Gold standard for the global goals
Monitoring report

Gold Standard® for the Global Goals

June 2017, version 1

Title of the project	Buenos Aires Renewable Energy Project
Gold Standard project id	Gold Standard ID number GS2290
Version number of the monitoring report	Version 06
Completion date of the monitoring report	03/09/2021
Date of project design certification	03/01/2014
Start date of crediting period	August 1st, 2008
Duration of this monitoring period	01/09/2017 to 31/12/2019
Duration of previous monitoring period	01/03/2012 to 31/08/2017
Project representative(s)	Sustainable Carbon – Projetos Ambientais Ltda. Patrícia Mattos de Cunha – EPP (Buenos Aires Ceramic Factory)
Host Country	Brazil
Certification pathway (activity certification/impact certification)	Activity Certification
SDG Contributions targeted (as per approved PDD)	1 – SDG 7: Affordable and Clean Energy 2 – SDG 8: Decent Work and Economic Growth 3 – SDG 13: Climate Action
Gold Standard statement/product certification sought (GSVER/ADALYs/RECs etc.)	GSVER
Selected methodology(ies)	AMS-I.E: "Switch from Non-Renewable Biomass for Thermal Applications by the User", version 05.0
Estimated amount of annual average certified SDG impact (as per approved PDD)	1 – SDG 7: 106.30 TJ 2 – SDG 8: 3 Health and Safety training and/or campaigns (mandatory programs) 3 – SDG 13: 26,179 tCO2e[1]
Total amount of certified SDG impact (as per approved methodology) achieved in this monitoring period	1 – SDG 7: 241.62 TJ 2 – SDG 8: 7 Health and Safety training and/or campaigns (4 non-mandatory trainings + 3 mandatory programs) 3 – SDG 13: 30,550 tCO2e (49,612 tCO2e)[2]

[1] This value refers to the annual average of estimated emission reductions, according to the Transition Annex of Buenos Aires Renewable Energy Project. The estimated ERs for this monitoring period is 63,053.66 tCO2e.

[2] The calculated ERs for this monitoring period is 49,612 tCO2e. Although, due to the Forward Action Request raised by Gold Standard at the previous period, an amount of 19,062 tCO2e had to be deducted from the total ERs.

SECTION A. Description of project

A.1. Purpose and general description of project

This project activity consists in one red ceramic industry located in Buenos Aires municipality, Pernambuco, north-eastern Brazil: Buenos Aires Ceramic Factory. The ceramic industry produces ceramic bricks and flagstones, mainly for the regional market in Pernambuco.

The fuel utilized to burn and dry ceramic pieces in the baseline scenario was native wood from deforestation from the Caatinga biome, which is the common practice in the region. This type of wood is considered a non-renewable biomass, once it is not originated in areas with reforestation activities or sustainable management activities.

The Caatinga is an exclusively Brazilian biome and occupies around 844,453 Km², equivalent to around 11% of the territory of the country. Although being rich in natural resources, the Caatinga is one of the most threatened ecosystems on the planet. Its high calorific value causes a major cause of its decline. In a region where the shortage of rivers leads to less access to electric energy, native firewood and charcoal account for thirty percent of the total energy utilized in the industries of the region, which has intensified the local deforestation.

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

This fuel switching project activity will reduce the greenhouse gases (GHG) emissions through the substitution of native wood from deforestation activity for renewable biomasses to generate thermal energy in the process of burning ceramic devices.

As renewable biomasses, the project activity consists in utilizing Algaroba wood, wood residues, eucalyptus and native wood with sustainable management plan to feed the factory's kilns, replacing the use of wood from areas with non-sustainable forest management, which did not have any kind of contribution to the level of biodiversity enrichment.

This project pointed out the possibility to switch non-renewable biomass for renewable biomasses, which was unattractive due to high investments on the adaptation of machineries to work with the new biomasses and other barriers. The ceramic owner considered the income from the commercialization of the carbon credits to become the project activity viable.

The main goal of this project activity is to minimize the negative impacts of the deforestation of the Caatinga biome by discouraging the exploitation of the area through limiting the interested party in acquiring the proper legal documents for the commercialization of the native firewood. Moreover, in opposition to the identified baseline, the project activity will generate thermal energy without stimulating deforestation by using abundant renewable biomasses in the region. All these measures contribute to sustainable development by promoting renewable energy, mitigating atmospheric pollution and improving the quality of employment for workers.

GHG emission reductions generated by this project activity due to fossil fuel switching to renewable biomasses measures resulted in 49,612 tCO2e during the monitoring period from 01/09/2017 to 31/12/2019. However, according to Issuance Review Round III carried out by the Gold Standard Team on 29/04/2018, a Forward Action Request was opened for this monitoring period, since the site visiting frequency did not meet GS requirements. Thus, Project Proponent shall deduct the credits generated during the period of 01/03/2012-27/09/2012 from next issuance. The value to be deducted is 19,062 tCO2e. This way, only 30,550 tCO2e will be issued in this monitoring period. The contribution to sustainability is being monitored applying the Sustainability Monitoring Plan, described on Section G of the Gold Standard Passport, version 05.

A.2. Location of project

The ceramic industry of this project activity is located in Brazil, in the state of Pernambuco, which is located in the northeast region of the country. Table 1 contains the location of the industry and its geographic coordinate. In addition, Figure 1 below shows the map of the municipality where the project activity is located.

Table 1. Location of project activity

Ceramic Industry	Municipality	State	Country	Latitude	Longitude
Buenos Aires Ceramic	Buenos Aires	Pernambuco	Brazil	7°58'00" S	37°37'59"W

Postal address of the site is detailed below:

- Buenos Aires Ceramic

Address: Granja São Joaquim, s/n, Buenos Aires – Pernambuco - Brazil.
Postal Code: 55.845-000

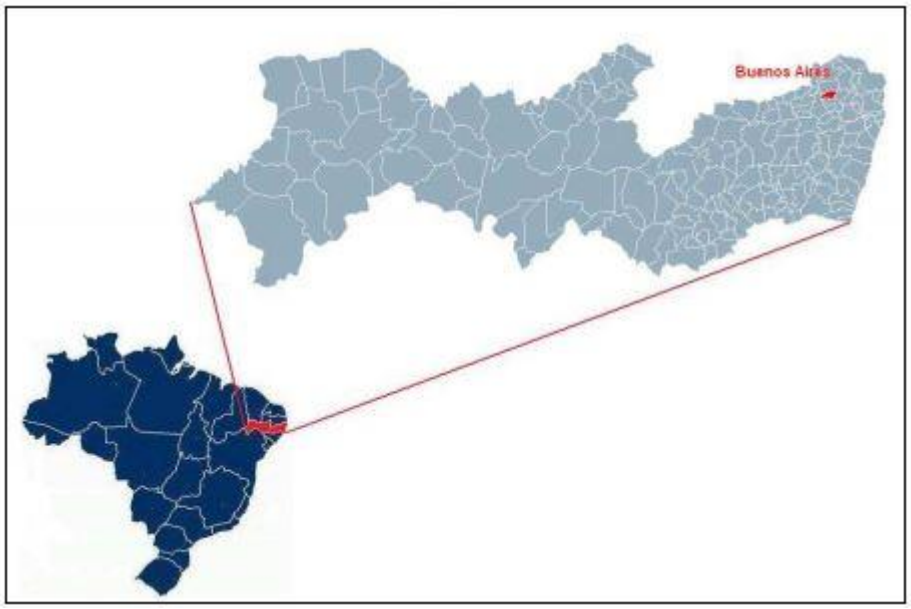


Figure 1. Geographic location of the municipality of the project activity (Buenos Aires, Pernambuco) that has the following coordinates: 7°58'00" S and 37°37'59"W.

A.3. Reference of applied methodology

The project activity utilizes the following methodology approved under the Gold Standard for VER small scale projects: AMS-I. E: "Switch from Non-Renewable Biomass for Thermal Applications by the User", version 05.0, valid from 03rd of August 2012 to 27th of November 2014[3].

Specifically, the project involves fuel switching (from native wood to renewable biomass).

In addition, the project activity also utilizes the following guidance and tools:

[3] Methodology AMS-I.E .: Switch from non-renewable biomass for thermal applications by the user - Version 05.0. Available at: < https://cdm.unfccc.int/filestorage/5/e/HSVPWKBG6X7Q8YEFMOT214IA3R0ZDL.pdf/EB%2068_repan22_Rev_AMS-I.E_ver05.0.pdf?t=elp8cTNwMWo1fDD4G07j2_q3-WqTD915twQ2>. Last visit on 17/12/2019.

- Attachment C to Appendix B: Indicative simplified baseline and monitoring methodologies for selected small-scale CDM project activity categories. General guidance on leakage in biomass project activities, Version 03 [4].

- Annex 18 of the 23rd meeting report of the CDM Executive Board. Definition of renewable biomass [5].

- CDM Methodological Tool: "Tool for the demonstration and assessment of additionality". Version 07 [6].

A.4. Crediting period of project

The starting date of the project activity was considered 01/08/2008. On this date, Buenos Aires ceramic included in the project have signed contracts with Sustainable Carbon to develop an emission reduction project. The starting date of the project is before the "Time of first submission" as per Gold Standard definitions [7].

Start date of the crediting period VCS: 01/01/2010.
Start date of the crediting period Gold Standard: 01/03/2012
End of the crediting period: 31/12/2019
Duration of the crediting period: 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. During ten years of this project, three of them were VCS, furthermore, rest of seven years corresponds to Gold Standard crediting period.
Crediting period type: Fixed crediting period

The timeline below briefly describes the project history.

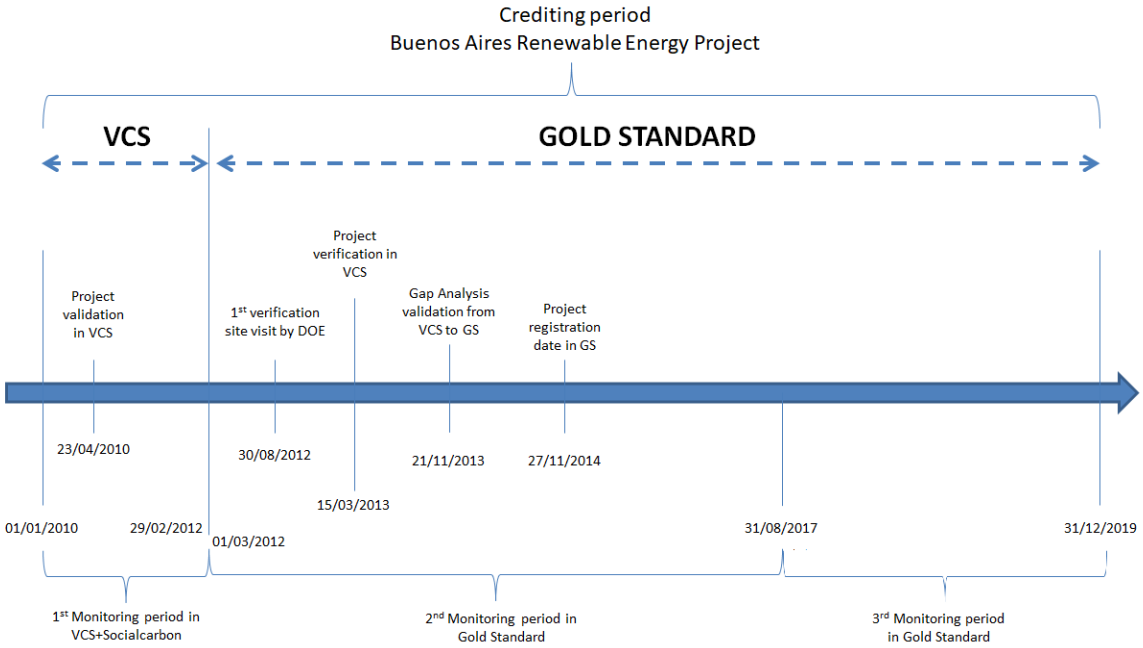


Figure 2. Timeline of Buenos Aires Renewable Energy Project

[4] Indicative simplified baseline and monitoring methodologies for selected small-scale CDM project activity categories. Available at: <http://cdm.unfccc.int/methodologies/SSCmethodologies/AppB_SSC_AttachmentC.pdf>. Last visit on: 20/09/2017.
[5] Available at: <http://cdm.unfccc.int/EB/Meetings/023/eb23_repan18.pdf>. Last visit on: 20/09/2017.
[6] Available at: <http://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-01-v7.0.0.pdf>. Last visit on: 20/09/2017.
[7] According to Gold Standard Requirements version 2.1, the time of first submission means submission of the Local Stakeholder Consultation Report for projects proceeding under the regular project cycle, and submission of the required Gold Standard project activity documentation for a Pre-Feasibility Assessment and payment of the applicable fee under the retroactive project cycle.

SECTION B. Implementation of project

B.1. Description of implemented project

This Gold Standard Voluntary Project was validated in VCS by Bureau Veritas Certification Holding SAS, the Gap Analysis to Gold Standard was validated by IBOPE (Instituto Brasileiro de Opinião Pública e Estatística Ltda), and this present monitoring report is being verified by the Earthood Services Private Limited.

The project activity involves the fuel switching from native wood from deforestation from the Caatinga biome to renewable biomass for the production process of a red ceramic industry located in Brazil. Although there are barriers associated to this practice, such measure is considered environmentally safe and sound.

Sustainable Carbon has helped introducing this practice in several ceramic industries in Brazil, which have benefited from the voluntary carbon market to mitigate their environmental impacts. Sustainable Carbon experience with this type of project indicates that the use of renewable biomass is a safe and sustainable practice for red ceramic industries.

It is important to state that, the fuel switching was not expected in absence of the project activity, once there were no incentives to support the fuel switching. According to the Brazilian Environmental Ministry the Caatinga biome has a high annual deforestation rate, reaching 0.28% in Brazil. Also, the common practice in the project region is the use of non-renewable native wood.

This present project activity created the opportunity for carrying out wood from Caatinga deforestation switch to renewable biomass, which was unattractive due to some barriers, including high investments on the purchase and adaptation of machineries to work with new biomasses. Thus, carbon benefits were seriously considered in the decision to undertake this project as a proposed emission reductions activity.

Buenos Aires Ceramic Industry is still operating three Hoffmann kilns and utilizes the same biomass types described in the PDD: wood residues, eucalyptus, Algaroba wood and native wood from sustainable management plan.

The use of native wood without sustainable management as fuel is a prevalent practice among the ceramic industries in Brazil. Wood from deforestation is delivered and utilized in the ceramic facility and this non-renewable biomass is offered with low prices. Although firewood from deforested areas has been used for many decades as fuel in Brazil it is impossible to define a start date on which this kind of non-renewable biomass began to be applied. Firewood used to be the most employed source of primary energy until the decade of 1970, when the petroleum started to supply the majority of Brazilian´s energy needs [8].

The employment of this fuel in Buenos Aires ceramic used to stimulate the increase of Brazilian deforestation rates. The baseline identified for this project activity is the utilization of 24,281 tonnes of non-renewable native wood per year to provide thermal energy to the ceramic factory's kilns.

B.2. Post-registration changes

B.2.1. Temporary deviations from Certified Key Project Information, Project Design Document, Monitoring & Reporting Plan, applied methodology or applied standardized baseline

No temporary deviations were made for the current monitoring period.

B.2.2. Corrections

No corrections on the monitoring plan were made for the current monitoring period, the parameters were updated only to suit the Gold Standard update, reaching the scope of GS4GG.

[8] BRITO, J.O. Energetic use of Wood. Available at: <http://www.scielo.br/scielo.php?pid=S010340142007000100015&script=sci_arttext&tlng=ES>. Last visited on September 12, 2017.

B.2.3. Changes to start date of crediting period

Not applicable, as no changes to start date of crediting period were applied on the current monitoring period.

B.2.4. Permanent changes from registered monitoring plan, applied methodology or applied standardized baseline

In annex I Sustainability monitoring plan it was validated by the Gold Standard Passport version 05.0 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 this current monitoring 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 presents monitoring errors. In this way, the monitoring should follow the standards of the second monitoring period (01/04/2012 to 31/08/2017).

Moreover, during the Performance Review – Round III, carried out by the Gold Standard Team on 26/07/2021, it was requested to change the following indicators: **Emissions to the atmosphere, Procedures related to the control and disposal of ashes** and **Number of Health and Security trainings and campaigns conducted during monitoring period** available in Buenos Aires Renewable Energy Project's Transition Annex v.02 for measuring the project's contribution to the UN SDGs.

The new indicators to monitor these parameters are presented below, respectively.

Relevant SDG Indicator	**SDG 13**
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 industry will monitor atmospheric emissions through atmospheric reports as recommended by the environmental authority of Pernambuco. There is no state and/or municipal legislation in Pernambuco, Brazil, regarding emission standards for polluting gases and particulate matter. Thus, the State applies, for its stages of environmental licensing, the federal legislation CONAMA resolution no. 436[9]. Based on this legislation, the following parameters for atmospheric emissions were defined: **CO** <1,300 mg/Nm³ **NOx**[10] < 100 mg/Nm³ **SO_2**[11] 0 mg/Nm³ **Particulate matter** < 730 mg/Nm³ These 3 parameters were used to assess the ceramic and it contribution to parameter *13.3 - Improve education, awareness-raising and human and institutional capacity on climate change mitigation, adaptation, impact reduction and early warning*, with emissions control being a way of mitigation and impact reduction to avoid the climate crisis. Thus, the Emissions to the atmosphere indicator will be evaluated in three reference scores: • Score 1 - No monitoring or measurement of polluting gas emissions is carried out • Score 2 - There is an emission measurement report, and the parameters are above the limit defined by the legislation; • Score 3 - There is an emission measurement report, and the parameters are within the limit defined by the legislation;
Monitoring frequency:	Annually
QA/QC procedures:	Data available in atmospheric reports sent to CPRH (Environment Agency of Pernambuco State).
Purpose of data:	This parameter monitors the emissions to the atmosphere and the air quality
Additional comments:	This parameter corresponds to the indicator n° 01 (Air Quality) from the Sustainability Monitoring Plan. This change occurred due to the update from Gold Standard to Gold Standard for Global Goals.

Relevant SDG Indicator	**SDG 13**
Data/parameter:	**Control and disposal of ashes**
Unit	40 kg storage bags
Description	Amount of ash destined for fertilizing green areas
Source of data	Ceramic factory controls the disposal of ashes through a control sheet. In addition, interviews and meetings with stakeholders and ceramic personal. Photographs may be used as evidence of the 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.
Monitoring frequency:	The parameter will be monitored at each monitoring period.

[9] Available at: https://www.novaconcursos.com.br/blog/pdf/resolucao-436-2011.pdf. Last visited on August 27th, 2021.

[10] Parameter with no national limit standard In Annex IV - Emission limits for air pollutants from heat generation processes to from the external combustion of wood derivatives. Quantity obtained according to the values measured in Buenos Aires ceramic factory.

[11] Parameter with no national limit standard In Annex IV - Emission limits for air pollutants from heat generation processes to from the external combustion of wood derivatives.. Quantity obtained according to the values measured in Buenos Aires ceramic factory.

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 destination whenever feasible.
Purpose of data:	This parameter determines the procedures adopted by the ceramic factory for the control and disposal of ashes.
Additional comments:	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	**SDG 8**
Data/parameter:	**Number of Health and Security trainings and campaigns**
Unit	-
Description	Monitoring Health and safety practices on the ceramic factory, including the use of safety equipment 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	The ceramic industry will monitor the number of health and security trainings and campaigns conducted during monitoring period through control records.
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:	This parameter determines the procedures adopted by the ceramic factory to offer Health and Security trainings and campaigns to its employees.
Additional comments:	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.

Changes made in these indicators do not influence or interfere with the baseline, additionality, and conservatism of this project.

B.2.5. Changes to project design of approved project

Not applicable, as no changes to the project design have taken place on the current monitoring period.

SECTION C. Description of monitoring system applied by the project

The project utilizes the following methodology approved under the Gold Standard for voluntary small scale projects: AMS-I.E: "Switch from Non-Renewable Biomass for Thermal Applications by the User", version 05.0, valid from 03rd of August 2012 to 27th of November 2014.

The project activity involves the total substitution of wood without sustainable management for renewable biomass. The use of native wood without sustainable management as fuel is a prevalent practice among the ceramics industries in Brazil. Wood from deforestation is delivered and utilized in the ceramic facility and this non-renewable biomass is offered with low prices.

According to Seye (2003)[12], in Brazil, the red ceramic pieces are produced through an inefficient and traditional process using wood without forest management to generate thermal energy. The use of wood is a prevalent practice among the ceramics in Brazil, representing about 98% of the total fuel employed.

The following entity is responsible for applying the monitoring methodology:

SUSTAINABLE CARBON - PROJETOS AMBIENTAIS LTDA

Project developers:
Carolina Pendl Abinajm – Technical Analyst
Guilherme Lucas Medeiros Prado – Technical Analyst
Lyara Carolina Montone do Amaral – Technical Analyst
Marcelo Hector Sabbagh Haddad – Technical Coordinator
Yara Fernandes da Silva – Technical Analyst

The management structure was relying on the local technicians with a periodical operation schedule during the monitoring period. The technical team managed the monitoring, the quality control and quality assessment procedures. Monitored parameters and frequency are described in Section D.

SECTION D. Data and parameters

D.1. Data and parameters fixed ex ante or at renewal of crediting period

Relevant SDG Indicator	**SDG 13**
Data/parameter:	**$EF_{projected\_fossilfuel}$**
Unit	tCO2/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 05.0.
Value(s) applied)	81.6
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 above, the use of fossil fuels is the most likely scenario in the absence of non-renewable biomass. This emission factor is recommended by the applied methodology to represent the mix of fossil fuels to be used for the present and future
Purpose of data	This parameter was used to calculate baseline emissions from the use of the fossil fuel that would be used in the baseline scenario.
Additional comments	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.

Relevant SDG Indicator	**SDG 13**
Data/parameter:	**$NCV_{biomass}$**
Unit	TJ/ton
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.
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.

[12] SEYE, O. **Análise de ciclo de vida aplicada ao processo produtivo de cerâmica estrutural tendo como insumo energético capim elefante** (Pennisetum Purpureum Schaum). Campinas, SP: [s.n.], 2003.

Purpose of data	This parameter was used to calculate baseline emissions, providing the energy generated by the amount of coal that would be used in the absence of the project activity.
Additional comments	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.

Relevant SDG Indicator	**SDG 13**
Data/parameter:	$\rho_{biomass}$
Unit	Tonnes/m^3
Description	Specific gravity of non-renewable biomass type j
Source of data	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:<http://bdtd.bczm.ufrn.br/tedesimplificado//tde_busca/arquivo.php?codArquivo=1239>. Last visit on 22/04/2013. 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>. Last visit on 22/04/2013.
Value(s) applied)	0.8072
Choice of data or measurement methods and procedures	The amount of wood used in the baseline was measured in volume units. This data is used for the unit conversion. The species used to calculate the average value of this parameter are typical trees of Caatinga Biome that are usually utilized as fuel in the ceramic industries of the region.
Purpose of data	This parameter was 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 comments	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:	**BF_y**
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, according to the baseline determinate 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	This parameter was used to calculate quantity of biomass is necessary to fire a thousand of ceramic units per year
Additional comments	

D.2. Data and parameter monitored

Relevant SDG Indicator	**SDG 13**
Data/parameter:	**PR_y**
Unit	Thousands of ceramic pieces

Description	Amount of products produced in year y
Measured/calculated/default	Values used for the calculations were taken from manual control of devices burned in the kiln. Measurements were done by an internal control sheet monitored by employees.
Source of data	Controlled by the ceramic owners
Value(s) of monitored parameter	<table><tr><th>PRy</th><th>2017*</th><th>2018</th><th>2019</th></tr><tr><td>Total</td><td>6,674</td><td>23,220</td><td>29,484</td></tr><tr><td>Total Monitoring Period</td><td colspan="3">59,378</td></tr></table> * From 01 September to 31 December
Monitoring equipment	No monitoring equipment was used to determine this parameter. Production was counted by trained personnel on each ceramic.
Measuring/reading/recording frequency:	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 reports 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.
Calculation method (if applicable):	Data regarding production was monitored through the number of devices burned in the kiln, measured manually on a daily or weekly basis and compiled into spreadsheets [13].
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 comments:	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 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	**SDG 13**
Data/parameter:	$Q_{renbiomass}$
Unit	Tonnes
Description	Amount of renewable biomass used during year y of the crediting period
Measured/calculated/default	Measured by the biomass providers and controlled by the ceramic owner
Source of data	It was monitored through purchase invoice, delivery notes or other documents concerning the acquision of renewable biomasses.
Value(s) of monitored parameter	<table><tr><th rowspan="2">Renewable Biomass</th><th colspan="3">Qrenbiomass</th></tr><tr><th>2017</th><th>2018</th><th>2019</th></tr><tr><td>Wood from sustainable forest management</td><td>81.60</td><td>379.38</td><td>24.22</td></tr><tr><td>Algaroba wood</td><td>2,318.00</td><td>12,070.70</td><td>8,905.30</td></tr><tr><td>Wood Residues</td><td>0.00</td><td>0.00</td><td>4,692.31</td></tr><tr><td>Eucalyptus</td><td>204.00</td><td>0.00</td><td>0.00</td></tr><tr><td>Total MR</td><td>2,603.60</td><td>12,450.08</td><td>13,621.83</td></tr></table>
Monitoring equipment	No monitoring equipment was used to determine this parameter.

[13] Spreadsheets with production control were made available to the verification team.

<table>
<tr><td>Measuring/reading/recording 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. Measurement was done by a spreadsheet monitored by the project proponent. The amount of renewable biomass described represents both the biomass fired and biomass stocked in the ceramics. These figures are different than the actual biomass fired on each ceramic. However, in the long term, biomass fired and biomasses purchased are likely to be similar.</td></tr>
<tr><td>Calculation method (if applicable):</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>0.95</td></tr>
<tr><td>Wood from sustainable forest management</td><td>0.81</td></tr>
<tr><td>Eucalyptus</td><td>0.51</td></tr>
<tr><td>Residues of wood</td><td>0.35</td></tr>
</table>

These values were taken from the source below:

Wood from sustainable management plan areas

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:<http://bdtd.bczm.ufrn.br/tedesimplificado//tde_busca/arquivo.php?codArquivo=1239>. Last visit on 22/04/2013

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>. Last visit on 22/04/2013.

Algaroba Wood

BARROS, B. C. Volumetria, Calorimetria e fixação de carbono em florestas plantadas com espécies exóticas e nativas. Recife, PE. 2009. Disponível em:<http://200.17.137.108/tde_busca/arquivo.php?codArquivo=525> Last visited on 03/04/2013.

Eucalyptus

IPCC: Intergovernmental Pannel on Climate Change. Orientación del IPCC sobre las buenas prácticas para UTCUTS. Capítulo 3: Orientación sobre las buenas prácticas en el sector de CUTS

Wood Residues

SIMIONI, F. J. Análise diagnóstica e prospectiva da cadeia produtiva de energia de biomassa de origem florestal no planalto sul de Santa Catarina - Curitiba: UFPR, 2007. 132p.: il. - Available at: <http://dspace.c3sl.ufpr.br/dspace/handle/1884/10294>.</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>
</table>

Purpose of data:	This parameter was monitored to calculate the amount of renewable biomass used during year y of the crediting period.
Additional comments:	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 credits for this project activity, whichever occurs later.

Relevant SDG Indicator	**SDG 13**
Data/parameter:	$f_{NRB,y}$
Unit	Fraction or percentage
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
Measured/calculated/default	The monitoring of this parameter was based on national and international articles, databases and data monitored by the project developer such as project activities at the same region. The sources provided information about the availability of woody biomass in the Caatinga biome.
Source of data	Survey methods.
Value(s) of monitored parameter	90.93
Monitoring equipment	No monitoring equipment was used to determine this parameter.
Measuring/reading/recording frequency:	Each monitoring period
Calculation method (if applicable):	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. In the last monitoring period, the Gold Standard required the application of the most conservative value between the calculated one and the one provided by the Gap Analysis report. Therefore, to maintain a more conservative scenario, the value of this parameter remains the same as the last monitoring period instead of the value that was calculated.
QA/QC procedures:	Data from published sources were used to determine this parameter[14].
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 the project activity that can be established as non-renewable biomass.
Additional comments:	Data will be kept for two years after the end of the crediting period or the last issuance of carbon credits for this project activity, whichever occurs later.

Relevant SDG Indicator	**SDG 13**
Data/parameter:	**Origin of Renewable Biomass**
Unit	Not applicable
Description	Renewable origin of the biomass
Measured/calculated/default	The guarantee of acquiring renewable wood was achieved by invoices from the providers. Biomasses were considered renewable as fulfilling the options described in the methodology applied.
Source of data	Controlled by the ceramic owners
Value(s) of monitored parameter	Not applied for the calculation. It is assumed that all biomass used during the crediting period is demonstrably renewable.
Monitoring equipment	No monitoring equipment was used to determine this parameter.
Measuring/reading/recording frequency:	Each monitoring period

[14] Available at: Spreadsheet GS MR Calculation Buenos Aires_01 09 2017_31 12 2019_v4, fNRB, y - Caatinga

Calculation method (if applicable):	Not applicable
QA/QC procedures:	Ceramic owner shall store invoices, receipt of sales or other documents to allow the traceability of the renewable biomass.
Purpose of data:	This information will be given by the biomass 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[15]. Also, Sustainable Carbon and Buenos Aires Ceramic worked 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 the national regulations.
Additional comments:	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	**SDG 13**
Data/parameter:	**Leakage due to competing uses of biomass**
Unit	tCO2e
Description	This source of leakage was relevant for biomass residues and biomass from existing forests, according to the general guidance on leakage in biomass project activities. The surplus of new kinds of renewable biomass available will be assessed to determine the occurrence of leakage.
Measured/calculated/default	Calculated
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) of monitored parameter	0 (zero)
Monitoring equipment	No monitoring equipment was used to determine this parameter.
Measuring/reading/recording frequency:	Annually

[15] Available at: <http://cdm.unfccc.int/EB/023/eb23_repan18.pdf>. Last visited on 20/09/2017.

Calculation method (if applicable):	The following surplus of each biomass is considered, as based on a study developed by Sustainable Carbon. According to the general guidance on leakage in biomass project activities (attachment C of Appendix B)[16], 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. - 65% for Wood Residues 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. Regarding 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.

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

	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. Regarding wood residues, a similar survey was carried out in the State of Ceará, which borders the State of Pernambuco. In this survey, it was concluded that wood residues are a significant concern for local producers, since the environmental authorities require them to provide a correct destination to such residues. Also, the risk of uncontrolled fire was mentioned by the respondents as an important factor associated to the handling of sawdust. Two of the experts informed there is a significant fraction of this biomass being discarded or sub utilized (the average result being equal to 65%). Currently, sawdust and wood residues (wood chips) are largely donated or sold for marginal prices to anyone willing to collect them. Most of the wood chips are destined to livestock farms, to be used as bedding material. As sawdust is not suitable for the use of bedding material, they are usually discarded without control by producers. In addition, field surveys allowed to identify there is a large amount of sawdust that does not have a proper destination. Sawmills owners interviewed during the study have shown great interest in contacting the ceramic factories developing GS projects, since they were willing to provide a useful destination for their residues. Furthermore, considering that around 22% of the wood produced generates wood residues[17], and that the production of wood in the State of Pernambuco was of 1,927,349 m³ in 2016[18], thus, it can be assumed that around 424,017 m³ of wood residues were generated, which is much larger than the quantity consumed by Buenos Aires Ceramic Factory. 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. According to CDM General guidance on leakage in biomass project activities v.03[19], section 18, 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. Therefore, the renewable biomass surplus values were not updated from the values presented in the Gold Standard PDD v.03. In addition, Sustainable Carbon performs an annual assessment of the occurrence of leakage from this source.
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.

[17] 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.

[18] According to IBGE. Available at: <https://cidades.ibge.gov.br/brasil/pe/pesquisa/16/12705>. Last visited on: 11-October-2017.

[19] Available at: <http://cdm.unfccc.int/methodologies/SSCmethodologies/approved/history/c_leak_biomass/guid_biomass_v03.pdf>. Last access on 17/09/2020.

Purpose of data:	Calculation of leakage emissions. This parameter is used to evaluate if there is any source of indirect emission related to renewable biomass. If applicable, leakage emissions are used to adjust emission reductions resulting from the project
Additional comments:	Data will be kept for two years after the end of the crediting period or the last issuance of carbon credits for this project activity, whichever occurs later.

Relevant SDG Indicator	**SDG 13**
Data/parameter:	**Leakage of non-renewable woody biomass**
Unit	tCO2e
Description	Leakage relating to non-renewable woody biomass
Measured/calculated/default	Monitored
Source of data	The source of leakage from non-renewable biomass was monitored according to the applied methodology.
Value(s) of monitored parameter	<table><tr><th>Buenos Aires Ceramic</th><th>2017*</th><th>2018</th><th>2019</th></tr><tr><td>Leakage Emissions</td><td>294</td><td>1,022</td><td>1,297</td></tr><tr><td>TOTAL</td><td colspan="3">2,613</td></tr></table> * From 01 September to 31 December
Monitoring equipment	No monitoring equipment was used to determine this parameter.
Measuring/reading/recording frequency:	The source of leakage from non-renewable biomass will be monitored according to the applied methodology.
Calculation method (if applicable):	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.
QA/QC procedures:	Data available regarding the ceramic industry fuel consumption was 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 comments:	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	**SDG 13**
Data/parameter:	**Emissions to the atmosphere**
Unit	-
Description	Procedures to control and monitor atmospheric emissions
Measured/calculated/default	Measured
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) of monitored parameter	Score 3 - There is an emission measurement report, and the parameters are within the limit defined by the legislation
Monitoring equipment	No monitoring equipment was used to determine this parameter.
Measuring/reading/recording frequency:	Annually
Calculation method (if applicable):	The ceramic factory monitors the atmospheric emissions through annual reports as recommended by CPRH (Environment Agency of Pernambuco State), the environmental authority. Through these reports, it is confirmed that the analyzes and results obtained in this monitoring period are in accordance with acceptable levels of atmospheric emissions.
QA/QC procedures:	Data available in atmospheric reports sent to CPRH (Environment Agency of Pernambuco State).
Purpose of data:	This parameter monitors the emissions to the atmosphere and the air quality.

Additional comments:	This parameter corresponds to the indicator n° 01 (Air Quality) from the Sustainability Monitoring Plan. This change occurred due to the update from Gold Standard to Gold Standard for Global Goals.

Relevant SDG Indicator	**SDG 13**
Data/parameter:	**Control and disposal of ashes**
Unit	40 kg storage bags
Description	Amount of ash destined for fertilizing green areas
Measured/calculated/default	Measured
Source of data	Ceramic factory controls the disposal of ashes through a control sheet. In addition, interviews and meetings with stakeholders and ceramic personal. Photographs may be used as evidence of the destination whenever feasible.
Value(s) of monitored parameter	742
Monitoring equipment	No monitoring equipment was used to determine this parameter.
Measuring/reading/recording frequency:	Ashes shall be quantified and have their destination monitored whenever they were collected for its destination. The assessment of the amount of ash bags leaving the ceramic will be carried out once in each monitoring period.
Calculation method (if applicable):	The ashes are saved in storage bags (which are not a unit of measure, but a means of transport for ashes) and taken to the eucalyptus plantation that the ceramics maintain for self-supply of biomass. Employees on the ceramic use spreadsheets to control the amount of storage bags leaving the ceramic each time ashes were collected for 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. Each storage bag holds 40 kilograms of ashes.
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 destination whenever feasible.
Purpose of data:	This parameter determines the procedures adopted by the ceramic factory for the control and disposal of ashes.
Additional comments:	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	**SDG 8**
Data/parameter:	**Number of Health and Security trainings and campaigns**
Unit	-
Description	Monitoring Health and safety practices on the ceramic factory, including the use of safety equipment by employees working with biomass and around the kilns.
Measured/calculated/default	Measured
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) of monitored parameter	<table><tr><th colspan="2">Health and Safety training</th><th>Date</th></tr><tr><td>1</td><td>Admission and periodic training on correct use of PPE, information on Collective Protection Equipment and inherent risks</td><td>21/12/2018</td></tr><tr><td>2</td><td>Training to perform specific functions</td><td>25/03/2019</td></tr><tr><td>3</td><td>Ergonomics training</td><td>29/04/2019</td></tr><tr><td>4</td><td>NR-35 Training (Brazilian Regulatory standard, on work at height)</td><td>18/10/2019</td></tr><tr><td>5</td><td>Environmental Risk Prevention Program (PPRA)</td><td>Annual</td></tr><tr><td>6</td><td>Occupational Health Medical Control Program (PCMSO)</td><td>Annual</td></tr><tr><td>7</td><td>Internal Accident Prevention Commission (CIPA)</td><td>Annual</td></tr></table>
Monitoring equipment	No monitoring equipment was used to determine this parameter.
Measuring/reading/recording frequency:	The parameter will be monitored at each monitoring period.
Calculation method (if applicable):	To collect information on the quality of employment focusing on actions of health and security, interviews were carried out with ceramic staff and information was collected on training offered to employees during this 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:	This parameter determines the procedures adopted by the ceramic factory to offer Health and Security trainings and campaigns to its employees.
Additional comments:	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	**SDG 13**
Data/parameter:	**Voluntary Emission Reductions issued**
Unit	VERs
Description	Voluntary emission reductions issued
Measured/calculated/default	Measured
Source of data	Reports from the registry platform that controls the amount of issued VERs.
Value(s) of monitored parameter	132,953
Monitoring equipment	No monitoring equipment was used to determine this parameter.
Measuring/reading/recording frequency:	The parameter will be monitored at each monitoring period.
Calculation method (if applicable):	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.
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 comments:	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	**SDG 13**
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
Measured/calculated/default	Calculated

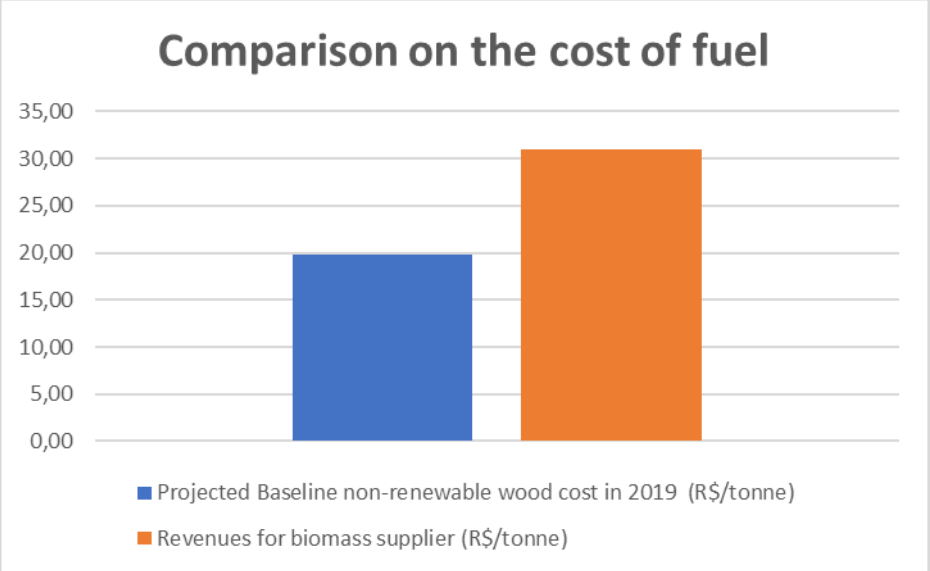
<table>
<tr><td>Source of data</td><td>Total revenues are monitored through interviews with biomass suppliers, purchase invoices, receipts of sale and/or other documents concerning biomass acquisition.</td></tr>
<tr><td>Value(s) of monitored parameter</td><td>
<table>
<tr><td>Wood from sustainable forest management</td><td>R$ 1.22/ton</td></tr>
<tr><td>Algaroba wood</td><td>R$ 58.77/ton</td></tr>
<tr><td>Wood Residues</td><td>R$ 11.84/ton</td></tr>
<tr><td>Eucalyptus</td><td>R$ 0.51/ton</td></tr>
</table>
</td></tr>
<tr><td>Monitoring equipment</td><td>No monitoring equipment was used to determine this parameter.</td></tr>
<tr><td>Measuring/reading/recording frequency:</td><td>Annually</td></tr>
<tr><td>Calculation method (if applicable):</td><td>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 20. The cost of non-renewable wood will be updated applying a conservative annual correction factor of 6.5%21,22.
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.
The chart below displays the comparison between the cost of non-renewable wood in the projected baseline scenario and the cost of biomass per ton during this monitoring period. It can be seen that non-renewable biomass is more financially attractive than using renewable biomass.
 

Chart 1. Comparison of the cost of fuel.</td></tr>
</table>

[20] 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.

[21] 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.

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

QA/QC procedures:	Total revenues are monitored by interviews with biomass suppliers, purchase invoices, receipts of sale and/or other documents concerning biomass acquisition[23].
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 comments:	This parameter corresponds to the indicator n° 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	**SDG 7**
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.
Measured/calculated/default	Calculated
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) of monitored parameter	100%
Monitoring equipment	No monitoring equipment was used to determine this parameter.
Measuring/reading/recording frequency:	On a monthly basis. Data will be consolidated on an annual basis.
Calculation method (if applicable):	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 monitoring period.
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 comments:	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.

D.3. Implementation of sampling plan

Not applicable as no sampling mechanism is performed.

SECTION E. Calculation of SDG outcomes

E.1. Calculation of baseline value or estimation of baseline situation of each 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 on January 01st, 2009. Currently

[23] Available at: Spreadsheet GS MR Calculation Buenos Aires_01 09 2017_31 12 2019_v.4, Revenues to supliers

Buenos Aires ceramic uses only native wood from sustainable forest management plan, Algaroba wood, wood residues and eucalyptus.

The outcome will be monitored through the parameter **Total energy produced from renewable sources**. The baseline value is 9.07%[24], as the use of renewable biomass was low.

SDG 8: Decent Work and Economic Growth

In order to monitor the project impact on the quality of employment, the project will apply the indicator **Number of Health and Security trainings and campaigns**.

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

$$L_{Imp} = NHS_{CMP} - NHSS_{BSL}$$

Where:

L_{Imp}	Level Improvement
NHS_{CMP}	No. of Health and Security training in the Current Monitoring Period
NHS_{BSL}	No. of Health and Security training 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 indicator **Number of Health and Security trainings and campaigns**. This indicator evaluates the existence and performance of campaigns, leisure and goal and plans regarding equipment use and the security procedures during the monitoring period.

In the baseline scenario of this parameter, the company only developed campaigns on the Environmental Risk Prevention Program (PPRA), a mandatory program for all companies that have employees governed by the Consolidation of Labor Laws (CLT), performed at least once a year.

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 operation of the project kilns in 2010. Data from August 2007 to July 2008 from the ceramic industry was used for calculating the baseline. A longer period could not be considered due to an insufficient record of consistent historical data. Table below provides information on brick production and fuel consumption of the ceramic industry. This set of data was chosen based on the prerogative of conservativeness and is considered to be the most reliable data available to determine baseline emissions. Margins of error were not quantified but are expected to be small, (lower than 10%) due to the reliable nature of the data used.

Table 3. Baseline information for the ceramic industry

[24] The $f_{NRB,y}$ of the Caatinga biome is 90.93%. The percentage of RB is calculated by subtracting the $f_{NRB,y}$ from 100% (which in this case results in 9.07%).

Parameter	Buenos Aires
Brick production (units)	42,290,369
Brick production (thousands of units)	42,290.37
Fuel (wood) consumption (m^3/month)	3,451.08
Total fuel (wood) consumption (m^3)	41,412.96
Baseline fuel consumption (m^3 per 1,000 bricks)	0.9792
Baseline energy consumption (TJ per 1,000 bricks)	0.012

At the period, Buenos Aires ceramic industry needed to use 0.97 tonnes of deforestation wood per 1,000 bricks produced, which is equivalent to 0.012 TJ of thermal energy per 1,000 bricks. A total of 41,412.96 m^3 of natural deforestation wood was demanded. During the project scenario, the of 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.

Buenos Aires ceramic is no longer using glycerin as fuel. Glycerin was only applied in the ceramic's kilns in the beginning of the project crediting period under the VCS, and the ceramic factory will not utilize it anymore. 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 Emission

Baseline emissions were 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"25. The project activity in this monitoring period (28 months) generated 575.96 TJ, or 246.84 TJ per year. Converting this number to MWh, it was generated 68,566.85 MWh per year, which corresponds to the use of 7.83 $MW_{thermal}$ on average of the kilns capacity during the monitored period, which is less than the limits of 45 $MW_{thermal}$ for Type I Small scale project activities.

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

Where:

BE_y: Baseline Emission reductions during the year y in tCO2e

B_y: 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

$NCV_{biomass}$: Net calorific value of non-renewable woody biomass that was substituted, in TJ/ton

25 Available at: <http://cdm.unfccc.int/filestorage/5/e/HSVPWKBG6X7Q8YEFMOT214IA3R0ZDL.pdf/EB%2068_repan22_Rev_AMS-I.E_ver05.0.pdf?t=R0I8b3dqcGw2fDCq6X3IVhPLakOQ3MBJK5Lm> Last visit on 20/09/2017

$EF_{projected\ fossil\ fuel}$: Emission factor for substitution of non-renewable woody biomass by similar consumers, in tCO2e/TJ[26].

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 number 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. Also, the following principles were considered:

Demonstrably Renewable woody biomass[27] (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 forests28 where:
    a. The land area remains a forest;
    b. Sustainable management practices are undertaken on these land areas to ensure 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 that the level of carbon stocks on these land areas does not systematically decrease over time (carbon stocks may temporarily decrease due to harvesting); and
    c. Any national or regional forestry, agriculture and nature conservation regulations are complied with.

Non-renewable biomass

Non-renewable woody biomass (NRB) is the quantity of woody biomass used in the absence of the project activity (By) minus the DRB component, if 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.

[26] 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.

[27] 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 20/09/2017.

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

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

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

Before the project activity, wood from areas without forest management was offered with low prices and high viability to the ceramic owner. Thus, most of the fuel employed in the baseline scenario was from non-renewable origin. A fraction of baseline fuel was from sustainable origin, namely woody biomass for which a DOF (Documento de Origem Florestal, Forest Origin Document) was available. According to the IBAMA Normative Instruction N° 112 from 21/08/2006, the entrepreneur who uses raw material from native forests is obliged to use the DOF 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 was considered renewable, since it complies with item 1 of the definition of renewable biomass.

The fNRB,y parameter was determined in two steps: the first step was 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 was an assessment on the fraction of woody biomass used that could 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[29]. A description of such methodology follows:
On a project-specific basis, project participants determine the shares of renewable (DRB) and non-renewable woody biomass (NRB) in the total biomass consumption. This has been performed in the first step, as described above.
A default value for fNRB,y in the Caatinga biome was derived by calculating Total Annual Biomass Removals (R) in this biome as a proxy for By and estimating the proportion of R that was demonstrably renewable (DRB) and non-renewable (NRB). The following equation was used:

NRB = R - DRB (Equation 4)

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

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) was calculated as the sum of the two, as below:

$$R = MAI + \Delta F \quad \text{(Equation 5)}$$

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) was 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:

$$MAI = F \times GR \quad \text{(Equation 6)}$$

Where:
F Extent of forest (ha)

[29] Document is available at: <http://cdm.unfccc.int/Panels/ssc_wg/meetings/035/ssc_035_an20.pdf>. Last visited on 15/09/2017.

GR Annual growth rate of biomass (t/ha-yr)

Demonstrably renewable biomass (DRB) was 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:

$$DRB = PA \times GR \quad \text{(Equation 7)}$$

Where:

PA Protected Area Extent of Forest (ha)

This approach was considered appropriate since it took in consideration historical practices of the ceramics involved in the project regarding fuel usage, meaning only native firewood from areas without forest management were 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 neither available nor feasible to obtain. Also, there is evidence to support that carbon stocks are depleting in the project area and that there is a trend showing an increase in time spent or distance travelled for gathering fuelwood by users[30].

E.2. Calculation of project value or estimation of project situation of each SDG outcome

Regarding the leakage of the non-renewable biomass, according to the AMS-IE, version 05, "it shall be assessed from ex-post surveys of users and areas from where biomass is sourced": however, the leakage of non-renewable biomass was not monitored as required, since it was not feasible due to the variety of sources of non-renewable biomass and the lack of information regarding its current users. Therefore, as an alternative, the project applied the requirements of the Methodology AMS-IE, version 05, which determines that By should be multiplied by the correction factor of 0.95 to account for leakages, since surveys were not required.

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 from sustainable forest management plan, Algaroba wood, wood residues and eucalyptus.

The outcome is monitored through the parameter **Total energy produced from renewable sources**.

The amount of renewable biomass is monitored by the weighing receipts issued by the weighbridge system of Buenos Aires ceramic and also through purchase invoice, delivery notes or other documents concerning the acquisition of renewable biomasses. Biomass providers measure the number of products delivered to the ceramic factory to determine due financial compensation.

As previously mentioned, Buenos Aires Ceramic Factory has already complete fuel switching since 2009. Thus, the value of energy produced from renewable sources is 100%.

SDG 8: Decent Work and Economic Growth

In order to monitor the project impact on the quality of employment, the project will apply the indicator **Number of Health and Security trainings and campaigns**.

[30] 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 15/09/2017

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

$$L_{Imp} = NHS_{CMP} - NHSS_{BSL}$$

Where:

L_{Imp}	Level Improvement
NHS_{CMP}	No. of Health and Security training in the Current Monitoring Period
NHS_{BSL}	No. of Health and Security training 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 was used the indicator **Number of Health and Security trainings and campaigns**. This indicator evaluates the existence and performance of campaigns, leisure and goal and plans regarding equipment use and the security procedures during the monitoring period.

In the baseline scenario of this parameter (NHS_{BSL}), the company developed just one campaign on the Environmental Risk Prevention Program (PPRA), a mandatory program for all companies that have employees governed by the Consolidation of Labor Laws (CLT). During this monitoring period, ceramic promoted 4 health and security training sessions for its employees, in addition to the PPRA, PCMSO and CIPA programs, which are mandatory ($NHS_{CMP} = 7$). Therefore, the Level Improvement (LI_{mp}) is 6.

SDG 13: Climate Action

Project emissions

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

Leakage emissions

Leakage is estimated as 2,613 (two thousand, six hundred and thirteen) tCO2e during the entire monitoring period.

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

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

Leakage from the use of renewable biomass was considered using the general guidance on leakage in biomass project activities (attachment C of Appendix B) [31]. 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.

[31] Document available at: <http://cdm.unfccc.int/methodologies/SSCmethodologies/AppB_SSC_AttachmentC.pdf>. Last visit on 15/09/2017.

Table 4. Sources of leakage according to the type of the biomass.

Biomass Type	Activity/Source	Shift of pre project activities	Emissions from biomass generation/ cultivation	Competing use of biomass
Biomass from forests	Existing forests	-	-	X
	New forests	X	X	-
Biomass from croplands or grasslands (woody or non-woody)	In the absence of the project the land would be used as a cropland/wetland	X	X	-
	In the absence of the project the land will be abandoned	-	X	-
Biomass residues or waste	Biomass residues or wastes are collected and use.	-	-	X

Observing the table above, the sources of leakage relevant to the present project activity are the competing use of biomass from existing forests and for biomass residues or waste and emissions from biomass generation/cultivation.

According to "General Guidance on leakage in biomass project activity" [32]:

A. 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 pre-project 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 4 summarizes, for different types of biomass, the cases where the emission source is relevant and the cases where it is not.

B. Emissions from the production of the renewable biomass

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

[32] Available at: <https://cdm.unfccc.int/methodologies/SSCmethodologies/approved/history/c_leak_biomass/guid_biomass_v03.pdf> Last visit in 14/10/2017

(a) Emissions from application of fertilizer[33]; 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 activity. In the absence of forest definition from the DNA, definitions provided by relevant international organisations (e.g., FAO) shall be used.

[33] 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.

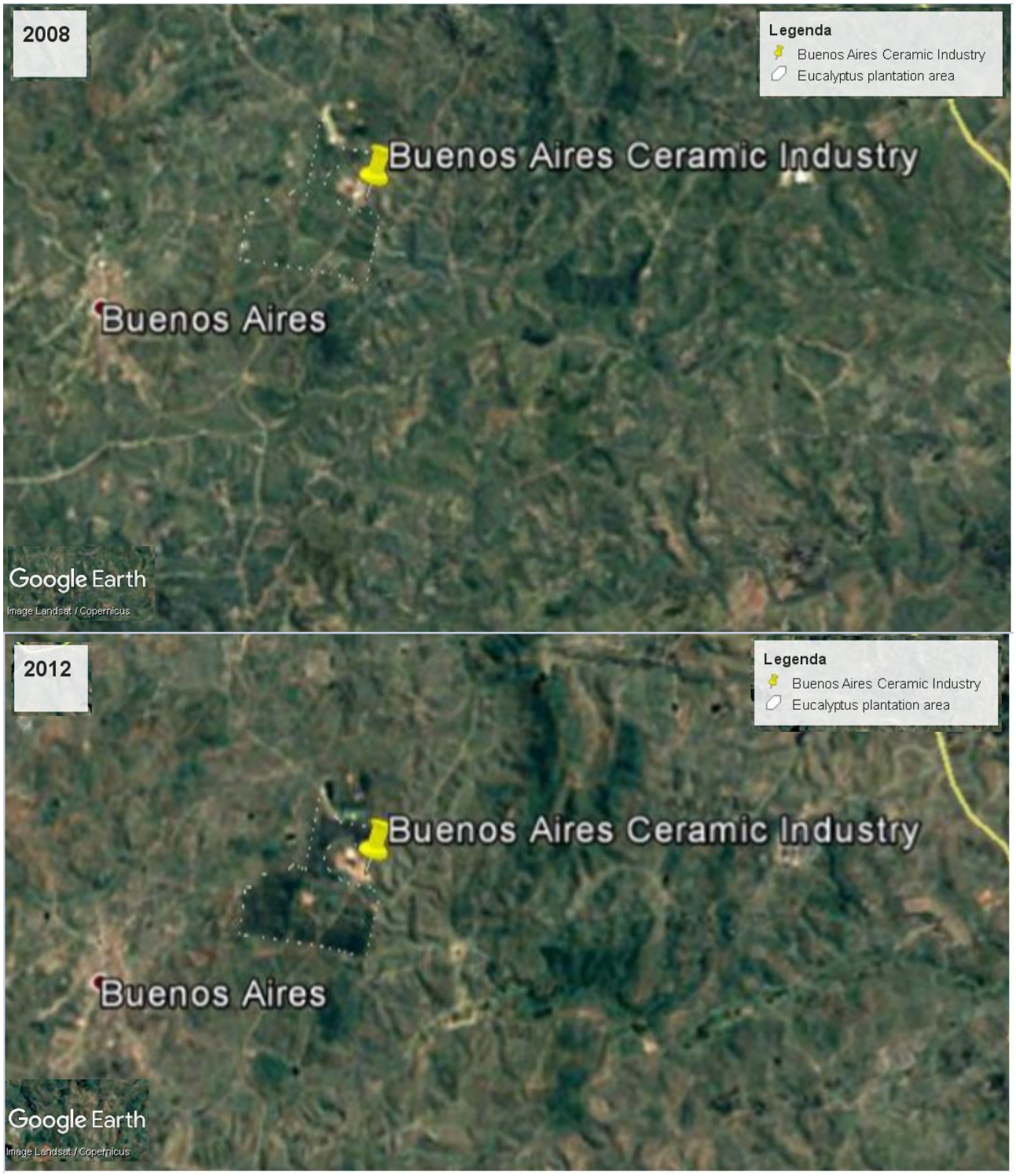


Image from 2012 was included to show the eucalyptius plantation of Buenos Aires Ceramic. In 2008 the Eucalyptus was not visible in Google Earth. The comparison of those images show no deforestation in this area has been carried out since 2008, when the project was implemented.

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.

Information on the biomass availability and consuption was assessed by Sustainable Carbon following a methodological plan that was based on the application of questionnaires to relevant biomass experts, producers and suppliers. An independent third-party expert opinion on the results and findings of such study was obtained to ensure the results are appropriate and conservative.

The results of the studies can be found in the monitored parameter Leakage due to competing use of biomaas, where it shows each biomass type utilized by the ceramic factory and the correspondent surplues expressed in percentage.

Furthermore, if any equipment is tranferred from another activity or if the existing equipment is transferred to another activity, leakage is to be considered. This leakage is not applicable for this project activity as there is no transference of equipment, despite new equipments had to be acquired.

E.3. Calculation of net benefits as difference of baseline and project values or direct calculation for each SDG outcome

SDG 7: Affordable and Clean Energy

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

The outcomes of Affordable and Clean Energy are calculated using the following equation:

$$\%RB = \%RBCMP - \%RBBSL$$

Where:

%RBCMP	Percentage of Renewable Energy used in the Current Monitoring Period
%RBBSL	Percentage of Renewable Energy used in the Baseline Scenario
%RB	Percentage Increase in the Current Monitoring Period in comparison to the Baseline Scenario

During the current monitoring period, the Project Activity increased the usage of renewable energy from 55% in 2017 to 67% in 2018 on an energy basis, as can be seen in the table below. In the baseline scenario, the ratio usage of renewable energy was 0% of the total energy produced. Considering this, the project activity implemented a ratio of 67% of renewable energy in 2018.

Table 5. Average of fuel switch ratio per year achieved by Buenos Aires Ceramic Industry during the current monitoring period Year Average fuel switch ratio on an energy basis (%)

Year	Average fuel switch ratio on an energy basis (%)
2017	100%
2018	100%
2019	100%
Average in the period	100%

Once again, as Buenos Aires Ceramic Factory has already complete fuel switching since 2009, the value of energy produced from renewable sources is 100%.

SDG 8: Decent Work and Economic Growth

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

$$L_{Imp} = NHS_{CMP} - NHSS_{BSL}$$

Where:

L_{Imp}	Level Improvement
NHS_{CMP}	No. of Health and Security training in the Current Monitoring Period
NHS_{BSL}	No. of Health and Security training in the Baseline

During the current Monitoring Period, the project activity increased in 6 Level of improvement on the Indicator "Actions of Health and Security" compared to the baseline scenario. The outcome is the offering of 7 training programs in health and safety for the employees of Buenos Aires Ceramic Factory during this monitoring period.

GS.3 – Voluntary Emission Reductions issued

According to the applied methodology, the emission reductions achieved by the project activity is calculated as the difference between the baseline emissions and the project emissions, minus leakage, as follows.

$$ERy = BEy - PEy - LEy$$

Where:

ERy Emission reductions in year y (tCO2e);

BEy Baseline emissions in the project activity in year y (tCO2e);

PEy Project emissions in the project activity in year y (tCO2e);

LEy Leakage emissions in year y (tCO2e)

Therefore, baseline emissions are calculated based on historical data on production levels and fuel consumption and monitored units of output. Project emissions are calculated based on the fossil fuel consumption for the project scenario. Leakage emissions are estimated to be zero, since the project used primarily abundant biomass residues, thus not causing emissions from any of the leakage sources described in Section E.2. above. Table 6 below summarizes the annual GHG emission reductions for the ceramic industry during the current monitoring period.

Table 6. GHG emission reductions in the monitoring period

Year	Emission Reductions (tCO2e)
2017	5,576
2018	19,399
2019	24,637
Total	**49,612**

E.4. Summary of ex-post values of each SDG outcome for the current monitoring period

Item	Baseline estimate	Project estimate	Net benefit
SDG 13: Climate Action	52, 225 tCO2e	2,613 tCO2e[34]	30,550 tCO2e (49,612 tCO2e)[35]
SDG 7: Affordable and Clean Energy	0% of renewable energy	100% of renewable energy used	100% of renewable energy used
SDG 8: Decent Work and Economic Growth	1 Health and Safety training and/or campaigns	7 Health and Safety training and/or campaigns	6 Health and Safety training and/or campaigns

[34] The project estimate corresponds to the project emissions and also leakage emissions of the project, when applicable. However, this project has no project emissions. Thus, the Project estimates refer only to the value of leakage emissions.

[35] The calculated ERs for this monitoring period is 49,612 tCO2e. Although, due to the Forward Action Request raised by Gold Standard at the previous period, an amount of 19,062 tCO2e had to be deducted from the total ERs generated in this monitoring period.

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 provides alternative and clean energy sources that were not utilized in the baseline situation.

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.

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.

Table 7. Emission reductions by Buenos Aires Ceramic for the monitoring period.

Emissions Reductions for the project activity (tCO2e)			
Buenos Aires Ceramic	**2017**	**2018**	**2019**
	September to December	January to December	January to December
Baseline Emissions	5,870	20,421	25,934
Project Emissions	0	0	0
Leakage Emissions	294	1,022	1,297
Emissions Reductions for the Monitoring Period (tCO2e)	5,576	19,399	24,637
Total	49,612		
ER to be deducted	19,062		
Total Monitoring Period	**30,550**		

According to Issuance Review Round III carried out by the Gold Standard Team on 29/04/2018, a Forward Action Request was opened for this monitoring period, since the site visiting frequency did not meet GS requirements. Therefore, the Project Proponent had to discount the credits generated in the period from 03/01/2012 to 09/27/2012. Table 8 below summarizes the annual distribution of ERs to be deducted from this Monitoring Period.

Table 8. Verified Emission Reductions (VERs) to be issued by year (in tCO2e)

Year	Calculated ERs	Amount to be deducted	Net Emission Reductions
2017[36]	5,576	2,142	3,434
2018	19,399	7,454	11,945
2019	24,637	9,466	15,171
Total	**49,612**	**19,062**	**30,550**

[36] From September 1st to December 31st.

E.5. Comparison of actual value of outcomes with estimates in approved PDD

Item	Values estimated in ex ante calculation of approved PDD	Actual values achieved during this monitoring period
SDG 13: Climate Action	63,053.66 tCO2e[37]	30,550 tCO2e (49,612 tCO2e)[38]
SDG 7: Affordable and Clean Energy	100%	100%
SDG 8: Decent Work and Economic Growth	3 Health and Safety training and/campaigns (mandatory programs)	7 Health and Safety training and/or campaigns (3 mandatory programs)

E.6. Remarks on difference from estimated value in approved PDD

SDG 7: Affordable and Clean Energy

The generation of clean energy in this monitoring period exceeded the estimate made by the PDD by more than 100%, not using other forms of energy to burn the ceramic pieces.

PDD	Monitored period
106.30	241.62

SDG 8: Decent Work and Economic Growth

The parameter *Number of Health and Security trainings and campaigns* exceeded the estimated, reaching 7 Health and Safety training and/or campaigns (4 non-mandatory trainings + 3 mandatory programs), showing that Buenos Aires ceramic factory proved to be committed to health and safety practices of the worker, such as the presence of a technician in work safety and CIPA meetings.

PDD	Monitored period
3 Health and Safety training and/or campaigns (mandatory programs)	7 Health and Safety training and/or campaigns (4 non-mandatory trainings + 3 mandatory programs)

SDG 13: Climate Action

The amount of Emissions Reductions achieved by this project during this monitoring period was lower than the amount estimated ex ante in the PDD (79.5%) for the same period, even more when the deducted value of the credits generated is taken into account, this value becomes only 49.3%. This may be related to the political-economic crisis that Brazil is currently going through, affecting the production of the ceramic factory.

PDD	Monitored period
63,053.66	30,550 tCO2e (49,612 tCO2e)

[37] Estimated ERs for the period from September 2017 to December 2019.

[38] The calculated ERs for this monitoring period is 49,612 tCO2e. Although, due to the Forward Action Request raised by Gold Standard at the previous period, an amount of 19,062 tCO2e had to be deducted from the total ERs generated in this monitoring period.

Table 9. Double Check (QA/QC Procedure)

	PDD	Monitored Period	Double Check (QA/QC Procedure)
ERy - Emission Reductions (tCO2e)	63,053.66	30,550 tCO2e (49,612 tCO2e)	The thermal energy generated per thousand of ceramic units produced at Buenos Aires Ceramic in the monitored period was larger than Gold Standard Gap Analysis report. This is not necessarily due to a drop in productivity or efficiency, but rather to the large amount of renewable biomass purchased – and which has not yet been fully consumed – by Buenos Aires ceramic factory during this monitoring period.
PRy - Production (thousand of ceramic units)	30,720.00	25,447.84	
Algaroba wood (tonnes)	4,921.00	9,983.14	
Wood from forest management plan (tonnes)	308.04	207.94	
Eucalyptus Wood (tonnes)	0	87.43	
Wood Residues (tonnes)	0	2,010.99	
Thermal Energy (TJ)	106.30	241.62	
Thermal energy per tonnes of pieces produced (TJ/thousand of pieces)	0.003460	0.009495	

SECTION F. Stakeholder inputs and legal disputes

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 your 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.

F.1. List all inputs/grievances which have been received for the project during the monitoring period together with their respective answers/actions

For the present monitoring period, even presenting the grievance mechanism, there was no record of grievance from stakeholders. If any grievance occurs over the years, the Buenos Aires Ceramic will register in a process book to always keep track of the problems relating to the project or other grievances appears. No issues about the project activity itself or regarding smoke, air soil, noise or other types of contamination have been observed.

F.2. List all inputs/grievances from previous monitoring period where follow up action is to be verified in this monitoring period

No grievances were received from stakeholders during the last monitoring period.

F.3. Provide details of any legal contest or dispute that has arisen with the project during the monitoring period

Not applicable.

APPENDIX 1. Contact information of project participants and responsible persons/entities

Project participant and/or responsible person/ entity	☒Project participant ☒Person/entity responsible for completing the CDM-MR-FORM
Organization name	Sustainable Carbon Projetos Ambientais Ltda
Street/P.O. Box	Rua Doutor Bacelar, 368 Conjunto 131
Building	-
City	São Paulo
State/region	São Paulo
Postcode	CEP: 04026-001
Country	Brazil
Telephone	+ 55 11 2649-0036
Fax	+55 11 2649-0042
E-mail	info@sustainablecarbon.com
Website	www.sustainablecarbon.com
Contact person	Mr. Stefano Merlin
Title	CEO
Salutation	Mr.
Last name	Merlin
Middle name	-
First name	Stefano
Department	-
Mobile	Not Available
Direct fax	+ 55 11 2649-0036
Direct tel.	+55 11 2649-0042
Personal e-mail	smerlin@sustainablecarbon.com

Project participant and/or responsible person/ entity	☒ Project participant ☐ Person/entity responsible for completing the CDM-MR-FORM
Organization name	Patrícia Matos de Cunha LTDA
Street/P.O. Box	Granja São Joaquim, s/nº
Building	-
City	Buenos Aires
State/region	Pernambuco
Postcode	CEP 55845-000
Country	Brazil
Telephone	+55 81 3621-4399
Fax	Not available
E-mail	Not available
Website	Not available

Contact person	Rodolpho Cunha Neto
Title	Director
Salutation	Mr
Last name	Neto
Middle name	Cunha
First name	Rodolpho
Department	General Management
Mobile	Not available
Direct fax	Not available
Direct tel.	Not available
Personal e-mail	rodolpho@cerbuenosaires.com.br