drying furnace. - Efficiency of kilns: The factory utilizes continuous furnaces (ex: hoffman, mobile, tunel) or the factory uses intermittent kilns, but which are adapted to improve their efficiency. - Kiln temperature control: The factory keeps a record of thermocouples or uses digital controls. - Kiln feeds: The factory feeds kilns using automatic or semi-automatic equipment. - Production: The factory control and records production at different stages of the production process (eg sales, ceramic devices that enter in the kiln). - Infrastructure: During the period analysed, infrastructural improvements in the factory were carried out, for instance: construction/renovation of toilets, refectory, cloakroom lecture hall, among others				
Situation	The factory meets the following aspects: - posses a dryer that recycles the heat from the kilns; - The factory has eight round kilns, considered intermittent kilns; however, it was explained that the round kiln is the most suitable kiln to produce the roof tiles. Therefore, it was considered that the factory has an efficient kiln for its production; - controls the kiln temperature: the factory keeps a record of thermocouples and the data is registered in a computer system; - the factory feeds kilns using a semi-automatic equipment; - The factory control and records production at different stages of the production process: molding machine, kiln loading and kiln unloading; - During the period analyzed, infrastructural improvements in the factory were carried out, such as renovation of toilets. The ceramic also purchased new equipments - a wood shredder and a dosing machine which makes the right dosage of biomass. These equipments improve the efficiency of the factory and at the same time reducing the physical efforts made by the employees.				
The factory does not meet any of the characteristics described.	The factory meets one of the characteristics described.	The factory meets 2-3 of the characteristics described	The factory meets 4 of the characteristics described.	The factory meets all of the characteristics described.	In addition to scenario 5, the factory has organized planning to improve general conditions of the production

					process
Score	5 (four)				
Prospects	The owner intends to automate the process of discharging the dry tiles. But this is an expensive system that will be feasible when the company has budget.				

Indicator	Technological advances to improve the general conditions of the working environment				
Description	Evaluates the following general conditions of the working environment: cleanliness, noise, heat, lighting and appropriate signage. - Cleanliness: There is not excess dust and debris (ex: broken bricks and iron) around the factory. - Noise: The factory applies programs for noise control that comply with legislation. - Heat: The factory uses equipment to reduce employee exposure to heat (eg fans, exhaust, etc). - Lighting: The factory uses equipment to maintain a well-lit working environment (ex: translucent tiles, LED or mercury lamps, etc) - Appropriate signage: ✓ Warning signs indicating danger, or caution; ✓ Warning signs indicating inflammable liquids; ✓ Warning signs encouraging PPE use; Signs identifying and indicating location of fire fighting equipment.				
Situation	The factory meets all the characteristics: - there is no excess of dust and debris; - the factory is a well ventilated place, not being necessary the use fans to maintain a good working environment; - the factory has translucent tiles, which provides a well-lit working environment; - The noise in the ceramic factory does not exceed those established by law. - The factory uses signing according to the applicable norms.				
The factory does not meet any of the characteristics described	The factory meets one of the characteristics described.	The factory meets 2-3 of the characteristics described.	The factory meets 4 of the characteristics described.	The factory meets all of the characteristics described.	In addition to scenario 5, the factory has organized planning to improve general conditions of the working environment.

Score	5 (five)
Prospects	There are currently no foreseen improvements.

Indicator	Product quality				
Description	Evaluates whether the quality of the products was evaluated during the time period analyzed.				
Situation	The enterprise has quality control of its products, including tests for the raw material and final product. The ceramic has a quality control center inside the company, where employees are trained to evaluate the quality control of the ceramic products. Besides that, the factory has PSQ certification (Quality Program) for the all types of tiles that are produced in the factory.				
No efforts were made to analyze or improve product quality.	Samples of some products were evaluated by quality tests.	Samples of all products were evaluated by quality tests.	Some of the products have quality certification.	All products have quality certification.	In addition to Scenario o 5, the factory has an in-house quality lab.
Score	6 (six)				
Prospects	There are currently no foreseen improvements.				

5.1.6 Carbon Resource

Indicator	Stakeholder consultation				
Description	Evaluates the existence of a stakeholder consultation system (local community, workers, suppliers, local authorities, civil society organizations, and other social parties involved).				
Situation	Kitambar ceramic factory is always participating in events and meetings in the region, where discloses about the carbon project. The owner, Mr. Antonio Marcos, noticed that people are always very interested when he explains about the carbon project, although he didn't conduct any formal consultation during the period.				
During the time period analyzed, the factory did not conduct a stakeholder consultation.	During the time period analyzed, the factory conducted an informal (no records) stakeholder consultation.	During the time period analyzed, the factory conducted a formal (with records) stakeholder consultation;	During the time period analyzed, the factory conducted a formal (with records) stakeholder consultation,	As well as the previous scenario, there are continuous means of communication	As well as the previous scenario, the next consultation is being planned together with

		however negative comments were made regarding the project.	and no negative comments were made regarding the project.	with stakeholders.	stakeholders.
Score	2 (two)				
Prospects	For the next monitoring period the owner intends to conduct a formal stakeholder consultation.				

Indicator	Green Marketing				
Description	Evaluates whether the factory has marketing strategies geared towards selling their products based on highlighting socio-environmental practices.				
Situation	The factory has an established plan to invest in green marketing. The ceramic factory hired an advertising company to help with the green marketing strategies. Currently Kitambar markets their environmental practices on its website (http://www.kitambar.com.br/?pagina=meioambiente), on facebook (https://pt-br.facebook.com/kitambar.pe), youtube (http://ow.ly/u1QqL) and also at the local radio. The factory sees positive results with these marketing strategies.				
The factory does not have marketing strategies based on their environmental practices.	The factory markets their environmental practices only using one means of communication. Example: magazine advertisement.	The factory markets their environmental practices using more than one means of communication. Example: magazine advertisement and billboard.	The factory has an established green marketing strategy, but still has not seen positive results.	The factory has an established green marketing strategy and sees positive results.	As well as the previous scenario, the factory has plans to invest in Green marketing.
Score	6 (six)				
Prospects	There are currently no foreseen improvements.				

Indicator	Project Performance
Description	Evaluates the factory's perception about the results of the project, considering

	the generation and sale of carbon credits and also external aspects of project.				
Situation	The owner states that he is very satisfied with the carbon project, and the project helps him to improve the social and environmental benefits that he provides to the community. Besides that, the ceramic factory has always been invited to participate in meetings to explain about its practices. Showing his social and environmental practices is a way to encourage other companies to adopt similar practices. Mr. Antonio Marcos considers that his carbon project brought a competitive advantage for his business.				
The factory is very dissatisfied and threatens to abandon the carbon project.	The factory is dissatisfied, but does not plan to abandon the carbon project.	The factory is indifferent about the carbon project.	The factory believes the carbon project is something positive, but has complaints	The factory is very satisfied with the carbon project.	In addition to the previous scenario, the factory considers the carbon project a competitive advantage for their business and encourages other factories to adopt similar practices.
Score	6 (six)				
Prospects	There are currently no foreseen improvements.				

5.2 Analysis of Results

5.2.1 Current Performance

Resource	Critical	Satisfactory	Sustainable	Average Score	Performance
Social	0.0%	33.3%	66.7%	4.3	Sustainable
Human	0.0%	0.0%	100%	5.3	Sustainable
Financial	0.0%	66.7%	33.3%	4.3	Satisfactory
Natural	33.3%	0.0%	66.7%	4.3	Satisfactory
Technology	0.0%	0.0%	100%	5.3	Sustainable
Carbon	33.3%	0.0%	66.7%	4.7	Sustainable
General	11%	17%	72%	4.7	Sustainable

5.2.2 Historical Performance

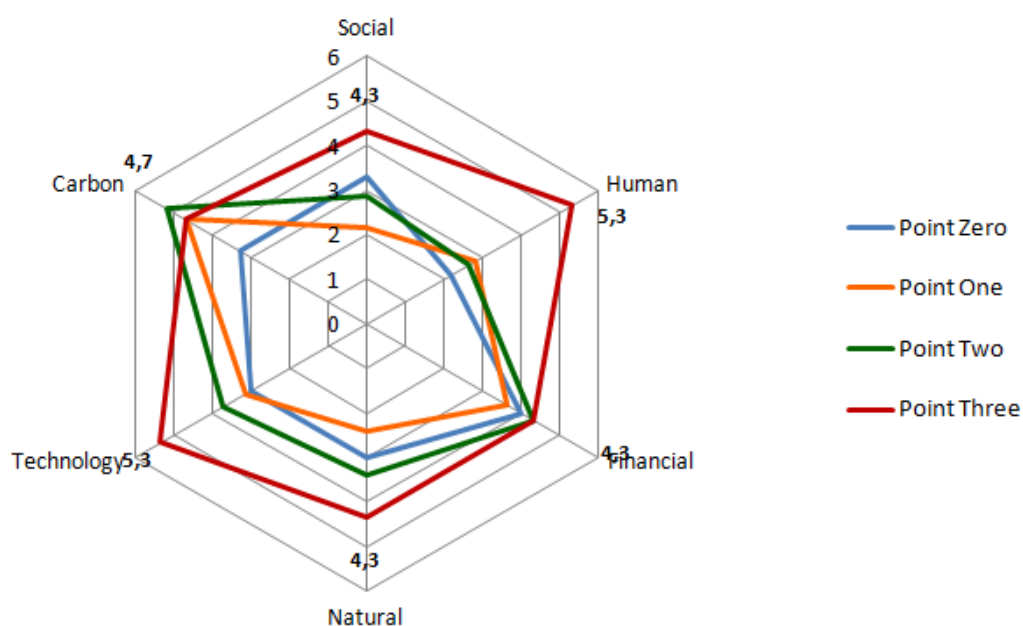
For the Point Two report “Indicators for Industries of the Ceramic Sector” were used. The current report (Point 03) uses the “Brazilian Red Ceramic factories Indicators”.

The new indicators were developed based on six years of experience in performance monitoring, project evaluation as well as numerous stakeholder consultations. The goal is to measure the contribution of the project to the sustainable development of Ceramics factories more accurately and efficiently.

Social	Point Zero	Point One	Point Two	Point Three
	Score 3.3	Score 2.1	Score 2.9	Score 4.3
Historic Analysis: The Social resource increased in comparison with the previous reports. The main social contribution is to ICIA (Childhood Cancer of Agreste Institute). The factory contributes with monthly financial donations and construction materials when it's necessary. Besides that, during the period, Kitambar made a partnership with the Federal Institution of Education, Science and Technology of Pernambuco – IFPE, to provide supervised internship to students from this institution. This partnership shows that the factory is formally involved and contributes with the development and implementation of social benefits in the community. The employee satisfaction survey indicator also increased, since the ceramic factory started to conduct employees' meetings and has also implemented some of the suggestions made by employees.				
Human	Point Zero	Point One	Point Two	Point Three
	Score 2.2	Score 2.8	Score 2.7	Score 5.3
Historic Analysis: The performance of the Human resource increased significantly, especially because the factory improved its training and capacity building programs indicator. Besides some training courses that were offered to employees, the ceramic factory also started an educational program called EJA - Educacional Program for Youth and Adults. The factory provides the place to study – a class inside the company and the classes are given by SESI professionals. Currently, there are 10 employees having the classes. The company also meets all legal requirements regarding health and safety practices and also has a safety engineer to ensure best practices in the company. Regarding the additional employee's benefits indicators, all employees receive more than one benefit, such as staple food, life insurance and transportation to work.				
Financial	Point Zero	Point One	Point Two	Point Three
	Score 4.0	Score 3.7	Score 4.3	Score 4.3
Historic Analysis: The Financial resource remained the same at this point. The ceramic factory controls the carbon credit income; however the company has partial control of the destination for proceeds. This is the same situation verified in the previous Social Carbon reports. At the biomass supply indicator, more than half of the biomass used by the factory comes from native wood with sustainable management, using just a little amount of residues. This fact led to a low grade at this indicator.				

On the other hand, on the Carbon credit investments indicator, the factory had the highest grade, investing more than 100% of the income generated by carbon credit sales in the factory and in the community development.				
Natural	Point Zero	Point One	Point Two	Point Three
	Score 3.0	Score 2.4	Score 3.4	Score 4.3
Historic Analysis: The Natural resource increased at this point. One of the reasons was because the factory was involved in a voluntary environmental initiative at this period with the NGO Caatinga Association in the program called I protect the armadillo. This association protects the armadillo, which is an endangered species. Regarding the environmental management practices, the ceramic showed commitment with two aspects: monitoring the air emissions and waste practices. The ceramic factory committed itself to improve this indicator in the next reports. The ceramic was also involved in some programs promoted by ANICER that evaluates the environmental practices. One of them was the João de Barro Award: Kitambar won the João de Barro award during the 42º National Meeting of the Ceramic Factories. Another initiative was the participation in the program called “Sustainable Ceramic Factory is more life” This project was created to promote the sustainability in the red ceramics factories through a set of actions. Kitambar also possesses all the legal documents and operational licenses.				
Technology	Point Zero	Point One	Point Two	Point Three
	Score 3.0	Score 3.1	Score 3.7	Score 5.3
Historic Analysis. The general condition of infrastructure and machinery/equipment used in the production process meets all of the characteristics described in the indicator. The ceramic factory also has achieved all of the aspects in the working environment indicator, providing well working environment for the employees. Regarding the production quality indicator, Kitambar has quality control of its products, including tests for the raw material and final product. The ceramic has a quality control center inside the company, where employees are trained to evaluate the quality control of the ceramic products. The factory also has PSQ certification (Quality Program) for the tiles.				
Carbon	Point Zero	Point One	Point Two	Point Three
	Score 3.3	Score 4.7	Score 5.2	Score 4.7
Historic Analysis: The Carbon resource decrease at this Point, mainly due to the indicator changes, which – as mentioned above – used to take into account different aspects of this resource. Also, during the analyzed period, the ceramic factory did not conduct a formal stakeholder consultation, although the owner have participated in several meetings and had disclosed about the carbon project several times. Kitambar achieved the highest grade at the green marketing indicator: the factory has an established plan to invest in green marketing and hired an advertising company to help with the green marketing strategies.				

5.2.3 Performance Hexagon



5.3 Prospect Status

5.3.1 Achieved Prospects

Human Resource	
Indicator	Additional employee benefits
Prospect	The company intends to provide health insurance for all employees, to build a lunch room and offer lunch and dinner to all employees. The ceramic also intends to organize more fraternization parties.
Details	The health insurance for all employees was achieved at this report.

Social resource	
Indicator	Employee satisfaction surveys

Prospect	The entrepreneur will implement a procedure to evaluate workers satisfaction.
Details	At this period the ceramic conducted employees meeting every two months.

Social resource	
Indicator	Community development
Prospect	Ceramic intends donate construction material to a religious institution in Caruarú.
Details	The ceramic donated material to the institution called Diocese de Caruaru – Paróquia de São Caetano, in 2013.

Human resource	
Indicator	Training and capacity building programs
Prospect	The ceramic company owner intends to establish a partnership with SESI to develop a program to illiterates.
Details	The factory started an educational program called EJA - Educacional Program for Youth and Adults in partnership with SESI. Currently there are 10 employees having the classes.

Human resource	
Indicator	Health and safety practices
Prospect	From 2012 on, the ceramic company intends to establish a partnership with SESI for health and security issues.
Details	The partnership was established.

Technology resource	
Indicator	Efficiency of the production process
Prospect	The entrepreneur intends to build a new changing room to employees.

Details	The factory renovated the bathrooms and it is not necessary build new ones.

Financial resource	
Indicator	Planning and control
Prospect	The company's representative plans to take out a loan in the future.
Details	The company made the loan

Financial resource	
Indicator	Planning and control
Prospect	The Kitambar owner intends to increase the ceramic company productivity.
Details	The company achieved this through the new machineries and the green marketing.

Technology resource	
Indicator	Efficiency of the production process
Prospect	The entrepreneur plans to maintain the use of Dropbox program.
Details	The factory used the Dropbox program in the current period.

5.3.2 Not Achieved Prospects

Human resource	
Indicator	Additional employee benefits
Prospect	The company intends to provide health insurance for all employees, to build a lunch room and offer lunch and dinner to all employees. The ceramic also intends to organize more fraternization parties.
Details	The perspectives of build a lunch room and offer lunch and dinner to all employees were not achieved in this monitoring period. The owner stated that it was not

	possible due to the lack of resources to invest in this area. The factory has invested in other areas during the period, such as technologic and environmental areas.
Follow Up	The ceramic factory intends to complete these prospects as soon as it receives more investments from carbon credit sales.

Natural resource	
Indicator	Voluntary environmental initiatives
Prospect	The entrepreneur intends to create and apply an environmental policy, environmental marketing actions and strategies for socio-environmental responsibility. Kitambar Ceramic also intends to donate seedlings to recover riparian at Tacaimbo city.
Details	The prospect was not achieved because the owner wants to hire an environmental professional to help with this activity.
Follow Up	The ceramic factory intends to complete this action at 2016.

5.3.3 Identified Prospects

Human Resource	
Indicator	Health and safety practices
Responsible	The owner – Mr Antonio Marcos
Timescale	For the next monitoring period, the company intends to initiate labor gymnastics to encourages and improve the physical activity of the employees.

Social Resource	
Indicator	Employee satisfaction surveys
Responsible	The owner – Mr Antonio Marcos
Timescale	For the next monitoring period the owner intends to record all employees' meeting through a minute.

Financial Resource	
--------------------	--

Indicator	Planning and control
Responsible	The owner – Mr Antonio Marcos
Timescale	For the next monitoring period the company intends to maintain an organized control of the destination for proceeds.

Natural Resource	
Indicator	Voluntary environmental initiatives
Responsible	The owner – Mr Antonio Marcos
Timescale	Until 2017 Kitambar Ceramic intends to complete the prospect regarding the donation of seedlings to recover riparian at Tacaimbo city.

Technology Resource	
Indicator	Efficiency of the production process
Responsible	The owner – Mr Antonio Marcos
Timescale	The owner intends to automate the process of discharging the dry tiles. But this is an expensive system that will be feasible when the company has budget.

Carbon Resource	
Indicator	Stakeholder consultation
Responsible	The owner – Mr Antonio Marcos
Timescale	For the next monitoring period the owner intends to conduct a formal stakeholder consultation.

APPENDIX 1: AMOUNT OF RENEWABLE BIOMASS CONSUMED PER MONTH ON KITAMBAR CERAMIC

Table 8. Amount of renewable biomass used by Kitambar Ceramic

Period		Algaroba Wood (tonnes)	Cashew tree residues (tonnes)	Forest Residues (tonnes)	Native Wood from managment (tonnes)
2012	March	430.68	0.00	35.51	0.00
	April	332.40	0.00	73.23	0.00
	May	383.01	0.00	94.41	0.00
	June	379.20	0.00	108.34	0.00
	July	405.24	0.00	78.26	0.00
	August	464.14	0.00	70.87	0.00
	September	329.08	19.32	105.43	0.00
	October	356.04	0.00	70.91	0.00
	November	365.12	0.00	46.74	0.00
	December	415.38	0.00	113.07	0.00
	Total 2012	3,860.29	19.32	796.77	0.00
2013	January	399.56	0.00	63.50	0.00
	February	425.57	0.00	69.69	0.00
	March	392.01	0.00	54.45	11.93
	April	372.50	0.00	95.95	35.78
	May	430.68	0.00	60.61	71.55
	June	333.43	0.00	68.70	23.85
	July	362.55	0.00	55.33	23.85
	August	375.73	0.00	65.06	47.70
	September	421.63	0.00	47.03	47.70
	October	409.50	0.00	89.81	59.63
	November	295.61	0.00	66.65	35.78
	December	376.04	0.00	87.84	0.00
	Total 2013	4,594.81	0.00	824.62	393.55
2014	January	403.94	0.00	62.85	0.00
	February	393.61	0.00	80.07	11.93

	March	340.70	0.00	67.49	0.00
	April	533.88	0.00	33.76	89.58
	May	454.42	0.00	68.02	0.00
	Total 2014	2,126.55	0.00	312.19	11,93
Total of monitored period		10,581.65	19.32	1,933.58	405,48