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KITAMBAR SWITCHING FUEL PROJECT



Document Prepared by Sustainable Carbon – Projetos Ambientais Ltda.

Project Title	Kitambar Switching Fuel Project
Version	06
Report ID	09
Date of Issue	07-March-2024
Project ID	33
Monitoring Period	01-August-2020 to 31-March-2022
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1 PROJECT DETAILS

1.1 Summary Description of the Implementation Status of the Project

This project activity was developed by Sustainable Carbon - Projetos Ambientais Ltda.

The project is applied at Kitambar Ceramic, which is a small and prototypical ceramic industry that produces structural ceramic devices like roof tiles, destined for the regional market. This project consists on utilizing renewable biomasses to feed the kilns rather than using native wood from areas without sustainable forest management, which is a pioneer practice in the region. This type of wood is considered a non-renewable biomass, once it is not originated in areas with reforestation activities.

As renewable biomasses, Kitambar Ceramic utilizes Algaroba wood¹, cashew tree residues², coconut husks, Sawdust and Native wood from forest management.

This fuel switching project is reducing the greenhouse gases (GHG) emissions through the substitution of native wood without sustainable management for renewable biomasses to generate thermal energy. The project activity will also indirectly help in reducing the Brazilian deforestation rates, the main source of greenhouse gas emissions in Brazil. Furthermore, by avoiding the anaerobic decay of these biomasses, this project will also contribute to lower greenhouse gas emissions.

In developing countries like Brazil, the deforestation rate is directly proportional to the greenhouse gases concentration in the atmosphere, which intensifies global warming.

The Caatinga is an exclusively Brazilian biome and occupies 850,000 Km², equivalent to 11% of the territory of the country³. Although being rich in natural resources, the Caatinga is one of the most threatened ecosystems on the planet. Its high calorific value is a major cause of its decline. In a region where the shortage of rivers leads to less access to electric energy, native firewood and charcoal account for thirty percent of the total energy utilized in the industries of the region, which has intensified the local deforestation.

The Caatinga is a biome with a strong propensity to desertification and its deforestation consequently brings forward an increase in this possibility. With the loss of natural vegetation, the exposed soil becomes more susceptible to erosion and salinization. These processes are responsible for changing the system of rivers, which makes the water supply of local communities and family farming scarce.

¹ The wood from afforestation in the northeast region of Brazil is mainly consisted of Algaroba (*Prosopis juliflora*).

² The cashew tree's pruning occurs due to its fructification, which happens more intensely in new branches.

³ Available at <<https://antigo.mma.gov.br/biomass/caatinga.html>>. Last visit on: April, 2022.

The proposed project completed the fuel switch in December of 2006, which was defined as the Project Start Date. This monitoring period is part of the Revalidation of the project's crediting period, which started in 2017 and ends in 2026.

According to the PD, the emission reductions due to the switching of non-renewable fuel (native wood) to renewable biomasses is estimated to result in 355,880 tCO₂e during the crediting period is 10 years, i.e., from 01-Jan-2017 to 31-Dec-2026. The contribution to sustainability is monitored applying the SOCIALCARBON® Standard, which is based in six main pointers: Technology; Natural; Financial; Human; Social and Carbon Resources.

The emission reductions due to the switching of non-renewable fuel (non-renewable wood) to renewable biomasses was equal to **50,763** during the monitoring period from 01-August-2020 to 31-march-2022.

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

Organization name	Kitambar Artefatos de Cerâmica Ltda.
Contact person	Mr. Antônio Marcos Tavares Barbosa and Mr. Severino Francisco Torres
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 - Pernambuco – Brazil Postal Code: 55.000-000
Telephone	+55 81 3722 7777

Email	financeiro.caruaru@kitambar.com.br http://www.kitambar.com.br
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Also as a Project Proponent, Sustainable Carbon is responsible for preparing the project reports jointly with the other proponent until the end of the crediting period.

Organization name	Sustainable Carbon – Projetos Ambientais Ltda.: Project Developer, Project Participant and Project Proponent
Contact person	Mariana Carriles Aline de Paulo Costa Lara de Paula
Title	Mariana Carriles: Technical consultant Aline de Paulo Costa: Technical analyst Lara de Paula: Technical analyst
Address	R. Doutor Bacelar. 368 – Conj. 23 – Vila Clementino São Paulo – SP. Brazil. Postal Code: 04026-001
Telephone	+55 11 2649 0036
Email	tecnica@sustainablecarbon.com

1.4 Other Entities Involved in the Project

No other entity was involved in the project activity.

1.5 Project Start Date

According to version 08 of the VCS-PD⁴, the project start date was defined as 01-December-2006. On this date, the project began reducing or removing GHG emissions, i.e., the ceramic factory started using renewable biomass as fuel.

1.6 Project Crediting Period

⁴ Document available at <<https://registry.verra.org/app/projectDetail/VCS/33>>. Last visit on: November, 2022.

The first crediting period for this project started on 01-January-2007 and ended on 31-December-2016. This is the second crediting period, which started on 01-January-2017 and ends on 31-December-2026.

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 factory 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 07, valid from 22-July-2016 until 31-October-2017⁵. This category comprises small thermal appliances that displace the use of non-renewable biomass by introducing new renewable energy end-user technologies.

The SOCIALCARBON indicators applied to the project are in accordance with the following document:

Brazilian Red Ceramic factories Indicators September 2013. Version 1.1⁶.

1.9 Participation under other GHG Programs

This project has not been registered under any other GHG programs.

1.10 Other Forms of Credit

This project is not creating any other form of environmental credit under any specific program. Social Carbon Methodology is being applied only as a Sustainability tool in association with VCS standard.

1.11 Sustainable Development

The project activity contributes to the reduction of greenhouse gas (GHG) emissions by avoiding the use of non-renewable fuels. In addition, the project activity will contribute to sustainable development of the host country, such as:

- The use of clean and efficient technologies through the use of renewable biomass as fuel. By these means, the project is in accordance to Agenda 21, with Brazilian Sustainable Development Criteria and the Sustainable Development Goals;
- A pioneer initiative that encourages the development of new technologies throughout the country, which replaces the use of non-renewable fuels with renewable biomass which presents an efficient thermal energy generation potential as shown in the project demonstration;
- The use of renewable biomasses results in GHG emission reductions. This way the project does not cause any additional negative impacts as all generated energy is a result of the best exploitation of the natural resources available. In addition, the project improves the local environmental conditions by establishing proper treatment for the renewable biomasses and also by contributing to the reduction on the use of fossil fuels.

⁵ This version of the methodology is available at <https://cdm.unfccc.int/UserManagement/FileStorage/J2H1I470Y38ZS6WFCEOPM5NBVRG9QX>. Last visit on: November, 2022.

⁶

https://static1.squarespace.com/static/6161c89d030b89374bec0b70/t/618a25d16fa7b70681f284b6/1636443603506/Red-Ceramic-Indicators_v02_05_09_20131.pdf

Furthermore, the project contributes to the following UN Sustainable Development Goals (SDG), which are better described in the SOCIALCARBON Report:

- SDG 3: Good health and well-being
- SDG 4: Quality Education
- SDG 7: Affordable and Clean Energy
- SDG 8: Decent Work and Economic Growth
- SDG 13: Climate Action

2 SAFEGUARDS

2.1 No Net Harm

The only negative impact identified is that the project activity generates ashes due to the burning of the biomass, but this impact is mitigated by reusing this residue as agriculture fertilizer.

The burning of the new biomasses also emits particulate material and CO₂, as well as when using native wood. However, GHG emission reductions will be improved since they are renewable biomasses which have carbon neutral lifecycles.

2.2 Local Stakeholder Consultation

The formal stakeholder consultation was carried out during the validation of the project, but no complaints, suggestions and/or comment about the project was received during the present monitoring period. Currently, the company's environmental management area is available to receive any kind of suggestions and comments from the community through telephone, e-mail or even personally.

2.3 AFOLU-Specific Safeguards

Not applicable. This is not an AFOLU project.

3 IMPLEMENTATION STATUS

3.1 Implementation Status of the Activity

The VCS PD was validated by Designated Operational Entity Earthood Services Private Limited and this present monitoring report will be verified by Earthood Services Private Limited.

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 baseline emissions.

As described in the VCS PD version 08, the production process of Kitambar Ceramic involves eight kilns with intermittent and reversible burning system, Round kiln type, which have capacity for approximately 46,000 ceramic units per burning cycle, depending on the kind of the products that are fired. 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.

The process for reducing water content in the ceramic devices is carried out through the employment of two dryer plants that utilize the heat originated in the kilns through an internal gas recirculation. Cerâmica Kitambar kilns are responsible for burning ceramic roof tiles, and it utilized an average of 3,128.35 tonnes per year of biomass in the current monitoring period, which made possible the production of an average of 20,841.98 tonnes of ceramic devices per year.

In the current Monitoring Period, Kitambar Ceramic Factory produced roof tiles (2.66 Kg) and bricks with 8 orifices (3.6 Kg). Thus, Cerâmica Kitambar was responsible for manufacturing an average of 1,736.83 tonnes of ceramic devices per month. The burning cycle comprises 24 hours to load the chamber with ceramic devices, approximately 16 hours to burn, 24 hours cooling and 8 hours to remove the pieces from the kiln.

In the 6th monitoring period (01-April-2015 to 31-March-2016), Kitambar Ceramic utilized Algaroba wood, sawdust and a small amount of Coconut Husk as renewable biomass. During the 7th monitoring period (01-April-2016 to 31-December-2016) the ceramic factory used Algaroba wood and sawdust as renewable biomasses. During the 8th monitoring period (01-January-2017 to 31-July-2020) the ceramic factory used Algaroba wood and sawdust as renewable biomasses.

In the current and 9th monitoring period (01-August-2020 to 31-March-2022), Kitambar Ceramic employed only Algaroba wood and Sawdust as renewable biomasses.

3.2 Deviations

3.2.1 Methodology Deviations

There were no methodology deviations during this monitoring period.

3.2.2 Project Description Deviations

There were no project description deviations during this monitoring period.

3.3 Grouped Projects

Not applicable. This is not a grouped project.

3.4 Safeguards

Safeguards were addressed at Section 2 of the present VCS + SOCIALCARBON Monitoring Report.

4 DATA AND PARAMETERS

4.1 Data and Parameters Available at Validation

Data / Parameter	EF _{projected fossil fuel}
Data unit	tCO ₂ /TJ
Description	Emission factor for the substitution of non-renewable woody biomass by similar consumers.
Source of data	AMS-I.E.: Switch from non-renewable biomass for thermal applications by the user - Version 7.0. Available at < https://cdm.unfccc.int/methodologies/DB/9LFOR81TCT5FLI1AJYP46CQY802J79 >. Last visit on: November, 2022.
Value applied	81.6 tCO ₂ /TJ
Justification of choice of data or description of measurement methods and procedures applied	This value represents the emission factor of the substitution fuels likely to be used by similar users, on a weighted average basis. It is assumed that the mix of present and future fuels used would consist of a solid fossil fuel (lowest in the ladder of fuel choices), a liquid fossil fuel (represents a progression over solid fuel in the ladder of fuel use choices) and a gaseous fuel (represents a progression over liquid fuel in the ladder of fuel use choices). Thus a 50 per cent weight is assigned to coal as the alternative solid fossil fuel (96 tCO ₂ /TJ) and a 25 per cent weight is assigned to both liquid and gaseous fuels (71.5 tCO ₂ /TJ for kerosene and 63.0 tCO ₂ /TJ for liquefied petroleum gas (LPG)).
Purpose of Data	The fossil fuel likely to be used by similar consumers is taken from the applied methodology. 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.

Comments	Applicable for stationary combustion in the manufacturing industries and construction.
Data / Parameter	ρ biomass
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. Revista da Madeira, nº 89, abril de 2005, pág. 100-106. Available at http://www.lippel.com.br/dados/download/05-05-2014-10-46poder-calorifico-da-madeira-e-de-materiais-ligno-celulosicos.pdf. Last visit on: November, 2022. IPCC: Intergovernmental Panel on Climate Change. Orientación del IPCC sobre las buenas prácticas para UTCUTS – Chapter 3 – 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: November, 2022. 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: November, 2022.
Value applied	0.88 tonne/m ³
Justification of choice of data or description of measurement methods and procedures applied	The species used to calculate the value are typical trees of <i>Caatinga</i> Biome that are usually employed as fuel in the ceramic factories of the region. The amount of wood used in the baseline was measured in volume unit. This datum was used for unit conversion.
Purpose of 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.
Comments	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 / Parameter	BF _y		
Data unit	Tonnes of wood per tonnes of devices		
Description	Consumption of non-renewable biomass per thousands of ceramic devices produced in year y.		
Source of data	Historical data from ceramic owner.		
Value applied	Ceramic factory	Kitambar	
	BF _y	1.30	
Justification of choice of data or description of measurement methods and procedures applied	The value was based on the historical situation at the site of the project activity prior to the implementation of the project. 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 parameter cannot be updated because the historical situation does not exist anymore as a result of the CDM project activity⁷. The value was employed to calculate the real amount of wood displaced to maintain the ceramic production in the baseline scenario.		
Purpose of Data	The purpose of the data is to provide the consumption of non-renewable biomass per tonnes of ceramic units produced in a year in the baseline scenario.		
Comments	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 / Parameter	EF _{co2,f}		
Data unit	g CO ₂ /t km		
Description	Default CO ₂ emission factor for freight transportation activity <i>f</i>		
Source of data	Methodological tool "Project and leakage emissions from transportation of freight"		
Value applied	Vehicle class	Emission factor (g CO ₂ /t km)	

⁷ Methodological Tool: "Assessment of the validity of the original/current baseline and update of the baseline at the renewal of the crediting period". Available at: <<http://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-11-v3.0.1.pdf>>. Last visit on: November, 2022.

	Light vehicles	245
	Heavy vehicles	129
Justification of choice of data or description of measurement methods and procedures applied	The value is calculated by the multiplication of distance between the origin and destination, total mass of freight transported, emission factor and freight transportation activities. The value is employed to calculate the project emission by transportation of biomass over a distance of 200km.	
Purpose of Data	Calculation of project emissions. The value is utilized to calculate the emissions of the biomass transportation if the distance is over 200km.	
Comments	Applicable to Option B of the Methodological tool ⁸ “Project and leakage emissions from transportation of freight” – 01.1.0. Where the values of light and heavy vehicles are from the Methodological tool.	

4.2 Data and Parameters Monitored

Data / Parameter	PRy							
Data unit	Tonnes of ceramic devices							
Description	Production of ceramic devices in tonnes							
Source of data	Controlled by the project proponent.							
Description of measurement methods and procedures to be applied	The amount of tonnes of ceramic pieces produced is monitored by counting the total production of one year, based on data from last crediting period and multiplying it by the weight of pieces. This parameter is monitored by the project proponent (meaning the ceramic owner). The amount is acquired by counting the total production of the ceramic factory and data is aggregated on a monthly and yearly basis.							
Frequency of monitoring/recording	Annually							
Value monitored	<table><tr><th colspan="2">Kitambar Ceramic</th></tr><tr><th>Period</th><th>PRy - Production (tonnes of ceramic units)</th></tr><tr><td></td><td></td></tr></table>		Kitambar Ceramic		Period	PRy - Production (tonnes of ceramic units)		
Kitambar Ceramic								
Period	PRy - Production (tonnes of ceramic units)							

⁸ Methodological tool “Project and leakage emissions from transportation of freight” Available at <<https://cdm.unfccc.int/methodologies/PAMethodologies/tools/am-tool-12-v1.1.0.pdf>> Last visit on: November, 2022.

	2020	August	1,504.58		
		September	1,832.61		
		October	1,772.73		
		November	1,715.83		
		December	2,014.36		
		Total 2020	8,840.10		
	2021	January	1,627.57		
		February	1,478.64		
		March	1,889.27		
		April	1,873.06		
		May	1,751.62		
		June	1,676.95		
		July	1,945.96		
		August	1,840.87		
		September	1,764.48		
		October	1,543.60		
		November	1,663.02		
		December	1,829.41		
		Total 2021	20,884.47		
	2022	January	1,514.61		
		February	1,513.67		
		March	1,983.78		
		Total 2022	5,012.05		
	Total in the monitoring period		34,736.63		
	For more detailed information, please see the VCS-MR Calculation Kitambar spreadsheet.				
	Monitoring equipment		No monitoring equipment is used to determine this parameter. Production is counted by trained personnel on Kitambar ceramic industry.		
	QA/QC procedures to be applied		The ceramic has an internal control of the quantity of pieces produced. It will be rechecked according to the biomass employed and the kiln consumption of renewable biomass.		
	Purpose of the data		This parameter is used to calculate baseline emissions and the total energy produced 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 will be rechecked according to the biomass employed in the ceramic kilns.
Comments	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 / Parameter	$Q_{renbiomass}$								
Data unit	Tonnes per year								
Description	Amount of renewable biomass utilized								
Source of data	Data is monitored through all the receipts and invoices of biomass received by the ceramic company.								
Description of measurement methods and procedures to be applied	In order to convert m^3 to tonnes, the specific gravity values of some renewable biomasses are available below: <table><thead><tr><th>Biomass</th><th>Specific gravity (tonnes/m^3)</th></tr></thead><tbody><tr><td>Sawdust</td><td>0.245</td></tr><tr><td>Algaroba wood</td><td>0.760</td></tr></tbody></table> Source of data: Serragem: PINHEIRO, G. F.; RENDEIRO, G.; PINHO J. T. Densidade Energética de Resíduos Vegetais. Biomassa & Energia, v. 2, n. 2, p. 113-123, 2005. Algaroba 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.	Biomass	Specific gravity (tonnes/ m^3)	Sawdust	0.245	Algaroba wood	0.760		
Biomass	Specific gravity (tonnes/ m^3)								
Sawdust	0.245								
Algaroba wood	0.760								
Frequency of monitoring/recording	Monthly								
Value monitored	Total amount of biomasses consumed during all months of this monitoring period (tonnes): <table><thead><tr><th colspan="4">Renewable biomass (tonnes)</th></tr><tr><th>Period</th><th>Algaroba</th><th>Sawdust</th><th>Total</th></tr></thead></table>	Renewable biomass (tonnes)				Period	Algaroba	Sawdust	Total
Renewable biomass (tonnes)									
Period	Algaroba	Sawdust	Total						

	2020	August	195.60	38.14	233.74
		September	297.16	15.24	312.40
		October	242.77	6.16	248.93
		November	120.39	64.83	185.22
		December	63.09	112.54	175.63
		Total 2020	919.01	236.91	1,155.92
	2021	January	142.24	80.32	222.56
		February	130.15	73.43	203.58
		March	178.69	115.04	293.73
		April	121.79	88.27	210.06
		May	236.45	78.31	314.76
		June	319.79	61.95	381.74
		July	243.37	61.45	304.82
		August	215.32	54.76	270.08
		September	158.34	77.42	235.76
		October	151.07	81.65	232.72
		November	195.32	40.60	235.92
		December	241.63	86.59	328.22
		Total 2021	2,334.16	899.79	3,233.95
	2022	January	143.11	21.56	164.67
		February	257.49	36.24	293.73
		March	295.98	69.67	365.65
		Total 2022	1,932.49	455.56	2,388.05
	Total in the monitoring period		3,949.75	1,264.17	5,213.92
More detailed information is available in the VCS-MR Calculation Kitambar spreadsheet.					
Monitoring equipment	No monitoring equipment is used to determine this parameter.				
QA/QC procedures to be applied	The ceramic has monthly records of the quantity of biomass acquired. It was rechecked according to the receipts of purchase.				
Purpose of the data	This parameter is used to: a. 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 for biomass renewable energy projects (capacity <45MWth); Calculation of leakage emissions due to competing use of biomass.				

Calculation method	The energy generated by the amount of renewable biomass is calculated based on the Net Calorific Value of each biomass, as can be seen on the VCS-MR Calculation Kitambar spreadsheet. Values in the receipts from biomass providers 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 under the item “Description of measurement methods and procedures to be applied”. Values in the receipts from biomass providers may be described in “sacos” (bags), therefore it is necessary the conversion to tonnes through multiplying the amount of bags by its weight (20kg = 0.02t).
Comments	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 / Parameter	Origin of Renewable Biomass
Data unit	Not applicable
Description	Renewable origin of the biomass
Source of data	Controlled by the project proponent
Description of measurement methods and procedures to be applied	This information is given by the biomass’ providers. The biomasses (Sawdust and Algaroba firewood) are considered renewable as fulfilling the options described in the methodology applied.
Frequency of monitoring/recording	Each monitoring period
Value monitored	Not applicable.
Monitoring equipment	No monitoring equipment is used to determine this parameter.
QA/QC procedures to be applied	The biomasses are considered renewable as they were in accordance with the definition given by the Annex 18 of the 23 rd meeting of the Executive Board from the Clean Development Mechanism ⁹ .
Purpose of the data	The objective of this data is monitoring the origin of the different types of biomasses utilized in the project.

⁹ CDM – Executive Board. Annex 18 definition of renewable biomass. EB 23. Available at <http://cdm.unfccc.int/EB/023/eb23_repan18.pdf>. Last visited on: November, 2022.

Calculation method	Not applicable.
Comments	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 / 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 sources of leakages predicted in the applied methodology are monitored. Scientific articles, official statistical data, regional and national surveys are assessed in order to ensure that there was no leakage from non-renewable biomass (or to estimate the leakage). Please see Section 5.3: "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 will be used to monitor the leakage.
Purpose of the data	Calculation of leakage emissions. This parameter is used to quantify source of indirect emission related to non-renewable biomass. The adjustment factor is used to adjust emission reductions resulting from the project.
Calculation method	Not applicable.
Comments	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 / Parameter	$f_{NRB,y}$
Data unit	Percentage
Description	Fraction of woody biomass used in the absence of the project activity in year y that can be established as non-renewable biomass using survey methods or government data or approved

	default country specific fraction of non-renewable biomass (fNRB) values available on the CDM website.
Source of data	Survey methods. Source of data: <u>Calculations according to Annex 20 of the 35th meeting of the Small-Scale Working Group of the Clean Development Mechanism:</u> CDM - SSC WG. Information note - Default values of fNRB for LDCs and SIDs. Thirty-fifth meeting Report, Annex 20. Available at <http://cdm.unfccc.int/Panels/ssc_wg/meetings/035/ssc_035_an20.pdf>. <u>Fnatural forests - extent of natural forests</u> SNIF – Sistema Nacional de Informações Florestais. Florestas Naturais. Available at <https://snif.florestal.gov.br/pt-br/os-biomas-e-suas-florestas>. <u>GRnatural forests - annual growth rate of biomass in natural forests</u> BRASIL. Ministério da Ciência, Tecnologia e Inovação. Secretaria de Políticas e Programas de Pesquisa e Desenvolvimento. Coordenação-Geral de Mudanças Globais de Clima. Terceira Comunicação Nacional do Brasil à Convenção-Quadro das Nações Unidas sobre Mudança do Clima – Volume III/Ministério da Ciência, Tecnologia e Inovação. 2016. Available at <https://sirene.mctic.gov.br/portal/export/sites/sirene/backened/galeria/arquivos/2018/10/11/TCN_Volume_3.pdf> Information taken from Section 1.1.5 page 294 of the report: 0.6 tC/ha is the value for annual growth of forests in the Caatinga biome. This parameter was divided by 0.47 tC/ha to convert tonne of carbon to tonne of biomass. <u>PA - protected area extent of forest</u> BRASIL. Ministério do Meio Ambiente. Departamento de Áreas Protegidas. Painel Unidades de Conservação Brasileiras. Available at <https://app.powerbi.com/view?r=eyJrIjojYjBiYzFiMWMtZTNkMS00ODk0LWI1OGltMDQ0NmUzNTQ4NzE4liwidCI6IjM5NTdhMzY3LTZkMzgtNGMxZi1hNGJhLTlmZmM2M1NTBINyJ9> <u>GR - annual growth rate of biomass in natural forests</u>

BRASIL. Ministério da Ciência, Tecnologia e Inovação. Secretaria de Políticas e Programas de Pesquisa e Desenvolvimento. Coordenação-Geral de Mudanças Globais de Clima. **Terceira Comunicação Nacional do Brasil à Convenção-Quadro das Nações Unidas sobre Mudança do Clima – Volume III/Ministério da Ciência, Tecnologia e Inovação.** 2016. Available at <https://sirene.mctic.gov.br/portal/export/sites/sirene/backened/galeria/arquivos/2018/10/11/TCN_Volume_3.pdf>.

Information taken from Section 1.1.5 page 294 of the report: 0.6 tC/ha is the value for annual growth of forests in the Caatinga biome. This parameter was divided by 0.47 tC/ha to convert tonne of carbon to tonne of biomass.

Caatinga deforestation rate

INPE – Instituto Nacional de Pesquisas Espaciais. TerraBrasilis. **Máscara de área acumulada de supressão da vegetação nativa – Shapefile.** Available at <<http://terrabrasilis.dpi.inpe.br/downloads/>>

Total above ground biomass of the Caatinga Biome

SNIF – Sistema Nacional de Informações Florestais. **Estoques das Florestas.** Available at <<https://snif.florestal.gov.br/pt-br/estoques-das-florestas>>

Planted forests in States inside Caatinga (hectares)

SNIF – Sistema Nacional de Informações Florestais. **Florestas Plantadas.** Available at <<https://snif.florestal.gov.br/pt-br/florestas-plantadas>>. Information on Planted Forests Only Eucalyptus and Pinus forests are considered, as the contribution of other species to planted forests is not significant in the states belonging to the Caatinga biome.

Growth rate - Eucalyptus and Pinus

BRASIL. Ministério da Ciência, Tecnologia e Inovação. Secretaria de Políticas e Programas de Pesquisa e Desenvolvimento. Coordenação-Geral de Mudanças Globais de Clima. **Terceira Comunicação Nacional do Brasil à Convenção-Quadro das Nações Unidas sobre Mudança do Clima – Volume III/Ministério da Ciência, Tecnologia e Inovação.** 2016. Available at <https://sirene.mctic.gov.br/portal/export/sites/sirene/backened/galeria/arquivos/2018/10/11/TCN_Volume_3.pdf>, pages 295-296.

Description of measurement methods and procedures to be applied	The monitoring of this parameter is based on national and international articles, databases and data monitored by the project developer such as project activities at the same region. The sources provide information about the availability of woody biomass in the Caatinga biome.										
Frequency of monitoring/recording	Annually.										
Value monitored	<table border="1"> <thead> <tr> <th colspan="2">FNRB, y</th></tr> <tr> <th>Year</th><th>Value</th></tr> </thead> <tbody> <tr> <td>2020</td><td>91.88%</td></tr> <tr> <td>2021</td><td>91.87%</td></tr> <tr> <td>2022</td><td>91.87%</td></tr> </tbody> </table> For more detailed information, please check VCS-MR Calculation Kitambar Spreadsheet – “F_{NRB,Y}” Tab.	FNRB, y		Year	Value	2020	91.88%	2021	91.87%	2022	91.87%
FNRB, y											
Year	Value										
2020	91.88%										
2021	91.87%										
2022	91.87%										
Monitoring equipment	No monitoring equipment is used to determine this parameter.										
QA/QC procedures to be applied	The monitoring of this parameter is based in national and international articles and database every monitoring period. The sources provided information about the sustainable use of <i>Caatinga</i> biome.										
Purpose of the data	The purpose of the data is to determine the fraction of woody biomass that would be used in the absence of the project activity in year y.										
Calculation method	The fraction of woody biomass used in the absence of the project activity in year y is essentially captured in the equation below: $f_{NRB} = NRB / (NRB + DRB)$ Where: fNRB: Fraction of non-renewable biomass (fraction or %) NRB: Non-renewable biomass (t/yr) DRB: Demonstrably renewable biomass (t/yr) Calculations according to Annex 20 of the 35th meeting of the Small-Scale Working Group of the Clean Development Mechanism: CDM - SSC WG. Information note - Default values of fNRB for LDCs and SIDs. Thirty-fifth meeting Report, Annex 20. Available at										

	< http://cdm.unfccc.int/Panels/ssc_wg/meetings/035/ssc_035_an20.pdf >.For detailed information please check the "fNRB,y" tab available in the "VCS-MR Calculation Kitambar" spreadsheet.
Comments	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 / Parameter	Renewable biomass surplus											
Data unit	tonnes or m³											
Description	Amount of renewable biomass available											
Source of data	Survey methods. Source of data: <u>Algaroba Wood:</u> Associação de Plantas do Nordeste (Northeast Plant Association – APNE). RIEGELHAUPT, Enrique. (et. al). Manejo racional dos algarobais espontâneos para o combate à desertificação no Sertão de Pernambuco. Recife: Associação Plantas do Nordeste – APNE, 2014. <u>Sawdust:</u> IBÁ. Industria Brasileira de Árvores. Relatório Anual, 2023. Table 51, pg. 58. Available at: <relatorio-anual-iba2023-r.pdf>. Last visit on: March, 2024											
Description of measurement methods and procedures to be applied	It is used to calculate the leakage of renewable biomass. The sources of leakages predicted in methodology applied are monitored. The measurement of the leakage is based in national and international articles and databases every monitoring period. These sources provide information about the biomass availability in the project activity’s region. The bibliographic references are described on the section 5.3 “Leakage”.											
Frequency of monitoring/recording	Annually											
Value monitored	<table><tr><th colspan="3">RENEWABLE BIOMASS SURPLUS</th></tr><tr><th>YEAR/BIOMASS</th><th>Algaroba Wood (tonnes)</th><th>Sawdust (tonnes)</th></tr><tr><td>2020</td><td>1.724.607.72</td><td>97.127.32</td></tr></table>			RENEWABLE BIOMASS SURPLUS			YEAR/BIOMASS	Algaroba Wood (tonnes)	Sawdust (tonnes)	2020	1.724.607.72	97.127.32
RENEWABLE BIOMASS SURPLUS												
YEAR/BIOMASS	Algaroba Wood (tonnes)	Sawdust (tonnes)										
2020	1.724.607.72	97.127.32										

		2021	1,723,192.57	96,464.44	
		2022	1,724,830.15	97,236.76	
	The surplus of each biomass was identified based on national and international articles and databases available during the survey research conducted throughout the monitoring period. The monitored amount of renewable biomass available is determined by subtracting the total available biomass (surplus) in the project region from the project consumption each year. More detailed information in section 5.3 – Leakage.				
Monitoring equipment	No monitoring equipment is used to determine this parameter.				
QA/QC procedures to be applied	Data available regarding the ceramic industry fuel consumption is 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 the total biomass available, which was calculated ex ante, according to CDM's "General guidance on leakage in biomass project activities - Version 03"¹⁰.				
Comments	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 / Parameter	NCV_{biomass}
Data unit	TJ/tonne of wood
Description	Net Calorific Value of non-renewable woody biomass that is substituted.
Source of data	AMS-I.E.: Switch from non-renewable biomass for thermal applications by the user - Version 7.0. Available at <https://cdm.unfccc.int/methodologies/DB/S0800GYGWHMXM287RBNKEYAMN9EUN0>. Last visit on: November, 2022. The value informed in the applied methodology is based on IPCC default for wood fuel.
Description of measurement methods and procedures to be applied	IPCC default for wood fuel, 0.015 TJ/tonne, based on the gross weight of the wood that is "air-dried".

¹⁰ General guidance on leakage in biomass project activities - Version 03. Available at <https://cdm.unfccc.int/methodologies/SSCmethodologies/AppB_SSC_AttachmentC.pdf>, paragraph 18. Last visited on: November, 2022.

Frequency of monitoring/recording	Annually
Value monitored	0.015
Monitoring equipment	No monitoring equipment is used to determine this parameter
QA/QC procedures to be applied	-
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.
Calculation method	Not applicable
Comments	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 / Parameter	D_{f,m}			
Data unit	Kilometre			
Description	Return trip road distance between the origin and destination of freight transportation activity f in monitoring period m			
Source of data	Records of vehicle operator or records by project participants			
Description of measurement methods and procedures to be applied	This parameter is recorded by the ceramic in a sheet with the distance between the ceramic and the furnisher. Information in section 5.2 – Project Emissions			
Frequency of monitoring/recording	Annually			
Value monitored	Provider	Origin	Destiny	Return trip distance (in kilometers) D _{f,m}
	Airon Jorge Vieira Da Silva	Rua Ozorio Ferreira dos Santos - Cumaru - PE - Postal Code 55.650-000	<u>Rodovia BR 232, Km 136, Distrito Industrial, Caruaru - PE - Postal Code 55.000-000</u>	160.00
	Dimas Domingos do Nascimento	Sítio Boqueirão, Zona Rural, Bezerros/PE		63.60
	Edilson da Silva Nogueira	Sítio Silvia, Caruaru/PE		88.00
	Edvanildo Santos Martins	Sítio Cachoeira Seca, Caruaru/PE		73.40

	Erivonaldo Alves	Rua do Sol, Centro, Barra de Guabiraba - PE		140.20
	Evandro Elias de Santana	Sítio Bento, Riacho das Almas/PE		74.80
	Herval Nordeste Ind	Rod BR 232, KM 109, Lote 01, Polo Industrial de Bezerros, Bezerros - PE - Postal Code 55.660-000		49.40
	Isaac Pereira de Lima	Caruaru/PE		88.00
	José Alexandre Pereira Neto	Av Sta Teresinha, Passira/PE		177.40
	José Franciermson	Sítio Lagoa Rosada, Caruaru/PE		88.00
	Jose Manoel Arruda	Sítio Lagoa do Algodão, Zona Rural, Riacho das Almas - PE - Postal Code 55.120-000		74.80
	Leonardo José dos Santos	Sítio Lagoa Rosada - Zona Rural - Caruaru - PE		88.00
	Moveis São Carlos Ltda	Rua Rosa Barros de Brito Costa, 104, Afogados da Ingazeira - PE - Postal Code 56.800-000		538.00*
	Movel Paz Industria	Rua Alfredo Alves da Cunha, 276, Distrito Industrial, Caruaru - PE - Postal Code 55.045-025		17.00
	Reconflex Ind. e Com.	Estrada Alto do Moura 2030, Caruaru/PE		19.40
	Renato Aragão da Silva	Sítio Bento, Riacho das Almas/PE		74.80
	W L Da Silva Pereira	Rua Joaquim Moita, 42, Centro, Tacaimbó - PE - Postal Code 55.140-000		60.60

	*The highlighted supplier with emphasis is the only one causing Project Emissions due to distance travelled. More detailed information available in the VCS-MR Calculation Kitambar spreadsheet and in the Appendix I.
Monitoring equipment	Determined once for each freight transportation activity f for a reference trip using the vehicle odometer or any other appropriate sources (e.g., on-line sources).
QA/QC procedures to be applied	-
Purpose of the data	This parameter is used to calculate project emissions.
Calculation method	Emissions from this parameter are only accounted if the return trip road distance between the origin and destination of freight transportation are greater than 200 km. Information in section 5.2 – Project Emissions
Comments	-

Data / Parameter	FR _{f,m}																									
Data unit	Tonnes																									
Description	Total mass of freight transported in freight transportation activity f in monitoring period m																									
Source of data	Records by project participants or records by truck operators																									
Description of measurement methods and procedures to be applied	This parameter is recorded by the ceramic in a sheet with the distance between the ceramic and the furnisher. Information in section 5.2 – Project Emissions																									
Frequency of monitoring/recording	Annually																									
Value monitored	<table><tr><th rowspan="2">Freight transported</th><th colspan="3">FR_{f,m} (tonnes)</th></tr><tr><th>2020</th><th>2021</th><th>2022</th></tr><tr><td>Algaroba</td><td>919.01</td><td>2,334.16</td><td>696.58</td></tr><tr><td>Sawdust</td><td>236.91</td><td>899.79</td><td>127.47</td></tr><tr><td rowspan="2">Total</td><td>1,155.92</td><td>3,233.95</td><td>824.05</td></tr><tr><td colspan="3">5,213.92</td></tr></table> More detailed information available at Appendix I.				Freight transported	FR _{f,m} (tonnes)			2020	2021	2022	Algaroba	919.01	2,334.16	696.58	Sawdust	236.91	899.79	127.47	Total	1,155.92	3,233.95	824.05	5,213.92		
Freight transported	FR _{f,m} (tonnes)																									
	2020	2021	2022																							
Algaroba	919.01	2,334.16	696.58																							
Sawdust	236.91	899.79	127.47																							
Total	1,155.92	3,233.95	824.05																							
	5,213.92																									

Monitoring equipment	Through a scale to know the weight of biomass.
QA/QC procedures to be applied	-
Purpose of the data	This parameter is used to calculate project emissions.
Calculation method	Total mass of freight transported in freight transportation are only accounted if the return trip road distance between the origin and destination of freight transportation are greater than 200 km. Information in section 5.2 - Project Emissions
Comments	Values were monitored at Monitoring Report.

4.3 Data Monitored and SOCIALCARBON

Resource: Social

Indicator	Diversity
Data unit	Quantity of women, seniors (older than 60 years), disabled and illiterate employees.
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 Social Information Report), CAGED (General Register of Employed and Unemployed Persons) Social inclusion policies and programs that value diversity.
Description of methods to collect information and procedures to be applied	The Sustainable Carbon team conducts an interview with the ceramic personnel and applies a questionnaire, aimed to indirectly obtain information regarding the six SOCIALCARBON Standard resources. Moreover, the Sustainable Carbon team collects the evidence provided by the ceramic personnel. Then, a cross-check is made in order to guarantee that all documentations were sent and complies with the information provided during the interview. For more Information, please check section 6.1 below.

Purpose of the data	Identify the number of employment opportunities offered by the ceramics industry to historically excluded social groups, such as: women, ex-prisoners, the elderly, indigenous peoples, the illiterate and the disabled.
Comments	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.

Indicator	Community development
Data unit	Quantity of initiatives, frequency and partnership with public entities and/or civil organizations.
Description	Evaluates the existence of management practices that contribute to local community development.
Source of data	Interviews and / or questionnaires. Complementary or supplementary evidence may include receipts, invoices, partnership contracts, statements.
Description of methods to collect information and procedures to be applied	The Sustainable Carbon team conducts an interview with the ceramic personnel and applies a questionnaire, aimed to indirectly obtain information regarding the six SOCIALCARBON Standard resources. Moreover, the Sustainable Carbon team collects the evidence provided by the ceramic personnel. Then, a cross-check is made in order to guarantee that all documentations were sent and complies with the information provided during the interview. For more Information, please check section 6.1 below.
Purpose of the data	Identify the existence of management practices that contribute to the development of the local community.
Comments	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.

Indicator	Employee satisfaction surveys
Data unit	Existence of a system to evaluate employee satisfaction.
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	Suggestion slips, suggestion box, employee satisfaction surveys, meeting attendance lists, photos.
Description of methods to collect information and procedures to be applied	The Sustainable Carbon team conducts an interview with the ceramic personnel and applies a questionnaire, aimed to indirectly obtain information regarding the six SOCIALCARBON Standard resources. Moreover, the Sustainable Carbon team collects the evidence provided by the ceramic personnel. Then, a cross-check is made in order to guarantee that all documentations were sent and complies with the information provided during the interview. For more Information, please check section 6.1 below.
Purpose of the data	Detect whether there are employee feedback systems (doubts, suggestions and complaints) and actions taken in response to feedback to make improvements.
Comments	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.

Resource: Human

Indicator	Additional employee benefits
Data unit	Quantity of additional benefits, quantity of employees who receive additional benefits, and the existence award programs based on merit.
Description	Evaluates the additional benefits provided to employees. Benefits required by law are not considered.

Source of data	Questionnaires, invoices, receipts, statements, pay stubs and signed list by employees stating receipt of benefits.
Description of methods to collect information and procedures to be applied	The Sustainable Carbon team conducts an interview with the ceramic personnel and applies a questionnaire, aimed to indirectly obtain information regarding the six SOCIALCARBON Standard resources. Moreover, the Sustainable Carbon team collects the evidence provided by the ceramic personnel. Then, a cross-check is made in order to guarantee that all documentations were sent and complies with the information provided during the interview. For more Information, please check section 6.1 below.
Purpose of the data	Identify and qualify additional benefits provided to employees.
Comments	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.

Indicator	Health and safety practices
Data unit	Compliance to the Mandatory and/or complementary programs, and monitoring usage of PEE (Personal Protective Equipment).
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	Participatory meetings, interviews, PPE control records, health and safety programs (CIPA PCMSO, PPRA), supervised EPI use (warnings, suspension), participant sign-in lists for lectures, contracts with health and safety professionals.
Description of methods to collect information and procedures to be applied	The Sustainable Carbon team conducts an interview with the ceramic personnel and applies a questionnaire, aimed to indirectly obtain information regarding the six SOCIALCARBON Standard resources. Moreover, the Sustainable Carbon team collects the evidence provided by the ceramic personnel. Then, a cross-check is made in order to guarantee that all documentations were sent and complies with the information provided during the interview. For more Information, please check section 6.1 below.
Purpose of the data	Identify which health and safety practices exist in the factories, including the distribution and supervised use of PPE (Personal Protective Equipment) by all employees, as well as health and safety programs.
Comments	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.

Indicator	Training and capacity building programs
Data unit	Assesses the entrepreneur's initiative in offering plans and training programs on climate change, including, strategies and frequency.
Description	Evaluates whether the factory encourages and invests in the professional development of its employees.
Source of data	Contracts, certificates, statements, planning controls.
Description of methods to collect information and procedures to be applied	The Sustainable Carbon team conducts an interview with the ceramic personnel and applies a questionnaire, aimed to indirectly obtain information regarding the six SOCIALCARBON Standard resources.

	Moreover, the Sustainable Carbon team collects the evidence provided by the ceramic personnel. Then, a cross-check is made in order to guarantee that all documentations were sent and complies with the information provided during the interview. For more Information, please check section 6.1 below.
Purpose of the data	Identify the actions that the factory encourages and invests in the professional development of its employees.
Comments	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.

Resource: Financial

Indicator	Biomass supply
Data unit	Control of the source and amount of renewable biomass.
Description	Evaluates the type, source and quantity of renewable biomass used as fuel, as well as the profile of suppliers.
Source of data	Questionnaires and monitoring report spreadsheets.
Description of methods to collect information and procedures to be applied	The Sustainable Carbon team conducts an interview with the ceramic personnel and applies a questionnaire, aimed to indirectly obtain information regarding the six SOCIALCARBON Standard resources. Moreover, the Sustainable Carbon team collects the evidence provided by the ceramic personnel. Then, a cross-check is made in order to guarantee that all documentations were sent and complies with the information provided during the interview. For more Information, please check section 6.1 below.
Purpose of the data	Identify forms of control over the types, sources and amounts of renewable biomass used as fuel, as well as the profile of suppliers.
Comments	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.

Indicator	Planning and Control
Data unit	Financial planning and control spreadsheet
Description	Evaluates the existence of financial planning and controls in regards to carbon credits sold by factory.
Source of data	Planning and control spreadsheets.
Description of methods to collect information and procedures to be applied	The Sustainable Carbon team conducts an interview with the ceramic personnel and applies a questionnaire, aimed to indirectly obtain information regarding the six SOCIALCARBON Standard resources. Moreover, the Sustainable Carbon team collects the evidence provided by the ceramic personnel. Then, a cross-check is made in order to guarantee that all documentations were sent and complies with the information provided during the interview. For more Information, please check section 6.1 below.
Purpose of the data	Identify the existence of financial planning and controls in relation to carbon credits sold by the factory.
Comments	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.

Indicator	Carbon credit Investments
Data unit	Carbon Credit Investments Percentual
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	Questionnaire and/or control spreadsheets.
Description of methods to collect information and procedures to be applied	The Sustainable Carbon team conducts an interview with the ceramic personnel and applies a questionnaire,

	aimed to indirectly obtain information regarding the six SOCIALCARBON Standard resources. Moreover, the Sustainable Carbon team collects the evidence provided by the ceramic personnel. Then, a cross-check is made in order to guarantee that all documentations were sent and complies with the information provided during the interview. For more Information, please check section 6.1 below.
Purpose of the data	Identify whether the proceeds from the sale of carbon credits were invested in plant improvements or activities that benefit the local community.
Comments	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.

Resource: Natural

Indicator	Environmental Management
Data unit	Quantity of initiatives and implementation of environmental management system
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.
Source of data	Questionnaires, interviews, photos, site visits. Complementary or supplementary evidence main include receipts, invoices, partnership contracts, statements among other documents.
Description of methods to collect information and procedures to be applied	The Sustainable Carbon team conducts an interview with the ceramic personnel and applies a questionnaire, aimed to indirectly obtain information regarding the six SOCIALCARBON Standard resources. Moreover, the Sustainable Carbon team collects the evidence provided by the ceramic personnel. Then, a

	cross-check is made in order to guarantee that all documentations were sent and complies with the information provided during the interview. For more Information, please check section 6.1 below.
Purpose of the data	Identify structured environmental management initiatives and systems related to waste, water, air, soil, energy and nature conservation management.
Comments	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.

Indicator	Brazilian environmental legislation
Data unit	Updated Licenses
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	Licenses
Description of methods to collect information and procedures to be applied	The Sustainable Carbon team conducts an interview with the ceramic personnel and applies a questionnaire, aimed to indirectly obtain information regarding the six SOCIALCARBON Standard resources. Moreover, the Sustainable Carbon team collects the evidence provided by the ceramic personnel. Then, a cross-check is made in order to guarantee that all documentations were sent and complies with the information provided during the interview. For more Information, please check section 6.1 below.
Purpose of the data	Identify whether the factory has a water grant (for those who use a well or pond), - Federal technical registration, operating license and license for clay extraction and is in

	compliance with the conditions established by the documents.
Comments	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.

Indicator	Voluntary environmental initiatives
Data unit	Quantity of voluntary environmental initiatives and benefits extension
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	Questionnaires, interviews, invoices, partnership contracts, photos, and any document that evidence established projects/initiatives.
Description of methods to collect information and procedures to be applied	The Sustainable Carbon team conducts an interview with the ceramic personnel and applies a questionnaire, aimed to indirectly obtain information regarding the six SOCIALCARBON Standard resources. Moreover, the Sustainable Carbon team collects the evidence provided by the ceramic personnel. Then, a cross-check is made in order to guarantee that all documentations were sent and complies with the information provided during the interview. For more Information, please check section 6.1 below.
Purpose of the data	Identify which voluntary environmental initiatives improve or establish new environmental goods and services, as well as those that increase the environmental awareness of workers, their families and the surrounding community.
Comments	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.

Resource: Technology

Indicator	Technological advances to improve efficiency of the production process
Data unit	Not applicable
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	Interviews with staff, receipts, contracts, photos.
Description of methods to collect information and procedures to be applied	The Sustainable Carbon team conducts an interview with the ceramic personnel and applies a questionnaire, aimed to indirectly obtain information regarding the six SOCIALCARBON Standard resources. Moreover, the Sustainable Carbon team collects the evidence provided by the ceramic personnel. Then, a cross-check is made in order to guarantee that all documentations were sent and complies with the information provided during the interview.

	For more Information, please check section 6.1 below.
Purpose of the data	Identifies the general state of the infrastructure and of the machines/equipment used in the production process, regarding brick drying methods, kiln efficiency, temperature control, kiln feeding, production, infrastructure, among others.
Comments	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.

Indicator	Technological advances to improve the general conditions of the working environment
Data unit	Not applicable
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 firefighting equipment.
Source of data	Questionnaires and interviews, on-site visits, evidence of existing respiratory protection, hearing conservation, or other relevant programs.

Description of methods to collect information and procedures to be applied	The Sustainable Carbon team conducts an interview with the ceramic personnel and applies a questionnaire, aimed to indirectly obtain information regarding the six SOCIALCARBON Standard resources. Moreover, the Sustainable Carbon team collects the evidence provided by the ceramic personnel. Then, a cross-check is made in order to guarantee that all documentations were sent and complies with the information provided during the interview. For more Information, please check section 6.1 below.
Purpose of the data	Identifies the general conditions of the work environment such as cleanliness, noise, heat, lighting and adequate signage.
Comments	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.

Indicator	Product quality
Data unit	Third party audit quality control reports
Description	Evaluates whether the quality of the products was evaluated during the time period analyzed.
Source of data	Internal or third party audit reports.
Description of methods to collect information and procedures to be applied	The Sustainable Carbon team conducts an interview with the ceramic personnel and applies a questionnaire, aimed to indirectly obtain information regarding the six SOCIALCARBON Standard resources. Moreover, the Sustainable Carbon team collects the evidence provided by the ceramic personnel. Then, a cross-check is made in order to guarantee that all documentations were sent and complies with the information provided during the interview. For more Information, please check section 6.1 below.

Purpose of the data	Identify if it exists and which evaluation methods guarantee the quality of the products during the analyzed period.
Comments	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.

Resource: Carbon

Indicator	Stakeholder consultation
Data unit	Stakeholder consultation meetings
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	Informative letter, satisfaction questionnaire, occurrence book, etc.
Description of methods to collect information and procedures to be applied	The Sustainable Carbon team conducts an interview with the ceramic personnel and applies a questionnaire, aimed to indirectly obtain information regarding the six SOCIALCARBON Standard resources. Moreover, the Sustainable Carbon team collects the evidence provided by the ceramic personnel. Then, a cross-check is made in order to guarantee that all documentations were sent and complies with the information provided during the interview. For more Information, please check section 6.1 below.
Purpose of the data	Identify the existence of a stakeholder consultation system (local community, workers, suppliers, local authorities, civil society organizations and other social parties involved).
Comments	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.

Indicator	Green Marketing
Data unit	Green marketing strategy efficiency and quantity
Description	Evaluates whether the factory has marketing strategies geared towards selling their products based on highlighting socio-environmental practices.
Source of data	Questionnaires, interviews and marketing material.
Description of methods to collect information and procedures to be applied	The Sustainable Carbon team conducts an interview with the ceramic personnel and applies a questionnaire, aimed to indirectly obtain information regarding the six SOCIALCARBON Standard resources. Moreover, the Sustainable Carbon team collects the evidence provided by the ceramic personnel. Then, a cross-check is made in order to guarantee that all documentations were sent and complies with the information provided during the interview. For more Information, please check section 6.1 below.
Purpose of the data	Identify whether the factory has marketing strategies aimed at selling its products based on the appreciation of socio-environmental practices.
Comments	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.

Indicator	Project Performance
Data unit	Level of satisfaction about the carbon project
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	Questionnaires and interviews.

Description of methods to collect information and procedures to be applied	The Sustainable Carbon team conducts an interview with the ceramic personnel and applies a questionnaire, aimed to indirectly obtain information regarding the six SOCIALCARBON Standard resources. Moreover, the Sustainable Carbon team collects the evidence provided by the ceramic personnel. Then, a cross-check is made in order to guarantee that all documentations were sent and complies with the information provided during the interview. For more Information, please check section 6.1 below.
Purpose of the data	Identify the factory's perception of the project's results, considering the generation and sale of carbon credits and also external aspects of the project.
Comments	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.

4.4 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 4.2 describes data and parameters monitored, as well as the procedures involved on the monitoring plan.

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 an internet cloud service (Dropbox). 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 $f_{NRB,y}$.

Periodically, Sustainable Carbon performs an analysis to verify if biomass and production data are being correctly filled in the monitoring spreadsheets. Analysis on production data are

performed by a series of comparisons between different measurement points of production (molding machine, kiln loading and kiln unloading or sales) to detect inconsistencies or suspicious data.

Analysis on biomass data are 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 sources of leakages predicted in the applied methodology are monitored. Scientific articles, official statistical data and 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's 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 is Mr. Francisco from Kitambar Ceramic Company. Sustainable Carbon's technical team (including those members described on Section 1.3) are also involved in the project monitoring.

5 QUANTIFICATION OF GHG EMISSION REDUCTIONS AND REMOVALS

5.1 Baseline Emissions

It is assumed that in the absence of the project activity, the baseline scenario would be the use of fossil fuels for meeting similar thermal energy needs. The project activity in this monitoring period (26 months) generated 60.10 TJ per year. Converting this number to MWh, it was generated 16,694.82 MWh per year, which corresponds to the use of 1.91 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.

The calculation of emission reductions is described below.

$$BE_y = B_y \times f_{NRB,y} \times NCV_{biomass} \times EF_{projected_fossil_fuel}$$

(Equation 01)

Where:

BE_y:	Baseline emissions during the year y in tCO ₂ e
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 ¹¹
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 tCO ₂ e/TJ ¹² .

B_y is determined using the following option:

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

$$B_y = \sum_i^n HG_{p,y} \div (NCV_{biomass} \times \eta_{old,i})$$

(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,i} :	Efficiency of pre-project device per type of device i.

$$HG_{p,y} = SGE \times PR_y$$

(Equation 03)

¹¹For detailed information please check the "f_{NRB,y}" tab available in the "VCS-MR Calculation Kitambar" spreadsheet. Calculation according to Annex 20 of the 35th meeting of the Small-Scale Working Group of the Clean Development Mechanism: CDM - SSC WG. Information note - Default values of f_{NRB} for LDCs and SIDs. Thirty-fifth meeting Report, Annex 20. Available at: <http://cdm.unfccc.int/Panels/ssc_wg/meetings/035/ssc_035_an20.pdf> Last visit: March, 2023.

¹² Value obtained on the AMS-I.E.: Switch from non-renewable biomass for thermal applications by the user - Version 7.0.

Where:

SGE: Specific energy which has to be generated in the process to produce a certain amount of ceramic units in TJ/tonnes of ceramic units fired.

PR_y: Amount of product produced in year y in tonnes of ceramic units

$$\eta_{old} = \frac{SGE}{SFE}$$

(Equation 04)

Where:

SFE: Specific fuel energy needed for the process to produce a certain amount of ceramic units in TJ/ tonnes of ceramic units

$$SFE = BF_y \times NCV_{biomass}$$

(Equation 05)

Where:

BF_y: Consumption of non-renewable biomass per tonne of ceramic units fired in year y

Using the equations 3, 4 and 5 in the Equation 2, it results to:

$$B_y = PR_y \times BF_y$$

(Equation 06)

As shown in the calculations above, the η_{old} is not required to calculate the Emission Reductions, thus it was excluded.

As shown in the calculations above, the η_{old} is not required to calculate the Baseline Emissions, thus it was 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 tonnes of ceramic devices.

Example of BE_y calculation in the year 2020, august:

$$BE_y = B_y \times f_{NRB,y} \times NCV_{biomass} \times EF_{projected_fossilfuel}$$

Where:

B_y (2020)= 1,955.95 (please check Table 1 below)

f_{NRB,y} (2020)= 91.88% (Please check “f_{NRB,y}” tab in the VCS MR Calculation Kitambar spreadsheet)

NCV_{biomass}= 0.015 TJ/tonne of wood (fixed parameter)

EF_{projected_fossil fuel} = 81.60 tCO₂/TJ (fixed parameter)

$$BE_y = 1,955.95 \times 0.9188 \times 0.015 \times 81.60$$

$$BE_y = 2,199.69 \text{ tCO}_2\text{e}$$

B_y was calculated according to equation:

$$B_y = PR_y \times BF_y$$

Where:

PR_y: Tonnes of ceramic units. Please check “9th period - VCUs Calculation” tab in the VCS MR Calculation Kitambar spreadsheet.

BF_y= 1.30 tonnes of wood per tonnes of ceramic pieces (fixed parameter)

$$B_y = 1,504.58 \times 1.30$$

$$B_y = 1,955.95 \text{ tonnes}$$

Table 1 below shows the calculation for all months of 2020:

Table 1: PR_y, B_y and BE_y values for Kitambar ceramic in 2020

	Period	PR _y - Production (tonnes of ceramic units)	B _y (tonnes)	BE _y (tCO ₂ e)
2020	August	1,504.58	1,955.95	2,199.69
	September	1,832.61	2,382.39	2,679.27
	October	1,772.73	2,304.55	2,591.72

	November	1,715.83	2,230.58	2,508.53
	December	2,014.36	2,618.67	2,944.98
	Total 2020	8,840.10	11,492.14	12,924.00

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

Table 2. Baseline Emissions for Kitambar Ceramic

<i>Kitambar Ceramic</i>		
Period		BEy (tCO2e)
2020	August	2,199.69
	September	2,679.27
	October	2,591.72
	November	2,508.53
	December	2,944.98
	Total 2020	12,924.00
2021	January	2,379.24
	February	2,161.53
	March	2,761.80
	April	2,738.11
	May	2,560.59
	June	2,451.42
	July	2,844.68
	August	2,691.05
	September	2,579.39
	October	2,256.49
	November	2,431.07
	December	2,674.30
	Total 2021	30,529.00
2022	January	2,214.10
	February	2,212.73
	March	2,899.96
	Total 2022	7,326.00

Total in the monitoring
period

50,779.00

5.2 Project Emissions

According to applied Methodology¹³, the project emissions could be a result of biomass transportation of a distance over 200Km or emissions from energy consumption associated with processing of biomass residue. Since it is a small-scale project, may neglect emissions from energy consumption associated with cultivation of biomass. If the biomass providers are located over a distance of 200 Km of the Ceramic factory, it will be calculated using the Methodological tool “Project and leakage emissions from transportation of freight” – 0.1.1.0 where the option B “using conservative default values” will be used. The emissions caused by transportation were monitored during the verification to ensure the distance is less than 200Km and if it is over than 200km calculate the emissions by the following equation:

$$PE_{TR,m} = \sum_f D_{f,m} \cdot FR_{f,m} \cdot EF_{CO_2,f} \cdot 10^{-6}$$

Where:

- $PE_{TR,m}$ = Project emissions from road transportation of freight monitoring period m (t CO₂)
- $D_{f,m}$ = Return trip road distance between the origin and destination of freight transportation activity f in monitoring period m (km)
- $FR_{f,m}$ = Total mass of freight transported in freight transportation activity f in monitoring period m (t)
- $EF_{CO_2,f}$ = Default CO₂ emission factor for freight transportation activity f (g CO₂ / t km)
- f = Freight transportation activities conducted in the project activity in monitoring period m

Example of $PE_{TR,m}$ calculation in the year 2020:

The $PE_{TR,m}$ was calculated based on the distance traveled by the biomass suppliers. Only distances greater than 200 km were considered. From the supplied quantities in tons of sawdust and algaroba wood purchased in 2020, the following was calculated:

$D_{f,m}$: > 200 Km Return trip distance (in kilometers)

¹³ Available at <<https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-16-v4.pdf>> Last visit on: November, 2022.

FR_{f,m}: Sawdust 100.35 tonnes / Algaroba 0 tonnes. Please check “Project emission” tab in the VCS MR Calculation Kitambar spreadsheet.

EF_{co2,f}: Fixed Parameter = Heavy vehicles 129 g CO₂/t Km.

Table 3: D_{f,m}, FR_{f,m} and PE_{TR,m} values for Kitambar ceramic in 2020.

Supplier	D _{f,m} (km)	FR _{f,m} (tonnes)		PE _{TR,m} (tCO ₂ e)
		Algaroba	Sawdust	
<u>Moveis São Carlos Ltda</u>	538	0	100.35	7.00

Table 4. Project Emissions for Kitambar Ceramic

Period	PE _y
2020 (from august)	7
2021	9
2022 (Until March)	0
Total	16

The detailed calculation can be found in the VCS-MR Calculation Kitambar spreadsheet.

5.3 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)¹⁴ 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 5. Different emission sources based for each type of biomass

Biomass Type	Activity/ Source	Shift of pre project activities	Emissions from biomass generation/ cultivation	Competing use of biomass
Biomass from forests	Existing forests	-	-	X
	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 the Table above, the possible sources of leakage of the present project activity are the competing use of Algaroba wood and Sawdust. All of these biomasses have enough availability as shown below demonstrating the lack of leakage for each biomass.

Algaroba wood

¹⁴ Document available at <http://cdm.unfccc.int/methodologies/SSCmethodologies/AppB_SSC_AttachmentC.pdf>. Last visit on: August, 2022.

According to Silva (2007)¹⁵, *Algaroba*¹⁶ (*Prosopis juliflora* (Sw.) D.C.) is a tropical legume tree fairly common in the semi-arid region of Brazil, which thrives in dry environments where other plants would hardly survive. A research made by EMBRAPA¹⁷, 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 impacts¹⁸. This source stated that there were several centers of *Algaroba* operation highlighting the San Francisco Water 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 dispersal¹⁹ 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. 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 IBAMA²⁰.

According to a survey conducted by the Associação de Plantas do Nordeste²¹ (Northeast Plant Association - APNE), in the state of Pernambuco, where the Project is located, in 2014, there was an area of 67,456 hectares of algaroba forests, where Algaroba trees grow naturally, resulting in an available stock of woody biomass of 1,889,159 m³.

Furthermore, the study projected the area of available algaroba forests for the year 2022, estimating a 20% increase, totaling 81,070 hectares. Based on this projection, the amount of woody biomass available for the same year would be 2,270,429.90 m³, equivalent to 1,725,526.73 tons per year.

According to the VCS PD, Kitambar Ceramic would consume approximately 6,578.3 tons of Algaroba wood per year, representing only 0.38% of the total Algaroba wood produced in the region.

¹⁵ 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.

¹⁶ Algaroba may also be known as mesquite.

¹⁷ 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.

¹⁸ 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

¹⁹ EMBRAPA, Projeto vai definir manejo para evitar invasão da Algaroba no ambiente semi-árido. Available at <http://www.cpatssa.embrapa.br:8080/noticias/bkp_noticiasantigas/noticia17.html>. Last visit on: November, 2022.

²⁰ 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 <<https://www.gov.br/ibama/pt-br>>. Last visit on August, 2022.

²¹Associação de Plantas do Nordeste (Northeast Plant Association - APNE). RIEGELHAUPT, Enrique. (et. al). Manejo racional dos algarobais espotâneos para o combate à desertificação no Sertão de Pernambuco. Recife: Associação Plantas do Nordeste - APNE, 2014.

The annual project activity consumption of Algaroba Wood during this monitoring period is presented in table below. The values represent less than 1% of Algaroba wood production in the project's region.

Table 6. Project activity consumption of Algaroba

Algaroba wood			
Production of Algaroba wood in the project's region (tonnes)			
1,725,526.73			
Period	Project activity consumption (tonnes)	Project consumption (%)	Renewable Biomass Surplus
2020*	919.01	0.053	1,724,607.72
2021	2,334.16	0.135	1,723,192.57
2022*	696.58	0.040	1,724,830.15

*Starting in August

**Ending in March

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.

The calculation method is described as:

$$Project\ consumption = \frac{Project\ Activity\ Consumption}{P_{algaroba}} \times 100$$

Where:

Project activity consumption = Project activity consumption in Year_x (tonnes) - please check "Renewable Biomass" tab in the VCS MR Calculation Kitambar spreadsheet.

P_{algaroba} = Production of Algaroba wood in the project's region = 1,725,526.73 tonnes per year.

Project consumption = Project activity consumption in Year_x (%) - Please check "Leakage" tab in the VCS MR Calculation Kitambar spreadsheet.

Renewable biomass surplus was calculated according to equation:

$$Renewable\ biomass\ surplus = P_{algaroba} - Project\ activity\ consumption$$

Sawdust

Sawdust is a probable 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.

The production of timber in the Pernambuco State was of 1,892,405 m³ ²² in 2022. Considering that around 21% of the wood produced will generate sawdust ²³, it can be assumed that around 397,405.05 m³ of sawdust was generated, which corresponds to 97,364.23 tonnes per year. According to the VCS PD, the average use of sawdust in this project activity is 586.2 tonnes per year, that represents 0.60% of the production. This way, this renewable biomass did not have potential to generate leakage emissions.

The annual project activity consumption of Sawdust during this monitoring period is presented in table below. The values represent no more than 2% of Sawdust production in the project's region.

Table 7. Project activity consumption of Sawdust

Sawdust			
Production of Sawdust wood in the project's region (tonnes)			
97,364.23			
Period	Project activity consumption (tonnes)	Project consumption (%)	Renewable Biomass Surplus
2020*	236.91	0.24	97,127.32
2021	899.79	0.92	96,464.44
2022*	127.47	0.13	97,236.76

*Starting in August

**Ending in March

This way, this renewable biomass did not have potential to generate leakage emissions due to its high availability.

The calculation method is described as:

$$Project\ consumption = \frac{Project\ Activity\ Consumption}{P_{sawdust}} \times 100$$

Project activity consumption = Project activity consumption in Yearx (tonnes) - please check "Renewable Biomass" tab in the VCS MR Calculation Kitambar spreadsheet.

²² According to IBGE. Available at <<https://cidades.ibge.gov.br/>> Last visit on: March, 2024.

²³ IBÁ. Indústria Brasileira de Árvores. Relatório Anual, 2023. Table 51, pg. 58. Available at: <<relatorio-anual-iba2023-r.pdf>>. Last visit on: March, 2024.

P_{sawdust} = Production of Sawdust in the project's region= 97,364.23 tonnes per year.

Project consumption = Project activity consumption in YearX (%) - please check "Leakage" tab in the VCS MR Calculation Kitambar spreadsheet.

Renewable biomass surplus was calculated according to equation:

$$\text{Renewable biomass surplus} = P_{\text{sawdust}} - \text{Project activity consumption}$$

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 equipment had to be acquired.

5.4 Net GHG emission reductions and removals

This category comprises small thermal appliances that displace the use of non-renewable biomass by introducing new renewable energy technologies. The project's emissions from the combustion of native wood are accounted in the same way as fossil fuel combustion, once it is non-renewable and emits CO₂.

Emissions reductions are to be estimated based on the equation below:

$$ER_y = BE_y - PE_y - LE_y \quad (\text{Equation 8})$$

Where:

ER_y: Emission Reductions in year y in tCO₂e

PE_y: Project Emissions in year y in tCO₂e

LE_y: Leakage Emissions in year y in tCO₂e

Table 8 below summarizes the emission reductions for this monitoring period:

Table 8. Emission Reductions

Year	Baseline emissions or removals (tCO ₂ e)	Project emissions or removals (tCO ₂ e)	Leakage emissions (tCO ₂ e)	Net GHG emission reductions or removals (tCO ₂ e)
2020 (From August)	12,924	7.00	0.00	12,917
2021	30,529	9.00	0.00	30,520
2022 (Until March)	7,326	0	0.00	7,326
Total	50,779	16	0	50,763

Table 9 below summarizes the emission reductions estimated (ex-ante) and the achieved (ex-post).

Table 9. Comparison between Emission Reductions estimated (ex-ante) and achieved (ex-post)

Year	Estimated net GHG emission reductions or removals (tCO ₂ e)	Net GHG emission reductions or removals (tCO ₂ e)
2020 (From August)	14,828	12,917
2021	35,588	30,520
2022 (Until March)	8,897	7,326
Total	59,313	50,763

According to the table above, although the ex-ante and ex-post estimated values are different, they still remain similar to the foreseen. This variation is already expected due to the fluctuation and difference in the values of production and use of biomass used in the monitored period.

Also, Table 10 below compares the ex-ante estimate of production and biomass with the values of the current monitoring period comparing 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).

Table 10. Production – Q_{renbiomass} – QA/QC Procedure

		VCS PD	Monitoring period
Period total production of ceramic at Kitambar Ceramic (tonnes of ceramic units)		40,201.00	34,736.63
Q _{renbiomass} (tonnes)	Algaroba wood	10,963.80	3,949.75
	Sawdust	977.00	1,264.17
Thermal Energy (TJ) generated at the ceramic industry		241.26	100.28
Thermal energy per tonnes pieces produced (TJ/tonnes of pieces)		0.0060	0.0029

As can be verified on Table 10, The production of ceramic units (tonnes) in the current Monitoring Period was smaller to the projected scenario on the VCS PD, as was the total amount of renewable biomass utilized.

Although, when it is calculated how many tonnes of ceramic units were produced with the corresponding tonnes of renewable biomass, it is possible to conclude that more tonnes of ceramic units were produced with a lesser amount of renewable biomass in the Monitoring Period (6.66 tonnes of ceramic units per tonne of renewable biomass) than in the VCS-PD's estimates (3.37 tonnes of ceramic units per tonne of renewable biomass).

Therefore, based on Category AMS-I.E.: Switch from Non-Renewable Biomass for Thermal Applications by the User - Version 7.0, valid from 22-July-2016 to 31-October-2017, this project activity contributes to Sustainable Development, once the ceramic company is using renewable biomass and applying the SOCIALCARBON methodology.

6 SOCIALCARBON RESULTS

6.1 Results

6.1.1 Social Resource

Indicator	1. 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	The Kitambar Ceramic Factory has 43 employees of which 5 belong to the minority group. This represents 12% of the workers					
	Excluded social groups			Number of workers		
	Women employees			2		
	Senior employees			1		
	Disabled employees			0		
Illiterate			2			
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	The ceramic factory intends to hire more than 15% of its employees from minority groups.					

Indicator	2. Community development
Description	Evaluates the existence of management practices that contribute to local community development.
Situation	The number of homeless people in Caruaru municipality increased 172% during the Covid-19 pandemic. In 2018, 94 people were living in the streets and in 2021 this number reached 256²⁴. To support social initiatives that help people who are experiencing this reality Kitambar ceramic factory donated R\$ 300.00 monthly to a project called “Love in the streets”, that aims to collect food and distribute meals to help people who are living on the streets of Caruaru. Also, during the monitored period the ceramic factory donated R\$ 100.00 monthly to “Home of the poor: San Francisco of Assis”, a philanthropic institution that shelters people aged 60 or over in a situation of social vulnerability, with or without family support. For more information, please access: https://casadospobres.com.br/ In 2022 Kitambar structured a volunteer program called “Inverno do Bem” that encouraged employees to donate clothes and blankets to homeless people and people in need. Part of the blankets were also purchased by the ceramic factory. A total of 34 employees participated of the initiative. Regarding the support in educational development initiatives, Kitambar still provides supervised visit to university students, which aims to show the factory productive process, its safety practices and its quality performance. This kind of action is very important for the improvement of academic and technical knowledge. Visits were suspended during the pandemic period, however in 2022 the ceramic factory provided two supervised visits to students from Federal University of Pernambuco. The Kitambar’s Health and Safety Technician was responsible for monitoring the visits. The factory has a partnership with two Educational Institutions: The Federal Institution of Education, Science and Technology of Pernambuco and the Federal University of Pernambuco due to the hiring of 2 students for the internship program. Kitambar was also selected as a case study for a postgraduate survey to the Bachelor of Science in Security Engineering Work course, from the Polytechnic School of University of Pernambuco.

²⁴ Source: https://obpoprua.direito.ufmg.br/moradia_pop_rua.html. Last visit: November, 2022.

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	3. 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	Kitambar promotes meetings with the employees every six months to address issues such as the performance of the factory during the period, updates in the red ceramic sector, the carbon project, new activities promoted by the factory, and health and safety practices. During these meetings the employees are encouraged to share their opinions about the company, their jobs and the activities developed in the factory. The dates of the meetings and the subjects to be discussed are announced in advance.

Every two years, an individual satisfaction survey is also carried out with all employees. The last application took place in May/June 2022 and it was carried out by the Health and Safety Technician. The data is presented to the Kitambar's Director who analyzes it and evaluates the actions to be taken. The factory has stipulated timeline for solutions to employee complains since the satisfaction survey results and the board decision must be presented at the following meeting, which in 2022 will be at the end of the year. In the last survey, the reintroduction of labor gymnastics practices was suggested. The Kitambar's Director is evaluating how to implement it, as this activity was offered three times per week by the Industry Social Service (SESI) but the institution no longer performs it. The Director is evaluating the possibility of hiring an intern to carry out this activity.					
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 implementin g 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	6 (six)				
Prospects	There are currently no foreseen improvements.				

6.1.2 Human Resource

Indicator	4. Additional employee benefits
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Description	Evaluates the additional benefits provided to employees. Benefits required by law are not considered.				
Situation	In addition to the fixed wage, the Kitambar ceramic factory offers the following benefits to employees: - Health insurance: the company pays 50% of the employee Health Insurance; - Dental Insurance: the company pays 100% of the employee Dental Insurance; - End of year party: due to the COVID-19 pandemic in 2020 the ceramic factory did not offer the end of the year party, however in 2021 the event was realized; - Saturday Off: The company granted the employee's request of having the Saturdays off; - 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 Caitano and the factory. São Caitano is the city where almost all employees live; this place was chosen by the employees. - Meal: The company offers meal vouchers to some of the employees, such as office workers, maintenance workers, machine operators and managers. For the other employees, the factory provides the place to have the meals and also provides one employee to cook and prepare the meals four times a week.				
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	The ceramic owner intends to implement labor gymnastics in workplace.				

Indicator	5. 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. 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.					
Situation	The ceramic factory has CIPA – Internal Commission for Accident Prevention. The Commission members promotes speeches, training programs and internal communication about health and safety practices. The ceramic applied to PCMSO - Program for Controlling Medical and Occupational and PPRA - Program for Prevention and Reduction of Accidents, both mandatory programs created to identify environmental risks and prevent occupational diseases and accidents. Kitambar Ceramic Factory also evaluates the risks and degree of exposure of employees to agents harmful to health through the Technical Report on Working Environment Conditions - LTCAT and the Health and Hazard Report - LIP. It also has a Health and Safety Technician, who is responsible for all the health and security issues. The company offers all the personal protective equipment necessary for the workers to carry on their activities safely and there is internal control of the PPEs delivery. The importance and need for the correct use of PPEs is encouraged both through lectures and through signs. In 2021 5 employees participated in fire prevention and firefighting training. During the monitoring period, the factory provided COVID-19 vaccines to the employees, encouraging employees to protect against severe illness or death from COVID-19. In partnership with the Industry Social Service - SESI, Kitambar offered hearing and respiratory effort tests, in addition to providing guidance on disease prevention.					
There is no control of PPE distribution. None of the	PPE distribution is being controlled OR there is at	The factory meets all legal	The factory meets all legal requirements and: (a)	In addition to scenario 4, the factory contracts or has a	In addition to scenario 5, the factory develops complement	

health and safety programs required by law are being implemented .	least one health and safety program required by law being implemented	requirements .	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.	technical professional or safety engineer on staff to ensure best practices in the company.	ary programs such as PPR, PPRPS and PCA; and/or The factory encourages physical activity or conducts activities for disease prevention.
Score	6 (six)				
Prospects	There are currently no foreseen improvements.				

Indicator	6. 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 building courses and lectures to employees. The courses and the number of employees who took them are presented below: - Digital marketing and social media strategies course – 4 employees; - Quality management system in the ceramic industry – 2 employees; - Management of processes and performance indicators – 1 employee;

- Performance and innovation for the ceramic tile market - – 1 employee; - Emotional intelligence in conflict management - – 1 employee; - Management for results – 11 employees; Kitambar has a planning control where it is established the next capacity building programs that the factory intends to participate according to the Federation of Industries courses and training calendar.					
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	6 (six)				
Prospects	There are currently no foreseen improvements.				

6.1.3 Financial Resource

Indicator	7. 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 two types of biomass: Algarroba wood and Sawdust. The factory has total control of the source and amount of renewable biomass used. The factory has total control of the source and amount of renewable biomass used and 23% of the fuel is coming from agro-industrial waste.				
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.	The 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	8. Planning and control				
Description	Evaluates the existence of financial planning and controls in regard to carbon credits sold by factory.				
Situation	The factory has organized controls of the income received from carbon credit sales, as well as of the destination for proceeds. The ceramic factory will continue the investment planned in the 8th monitoring period, with regard to improvements in the production system and acquisition of new equipment.				
The factory has no organized controls of the income received	The factory has partial control of the income received from carbon	The factory has organized controls of the income received	The factory has organized controls of the income received	The factory has organized controls of the income received	The factory has organized controls of the income received

from carbon credit sales nor the destination for proceeds.	credit sales and the destination for proceeds.	from carbon credit sales, but control of the destination for proceeds is partial.	from carbon credit sales, as well as of the destination for proceeds. However, the factory presents no future planning.	from carbon credit sales, as well as of the destination for proceeds. However, the factory presents incomplete future planning.	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	6 (six)				
Prospects	There are currently no foreseen improvements.				

Indicator	9. 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	100% of the income generated by carbon credit sales was invested in the factory. During the monitored period, the financial resource was invested in the renovation of the kilns and in the adaptation process for migration to the free energy market.				
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	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	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 .

allocation of proceeds.			development		
Score	6 (six)				
Prospects	There are currently no foreseen improvements.				

6.1.4 Natural Resource

Indicator	10. 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: - Energy: In 2021 the Kitambar started to consume electricity from the free energy market, a special trading environment whereby sellers and purchasers can trade electric energy freely among themselves in compliance with the regulations for the sector. Free market energy contracts tend to be more economical and purchasers have more control over the type of energy they are consuming, since they can choose to contract only renewable energy sources, as is the case of Kitambar, which buys energy generated by wind and solar plants; - Water: In partnership with the Federal Rural University of Pernambuco, Kitambar implemented a system to collect rainwater to use in the production process, as a manner to reduce public water consumption. - 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 as agriculture fertilizer. Besides, the remaining materials, such as gloves and EPs, contaminated with oil are collected by a company also responsible for the treatment and correct final disposal of waste. - Air: Kitambar has semiannual reports that monitor the atmospheric emissions.

There are no environmental management initiatives.	There are up to two specific initiatives to prevent/reduce the main environmental impacts caused by the Ceramic factory.	There are more than two initiatives to prevent / reduce the main environmental impacts caused by Ceramic factory.	In addition the scenario 3, the factory is structuring an environmental management system in the company.	The factory has implemented a formal environmental management system.	The factory's environmental management system has been certified by a third party.
Score	3 (three)				
Prospects	Carry out campaigns for the conscious use of water.				

Indicator	11. 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: - The clay used by the ceramic comes from two different suppliers: License for clay extraction nº 307/2002 issued by the National Department for Mineral Production - DNPM/PE, valid until July 23rd, 2022, which is in process of getting renewed as registered in the protocol nº 001/2022 issued by the Belo Jardim City Hall valid until August 17th, 2025. License for clay extraction nº 05.20.06.001845-1 issued by the State Environmental Agency of Pernambuco, valid until June 18th, 2023. - Operation License nº 19/2022, issued by the Autarchy of Urbanization and Environment of Caruaru, expiring on April 01st, 2024. - Federal Technical Registry issued by Brazilian Institute of Environment and Natural Resources – IBAMA - valid until February 07th, 2023. - The ceramic uses water from the public supply and also buys water from a company that has the water grant license nº 336-P/21 issued by the

	Secretary of Infrastructure and Water Resources of the state of Pernambuco and valid until February 28 th , 2023. 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 possess two of the following: -operating license -license for clay extraction -water grant - federal technical registry	The factory only possess three of the following: -operating license -license for clay extraction -water grant - federal technical registry	The factory possess all of the following: -operating license -license for clay extraction -water grant - federal technical registry However, they do not meet all the conditions established by them.	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 projects.
Score	5 (five)				
Prospects	There are currently no foreseen improvements.				

Indicator	12. 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	During the monitoring period the ceramic factory planted native tree seedlings into the Ceramic's factory property, showing continuity for this initiative.				
The factory is not involved	The factory has	The factory has	The factory has	In addition to the previous	In addition to the previous

in voluntary environmental initiatives.	implemented only one internal environmental initiative. Example: Planting ten tree saplings on factory grounds.	implemented more than one internal initiative or is showing continuity for an existing Initiative. Example: Periodic planting of saplings on factory grounds.	implemented more than one initiative or ongoing initiative whose benefits extend to workers families.	scenario, the benefits of the initiatives also extend to community members.	scenario, the factory promotes voluntary environmental initiatives with civil society organizations and/or public administration.
Score	3 (three)				
Prospects	There are currently no foreseen improvements.				

6.1.5 Biodiversity/Technology Resource

Indicator	13. 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, tunnel) 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 (egsales, 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:				
	- Possess 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. Recently Kitambar acquired an anemometer to improve the monitoring of the air entering the kilns and thus increase the efficiency of the firing; - The factory feeds kilns using semi-automatic equipment; - The factory controls and records production at different stages of the production process: molding machine, kiln loading and kiln unloading; - During the period analyzed there was no need for infrastructural improvements in the factory;				
	During the 08 th monitoring period, Kitambar started a project to improve the production system through the replacement of equipment such as carts and shelves to dry out the tiles, the purchase of a tile mouthpiece with a 3-outlet tube, as well as a “duck beak” funnel with quick coupling durometer and mouthpiece dryer to increase the number of tile outlets in the “maromba” extruder. However, the equipment is still in the testing and adaptation phase, as the test result did not meet the expected quality standard.				
	In 2021 Kitambar hired a specialized consultancy to implement a management system aimed at establishing indicators, targets and standardizing processes. The first stage of the project was expected to last 1 year ending in June 2022. According to the Kitambar’s Director, the ceramic factory currently has a consistent control over production management and has increased productivity by 25%. In addition, they began to carry out strategic production planning.				
	In 2022 a Kitambar’s intern won the FIEP award "IEL Prize - Euvaldo Lodi Institute" for outstanding company, innovative company category, as a result of this consultancy.				
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	6 (six)				
Prospects	Kitambar plans to start manufacturing solid brick to be used in masonry and paving, which is a which a competitive advantage for ceramic factory.				

Indicator	14. 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 (e.g., 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 firefighting equipment.
Situation	The factory meets all the characteristics: - There is no excess of dust and debris – there is an employee in charge of cleaning; - The factory is a well-ventilated place; - The factory has translucent tiles, which provides a well-lit working environment; - The noise in the ceramic factory does not exceed the established by law;

	- The factory uses signing according to the applicable norms. - Kitambar also implemented a new firefighting system, in addition to increase signage and training for employees. Besides that, the factory has an organized planning to improve the general conditions described above. The health and safety technician has a work spreadsheet, where she controls the cleaning and its frequency, the noise control and the PPE usage, the signs and its conservation, among other characteristics to maintain a good environment. The factory is also applying the 5S Methodology, in order to maintain the organization and the cleanliness in the factory. During the 5S training the employees were instructed to keep the equipment and machines in their right place; to check preventive needs for maintenance in each sector; to check the documentation for each area, such as reports, schedules, maintenance report, among others; to make the disposal of each type of waste, etc. In order to increase the organization and the efficiency at the factory, Kitambar has signals on each equipment, to inform about the procedures regarding its operation and maintenance.				
	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 6 (six)				
	Prospects There are currently no foreseen improvements.				

Indicator	15. 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 tile 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 5, the factory has an in-house quality lab.
Score	6 (six)				
Prospects	There are currently no foreseen improvements.				

6.1.6 Carbon Resource

Indicator	16. 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	The formal stakeholder consultation was carried out during the new validation of the project. Kitambar's Director is President of the Pernambuco Ceramics Union, and member of the Municipal Council for the Defense of the Environment, as a representative of the Federation of Industries of the State of Pernambuco. In these forums, he participates in meetings and events and is always in contact with stakeholders who can share their opinions about the project. The company's environmental management area is available to receive any kind of suggestions and comments from the community through their website, telephone, e-mail or even personally. Aside from that, there are meetings with the working staff every six months and surveys every two years to integrate the collaborators with ceramic and carbon project matters, these meetings and surveys have already set the next meetings' dates.				
During the time period analyzed, the factory did not conduct	During the time period analyzed, the factory conducted	During the time period analyzed, the factory conducted a	During the time period analyzed, the factory conducted a	As well as the previous scenario, there are continuous	As well as the previous scenario, the next consultation

a stakeholder consultation.	an informal (no records) stakeholder consultation.	formal (with records) stakeholder consultation; however negative comments were made regarding the project.	formal (with records) stakeholder consultation, and no negative comments were made regarding the project.	means of communication with stakeholders.	is being planned together with stakeholders.
Score	5 (five)				
Prospects	There are currently no foreseen improvements.				

Indicator	17. Green marketing
Description	Evaluates whether the factory has marketing strategies geared towards selling their products based on highlighting socio-environmental practices.
Situation	Kitambar is constantly improving its marketing strategies. The factory sees positive results with these marketing strategies and intends to continue investing on them. In 2022, 4 employees took the Digital marketing and social media strategies course provided by the ceramic factory. Besides, Kitambar has a team specialized in the area, made up of a journalist and a communication company. Kitambar markets their environmental practices on their website and social media pages. However, in the second semester of 2022 the site was hacked and was under maintenance. For more information, please access: Facebook page: - https://pt-br.facebook.com/kitambar.pe Twitter account: - https://twitter.com/kitambar Instagram page: - https://www.instagram.com/kitambar/ And through YouTube, with the carbon project's video: - https://www.youtube.com/watch?v=2eda7yM02mo&t=59s

	And also, at the local radio.				
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	18. 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, because it changed the way of thinking, acting and planning socio-environmental actions. In his opinion, the community's view of the company has changed with the project. As a representative of the Federation of Industries of the State of Pernambuco, Kitambar's Director is always publicizing the company's initiatives nationwide. Mr. Antônio Marcos considers that the carbon project brought a competitive advantage for his business, as the company became a reference in environmental actions.				
The factory is very dissatisfied and threatens to abandon the	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	The factory is very satisfied with the carbon project.	In addition to the previous scenario, the factory considers the carbon project a

carbon project.			has complaints.		competitive advantage for their business and encourages other factories to adopt similar practices.
Score	6 (six)				
Prospects	There are currently no foreseen improvements.				

6.2 Analysis of Results

6.2.1 Current Performance

Resource	Critical	Satisfactory	Sustainable	Average Score	Performance
Social	0%	33.3%	66.7%	4.7	Satisfactory
Human	0%	0%	100%	6.0	Sustainable
Financial	0%	33.3%	66.7%	5.3	Sustainable
Natural	0%	66.7%	33.3%	3.7	Satisfactory
Biodiversity/Tech	0%	0%	100%	6.0	Sustainable
Carbon	33.3%	0%	66.7%	5.7	Sustainable

6.2.2 Historical Performance

Social	Point Zero	Point One	Point Two	Point Three	Point Four	Point Five	Point Six	Point Seven	Point Eight
	3.3	2.1	2.9	4.3	5.0	4.7	5.0	5.0	4.7

Historic Analysis: During the current monitoring period the Social Resource decreased because Kitambar does not have more than 30% of employees from minority groups. Despite not yet reaching the target, the ceramic factory has increased its staff from 0% in July 2020 to 12% in March 2022 and is committed to continuing promote diversity in the workplace.

The contribution to community development was a highlight in Kitambar's Social Resource performance. The large increase in homeless people in Caruaru municipality during the Covid-19 pandemic motivated the ceramic factory to provide funds to two social projects and to structure a

volunteer program that encouraged employees to donate clothes and blankets. Regarding the support in educational development initiatives, Kitambar still provides supervised visit to university students and has an internship program, continuing the initiatives that were already being implemented since Point 7.

Besides the ceramic factory still promotes periodic satisfaction surveys among employees.

Human	Point Zero	Point One	Point Two	Point Three	Point Four	Point Five	Point Six	Point Seven	Point Eight
	2.2	2.8	2.7	5.3	6.0	6.0	6.0	6.0	6.0

Historic Analysis: The performance of the Human resource remained stable. The factory continued to offer a significant amount of training courses to its employees. Regarding the additional employee's benefits indicators, all employees receive more than one benefit, such as health and dental insurance, transportation to work, meal vouchers, among others.

The ceramic factory applied to all the mandatory programs, has an Internal Commission for Accident Prevention, and a Health and Safety Technician. Kitambar provided COVID-19 vaccines for the employees and offered hearing and respiratory effort tests.

Financial	Point Zero	Point One	Point Two	Point Three	Point Four	Point Five	Point Six	Point Seven	Point Eight
	4.0	3.7	4.3	4.3	4.3	5.3	5.3	5.3	5.3

Historic Analysis: The Financial resource score remained stable since Kitambar presented an organized financial control of its investments and also presented a future planning, with timeline, budget, and benefits.

The ceramic factory uses two types of biomass - Algarroba wood and Sawdust - having full control of the source and amount of renewable biomasses used and 23% of the fuel is coming from agro-industrial waste. Besides that, the income generated by the carbon credit sales was invested in factory improvements such as the renovation of the kilns and in the adaptation process for migration to the free energy market.

Natural	Point Zero	Point One	Point Two	Point Three	Point Four	Point Five	Point Six	Point Seven	Point Eight
	3.0	2.4	3.4	4.3	4.3	4.7	4.7	4.7	3.7

Historic Analysis: During the current monitored period the Natural resource decreased. Despite the ceramics having continued the initiative of planting seedlings on its property, no other actions were implemented in partnership with civil society organizations and/or public administration due the Covid-19 pandemic.

Regarding the environmental management practices, in the current monitoring period Kitambar started to consume electricity from the free energy market, generated by wind and solar plants. The ceramic factory also continued the actions reported in Point 7 - monitoring atmospheric emissions, reuse of production process residues, correct final disposal of contaminated waste and rainwater use in the production process. The ceramic is also in conformity with all national environmental legislation.

Biodiversity	Point Zero	Point One	Point Two	Point Three	Point Four	Point Five	Point Six	Point Seven	Point Eight
	3.0	3.1	3.7	5.3	5.7	5.7	5.7	6.0	6.0

Historic Analysis: The performance of the Technology resource remained stable. In 2021 Kitambar implemented a management system that increased productivity by 25%, receiving in 2022 the award "IEL Prize - Euvaldo Lodi Institute" for outstanding company, innovative company category. The ceramic factory continues to meet the necessary conditions for a healthy working environment. The condition of infrastructure and machinery/equipment used in the production process remained the same

The factory also applies the 5S Methodology, a methodology that results in a workplace that is clean, safe, and well organized to help reduce waste and optimize productivity. 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 tile.

Carbon	Point Zero	Point One	Point Two	Point Three	Point Four	Point Five	Point Six	Point Seven	Point Eight
	3.3	4.7	5.2	4.7	5.7	5.7	5.7	6.0	5.7

Historic Analysis: During the current monitored period the Carbon resource decreased since Kitambar did not conduct a formal stakeholder consultation. The last one was carried out during the new validation of the project, and due to the COVID-19 pandemic the ceramic factory could not conduct a new one. However, Kitambar's Director is President of the Pernambuco Ceramics Union, and member of the Municipal Council for the Defense of the Environment, as a representative of the Federation of Industries of the State of Pernambuco. In these forums, he participates in meetings and events and is always in contact with stakeholders who can share their opinions about the project.

The company's environmental management area is available to receive any kind of suggestions and comments from the community through their website, telephone, e-mail or even personally. Aside from that, there are meetings with the working staff every six months and surveys every two years to integrate the collaborators with ceramic and carbon project matters, these meetings and surveys have already set the next meetings' dates.

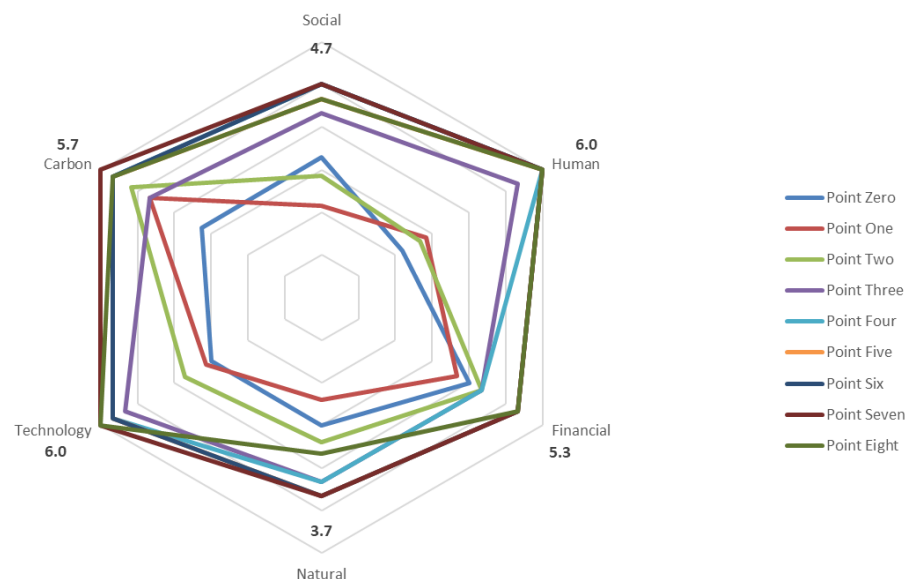
Regarding the green marketing indicator, the factory strongly invests in green marketing through its social media, website, among others.

The ceramic owner is very satisfied with the carbon project because it changed the way of thinking, acting and planning socio-environmental actions. In his opinion, the community's view of the company has changed with the project. He recognizes how the carbon project brought a competitive advantage for his business, turning Kitambar a reference in sustainability in the red ceramic industry.

General Performance	3.1	3.1	3.7	4.7	5.2	5.3	5.4	5.5	5.2
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6.2.3 Performance Hexagon

Figure 02. Graphic of the performance showing the average score obtained for each resource.



6.3 Prospect Status

6.3.1 Achieved Prospects

Natural Resource	
Indicator	10. Environmental management
Prospect	The ceramic factory intends to elaborate a study to assess the possibility of implementing an environmental management system in the next years.
Details	In 2021 Kitambar implemented a quality management system aimed at establishing indicators, targets and standardizing processes.

Technology Resource	
Indicator	13. Technological advances to improve efficiency of the production process
Prospect	The ceramic owner intends to carry on with the implementation of the new production management system mentioned in Indicator 13, which includes buying new carts and shelves to dry out the ceramic units, as well as tile mouthpiece and funnel to increase the number of tile outlets in the extruder.
Details	Kitambar implemented the new production management system, however, the results of the new mouthpiece and funnel test did not meet the expected quality standard.

Technology Resource	
Indicator	14. Technological advances to improve the general conditions of the working environment
Prospect	Kitambar Ceramic intends to implement a new firefighting system, with budgets and estimates already being studied, to take hold in the next monitoring period.
Details	Kitambar Ceramic implemented a new firefighting system. New fire extinguishers and signage boards were purchased and 5 employees took part in fire prevention training.

6.3.2 Not Achieved Prospects

Social Resource	
Indicator	1. Diversity
Prospect	The ceramic factory intends to hire more than 15% of its employees from minority groups.
Details	Despite not yet reaching the target, the ceramic factory has increased its staff from 0% in July 2020 to 12% in March 2022, and is committed to continuing promote diversity in the workplace.

Human Resource	
Indicator	5. Health and safety practices
Prospect	The ceramic owner intends to hold labor gymnastics lectures to encourage physical activities to the employees and promote disease prevention.
Details	The Kitambar's Director is evaluating how to implement it, as this activity was offered three times per week by the Industry Social Service (SESI) but the institution no longer performs it. The Director is evaluating the possibility of hiring an intern to carry out this activity.

Financial Resource	
Indicator	7. Biomass supply
Prospect	The factory intends to use more than 50% of fuel from agro-industrial waste in the next monitoring period.
Details	Despite not yet reaching the target, the ceramic factory has increased the use of agro-industrial fuel from 18% during Point 7 to 23% in the current monitoring period.

Carbon Resource	
Indicator	16. Stakeholder consultation
Prospect	The factory intends to conduct another formal stakeholder consultation during the next monitoring period.
Details	Due to the COVID-19 pandemic, the Kitambar did not conduct a formal stakeholder consultation. However, Kitambar's Director is constantly in touch with stakeholders, the company's environmental management area is available to receive any kind of

suggestions and comments from the community through their website, telephone, e-mail or even personally and there are regular meetings with the working staff so they can share their opinions about the project.

6.3.3 Identified Prospects

SOCIAL	
Indicator: Diversity	The ceramic factory intends to hire more than 15% of its employees from minority groups.
Responsible	Antônio Marcos Tavares Barbosa
Timescale	2024
HUMAN	
Indicator: Health and safety practices	The ceramic owner intends to implement labor gymnastics in workplace.
Responsible	Antônio Marcos Tavares Barbosa
Timescale	2024
NATURAL	
Indicator: Environmental Management	The ceramic factory intends to carry out campaigns for the conscious use of water.
Responsible	Antônio Marcos Tavares Barbosa
Timescale	2024
TECHNOLOGY	

Indicator: Technological advances to improve efficiency of the production process	Kitambar plans to start manufacturing solid brick to be used in masonry and paving.
Responsible	Antônio Marcos Tavares Barbosa
Timescale	2024

APPENDIX

Appendix I. Total mass of freight transported in freight transportation activity f in monitoring period m

Provider	FRf,m in tonnes					
	2020		2021		2022	
	Algaroba	Sawdust	Algaroba	Sawdust	Algaroba	Sawdust
Airon Jorge Vieira Da Silva	832.02	0.00	1,341.79	0.00	0.00	0.00
Dimas Domingos do Nascimento	0.00	0.00	0.00	0.00	182.10	0.00
Edilson da Silva Nogueira	0.00	0.00	0.00	0.00	22.02	0.00
Edvanildo Santos Martins	0.00	0.00	0.00	0.00	209.93	0.00
Erivonaldo Alves	9.36	0.00	0.00	0.00	0.00	0.00
Evandro Elias de Santana	0.00	0.00	0.00	0.00	104.41	0.00
Fernando Junior	0.00	0.00	0.00	0.00	17.80	0.00
Herval Nordeste Ind	0.00	48.10	0.00	476.09	0.00	222.19
Isaac Pereira de Lima	0.00	0.00	103.21	0.00	47.11	0.00
José Alexandre Pereira Neto	0.00	0.00	341.28	0.00	393.92	0.00
José Franciermson	0.00	0.00	516.45	0.00	556.95	0.00
Jose Manoel Arruda	77.63	0.00	18.43	0.00	0.00	0.00
Leonardo José dos Santos	0.00	0.00	0.00	0.00	96.92	0.00
Moveis São Carlos Ltda	0.00	100.80	0.00	119.42	0.00	24.43
Movel Paz Industria	0.00	19.14	0.00	24.90	0.00	2.58
Reconflex Ind. e Com.	0.00	9.92	0.00	186.18	0.00	105.56
Renato Aragão da Silva	0.00	0.00	0.00	0.00	301.33	0.00
W L Da Silva Pereira	0.00	52.88	0.00	86.80	0.00	100.80
Total	919.01	230.84	2,321.16	893.39	1,932.49	455.56
	1,149.85		3,214.55		2,388.05	
	6,752.45					

Appendix II. Social Carbon Indicators

Results

Social Resource				Human Resource				Financial Resource			
1°		Score	Analysis	4°		Score	Analysis	7°		Score	Analysis
	Diversity	3	SA		Additional employee benefits	6	SU		Biomass supply	4	SA
2°	Community development	5	SU	5°	Health and safety practices	6	SU	8°	Planning and control	6	SU
3°	Employee satisfaction surveys	6	SU	6°	Training and capacity building programs	6	SU	9°	Carbon credit investments	6	SU
Average		4.7	SA	Average		6.0	SU	Average		5.3	SU
Indicators evaluated		3		Indicators evaluated		3		Indicators evaluated		3	
C	Critical	0	0.0%	C	Critical	0	0.0%	C	Critical	0	0.0%
SA	Satisfactory	1	33.3%	SA	Satisfactory	0	0.0%	SA	Satisfactory	1	33.3%
SU	Sustainable	2	66.7%	SU	Sustainable	3	100.0%	SU	Sustainable	2	66.7%
Natural Resource				Technology Resource				Carbon Resource			
10°		Score	Analysis	13°		Score	Analysis	16°		Score	Analysis
	Environmental management	3	SA		Efficiency of the production process	6	SU		Stakeholder consultation	5	SU
11°	Brazilian environmental legislation	5	SU	14°	Working environment	6	SU	17°	Green marketing	6	SU
12°	Voluntary environmental initiatives	3	SA	15°	Product quality	6	SU	18°	Project performance	6	SU
Average		3.7	SA	Average		6.0	SU	Average		5.7	SU
Indicators evaluated		3		Indicators evaluated		3		Indicators evaluated		3	
C	Critical	0	0.0%	C	Critical	0	0.0%	C	Critical	0	0.0%
SA	Satisfactory	2	66.7%	SA	Satisfactory	0	0.0%	SA	Satisfactory	0	0.0%
SU	Sustainable	1	33.3%	SU	Sustainable	3	100.0%	SU	Sustainable	3	100.0%