The Gold Standard®
Premium quality carbon credits

THE GOLD STANDARD MICRO-SCALE SCHEME PROJECT DESIGN DOCUMENT FORM - Version 2.2

CONTENTS

Annexes

SECTION A. General description of micro-scale project activity

A.1 Title of the micro-scale project activity:

Balsas Renewable Energy Project
PDD Completed in: 10/09/2013
Version 09

A.2. Project participants:

Project Developer

Sustainable Carbon – Projetos Ambientais Ltda.: Project developer, Project participant and Project idealizer.

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

Other information on the project's developer's contact:

Address:
R. Doutor Bacelar, 368 – Conj. 54 – Vila Clementino
Postal Code: 04.026-001
São Paulo – SP, Brazil
Phone number: +55 11 2649 0036
Web site: http://www.sustainablecarbon.com

Emails: marcelo@sustainablecarbon.com; camila@sustainablecarbon.com; marianas@sustainablecarbon.com; mariana@sustainablecarbon.com; larissa@sustainablecarbon.com; thiago.othero@sustainablecarbon.com.

Project Proponent
The project proponent is:
Ceramica Balsas Ltda (*Balsas* Ceramic)

The following focal points are appointed to this project activity:

Mr. José Thyrson Ladeira da Paz, Director: Information and visit of the ceramic, detailed information on process and production lines, environmental challenges, technological challenges, research and development history and ceramic devices market challenges.

Mrs. Soraia da Silva Silveira, Secretary and Monitoring data responsibilities: General data, information on inputs and outputs of the ceramic, detailed information and numbers on sales, how output data is handled and how data is stored and kept by the *Balsas*'s office.

Other information on the project's proponent:

Address: Rod. BR 230, Km 09 – Rod. *Balsas*/Riachão, SN, Zona Rural, *Balsas*/MA.
Postal code: 65800-000
Phone number: +55 (99) 3541-9668
E-mail: ceramicabalsas@gmail.com

A.3 Description of the micro-scale project activity:

A.3.1. Location of the micro-scale project activity:

The project is located in northeast region of Brazil, in the State of *Maranhão*. Sections below provide more information on the exact location of *Balsas* Ceramic.

A.3.1.1. Host Country:

Brazil.

A.3.1.2. Region/State/Province etc.:

Maranhão.

A.3.1.3. City/Town/Community etc:

Balsas.

A.3.1.4. Details of physical location, including information allowing the unique identification of this micro-scale project activity:

The project activity is located in the northeast of Brazil, in the municipality of *Balsas* state of *Maranhão,* which is indicated in Figure 1 below. The geographic location of the project activity is: Latitude -7.486111 and Longitude -46.156667.

The project site has the following geographic location and postal address:

BR 230, km 09 Rodovia Balsa/Riachão - Zona rural
Balsas - Maranhão, Brazil
Zip code: 65800 – 000

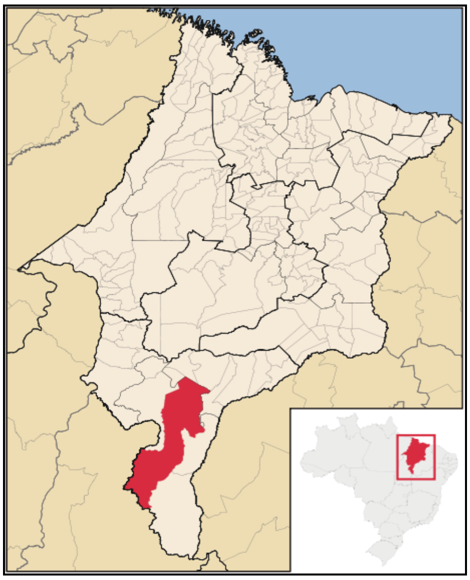


Figure 1. Geographic location of *Balsas*

A.3.2. Description including technology and/or measure of the micro-scale project activity:

The project activity is the project of *Balsas* Ceramic, which is a red ceramic company located in *Balsas* municipality, state of *Maranhão*, northeast of Brazil. *Balsas* Ceramic produces structural ceramic bricks destined mainly for the regional market in the municipalities of *Balsas*, *Mangabeira*, *Fortaleza dos Nogueira* and *Alto Parnaiba*.

The ceramic factory used exclusively non-renewable woody biomass (wood without sustainable forest management, also referred as native firewood) as fuel. The use of this type of non-renewable biomass is a common practice in the ceramic industry. Although firewood has been used for many decades as a 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 1970's, when the petroleum started to supply the majority of Brazilian´s energy needs[1]. Moreover, the Brazilian Energy and Mine Ministry has been monitoring every energy sector of Brazil since 1970, and firewood appears over the years monitored as a significant source of thermal energy for ceramic sector[2]. On the other hand, the project activity focuses on the use of renewable biomass for thermal energy supply.

Before August, 2008 *Balsas* Ceramic production process encompassed one Tunnel[3] kiln which operated using exclusively native firewood (wood without sustainable forest management) from the *Cerrado* Biome as fuel. In the middle of August, 2008 the ceramic

[1] BRITO, J.O. "The use of wood as energy". Available at: <http://www.scielo.br/scielo.php?pid=S0103-40142007000100015&script=sci_arttext&tlng=ES>. Last visited on 27/05/2013.
[2] Energy Research Company. National Energy Balance - energy consumption per sector. Available at: <https://ben.epe.gov.br/BEN2007_Capitulo3.aspx>. Last visit on: 27/05/2013.
[3] High efficiency kiln. Tunnel kiln has three sections: heating, burning and cooling, with the reutilization of heat among the sections. This kind of kiln is more efficient and modern than other kilns, where the ceramic pieces are transported through a conveyor belt or special karts inside the kiln.

company started testing renewable biomass, such as rice husks[4], in the Tunnel kiln. By December, 2008 they finished the construction of two Round[5] kilns which also started to operate using exclusively native firewood up to March, 2009. Tunnel kilns have a much higher efficiency rate due to the production setup. While the Tunnel kilns are run at a constant temperature guaranteeing and continuous production flow, Round kilns, on the other hand only have a limited capacity and need to be ignited and cooled down for each production cycle.The fuel switching, from non-renewable biomass (native firewood) to renewable biomass (rice husks) - in the Tunnel kiln and in the both Round kilns - occurred in March 21st, 2009[6]. It is important to state that, the fuel switching was not expected in absence of the project activity, once there were no the incentives from the carbon credits revenues to support the fuel switching. The *Cerrado* biome has the highest deforestation rate on Brazil and the common practice in the project region is the use of non-renewable native wood[7]

As the project activity, besides the proponent has switched its fuel to renewable biomass the ceramic company has also acquired new equipments, including automatic feeders, to allow an efficient use of renewable biomass as fuel.

Before being cooked in the kilns, the pieces must be dried. At the ceramic factory the pieces are dried naturally, so no fuel is used for the drying process. During 2008, *Balsas* Ceramic has produced approximately 11,516 thousands of ceramic pieces. The identified baseline for this ceramic is the utilization of a total of around 5,500.83 tonnes of non-renewable woody biomass per year to provide thermal energy to the ceramic's kilns.

This project activity will reduce the greenhouse gases (GHG) emissions through the substitution of non-renewable biomass for renewable biomasses to generate thermal energy. As renewable biomasses, the project activity will utilize mostly biomass residues (such as rice husks and wood residues), biomass from forests and biomass from cropland and/or grasslands) to feed the ceramic's kilns. The project will also involve energy efficiency measures, such as improved fuel handling and kilns improvement to reduce the necessary energy per production output[8].

This project pointed out the possibility for switching from non-renewable biomass to renewable biomasses, which was unattractive due some barriers, including higher fuel costs, uncertainties associated to the fuel switch and the lack of knowledge to operate with renewable biomass. The barriers that prevented the implementation of this project are further described in Section B.5. The ceramic owners have considered the income from the commercialization of the carbon credits to make the project activity viable.

---

[4] During the crediting period other types of renewable biomasses can also be used, such as: wood residues, biomass from forests and biomass from cropland and/or grasslands.

[5] Medium efficiency kiln. Round kilns are extremely economical and work well with any type of fuel. It is an easy kiln to operate and it considered the best kiln to cook and burn roof tiles.

[6] According to the ceramic owner, the complete fuel switch has occured in 01/04/2009.

[7] BRASIL. Ministério do Meio Ambiente (MMA). Projeto de monitoramento do desmatamento nos biomas brasileiros por satélite (PMDBBS). Brasília, 2012. Disponível em: < http://siscom.ibama.gov.br/monitorabiomas/cerrado/RELATORIO%20FINAL_CERRADO_2010.pdf>. Acesso em: 28/05/2013.

[8] No emission reductions are claimed for energy efficiency measures, since these are applied after the complete fuel switch to renewable biomass.

The main goal of this project activity is to minimize the negative impacts of deforestation to obtain firewood, whose consumption also leads to GHG emissions that contribute to climate change. Moreover, in opposition to the identified baseline, the project activity will generate thermal energy exclusively from renewable sources, 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 the ceramic workers.

Table below provides a brief history of the implementation of this project:

Table 1. Brief history on the project implementation.

Date	Event
August, 1st 2008	*Balsas* Ceramic begins testing renewable biomass in the Tunnel kiln assisted by the Field Agent of Sustainable Carbon, *Antônio Cubano Rissone*.
September, 1st 2008	Start date of two Round kilns construction.
November, 1st 2008	Conclusion date of the first Round kiln construction. Burning process using native firewood (without sustainable management plan).
December, 1st 2008	Conclusion date of the second Round kiln construction. Burning process using native firewood (without sustainable management plan).
March, 1st 2009	Burning process in the both Round kilns performed with native firewood (without sustainable management plan) and technological adaptations in the Tunnel kiln to allow the use of renewable biomass.
March, 21st 2009 (Starting date of the project activity)	On this date, Balsas Ceramic has begun to switch to renewable biomass (rice husks)[9].
September, 1st 2009	*Balsas* Ceramic and Sustainable Carbon sign a contract for the development of a GHG emission reduction project.
September, 1st 2011	Starting date of the crediting period.

[9] According to the ceramic owner, the complete fuel switch has occured in 01/04/2009.

Date	Event

A.3.3 Estimated amount of emission reductions over the chosen crediting period:

Years	Annual estimation of emission reductions (tCO2e)
2011	1,896
2012	5,688
2013	5,688
2014	5,688
2015	5,688
2016	5,688
2017	5,688
2018	5,688
2019	5,688
2020	5,688
2021	3,792
Total estimated Emission Reductions (tCO2e)	**56,880**
Number of years of the crediting period	10
Annual average of estimated emissions reductions over the crediting period (tCO2e)	**5,688**

A.3.4. Public funding of the micro-scale project activity:

There is no public funding involved in this project activity. The project does not receive Official Development Assistance.

SECTION B. Application of an existing baseline and monitoring methodology or of a new methodology submitted as part of this project activity

B.1. Title and reference of the existing or new baseline and monitoring methodology applied to the micro-scale project activity:

This is a voluntary project activity that fits into the following categories according to UNFCCC and Gold Standard definitions:

- **Project scale**: the project is a micro-scale project. It generates less than 10,000 tCO_2e of emissions reductions per year.
- **Project type**: the project activity fits in the Renewable Energy Supply category as it generates energy from non-depletable energy sources (renewable biomasses). It is

possible that the project's implementation results in an improvement of the ceramics energy efficiency, however it is not considered in the project activity. The project also fits in the following category of Annex C[10] of the Gold Standard Toolkit version 2.2[11]: "*Electricity and/or heat, and liquid biofuels from biomass resources*", since the project generates heat from biomass resources.

- **Previous Announcement**: The project has not been previously announced to be going ahead without the revenues from carbon credits. *Balsas* ceramic was aware of the benefits of the voluntary carbon market before investing in the project measures (fuel switching to renewable biomass). The ceramic factory begins testing renewable biomass in the Tunnel kiln assisted by the Field Agent of Sustainable Carbon, *Antônio Cubano Rissone* by August, 1st 2008. Hence, the ceramic owner was aware of the carbon credits prior to investing in the project. No announcement on the project measures was made prior to his consulting services.

The project qualifies as a micro-scale project activity, however utilizes the following methodology approved under the Clean Development Mechanism for small scale projects*:* ***"AMS*-I.E: Switch *from* Non-Renewable Biomass for Thermal Applications by the User**", version 05[12], valid from 03/08/2012 onwards.

This category comprises activities to displace the use of non-renewable biomass by introducing renewable energy technologies. The technology in case of this project activity is determined as the ceramic facilities, which utilize thermal energy generated by the new renewable energy technology.

The project also utilizes the following tool: Tool for the demonstration and assessment of additionality, version 06[13].

B.2 Justification of the choice of the methodology and applicability:

The applied methodology is applicable for the generation of thermal energy by introducing renewable energy technologies that displace the use of non-renewable biomass. As the project involves the substitution of non-renewable biomass (wood from areas without forest management plan) with renewable biomass, the project complies with conditions described on this methodology.

As further detailed in Section B.1, the project qualifies as a micro-scale project activity and will remain under the limits of micro-scale project activity types during every year of the

[10] Annex C available at: <http://www.cdmgoldstandard.org/wp-content/uploads/2012/05/v2.2_ANNEX-C.pdf >. Last visited on 28/05/2013.
[11] Toolkit available at: <http://www.cdmgoldstandard.org/wp-content/uploads/2012/06/GSv2.2_Toolkit.pdf >. Last visited on 28/05/2013.
[12] Methodology available at: <http://cdm.unfccc.int/methodologies/DB/WHTQUFLWCVNB9CIUZC198A712WGQR4/view.html >. Last visited on: 28/05/2013.
[13] Tool available on UNFCCC's *website: <http://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-01-v6.0.0.pdf>.* Last visited on*:* 28/05/2013.

crediting period[14]. As demonstrated on Section A.3.3, emission reductions are expected to remain below ten thousand tonnes of CO_2e per year.

The project is also within the CDM limits for small scale projects of type I. In 2008, the consumption of 5,500.83 tonnes of non-renewable biomass in the kilns of *Balsas* Ceramic has generated 82.51TJ. Converting this number to MWh, it was generated 22,920.13MWhthermal per year, which corresponds to a capacity of 2.62 MWthermal on average per year[15]. The project will generate 100% of the needed energy from renewable biomasses and will involve energy efficiency measures, thus reducing the amount of energy per production output. As a conservative estimate, the project capacity for renewable energy generation is considered the same as the baseline scenario[16], which is less than the limits of 45 MWthermal for Type I Small scale project activities.

Energy generation might vary during the crediting period based on the ceramics production and on the energy content of the fuels used. The production of the ceramics is expected to increase during the project activity; however, an increase of more than 1,619.89% on the baseline capacity would be required to exceed the limits of small scale project activities. Such increase is not expected during the crediting period.

The table below provides an assessment of relevant applicability conditions and how the project complies with such conditions:

Table 2. Assessment of the project compliance to the chosen methodology and to Gold Standard eligibility requirements.

Applicability conditions		Assessment of project compliance to the applicability condition
Section	**Description**	
AMS-I.E: Switch from Non-Renewable Biomass for Thermal Applications by the User, version 05		
1.	This category comprises activities to displace the use of non-renewable biomass by introducing renewable energy technologies. Examples of these technologies include but are not limited to biogas stoves, solar cookers, passive solar homes, renewable energy based drinking water treatment technologies (e.g.	The main focus of this Project is to allow the substitution of non-renewable biomass with renewable biomass for thermal energy generation. Such biomass will be used to provide thermal energy in kilns of *Balsas* Ceramic.

[14] According to the Annex T of the Gold Standard version 2.2 (Standalone micro---scale scheme rules), project activities are eligible under the micro-scale scheme if the annual emission reductions achieved are limited to a maximum of 10,000 tonnes of CO_2e in each and every year of the crediting period. Available at: <*http://www.cdmgoldstandard.org/wp-content/uploads/2012/05/v2.2_ANNEX-T.pdf*>. Last visit on: 28/05/2013.

[15] To convert 82.51TJ to MWh it was used a conversion factor of 277.78. Avaiable at: http://www.aneel.gov.br/arquivos/PDF/atlas_fatoresdeconversao_indice.pdf. Last visited on: 01/07/2013.

[16] Energy production might vary during the crediting period depending on production. The production of the ceramic factory is expected to increase during the project activity. However, an increase beyond the limits of small scale project activities is not expected.

Applicability conditions		Assessment of project compliance to the applicability condition
Section	**Description**	
	sand filters followed by solar water disinfection; water boiling using renewable biomass).	
2.	Project participants are able to show that non-renewable biomass has been used since 31 December 1989, using survey methods or referring to published literature, official reports or statistics.	Firewood used to be the most employed source of primary energy until 1970's, when the petroleum started to supply the majority of Brazilian´s energy needs[17]. Moreover, the Brazilian Energy and Mine Ministry has been monitoring every energy sector of Brazil since 1970, and firewood appears over the years monitored as a significant source of thermal energy for ceramic sector[18]. According to the ceramic owner, Balsas Ceramic used non renewable native firewood since its launch on May, 15th 1999. The use of firewood (without a sustainable management plan) to provide thermal energy during the production process of the ceramic factories is a common practice in Brazil, as related by several authors (UHLIG, 2008[19]; NERI, 2003[20]; BRITO[21]; CARDOSO, 2008[22]). The demand for firewood in the industrial sector shows negative environmental impacts, specifically in the Northeast region of

[17] BRITO, J.O. "The use of wood as energy". Available at: <http://www.scielo.br/scielo.php?pid=S0103-40142007000100015&script=sci_arttext&tlng=ES>. Last visited on 28/05/2013.
[18] Energy Research Company. National Energy Balance - energy consumption per sector. *Available at:* <https://ben.epe.gov.br/BEN2007_Capitulo3.aspx>. Last visited on 28/05/2013.
[19] UHLIG, A. **Lenha e carvão vegetal no Brasil: balanço oferta-demanda e métodos para a estimação do consumo**. 2008, 156f. Dissertação (Pós Graduação em Energia) – Universidade de São Paulo. Available at: <http://www.teses.usp.br/teses/disponiveis/86/86131/tde-14052008-113901/publico/UHLIG_Tese1.pdf>. Last visited on 28/05/2013.
[20] NERI, J.T. **Energia Limpa, Sustentável ou de Subsistência? Cerâmica Industrial,** Rio Grande do Norte;V,8, n.1,35 - 6,2003. Available at: <http://www.ceramicaindustrial.org.br/pdf/v08n01/v8n1_5.pdf>. Last visited: 04/07/2013.
[21] BRITO, J.O. "The use of wood as energy". Available at: <http://www.scielo.br/scielo.php?pid=S0103-40142007000100015&script=sci_arttext&tlng=ES>. Last visited on 28/05/2013.
[22] CARDOSO, C.F.R. **Panorama do Setor Florestal: o que tem sido feito na esfera do Governo Federal**., Rio de Janeiro, 03 Set. 2008. Report presented in 1º SEMINÁRIO DE MADEIRA ENERGÉTICA, 2008.

Applicability conditions		Assessment of project compliance to the applicability condition
Section	**Description**	
		Brazil, due to heavy users, such as ceramic factories. In these cases, the use of firewood is primarily from non-renewable and unsustainable sources[23]. This fact is justified by the low price paid for the non-renewable native firewood by the ceramic factories in this region[24] and by a lack of government monitoring in Cerrado biome[25].
Gold Standard Toolkit Annex C		
First item	Activities making use of non-renewable biomass resources shall NOT be eligible for Gold Standard registration. Project Participants shall therefore provide convincing evidence that the project activities make use of renewable biomass resources. This criteria shall be monitored along the crediting period and therefore be included in the Sustainability Monitoring Plan.	The project will use exclusively demonstrably renewable biomasses whose source can be verified. *Balsas* ceramic acquires all the rice husks used to provide thermal energy in the production process from a single provider. An interview was carried out with the rice husk provider on September 12th, 2012, and it was stated that, before the project implementation there was no determined purpose for the rice husks, as there was no market demand to use of this biomass as fuel. For this reason, the rice husks were stockpiled in a piece of land besides the rice factory, to be later sent to landfills. Currently they have an exclusive contract to supply rice husks to *Balsas*

[23] UHLIG, A. **Lenha e carvão vegetal no Brasil: balanço oferta-demanda e métodos para a estimação do consumo**. 2008, 156f. Dissertação (Pós Graduação em Energia) – Universidade de São Paulo. Available at: <http://www.teses.usp.br/teses/disponiveis/86/86131/tde-14052008-113901/publico/UHLIG_Tese1.pdf>. Last visited on 28/05/2013.

[24] NERI, J.T. **Energia Limpa, Sustentável ou de Subsistência? Cerâmica Industrial,** Rio Grande do Norte;V,8, n.1,35 -6,2003. Available at: <http://www.ceramicaindustrial.org.br/pdf/v08n01/v8n1_5.pdf>. Last visited: 04/07/2013.

[25] CAMELI, J. 2011. Envolverde: Jornalismo e Sustentabilidade. **O Cerrado é o veio natural da expansão sucroenergética no Brasil**. Available at: <http://envolverde.com.br/economia/entrevista-economia/o-cerrado-e-o-veio-natural-da-expansao-sucroenergetica-no-brasil/>. Last visited on: 04/07/2013.

Applicability conditions		Assessment of project compliance to the applicability condition
Section	Description	
		ceramic. Biomasses shall be considered renewable only if they are in accordance to the CDM EB definitions set out in Annex 18 of EB meeting 23[26].
Second item	Activities expected to make use of biomass resources already in use shall NOT be eligible for Gold Standard registration unless convincing evidence is provided showing that the current users are in agreement with the envisioned shift of use (potential leakage associated to such a shift must be taken into account). In the absence of such an agreement, Project Participants shall demonstrate that their project makes use of surplus biomass for each type of biomass resources used. They must do so once, ex-ante on time for validation for small-scale activities, and in time for validation and for each one of the verifications (inclusion in the Sustainability Monitoring Plan) for large-scale activities.	In case the project utilizes existing biomass, it shall be demonstrated that only surplus biomass is used. Publications shall be used to determine biomass availability in the project region.
Third item	Project Participants shall demonstrate that their activity will only make use of degraded land and shall include this criterion in the Sustainability Monitoring Plan. Two exceptions may be considered: convincing evidence is provided showing that the envisioned energy crop is part of a traditional rotational cropping, OR an increase of the productivity is obtained, locally and to the benefit of the current users, through measures implemented in the context of the activity so as to at a minimum compensate for the part of the land newly allocated to growing the energy crop. Compliance with these criteria above must be monitored over the crediting period and thus be part of the Sustainability Monitoring Plan.	The project is not expected to use lands to grow dedicated energy crops. If that occurs during the crediting period, compliance with that applicability condition will be assured applying one of the methods described below: a) If necessary, Leasing Contract of the rural property; b) Verify if the rural property is legally endorsed, complying with the requirements of Legal Reserves and Preserved Areas; c) Satellites images from Landsat, showing that the rural property was cleared before 1989; d) Check the new tool from Google

[26] Document is available at: <http://cdm.unfccc.int/EB/Meetings/023/eb23_repan18.pdf>. Last visited on 28/05/2013.

Applicability conditions		Assessment of project compliance to the applicability condition
Section	**Description**	
		Earth showing the evolution and growth of deforestation/cities: <http://earthengine.google.org/ #intro/Amazon>.
Fourth item	Activities making use of GMOs shall declare so in a transparent way. Local stakeholders opinion on GMOs shall prevail and appropriate mitigation measures shall be put in place to address their concerns, if any, in a satisfactory way.	The project is not expected to use Genetically Modified Organisms.

B.3. Description of the project boundary:

According to the applied methodology, the project boundary for the project is the physical, geographical site of the use of biomass or the renewable energy. This means that the *Balsas* Ceramic is the project boundary.

For the determination of the baseline emissions, it is assumed that in the absence of the project activity, the baseline scenario would be the use of fossil fuels for meeting similar thermal energy needs. This means that baseline emissions are those resulting from the use of non-renewable fuels to burn ceramic pieces. This practice is responsible to discharge in the atmosphere the carbon that was stored in the fuel. According to the applied methodology, project emissions are not accounted for. An increase in emissions due to transportation of renewable biomass is not likely to be significant, since similar means of transportation were used in the baseline scenario for the transportation of non-renewable biomass. Table below provides more information on the emission sources included in the project boundary.

Table 3. Gases included in the project boundary and brief explanation.

	Gas	Source	Included?	Justification/ Explanation
Baseline	CO_2	Emission from the combustion of fossil fuels	Yes	The major source of emissions in the baseline
	CH_4		No	Excluded for simplification. This is conservative.
	N_20		No	Excluded for simplification. This is conservative.

Project Activity	The methodology does not include any source of project emissions.

B.4. Description of the baseline and its development as per the chosen methodology:

The baseline scenario is identified according to general guidance to the small-scale CDM methodologies[27]. The baseline scenario is identified by assessing possible alternatives to the project that could provide similar levels of activity.

The possible alternatives to the project consist in the production of ceramic pieces by using different types of fuels to obtain thermal energy. Common fuels employed and therefore candidates for baseline fuels are (as shown in the Table 4): natural gas, charcoal, wood, other recuperations, diesel oil, fuel oil, liquefied petroleum gas, others from petroleum, piped gas, electricity and others none specified.

The most probable scenario, in the absence of the non-renewable biomass (i.e. firewood), would be the use of fossil fuels taking in considerations historic fuel usage by the ceramic sector in Brazil and barriers to the project as detailed in Section B.5.

Table 4. Distribution of fuel utilized on the ceramic sector in Brazil.

BRAZILIAN ENERGY BALANCE 2009[28] - CERAMIC SECTOR EVALUATION Unit: 10^3 Tonnes of oil equivalent				
FUEL	**2006**	**2007**	**2008**	**2009**
Natural Gas	901	960	1,007	1,000
Charcoal	42	33	9	1
Wood	1,762	1,885	2,122	2,081
Other recuperations	32	35	53	52
Diesel Oil	8	7	8	8
Fuel Oil	285	313	322	322
Liquefied Petroleum Gas	151	153	166	162
Others from Petroleum	76	170	173	179
Piped gas	0	0	0	0
Electricity	276	284	298	300
Others non specified	0	0	0	0
TOTAL	**3,533**	**3,841**	**4,157**	**4,107**

[27] Available at: < https://cdm.unfccc.int/Reference/Guidclarif/ssc/methSSC_guid06.pdf>. Last visited on 28/05/2013.

[28] Brazilian Energy Balance, Chapter 3 Available at: https://ben.epe.gov.br/BENSeriesCompletas.aspx. Last visited on 28/05/2013.

The baseline is identified as the amount of non-renewable biomass displaced with the fuel switching project. The overall characteristics of the ceramic production are used to obtain the real amount of non-renewable biomass used in the baseline scenario. Conservativeness in the determination of the baseline is assured by applying approved methodologies and methodological tools. The most recent versions at the time of first submission are applied. Conservativeness is also achieved by utilizing historical data from the project site for the ex-ante calculation of baseline and project emissions. More information on the set of data used for calculating baseline emissions is available in Section B.6.3.

According to the identified baseline scenario for this project activity, *Balsas* Ceramic would utilize around 458.40tonnes of non-renewable biomass per month to provide thermal energy to the ceramic's kilns and obtain an approximate temperature of 950ºC, in order to produce an average of around 959.664 thousands of ceramic units per month. Therefore, the wood consumption of the ceramic in the baseline scenario is 0.4776tonnes of woody biomass per thousands of ceramic pieces produced.

Table 5. Baseline scenario of the project activity.[29]

	***Balsas* Ceramic**
Production (thousands of ceramic pieces per month)	959.664
Consumption of non-renewable woody biomass (native firewood) without the project activity (tonnes per month)	458.40
BF_y (quantity of woody biomass per thousand of ceramic units fired)	0.4776

The identified barriers are described in Section B.5. Please refer to this Section to obtain more information on the criteria for the elimination and ranking of the identified alternatives. As a result of the barriers test, only one alternative remains: the continuation of the practice observed prior to the project initiation, which involves the use of non-renewable biomass to provide thermal energy.

This situation was also the scenario existing prior to the initiation of the project and is the prevailing practice in the project region. Native firewood has been used to provide most of the thermal energy for the production process.

Therefore, the baseline presents the use of around 0.4776 tonnes of woody biomass per thousands of ceramic pieces produced. During the project, the annual production is expected to vary based on market demand. Annual production will be monitored during the crediting period

[29] In the absence of the project activity, the fuel utilized to fire the ceramic units would be native firewood. This biomass is classified as woody biomass.

to transparently calculate emission reductions. Emission reductions will be claimed for the amount of non-renewable fuel that would otherwise be used in the absence of the project activity.

B.5. Description of how the anthropogenic emissions of GHG by sources are reduced below those that would have occurred in the absence of the registered micro-scale project activity:

The methodology applied is "**AMS-I.E: Switch from Non-Renewable Biomass for Thermal Applications by the User**", version 05, which comprises activities to displace the use of non-renewable biomass by introducing renewable energy technologies. The technology in case of this project activity is determined as the ceramic facilities, which utilize thermal energy generated by the new renewable energy technology. The project involves the substitution of non-renewable biomass with renewable biomass in existing red ceramic factories, thus complying with the referred methodology.

The starting date of the project activity (as defined in Section C.1.1) is considered 21/03/2009. The starting date of the project is before the "*Time of first submission*" as per Gold Standard definitions. Hence, the project is applying for retroactive registration according to Gold Standard Toolkit Section 1.2.6.

The baseline scenario is the use of non-renewable biomass to provide thermal energy during the production process of the ceramic factories. This is a common practice in ceramic factories in Brazil, as related by several authors (UHLIG, 2008[30]; NERI, 2003[31]; BRITO[32]; BRASIL, 2001[33]; CARDOSO, 2008[34]). The demand for firewood in the industrial sector shows negative environmental impacts, specifically in the Northeast region of Brazil, due to heavy users, such as ceramic factories. In these cases, the use of firewood is primarily from non-renewable and unsustainable sources[35]. This fact is justified by the low price paid for the non-renewable native

[30] UHLIG, A. **Lenha e carvão vegetal no Brasil: balanço oferta-demanda e métodos para a estimação do consumo**.2008, 156f. Dissertação (Pós graduação em Energia) – Universidade de São Paulo. Available at: <http://www.teses.usp.br/teses/disponiveis/86/86131/tde-14052008-113901/publico/UHLIG_Tese1.pdf>. Last visited on 28/05/2013.

[31] NERI, J.T. **Energia Limpa, Sustentável ou de Subsistência? Cerâmica Industrial,** Rio Grande do Norte;V,8, n.1,35 - 6,2003.

[32] BRITO, J.O. "The use of wood as energy". Available at: <http://www.scielo.br/scielo.php?pid=S0103-40142007000100015&script=sci_arttext&tlng=ES>. Last visited on 28/05/2013.

[33] BRASIL. Ministério de Ciências e Tecnologias. **Levantamento da Situação e das Carências Tecnológicas dos Minerais Industriais Brasileiros**: com enfoque na mineração de: Argila para cerâmica, Barita, Bentonita, Caulim para carga, Talco / Agalmatolito e Vermiculita. Brasília, 2001. Available at: < http://web.archive.org/web/20080911184221/http://www.cgee.org.br/prospeccao/doc_arq/prod/registro/pdf/regdoc710.pdf >. Last visited on 28/05/2013.

[34] CARDOSO, C.F.R. **Panorama do Setor Florestal: o que tem sido feito na esfera do Governo Federal**., Rio de Janeiro, 03 Set. 2008. Report presented in 1º SEMINÁRIO DE MADEIRA ENERGÉTICA, 2008.

[35] UHLIG, A. **Lenha e carvão vegetal no Brasil: balanço oferta-demanda e métodos para a estimação do consumo**. 2008, 156f. Dissertação (Pós Graduação em Energia) – Universidade de São Paulo. Available at: <http://www.teses.usp.br/teses/disponiveis/86/86131/tde-14052008-113901/publico/UHLIG_Tese1.pdf>. Last visited on 28/05/2013.

firewood by the ceramic factories in this region[36] and by a lack of government monitoring in Cerrado biome[37]. Project additionality is explained according to the Tool for the demonstration and assessment of additionality, version 06. This tool provides for a step-wise approach to demonstrate and assess additionality. The steps are described below:

Step 1: Identification of alternatives to the project activity consistent with current laws and regulations

Sub-step 1a: Define alternatives to the project activity:

The identified alternatives to the project activity consist in the use of different types of fuels to obtain thermal energy. More specifically, this includes:

a. The continuation of the current (pre-project) practice, where no project is undertaken and non-renewable biomass remains being the fuel used.
b. The extensive use of renewable biomasses without being undertaken as a GHG emission reduction project;
c. The use of fossil fuels commonly used by the ceramic sector in Brazil.

As described in Section B.4, common fuels employed by the ceramic sector in Brazil include natural gas, charcoal, wood, other recuperations, diesel oil, fuel oil, liquefied petroleum gas, others from petroleum, piped gas, electricity and others none specified. As available on table 4, fossil fuels are the main energy source when native firewood is excluded from consideration. These fuels are locally available and could provide the same levels of activity of the project. The use of natural gas is not considered the most probable alternative to this project activity. The Brazilian Energy Balance results (available in Table 4) showed significant percentage of natural gas consumption for production of ceramic tiles (used to finish floor or wall).

On the other hand, in the case of structural ceramic, the use of natural gas is restricted by the absence of pipes and its high costs[38]. The use of natural gas also involves risks of insufficient supply and higher costs when compared to other fuels, thus discouraging investment in this scenario even in places with piped gas availability. Electricity is shown on Table 4 as an important energy source for the ceramic sector, but it is not considered a credible alternative because it cannot be used in kilns to provide thermal energy. Hence, the use of fossil fuels is considered the most likely scenario in the absence of the non-renewable biomass.

Outcome of Step 1a: At the end of Step 1, realistic and credible alternatives that could provide the same levels of activity than the project are identified. These include the use of fossil fuels, the extensive use of renewable biomass without being undertaken as a GHG emission reduction

[36] NERI, J.T. **Energia Limpa, Sustentável ou de Subsistência? Cerâmica Industrial,** Rio Grande do Norte;V,8, n.1,35 - 6,2003. Available at: <http://www.ceramicaindustrial.org.br/pdf/v08n01/v8n1_5.pdf>. Last visited: 04/07/2013.

[37] CAMELI, J. 2011. Envolverde: Jornalismo e Sustentabilidade. **O Cerrado é o veio natural da expansão sucroenergética no Brasil**. Available at: <http://envolverde.com.br/economia/entrevista-economia/o-cerrado-e-o-veio-natural-da-expansao-sucroenergetica-no-brasil/>. Last visited on: 04/07/2013.

[38] SCHOWOB, M. R. V. Perspectivas de difusão do gás natural na indústria brasileira de cerâmica vermelha. Available at: <http://www.ppe.ufrj.br/ppe/production/tesis/mscschwobmrv.pdf>. Last visited on 28/05/2013.

project and the continuation of the pre-project situation, where non-renewable biomass is used as fuel.

Sub-step 1b: Consistency with mandatory laws and regulations:

There are legal constraints regarding the use of non-renewable biomass as exposed in Decree N.5,975 of November 30th, 2006[39]. However, it is not enforced namely due to the lack of control[40]. *Maranhão* is the state with the largest number of municipalities which contribute for *Cerrado* deforestation[41]. From 2008 to 2009 the *Maranhão* state lost an area of 2,338 km² of native forests, being classified as the state that most contributed to the *Cerrado* deforestation (almost 30%)[42]. From 2009 to 2010, the state of *Maranhão* remained again at the first place among the states that deforested the Cerrado biome[43]. The consumption of non-renewable biomass by ceramic industry was noted by several authors (UHLIG, 2008[44]; NERI, 2003[45]; BRITO[46]; CARDOSO, 2008[47]). The demand for firewood in the industrial sector shows negative environmental impacts, specifically in the Northeast region of Brazil, due to heavy users, such as ceramic factories. In these cases, the use of firewood is primarily from non-renewable and unsustainable sources[48]. This fact is justified by the low price paid for the non-renewable native firewood by the ceramic factories in this region[49] and by a lack of government monitoring in

---

[39] Available at: http://www.planalto.gov.br/ccivil_03/_Ato2004-2006/2006/Decreto/D5975.htm. Last visited on: 28/05/2013

[40] MOUTINHO, P. et al. **REDD no Brasil:** um enfoque amazônico: fundamentos, critérios e estruturas institucionais para um regime nacional de Redução de Emissões por Desmatamento e Degradação Florestal – REDD. Brasília, DF: Instituto de Pesquisa Ambiental da Amazônia, 2011. Available at: <www.cgee.org.br/atividades/redirect/6995>. Last visit on: 28/05/2013.

[41] Envolverde. **Maranhão é o Estado com o maior número de municípios que desmatam o Cerrado**. Available at: <http://envolverde.com.br/noticias/maranhao-e-o-estado-com-o-maior-numero-de-municipios-que-desmatam-o-cerrado/?utm_source=CRM&utm_medium=cpc&utm_campaign=02-%5B2012-04-02-11%3A44%3A22%5D>. Last visited on 28/05/2013.

[42] IBAMA. Available at: <http://siscom.ibama.gov.br/monitorabiomas/cerrado/RELATORIO_CERRADO_2008-2009.pdf>. Last visit on **28/05/2013**.

[43] IBAMA. Available at: <http://siscom.ibama.gov.br/monitorabiomas/cerrado/RELATORIO%20FINAL_CERRADO_2010.pdf>. Last visit on 28/05/2013.

[44] UHLIG, A. **Lenha e carvão vegetal no Brasil: balanço oferta-demanda e métodos para a estimação do consumo**.2008, 156f. Dissertação (Pós graduação em Energia) – Universidade de São Paulo. Available at: < http://www.acendebrasil.com.br/archives/multimedia/UHLIG_Tese1.pdf >. Last visited on 28/05/2013.

[45] NERI, J.T. **Energia Limpa, Sustentável ou de Subsistência? Cerâmica Industrial,** Rio Grande do Norte;V,8, n.1,35 - 6,2003.

[46] BRITO, J.O. "The use of wood as energy". Available at: <http://www.scielo.br/scielo.php?pid=S0103-40142007000100015&script=sci_arttext&tlng=ES>. Last visited on 28/05/2013.

[47] CARDOSO, C.F.R. **Panorama do Setor Florestal: o que tem sido feito na esfera do Governo Federal**., Rio de Janeiro, 03 Set. 2008. Report presented in 1º SEMINÁRIO DE MADEIRA ENERGÉTICA, 2008.

[48] UHLIG, A. **Lenha e carvão vegetal no Brasil: balanço oferta-demanda e métodos para a estimação do consumo**. 2008, 156f. Dissertação (Pós Graduação em Energia) – Universidade de São Paulo. Available at: <http://www.teses.usp.br/teses/disponiveis/86/86131/tde-14052008-113901/publico/UHLIG_Tese1.pdf>. Last visited on 28/05/2013.

[49] NERI, J.T. **Energia Limpa, Sustentável ou de Subsistência? Cerâmica Industrial,** Rio Grande do Norte;V,8, n.1,35 - 6,2003. Available at: <http://www.ceramicaindustrial.org.br/pdf/v08n01/v8n1_5.pdf>. Last visited: 04/07/2013.

Cerrado biome[50]. This was also observed in other industries, for example in production of steel[51], which has a much better structure and internal organization when compared to ceramic factories that are generally small and family-run enterprises. According to Sub-step 1b, paragraph (3), if an alternative does not comply with all mandatory applicable legislation and regulations, then it must be demonstrated, based on an examination of current practice in the country or region in which the law or regulation applies, that those applicable legal or regulatory requirements are systematically not enforced and that noncompliance with those requirements is widespread in the country. Given the exposed above, it is evidenced that restrictions on the use of non-renewable biomass is widely not enforced in Brazil.

Currently, there are no other legal requirements or future legally binding regulatory instruments demanding ceramic factories to mitigate GHG emission or to use renewable sources of fuel. Therefore, it is considered that all alternatives identified in sub-step 1a are in compliance with mandatory legislation and regulations taking into account the enforcement in the region or country.

Outcome of Step 1b: At the end of Step 1, credible alternatives to the project activity that are consistent with current laws and regulations (taking into account the enforcement in the region or country) have been identified. All three alternatives identified in 1a are considered credible alternatives to the project activity. The additionality assessment will now move to Step 2 – Investment analysis.

Step 2: Investment analysis

According to the referenced tool, the investment analysis is used to determine whether the project activity is not:

(a) The most economically or financially attractive; or

(b) Economically or financially feasible, without the revenue from the sale of certified emission reductions (CERs).

The project proponents have chosen to follow option (a), and shall demonstrate that the project activity is not the most economically attractive following the sub-steps of the tool described below.

Sub-step 2a: Determine appropriate analysis method

There are three possible methods to demonstrate the investment analysis, according to the referred tool: simple cost analysis, investment comparison analysis or benchmark analysis. Simple cost analysis is applicable to projects that generate no financial or economic benefits other than CDM (or carbon credits) related income. As the proposed project activity includes fuel switching, a possible income arises from saving on fuel purchase, in case the new fuel is cheaper than the baseline fuel. Hence, simple cost analysis is not appropriate.

[50] CAMELI, J. 2011. Envolverde: Jornalismo e Sustentabilidade. **O Cerrado é o veio natural da expansão sucroenergética no Brasil**. Available at: <http://envolverde.com.br/economia/entrevista-economia/o-cerrado-e-o-veio-natural-da-expansao-sucroenergetica-no-brasil/>. Last visited on: 04/07/2013.

[51] Instituto Observatório Social. O Aço da Devastação. Available at: <http://www.observatoriosocial.org.br/portal/noticia/780>. Last visited on 28/05/2013.

According to the Guidelines on the assessment of investment analysis (version 05, EB62, Annex 5)[52], the investment comparison analysis shall be applied if the proposed baseline scenario leaves the project participant no other choice than to make an investment to supply the same (or substitute) products or services. As the proposed baseline (as any of its credible alternatives) demands investments in the purchase of fuel to produce ceramic pieces, investment comparison analysis is considered the most appropriate method to perform the investment analysis.

Sub-step 2b: Option II. Apply investment comparison analysis:

The financial indicator most suited for the investment comparison analysis is the unit cost of service, more specifically the cost of delivered heat, measured in R$ per TJ of thermal energy delivered. This indicator is the most appropriate since fuel purchase is one of the major cost components of the ceramic factories and the one most affected by this project, which involves fuel switching.

The most important parameters determining the cost of delivered heat are the unit cost of fuel (R$ per ton or m³ of each fuel), the Net Calorific Value of each fuel (in TJ per ton) and the total amount of fuel to be employed (in tonnes or m³). These parameters combined determine the total cost of fuel for a given production output.

Sub-step 2c: Calculation and comparison of financial indicators

Table below provides data on the non-renewable fuel costs[53].

Table 6. Data determining baseline fuel costs.

Parameter	**Unit**	***Balsas* Ceramic**
Non-renewable fuel used	N/A	Native firewood
Production	Thousand pieces per month	959.664
Monthly consumption of fuel	Tonnes	458.40
Cost of fuel	R$/tonne	R$ 21.04
Net Calorif Value of the fuel[54]	TJ/tonne	0.0150
Thermal energy delivered	TJ	6.88
Monthly fuel cost	R$	**R$ 9,643.11**
Cost of delivered heat	**R$/TJ**	**R$ 1,402.42**

As demonstrated above, fuel costs for the baseline scenario were BRL 1,402 per TJ of thermal energy. As the project activity, the baseline non-renewable fuel is being replaced by renewable biomasses such as rice husks[55].

[52] Available at: <http://cdm.unfccc.int/Reference/Guidclarif/reg/reg_guid03.pdf> Last visited on: 28/05/2013.
[53] Historical data from *Balsas* ceramic are used for the quantification of these parameters, including the cost of fuel. Evidences are available for the validation team.
[54] Please check Section B.6.2, item $NCV_{biomass}$ for more information on the determination of this parameter.

An investment comparison is made to demonstrate how these fuels compare to native firewood in terms of cost per energy delivered. Table below provide the parameters used for such analysis.

Table 7. Data determining fuel costs for renewable biomasses.

Fuel type	Cost of fuel[56] (R$/tonne)	Net Calorific Value (TJ/tonne)	Energy demand (TJ)[57]	Necessary monthly consumption to meet energy demand (tonnes)[58]	Cost of delivered heat (R$/TJ)
Rice Husk	R$ 26.25	0.0138	1.00	72.46	R$ 1,902.17
Forest Residues (sawdust/MDF/woodchips)	R$ 60.00	0.0146	1.00	68.49	R$ 4,109.59
Elephant grass	R$ 101.36	0.0134	1.00	74.63	R$ 7,564.03
Wood from areas with sustainable forest management plan	R$ 34.69	0.0150	1.00	66.67	R$ 2,312.67

As the tables above show, the fuels applied by the project are more costly on an energy basis than the baseline non-renewable fuel. This represents a significant barrier for the fuel switching. The continuation of the current practice, where no project is undertaken and non-renewable biomass remains being the fuel used is therefore a more economically attractive scenario than the measures proposed by the project activity.

[55] During the crediting period other types of renewable biomasses can also be used, such as: wood residues, biomass from forests and biomass from cropland and/or grasslands.

[56] Fuel costs of Rice Husks were determined based on purchases of biomass by *Balsas* Ceramic during 2009. The fuel costs of Forest Residues and Wood from areas with sustainable forest management plan were taken of the *Ceará* Renewable Energy Bundled Project. And costs with Elephant grass were taken from MAZZARELLA, V. Capim-elefante como fonte de biomassa para a siderurgia. Workshop sobre produção sustentável de ferro-gusa. IPT, (12/09/2006). (Elephant-grass as a renewable source to the steel industry. Workshop regarding sustainable production of cast-iron). Minimum value: USD 46.64. Available at: <www.abmbrasil.com.br/cim/download/10h45%20Mazzarela.pps>. Last visited: 04/07/2013; and BANCO CENTRAL DO BRASILI. Currency conversion. Available at: <http://www4.bcb.gov.br/pec/conversao/Resultado.asp?idpai=convmoeda>. Last visited: 04/07/2013. Dollar Exchange Rate on 12/09/2006: 2.1732..

[57] This table provides the calculation on the cost of fuel to provide 1 TJ of energy, in order to compare such cost with the baseline cost of delivered heat.

[58] This parameter is calculated based on the Net Calorific Value of each fuel and represents the amount of fuel needed to obtain 1 TJ of thermal energy.

Also, the use of renewable biomass as a fuel involves significant risks, such as the risk of instability of energy flow rates. Alternative fuels, such as biomass residues, are naturally subject to significant variation on its chemical and energy properties. Such materials might present variations in terms of density, particle size, humidity and other characteristics that affect its efficiency as fuel. These risks are only mitigated if proper handling and storage of biomass is continuously observed, thus demanding increased efforts from the ceramic factory employees[59].

Finally, the fuel switch to renewable biomass also demanded other costs besides the increase in fuel cost, such as the purchase of automatic feeders and thermocouples. These equipments were needed to allow the efficient use of biomass and would not be necessary if the ceramic owners remained using native firewood as fuel. These costs will likely result in energy efficiency (and consequently in reduced costs on fuel purchase). However, savings from energy efficiency are not easy to be determined upfront, since these measures follow the application of a new type of fuel (renewable biomass) which is more expensive than the baseline fuel.

The fuel switching also involves a period of adaptation until the kiln operators learned to operate with the new fuel. In this adaptation period, income loss generally results from losses of fuel and losses of ceramic pieces damaged by irregular burning cycles. All these additional costs would not be needed if the fuel switching did not occur making the continued use of non-renewable fuels an attractive scenario.

Sub-step 2d: Sensitivity analysis

The objective of this sub step is to show that the conclusion regarding the financial attractiveness of the project is robust to reasonable variations of the critical assumptions. According to the Guidelines on the assessment of investment analysis, variables that constitute more than 20% of either total project costs or total project revenues should be subjected to reasonable variation, the results of which should be presented in the PDD.

However, for the calculation of the selected indicator (cost of delivered heat), it is considered that the variation of only one variable, namely the cost of fuel (in R$ per ton), is sufficient for the sensitivity analysis. This is because in this case the variation of any of the other variables, such as the Net Calorific Value would provide redundant results, as the indicator (expressed in R$/TJ) is directly proportional to both the cost of fuel and the Net Calorific Value. Tables below provide the sensitivity analysis on the cost of delivered heat based on the variation on the cost of fuels.

[59] Such barriers are commonly attributed to the use of biomass as fuel. See for instance the following presentation on biomass as fuel: <http://www.unep.org/ClimateChange/LinkClick.aspx?fileticket=JDGR4kratWY%3D&tabid=4845&language=en-US>. Last visit on 28/05/2013.

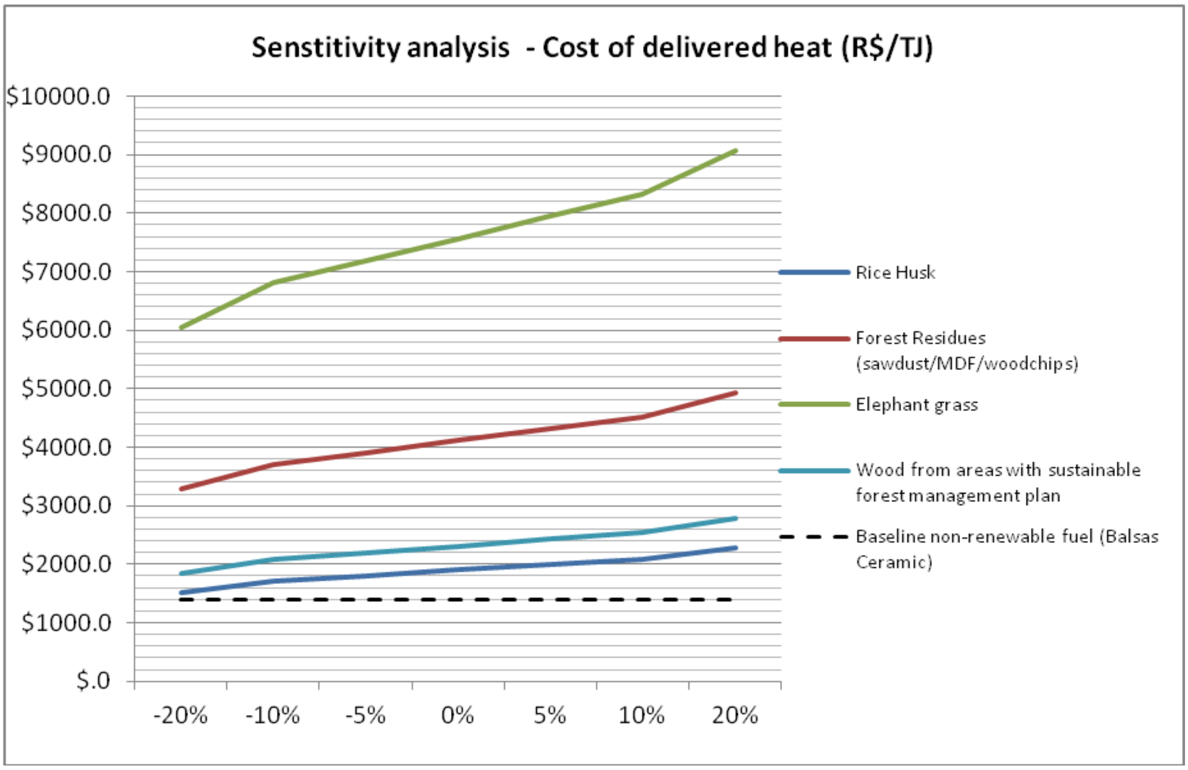
Table 8. Sensitivity analysis based on the variation on the cost of fuels.

	Cost of delivered heat according to variation on the cost of fuel						
Fuel type	**-20%**	**-10%**	**-5%**	**0%**	**5%**	**10%**	**20%**
Rice Husk	R$ 1,521.74	R$ 1,711.96	R$ 1,807.07	R$ 1,902.17	R$ 1,997.28	R$ 2,092.39	R$ 2,282.61
Forest Residues (sawdust/MDF/woodchips)	R$ 3,287.67	R$ 3,698.63	R$ 3,904.11	R$ 4,109.59	R$ 4,315.07	R$ 4,520.55	R$ 4,931.51
Elephant grass	R$ 6,051.23	R$ 6,807.63	R$ 7,185.83	R$ 7,564.03	R$ 7,942.24	R$ 8,320.44	R$ 9,076.84
Wood from areas with sustainable forest management plan	R$ 1,850.13	R$ 2,081.40	R$ 2,197.03	R$ 2,312.67	R$ 2,428.30	R$ 2,543.93	R$ 2,775.20
Baseline non-renewable fuel (***Balsas* Ceramic)**	R$ 1,402.42						

The sensitivity analysis shows that the fuels proposed by the project activity are significantly more costly than the baseline non-renewable fuel (native firewood).

The graphic below provides a summary of the sensitivity analysis.

Figure 2. Sensitivity analysis on the cost of delivered heat for renewable biomasses.



The sensitivity analysis demonstrates the cost of delivered heat is likely to increase due to the project implementation, since the use of biomass is more costly on an energy basis than the baseline fuel. An analysis on the fuels used by *Balsas* Ceramic indicates that the cost of delivered heat has indeed increased, going above R$ 2,500.00 per TJ, which is quite above baseline costs. Information on this analysis was made available to the validation team.

Step 4: Common Practice analysis

This Step is a credibility check to complement the investment analysis (Step 2) or barrier analysis (Step 3).

Sub-step 4a: Analyze other activities similar to the proposed project activity

In Brazil, the red ceramic pieces are produced through an inefficient and traditional processes using predominantly wood without forest management to generate thermal energy[60]. It happens because wood without forest management is offered for much lower prices than wood from areas

[60] ABREU, Y. V.; GUERRA, S. M. G. **Indústria de Cerâmica no Brasil e o Meio Ambient**e. Chile: IV Congreso Nacional de Energía, 2000. Available at: <http://www.nuca.ie.ufrj.br/bgn/bv/abreu2.htm>. Last visited on 28/05/2013. See also Ïnforme Setorial Cerâmica Vermelha", from Banco do Nordeste (Sectorial Information Report from Bank of Northeast). Available at: <http://www.bnb.com.br/content/aplicacao/etene/etene/docs/ano4_n21_informe_setorial_ceramica_vermelha.pdf >. Last visited on 28/05/2013.

with forest management[61]. Furthermore, using non-renewable wood is a simple procedure and well known by the kiln operators.

The native forest without any kind of sustainable management has traditionally been a source of firewood for the ceramic sector[62], which seemed inexhaustible, due to the amounts generated due to an expansion of the agriculture frontier. Unfortunately, hand in hand with it came environmental impacts like soil degradation, change in the rainfall regime and consequent desertification.

The ceramic industry sector has practically not evolved compared to the past, mainly due to the simple manufacturing techniques. Moreover, the major equipments (chiefly kilns) of the production process have not improved significantly in terms of technology or efficiency recently. Many of the ceramics factories still use non-renewable wood in their kilns and the drying process occurs naturally, without any energy utilization. Also, the influence of the market as a drive for improvements in this sector is very insignificant[63].

Thus, the common practice is the use of wood – more precisely its non-renewable fraction, which is the fuel most often employed, most viable and associated with the lower risks. Similar activities to the project were not found in the region, except those being developed within the carbon market[64] (as voluntary project activities) and hence cannot be included in this analysis.

Sub-step 4b: Discuss any similar Options that are occurring:

As described above, similar activities are not widely observed in the project region. According to the referenced tool for the demonstration and assessment of additionality, if similar activities cannot be observed then the proposed project activity is additional.

B.6 Emission reductions:

B.6.1. Explanation of methodological options or description of new proposed approach:

Below, a description of the equations and procedures used for the calculation of emission reductions follows:

Emission Reductions

$$\mathbf{ER_y = B_y \times \mathit{f}_{NRB,y} \times NCV_{biomass} \times EF_{projected\_fossilfuel}} \qquad \text{(Equation 01)}$$

Where:

ER_y:	Emission reductions during the year y in tCO_2e
B_y:	Quantity of woody biomass that is substituted or displaced in tonnes
$f_{NRB,y}$:	Fraction of woody biomass used in the absence of the project activity in year *y*

[61] Seye, Omar. **Análise de ciclo de vida aplicada ao processo produtivo de cerâmica estrutural tendo como insumo energético capim elefante** (Pennisetum Purpureum Schaum) / Omar Seye. Campinas, SP: [s.n.], 2003. Available at: <http://libdigi.unicamp.br/document/?code=vtls000411276>. Last visited on 28/05/2013.

[62] UHLIG, A. **Lenha e carvão vegetal no Brasil: balanço oferta-demanda e métodos para a estimação do consumo**.2008, 156f. Dissertação (Pós graduação em Energia) – Universidade de São Paulo. Available at: <http://www.acendebrasil.com.br/archives/multimedia/UHLIG_Tese1.pdf>. Last visited on 28/05/2013.

[63] PAULETTI, M. C. **Modelo para Introdução de Nova Tecnologia em Agrupamentos de Micro e Pequenas Empresas: Estudo de Caso das indústrias de Cerâmica Vermelha no Vale do Rio Tijucas**. 2001. Available at: <http://biblioteca.universia.net/html_bura/ficha/params/id/597230.html>. Last visited on 28/05/2013.

[64] Such as several projects developed by Sustainable Carbon under the Voluntary Carbon Standard. Information on such projects available at: <http://mer.markit.com/br-reg/public/index.jsp?s=cp >. Access this site and type Sustainable Carbon in the search field. Last visit on 28/05/2013.

that can be established as non-renewable biomass using survey methods

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

$EF_{projected\ fossil\ fuel}$: Emission factor for substitution of non-renewable woody biomass by similar consumers, in tCO_2e/TJ[65].

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

(a) **B_y** is calculated as the product of the number of appliances multiplied by the estimate of average annual consumption of woody biomass per appliance (tonnes/year);
More specifically, appliances are the kilns producing ceramic pieces. The consumption of woody biomass in the kilns is 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:

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

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 ceramicfactory, by dividing monthly average consumption in the baseline by monthly average baseline production.

According to procedures on the applied methodology, the project participants shall determine the shares of renewable and non-renewable woody biomass in B_y using nationally approved methods. Also, the following principles shall be taken into account:

Demonstrably Renewable woody biomass[66] (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[67] where:
(a) The land area remains a forest;
(b) Sustainable management practices are undertaken on these land areas to ensure, in particular, that the level of carbon stocks on these land areas does not systematically decrease over time (carbon stocks may temporarily decrease due to harvesting); and
(c) Any national or regional forestry and nature conservation regulations are complied with.
2. The biomass is woody biomass and originates from non-forest areas (e.g. croplands, grasslands) where:
(a) The land area remains cropland and/or grasslands or is reverted to forest;
(b) Sustainable management practices are undertaken on these land areas to ensure in particular that the level of carbon stocks on these land areas does not systematically decrease over time (carbon stocks may temporarily decrease due to harvesting); and

---

[65] 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.
[66] 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 28/05/2013.
[67] The forest definitions as established by the country in accordance with the Decisions 11/CP.7 and 19/CP.9 should apply.

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

Non-renewable biomass

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

- A trend showing an increase in time spent or distance travelled for gathering fuel-wood by users (or fuel-wood suppliers) or alternatively, a trend showing an increase in the distance the fuel wood is transported to the project area[68];
- 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[69];
- Increasing trends in fuel wood prices indicating a scarcity of fuel-wood;
- Trends in the types of cooking fuel collected by users, suggesting scarcity of woody biomass.

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

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

Before the project activity, wood from areas without forest management was offered with low prices and high viability to the ceramic owner. According to the IBAMA Normative Instruction Nº 112 from 21/08/2006[70], 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 is considered renewable, since it complies with item 1 of the definition of renewable biomass. On the other hand, no native firewood with no DOF is considered a non-renewable biomass. Thus, the fuel employed in the baseline scenario by *Balsas* ceramic was from non-renewable origin.

The $f_{NRB,y}$ parameter is determined in two steps: the first step is based on project specific information regarding the amount of native firewood from areas without forest management and the amount of firewood with DOF. This provides a fraction of non-renewable biomass used in the baseline scenario based on the origin of the firewood. The second step is an assessment on the fraction of woody biomass used that can be established as non-renewable biomass using survey methods applied to the *Cerrado* 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 $f_{NRB,y}$[71]. A description of such methodology follows:

---

[68] More information on this indicator for the project area available on Page 29.
[69] More information on this indicator for the project area available on Page 29.
[70] BRASIL. INSTRUÇÃO NORMATIVA IBAMA Nº 112, DE 21 DE AGOSTO DE 2006. Available at: <http://www.cetesb.sp.gov.br/licenciamentoo/legislacao/federal/inst_normativa/2006_Instr_Norm_IBAMA_112.pdf>. Visited on 28/05/2013.
[71] Document is available at: <http://cdm.unfccc.int/Panels/ssc_wg/meetings/035/ssc_035_an20.pdf>. Last visited on 28/05/2013.

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 *Cerrado* biome is derived by calculating Total Annual Biomass Removals (R) in this biome as a proxy for B_y and estimating the proportion of R that is demonstrably renewable (DRB) and non-renewable (NRB). The following equation is used:

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

Where:

R Total annual biomass removals (tonnes/year)

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

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

Where:

MAI Mean Annual Increment of biomass growth (tonnes/year)

ΔF Annual change in living Forest biomass (tonnes/year)

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

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

Where:

F Extent of forest (ha)

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

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

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

Where:

PA Protected Area Extent of Forest (ha)

This approach is considered appropriate since it takes in consideration historical practices of the ceramic factory in regard to fuel usage, meaning only native firewood from areas without forest management will be considered as non-renewable. Also, choosing the biome where the project is located as the geographical boundary for the second step is a more accurate approach than performing a national assessment, given the dimensions and peculiarities of each biome in Brazil and considering that sub-regional information is not available nor feasible to obtain. Also, there is evidence to support that carbon stocks are depleting in the project area[72] and that there is a trend showing an increase in time spent or distance travelled for gathering fuel-wood by users[73] [74].

Leakage (LE_y)

According to the applied methodology, leakage relating to the non-renewable woody biomass saved by the project activity shall be assessed based on *ex post* surveys of users and the areas from which this woody biomass is sourced (using 90/30 precision for a selection of samples). The following potential source of leakage shall be considered:

(a) The use/diversion of non-renewable woody biomass saved under the project activity by non-project households/users that previously used renewable energy sources. If this leakage assessment quantifies an increase in the use of non-renewable woody biomass used by the non-project households/users, that is attributable to the project activity, then B_y is adjusted to account for the quantified leakage. Alternatively, B_y is multiplied by a net to gross adjustment factor of 0.95 to account for leakages, in which case surveys are not required.

This source of leakage shall be assessed for each crediting period, but leakage emissions from this source are not expected since the common practice in the region (especially for ceramic industries) is the use of non-renewable biomasses. The fuel switching project is not expected to result in local alteration on fuel prices, since the volume of fuels used in the project are not significant compared to total availability of both baseline fuels (native firewood) and project fuels (renewable biomasses).

Leakage from the use of renewable biomass must be considered using the general guidance on leakage in biomass project activities (attachment C of Appendix B)[75]. Also, the specific rules on biomass resources as set out in the applicable version of the Gold Standard, especially Toolkit Annex C shall be complied with.

For this project activity, the following sources of leakage are included:

A. *Shifts of pre-project activities*;

B. *Emissions related to the production of Biomass*, and;

C. *Competing uses for the biomass*.

The Attachement 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 shall include the area where the biomass is extracted or produced. Table below summarizes the sources of leakage.

[72] The Brazilian Forestry Service provides data regarding estimates of carbon pools in million metric tonnes for natural forests per biome, per category and per year, showing that the net carbon emissions for the *Cerrado* biome in the measured carbon pools constantly decreased between 1990 and 2005. Document available at: <http://www.florestal.gov.br/snif/recursos-florestais/estoque-das-florestas>. Last visited on 27/05/2013.

[73] EMBRAPA. **Manejo Florestal ou Silvicultura?** Information on third paragraph shows increasing distances to obtain firewood in the *Cerrado* biome. Document available at: <http://www.embrapa.br/imprensa/artigos/2003/artigo.2004-12-07.2303694691/>. Last visited on 27/05/2013.

[74] REINATO, Carlos H. R. et al. **Consumo de energia e custo de secagem de café cereja em propriedades agrícolas do sul de Minas Gerais.** Information on third paragraph shows increasing distances to obtain firewood in the *Cerrado* biome Document available at: <http://www.scielo.br/pdf/rbeaa/v6n1/v6n1a20.pdf>. Last visited on 27/05/2013.

[75] Document available at: <http://cdm.unfccc.int/methodologies/SSCmethodologies/AppB_SSC_AttachmentC.pdf>. Last visit on 28/05/2013.

Table 9. 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 for biomass from existing forests and for biomass residues or waste. The source of leakage of the present project is assessed below, for each type of biomass:

Rice Husk

The project activity is switching native firewood to rice husk, an abundant biomass in the region. The state of *Maranhão* is one of the main producers of rice in Brazil and, consequently, a great supplier of rice husk.

Table 10 shows production of rice and rice husk in the state of *Maranhão* in the years of 2010 and 2011[76]. Each tonne of produced rice leads to the supply of 0.23 tonne of rice husk[77].

Table 10. Rice and rice husk production in 2010 e 2011.

Harvest	Rice (tonnes)	Rice husk (tonnes)
2009/10	590 thousand	135.7 thousand
2010/11	704 thousand	161.9 thousand

The harvest of 2010/11 produced 704 thousand tonnes, generating around 161.9thousand tonnes of rice husks. The project activity will employ approximately 354..57 tonnes[78] of biomass per month which leads to the fraction of 0.22% of the total availability of this kind of biomass in the region.

[76] Source:<http://cepa.epagri.sc.gov.br/Publicacoes/Sintese_2011/Arroz%20sintese%202011.pdf>. Visited in: 28/05/2013.

[77] GAIDZINSKI, R. Utilização da casca de arroz como sorvente alternativo para o tratamento de efluentes da Região Carbonífera Sul Catarinense. 2007. Page 2. Rice husk is a by-product of rice production which represents about 23% of rice's weight. Available at: http://www.cetem.gov.br/publicacao/serie_anais_I_jpci_2007/Roberta_Gaidzinski.pdf. Last visited on 17/07/2013.

[78] Source: According to the average of rice husks consumed by *Balsas* ceramic during 2011 and 2012.

Thus, It can be concluded that the biomass available is widely superior then the amount required for this project i.e. leakage from rice husk can be neglected.

B.6.2. Data and parameters that are available at validation:

Data / Parameter:	**$EF_{projected\_fossilfuel}$**
Data unit:	tCO_2/TJ
Description:	Emission factor for substitution of non-renewable woody biomass by similar consumers.
Source of data used:	Approved small scale methodology AMS-I.E “Switch from Non-Renewable Biomass for Thermal Applications by the User”, version 05.
Value applied:	81.6 tCO_2/TJ
Justification of the choice of data or description of measurement methods and procedures actually applied :	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 in Section B.5, 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.
Any comment:	

Data / Parameter:	**$NCV_{biomass}$**
Data unit:	TJ/ton
Description:	Net calorific value of the non-renewable woody biomass that is substituted
Source of data used:	Approved small scale methodology AMS-I.E “Switch from Non-Renewable Biomass for Thermal Applications by the User”, version 05.
Value applied:	0.015
Justification of the choice of data or description of measurement methods and procedures actually applied :	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.
Any comment:	

Data / Parameter:	**$\rho_{biomass}$**
Data unit:	Tonnes/m^3
Description:	Specific gravity of non-renewable biomass type *j*
Source of data used:	Brazilian study carried out with Cerrado wood: VALE, A.T; BRASIL, M.A.M; LEÃO, A.L. **Quantificação e caracterização energética da madeira e casca de espécies de Cerrado**. Ciência Florestal, Santa Maria; v.12, n.1, p. 71-80; 2002. Available at: <http://www.ufsm.br/cienciaflorestal/artigos/v12n1/A8V12N1.pdf>. Visited on: 27/04/2012.

Value applied:	0.5702
Justification of the choice of data or description of measurement methods and procedures actually applied :	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 *Cerrado* Biome that are usually utilized as fuel in the ceramic industries of the region.
Any comment:	

Data / Parameter:	**BF_y**
Data 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 used:	Historical data from project proponent
Value of data	0.4776
Justification of the choice of data or description of measurement methods and procedures actually applied :	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 2008 was used. The value is employed to calculate the real amount of wood displaced to maintain the ceramic production in the baseline scenario.
Any comment:	

B.6.3 Ex-ante calculation of emission reductions:

Emission reductions are calculated with equations described in Section B.6.1. The quantity of woody biomass per thousand of ceramic units fired (BF_y) is calculated based on historical information on production and fuel consumption in *Balsas* ceramic. Internal data is partially used to determine baseline emissions (such as the production of bricks in the baseline period), but are considered to be of a reliable nature since they are used to assess the *Balsas* ceramic productivity.

The consumption of non-renewable fuels during the baseline period was taken from receipts signed by fuel suppliers, a third party information which is used for commercial purposes (to determine financial compensations between the ceramic owners and the suppliers). Hence, this information is also considered to be reliable.

Data from 2008 (the last year before the project measures became operational) was used. Data used to calculate baseline emissions were doubled checked by Sustainable Carbon in order to minimize the likelihood of data errors. 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 are not quantified but are expected to be small, (lower than 10%) due to the reliable nature of the data used. Table below provides information on production and fuel consumption for *Balsas* ceramic.

Table 11. Baseline information for *Balsas* ceramic.

Parameter	*Balsas* Ceramic
2008 production (thousands of ceramic pieces)	11,516
2008 consumption of non-renewable native firewood (tonnes)	458.40
Quantity of woody biomass per thousand of ceramic units fired in year y (BF_y)	0.4776
Quantity of woody biomass that is substituted or displaced in tonnes (B_y)	5,500.83

Balsas ceramic have used exclusively native firewood prior to the project initiation. This type of biomass is considered non-renewable woody biomass.

The $f_{NRB,y}$ parameter is determined in two steps: the first step is based on project specific information regarding the amount of native firewood from areas without forest management plan. This provides a fraction of non-renewable biomass used in the baseline scenario based on the origin of the firewood. The second step is an assessment on the fraction of woody biomass used that can be established as non-renewable biomass using survey methods applied to the *Cerrado* 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 $f_{NRB,y}$[79]. Table below summarizes project specific data used for the calculation of $f_{NRB,y}$.

Table 12. Project specific data used for the determination of $f_{NRB,y}$.

Parameter	*Balsas* ceramic
Consumption of non-renewable woody biomass for 2008 (tonnes)	458.40
Fraction of non-renewable woody biomass used in 2008 (calculated with equation 3)	0.8450

Figures on the table above were calculated from historical records of *Balsas* ceramic. Data on the fuels used in 2008 was considered. Receipts of sale from native firewood providers were used to determine the amount of non-renewable woody biomass used by *Balsas* ceramic. All of the providers considered for the quantification of non-renewable biomass were extracting firewood from the *Cerrado* biome without any forest management or conservation methods. Receipts of sale were made available to the validation team.

[79] Document is available at: <http://cdm.unfccc.int/Panels/ssc_wg/meetings/035/ssc_035_an20.pdf>. Last visited on 28/05/2013.

Table 13. Data used for determination of $f_{NRB,y}$ for the *Cerrado* biome.

Parameter	Unit	Value	Source
Non-renewable biomass in the *Cerrado* biome (NRB)	tonnes/year	525,078,686	Calculated by Project Participants.
Demonstrably renewable biomass in the *Cerrado* biome (DRB)	tonnes/year	96,280,135	Calculated by Project Participants.
Extent of natural forests in the *Cerrado* biome	Hectares	70,007,832	FAO. Global Forest Resources Assessment 2010: Brazil. Table "Result of forest area estimation data for 1990, 2000, 2005, and 2010", Pag 17. Available at: <http://www.fao.org/docrep/013/al464E/al464E.pdf>. Last visited: 18/06/2012
Extent of planted forests in the *Cerrado* biome	Hectares	4,804,350	ABRAF Statistical Yearbook 2010. Publication available at: http://www.abraflor.org.br/estatisticas/ABRAF10-EN.pdf. Information on Table 1.01.
Growth rate of natural forests	tonnes d.m./ha/year	7.4	Second National Inventory of Greenhouse Gas Emissions. Document available at: http://www.mct.gov.br/upd_blob/0215/215037.pdf. Information taken from Section 3.5.2.3, page 239 of the report. A value of 3.7 tC/hectare/year was chosen, which is applicable to forest areas with above ground biomass below 93 tC/hectare. This parameter was divided by 0.5 to convert from tonnes of carbon to tonnes of dry biomass.
Growth rate of planted forests	tonnes d.m./ha/year	20.33	ABRAF Statistical Yearbook 2010. Publication available at: http://www.abraflor.org.br/estatisticas/ABRAF10-EN.pdf. Information on Graph 2.05 .
Protected Area Extent of Forest	Hectares	13,010,829	Ministério do Meio Ambiente. *Florestas do Brasil em resumo* (Brazilian Ministry of the Environment. *Brazilian forests in brief*). Publication available at: http://www.ciflorestas.com.br/arquivos/doc_florestas_resumo_22648.pdf. Information available on page 39 of the report.
Fraction of non-renewable woody biomass in the *Cerrado* biome	%	84.50%	Calculated by Project Participants.

Finally, table below provides values applied for the calculation of emission reductions according to equation 1.

Table 14. Data used for the calculation of emission reductions.

Parameter		***Balsas* Ceramic**
$\mathbf{B_y}$	Quantity of woody biomass that is substituted or displaced in tonnes	5,500.83
$\mathbf{f_{NRB,y}}$	Fraction of woody biomass used in the absence of the project activity in year *y* that can be established as non-renewable biomass	0.8450
$\mathbf{NCV_{biomass}}$	Net calorific value of non-renewable woody biomass that is substituted, in TJ/ton	0.015
$\mathbf{EF_{projected\ fossil\ fuel}}$	Emission factor for substitution of non-renewable woody biomass by similar consumers, in tCO_2e/TJ	81.6
$\mathbf{ER_y}$	Emission reductions in the year y	5,688

It is important to state that the actual production and use of renewable biomass might be different during the crediting period. Production naturally fluctuates according to market demand. The ceramic factory might manage to use higher amounts of renewable biomass in case the production increases, which is expected to occur during the crediting period. The ceramic factory may use different kinds of renewable biomass during the crediting period, as long as its origin is verifiable. The consumption of each type of renewable biomass will be monitored during the crediting period. Emission reductions will be calculated based on monitored values of production and fuel usage.

Therefore, baseline emissions are calculated based on historical data on production levels and fuel consumption in *Balsas* ceramic. Tables below provide the calculated baseline emissions. More information on baseline emissions can be found in Annex 3. Project emissions are not considered according to the approved methodology. Emissions due to transportation of the renewable biomasses are not expected to significantly increase compared to emissions resulting from the transportation of the baseline fuel (non-renewable biomass). Leakage emissions are estimated to be zero, since the project will use primarily abundant biomass residues, thus not causing emissions from any of the leakage sources described in Section B.6.1. Table below provides information on baseline emissions *Balsas* ceramic across the crediting period.

Table 15. Baseline emissions of *Balsas*ceramic (in tCO_2e).

Year	Total Baseline emissions of *Balsas* ceramic
2011	1,896
2012	5,688
2013	5,688
2014	5,688
2015	5,688
2016	5,688
2017	5,688
2018	5,688
2019	5,688
2020	5,688
2021	3,792
Total baseline emissions (tCO2e)	**56,880**
Number of years of the crediting period	10
Annual average of estimated baseline emissions for the 10 years of crediting period (tCO2e)	**5,688**

The project capacity for thermal energy generation was calculated based on the amount of woody biomass used as fuel in 2008 and on the net calorific value of such fuel. These parameters allow quantifying the amount of thermal energy produced (in TJ). A conversion factor was used to obtain the amount of energy produced in 2008 in $MWh_{thermal}$. This value was divided by 8,760 hours per year to determine the equivalent capacity of the project. Table below provides more information on such calculation.

Table 16. Data used for the calculation of the project thermal energy capacity.

Parameter	Unit	Value	Source
Amount of woody biomass fired in 2008	Tonnes	458.40	Historical data from the ceramic factory
Net calorific value of woody biomass	TJ/ton	0.015	Please see Section B.6.2, item $NCV_{biomass}$
Energy generated from woody biomass	TJ	82.51	Calculated with the information above
Energy generated from woody biomass	MWh	22,920.13	Calculated with a conversion factor of 277.78 MWh/TJ was used. Source: ANEEL (Brazilian Electricity Regulatory Agency). Available at: <http://www.aneel.gov.br/arquivos/PDF/atlas_fatoresdeconversao_indice.pdf>
Equivalent energy capacity (bundled project)	MW	2.62	Calculated as the energy generated (in MWh) divided by 8,760 hours per year.

B.6.4 Summary of the ex-ante estimation of emission reductions:

Year	Total Baseline emissions (tCO_2e)	Total Project emissions (tCO_2e)	Leakage (tCO_2e)	Total emission reductions (tCO_2e)
2011	1,896	0	0	1,896
2012	5,688	0	0	5,688
2013	5,688	0	0	5,688
2014	5,688	0	0	5,688
2015	5,688	0	0	5,688
2016	5,688	0	0	5,688
2017	5,688	0	0	5,688
2018	5,688	0	0	5,688
2019	5,688	0	0	5,688
2020	5,688	0	0	5,688
2021	3,792	0	0	3,792
Total Emission Reductions (tCO_2e)	**56,880**	**0**	**0**	**56,880**
Number of years of the crediting period	10	10	10	10
Annual average of estimated emissions reductions for the 10 years of crediting period (tCO_2e)	**5,688**	**0**	**0**	**5,688**

B.7 Application of a monitoring methodology and description of the monitoring plan as per the existing or new methodology applied to the micro-scale project activity:

B.7.1 Data and parameters monitored:

Data / Parameter:	**PR_y**
Data unit:	Thousands of ceramic pieces
Description:	Amount of products produced in year y
Source of data to be used:	Controlled by the ceramic owners
Value of data	Values applied for ex-ante calculation are described in Section B.6.3. Detailed information is available in Annex 3.
Description of measurement methods and procedures to be applied, inc. frequency:	This parameter is monitored by employees on *Balsas* ceramic, counting the total production on a daily 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.
QA/QC procedures to	*Balsas* ceramic have internal controls to assure proper monitoring of this

be applied:	parameter. Data will be compared to the amount of renewable biomass employed.
Any comment:	Although this information originates from internal data, margins of error for this parameter are expected to be small, since they are used to assess the productivity of *Balsas* 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
Source of data to be used:	Measured by the biomass providers and controlled by the ceramic owners
Value of data	This parameter is not directly used for the calculation of emission reductions. It is assumed that the consumption of renewable biomass will be enough to provide 100% of the energy demand for the production of ceramic pieces.
Description of measurement methods and procedures to be applied, inc. frequency:	It is monitored through purchase invoice, delivery notes or other documents related to the acquisition of renewable biomasses. Only documents issued from either government agencies or control documents that were provided or validated by the biomass suppliers will be considered as "other documents". 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: **Biomass type** — **Specific gravity (tonnes/m³)** Rice husks — 1.458 These value were taken from the source below: **Rice husks:** SILVA, A. P., AKASAKI, J. L. *Produção de tijolos de solo-cal + resíduos agroindustriais.* Available at: <http://www.ppgec.feis.unesp.br/producao2004/Produ%E7%E3o%20de%20 tijolos%20de%20solo-cal%20+%20res%EDduos%20agroindustriais.pdf>.
QA/QC procedures to be applied:	*Balsas* ceramic shall store all documents related to the purchase or acquisition of renewable biomass. Data will be compared to production output.
Any comment:	Monitored data for this parameter comes from third party information, which is used for commercial purposes (to determine financial compensations between the ceramic owners 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:	$f_{NRB,y}$
Data 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
Source of data to be used:	Survey methods.
Value of data	0.8450 or 84.50%
Description of measurement methods and procedures to be applied, inc. frequency:	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 *Cerrado* biome.
QA/QC procedures to be applied:	Data from published sources will be used to determine this parameter.
Any comment:	Data will be kept for two years after the end of the crediting period or the last issuance of carbon credits for this project activity, whichever occurs later.

Data / Parameter:	***Origin of Renewable Biomass***
Data unit:	Not applicable
Description:	Renewable origin of the biomass
Source of data to be used:	Controlled by the ceramic owners
Value of data	Not applied for the calculation. It is assumed that all biomass used during the crediting period is demonstrably renewable.
Description of measurement methods and procedures to be applied, inc. frequency:	This information will be given by the biomasses providers. The guarantee of acquiring renewable biomass will be achieved by invoices from the providers. As stated in section B.6.1, the biomasses are considered renewable as fulfilling definitions of renewable biomass approved by the CDM Executive Board.
QA/QC procedures to be applied:	Ceramic owner shall store invoices, receipt of sales or other documents to allow the traceability of the renewable biomass. Only documents issued from either government agencies or control documents that were provided or validated by the biomass suppliers will be considered as "other documents".
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***
Data unit:	tCO_2e
Description:	This source of leakage is relevant for biomass residues and biomass from existing forests, according to the general guidance on leakage in biomass

	project activities. The quantity of renewable biomass available will be assessed annually to determine the occurrence of leakage.
Source of data to be used:	Monitored by surveys and publications
Value of data	0 (zero). The amount of biomass available is described in Section B.6.1. It is considered that there is sufficient biomass surplus in the region to avoid the occurrence of leakage. The following biomass availability in the project region is considered:
	Biomass type / **Availability** / **Year**: Rice husks[80] / 154.9 thousand tonnes / 2010/11
Description of measurement methods and procedures to be applied, inc. frequency:	Biomass availability will be used to calculate leakage from renewable biomass. Surveys and publications shall be used to determine the availability of each type of biomass in the project region (the State of *Maranhão* and neighboring States). Sources of information shall provided figures that allow for the estimation of the availability of the types of biomass residues used by the ceramic factory. Project Proponents consider it is a conservative measure to estimate leakage emissions from competing use of biomass in case both the following conditions are met: (i) there is insufficient data to determine the total amount of biomass that is utilized in the project region (including non-project users); (ii) the project use is equal to or above 10% of total biomass availability in the project region; The sources of leakages predicted in the methodology applied will be monitored. The measurement of the leakage will be based in national and international articles and databases every monitoring period. These sources will provide information about the biomass availability in the project's regions.
QA/QC procedures to be applied:	Data available regarding the ceramic industry fuel consumption will be utilized to monitor the leakage.
Any comment:	Data will be kept for two years after the end of the crediting period or the last issuance of carbon credits for this project activity, whichever occurs later.

Data / Parameter:	***Leakage of non-renewable woody biomass***
Data unit:	tCO_2e
Description:	Leakage related to the non-renewable woody biomass
Source of data to be used:	Monitored
Value of data	0 (zero). It is assumed for the ex-ante calculation of emission reductions that no emissions occur due to this source, as explained in Section B.6.1.
Description of	The source of leakage from non-renewable biomass will be monitored

[80] Sources regarding the availability of rice husks are available in Section B.6.1.

measurement methods and procedures to be applied, inc. frequency:	according to the applied methodology. This means Project Participants shall assess the use/diversion of non-renewable woody biomass saved under the project activity by non-project households/users that previously used renewable energy sources. Monitoring shall include data on the amount of woody biomass saved under the project activity that is used by non-project households/users (who previously used renewable energy sources). Other data on non-renewable woody biomass use required for leakage assessment shall also be collected.
QA/QC procedures to be applied:	In case this source of leakage cannot be determined, B_y will be multiplied by a net to gross adjustment factor of 0.95 to account for leakages, in which case surveys are not required.
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.

Monitoring shall also include checking of all appliances or a representative sample thereof, at least once every two years to ensure that they are still operating or are replaced by an equivalent in service appliance. Checking will consist of visual inspections and interviews with the employees of *Balsas* ceramic to confirm the kilns are still operating or were replaced by an equivalent in service kiln.

B.7.2 Description of the monitoring plan:

The party responsible for implementing the monitoring plan will be the owner of *Balsas* ceramic. The ceramic owner will also be responsible for developing the forms and registration formats for data collection and further classification. Monitored data will be kept for two years after the end of the crediting period or the last issuance of carbon credits for this project activity, whichever occurs later. For this purpose, the authority for the registration, monitoring, measurement and reporting will be the ceramic owner. The management structure will rely on the local technicians with a periodical operation schedule during the project. The technical team will manage the monitoring, the quality control and quality assessment procedures. Monitored parameters are described in Section B.7.1 and will be monitored with the frequency described in Table below.

Table 17. Further information on the monitored parameters.

Parameters	Description	Units	Origin	Frequency
PR_y	Amount of products produced in year y	Thousands of ceramic pieces	This parameter is monitored by employees on *Balsas* ceramic, counting the total production. Measurements are done by an internal control sheet monitored by the project proponent. Values used during the project monitoring might be taken either from sales reports or from production control documents.	Measured on a daily basis. Data will be aggregated on a monthly and yearly basis.
$Q_{renbiomass}$	Amount of	Tonnes	Measured by the biomass	Monthly

Parameters	Description	Units	Origin	Frequency
	renewable biomass used during year *y* of the crediting period		providers and controlled by the ceramic owner. Data is calculated from receipts, invoices and other documents regarding the acquisition of renewable biomass. Only documents issued from either government agencies or control documents that were provided or validated by the biomass suppliers will be considered as "other documents".	
$f_{NRB,y}$	Fraction of woody biomass used in the absence of the project activity in year *y* that can be established as non-renewable	Fraction	Survey methods, as described in Section B.7.1	Annually
Origin of Renewable Biomass	Renewable origin of the biomass	Not applicable	This information will be given by the biomasses providers and controlled by the ceramic owner. The guarantee of acquiring renewable biomass will be achieved by invoices from the providers. Ceramic owner shall store these invoices, receipt of sales or other documents to allow the traceability of the renewable biomass. Only documents issued from either government agencies or control documents that were provided or validated by the biomass suppliers will be considered as "other documents".	Annually
Leakage due to competing uses of biomass	This source of leakage is relevant for biomass residues and biomass from existing forests. The quantity of renewable biomass available will be	tCO_2e	Monitored by surveys and publications	Each crediting period

Parameters	Description	Units	Origin	Frequency
	assessed annually to determine the occurrence of leakage			
Leakage of non-renewable woody biomass	This source of leakage assesses the use/diversion of non-renewable woody biomass saved under the project activity by non-project households/users that previously used renewable energy sources.	tCO_2e	Monitored by surveys and publications	Annually
Checking of all appliances (kiln)	According to the applied methodology, monitoring shall include checking of all appliances or a representative sample thereof, to ensure that they are still operating or are replaced by an equivalent in service appliance.	Not applicable	Sustainable Carbon shall perform visual inspections and interviews with the employees of Balsas ceramic to confirm the kilns are still operating or were replaced by an equivalent in service kiln.	Once every two years

B.8 Date of completion of the application of the existing or new baseline and monitoring methodology and name of the responsible person(s)/entity(ies)

The application of the baseline and monitoring methodology was finalized on 10/08/2012. The following entity is responsible for applying the baseline and monitoring methodology:

SUSTAINABLE CARBON - PROJETOS AMBIENTAIS LTDA

Project developers: Thiago de Avila Othero and Marcelo Hector Sabbagh Haddad: Technical Coordinators.

Camila Vaccari and Mariana dos Santos Silva, Technical Analysts.

SECTION C. Duration of the project activity / crediting period

C.1 Duration of the project activity:

C.1.1. Starting date of the project activity:

21/03/2009. On this date, *Balsas* ceramic starts to use exclusively renewable biomass in the ceramic kilns. The starting date of the project is before the "*Time of first submission*" as per Gold Standard definitions[81]. Hence, the project is applying for retroactive registration according to Gold Standard Toolkit Section 1.2.6.

C.1.2. Expected operational lifetime of the project activity:

30 years 0 months.

C.2 Choice of the crediting period and related information:

C.2.1. Renewable crediting period

C.2.1.1. Starting date of the first crediting period:

Not applicable.

C.2.1.2. Length of the first crediting period:

Not applicable.

C.2.2. Fixed crediting period:

C.2.2.1. Starting date:

01/09/2011. The starting date of the crediting period was defined to ensure the project is able to request retroactive credits in line with Gold Standard requirements version 2.2. Such date was defined based on the date of project registration under the Gold Standard: 15/08/2012. On this date, the ceramic factories were already reducing their baseline emissions due to the use of renewable biomass.

C.2.2.2. Length:

10 years, 0 months.

[81] According to Gold Standard Requirements version 2.2, 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 D. Stakeholders' comments

D.1. Brief description how comments by local stakeholders have been invited and compiled:

Balsas Stakeholders Consultation meeting took place on September 13th, 2012 in the municipality of Balsas/MA, in the same city where Balsas Ceramic is located. As requested during the pre-feasibility assessment of this project, the Stakeholder Feedback Round was developed following Gold Standard requirements for the Local Stakeholder Consultation process.

Relevant stakeholders were identified based on Section 2.6 of the GS Toolkit v.2.2. Information on such section of the Toolkit was used to guarantee all categories of stakeholders were included in the list of relevant stakeholders. Representatives of local people were identified with the help of the ceramic owner, since he has reasonable interaction with the local community. The local language (Portuguese) was used in all invitations to local stakeholders. The ceramic owner has arranged for a bus to transport workers and their family members to attend the presentation. Most of these families live in the surroundings of the project site, so their relation to the project is very intimate.

No negative comments were received and during the physical meeting no indicators were scored negatively. Stakeholders were of the opinion that the monitoring of sustainability indicators is well designed and no specific suggestions for improvement were received.

Letters were sent on 30/10/2012 to relevant stakeholders (the same stakeholders invited for the physical meetings) describing how the consultations process was developed. A summary of the stakeholder comments received and how they were assessed was also described on such letters. A full report on the consultation process, with more information regarding the Stakeholder Feedback Round was made available to the validation team. The most recent version of the PDD and Local Stakeholder Consultation Report were made publicly available at the Sustainable Carbon website[82].

D.2. Summary of the comments received:

The project has received several comments during the physical meeting developed as part of the Stakeholder Feedback Round. No negative comments were received, nor comments requesting any changes to the project design. Detailed information on the comments received during the Stakeholder Feedback Round was made available to the validation team (as part of the Local Stakeholder Consultation Report, used to describe the Stakeholder Consultation Process).

D.3. Report on how due account was taken of any comments received and on measures taken to address concerns raised:

No negative comments were received on the Project activity. Some comments were raised regarding the need to announce both the project activity and the consultation meeting with more emphasis.

The sustainable development assessment is not going to be revised since the majority of comments from stakeholders were very positive. No negative comments were received and during the summarized blind exercise no indicators were scored negatively.

Stakeholders were of the opinion that the project generates benefits on biodiversity and ecosystem conservation, as it prevents deforestation to obtain fuel wood. However, Project Participants will not consider a positive impact on the biodiversity indicator since the actual conservation of ecosystems depends on several factors not controlled by the project.

[82] Available at: http://www.sustainablecarbon.com/Conhecimento/.

Stakeholders were of the opinion that the monitoring of sustainability indicators is well designed and no specific suggestions for improvement were received. Given the exposed, project proponents are of the view that no changes to the sustainable development assessment are needed.

Following the meeting, letters were sent to relevant stakeholders (the same stakeholders invited for the physical meeting) describing how the consultations process was developed. A summary of the stakeholder comments received and how they were assessed was also described on such letters. In this same letter, stakeholders were informed on how to make additional comments on the project and on how to obtain the current version of the project PDD and ANNEX-AQ.

D.4. Report on the Continuous input / grievance mechanism:

Discuss the Continuous input / grievance mechanism expression method and details, as discussed with local stakeholders.

Sustainable Carbon has explained the concepts of continuous input/grievance mechanism to stakeholders during the consultation meeting. Such explanation was followed by detailing the suggested methods proposed for the project (process book, telephone access and internet/email access). Stakeholders made few comments and did not require the use of a Nominated Independent Mediator. Hence, this additional method will not be used.

	Method Chosen	**Justification**
Continuous Input / Grievance Expression Process Book	The Expression process book was adopted a few days after the consultation meetings. It is located in the Reception desk of *Balsas* Ceramic.	The reception desk was chosen as the most appropriate place, since any person entering the ceramic company should first go to the reception. Placing the book outside the ceramic company was not considered feasible, since the ceramic factory is in an unpopulated area distant from the urban area. The only residences nearby, belonging to the ceramic factory employees, who have unrestricted access to the reception.
Telephone access	Sustainable Carbon telephone was defined as the telephone access. Contact numbers were provided during the consultation meeting and in the invitations.	Sustainable Carbon is the party responsible for the communication with stakeholders.
Internet/email access	Sustainable Carbon e-mails and website were defined as the point of contact. Contact details were provided during the consultation meeting and in the invitations.	Sustainable Carbon is the party responsible for the communication with stakeholders.

Nominated Independent Mediator (optional)	This method is not to be used.	Sustainable Carbon and *Balsas* Ceramic consider it is not feasible to opt for the nominated independent mediator. Stakeholders consider this choice is also not required.

All issues identified during the crediting period through any of the Methods shall have a mitigation measure in place that should be added to the monitoring plan.

D.5. Report on stakeholder consultation feedback round:

As stated in Section A.3., this project is applying under the retroactive project cycle. The Stakeholder Feedback Round was developed following Gold Standard recommendations for the Local Stakeholder Consultation Process. This means the physical meetings and further steps described in previous sections of these documents were part of the Stakeholder Feedback Round.

Letters were sent on 30/10/2012 to relevant stakeholders (the same stakeholders invited for the physical meetings) describing how the consultations process was developed.

A summary of the stakeholder comments received and how they were assessed was also described on such letters. In this same letter, stakeholders were informed on how to make additional comments on the project and on how to obtain the current version of the project PDD, ANNEX-AQ and Local Stakeholders Consultation Report. These documents were made available on Sustainable Carbon website (http://www.sustainablecarbon.com/Conhecimento/).

Annex 1

CONTACT INFORMATION ON PARTICIPANTS IN THE PROJECT ACTIVITY

Organization:	Sustainable Carbon Projetos Ambientais Ltda
Street/P.O.Box:	Rua Doutor Bacelar, 368 Conjunto 73
Building:	-
City:	São Paulo
State/Region:	São Paulo
Postfix/ZIP:	CEP: 04026-001
Country:	Brazil
Telephone:	+ 55 11 2649-0036
FAX:	+55 11 2649-0042
E-Mail:	info@sustainablecarbon.com
URL:	www.sustainablecarbon.com
Represented by:	Mr. Stefano Merlin
Title:	CEO
Salutation:	Mr.
Last Name:	Merlin
Middle Name:	-
First Name:	Stefano
Department:	-
Mobile:	Not available
Direct FAX:	+55 11 2649-0042
Direct tel:	+ 55 11 2649-0036
Personal E-Mail:	smerlin@sustainablecarbon.com

Organization:	Cerâmica *Balsas* Ltda
Street/P.O.Box:	Rodovia BR 230, km 09 – Rodovia *Balsas*/Riachão, SN, Zona Rural.
Building:	Not applicable.
City:	*Balsas*
State/Region:	Maranhão
Postfix/ZIP:	CEP 65800-000
Country:	Brazil
Telephone:	+55 (99) 3541-9668
FAX:	Not Available
E-Mail:	ceramica*Balsas*@gmail.com
URL:	Not Available
Represented by:	José Thyrson Ladeira da Paz
Title:	Director
Salutation:	Mr.
Last Name:	da Paz
Middle Name:	Ladeira
First Name:	José Thyrson
Department:	General Management
Mobile:	Not available
Direct FAX:	Not available
Direct tel:	Not available
Personal E-Mail:	Not available

Annex 2 - **Information regarding Public Funding**

There is no public funding involved in this project activity. The project does not receive Official Development Assistance.

Annex 3 – **Baseline Information**

Consumption of woody biomass:

Year	Month	Native Firewood (non-renewable biomass) used [m³]	Total of non-renewable biomass [t]
2008	**January**	938.00	534.86
	February	957.92	546.22
	March	202.93	115.71
	April	326.60	186.23
	May	751.12	428.30
	June	1,008.12	574.84
	July	1,086.96	619.80
	August	1,135.10	647.25
	September	1,059.78	604.30
	October	1,028.04	586.20
	November	792.36	451.81
	December	360.05	205.31
	Total	**9,646.98**	**5,500.83**
	Average	**803.92**	**458.40**

Baseline production:

Baseline historical data		
Year	**Month**	**Production [thousands]**
2008	**January**	851
	February	922
	March	870
	April	1,002
	May	935
	June	1,045
	July	967
	August	958
	September	940
	October	994
	November	1,028
	December	1,003
	Total	**11,516**
	Average	**959.664**

Annex 4 – **Monitoring Information**

Monitoring information is available on Section B.7.