Monitoring report form for CDM project activity
(Version 06.0)

MONITORING REPORT		
Title of the project activity	*Buenos Aires Renewable Energy Project*	
UNFCCC reference number of the project activity	Not applicable – This project is being developed under the Voluntary Carbon Market, following Gold Standard Rules; Gold Standard ID number GS2290	
Version number of the PDD applicable to this monitoring report	Version 08	
Version number of this monitoring report	Version 06	
Completion date of this monitoring report	02/05/2018	
Monitoring period number	Second monitoring period	
Duration of this monitoring period	From 01/03/2012 - 31/08/2017 (days included)	
Monitoring report number for this monitoring report	Not applicable	
Project participants	Sustainable Carbon - Projetos Ambientais Ltda Patrícia Mattos de Cunha – EPP (Buenos Aires Ceramic Factory)	
Host Party	Brazil	
Sectoral scopes	Energy industries (renewable - / non-renewable sources)	
Applied methodologies and standardized baselines	AMS-I.E.: Switch from non-renewable biomass for thermal applications by the user - Version 5.0	
Amount of GHG emission reductions or net anthropogenic GHG removals achieved by the project activity in this monitoring period	Amount achieved before 1 January 2013	Amount achieved from 1 January 2013
	26,446tCO2e	106,507tCO2e
Amount of GHG emission reductions or net anthropogenic GHG removals estimated ex ante for this monitoring period in the PDD	148,737 tCO2e	

SECTION A. Description of project activity

A.1. General description of project activity

This project activity consists in one red ceramic industry located in Buenos Aires municipality, Pernambuco, northeastern 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 **132,953** tCO2e during the monitoring period from 01/03/2012 to 31/08/2017. 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 activity

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°41'46"S	35°19'01"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

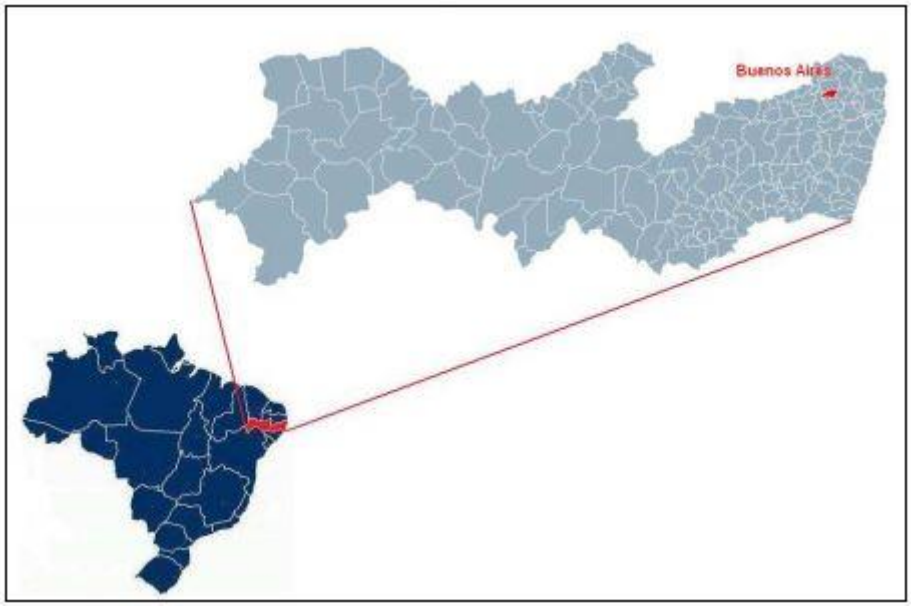


Figure 1. Geographic location of the municipality of the project activity (Buenos Aires, Pernambuco) that has the following coordinates: 07º58'00" S and 37º37'59" W.

A.3. Parties and project participants

Table 02. Project participants

Parties involved	Project participants	Indicate if the Party involved wishes to be considered as project participant (Yes/No)
Brazil (host Party)	Sustainable Carbon - Projetos Ambientais Ltda Patrícia Mattos de Cunha - EPP	No

A.4. Reference to applied methodologies and standardized baseline

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 03/08/2012 to 27/11/2014.[1]

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

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

- 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.[2]
- Annex 18 of the 23rd meeting report of the CDM Executive Board. Definition of renewable biomass.[3]
- CDM Methodological Tool: "Tool for the demonstration and assessment of additionality". Version 07.[4]

A.5. Crediting period type and duration

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[5]. Hence, the project is following the retroactive project cycle according to Gold Standard Toolkit version 2.1.

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.

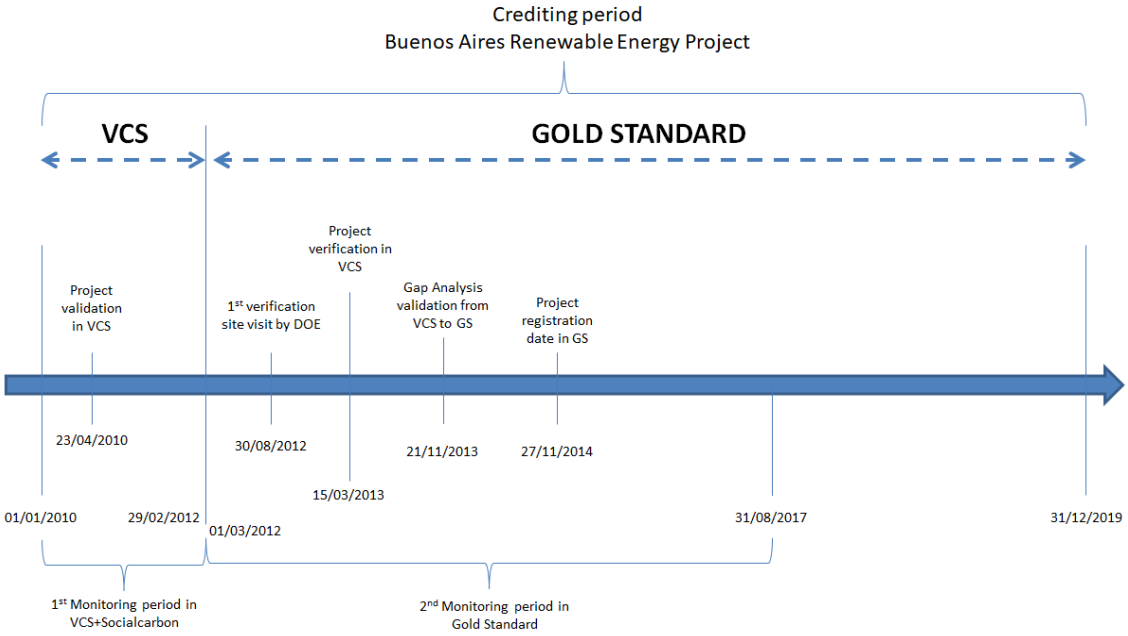
[1] Available at: <http://cdm.unfccc.int/filestorage/5/e/HSVPWKBG6X7Q8YEFMOT214IA3R0ZDL.pdf/EB%2068_repan22_Rev_AMS-I.E_ver05.0.pdf?t=R0l8b3dqcGw2fDCq6X3lVhPLakOQ3MBJK5Lm> Last visit on 20/09/2017

[2] Available at: <http://cdm.unfccc.int/methodologies/SSCmethodologies/AppB_SSC_AttachmentC.pdf>. Last visit on: 20/09/2017.

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

[4] Available at: <http://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-01-v7.0.0.pdf>. Last visit on: 20/09/2017.

[5] 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 activity

B.1. Description of implemented project activity

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 Catinga 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. Buenos Aires has been utilizing the same biomass types described in the PDD: wood residues, eucalyptus, Algaroba wood and native wood with 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[6].

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´s kilns.

Buenos Aires Ceramic produces ceramic bricks and flagstones. The production process at the factory encompasses three “Hoffman” kilns in order to burn the fuel and cook the ceramic pieces at 850ºC.

B.2. Post-registration changes

B.2.1. Temporary deviations from the registered monitoring plan, applied methodology or standardized baselines

No temporary deviations were made for the current monitoring period.

B.2.2. Corrections

No corrections or revisions on the monitoring plan were made for the current monitoring period. The monitoring data was kept according to the monitoring plan described in the Project Design Document, version 08. During this monitoring period it was used the CDM template version 06, which was the most recent template at the verification time.

B.2.3 Changes to the start date of the crediting period

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

B.2.4 Inclusion of a monitoring plan

Not applicable, as no monitoring plan was included during the current monitoring period

B.2.5. Permanent changes to the registered monitoring plan, or permanent deviation of monitoring from the applied methodologies, standardized baselines, or other applied standards or tools

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 this monitoring period (second monitoring period from 01/04/2012 to 31/08/2017).

B.2.6. Changes to project design

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

[6] 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.

SECTION C. Description of monitoring system

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 03/08/2012 to 27/11/2014.

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)[7], 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:
Fernanda Alves de Almeida – Technical Analyst
Fernanda Sayuri Suzuki – Technical Analyst
Guilherme Lucas Medeiros Prado – Technical Analyst
Livia Demier Mauri – Technical Analyst
Luana Ribeiro Alves – Technical Analyst
Marcelo Hector Sabbagh Haddad – Technical Coordinator

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 are described in Section D and were monitored with the frequency described in Table below.

Table 03. Monitored parameters

Parameters		Data
$Q_{renbiomass}$ Amount of renewable biomass	Unit	Tonnes
	Origin of data	Measured by the biomass providers and controlled by the ceramic owner.
	Frequency	Monthly
Origin of Renewable Biomass	Unit	Not applicable
	Origin of data	Ceramic owner shall store invoices, receipt of sales or other documents to allow the determining if the biomass can be considered renewable. Also, Sustainable Carbon and Buenos Aires Ceramic will work with biomass providers to allow tracking the origin of Algaroba firewood. Biomass providers and/or land owners shall be contacted to ensure a appropriate management of Algaroba forests, in accordance with national regulations.
	Frequency	Annually
PR_y **Production of ceramic pieces**	Unit	Thousands of ceramic pieces
	Origin of data	Controlled by the ceramic owner. Measurements will be done by an internal control sheet monitored by the project proponent.
	Frequency	Monthly
$f_{NRB,y}$	Unit	Fraction

[7] *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.*

Fraction of biomass (wood) used in the absence of the project activity in year y can be established as non-renewable biomass using survey methods	Origin of data	Assessment was based on Annex 20 of the 35th meeting of the Small Scale Working Group of the Clean Development Mechanism, which provides a methodology for the calculation of $f_{NRB,y}$[8]
	Frequency	Annually
Leakage of Non-Renewable woody Biomass	Unit	tCO_2e
	Origin of data	Monitored by surveys and publications.
	Frequency	Annually
Leakage due to competing uses of biomass	Unit	tCO_2e
	Origin of data	Surveys or national and international databases
	Frequency	Annually
Renewable Biomass Surplus Amount of renewable biomass available[9]	Unit	Tonnes or m^3
	Origin of data	Monitored by surveys, articles and databases, as part of the procedures to determine leakage due to competing use of biomass.
	Frequency	Annually

SECTION D. Data and parameters

D.1. Data and parameters fixed ex ante

Data / Parameter:	**$EF_{projected\_fossilfuel}$**
Unit:	tCO_2/TJ
Description:	Emission factor for substitution of non-renewable woody biomass by similar consumers.
Source of data:	Approved small scale methodology AMS-I.E "Switch from Non-Renewable Biomass for Thermal Applications by the User", version 05.
Value(s) applied:	81.6 tCO_2/TJ
Choice of data or measurement methods and procedures	In the baseline scenario, non-renewable biomass was used as an energy source.This is the common practice for the red ceramic sector in the project region. As described 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/ parameter	This parameter was used to calculate baseline emissions from the use of the fossil fuel that would be used in the baseline scenario.
Additional comment:	According to the applied methodology, a value of 81.6 tCO_2/TJ shall be used for this emission factor, representing the mix of fossil fuels to be used for the present and future.

Data / Parameter:	**$NCV_{biomass}$**
Unit:	TJ/ton

[8] Document is available at: <http://cdm.unfccc.int/Panels/ssc_wg/meetings/035/ssc_035_an20.pdf>. Last visited on 02/04/2013.

[9] This parameter is monitored to determine leakage due to competing use of biomass. Please see the table of such parameter for more information on how the renewable biomass surplus will be monitored.

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 TJ/tonne
Choice of data or measurement methods and procedures:	In the baseline scenario, non-renewable biomass was used as an energy source. This is the common practice for the red ceramic sector in the project region. Applied value is recommended by the approved methodology.
Purpose of data/ parameter:	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 comment:	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.

Data / Parameter:	$\rho_{biomass}$
Unit:	Tonnes/m³
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/ parameter:	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 comment:	The specific gravity of non-renewable wood value is the same adopted in the Buenos Aires Ceramic - VCS Project Description,

	version 08.

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/ parameter :	This parameter was used to calculate quantity of biomass is necessary to fire a thousand of ceramic units per year
Additional comment:	

D.2. Data and parameters monitored

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:	

PRy	**2012 (From 01 March to 31 December)**	**2013**	**2014**	**2015**	**2016**	**2017 (From 01 January to 31 August)**
Total	31,480.00	28,778	26,004	30,718	26,523	14,770
Total Monitoring Period	158,272					

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[10].
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/ parameter:	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.

Data / Parameter:	**$Q_{renbiomass}$**
Data unit:	Tonnes
Description:	Amount of renewable biomass used during year y of the crediting period
Measured /Calculated /Default:	Measured by the biomassa 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:	
Monitoring equipment:	No monitoring equipment was used to determine this parameter.
Measuring/ Reading/ Recording frequency:	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.
Calculation method (if applicable):	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:

	Renewable Biomass	Qrenbiomass				
		Wood from sustainable forest management	Algaroba wood	Wood Residues	Eucalyptus	Total MR
Buenos Aires Ceramic	2012	1,122.82	2,736.00	0.00	0.00	3,858.82
	2013	286.56	11,723.00	0.00	0.00	12,009.56
	2014	0.00	10,891.75	143.50	0.00	11,035.25
	2015	427.82	10,820.50	80.00	720.00	12,048.32
	2016	0.00	3,771.50	1,659.88	720.00	6,151.38
	2017	32.29	6,789.65	0.00	0.00	6,821.94

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

	<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>0.8072</td></tr><tr><td>Eucalyptus</td><td>0.51</td></tr><tr><td>Residues of wood</td><td>0.35</td></tr></table> These value 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>.
QA/QC procedures:	Buenos Aires ceramic shall store all documents related to the purchase or acquisition of renewable biomass. Data will be compared to production output.
Purpose of data/ parameter:	This parameter was monitored to calculate the amount of renewable biomass used during year y of the crediting period.
Additional comment:	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.

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.
QA/QC procedures:	Data from published sources were used to determine this parameter.[11]
Purpose of data/ parameter:	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.

Data / Parameter:	**Origin of Renewable Biomass**
Data 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
Calculation method (if applicable):	Not applicable
QA/QC procedures:	Ceramic owner shall store invoices, receipt of sales or other

[11] Available at: Spreadsheet GS MR Calculation Buenos Aires_01 03 2012_31 08 2017_v2, fNRB, y - project

	documents to allow the traceability of the renewable biomass.
Purpose of data/ parameter:	This information will be given by the biomasses providers. The guarantee of acquiring renewable biomass will be achieved by invoices from the providers. Biomasses are considered renewable as fullgilling definitions of renewable biomass approved by the CDM Executive Board[12]. 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.
Any comment:	The biomasses will be considered as renewable if they are in accordance to the definition by the CDM Executive Board. Data will be kept for two years after the end of the crediting period or the last issuance of carbon credits for this project activity, whichever occurs later.

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
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)[13], 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

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

13Document available at: <http://cdm.unfccc.int/methodologies/SSCmethodologies/AppB_SSC_AttachmentC.pdf>. Last visit on 11/04/2013.

	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. In regard to wood from areas with sustainable forest management plan, Sustainable Carbon has developed a methodology that assesses the availability and surplus of Caatinga firewood from forest management plans. According to the methodology applied, the effective capacity of a managed forest to sustain a certain level of harvest depends on its growth rate, indicated by the Mean Annual Increment (MAI). This value represents the mean rate of harvestable growth of wood that is expected to occur in the managed area and consists of measuring the harvestable stock by an inventory and dividing this value by the number of years in the cutting cycle. However, this methodology does not take into consideration two facts that in practice increase the standing stock in the coupes not yet harvested. - The trees keep growing after the inventory is made so that their volume and mass will continuously increase. Thus, in every coupe of the cutting series the forest will be older and more heavily stocked than it was at the time of the inventory; - New trees grow in the not harvested coupes along the same time series, adding new biomass to the standing stock. When these two factors are considered it is evident that the standing stock in the not harvested coupes is dynamic and grows along the cutting cycle, which means an increasing harvestable stock can be expected along a coupes series. Thus, it can be stated that the growth of trees in the not harvested

	coupes originates increases in the standing stock along the cutting cycle, which results in average 27% higher that the starting stock as calculated by the forest inventory. Furthermore, in most cases, a lapse of one year occurs between the inventory is made and a Forest Management Plan (FMP) is approved, and frequently another year passes until the FMP starts to harvest the first coupe. Based on that, it is reliable to state that a surplus of biomass exists, since the average stock of harvestable firewood along the cutting cycle of FMPs in Pernambuco State is at least 25% higher than the estimate in the Forest Inventory and the corresponding cutting authorizations issued by Pernambuco State authority (Agência Estadual de Meio Ambiente - CPRH). In order to evaluate the surplus availability of wood from sustainable forest management areas, a comparison was performed between the effective annual availability of firewood and the amount of native firewood provided with Forest Origin Document (in Portuguese, DOF - Documento de Origem Florestal), in the state of Pernambuco in the year 2012. The annual availability of native wood data was based on the Forest Management Plans in the State of Pernambuco, registered by the Environmental Authority of Pernambuco State, CPRH. In addition, the effective available firewood was calculated considering the increase of 27% in the standing stock along the cutting cycle. Comparing the effective available amount of firewood and the amount of wood provided by Forest Origin Documents, the verified surplus of wood from management plans was of 154.17% in 2012. This value determines that the availability of wood from sustainable forest management serves local consumers, with significant surplus in the State of Pernambuco. This data demonstrates effective availability of 480,504 stereo meters of wood per year against total annual consumption of 189.049 stereo meters, which represents firewood surplus of 154% for Pernambuco in year 2012. This is the outcome of the quantitative analysis reported by Brazilian Environmental Authorities, which are the responsible to control the annual availability of wood and its consumption through Forest Origin Documents. It is important to note that there are some barriers to the commercialization of wood from management areas, such as distance from centers of consumption and the low price of the firewood from deforestation, causing an unfair competition. In conclusion, the official data showed a large surplus of native wood from management plans in 2012. Hence, Sustainable Carbon considers that data indicates there is abundant firewood in the project region to avoid possibility of competing uses of biomass due to the project implementation. The complete methodology and source of the official data provided by Environmental Authority of Pernambuco State will be

	made available to the verification team and the GS Secretariat. 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[14], and that the production of wood in the State of Pernambuco was of 1,927,349 m³ in 2016[15], 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.
QA/QC procedures:	Sustainable Carbon has hired an independent consultant with significant expertise in assessing biomass supply chains to develop a methodology for the assessment of biomass surplus. Such methodology shall be applied using conservative assumptions to determine renewable biomass surpluses.
Purpose of data/ parameter:	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
Any comment:	Data will be kept for two years after the end of the crediting period

[14] 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.

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

	or the last issuance of carbon credits for this project activity, whichever occurs later.

Data / Parameter:	***Leakage of non-renewable woody biomass***						
Unit:	tCO_2e						
Description:	Leakage relating to non-renewable woody biomass						
Measured /Calculated /Default:	The source of leakage from non-renewable biomass was monitored according to the applied methodology.						
Source of data:	Monitored						
Value(s) of monitored parameter:	**Buenos Aires Ceramic**	**2012 (March to December)**	**2013**	**2014**	**2015**	**2016**	**2017 (January to August)**
	Leakage Emissions	1,245	1,138	1,028	1,214	1,049	584
	TOTAL	6,258					
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 07, 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/ parameter:	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.						
Any comment:	The biomasses will be considered as renewable if they are in accordance to the definition by the CDM Executive Board. Data will be kept for two years after the end of the crediting period or the last issuance of carbon credits for this project activity, whichever occurs later.						

D.3. Implementation of sampling plan

Not applicable as no sampling mechanism is performed.

SECTION E. Calculation of emission reductions or net anthropogenic removals

E.1. Calculation of baseline emissions or baseline net removals

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**"[16]. The project activity in this monitoring period (66 months) generated 1,047.14 TJ, or 190.39 TJ per year. Converting this number to MWh, it was generated

16Available at:<http://cdm.unfccc.int/filestorage/5/e/HSVPWKBG6X7Q8YEFMOT214IA3R0ZDL.pdf/EB%2068_repan22_Rev_AMS-I.E_ver05.0.pdf?t=R0l8b3dqcGw2fDCq6X3lVhPLakOQ3MBJK5Lm> Last visit on 20/09/2017

52,928.01 MWh per year, which corresponds to the use of 6.04 MWthermal on average of the kilns capacity during the monitored period, which is less than the limits of 45 MWthermal for Type I Small scale project activities.

Baseline Emission

$$BEy = B_y \times f_{nrb,y} \times NCV_{biomass} \times EF_{projected\_fossilfuel}$$

(Equation 01)

Where:

BE_y:	Baseline Emission reductions during the year y in tCO_2e
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
$EF_{projected\ fossil\ fuel}$:	Emission factor for substitution of non-renewable woody biomass by similar consumers, in tCO_2e/TJ[17].

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

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

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

$$B_y = PR_y \times BF_y$$

(Equation 02)

Where:

PR_y:	Amount of products produced in year y, in thousand of ceramic pieces
BF_y:	Quantity of woody biomass per thousand of ceramic units fired in year y.

The value of BF_y 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 B_y using nationally approved methods. Also, the following principles were taken into account:

Demonstrably Renewable woody biomass[18] (DRB)

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

1. The woody biomass is originating from land areas that are forests[19] where:
   (a) The land area remains a forest;
   (b) Sustainable management practices are undertaken on these land areas to ensure, in particular, that the level of carbon stocks on these land areas does not systematically decrease over time (carbon stocks may temporarily decrease due to harvesting); and

17 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.

18 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.

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

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

2. The biomass is woody biomass and originates from non-forest areas (e.g. croplands, grasslands) where:

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

Non-renewable biomass

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

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

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

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

Before the project activity, wood from areas without forest management was offered with low prices and high viability to the ceramic owner. Thus, the majority 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 Nº 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 $f_{NRB,y}$ 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 $f_{NRB,y}$[20]. 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 $f_{NRB,y}$ 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:

$$NRB = R - DRB \quad \text{(Equation 4)}$$

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)
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 in regard to 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 fuel-wood by users[21].

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

21 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.

E.2. Calculation of project emissions or actual net removals

The applied methodology does not include any source of project emissions

E.3. Calculation of leakage emissions

Leakage is estimated as 0 (zero) tCO_2e during the current 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)[22]. Also, the specific rules on biomass resources as set out in the applicable version of the Gold Standard, especially ToolKit Annex C were complied with.

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

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

Table 04. 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.

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

According to “General Guidance on leakage in biomass project activity”[23]:

Identification of relevant emission sources

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

A. Shifts of pre-project activities. Decreases of carbon stocks, for example as a result of deforestation, outside the land area where the biomass is grown, due to shifts of preproject activities.

B. Emissions related to the production of the biomass.

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

These emission sources may be project emissions (if under the control of project participants, i.e. if the land area where the biomass is grown is included in the project boundary) or sources of leakage (if the source is not under control of project participants). Table 1 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:

(a) Emissions from application of fertilizer[24] ; 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 N_2O 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.

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

[24] 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.


1998
Legenda
Buenos Aires Ceramic Industry
Eucalyptus plantation area
Buenos Aires Ceramic Industry
Buenos Aires
Google Earth
Image Landsat / Copernicus


2008
Legenda
Buenos Aires Ceramic Industry
Eucalyptus plantation area
Buenos Aires Ceramic Industry
Buenos Aires
Google Earth
Image Landsat / Copernicus

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, in spite of new equipments had to be acquired.

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

E.4. Calculation of emission reductions or net anthropogenic removals

Table 05. Summary of calculation of emission reductions

	Baseline GHG emissions or baseline net GHG removals (t CO_2e)	Project GHG emissions or actual net GHG removals (t CO_2e)	Leakage GHG emissions (t CO_2e)	GHG emission reductions or net anthropogenic GHG removals (t CO_2e)		
				Before 01/01/2013	From 01/01/2013	Total amount
Total	139,211	0	6,258	26,446	106,507	132,953

According to Issuance Review Round III carried out by the Gold Stantard Team on 29/04/2018, a Forward Action Request was opened for the next 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 for the next issuance is 19,062 tCO2e.

Table 06. Emission reductions by Buenos Aires Ceramic for the monitoring period.

Emissions Reductions for the project activity (tCO2e)						
	2012	2013	2014	2015	2016	2017
Buenos Aires Ceramic	March to December	January to December	January to December	January to December	January to December	January to August
Baseline Emissions	27,691	25,313	22,870	27,019	23,328	12,990
Project Emissions		0	0	0	0	0
Leakage Emissions	1,245	1,138	1,028	1,214	1,049	584
Emissions Reductions for the	26,446	24,175	21,842	25,805	22,279	12,406
Total Monitoring Period	132,953					

E.5. Comparison of emission reductions or net anthropogenic removals achieved with estimates in the registered PDD

This section includes a comparison of actual values of the emission reductions achieved during the monitoring period with the estimations in the registered PDD.

Amount achieved during this monitoring period (tCO2e)	Amount estimated ex antes (tCO2e)
132,953	148,737

E.6. Remarks on increase in achieved emission reductions

The amount of Emissions Reductions achieved by this project during this monitoring period was quite similar to the amount estimated ex ante in the PDD (89,38%).

Table 07. Double Check (QA/QC Procedure) .

	PDD	Monitored Period	Double Check (QA/QC Procedure)
PRy - Production (thousand of ceramic units)	30,720.00	28,776.75	The thermal energy generated per thousand of ceramic units produced at Buenos Aires Ceramic in the monitored period was similar to Gold Standard PDD
Algaroba wood (tonnes)	4,921.00	8,496.80	
Wood from forest management plan (tonnes)	308.04	339.90	
Eucalyptus Wood (tonnes)	0	261.82	
Wood Residues (tonnes)	0	342.43	
Thermal Energy (TJ)	106.49	190.39	
Thermal energy per tonnes of pieces produced (TJ/thousand of pieces)	0.0035	0.0066	

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
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Annex 1 – Sustainability Monitoring Plan

This Annex describes the monitoring of the sustainability indicators, as defined by the Sustainability Monitoring Plan described in the Gold Standard Passport, version 05.0. Monitoring of the sustainability indicators was based on best available sources of information.

No	01
Indicator	**Air quality**
Mitigation measure	None.
Chosen parameter	**Emissions to the atmosphere**
Current situation of parameter	Currently, the ceramic factory has control of emissions to the atmosphere by an atmospheric emissions report performed according to the State Environmental Agency of Pernambuco (CPRH) rules. Also, in part of the monitoring period it was observed the smoke from the kiln's chimneys according to a smoke charts in order to classify the air quality. The monitoring reports of pollutant emissions to the atmosphere indicate that the results are in accordance with the acceptable rates of gas emissions. The project was evaluated according to a SOCIALCARBON indicator for Ceramic Industry [25] , obtaining score 5 (five) for the parameter Emissions to the atmosphere: “There is monitoring and the entrepreneur can guarantee that it is in conformity with the legislations, norms and applies requisites”.
Estimation of baseline situation of parameter	In the baseline situation, the ceramic factory did not have specific procedures to control and monitor atmospheric emissions. A quantification of these emissions in the baseline was not possible, since information is not available.
Future target for parameter	There are currently no foreseen improvements.

25 Available at: <http://www.socialcarbon.org/wp-content/themes/socialcarbon/docs/Industries_Ceramic_Sector_v8.2_09_06_2011.pdf>. Last visit on 06/09/2017.

Way of monitoring	How	The monitoring of the atmospheric emissions was realized by the delivery of the report of atmospheric emissions. The atmospheric emissions report shall be made twice a year using gas measurement equipment. The levels of the gases emitted by the ceramics should be included in the report. In addition to this monitoring, an emissions analysis was perfomed according to the State Environmental Agency of the State of Pernambuco (CPRH) determined in the Buenos Aires Ceramic Operation License. Also, the project is evaluated by applying the SOCIALCARBON indicators for Ceramic Industry.
	When	The atmospheric emissions report were monitored twice a year. The atmospheric emissions reports were carried out annually. The assessment on the relevant score of the SOCIALCARBON indicator is performed once every monitoring period.
	By who	Project participants. Ceramic factory employees are responsible for monitor the atmospheric emissions and Sustainable Carbon helped the ceramic owner to identify the corresponding scoring of the Project scenario, following the requirements of SOCIALCARBON Standard.

No	02
Indicator	**Soil condition**
Mitigation measure	Monitoring the procedures related to the control and disposal of ashes.
Chosen parameter	**Procedures related to the control and disposal of ashes.**
Current situation of parameter	Buenos Aires ceramic minimize the environmental impacts of the ashes with the control of its disposal. Major incidents or impacts were not observed due to the disposal of ashes. A SOCIALCARBON indicator for Ceramic Industry was applied to the project in order to evaluate the control of ashes, obtaining score 4 (four): “Ashes are totally reused or donated, with control of the quantity and destination of the material”. All ashes produced in Buenos Aires Ceramics was used to fertilizer for eucalyptus plantation.
Estimation of baseline situation of parameter	In the baseline situation, Buenos Aires ceramic discarded the ashes without a proper procedure causing environmental impacts.
Future target for parameter	The company intends to implement a management system that includes procedures to store, to monitor, to reduce the generation, and if possible, commercialize the ashes.

Way of monitoring	How	Ashes were quantified by using standard storage bags with a known weight. Employees on the ceramic used spreadsheets to control the amount of storage bags leaving the ceramic each time ashes were collected for final destination. The spreadsheet includes information on the destination of ashes, such as the person/entity responsible for collecting the ashes and the place of destination. Photographs were also used in order to demonstrate its final destination.
	When	Ashes were quantified and had their destination monitored whenever it were collected for its final destination. The assessment on the relevant score of the SOCIALCARBON indicator is performed once every monitoring period.
	By who	Project participants. A ceramic factory employee was assigned to quantify and monitor the final destination of ashes. Sustainable Carbon helped the ceramic owner to identify the corresponding scoring of the Project scenario, following the requirements of SOCIALCARBON Standard

No	03
Indicator	**Quality of employment**
Mitigation measure	Monitoring Health and Safety practices on the ceramic factory, including the use of safety equipments by employees working with biomass and around the kilns.
Chosen parameter	**Health and safety practices**
Current situation of parameter	The project developer implemented a spreadsheet to control and monitor the use of safety equipments. The spreadsheet contains date, type of equipment, employee's name and signature. The project was evaluated according to a SOCIALCARBON indicator for Ceramic Industry, obtaining score 3 (three) for the parameter Actions of Health and Security: "Only occasional campaigns or lectures of awareness regarding the occupational health and security in the last 12 months". In addition, Buenos Aires Ceramic presented PPRA (Programa de Prevenção a Riscos e Acidentes), PCMSO (Programa de Controle Médico de Saúde Ocupacional).

Estimation of baseline situation of parameter		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.
Future target for parameter		The company intends to develop regular campaigns, meetings, training regarding occupational health and security each year.
Way of monitoring	How	Ceramic manager uses spreadsheets to control the use of safety equipments by employees. Employees provide their signatures on such spreadsheet each time they receive safety equipment. Beyond the control of PPE use, site visits, reports on health and safety programs/actions and interviews with employees and managers of the ceramic were used to assess further health and safety practices.
	When	The use of PPE is registered on a monthly basis. Health and safety practices are evaluated on a yearly basis.
	By who	Project Participants. Ceramic assigned a manager to monitor the use of safety equipments. Sustainable Carbon helped the ceramic owner to assess Health and Safety practices and to identify their respective score (scenario) as defined by the SOCIALCARBON indicator.

No	04
Indicator	**Quantitative employment and income generation**
Mitigation measure	None
Chosen parameter	**Voluntary emission reductions issued**
Current situation of parameter	The project has already issued Voluntary Emission Reductions. Under the Verified Carbon Standard (VCS) the project has issued 67,017 tCO2e from 01/01/2010 to 29/02/2012, corresponding to its first monitoring period. Applying to Gold Standard, the project crediting period starts on 01/03/2012, and ends on 31/12/2019. The current monitoring period, from 01/03/2012 to 31/08/17 is expected to issue 132,953 tCO2e

Estimation of baseline situation of parameter		In the baseline scenario, Buenos Aires ceramic had no incentive to reduce their GHG emissions and consequently did not invest in reducing their emissions.
Future target for parameter		The project is expected to reduce 209,428 tCO2e during the crediting period. However, the actual emission reductions depends on the production and the related amount of renewable biomass used. Hence, a positive impact for this indicator is achieved in case the project is able to generate and issue carbon credits.
Way of monitoring	How	The issuance of Voluntary Emission Reductions was monitored from 01/03/2012 to 31/08/17, according to data on production and biomass consumption. More detailed information about the calculations are available in this monitoring report.
	When	Annually
	By who	Project Participants. Staff from Buenos Aires ceramic are responsible for provide information regarding the project operation, including fuel usage and production output. Sustainable Carbon determines the emission reductions resulting from the project through appropriate calculations and methodology.

No	05
Indicator	**Quantitative employment and income generation**
Mitigation measure	None.
Chosen parameter	**Additional revenues for biomass suppliers**
Current situation of parameter	Currently, ceramic owner controls the payments to each of their biomass suppliers. Only renewable biomass is used. The project presented an employment generation in this current monitoring period because the Buenos Aires ceramic started to expand new biomasses approved in VCS PD and Gap Analysis such as Eucalyptus wood and wood residues but never used in another monitoring period. This activity generated greater availability of renewable biomass in Buenos Aires Ceramic and the northeast. The great variety of biomass increases the number of employments generation and income generation for the cultivation and sale of biomass.
Estimation of baseline situation of parameter	In the baseline, revenues were being destined to individuals who explored the Caatinga biome to obtain firewood, which cause deforestation. Revenues were rather low, since this type of fuel was inexpensive

Future target for parameter		The project is allowing Buenos Aires ceramic to use exclusively renewable biomass as fuel. Since these types of fuels are more expensive than native firewood, it is likely that total revenues to biomass suppliers will increase. Furthermore, these revenues are now being destined to suppliers of renewable biomass, which do not cause deforestation.
Way of monitoring	How	Total revenues are monitored by storing purchase invoices, receipts of sale and other documents concerning biomass acquisition. Total revenues were compared to the projected baseline fuel cost for Buenos Aires ceramic which was destined to native firewood suppliers.
	When	Annually
	By who	Project Participants. Staff from Buenos Aires ceramic store information on biomass acquisition and costs. Sustainable Carbon team determine the additional revenues by comparing monitored values with figures estimated for the baseline situation.

No	06
Indicator	**Biodiversity**
Mitigation measure	Monitoring the origin of biomass
Chosen parameter	**Origin of renewable biomass**
Current situation of parameter	Following the project measures, Buenos Aires ceramic has been utilizing renewable biomass as fuel. Currently, the ceramic company uses exclusively renewable biomass, such as Algaroba wood, native wood from sustainable management, eucalyptus and wood residues. All types of biomasses utilized were considered renewable as per the definitions of renewable biomass approved by the CDM Executive Board[26].
Estimation of baseline situation of parameter	In the baseline situation, Buenos Aires ceramic used 100% of non renewable woody for thermal energy generation.
Future target for parameter	The project aims to purchase a weighbridge to monitor the amount of biomass using weighing receipts issued by the weighbridge system.

26 EB 23, Annex 18 – Definition of renewable biomass. Available at: <http://cdm.unfccc.int/EB/Meetings/023/eb23_repan18.pdf>Last visit on 08/09/17.

Way of monitoring	How	The origin of the renewable biomass were assessed by storing documents (receipts, invoices) from the biomasses providers, thus allowing determining its origin. The biomasses are considered renewable as fulfilling definitions of renewable biomass approved by the CDM Executive Board.
	When	Annually
	By who	Project Participants. Staff from Buenos Aires ceramic store information regarding the biomass purchase and acquisition. Sustainable Carbon evaluates the source of biomass and confirm they comply with CDM EB definitions of renewable biomass.

No	07
Indicator	**Biodiversity**
Mitigation measure	Monitoring the use of biomass
Chosen parameter	**Biomass surplus**
Current situation of parameter	Following the project measures, Buenos Aires ceramic has begun utilizing renewable biomass as fuel. Currently, 100% of the energy used for the productive process of the ceramic company comes from renewable sources. Evidences show there is sufficient biomass surplus in the region to avoid the occurrence of leakage. More information is available in Section E.3 – Calculation of Leakage, of the present Monitoring Report.
Estimation of baseline situation of parameter	In the baseline situation, Buenos Aires ceramic used a 100% of non renewable woody biomass for thermal energy generation. Although it is not feasible to determine the amount of native firewood available, this type of fuel has been an important source of energy for the ceramic sector[27].
Future target for parameter	The project aims to purchase a weighbridge to monitor the amount biomass using weighing receipts issued by the weighbridge system.

27 Energy Research Company. National Energy Balance 2016 - Base year 2015. Available at <https://ben.epe.gov.br/downloads/Relatorio_Final_BEN_2016.pdf>. Last visit on 08/06/17.

Way of monitoring	How	Sustainable Carbon have evaluated the existence of biomass surplus by using published literature, official reports and surveys for each biomass type used by Buenos Aires Ceramic in the project region. During the monitoring period, it was determined if the quantity of available biomass in the region (as determined ex ante) was at least 25% larger than the quantity of biomass that is utilized including the project activity. More detailed information is available in Section E.3 – Calculation of Leakage, of the present Monitoring Report. The amount of renewable biomass is monitored through purchase invoice, delivery notes or receipts or other documents concerning the acquisition of the renewable biomasses.
	When	Annually
	By who	Project Participants. Staff from Buenos Aires ceramic store information regarding the project operation, including biomass usage. Sustainable Carbon evaluates the biomass surplus and determine the occurrence of leakage.

No	08
Indicator	**Access to affordable and clean energy services**
Mitigation measure	None.
Chosen parameter	**Total energy produced from renewable sources**
Current situation of parameter	Following the project measures, 100% of the energy used in the kilns comes from renewable sources. In the current monitoring period, Buenos Aires ceramic used around 1,040.47 TJ of renewable energy per thousand of ceramic pieces produced.
Estimation of baseline situation of parameter	In the baseline situation, Buenos Aires ceramic used exclusively native firewood as fuel. As described on the Gap Analysis Report (version 05), 90.93% of that fuel was considered non renewable. This means Buenos Aires ceramic used around 0.0011 TJ of renewable energy per thousand of ceramic pieces produced[28].
Future target for parameter	The project has already reached the complete substitution of non-renewable biomass with renewable biomasses, therefore all the energy demand is generated from renewable sources.

28 Calculations are available on version 4.0 of the VER Estimates spreadsheet.

Way of monitoring	How	The amount of renewable biomass used by the ceramic factory were 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 were to determine the amount of renewable energy produced during each year of the crediting period.
	When	On a monthly basis and consolidated on an annual basis.
	By who	Project Participants. Staff from Buenos Aires ceramic are responsible for the storage of information on biomass purchase and acquisition. Sustainable Carbon determines the amount of renewable energy generated during the crediting period.

Annex 2 – Grievance Mechanism

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. 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.