Gold Standard for the Global Goals
Transition Annex

Version 1 – September 2017

Gold Standard

KEY PROJECT INFORMATION

Title of Project/PoA/Activity:	Buenos Aires Renewable Energy Project
GS ID of the project/PoA/activity:	GS2290
GS Version:	GS4GG
Brief description of Project:	The project activity is the project of Buenos Aires Ceramic, which is a red ceramic industry located in Buenos Aires, in the state of Pernambuco, Brazil. The fuel utilized in the baseline scenario to manufacture ceramic pieces was native wood from deforestation of the Caatinga Biome, which is the common practice in the region. The project activity reduces greenhouse gases (GHG) emissions through the substitution of native wood from deforestation for renewable biomasses to generate thermal energy.
Project type: Energy/Land Use	Fuel Switching/Renewable Energy
For Renewable Energy Projects – intention to apply RECs Labels (y/n)	No
GS Stream (CDM/VER):	VER
Scale (large/scale/micro):	Small Scale
GS Registration Date:	27/11/2014
GS Crediting period start date:	01/03/2012
CDM Registration Date:	n/a
CDM Crediting period start date:	n/a
Project Developer:	Sustainable Carbon – Projetos Ambientais Ltda
Project Representative:	Stefano Merlin
Project Participants and any communities involved:	Sustainable Carbon – Projetos Ambientais Ltda Patrícia Matos de Cunha Ltda
Host Country/Location:	Brazil
Methodologies applied:	AMS-I.E: Switch from Non-Renewable Biomass for Thermal Applications by the User, version 05.
SDG Impacts:	1 – SDG 7: Affordable and Clean Energy 2 – SDG 8: Decent Work and Economic Growth 3 – SDG 13: Climate Action
Estimated amount of SDG Impact (GSVERs and others)	SDG 7: 100% usage of renewable energy. SDG 8: Higher than Score 4 of SOCIALCARBON indicator (Score 4: The company develops regular campaigns, meetings, training regarding occupational health and security in the last 12 months.) SDG 13: Estimated total Emission Reductions (tCO2e): 209,428.
Evidence that Project Boundary is clearly distinguishable in the field:	Buenos Aires Ceramic: 7°58'00" S, 37°37'59"W

SECTION A Sustainable Development Goals (SDG) outcomes

A.1 Relevant target for each of the three SDGs

SDG 7: Affordable and Clean Energy

The project is positively impacting the access to affordable and clean energy services. The measures applied by the project activity result in renewable energy generation by utilizing renewable biomass. The use of renewable biomasses provide alternative and clean energy sources that were not utilized in the baseline situation.
The project impacts are monitored through the total energy produced from renewable sources. The project aims to increase the level of energy from renewable sources through the substitution of native wood from deforestation activity for renewable biomasses to generate thermal energy in the process of burning ceramic devices. A positive impact can be verified when these parameters are better than in the baseline situation.

In this context, the main SDG 7 targets supported by the project are:

TARGETS	UN INDICATORS	GS PROJECT INDICATOR
7.2. By 2030, increase substantially the share of renewable energy in the global energy mix	7.2.1. Renewable energy share in the total final energy consumption	GS.1 - Total energy produced from renewable sources

SDG 8: Decent Work and Economic Growth

The project promotes inclusive and sustainable economic growth, as well as employment and decent work, due to its positive impacts in the quality of employment. It has also improved the commitment with actions of health and security for all employees responsible for feeding the kilns with bricks and fuel.

In order to monitor the project impacts, the project will apply indicators from The SOCIALCARBON Standard[1], as defined in the section A2 of this report.

The main targets of SDG 8 supported by the project are:

TARGETS	UN INDICATORS	GS PROJECT INDICATOR
8.8. Protect labour rights and promote safe and secure working environments for all workers, including migrant workers, in particular women migrants, and those in precarious employment	8.8.1. Frequency rates of fatal and non-fatal occupational injuries, by sex and migrant status	GS.2 – Number of health and security trainings and campaigns conducted during monitoring period

SDG 13: Climate Action

By changing the fuel from deforestation native wood to renewable biomass, the project is reducing greenhouse gases (GHG) emissions, and consequently, contributing to combat climate change and its impacts.

Then, the main targets of SDG 13 supported by the project are:

TARGETS	UN INDICATORS	GS PROJECT INDICATOR
13.3. Improve education, awareness-raising and human and institutional capacity on climate change mitigation, adaptation,	13.3.1. Number of countries that have integrated mitigation, adaptation, impact reduction and	GS.3 - Voluntary Emission Reductions issued

[1] The SOCIALCARBON Standard is a certification that brings demonstrable social, environmental and economic benefits to the stakeholders of carbon offset projects. More information at: <http://www.socialcarbon.org/>. Last visit on: 04/10/2019.

impact reduction and early warning	early warning into primary, secondary and tertiary curricula	

A.2 Explanation of methodological choices/approaches for estimating the SDG outcome

SDG 7: Affordable and Clean Energy

- **GS.1 - Total energy produced from renewable sources**

The contribution to SDG 7 is defined as the energy produced from renewable biomass. The complete fuel switching, from non-renewable biomass to renewable biomass occurred in January 01st, 2009. Currently Buenos Aires ceramic uses only native wood with sustainable forest management, Algaroba wood and wood residue.

The outcome will be monitored through the parameter **Total energy produced from renewable sources**. This parameter will be used to monitor the percentage of energy produced from renewable sources.

The amount of renewable biomass will be monitored by the weighing receipts issued by the weighbridge system of Buenos Aires ceramic.

The amount of renewable biomass can also be monitored through purchase invoice, delivery notes or other documents concerning the acquisition of renewable biomasses. Biomass providers measure the amount of products delivered to the ceramic factory to determine due financial compensation.

In case any renewable biomass is measured in volume, default values of specific gravity shall be used to convert it to tonnes.

SDG 8: Decent Work and Economic Growth

In order to monitor the project impact on the quality of employment, the project will apply indicators from SOCIALCARBON Standard.

The project outcome regarding decent work and economic growth is defined as the improvement in SocialCarbon Indicator score achieved in the Monitoring Period, compared to the Baseline Scenario score. The following calculation is used:

$$SL_{Imp} = SS_{CMP} - SS_{BSL}$$

Where:

SL_{Imp}	SocialCarbon Level Improvement
SS_{CMP}	SocialCarbon Score in the Current Monitoring Period
SS_{BSL}	SocialCarbon Score in the Baseline

- **GS.2 – Number of Health and Security trainings and campaigns conducted during monitoring period**

To monitor the number of health and security trainings and campaigns conducted at the factory, it will be used the SocialCarbon Indicator for Ceramic Industry: "Actions of Health and Security - Evaluates the existence and performance of campaigns, leisure and goal and plans regarding to health and security. The project situation should be analyzed on a periodical basis and scored from 1 to 6, where 1 represents a critical situation and 6 represents a sustainable scenario.
For the Actions of Health and Security Indicator, the following scenarios are defined:

- Score 1: Occurrence of serious accidents in the last 12 months.
- Score 2: There were no serious accidents, but no campaign, lecture or training was done in the last 12 months.

- Score 3: Only occasional campaigns or lectures of awareness regarding the occupational health and security in the last 12 months AND/OR Security internal communication in specific places (ex: posters, warnings, etc).
- Score 4: The company develops regular campaigns, meetings, training regarding occupational health and security in the last 12 months.
- Score 5: In addition to the previous item, the company has goals and planning regarding the occupational health and security with difficulties to execute.
- Score 6: Goals and planning regarding the occupational health and security, with satisfactory execution.

The baseline scenario of this parameter was: "Scenario 4: The company develops regular campaigns, meetings, training regarding occupational health and security in the last 12 months".

SDG 13: Climate Action

- **GS. 3 - Voluntary Emission Reductions issued**

The fuel switching project will allow the ceramic company to produce and trade carbon credits. The emission reductions will result in carbon credits, that will be controlled by the parameter **Voluntary Emission Reductions issued.** It will be monitored through reports from the registry platform that controls the amount of issued VERs.

In order to monitor greenhouse gases (GHG) emissions reductions in the project activity, baseline emissions, project emissions and leakage emissions should be calculated. The calculations result in the value of GHG emission reductions, which represents the total of greenhouse gases (GHG) avoided due to the project activity. Emission reductions are calculated with equations described in Section B.6.1.

The ceramic company has started the project under GS in 2010. During the project scenario, the ceramic stopped using deforestation wood.
Due to the fuel switch, a set of adaptations were necessary, such as adjustments in the kiln entrances to embed mechanic burners and to permit the entrances of the renewable biomasses. Moreover, a shed was constructed in order to store and dry biomasses and consequently, improve their burning efficiency.

The complete fuel switching, from non-renewable biomass to renewable biomass occurred in January 01st, 2009 when the ceramic factory stopped employing native wood and started using sustainable forest management in the Hoffman kilns.

Glycerin was applied in the ceramics kilns in the beginning of the project crediting period under the VCS, however, Buenos Aires ceramic is no longer using glycerin as fuel. Currently, Buenos Aires ceramic uses only native wood with sustainable forest management and Algaroba wood, but other biomasses could also be utilized, such as Eucalyptus wood, cashew tree pruning, coconut fiber, sugar cane briquette, elephant grass and wood residues.

It is important to state that the proportion of renewable biomass may change depending on the harvest, which may occur shortages depending on natural and economic factors. In case of shortages, Buenos Aires Ceramic may equalize by buying more native wood with sustainable management plan or any other renewable biomass, once its origin is verified. Buenos Aires Ceramic utilized coconut fiber as fuel during the testing period, which demonstrates this practice of changing proportions.

Baseline emissions

Baseline emissions are estimated following procedures of the applied methodology: "AMS-I.E: Switch from Non-Renewable Biomass for Thermal Applications by the User", version 05.0, valid from 03/08/2012 to 27/11/2014"[2]. Baseline emissions are calculated by following equations below:

[2] Available at:<http://cdm.unfccc.int/filestorage/5/e/HSVPWKBG6X7Q8YEFMOT214IA3R0ZDL.pdf/EB%2068_repan22_Rev_AMS-I.E_ver05.0.pdf?t=R0l8b3dqcGw2fDCq6X3lVhPLakOQ3MBJK5Lm> Last visit on 19/09/2019

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

Where:

BEy: Baseline Emission reductions during the year y in tCO2e

By: Quantity of woody biomass that was substituted or displaced in tonnes

***f*NRB,y:** Fraction of woody biomass used in the absence of the project activity in year y that was established as non-renewable biomass using survey methods

NCVbiomass: Net calorific value of non-renewable woody biomass that was substituted, in TJ/ton

EFprojected fossil fuel: Emission factor for substitution of non-renewable woody biomass by similar consumers, in tCO2e/TJ[3].

By was calculated according to option (a) of the selected methodology, as follows:

By was calculated as the product of the number of appliances multiplied by the estimate of average annual consumption of woody biomass per appliance (tonnes/year);

The consumption of woody biomass in the kilns was calculated as the amount of products (ceramic pieces) produced and the consumption of woody biomass per thousand of ceramic pieces fired in year y, as follows:

$$B_y = PR_y \times BF_y \quad \text{(Equation 02)}$$

Where:

PRy: Amount of products produced in year y, in thousand of ceramic pieces

BFy: Quantity of woody biomass per thousand of ceramic units fired in year y.

The value of BFy was determined with the use of the historical records from the ceramics included in the project, by dividing monthly average consumption in the baseline by monthly average baseline production.

According to procedures on the applied methodology, the project participants determined the shares of renewable and non-renewable woody biomass in By using nationally approved methods.
The following principles were taken into account to calculate the fraction of woody biomass saved by the project ($f_{NRB,y}$):

Demonstrably Renewable woody biomass[4] (DRB)

Woody biomass is "renewable" if one of the following two conditions is satisfied:

1. The woody biomass is originating from land areas that are forests[5] where:
   (a) The land area remains a forest;
   (b) Sustainable management practices are undertaken on these land areas to ensure, in particular, that the level of carbon stocks on these land areas does not systematically decrease over time (carbon stocks may temporarily decrease due to harvesting); and
   (c) Any national or regional forestry and nature conservation regulations are complied with.
2. The biomass is woody biomass and originates from non-forest areas (e.g. croplands, grasslands) where:
   (a) The land area remains cropland and/or grasslands or is reverted to forest;
   (b) Sustainable management practices are undertaken on these land areas to ensure in particular that the level of carbon stocks on these land areas does not systematically decrease over time (carbon stocks may temporarily decrease due to harvesting); and

[3] According to the applied methodology, a value of 81.6 tCO2/TJ shall be used for this emission factor, representing the mix of fossil fuels to be used for the present and future.

[4] This definition uses elements of Annex 18, EB 23. Document available at: <http://cdm.unfccc.int/EB/Meetings/023/eb23_repan18.pdf>. Last visit on 13/09/2019.

[5] The forest definitions as established by the country in accordance with the Decisions 11/CP.7 and 19/CP.9 should apply.

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

Non-renewable biomass

Non-renewable woody biomass (NRB) is the quantity of woody biomass used in the absence of the project activity (B_y) minus the DRB component, as long as at least two of the following supporting indicators are shown to exist:

- A trend showing an increase in time spent or distance travelled for gathering fuel-wood by users (or fuel-wood suppliers) or alternatively, a trend showing an increase in the distance the fuel wood is transported to the project area;
- Survey results, national or local statistics, studies, maps or other sources of information such as remote sensing data that show that carbon stocks are depleting in the project area;
- Increasing trends in fuel wood prices indicating a scarcity of fuel-wood;
- Trends in the types of cooking fuel collected by users, suggesting scarcity of woody biomass.

Thus the fraction of woody biomass saved by the project activity in year y that can be established as non-renewable is:

$$f_{NRB,y} = \frac{NRB}{NRB + DRB} \qquad \text{(Equation 3)}$$

Before the project activity, wood from areas without forest management was offered with low prices and high viability to the ceramic owner. According to the IBAMA Normative Instruction N° 112 from 21/08/2006[6], the entrepreneur who uses raw material from native forests is obliged to use the Forest Origin Document (in Portuguese, DOF - Documento de Origem Florestal), to control the origin, transportation, and storage of forest products and by-products. This document ensures that the related forest products were obtained from legalized areas where conservation measures are applied.
Therefore, firewood with DOF is considered renewable, since it complies with item 1 of the definition of renewable biomass. On the other hand, native firewood with no DOF is considered a non-renewable biomass. Thus, the fuel employed in the baseline scenario by Buenos Aires ceramic was from non-renewable origin.

The fNRB,y parameter is determined in two steps: the first step is based on project specific information regarding the amount of native firewood from areas without forest management and the amount of firewood with DOF. This provides a fraction of non-renewable biomass used in the baseline scenario based on the origin of the firewood. The second step is an assessment on the fraction of woody biomass used that can be established as non-renewable biomass using survey methods applied to the Caatinga biome, where the project is located.

Such assessment was based on Annex 20 of the 35th meeting of the Small Scale Working Group of the Clean Development Mechanism, which provides a methodology for the calculation of fNRB,y[7]. A description of such methodology follows:

A default value for fNRB,y in the Caatinga biome is derived by calculating Total Annual Biomass Removals (R) in this biome as a proxy for By and estimating the proportion of R that is demonstrably renewable (DRB) and non-renewable (NRB). The following equation is used:

$$NRB = R - DRB \qquad \text{(equation 4)}$$

Where:
R Total annual biomass removals (tonnes/year)

[6] BRASIL. **INSTRUÇÃO NORMATIVA IBAMA Nº 112**, DE 21 DE AGOSTO DE 2006. Available at: <https://www.mma.gov.br/estruturas/pnf/_arquivos/in%20ibama112_2006.pdf>. Visited on 16/09/2017.

[7] Document is available at: <http://cdm.unfccc.int/Panels/ssc_wg/meetings/035/ssc_035_an20.pdf>. Last visited on 16/09/2019.

Total Annual Biomass Removals (R) for each country is inferred by calculating the sum of the Mean Annual Increment in biomass growth (MAI) and the Annual Change in Living Forest Biomass stocks (ΔF). Given biomass growth (MAI) and change in stock (ΔF) are both known, the balancing removals (R) can be calculated as the sum of the two, as below:

$$R = MAI + \Delta F \qquad \text{(equation 5)}$$

Where:
MAI Mean Annual Increment of biomass growth (tonnes/year)
ΔF Annual change in living Forest biomass (tonnes/year)

Mean Annual Increment of biomass growth (MAI) is calculated in equation below as the product of the Extent of Forest (F) in hectares and the country-specific Growth Rate (GR) of the Mean Annual Increment:

$$MAI = F \times GR \qquad \text{(equation 6)}$$

Where:
F Extent of forest (ha)
GR Annual growth rate of biomass (t/ha-yr)

Demonstrably renewable biomass (DRB) is calculated in equation below as the product of Protected Area Extent of Forest (PA) in hectares and the country-specific Growth Rate (GR) of the Mean Annual Increment:

$$DRB = PA \times GR \qquad \text{(equation 7)}$$

Where:
PA Protected Area Extent of Forest (ha)

This approach is considered appropriate since it takes in consideration historical practices of the ceramic factory in regard to fuel usage, meaning only native firewood from areas without forest management will be considered as non-renewable. Also, choosing the biome where the project is located as the geographical boundary for the second step is a more accurate approach than performing a national assessment, given the dimensions and peculiarities of each biome in Brazil and considering that sub-regional information is not available nor feasible to obtain. Also, there is evidence to support that carbon stocks are depleting in the project area and that carbon sequestration is greatest in more preserved areas[8] and that there is a trend showing an increase in time spent or distance travelled for gathering fuel-wood by users[9].

Table 1. Baseline emissions estimate during the crediting period

Year	Total Emission Reductions (tCO_2e)
March 01st, 2012	20,267
2013	27,023
2014	27,023
2015	27,023
2016	27,023
2017	27,023

[8] MORAIS, Y.C.B et al., **Análise do Sequestro de Carbono em Áreas de Caatinga do Semiárido Pernambucano**. Revista Brasileira de Meteorologia, v. 32, n. 4. Available at < http://www.scielo.br/pdf/rbmet/v32n4/0102-7786-rbmet-32-04-0585.pdf> Last visited on 18/09/2019.

[9] DA SILVA, E.R. **A exploração da lenha da caatinga como fonte de energia para as lavanderias de jeans em Toritama – Pernambuco**. Information on Page 2 shows increasing distances to obtain firewood in the Caatinga biome. Document available at: <http://www.eventosufrpe.com.br/jepex2009/cd/resumos/r1451-2.pdf>. Last visited on 16/09/2019.

Year	Total Emission Reductions (tCO_2e)
2018	27,023
2019	27,023
Total Emission Reductions (tCO_2e)	**209,428**
Number of years of the crediting period	7 years and 10 months [10]
Annual average of estimated emissions reductions (tCO_2e)	**26,179**

Project emissions:

The applied methodology does not predict any type of project emissions.

Leakage emissions:

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.

Leakage from the use of renewable biomass was considered using the general guidance on leakage in biomass project activities (attachment C of Appendix B)[11]. Also, the specific rules on biomass resources as set out in the applicable version of the Gold Standard, especially ToolKit Annex C were complied with.

For this project activity, the following sources of leakage were included: *A. Shifts of pre-project activities; B. Emissions related to the production of Biomass, and C. Competing uses for the biomass.*

The Attachment C to Appendix B of the Indicative simplified baseline and monitoring methodologies provides different emission sources based on type of biomass being considered. For biomass from forests and biomass from croplands or grasslands, the project boundary included the area where the biomass was extracted or produced. Table below summarizes the sources of leakage:

Table 2. Sources of leakage according to the biomass type

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	-

[10] The Project started the crediting period in VCS Standard in 01/01/2010. Stard date of the crediting period in Gold Standard is 01/03/2012. During ten years of this project, 2 years and 2 months of them were VCS, furthermore, 7 years and 10 months years corresponds to Gold Standard crediting period. More information on the Project timeline is available in section D.1.1.

[11] Document available at: <http://cdm.unfccc.int/methodologies/SSCmethodologies/AppB_SSC_AttachmentC.pdf>. Last visit on 11/04/2013.

Biomass Type	Activity/Source	Shift of pre project activities	Emissions from biomass generation/ cultivation	Competing use of biomass
Biomass residues or waste	Biomass residues or wastes are collected and use.	-	-	X

According to the table above, the sources of leakage relevant to the present project activity are the competing use of biomass.

Identification of relevant emission sources

For small-scale energy CDM project activities involving renewable biomass, there are three types of emission sources that are potentially significant (>10% of emission reductions) and attributable to the project activities:

A. Shifts of pre-project activities. Decreases of carbon stocks, for example as a result of deforestation, outside the land area where the biomass is grown, due to shifts of preproject activities.
B. Emissions related to the production of the biomass.
C. Competing uses for the biomass. The biomass may in the absence of the project activity be used elsewhere, for the same or a different purpose.

These emission sources may be project emissions (if under the control of project participants, i.e. if the land area where the biomass is grown is included in the project boundary) or sources of leakage (if the source is not under control of project participants). Table 2 summarizes, for different types of biomass, the cases where the emission source is relevant and the cases where it is not.

There are no shifts of pre-project activities related to this project. Thus, only emission sources B and C are accounted.

B. Emissions related to the production of the biomass

Potentially significant emission sources from the production of renewable biomass can be:

(a) Emissions from application of fertilizer[12] ; and

(b) Project emissions from clearance of lands.

These emissions sources should respectively be included in a simplified manner, not involving any significant transaction costs. All other emission sources are likely to be smaller than 10% (each) - including transportation of raw materials and biomass, fossil fuel consumption for the cultivation of plantations - and can therefore be neglected in the context of SSC project activities.

(a) Emissions from application of fertilizer: Not applicable. Buenos Aires ceramic does not utilize N2O fertilizers in eucalyptus forest.

(b) Project emissions from clearance of lands: Where the project activity involves the use of a type of renewable biomass that is not a biomass residues or waste, project participants should demonstrate that the area where the biomass is grown is not a forest (as per DNA forest definition) and has not been deforested, according to the forest definition by the national DNA, during the last 10 years prior to the implementation of the project

[12] While this emission source may be small for most forest plantations, it may be very large (>30% of emission reductions through fossil fuel substitution) for some energy crops.

activity. In the absence of forest definition from the DNA, definitions provided by relevant international organisations (e.g., FAO) shall be used.

Image from 2012 was included to show the eucalyptius plantation of Buenos Aires Ceramic. In 2008 the Eucalyptus was not visible in Google Earth. The comparison of those images show no deforestation in this area has been carried out since 2008, when the project was implemented.

C. Competing uses for the biomass. The biomass may in the absence of the project activity be used elsewhere, for the same or a different purpose.

Sources of leakage are described below according to each biomass type utilized by the project activity.

Native wood with sustainable forest management plan

The sustainable forest management plan can be organized into three stages: first, the division of the property in exploitable areas and areas of permanent preservation that are inaccessible to exploitation. The second stage is the planning of roads that connect the area with the primary roads. In the third stage, the allocated area is divided for exploration in blocks in order to sustain forest exploitation annually[13].

Afterwards, a technical responsible elaborates the next stages: forest inventory, estimation of growth, the best intervention techniques, fixes the arrangement of exploration and the silvicultural treatment. An annual technical report of the sustainable forest management area is elaborated and it is necessary a yearly authorization of the environmental agency of the state to keep the activities. Furthermore, the minimum requirements of the management plan are defined by Articles 19, 20 and 21 of Brazilian Forest Code, and are regulated by Decree 5975/06[14]

The total area properly regularized with sustainable forest management plan in the Caatinga biome corresponds to 94,287 hectares. There are around 189 sustainable forest management plans operating in this biome[15].

[13] ICMBio **Roteiro Metodológico para Elaboração de Planos de Manejo de Florestas Nacionais.** Available at: <http://www.icmbio.gov.br/portal/images/stories/imgs-unidades-coservacao/roteiroflona.pdf>. Last visit on: 29/08/2019.

[14] BRASIL. Lei nº. 4.771, de 15 de setembro de 1965. Código Florestal. Diário Oficial [da] República Federativa do Brasil, Brasília, DF, 16 de set. 1965. Available at: <http://www.planalto.gov.br/ccivil_03/LEIS/L4771.htm>. Last visit on 29/08/2019.

[15] CNIP, 2007. Source: <http://www.cnip.org.br/planos_manejo.html>. Last visit on: 29/08/2019.

Considering that around 5.7% of a sustainable forest management plan can be explored per year (exploration in blocks in order to sustain forest exploitation annually)[16], the area available for exploration is around 5,374 ha per year in Caatinga biome. In addition, the productivity of wood in Caatinga biome is around 96.68 m^3/ha[17]. Therefore, the production of wood with sustainable forest management plan in Caatinga biome was around 519,558 m^3 in 2007.

As Buenos Aires ceramic consumption presented in this project activity is around 2,928 tons (or 3,627 m^3) per year, the consumption of this kind of fuel represents less that 1% of the total of wood with sustainable forest management plan produced in the region.

The sustainable forest management promotes the conservation of biodiversity, conservation of soil and water regime, which are essential practices to combat the desertification. Moreover, there is an increment at the opportunity of employment for the rural population due to the sustainable exploration of plants destined for fruits, apiculture, medicinal, oil, ornamental and fiber production purposes[18].

Sugar Cane Briquette

A study made by Universidade Estadual de Campinas and Universidade de São Paulo (two of the most respected universities in Brazil) showed that in Brazil there are around three hundred sugar cane plants. Each plant produces around 1.5 million tons of cane yearly[19]. One ton of sugar cane produces about 140 kilograms of cane bagasse and finally 90% of this amount can be used to energy production, either in natura or compacted into briquettes[20].

According to the table 3, the state of Pernambuco presents a great amount of sugar cane bagasse, i.e. the ceramic has enough availability of this kind of biomass, what avoids the possibility of leakage generation in case of the sugar cane utilization as fuel source.

Table 3. Production of Sugar Cane in the State of Pernambuco

Harvest	**04/05**	**05/06**	**06/07**	**07/08**
Production of Sugar Cane (in tonnes)	16,684,867	13,858,319	15,293,700	19,844,415
Sugar Cane Bagasse (in tonnes)	2,335,881	1,940,165	2,141,118	2,778,218

Source: http://www.unica.com.br/downloads/estatisticas/processcanabrasil.xls

Sugar cane bagasse is also employed for cogeneration systems. However, figure 1 presents the excess of energy in Brazil from sugar cane bagasse. Please observe that the State of Pernambuco (PE) presents a large surplus of this biomass.

Pernambuco state is marked by the monoculture of sugar cane, using much of the labor-place. The ceramics may be supplied easily with sugar cane briquette, due to its availability at the local market.

[16] BRASIL. **Manejo sustentável dos recursos florestais da Caatinga/MMA.** Secretaria de Biodiversidade e Florestas. Departamento de Florestas. Programa Nacional de Florestas. Unidade de Apoio do PNF no Nordeste._Natal: MMA, 2008. 28p.

[17] Adapted from: BRASIL. **Estatística Florestal da Caatinga/MMA.** Ano 1. Vol. 1 (ago. 2008). Natal, RN: APNE, 2008. 136p.

[18] BRASIL. **Manejo sustentável dos recursos florestais da Caatinga/MMA.** Secretaria de Biodiversidade e Florestas. Departamento de Florestas. Programa Nacional de Florestas. Unidade de Apoio do PNF no Nordeste._Natal: MMA, 2008. 28p.

[19] Universidade Estadual de Campinas. **Unicamp e USP agregam suas pesquisas sobre biomassa da cana.** Jornal da Unicamp. Campinas, 2003. Available at: <https://www.unicamp.br/unicamp/unicamp_hoje/jornalPDF/203pag03.pdf> Last visit on: 29/08/2019.

[20] Centro de Gestão e Estudos Estratégicos (CGEE), 2001. Available at: <https://www.cgee.org.br/documents/10195/734063/estudo_biomassa_1012.pdf/21e2f32d-d3a3-474b-b505-e9cb11d8cf78?version=1.0>. Last visit on: 29/08/2019.

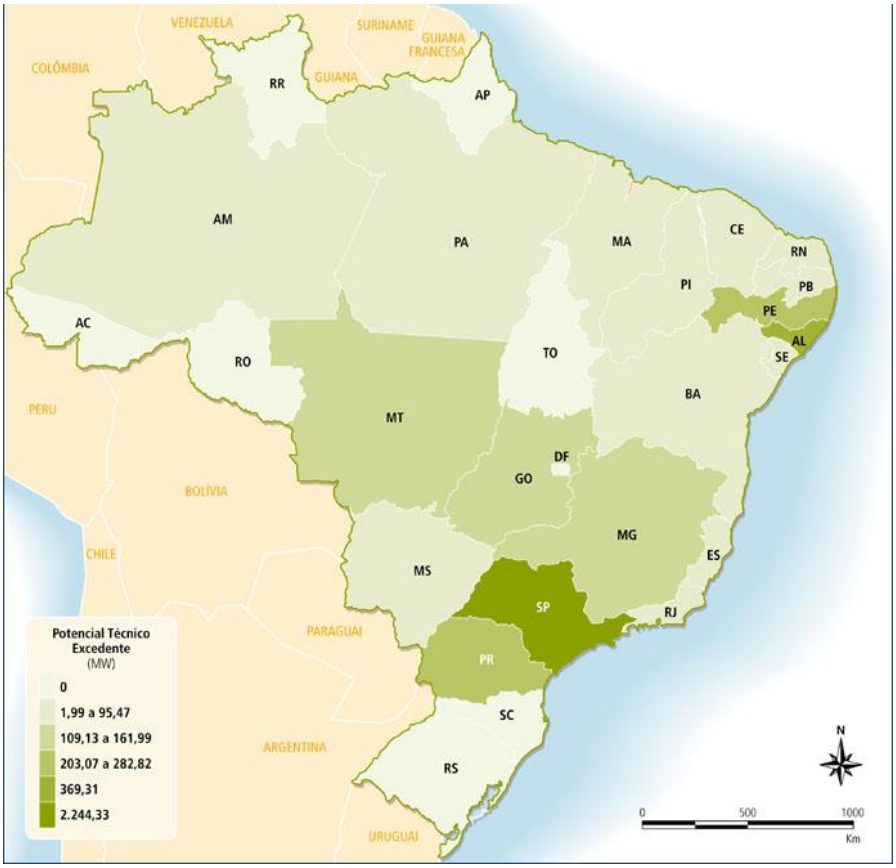

Figure 1. Sugar Cane Residue Potential for Energy Generation[21]

This project activity would be responsible for the consumption of around 7,055 tonnes per year, or around 0.3% of the total production of bagasse from sugar cane[22]. Thus, the amount of residues from sugar cane necessary to provide thermal energy in the ceramics' kilns would not be significant, which avoids the possibility of leakage.

Algaroba wood

According to Silva (2007)[23], Algaroba[24] (*Prosopis juliflora*) 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.

At the beginning of 40's, this species was introduced in the Northeast region of Brazil with the aim of providing food to animals and to be utilized for reforestation actions. However, currently, due to its competitive skills, Algaroba has spread through several regions of Brazilian semi-arid areas[25].

A research made by EMBRAPA[26], 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 impacts[27]. This source stated that there were several centers of Algaroba operation highlighting the San

[21] CENTRO NACIONAL DE REFERÊNCIA EM BIOMASSA - CENBIO. **Panorama do potencial de biomassa no Brasil.** Brasília; Dupligráfica, 2003. 80 p.

[22] Considering a generation of 2,500,396 tons of sugar cane bagasse on 07/08 that can be used to energy production.

[23] 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.

[24] Algaroba may also be known as mesquite.

[25] EMBRAPA. **Projeto vai definir manejo para evitar invasão da Algaroba no ambiente semi-árido**. Avaliable at: <https://www.embrapa.br/busca-de-noticias/-/noticia/17931180/projeto-vai-definir-manejo-para-evitar-invasao-da-algaroba-no-ambiente-semi-arido>. Last visit on: 29/08/2019.

[26] 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.

[27] 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.

Francisco Basin, which is comprised for many municipalities from the states of Bahia and Pernambuco, including this project region. Besides, Algaroba presents a considerable capacity of regeneration and dispersal[28], which means that the plant does not die, it sprouts again stead.

The research's author reported that wood from Algaroba exploration on San Francisco Basin is mainly commercialized as fuel for industries of vegetable oil, leather, ceramic and bakeries. On the other hand, Algaroba wood is not sold for stake[29], pegs and poles uses.

The factors which contribute most to the expansion of Algaroba uses, as firewood in these industries sectors, were its wide availability in the region and its legal release extraction from IBAMA[30]. Furthermore, this research showed that Algaroba is not used as a unique source of fuel for thermal energy generation in these industries sectors, e.g. corresponding only for 30% of the fuel's source in bakeries of the region studied.

The same research estimated that in the Northeast semi-arid region there were about 500 thousands hectares spread through every type of its region land. Moreover, according to EMBRAPA (1992)[31], wood's production by Algaroba is at least 5 m³/ha/year, i.e. the production in the project's region is about 2,500 thousands of m³ per year, what represents less than 1% of the total of Algaroba wood utilized per year, as Buenos Aires Ceramic would consume approximately 3,120 m³ of Algaroba wood per year.[32]

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

Cashew tree pruning

The cashews cultivation is extremely important to the Brazilian economy, where it is responsible for the generation of 150 million dollars per year. The cashew production is important especially in the northeast region, representing about 95% of Brazilian's cashew production. Besides, cashew production is responsible for generating job opportunities for 35,000 fieldworkers, 15,000 in the manufacturing process and 200,000 indirect job opportunities[33].

The Brazilian production achieved 143,000 tons of cashew-nuts in 2005 spread in an area of 650,000 Hectares. Besides, Brazilian´s production presents the tendency of increasing so far, carried by the new technologies utilized and the higher national and international demand of cashew nuts[34]. This way, the Brazilian sources of residues from cashew trees will increase following the Brazilian production, due the fact that cashew cultivation request continuous cut of cashew trees.

The cut of cashew trees is necessary in order to allow an appropriate formation of the tree and maintaining favorable conditions for the next harvest time. This way, in cashew cultivation undesirable branches of the

[28] EMBRAPA. **Projeto vai definir manejo para evitar invasão da Algaroba no ambiente semi-árido**. Avaliable at: <https://www.embrapa.br/busca-de-noticias/-/noticia/17931180/projeto-vai-definir-manejo-para-evitar-invasao-da-algaroba-no-ambiente-semi-arido>. Last visit on: 29/08/2019.

[29] Heavy pole to which cattle is tied.

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

[31] EMBRAPA. **Comunicado Técnico.** Nov/92, p.1-2. Available at: <http://www.cpatsa.embrapa.br/public_eletronica/downloads/COT51.pdf>. Last visit on: 29/08/2019.

[32] According to Barro Forte Ceramic (Tacaimbó – PE), which utilizes around 100 m³ per month to maintain a 2.6 lesser production. It was considered the specific gravity of Algaroba wood 0.76 ton/m³, according to: Pereira J. C. D., Lima P. C. F. **Comparação da Qualidade da Madeira de Seis Espécies de Algarobeira para a Produção de Energia**. Bol. Pesq. Fl., Colombo, n. 45, jul/dez. 2002 p. 99-109

[33] According with EMBRAPA (Brazilian Agricultural Research Corporation's). Available at: < https://www.spo.cnptia.embrapa.br/conteudo?p_p_id=conteudoportlet_WAR_sistemasdeproducaolf6_1ga1ceportlet&p_p_lifecycle=0&p_p_state=normal&p_p_mode=view&p_p_col_id=column-2&p_p_col_count=1&p_r_p_-76293187_sistemaProducaoId=7705&p_r_p_-996514994_topicoId=10308>. Last visit on: 18/09/2019

[34] Available at: <https://grnews.com.br/25112018/grnews/novas-tecnologias-para-producao-de-caju-de-alto-desempenho>. Last visit on 18/09/2019.

cashew trees must be cutted[35]. Moreover, dry branches on the ground compound a considerable amount of residues from cashew trees cultivation.

There is no estimated amount of residues from cashew trees, however its abundant availability is well-known all over the country. Besides, in order to destine the great amount of residues from cashew trees, the Brazilian´s government allowed the utilization of this residue as firewood.

According to "Plantar Caju" cashew trees cultivation presents an average density of 300 units of trees per hectare[36], and the production of firewood residues from each tree is 2.5 kg per year[37]. The cultivation of cashew is located in an area of 650,000 hectares. This way, the Brazilian production of residues from cashew trees is around 82,875 tonnes per year. According with other ceramic industry that utilizes this fuel[38], this project activity would be responsible for the consumption of around 2,400 tons per year, or around 3% of the total production of residues from cashew trees. Thus, the amount of residues from cashew trees necessary to provide thermal energy in the ceramics' kilns would not be significant, which avoids the possibility of leakage.

Eucalyptus wood

The area destined for afforestation in Brazil corresponds to 5.6 millions of hectares, where the Eucalyptus genus corresponds to 3.5 millions of this area, and can generate 23 to 25 tonnes of biomass per hectare[39]. The grand major of these cultivations were established in the middle of 1970 to 1980. The Eucalyptus and Pinus genuses correspond to 80% of the afforestation in Brazil.

In addition, sustainable management practices of the afforestation in Brazil (as the techniques of preparation, fertilization, control of weeds, improved seeds, cloning and reform) were introduced and constantly improved in order to increase its productivity[40]. As a consequence, Brazil withholds the best productivity taxes (in $m^3/ha/year$) over the world due to the adaptation of these species to the Brazilian territory and the success of the experiments of genetic improvement[41].

The production of wood from afforestation in the state of Bahia, which is a bordering state in the northeast region of Brazil, was of 13,259,341 m^3[42] in 2007. According with other ceramic industry that utilize this biomass[43], the consumption of this kind of fuel by Buenos Aires Ceramic would be around 1,560 m^3 per year, what would represent around 0.01% of the total of Eucalyptus wood produced in the region.

Sawdust

The production of wood generates a large amount of residues, which can be reused to generate thermal energy, considering that around 22% of the wood produced will generate sawdust[44]. The production of wood in the state of Pernambuco was 13,259,341 m^3 [45] in 2007. Thus, the production of sawdust was 2,917,055 m^3 per year.

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[35] According with EMBRAPA (Brazilian Agricultural Research Corporation's). Available at: < https://ainfo.cnptia.embrapa.br/digital/bitstream/item/162248/1/A-cultura-do-caju.pdf>. Last visit on: 18/09/2019.

[36] According with EMBRAPA (Brazilian Agricultural Research Corporation's). Available at: < https://ainfo.cnptia.embrapa.br/digital/bitstream/item/162248/1/A-cultura-do-caju.pdf>. Last visit on: 18/09/2019

[37] According with "Manual de Aplicação de sistemas descentralizados de Geração de Energia elétrica para projetos de Eletrificação rural" Available at: <http://www.cepel.br/~per/download/rer/rt-789-00.pdf>.

[38] According with J. L. Silva ceramic, which utilizes around 150 tons of cashew tree pruning per month in order to produce ¾ of Buenos Aires production.

[39] Available at: <http://www.agencia.fapesp.br/materia/9405/especiais/eucalipto-no-pareo.htm>. Last visit on: 29/08/2019

[40] MCT/IPEF. Silvicultura e Manejo. Source: <https://www.ipef.br/silvicultura/>. Last visit on: 29/08/2019.

[41] JUVENAL, T. L.; MATTOS, R. L. G. O setor florestal no Brasil e a importância do reflorestamento. BNDES Setorial, Rio de Janeiro, n. 16, p. 3-30, set. 2002. Available at: <https://web.bndes.gov.br/bib/jspui/handle/1408/3142>. Last visit on: 29/08/2019.

[42] According to IBGE (Geographic and Statistic Brazilian Institute). Available at: <http://www.ibge.gov.br/estadosat/temas.php?sigla=ba&tema=extracaovegetal2007>. Last visit on: 29/08/2019.

[43] According with Bom Jesus Ceramic, which utilizes around 78 m^3 of Eucalyptus wood per month in order to produce 60% of Buenos Aires production.

[44] BRITO EO. **Estimativa da produção de Resíduos na Indústria Brasileira de Serraria e Laminação de Madeira**. Rev. da Madeira. v.4. n.26. 1995, pp. 34-39.

[45] Available at: <http://www.ibge.gov.br/estadosat/temas.php?sigla=pe&tema=extracaovegetal2007>. Last visit on 04/10/18.

According to other ceramic industry that utilize this fuel[46], Buenos Aires ceramic industry would utilize 13,080 m³ per year, i.e. the factory would utilize less than 1% of the biomass availability in the state of Bahia. This way, this renewable biomass does not have potential to generate leakage emissions due to its high availability.

As can be observed in the figure below, the potential of energy generation in the state of Bahia is considered high, which means that there is an enormous availability of this kind of fuel to be employed in the project activity.

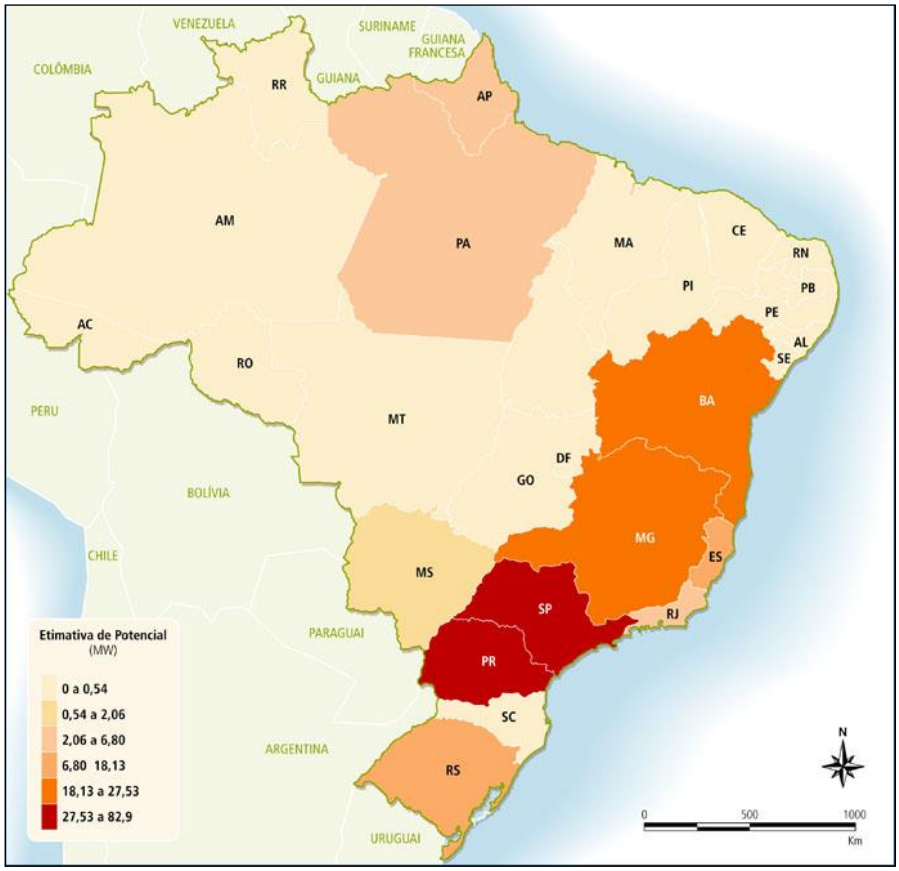


Figure 2. Woody Residues Potential for Energy Generation[47]

Coconut fiber

The coconut has several uses, which briefly is used for aliment, water, fiber among others. Coconut fiber is produced from coconut husk, which is a common residue at northeast region of Brazil, reaching 6.7 millions tonnes of coconut husk annually[48]. To produce coconut fiber, it is utilized some equipments in order to crush, press and segregate fiber and power.

Considering the residue generation stated above, and that only 4.5% of the coconut husk is converted into coconut fiber[49], thus, the northeast coconut fiber generation is around 301,500 tons yearly.

[46] According with Bandeira Ceramic, which utilizes around 545 m³ of sawdust per month in order to produce 50% of Buenos Aires production.

[47] CENTRO NACIONAL DE REFERÊNCIA EM BIOMASSA - CENBIO. **Panorama do potencial de biomassa no Brasil.** Brasília; Dupligráfica, 2003. 80 p.

[48] MACEDO, G.R. **Desenvolvimento de bioprocessos para agregação de valor a resíduos agroindustriais do Nordeste.** Available at: <http://www.sbpcnet.org.br/livro/60ra/textos/SI-GoreteMacedo.pdf>. Last visit on: 29/08/2019.

[49] ROSA, M. F. et al. **Caracterização do pó da casca de coco verde usado como substrato agrícola.** EMBRAPA. Available at: <https://www.embrapa.br/busca-de-publicacoes/-/publicacao/423156/caracterizacao-do-po-da-casca-de-coco-verde-usado-como-substrato-agricola>. Last visit on: 29/08/2019.

This project activity would be responsible for the consumption of around 1,713 tons of coconut fiber per year[50], or around 0.6% of the coconut fiber availability. Therefore, this biomass is widely available in the region, once its use for generate thermal energy may be a solution for the solid waste disposal in these cities.

Elephant grass

In case of using elephant grass[51] it will be cultivated in pasture or degraded areas, in which there is no vegetation to be deforested. Therefore, this practice will not generate competing use of biomass and it will not deforest a vegetated area, therefore the leakage that would be applicable is the emissions from biomass generation/cultivation. Currently, elephant grass has been acquiring national importance as biomass[52] to generate thermal energy due to its high productiveness and easy adaptation in almost all climate and soil Brazilian conditions.

In case of using this kind of biomass, the ceramic company will cultivate, by itself, elephant grass in abandoned areas, in which there is no vegetation to be deforested. Therefore, this practice will not generate competing use of biomass and it will not deforest a vegetated area, i.e. only the leakage from biomass cultivation will be monitored in case of its use.

Moreover, studies of drying elephant grass in order to employ it as fuel are being done and there are possibilities of start using this as renewable biomass in the project. Elephant grass has an excellent net calorific value when it is dried, although its drying process is still a problem for the project proponents.
This way, these renewable biomasses do not have potential to generate leakage emissions due to their high availability.

Furthermore, the project might use different types of renewable biomasses during the crediting period. In that case, leakage shall be assessed according to Gold Standard for Global Goals requirements.

According to the applied methodology, emission reductions achieved by the project activity will be calculated as follows:

$$ER_y = B_y \times f_{NRB,y} \times NCV_{biomass} \times EF_{projected\_fossilfuel}$$

Where,
ERy: Emission reductions during the year y in tCO2e

By: Quantity of woody biomass that is substituted or displaced in tonnes

***f*NRB,y**: 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

NCVbiomass: Net calorific value of non-renewable woody biomass that is substituted, in TJ/tonne

EFprojected fossil fuel: Emission factor for substitution of non-renewable woody biomass by similar consumers, in tCO2e/TJ.

Table 4. Emission reductions of Buenos Aires Renewable Energy Project

Year	*Total Baseline Emissions (tCO_2e)*	*Project Emissions (tCO_2e)*	*Total Leakage Emissions (tCO_2e)*	*Emission Reductions (tCO_2e)*
March 01st, 2012	20,267	0	0	20,267

[50] According to CGM Ceramic, located at Crato – CE, which utilizes around 60 tons of coconut husk per month to maintain a 2.38 times lesser production.

[51] An African grass mostly used to feed cattle which its fast growing can promote four harvests per year. It was verified, after many studies, that the Elephant Grass when dried is a great source of biomass that can be used to energy generation purposes.

[52] Source: <https://www.embrapa.br/busca-de-publicacoes/-/publicacao/1043423/capim-elefante-como-biomassa-para-producao-de-energia> Last visit on 18/09/2019

2013	27,023	0	0	27,023
2014	27,023	0	0	27,023
2015	27,023	0	0	27,023
2016	27,023	0	0	27,023
2017	27,023	0	0	27,023
2018	27,023	0	0	27,023
2019	27,023	0	0	27,023
Total (tCO_2e)	**209,428**	0	0	**209,428**
Number of years of the crediting period[53]	7 years and 10 months	7 years and 10 months	7 years and 10 months	7 years and 10 months
Annual average of estimated emissions (tCO_2e)	**26,179**	**0**	**0**	**26,179**
Total (tCO_2e)	**209,428**	**0**	**0**	**209,428**

A.3 Data and parameters fixed ex ante for monitoring contribution to each of the three SDGs

Relevant SDG Indicator	SDG 13
Data/parameter	EFprojected fossil fuel
Unit	tCO_2/TJ
Description	Emission factor for substitution of non-renewable woody biomass by similar consumers
Source of data	Approved small scale methodology AMS-I.E "Switch from Non-Renewable Biomass for Thermal Applications by the User", version 05.
Value(s) applied	81.6 tCO2/TJ
Choice of data or Measurement methods and procedures	In the baseline scenario, non-renewable biomass was used as an energy source. This is the common practice for the red ceramic sector in the project region. As described, the use of fossil fuel is the most likely scenario in the absence of non-renewable biomass. This emission factor is recommended by the applied methodology.
Purpose of data	This parameter will be used to calculate baseline emissions from the use of the fossil fuel that would be used in the baseline scenario, i.e. oil.
Additional comment	Applicable for stationary combustion in the manufacturing industries and construction.

Relevant SDG Indicator	SDG 13
Data/parameter	NCVbiomass
Unit	TJ/tonne
Description	Net calorific value of the non-renewable woody biomass that is substituted
Source of data	Approved small scale methodology AMS-I.E "Switch from Non-Renewable Biomass for Thermal Applications by the User", version 05.

[53] The Project started the crediting period in VCS Standard in 01/01/2010. Stard date of the crediting period in Gold Standard is 01/03/2012. During ten years of this project, 2 years and 2 months of them were VCS, furthermore, 7 years and 10 months corresponds to Gold Standard crediting period. More information on the Project timeline is available in section D.1.1

Value(s) applied	0.015
Choice of data or Measurement methods and procedures	In the baseline scenario, non-renewable biomass was used as an energy source. This is the common practice for the red ceramic sector in the project region. Applied value is recommended by the approved methodology.
Purpose of data	This value will provide the energy generated by the amount of wood that would be used in the absence of the project.
Additional comment	-

Relevant SDG Indicator	SDG 13
Data/parameter	$\rho_{biomass}$
Unit	Tonnes/m^3
Description	Specific density of non-renewable biomass type *j*
Source of data	Brazilian study carried out with Caatinga wood utilized at the ceramic sector: NASCIMENTO, W. S. A. **Avaliação dos Impactos Ambientais Gerados Por Uma Indústria Cerâmica Típica da Região do Seridó/RN.** Dissertação (Mestrado em Engenharia Mecânica), Universidade Federal do Rio Grande do Norte, Natal, 2007. Available at: <https://repositorio.ufrn.br/jspui/handle/123456789/15735>. Last visit on: 03/09/2019. 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. **Associação de Plantas do Nordeste**. Projeto Madeira. Available at: <http://www.plantasdonordeste.org/madeiras.pdf>.
Value(s) applied	0.8072
Choice of data or Measurement methods and procedures	The amount of wood used in the baseline was measured by volume units, so this data is used to the unity conversion. The species used to calculate the average value are typical trees of *Caatinga* Biome that are usually employed as fuel in the ceramic industries of the region.
Purpose of data	This parameter will be used to convert the amount of biomass consumed by the project activity from volume to weight. Applicable for the calculation of leakage emissions due to competing use of biomass, and for the calculation of the ratio of biomass used in the project activity.
Additional comment	It was included species that are usually employded as fuel from Caatinga Biome in the ceramic sector according to "NASCIMENTO, W.S.A.". These species present such good characteristics in order to be applied as fuel in the ceramic kilns. The specific gravity of non-renewable wood value is the same adopted in the Buenos Aires Ceramic - VCS Project Description, version 08.

Relevant SDG Indicator	SDG 13
Data/parameter	BFy
Unit	Tonnes of wood per thousand of ceramic pieces
Description	Quantity of woody biomass per thousand of ceramic units fired in year y

Source of data	Historical data from ceramic owner[55], according to the baseline determinated in the VCS PD.
Value(s) applied	0.7904
Choice of data or Measurement methods and procedures	The value was acquired using historical data on woody biomass consumption and production of ceramic pieces when the ceramic used to consume non-renewable wood. Data from August, 2007 to July, 2008 was used. The value is employed to calculate the real amount of wood displaced to maintain the ceramic production in the baseline scenario.
Purpose of data	The value is utilized to calculate quantity of biomass necessary to fire a thousand of ceramic units per year
Additional comment	-

[55] The BFy was determinated in the VCS PD. The value was acquired through the average consumption and production of ceramic pieces during the years when the ceramic used to consume non-renewable wood.

SECTION B Safeguarding Principles Assessment

B.1 Analysis of social, economic and environmental impacts

Safeguarding principles	Sub-principle	Assessment questions	Assessment of relevance to the project (Yes/potentially/no)	Justification	Mitigation measure (if required)
Social Safeguarding Principles					
Principle 1 - Human Rights		a. Does the Project disrespect any article of the Universal Declaration of Human Rights?	No	The project is not expected to result in Human right abuses. Brazil ratified several treaties and conventions on human rights, including the American Convention on Human Rights (also known as the Pact of San José)[56] .	Not Required
		b. Does the Project prevent one or more fundamental human rights and/or freedoms from being fully realized?	No	The Project does not foresee any aggression against the free will of any human being.	Not Required
		c. Does the Project promote or support actions that may contribute to violation of a State's human rights?	No	The project does not involve any actions that contribute to violation of a State's human right.	Not Required
Principle 2 – Gender Equality and Women's Rights		a. Does the Project consider gender roles and the abilities of women or men to benefit from the Project's activities, reinforcing gender-based discrimination? Is there a possibility that the Project might reduce or put at risk women's access to or control of resources, entitlements and benefits?	No	The Project will not promote distinction between men and women, and is not expected to put at risk women's access to or control of resources, entitlements and benefits.	Not Required

[56] More information on: <http://www.oas.org/dil/treaties_B-32_American_Convention_on_Human_Rights_sign.htm>

		Does the Project design contribute to an increase in women's workload that adds to their care responsibilities or that prevents them from engaging in other activities?	No	Not relevant. The project design does not affect women's workload and/or prevents them from engaging in other activities.	Not Required
		Would the Project potentially limit women's ability to use, develop and protect natural resources, taking into account different roles and priorities of women and men in accessing and managing environmental goods and services?	No	The project does not reproduce or support any kind of gender discrimination and it does not affect women's ability to use, develop and protect natural resources.	Not Required
		Is there a likelihood that the proposed Project would expose women and girls to further risks or hazards?	No	The project activity involves adaptation of equipment and adjustments in the kiln entrances to embed mechanic burners and to permit the entrance of the renewable biomasses, which also improves working conditions, mechanizing the furnace feed. Thus, there is a reduction in exposure to risks and hazards for employees of all genders.	Not Required
Principle 3 – Community Health, Safety and Working		Does the project affect the employees' freedom of association and their right to collective bargaining?	No	Not relevant. The project will not affect the employees' freedom of Association. The Brazilian Government has ratified[57] 5 conventions of the	Not Required

[57] More information on: https://www.ilo.org/dyn/normlex/en/f?p=1000:11200:0::NO:11200:P11200_COUNTRY_ID:102571

Conditions				International Labor Organization on Freedom of Association, Collective Bargaining, and Industrial Relations. These include Conventions C098 (Right to Organize and Collective Bargaining Convention), C135 (Workers' Representatives Convention), C141 (Rural Workers' Organizations Convention), C151 (Labor Relations (Public Service) Convention) and C154 (Collective Bargaining Convention). Such conventions aim to provide workers' with important rights and benefits, such as protection against acts of anti-union discrimination in respect of their employment, effective protection against any act prejudicial to workers based on their status or activities as a workers' representative or on union membership or participation in union activities, ensure rural workers and public employees the principles of	

				freedom of association, amongst others. These principles are respected by the project proponents.	
		Does the project involve or is complicit in any form of forced or compulsory labor?	No	The project will not involve any form of forced or compulsory labor. Brazil has ratified ILO Conventions C29 (Forced Labor Convention) and C105 (Abolition of Forced Labor Convention). These conventions determine that each Member which ratifies it undertakes to take effective measures to secure the immediate and complete abolition of forced or compulsory labor: (a) as a means of political coercion or education or as a punishment for holding or expressing political views or views ideologically opposed to the established political, social or economic system; (b) as a method of mobilizing and using labor for purposes of economic development; (c) as a means of labor discipline; (d) as a punishment for having participated in strikes;	Not Required

				(e) as a means of racial, social, national or religious discrimination.	
		Does the project provide workers with a safe and healthy work environment and is not complicit in exposing workers to unsafe or unhealthy work environment?	Yes	Employees in the ceramic sector are exposed to several occupational hazards that may compromise their health and safety. Thus, it is necessary to prioritize measures that eliminate or reduce the workers' exposure to these risks. Consequently, the use of PPE will be monitored by the project activity. The Company also applies the Environmental Risks Prevention Program (PPRA), a program established by the Norma Regulamentadora - NR-9 of the Secretariat of Labor Health and Safety of the Minister of Labor. It works in accordance with the Medical Control in Occupational Health Program – PCMSO, the NR-7, to promote Occupational Health. In case of a serious injury, the ceramic factory provides a personal transportation to the	Health and safety regulations are complied with. The project is expected to have a positive effect on the working conditions. As a mitigation measure, the project will monitor Actions of Health and Security through indicator GS.2 – Number of Health and Security trainings and campaigns conducted during monitoring period.

				nearest hospital. In case of minor injuries Buenos Aires ceramic has a first aid material to attend the employees. Buenos Aires ceramic hired a consulting Engineer of Health and Safety at Work to make an assessment of the potential risks and which points can be improved within the company. Measures are being implemented at the moment. In addition, employees, who are allocated in charges are considered of higher insalubrities and earn additional income on their payment according to Brazilian Law[58]	
Principle 4 – Cultural Heritage, Indigenous Peoples, Displacement and Resettlement	4.1 Sites of Cultural and Historical Heritage	a. Does the Project Area include sites, structures, or objects with historical, cultural, artistic, traditional or religious values or intangible forms of culture (e.g., knowledge, innovations, or practices)?	No	The project area does not include sites, structures or objects with historical, cultural, artistic, traditional or religious values or intangible forms of culture.	Not Required
	4.2 Forced Eviction and Displacement	a. Does the Project require or cause the physical or economic relocation of	No	The project does not involve any kind of resettlement or relocation.	Not Required

[58] Information regarding additional payment due to insalubrious working conditions are available at: < http://www.planalto.gov.br/ccivil_03/LEIS/L6514.htm#art193>

		peoples (temporary or permanent, full or partial)?			
	4.3 Land Tenure and Other Rights	a. Does the Project require any change to land tenure arrangements and/or other rights?	No	Not relevant. The project does not involve any land tenure arrangements and/or other rights.	Not Required
	4.4 Indigenous Peoples	a. Are indigenous peoples present in or within the area of influence of the Project and/or is the Project located on land/territory claimed by indigenous peoples?	No	The Project is not located on or near indigenous lands.	Not Required
Principle 5 – Corruption		Does the Project have non-conformity with current anti-corruption legislation or is it not committed to conduct the activities honestly?	No	The Project complies with current federal[59] and state[60] anti-corruption legislation.	Not Required
Economic Safeguarding Principles					
Principle 6 – Economic Impacts	6.1 Labour Rights	a. Does the Project foresee as a consequence of its activities the generation of informal labour/child labour/forced labour?	No	The project will not involve any form of child labor. Brazil has ratified ILO Conventions C138 (Minimun Age Convention) and C182 (Worst Forms of Child Labor Convention) [61] . Convention C138 determines that each Member for which this Convention is in force undertakes to pursue a	Not Required

[59] Federal law nº 12.846, August 1st, 2013. Available at: <http://www.planalto.gov.br/ccivil_03/_ato2011-2014/2013/lei/l12846.htm>. Access on 09/12/2019.

[60] State Decree nº 46.782, June 23th, 2015. Available at: https://www.legisweb.com.br/legislacao/?id=286118. Access on 09/12/2019.

[61] More information on: https://www.ilo.org/dyn/normlex/en/f?p=1000:11200:0::NO:11200:P11200_COUNTRY_ID:102571

				national policy designed to ensure the effective abolition of child labor and to raise progressively the minimum age for admission to employment or work to a level consistent with the fullest physical and mental development of young persons. Convention C182 determines that Each Member which ratifies this Convention shall take immediate and effective measures to secure the prohibition and elimination of the worst forms of child labor as a matter of urgency. Worst forms of child labor include: all forms of slavery or practices similar to slavery, the use, procuring or offering of a child for prostitution, for the production of pornography or for pornographic performances, the use, procuring or offering of a child for illicit activities, in particular for the production and trafficking of drugs, work which, by its nature or the circumstances in	

				which it is carried out, is likely to harm the health, safety or morals of children. No child labor is involved in any phase of this project activity, nor in the collection of biomass used by the project proponents.	
	6.2 Negative Economic Consequences	a. Does the project cause negative economic consequences during and after project implementation, e.g., for vulnerable and marginalized social groups in targeted communities?	No	The project does not cause negative economic consequences for vulnerable and marginalized social groups.	
Environmental/Ecological Safeguarding Principles					
Principle 7 – Climate and Energy	7.1 Emissions	a. Will the Project increase greenhouse gas emissions over the Baseline Scenario?	No	The Project will reduce greenhouse gas emissions when compared to the baseline scenario.	Not Required
	7.2 Energy Supply	a. Will the Project use energy from a local grid or power supply (i.e., not connected to a national or regional grid) or fuel resource (such as wood, biomass) that provides for other local users?	Yes	The project is expected to positively impact the access to affordable and clean energy services. The measures applied by the project activity will result in renewable energy generation by utilizing renewable biomasses, thus providing alternative and clean energy sources that were not utilized in the baseline scenario.	Leakage emissions from competing use of biomass will be monitored annually. The project aims to use predominantly biomass residues that are abundant within the project region, in a manner to avoid the occurrence of leakage emissions.

Principle 8 – Water	8.1 Impact on Natural Water Patterns/Flows	a. Will the Project affect the natural or pre-existing pattern of watercourses, groundwater and/or the watershed(s) such as high seasonal flow variability, flooding potential, lack of aquatic connectivity or water scarcity?	No	The fuel switching project is not expected to result in impacts in water quality and quantity. Although water is used in the brick production process during the molding phase, the project only involves modifications in the burning phase, where impacts on water are unlikely to occur. The use of water shall remain similar to the baseline situation, where major impacts on water quality and quantity are not observed.	Not Required
	8.2 Erosion and/or Water Body Instability	a. Could the Project directly or indirectly cause additional erosion and/or water body instability or disrupt the natural pattern of erosion?	No	The project does not cause any additional erosion and/or water body instability. Although clay is used for the brick production, the project only involves modifications in the burning and drying phases, where no impacts on erosion occur. The use of clay shall remain similar to the baseline situation, where major significant impacts on erosion were not observed. The ceramic industry has all the clay extraction licenses and adopt the best measures to avoid erosions, such as reforestation of explored areas.	Not Required

Principle 9 - Environment, ecology and land use	9.1 Landscape Modification and Soil	a. Does the Project involve the use of land and soil for production of crops or other products?	Yes	The ceramic has a dedicated plantation of Eucalyptus and uses the wood as fuel according to the plantation growth cycle.	The monitoring of harvesting is made through invoices and registry of harvested wood quantity. The production's main fuel source is through the purchase of biomass from external suppliers.
	9.2 Vulnerability to Natural Disaster	a. Will the Project be susceptible to or lead to increased vulnerability to wind, earthquakes, subsidence, landslides, erosion, flooding, drought or other extreme climatic conditions?	No	Not relevant. The project activity is not affected by natural disasters. By reducing the GHG emission in the ceramic production, the project will contribute to reduce the ceramic's impact in climate change and its consequences.	Not Required
	9.3 Genetic Resources	a. Could the Project be negatively impacted using genetically modified organisms or GMOs (e.g., contamination, collection and/or harvesting, commercial development)?	No	Not relevant. The project is not negatively impacted by the use of genetically modified organisms.	Not Required
	9.4 Release of pollutants	a. Could the Project potentially result in the release of pollutants to the environment?	No	The fuel switching project is not expected to result in increase or decrease of other pollutants. Brazilian legislation does not establish	The ceramic owner will monitor atmospheric emissions with the use of Ringelmann smoke charts and

				emission standards to ceramic industries, which indicates that these impacts are not expected to occur. Impacts on other pollutants due to the transportation of biomass are not expected, since similar means of transportation (mainly trucks) were used in the baseline for the transportation of non-renewable biomass.	atmospheric reports as recommended by the environmental authority of Pernambuco. It will be monitored through the parameter "Emissions to the atmosphere".
	9.5 Hazardous and Non-hazardous Waste	a. Will the Project involve the manufacture, trade, release, and/or use of hazardous and nonhazardous chemicals and/or materials?	Yes	Not relevant. The project does not involve the manufacture, trade, release, and/ or use of hazardous chemicals and/or materials. Regarding non-hazardous wastes, all residues from the project activity are correctly destined. The ashes generated during the production process are reused to seal the kiln's doors or destined to other reuses.	The ashes resulted from the biomass combustion should be controlled and proper destined. The monitoring parameter will be the indicator "Procedures related to the control and disposal of ashes"
	9.6 Pesticides & Fertilizers	a. Will the Project involve the application of pesticides and/or fertilizers?	No	The project does not involve the use of pesticides or fertilizers.	Not Required
	9.7 Harvesting of Forests	a. Will the Project involve the harvesting of forests?	No	The project will predominantly use native wood from sustainable management plans and Algaroba wood as fuels.	The origin of the renewable biomass should be assessed through

				In the baseline situation, Buenos Aires ceramic used 100% of non-renewable woody biomass for thermal energy generation. Therefore, the project will discourage deforestation to obtain firewood.	documents (receipts, invoices and legal documents) from biomasses providers. The different types of biomasses are considered renewable as fulfilling definitions of renewable biomass approved by the CDM Executive Board[62].
	9.8 Food	a. Does the project modify the quantity or nutritional quality of food available such as through crop regime alteration or export or economic incentives?	No	Not relevant. The project does not affect the quantity or nutritional quality of food available.	Not Required
	9.9 Animal Husbandry	a. Will the Project involve animal husbandry?	No	Not relevant. The project does not involve animal husbandry.	Not Required
	9.10 High Conservation Value Areas and Critical Habitats	a. Does the Project physically affect or alter largely intact or High Conservation Value (HCV) ecosystems, critical habitats, landscapes, key biodiversity areas or sites identified?	No	The project does not affect or alter largely intact or HCV ecosystems, critical habitats, landscapes, key biodiversity areas or sites identified.	Not Required

[62] EB 23, Annex 18 – Definition of renewable biomass. Available at: <http://cdm.unfccc.int/EB/Meetings/023/eb23_repan18.pdf>. Last visit on: 16/09/2019.

				Buenos Aires ceramic used 100% of non-renewable woody biomass for thermal energy generation. Therefore, the project will discourage deforestation to obtain firewood.	
	9.11 Endangered Species	a. Are there any endangered species identified as potentially being present within the Project boundary (including those that may route through the area)?	No	The project does not affect endangered species.	Not Required
		b. Does the Project potentially impact other areas where endangered species may be present through transboundary affects?	No	The project does not affect endangered species.	Not Required

SECTION C Monitoring plan

C.1 Data and parameters to be monitored

Relevant SDG Indicator/Safeguarding Principle	SDG 13 - Indicator 13.3 Improve education, awareness-raising and human and institutional capacity on climate change mitigation, adaptation, impact reduction and early warning.
Data / Parameter	PRy
Unit	Thousands of ceramic pieces
Description	Amount of products produced in year y
Source of data	Controlled by the ceramic owner
Value(s) applied	Value applied in the baseline scenario was 3,524 thousands of ceramic devices produced monthly. However, the current ceramic production average data, considering the period from January to March 2013 is 2,560 thousands of ceramic pieces per month.
Measurement methods and procedures	This parameter is monitored by employees on Buenos Aires ceramic, counting the total production on a daily or weekly basis. Values used for the calculations are taken either from sales report or from production control documents. Data will be aggregated on a monthly and yearly basis. Measurements are done by an internal control sheet monitored by the project proponent. The production might also be used to ensure that all appliances are still in operation.
Monitoring frequency	Monthly
QA/QC procedures	The ceramic has an internal control of the quantity of pieces produced. It will be rechecked according to the biomasses utilized and the kiln consumption of renewable biomass.
Purpose of data	This parameter is used to calculate the amount of products produced in year y.
Additional comment	Although this information originates from internal data, margins of error for this parameter are expected to be small, since they are used to assess the productivity of Buenos Aires Ceramic. Hence, this information is considered to be from a reliable nature. Data will be kept dor two years after the end of the crediting period or the last issuance of carbon credits for this project activity, whichever occurs later.

Relevant SDG Indicator/Safeguarding Principle	SDG 13 - Indicator 13.3 Improve education, awareness-raising and human and institutional capacity on climate change mitigation, adaptation, impact reduction and early warning.
Data / Parameter	Qrenbiomass
Unit	Tonnes
Description	Amount of renewable biomass used during year y of the crediting period
Source of data	Measured by the biomass providers and controlled by the ceramic owner.
Value(s) applied	This parameter is not directly used for the calculation of emission reductions. It is assumed that the consumption of renewable biomass will be enough to provide 100% of the energy demand for the production of ceramic pieces.

<table>
<tr><td>Measurement methods and procedures</td><td>The amount of Algaroba wood and wood from sustainable management plan areas will be monitored by the weighing receipts issued by the weighbridge system of Buenos Aires ceramic.

Besides that, the amount of renewable biomass can also be monitored through purchase invoice, delivery notes or other documents concerning the acquisition of renewable biomasses. Biomass providers measure the amount of products delivered to the ceramic factory to determine due financial compensation.
In case any renewable biomass is measured in volume, default values of specific gravity shall be used to convert it to tonnes. Values below might be applied for the given biomass types:

<table>
<tr><th>Biomass type</th><th>Specific gravity (tonnes/m³)</th></tr>
<tr><td>Algaroba</td><td>0.9500</td></tr>
<tr><td>Wood from sustainable forest management</td><td>0.8072</td></tr>
</table>

These value were taken from the source below:

<u>Wood from sustainable management plan areas</u>

NASCIMENTO, W. S. A. Avaliação dos Impactos Ambientais Gerados Por Uma Indústria Cerâmica Típica da Região do Seridó/RN. Dissertação (Mestrado em Engenharia Mecânica), Universidade Federal do Rio Grande do Norte, Natal, 2007. Available at: < https://repositorio.ufrn.br/jspui/handle/123456789/15735>. Last visit on 09/09/2019.

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.

Associação de Plantas do Nordeste. Projeto Madeira. Available at: < http://www.cnip.org.br/produtos/livros01.html >. Last visit on 09/09/2019.

<u>Algaroba Wood</u>
BARROS, B. C. Volumetria, Calorimetria e fixação de carbono em florestas plantadas com espécies exóticas e nativas. Recife, PE. 2009. Disponível em: <http://www.tede2.ufrpe.br:8080/tede2/handle/tede2/5454>. Last visited on 09/09/2019.</td></tr>
<tr><td>Monitoring frequency</td><td>This parameter was monitored by documents concerning the acquisition of renewable biomasses, counting the biomass purchase on a daily or weekly basis. Data was aggregated on a monthly and yearly basis.</td></tr>
<tr><td>QA/QC procedures</td><td>Buenos Aires ceramic shall store all documents related to the purchase or acquisition of renewable biomass. Data will be compared to production output.</td></tr>
<tr><td>Purpose of data</td><td>This parameter was monitored to calculate the amount of renewable biomass used during year y of the crediting period.</td></tr>
<tr><td>Additional comment</td><td>Monitored data for this parameter comes from third party information, which is used for commercial purposes (to determine financial compensations between the ceramic owner and the suppliers. Hence, this information is considered to be reliable.
Data will be kept for two years after the end of the crediting period or the last issuance of carbon for this project activity, whichever occurs later.</td></tr>
</table>

Relevant SDG Indicator/Safeguarding Principle	SDG 13 - Indicator 13.3 Improve education, awareness-raising and human and institutional capacity on climate change mitigation, adaptation, impact reduction and early warning.
Data / Parameter	$f_{NRB,y}$
Unit	Fraction
Description	Fraction of woody biomass used in the absence of the project activity in year y that can be established as non-renewable using survey methods.
Source of data	Survey methods
Value(s) applied	0.9093
Measurement methods and procedures	The monitoring of this parameter will be based on national and international articles, databases and data monitored by the project developer such as project activities at the same region. The sources will provide information about the availability of woody biomass in the Caatinga biome.
Monitoring frequency	Each monitoring period
QA/QC procedures	Data from published sources will be used to determine this parameter.
Purpose of data	This parameter is used to calculate Baseline emissions. The $f_{NRB,y}$ determines the fraction of biomass (wood) used in the absence of
Additional comment	Data will be kept for two years after the end of the crediting period or the last issuance of carbon credits for this project activity, whichever occurs later.

Relevant SDG Indicator/Safeguarding Principle	Safeguarding Principle 9.1/SDG 13 - Indicator 13.3 Improve education, awareness-raising and human and institutional capacity on climate change mitigation, adaptation, impact reduction and early warning.
Data / Parameter	Origin of Renewable Biomass
Unit	Not applicable
Description	Renewable origin of the biomass
Source of data	Controlled by the ceramic owner
Value(s) applied	Not applicable
Measurement methods and procedures	This information will be given by the biomasses providers. The guarantee of acquiring renewable biomass will be achieved by invoices from the providers. Biomasses are considered renewable as fulfilling definitions of renewable biomass approved by the CDM Executive Board[63]. Also, Sustainable Carbon and Buenos Aires Ceramic will work with biomass providers to allow tracking the origin of Algaroba firewood. Biomass providers and/or land owners shall be contacted to ensure a sustainable management of Algaroba forests, in accordance with national regulations.
Monitoring frequency	Every monitoring period
QA/QC procedures	Ceramic owner shall store invoices, receipts of sales or other documents to allow the traceability of the renewable biomass.
Purpose of data	Not directly applied for calculations. This parameter will be used to guarantee that all biomass acquired by the project activity has a renewable origin.
Additional comment	The biomasses will be considered as renewable if they are in accordance to the definition by the CDM Executive Board. 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.

[63] Available at: <http://cdm.unfccc.int/EB/023/eb23_repan18.pdf>. Last visited on 09/09/2019.

Relevant SDG Indicator/Safeguarding Principle	SDG 13 - Indicator 13.3 Improve education, awareness-raising and human and institutional capacity on climate change mitigation, adaptation, impact reduction and early warning.
Data / Parameter	Leakage due to competing uses of biomass
Unit	tCO2e
Description	This source of leakage is relevant for biomass residues and biomass from existing forests, according to the general guidance on leakage in biomass project activities. The surprlus of new kinds of renewable biomass available will be assessed to determine the occurrence of leakage.
Source of data	Surveys, national or international databases. Information on the biomass availability and consumption of Algaroba firewood was assessed by Sustainable Carbon following a methodological plan that is based on primary and secondary data collection regarding the availability and consumption of biomass in the supply basin on Buenos Aires Ceramic. This survey was used as reference to determine the surplus availability of Algaroba firewood.
Value(s) applied	0 (zero)

Measurement methods and procedures	According to the general guidance on leakage in biomass project activities (attachment C of Appendix B)64, the project participant shall evaluate ex ante if there is a surplus of the biomass in the region of the project activity, which is not utilized. If it is demonstrated (e.g., using published literature, official reports, surveys etc.) at the beginning of each crediting period that the quantity of available biomass in the region (e.g., 50 km radius), is at least 25% larger than the quantity of biomass that is utilized including the project activity, then this source of leakage can be neglected otherwise this leakage shall be estimated and deducted from the emission reductions. The calculated values of surplus are as follows: - 25.72% for Algaroba firewood - 154.17% for wood from areas with sustainable forest management plan Sustainable Carbon applied a methodological approach to assess biomass surplus by building supply and demand balances of Algaroba firewood. The methodology relies on secondary and primary, field-collected data about the production and consumption of biomass. Thus, conclusions were obtained about the surplus of Algaroba firewood, the biomass type currently used. Given the results of such survey, leakage emissions from this biomass will be neglected. In regard to wood from areas with sustainable forest management plan, Sustainable Carbon has developed a methodology that assesses the availability and surplus of Caatinga firewood from forest management plans. According to the methodology applied, the effective capacity of a managed forest to sustain a certain level of harvest depends on its growth rate, indicated by the Mean Annual Increment (MAI). This value represents the mean rate of harvestable growth of wood that is expected to occur in the managed area and consists of measuring the harvestable stock by an inventory and dividing this value by the number of years in the cutting cycle. However, this methodology does not take into consideration two facts that in practice increase the standing stock in the coupes not yet harvested. - The trees keep growing after the inventory is made so that their volume and mass will continuously increase. Thus, in every coupe of the cutting series the forest will be older and more heavily stocked than it was at the time of the inventory; - New trees grow in the not harvested coupes along the same time series, adding new biomass to the standing stock. When these two factors are considered it is evident that the standing stock in the not harvested coupes is dynamic and grows along the cutting cycle, which means an increasing harvestable stock can be expected along a coupes series. Thus, it can be stated that the growth of trees in the not harvested coupes originates increases in the standing stock along the cutting cycle, which results in average 27% higher that the starting stock as calculated by the forest inventory. Furthermore, in most cases, a lapse of one year occurs between the inventory is made and a Forest Management Plan (FMP) is approved, and frequently another year passes until the FMP starts to harvest the first coupe. Based on that, it is reliable to state that a surplus of biomass exists, since the average stock of harvestable firewood along the cutting cycle of FMPs in Pernambuco State is at least 25% higher than the estimate in the Forest Inventory and the corresponding cutting authorizations issued by Pernambuco State authority (Agência Estadual de Meio Ambiente - CPRH). In order to evaluate the surplus availability of wood from sustainable forest management areas, a comparison was performed between the effective annual availability of firewood and the amount of native firewood provided with Forest

	Origin Document (in Portuguese, DOF - Documento de Origem Florestal), in the state of Pernambuco in the year 2012. The annual availability of native wood data was based on the Forest Management Plans in the State of Pernambuco, registered by the Environmental Authority of Pernambuco State, CPRH. In addition, the effective available firewood was calculated considering the increase of 27% in the standing stock along the cutting cycle. Comparing the effective available amount of firewood and the amount of wood provided by Forest Origin Documents, the verified surplus of wood from management plans was of 154.17% in 2012. This value determines that the availability of wood from sustainable forest management serves local consumers, with significant surplus in the State of Pernambuco. This data demonstrates effective availability of 480,504 stereo meters of wood per year against total annual consumption of 189,049 stereo meters, which represents firewood surplus of 154% for Pernambuco in year 2012. This is the outcome of the quantitative analysis reported by Brazilian Environmental Authorities, which are the responsible to control the annual availability of wood and its consumption through Forest Origin Documents. It is important to note that there are some barriers to the commercialization of wood from management areas, such as distance from centers of consumption and the low price of the firewood from deforestation, causing an unfair competition. In conclusion, the official data showed a large surplus of native wood from management plans in 2012. Hence, Sustainable Carbon considers that data indicates there is abundant firewood in the project region to avoid possibility of competing uses of biomass due to the project implementation. The complete methodology and source of the official data provided by Environmental Authority of Pernambuco State will be made available to the verification team and the GS Secretariat. Other surveys or national and international databases shall be used to determine renewable biomass surplus and leakage due to competing use of biomass in case Buenos Aires Ceramic introduces different types of biomass during the crediting period. This assessment shall be done on an annual basis
Monitoring frequency	Annually
QA/QC procedures	Sustainable Carbon has hired an independent consultant with significant expertise in assessing biomass supply chains to develop a methodology for the assessment of biomass surplus. Such methodology shall be applied using conservative assumptions to determine renewable biomass surpluses.
Purpose of data	Calculation of leakage emissions due to competing use of biomass. This parameter will be used to evaluate if there is any source of indirect emission related to renewable biomass. If applicable, leakage emissions will be used to adjust emission reductions resulting from the project activity.
Additional comment	This parameter corresponds to the indicator n° 07 (Biodiversity – Biomass surplus) from the Sustainability Monitoring Plan. This change occurred due to the update from Gold Standard to Gold Standard for Global Goals.

Relevant SDG Indicator/Safeguarding Principle	SDG 13 - Indicator 13.3 Improve education, awareness-raising and human and institutional capacity on climate change mitigation, adaptation, impact reduction and early warning.
Data / Parameter	Leakage of non-renewable woody biomass
Unit	tCO2e

[64] Document available at: <http://cdm.unfccc.int/methodologies/SSCmethodologies/AppB_SSC_AttachmentC.pdf>. Last visit on 09/09/2019.

Description	Leakage related to non-renewable woody biomass
Source of data	Monitored
Value(s) applied	According to the CDM Methodology AMS I.E., Version 05, By is multiplied by a net to gross adjustment factor of 0.95 to account for leakages, in which cases surveys are not required.
Measurement methods and procedures	The source of leakage from non-renewable biomass will be monitored according to the applied methodology.
Monitoring frequency	Annually
QA/QC procedures	Data available regarding the ceramic industry fuel consumption will be employed to monitor the leakage.
Purpose of data	Calculation of leakage emissions. This parameter is used to evaluate if there is any source of indirect emission related to non-renewable biomass. If applicable, leakage emissions are used to adjust emission reductions resulting from the project.
Additional comment	The biomasses will be considered as renewable if they are in accordance to the definition by the CDM Executive Board. 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.

Relevant SDG Indicator/Safeguarding Principle	SDG 13 - Indicator 13.3 Improve education, awareness-raising and human and institutional capacity on climate change mitigation, adaptation, impact reduction and early warning.
Data / Parameter	Emissions to the atmosphere
Unit	-
Description	Procedures to control and monitor atmospheric emissions
Source of data	Evaluations through annual reports as recommended by CPRH (Environment Agency of *Pernambuco* State), the environmental authority. Results shall be stored to assess the intensity of atmospheric emissions.
Value(s) applied	In the baseline situation, the ceramic factory lack specific procedures to control and monitor atmospheric emissions. A quantification of these emissions in the baseline is not possible, since information is not available.
Measurement methods and procedures	The ceramic owner will monitor atmospheric emissions through atmospheric reports as recommended by the environmental authority of *Pernambuco*. The project will apply the following indicator from SOCIALCARBON Standard®[65]: SOCIALCARBON indicators for Ceramic Industry[66]: Emissions to the atmosphere. The target is to obtain a higher score than the estimated for the baseline situation. The scoring system of the SOCIALCARBON Standard is described in Section F.2.
Monitoring frequency	On an annual basis for atmospheric reports.
QA/QC procedures	Reports sent to CPRH (Environment Agency of Pernambuco State)
Purpose of data	This parameter monitors the emissions to the atmosphere and the air quality

[65] The SOCIALCARBON Standard is a certification adept at bringing demonstrable social, environmental and economic benefits to the stakeholders of carbon offset projects. More information at: <http://www.socialcarbon.org/>.

[66] Available at: <http://www.socialcarbon.org/wp-content/themes/socialcarbon/docs/Industries_Ceramic_Sector_v8.2_09_06_2011.pdf>. Last visit on 04/10/2019.

Additional comment	This parameter corresponds to the indicator nº 01 (Air Quality) from the Sustainability Monitoring Plan. This change occurred due to the update from Gold Standard to Gold Standard for Global Goals. In annex I Sustainability monitoring plan it was validated by the Gold Standard Passport version 05.0 that the monitoring of indicator 1 - Air quality was monitored by the Ringelmann smoke charts method. However, Buenos Aires ceramics presented an atmospheric emissions report. This report represents a more complex and efficient method for the monitoring of atmospheric emissions. This method was carried out in the monitoring periods and presents advantages such as: The report of atmospheric emissions in addition to the data collection and the information presented is checked with equipment, the environmental organism declares in the conditions of the operation license that the Buenos Aires ceramic must carry out its monitoring of emissions by this method. The method that was valid (ringelmann smoke charts) is only visual, which can lead to monitoring errors.

Relevant SDG Indicator/Safeguarding Principle	Safeguarding Principle 9.5/ SDG 13 - Indicator 13.3 Improve education, awareness-raising and human and institutional capacity on climate change mitigation, adaptation, impact reduction and early warning.
Data / Parameter	Procedures related to the control and disposal of ashes
Unit	-
Description	Monitoring the procedures related to the control and disposal of ashes
Source of data	Interviews and meetings with stakeholders and ceramic personal on each ceramic. In addition, photographs are to be used as evidence of the final destination whenever feasible.
Value(s) applied	In the baseline situation, Buenos Aires ceramic discarded the ashes without a proper procedure and the potential for environmental impacts exists. With the project activity, new kinds of fuels will be used (renewable biomasses such as biomass residues) and the generation of ashes might increase. Therefore, the project proponent will monitor the procedures to control and dispose ashes on Buenos Aires ceramic.
Measurement methods and procedures	Ashes shall be quantified by using standard storage bags with a known weight. Employees on the ceramic shall use spreadsheets to control the amount of storage bags leaving the ceramic each time ashes were collected for final destination. Such spreadsheet shall also include information on the destination of ashes, such as the person/entity responsible for collecting the ashes and the place of destination. Photographs shall be used evidencing its final destination. Interviews and meetings with stakeholders and ceramic personnel on Buenos Aires ceramic shall also be applied to identify the relevant score under the SOCIALCARBON indicator. The project will apply the following indicator from SOCIALCARBON Standard®[67]: SOCIALCARBON indicators for Ceramic Industry, version 8.2[68]: **Ashes** - Evaluates the procedures adopted by the entrepreneur in order to control the ashes and its destination. This indicator is used to guarantee that appropriated measures is taken to regarding the displacement of ashes in over 40 ceramic industries in Brazil, through a more practical method based on participatory interviews and meetings with stakeholders. The project situation is analyzed on a periodical basis and is scored from 1 to 6, where 1 represents a critical situation and 6 represents a sustainable scenario.

[67] The SOCIALCARBON Standard is a certification adept at bringing demonstrable social, environmental and economic benefits to the stakeholders of carbon offset projects. More information at: <http://www.socialcarbon.org/ >.

[68] Available at: <http://www.socialcarbon.org/wp-content/themes/socialcarbon/docs/Industries_Ceramic_Sector_v8.2_09_06_2011.pdf>. Last visit on 04/10/2019.

Monitoring frequency	Ashes shall be quantified and have their destination monitored whenever they were collected for its final destination. The assessment on the relevant score of the SOCIALCARBON indicator will be performed once every monitoring period.
QA/QC procedures	Interviews and meetings with stakeholders and ceramic personal on each ceramic may be used to confirm the value applied to this parameter. In addition, photographs may also be used as evidence of the final destination whenever feasible.
Purpose of data	This parameter determines the procedures adopted by the ceramic factory for the control and disposal of ashes.
Additional comment	This parameter corresponds to the indicator n° 02 (Soil Condition) from the Sustainability Monitoring Plan. This change occurred due to the update from Gold Standard to Gold Standard for Global Goals.

Relevant SDG Indicator/Safeguarding Principle	GS.2/SDG 8 – Indicator 8.8.1. Frequency rates of fatal and non-fatal occupational injuries, by sex and migrant status
Data / Parameter	Number of Health and Security trainings and campaigns conducted during monitoring period
Unit	Not applicable
Description	Monitoring Health and safety practices on the ceramic factory, including the use of safety equipments by employees working with biomass and around the kilns.
Source of data	Evidence of participatory meetings, interviews, personal protection equipment (PPE) control records, health and safety programs (CIPA PCMSO, PPRA), supervised PPE use (warnings, suspension), participant sign-in lists for lectures, contracts with health and safety professionals. In addition, site visits and interviews with employees and managers of ceramic factory may be used as evidence of the health and security actions whenever feasible.
Value(s) applied	In the baseline situation, employees were resistant to use safety equipments, since they felt these equipments were uncomfortable to use due to high local temperatures. Also, no specific monitoring on the use of safety equipments existed. The baseline situation also included the manual transportation and feeding of the kilns, which could expose workers to unsafe conditions and cause excessive smoke due to inefficient burning of woody biomass.
Measurement methods and procedures	To collect information on the quality of employment focusing on actions of health and security, the following indicator from SOCIALCARBON Standard is applied: - Social Carbon indicators for Ceramic Industry: Actions of Health and Security – Evaluates the existence and performance of campaigns, leisure and goal and plans regarding to health and security The project situation was analyzed on a periodical basis and was scored from 1 to 6, where 1 represents a critical situation and 6 represents a sustainable scenario. Ceramic manager shall use spreadsheets to control the use of safety equipments by employees.
Monitoring frequency	The parameter will be monitored at each monitoring period.
QA/QC procedures	Evidence of participatory meetings, interviews, PPE control records, health and safety programs (CIPA PCMSO, PPRA), supervised PPE use (warnings, suspension), participant sign-in lists for lectures, contracts with health and safety professionals.
Purpose of data	The parameter will be monitored at each monitoring period.
Additional comment	This parameter incorporates the indicator n° 3 (Quality of employment) from the Sustainability Monitoring Plan. This change occurred due to the update from Gold Standard to Gold Standard for Global Goals.

Relevant SDG Indicator/Safeguarding Principle	GS.3/SDG 13 – Indicator 13.3. Improve education, awareness-raising and human and institutional capacity on climate change mitigation, adaptation, impact reduction and early warning
Data / Parameter	Voluntary Emission Reductions issued
Unit	VERs
Description	Voluntary emission reductions issued
Source of data	Reports from the registry platform that controls the amount of issued VERs.
Value(s) applied	In the baseline scenario, Buenos Aires ceramic had no incentive to reduce their GHG emissions and consequently did not invest in reducing their emissions. The project has already issued Voluntary Emission Reductions. Under the Verified Carbon Standard (VCS) the project has issued 67,017 tCO2e from 01/01/2010 to 29/02/2012, corresponding to its first monitoring period. Applying to Gold Standard, the project crediting period started on 01/03/2012, and ended on 31/12/2019.
Measurement methods and procedures	The calculation was made based on the quantity of VERs issued on the GS Registry. Staff from Buenos Aires ceramic shall store information regarding the project operation, including fuel usage and production output. Sustainable Carbon shall determine the emission reductions resulting from the project.
Monitoring frequency	The parameter will be monitored at each monitoring period.
QA/QC procedures	The internal control of issuances will be compared to the report from the GS Registry platform.
Purpose of data	This parameter will be used to calculate the amount of VERs issued at each monitoring period.
Additional comment	This parameter corresponds to the indicator n° 04 (Quantitative employment and income generation) from the Sustainability Monitoring Plan. This change occurred due to the update to Gold Standard for Global Goals.

Relevant SDG Indicator/Safeguarding Principle	SDG 13 - Indicator 13.3 Improve education, awareness-raising and human and institutional capacity on climate change mitigation, adaptation, impact reduction and early warning.
Data / Parameter	Revenues for biomass suppliers
Unit	R$/ton of biomass
Description	Revenue (in Brazilian Real – R$) for each biomass type supplied to the project activity
Source of data	Total revenues are monitored through interviews with biomass suppliers, purchase invoices, receipts of sale and/or other documents concerning biomass acquisition.
Value(s) applied	In the baseline, revenues were being destined to individuals who explored the Caatinga biome to obtain firewood, which cause deforestation. Revenues were rather low, since this type of fuel was inexpensive

Measurement methods and procedures	Total revenues will be monitored by storing purchase invoices, receipts of sale and other documents concerning biomass acquisition. Total revenues shall be compared to the projected baseline fuel cost for Buenos Aires ceramic which was destined to native firewood suppliers. This parameter is defined ex-ante using data from August, 2007 to July, 2008[69]. The cost of non-renewable wood will be updated applying a conservative annual correction factor of 6.5%[70,71]. Staff from Buenos Aires ceramic shall store information on biomass acquisition and costs. Sustainable Carbon shall determine the additional revenues by comparing monitored values with figures estimated for the baseline situation.
Monitoring frequency	Annually
QA/QC procedures	Total revenues are monitored by interviews with biomass suppliers, purchase invoices, receipts of sale and/or other documents concerning biomass acquisition.
Purpose of data	This parameter has the purpose of monitoring the total revenues for biomass suppliers, which provided renewable biomass for the project activity.
Additional comment	This parameter corresponds to the indicator nº 05 (Quantitative employment and income generation) from the Sustainability Monitoring Plan. This change occurred due to the update to Gold Standard for Global Goals.

Relevant SDG Indicator/Safeguarding Principle	GS.1/SDG 7 – Indicator 7.2. By 2030, increase substantially the share of renewable energy in the global energy mix
Data / Parameter	Total energy produced from renewable sources
Unit	%
Description	The measures applied by the project activity resulted in renewable energy generation by utilizing renewable biomasses instead of non-renewable biomass. This parameter will be used to monitor the percentage of energy produced from renewable sources.
Source of data	The amount of renewable biomass used by the ceramic factories is monitored through purchase invoices, delivery notes or other documents concerning the acquisition of biomass.
Value(s) applied	In the baseline situation, Buenos Aires ceramic used exclusively native firewood as fuel. As described above in the $f_{NRB,y}$ parameter, 90.93% of that fuel was considered non-renewable. This means Buenos Aires ceramic used around 0.0011 TJ of renewable energy per thousand of ceramic pieces produced[72].
Measurement methods and procedures	The amount of renewable biomass used by the ceramic factory will be monitored during the crediting period (through purchase invoice, delivery notes or other documents concerning the acquisition of biomass). By using default values of energy content, the project proponents will be able to determine the amount of renewable energy produced during each year of the crediting period. Staff from the ceramic factory shall store information on biomass purchase and acquisition. Sustainable Carbon shall determine the amount of renewable energy generated during the crediting period.
Monitoring frequency	On a monthly basis. Data will be consolidated on an annual basis

[69] The same data was used for the assessment of additionality. Hence, this approach provides consistency. Furthermore, it is not feasible to monitor the cost of non-renewable biomass ex-post, since this biomass is no longer used by the project.

[70] A factor of 6.5% will be used to account for general price increase due to inflation. This value is considered conservative since it was the rounded-upaverage inflation rate evidenced in Brazil during the 2010-2018 period. Information available at: <https://www.ibge.gov.br/explica/inflacao.php >. Last visited on 04/10/2019.

[71] No methodology was found to correct the price of non-renewable biomass in Brazil, since this is mostly an informal market.

[72] Calculations are available on version 6.0 of the VER Estimates spreadsheet of GAP Analysis.

QA/QC procedures	An internal control of the quantity of fuel used was implemented in the ceramic factory. Data used to calculate the energy generated was cross-checked according to the receipts of purchase, delivery notes, receipts, or other documents concerning the acquisition of coal.
Purpose of data	This parameter determines the quantity of renewable energy used for the production in comparison to the total energy used in the monitoring period.
Additional comment	This parameter corresponds to the indicator n° 8 (Access to affordable and clean energy services) from the Sustainability Monitoring Plan. This change occurred due to the update from Gold Standard to Gold Standard for Global Goals.

C.1.1 Other elements of monitoring plan (if applicable)

The project utilizes the "**AMS-I.E: Switch from Non-Renewable Biomass for Thermal Applications by the User, version 05.**" methodology, approved under the Gold Standard for voluntary small scale projects. This methodology is applicable to fuel switching from fossil fuel to renewable biomass, aiming at reducing emissions through the use of renewable biomass in red ceramic production.

Baseline emissions are the before-project scenario, which means that baseline emissions are those resulting from the use of illegal deforestation firewood to burn and dry ceramic pieces. This practice is responsible to discharge in the atmosphere the carbon that was stored in native Cerrado wood.

The owner of the ceramic industry is responsible for implementing the monitoring plan. In addition, ceramic employees are responsible for filling forms for data collection and further classification.

Monitoring parameters are described in Section C.1 above and are monitored with the frequency described in Table 5 below. Monitored 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.

Table 5. Information on the monitored and fixed parameters of the present project activity

Parameters		**Gap Analysis: Gold Standard Description**
EFprojected fossil fuel Emission factor for the projected fossil fuel consumption in the baseline.	**Unit**	tCO2/TJ
	Origin of data	Value applied according to the methodology AMS-I.E, version 05.
	Frequency	Not monitored
NCVbiomass Net Calorific Value of non-renewable	**Unit**	TJ/tonne of wood
	Origin of Data	Value applied according to the methodology AMS-I.E, version 05
	Frequency	Not monitored
ρbiomass Specific gravity of non-renewable biomass per thousand of ceramic pieces produced	**Unit**	Tonne/m³
	Origin of Data	Monitored by surveys and publications
	Frequency	Not monitored
BFy Consumption of non-renewable biomass per thousand of ceramic pieces produced	**Unit**	Tonnes of wood per thousand of ceramic pieces
	Origin of data	The value determined in the VCS PD will be adopted under the Gold Standard application. This parameter is based in historical data of non renewable wood consumption before the project activity
	Frequency	Not monitored
Qrenbiomass	**Unit**	Tonnes

	Origin of data	Measured by the biomass providers and controlled by the ceramic owner
	Frequency	Monthly
Origin of Renewable Biomass	**Unit**	Not applicable
	Origin of data	Ceramic owner shall store invoices, receipt of sales or other documents to determine if the biomass can be considered renewable. Also, Sustainable Carbon and Buenos Aires Ceramic will work with biomass providers to track the origin of Algaroba firewood. Biomass providers and/or land owners shall be contacted to ensure an appropriate management of Algaroba forests, in accordance with national regulations.
	Frequency	Annually
Pry Production of ceramic pieces	**Unit**	Thousands of ceramic pieces
	Origin of data	Controlled by the ceramic owner. Measurements will be done by an internal control sheet monitored by the project proponent
	Frequency	Monthly
$f_{NRB,y}$ Fraction of biomass (wood) used in the absence of the project activity in year y can be established as non-renewable biomass using survey methods	**Unit**	Fraction
	Origin of data	Assessment was based on Annex 20 of the 35th meeting of the Small Scale Working Group of the Clean Development Mechanism, which provides a methodology for the calculation of $f_{NRB,y}$
	Frequency	Annually
Leakage of non-renewable woody biomass	**Unit**	tCO2e
	Origin of data	Monitored by surveys and publications
	Frequency	Annually
Leakage due to competing uses of biomass	**Unit**	tCO2e
	Origin of data	Surveysor national and international databases
	Frequency	Annually
Renewable Biomass Surplus Amount of renewable biomass available	**Unit**	Tonnes or m^3
	Origin of data	Monitored by surveys, articles and databases, as part of the procedures to determine leakage due to competing use of biomass
	Frequency	Annually

The figure below shows a diagram of the ceramic industry production. The parameters will be monitored following this process, inside the Project Boundary:

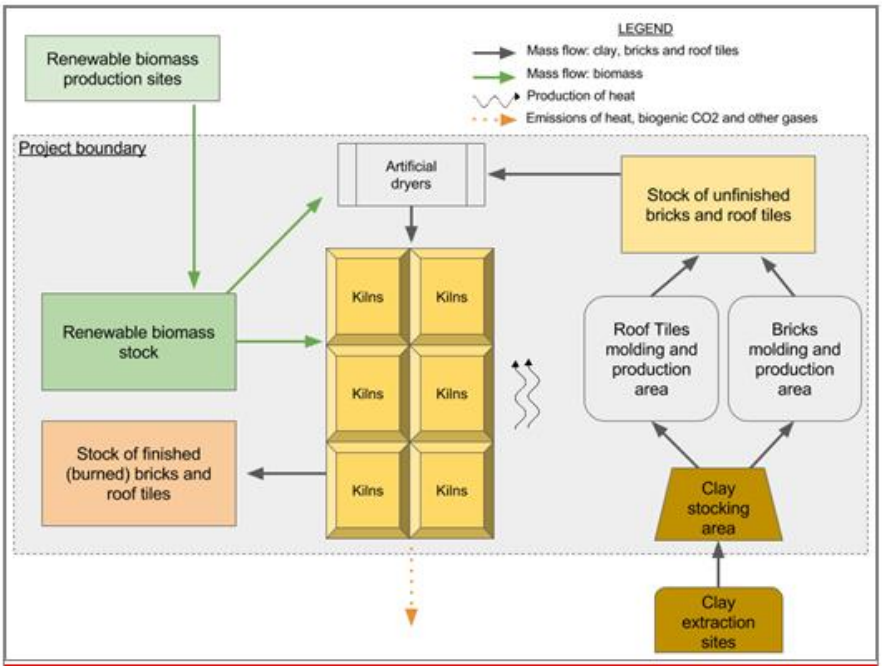


Figure 3. Diagram representing project boundaries

Regarding Stakeholder Consultation and monitoring of the project's impacts on the community, the Buenos Aires Ceramic Industry has a Grievance Input Mechanism as per the GS4GG Principles and Requirements.
The GS Buenos Aires Ceramic Project grievance mechanism is centralized in one person, which has the function of receiving any grievances regarding the project, as well as being available to solve stakeholder problems. The name of the person in charge is Elleny. Her telephone number is +55 81 3621-4399 and her e-mail address is: buenosaires@cerbuenosaires.com.br. When some grievance is directed towards the person in charge, a meeting is held with the owner of the ceramic factory and they find the best way to solve the grievance.
Besides the formal centralized grievance mechanism, the ceramics owners have a very good relationship with surrounding communities and are open for any requests/complaints.

SECTION D Duration and crediting period

D.1 Duration of project

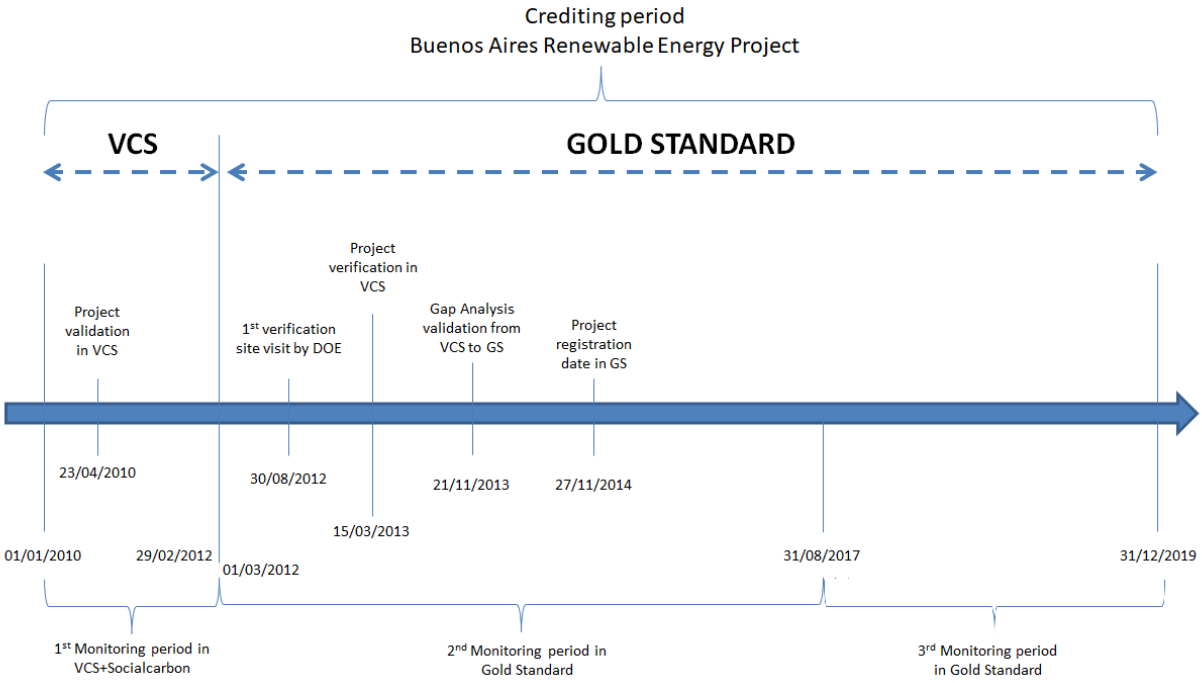
D.1.1 Start date of project

The project start date is defined as the date when the project proponent began employing renewable biomass. This has occurred on 01/08/2008. The project was registered under the VCS (entitled Buenos Aires Ceramic Fuel Switching Project). Applying to Gold Standard, the project crediting period started on 01/03/2012, and ended on 31/12/2019.

Timeline below briefly describes the project history:

17/07/2008	Buenos Aires ceramic and Sustainable Carbon signed a contract for the development of a voluntary emission reduction project applying for Verified Carbon Sandard and SOCIALCARBON Standard. By this time, the ceramic factory was employing non-renewable wood as fuel in the kilns
01/08/2008	Buenos Aires ceramic begins tests with renewable biomass, such as coconut residues, in the kilns. This data is defined as the project start date of the project activity under the VCS and SOCIALCARBON application.
01/01/2009	The ceramic factory completed fuel switching from non-renewable biomass to renewable biomass.
01/01/2010	Buenos Aires Ceramic Fuel Switching Project crediting period start date under VCS and SOCIALCARBON application. In April 2010 the project was validated.
January, 2013	The project activity started GAP Analysis from VCS and SOCIALCARBON to Gold Standard.

15/03/2013	The project, under the VCS, has issued 67,017 tCO2e from 01/01/2010 to 29/02/2012, the first monitoring period.
21/11/2013	Gap Analysis validation from VCS to GS.
27/11/2014	Project registration date in GS. Applying to Gold Standard, the project crediting period starts on 01/03/2012, and ends on 31/12/2019.



D.1.2 Expected operational lifetime of project

As established by the Gold Standard, the project crediting period is 10 years, non renewable. Total crediting period for the Project (including the crediting period under the VCS) will not exceed ten years. No renewal of crediting period will be requested.

D.2 GS Crediting period of the project/activity

D.2.1 Start date of the ongoing GS crediting period

The start date of the ongoing GS crediting period is 01/03/2012.

D.2.3 End date of the ongoing GS crediting period

The end date of the ongoing GS crediting period is 31/12/2019.

D.2.3 Total length of the GS crediting periods

The total length of the GS crediting period is 10 years.

SECTION E Stacking of new assets

Not applicable.

Appendix 1. Contact information of project participants

Organization name	Sustainable Carbon - Projetos Ambientais Ltda
Registration number with relevant authority	09.510.073/0001-06
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E-mail	web@sustainablecarbon.com
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E-mail	Not available
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Salutation	Mr
Last name	Neto
Middle name	Cunha
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