Programme of activities design document form
(Version 09.0)

BASIC INFORMATION	
Title of the PoA	Fuel switching, energy efficiency and renewable energy in ceramic industries
Version number of the PoA-DD	06
Completion date of the PoA-DD	18/11/2020
Coordinating/managing entity	Clean Sistemas de Automação Industrial EIRELI.
Host Parties	Brazil
Applied methodologies and standardized baselines	AMS.III.Z – Fuel switching, process improvement and energy efficiency in brick manufacture – Version 06.0
Sectoral scopes	Sectoral scopes: 01 – Energy industries (renewable/non-renewable sources); 04 - Manufacturing industries

PART I. Programme of activities (PoA)

SECTION A. Description of PoA

A.1. Purpose and general description of PoA

The objective of this Programme of Activities (PoA) is to contribute to environmental, social and economic sustainability by promoting the adoption of improved and cleaner technologies and fuel switching from non-renewable biomass to renewable biomass in brick-ceramic industries in Brazil.

The purpose of this PoA is to permanently avoid the use of non-renewable native firewood through the fuel switching to biomass residues, which are renewable according to CDM definitions on renewable biomass[1]. Thus, this PoA will contribute to reduce the land clearing of native forests where firewood is sourced, also providing useful destination to agro-industrial and urban biomass residues that currently do not find safe and proper means of disposal.

This PoA was elaborated by Clean Sistemas de Automação Industrial EIRELI, which has developed kilns for renewable biomass utilization in brick ceramic industries. It follows the methodology AMS.III.Z – *Fuel switching, process improvement and energy efficiency in brick manufacture – Version 06.0.*

The PoA will include activities that promote fuel switching in brick ceramic industries that use non-renewable biomass in the baseline and will use renewable biomass, to reduce greenhouse gases (GHG) emissions for brick manufacturing, replacing traditional kilns by the innovative kiln developed by Clean. These kilns will also provide additional benefits to the ceramic industries, such as higher productivity, better product quality, lower emissions of air pollutants, and better work conditions for their labor force; besides generating carbon credits and reducing other environmental impacts related to non-renewable biomass consumption. Furthermore, all kilns used under the PoA will not allow the utilization of firewood; on the other hand, they have been designed for the utilization of only biomass residues, as described in Section A.3 below.

The Component Project Activities (CPAs) that will be included in this PoA may be implemented in the North, Northeast and Central West regions of Brazil, specifically in the Amazon, Caatinga and Cerrado biomes.

The PoA seeks to foster the implementation of fuel switching to renewable residual biomass alternatives, thus helping to achieve Brazilian voluntary climate change mitigation goals. It will also contribute to the sustainable development of regional economies by using biomass residues as a valuable clean fuel, so improving the livelihoods and the quality of life of local communities.

The Coordinating and Managing Entity (CME) – Clean Sistemas de Automação Industrial EIRELI. (hereafter, Clean Sistemas) – will promote the program and coordinate the efforts to develop, implement and operate the PoA. Clean Sistemas will conduct the inclusion of CPAs in the PoA, provided that they comply with eligibility criteria, all applicable CDM requirements and methodology, and national legislation. Further details are described in Section B below.

The organizational structure of the programme is described below:

[1] CDM EB 23, Annex 18 – Definition of Renewable Biomass. Available at: <https://cdm.unfccc.int/EB/023/eb23_repan18.pdf>.

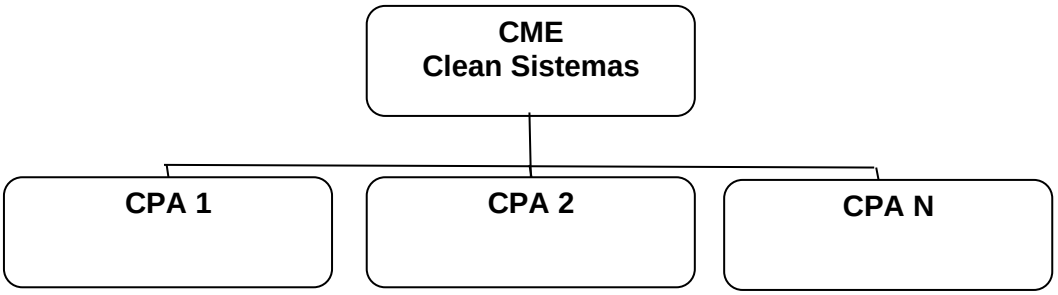


Figure 1. Organizational structure of the PoA for Clean Sistemas

Prior to the submission of the request for registration at the CDM Executive Board, the project participants and the CME will obtain the Letter of Approval from the Designated National Authority (DNA)[2] of Brazil, which will confirm its voluntary participation and that the activity assists in achieving sustainable development and therefore, is in compliance with the required procedure.

The proposed PoA will contribute to the sustainable development of Brazil by:

- Using clean and efficient technologies based on renewable, low carbon intensity biomass as fuel. Therefore, the project agrees to Agenda 21 Sustainable Development Criteria and Sustainable Development Goals;
- Pioneering the deployment of new technologies, switching non-renewable fuels to residual biomass, and granting an efficient recovery of its energy content;
- Switching non-renewable biomass, to achieve GHG emission reductions and to improve local environment by establishing proper treatment and final disposition of organic residues;
- Generating new sources of income by the collection, processing and handling of residues.

The project contributes to the following UN Sustainable Development Goals (SDG)

- SDG 7: Affordable and Clean Energy;
- SDG 8: Decent Work and Economic Growth;
- SDG 13: Climate Action.

A.2. Physical/geographical boundary of PoA

All CPAs to be included in the PoA will be implemented within Brazil's geographical boundary. It is important to note that the south and southeast regions of Brazil have been using renewable biomass as fuel for several years. Therefore, this PoA will be applied in the north, northeast and central west regions of Brazil, specifically in the Amazon, Caatinga and Cerrado biomes.

[2] The Designated National Authority (DNA) of Brazil is the General Coordination of Climate Science and Sustainability). Available at <http://antigo.mctic.gov.br/mctic/opencms/ciencia/SEPED/clima/index.html>. Last visit on 05/11/2020.

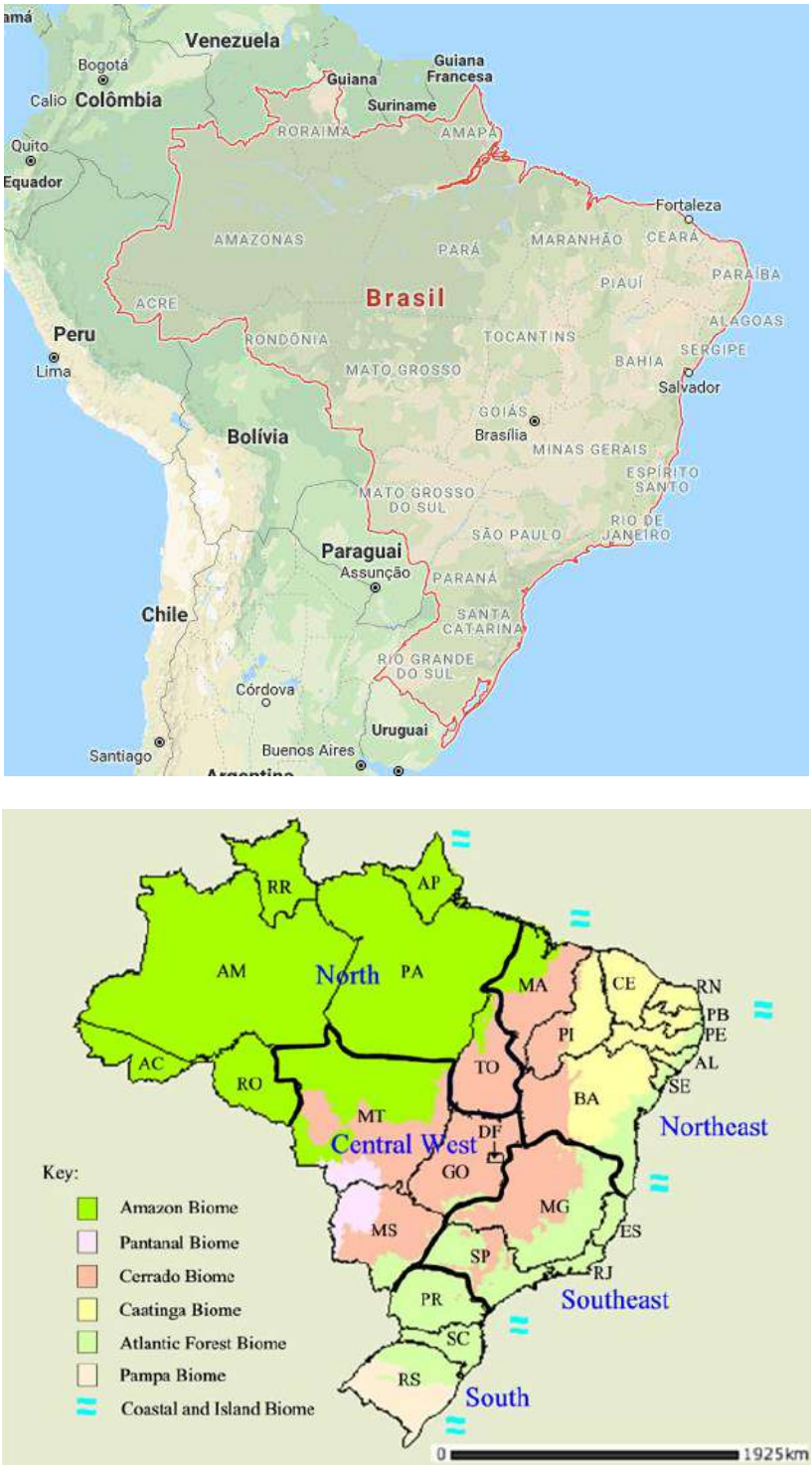


Figure 2. Regions and Biomes of Brazil

A.3. Technologies/measures

The proposed PoA falls in Type III, Scope 1: Energy industries (renewable / non-renewable sources) and Scope 4: Manufacturing Industries.

This PoA focusses on brick industries throughout Brazil, having as its project activity the switching from non-renewable biomass to renewable residual biomass through the implementation of the Clean Kiln.

In order to participate in this PoA, each CPA shall comply with all applicable national legislation for ceramic brick manufacturing.

The technology to be deployed in this PoA will use the Clean mobile kiln, which is a high performance and extremely efficient kiln for ceramic industries. It is of metallic construction, with steel modules internally lined with high technology ceramic fiber thermal blankets. This allows for uniform burning, yielding products of consistently high quality with very little losses, less than 2%, in short burning cycles. The Clean burning system features an automated, programmable smart system managed by PLC (Programmed Logic Controller), that receives signals from temperature sensors distributed along the equipment, and adjusts fuel and air injection to the burners. Process data are displayed through a Man-Machine Interface (MMI), in an easy to read screen showing temperature, pressure, bricks loaded, burning time, fuel used, fuel consumption per tonne of bricks burned, consumed electricity, among other parameters.

It is also possible to manage the kiln manually, or with pre-defined burning programs that the operator follows.

The equipment has local and remote access. The Local Access is available to monitor the kiln operation through a computer installed at the factory's office, that receives information from the MMI via cable. The Remote Access is remotely available, through the Internet, to the CME central, as demonstrated below.

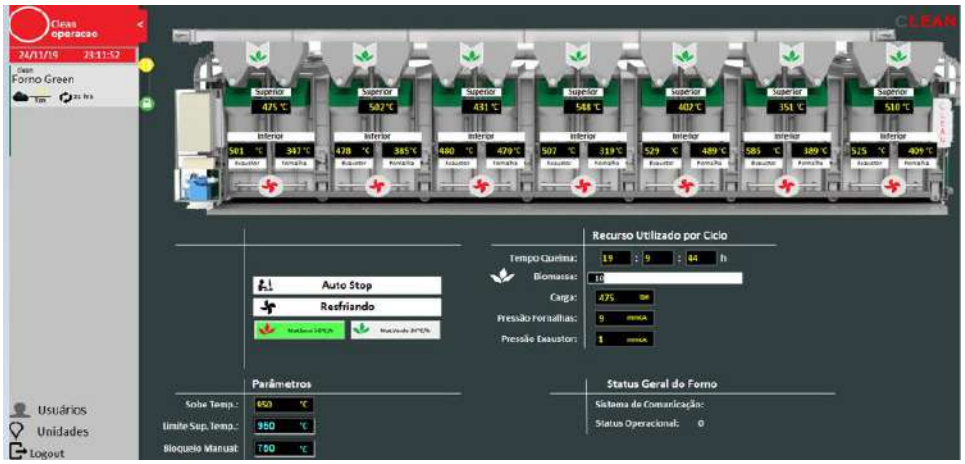


Figure 3 – Initial screen of the system

All the burning cycles data of each Clean kiln are stored in the cloud and can be accessed any time by the system. The stored information can be shown as graphics or tables. The data also can be downloaded from the system. The figures 4 and 5 below demonstrate the stored data and burning cycles generated by the system.

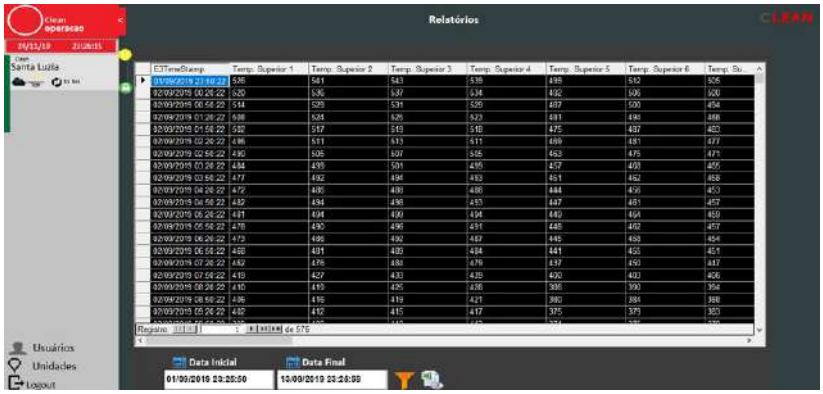


Figure 4 – Stored Data Table

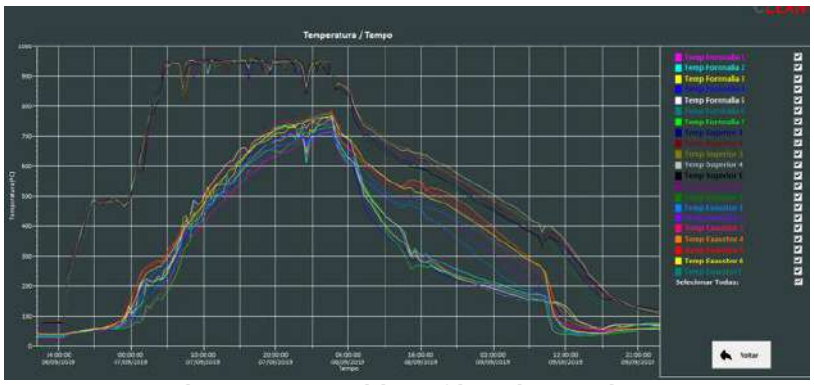


Figure 5 – Graphics of burning cycles

The whole system is governed by a mechatronic intelligence that can adjust the burning mode, temperature, air and gas flows, enabling to produce the best finished product in a short time, with high efficiency.

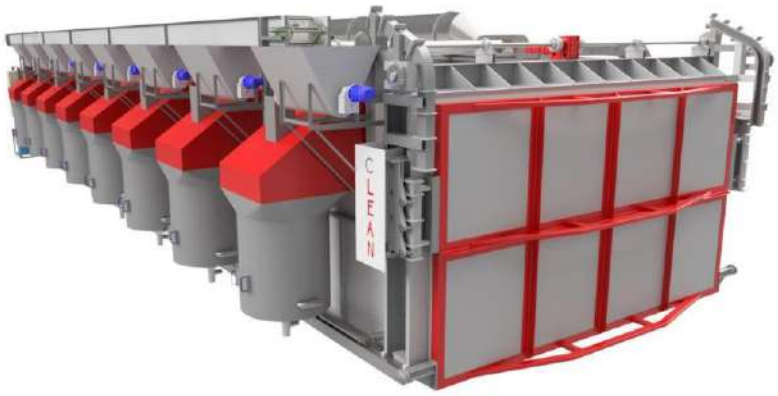


Figure 6 – Clean Kiln

Figure 7 – Clean Kiln

The production of bricks includes mixing clay and other components to form blocks of specific properties and dimensions by molding. The raw bricks are dried and loaded into kilns for burning. After cooling, they are unloaded and stored.

This emission reduction project will not involve modifications to the basic production processes of clay preparation, molding and drying. Its scope will be limited to allowing the use of renewable, residual biomass instead of non-renewable firewood in the burning phase.

Furthermore, the following technologies will also be installed together with the Clean Kiln.

- Rotating sieve for biomass selection by granulometry (5 cm²);

- Automatic furnace feeding system (conveyor belts and mechanical burners), which releases biomass according to the kiln´s internal temperature, measured by thermocouples;

- Cylindrical furnaces that allow greater burning efficiency and reaching high temperatures;

- Air injection system for combustion of biomass, according to the kiln´s internal temperature, measured by thermocouples.

The figures below show the technologies described above:

Figure 8 - Clean Kiln´s Rotating sieve

Figure 9 - Clean Kiln´s furnace

Figure 10 - Air injection system for combustion of biomass

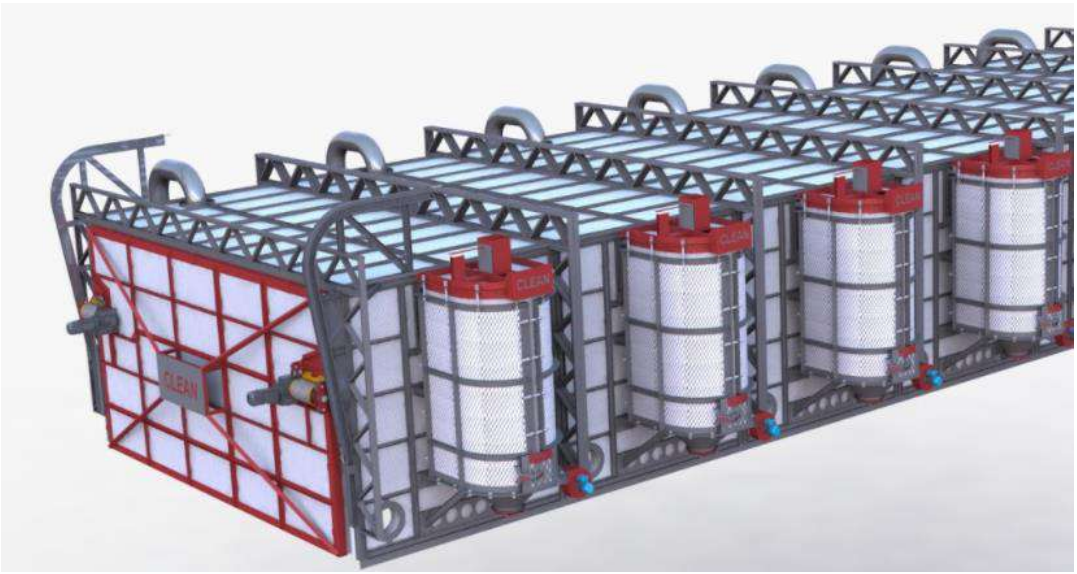


Figure 11 - Clean Kiln with the technologies

Furthermore, the Clean kiln can work only if granular, dried and clean biomass is constantly supplied to the conveying / metering / feeding system to be burnt in the furnaces. The fuel feeding rate is volumetrically controlled by the PLC to ensure that a proper air / fuel mixture is kept and that the temperature of inlet gases is within the limits set by the burning schedule, within values that change from hour to hour. This operation imposes a careful control of the fuel flow and fuel quality: thus, the particle size, moisture content, calorific value, ash content, and other properties must be kept within certain limits. Only granular biomass, such as sawdust, hulls and shells of dry fruits, husks of seeds, shredded lignocelullosic material, and other biomass residues can be handled by the feeding system of the Clean kiln, provided they are kept within certain moisture content and size limits.

In addition to the Clean features described above, this PoA will ensure the use of renewable biomass through the application of a chain of custody monitoring method in order to guarantee that the CPA uses only residual and renewable biomasses. This procedure is further detailed below.

When the kiln is assembled, the Clean consultants adjust the system to the ceramic industry reality. The burning cycle is determined considering the biomass characteristics, such as the particle size, moisture content, calorific value, ash content, and other properties and the Consultant will generate a pattern for the cycles. Any changes in these parameters will affect the burning cycle and will likely reduce the kiln's efficiency and/or the quality of kilns produced. The burning cycle control system

ensures that the kiln is operating within the parameters defined for each kiln when the Clean consultants start the kiln in the ceramic industry.

The technologies/measures that will be implemented in this PoA are national, and therefore, no technology transfer to the host country will be carried out. In addition, suitable training will be conducted for the CPA Implementers and their employees/technicians to make sure that all CPAs are correctly and efficiently implemented.

It is important to note that the Clean kiln will replace the traditional kilns existing in the brick ceramic industry in the baseline scenario. Thus, the deactivation of these baseline equipment and the application of the chain of custody in this PoA will avoid the possibility of using firewood and therefore, ensure the generation of GHG emission reductions due to fuel switching.

In case of using wood residues from firewood, such as sawdust or wood chips, the biomass shall be tracked until its origin to guarantee its renewable source according to CDM definitions. The tracking until its origin will be identified by invoice or equivalent documents, which specify the type, volume, weight, place of origin, date and kind of transportation. The ceramic industry shall record and provide the information immediately to CLEAN through the monitoring system.

These conditions aggregated with a continuous monitoring system of the information flow and verification of the documents of origin of the biomass by the CME are necessary steps of the chain of custody and guarantee that the CPA uses only residual and renewable biomasses. This system will include the following steps:

1. Registration of legalized renewable biomass suppliers;

2. Acquisition of renewable biomass from registered sources, provided through invoices and tracked until its origin;

3. Control of specific energy consumption during the burning process;

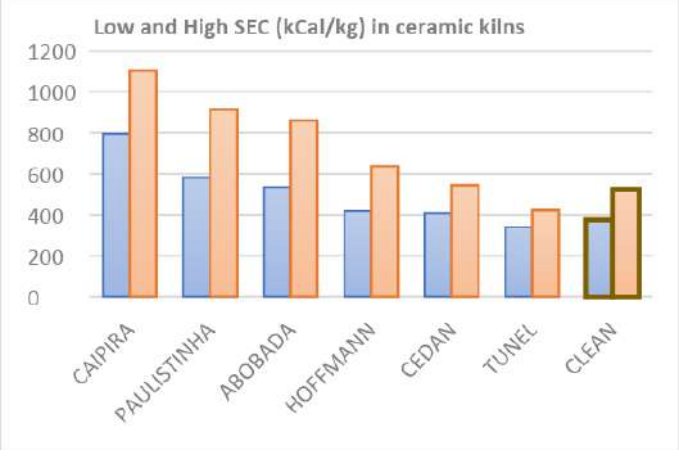
4. Data of monthly verification between biomass consumption, energy consumption, and ceramic production.

According to the technologies described above in this Section and the steps of the chain of custody, this PoA ensures the origin of renewable biomass.

In addition, the Clean kiln presents one of the lowest specific energy consumptions (SEC) among the most utilized ceramic brick kiln types in Brazil. From all the ceramic brick kilns utilized in Brazil, around 70% are of Paulistinha, Abóboda and Capira types, which are the most inefficient and low technology kilns, and 28% of Hoffmann kiln type[3]. Thus, the Clean kiln is more efficient than 98% of the kilns utilized in Brazil, which means that less energy is necessary to produce the same amount of bricks. The Figure below shows a comparison of the SEC in Brazilian kilns.

Specific Energy Consumption (SEC) (kCal/kg) in Brasil

KILN TYPE	Low	High
CAIPIRA	795	1104
PAULISTINHA	583	914
ABOBADA	536	860
HOFFMANN	418	637
CEDAN	409	545
TUNEL	341	422
CLEAN	375	575



[3] *AGÊNCIA BRASILEIRA* DE *DESENVOLVIMENTO INDUSTRIAL* – ABDI. **Estudo técnico setorial da *cerâmica vermelha***. Brasília, *2016.*

Figure 12. Specific consumption of thermal energy per ceramic brick kilns in Brazil Sources: INT (2015)[4]; own data for CLEAN

Therefore, this PoA will include activities that reduce GHG emissions in brick manufacturing industries through the fuel switching from non-renewable biomass to renewable biomass, at the same time that it replaces traditional kilns by the innovative kiln developed by Clean.

According to CDM definitions of renewable biomass[5], a biomass shall be considered "renewable" if one of the following five conditions applies, otherwise, when any of these conditions is not met, biomass is considered "non-renewable":

1. The biomass is originating from land areas that are forests where:

(a) The land area remains a forest; and

(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 croplands and/or grasslands where:

(a) The land area remains cropland and/or grasslands or is reverted to forest; and

(b) Sustainable management practices are undertaken on these land areas to ensure in particular that the level of carbon stocks on these land areas does not systematically decrease over time (carbon stocks may temporarily decrease due to harvesting); and

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

3. The biomass is non-woody biomass and originates from croplands and/or grasslands where:

(a) The land area remains cropland and/or grasslands or is reverted to forest; and

(b) Sustainable management practices are undertaken on these land areas to ensure in particular that the level of carbon stocks on these land areas does not systematically decrease over time (carbon stocks may temporarily decrease due to harvesting); and

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

4. The biomass is a biomass residue and the use of that biomass residue in the project activity does not involve a decrease of carbon pools, in particular dead wood, litter or soil organic carbon, on the land areas where the biomass residues are originating from.

5. The biomass is the non-fossil fraction of an industrial or municipal waste.

Otherwise, where none of these conditions apply, the biomass is considered as “non-renewable”.

According to the aforementioned CDM definitions, the fuel used in the baseline scenario of this PoA - firewood from native forests - could only be renewable if all the conditions in item 1 (biomass originates from land areas that are forests) are applicable.

The firewood used in the baseline scenario complies with the item 1.c) of the CDM definitions described above, because the suppression of native vegetation was authorized by the competent body, according to the national environmental law. However, the use of native firewood does not comply with the provisions of item 1.a) because the land area does not remain a forest; and also does not meet item 1.b), because sustainable management practices are not adopted in these areas to ensure that the level of carbon stocks does not decrease systematically over time - which would be possible if a Sustainable Forest Management Plan be applied in this forested area. Thus, the

[4] M. F. HENRIQUES JUNIOR et al. **Manual de fornos eficientes para indústria de cerâmica vermelha.** Rio de Janeiro: INT / MCTI, 2015. 80 p . ISBN 978-85-99465-09-7

[5] CDM EB 23, Annex 18 – Definition of Renewable Biomass. Available at: <https://cdm.unfccc.int/EB/023/eb23_repan18.pdf>.

suppression of native vegetation inevitably generates the immediate release of carbon stocks to the atmosphere due to irreversible land use change.

The production of residual renewable biomass in priority regions of this PoA is summarized below:

Biomass residues obtained from the processing of vegetal extraction products

The activities of harvesting and extraction of vegetal products generate large volumes of residues, which are suitable as fuel in Clean kiln. Moreover, these biomasses are considered renewable according to the CDM definitions. Depending on the region, the most important sources are:

a. Açaí. Native fruits very abundant on the riversides and floodplains of the Amazon region. These fruits are processed to obtain “wine” and açaí pulp. The pits are discarded as urban waste or thrown into water courses[6]; sometimes recovered as fuel[7] for ceramic kilns and plaster calciners[8]. Spherical, with a diameter of 5 to 8 mm;

b. Babaçu**.** Coconuts collected in native palm areas, which are broken to separate the almonds from the bark (endocarp). The shells can be converted into charcoal or used as fuel. Semi-spherical, with a diameter of around 50 mm;

c. Brazilian nuts. Fruits harvested from native trees whose cutting is prohibited by law. The shells (pericarps) are separated in a primary processing in the forest, and the "barks" are separated during industrial processing. Irregularly with diameter and length up to 30 mm[9].

d. Sawdust. The industrial and/or commercial processing of wood logs generates “sawdust”, which are mainly produced at sawmills. The residue is finely divided, from 0.5 to 2 mm

The assessment of biomass residues outputs was derived from the last available data from IBGE (year of 2017)[10], multiplied by specific values of Factor of Residues Generation (FRG) obtained from scientific references.

The total generation of residues from vegetal extraction in the three priority regions of this PoA (North, Central-West and Northeast of Brazil) is almost 2 million tonnes per year (see Table 01 below) and contains 34 x 10^9 J[11]. Considering a specific consumption of 0.5 kCal/g or 2 J/g in the most efficient ceramic brick kilns[12], these residues can sustain a production of 17 million tonnes of

[6] G.K ALENCAR MENEZES et al. **Gestao dos residuos de caroços de açai como instrumento de desenvolvimento local: o caso do municipio de Ananindeua – PA.** IX Congresso Brasileiro de Gestao, 2018

[7] SANTOS ET AL., 2018. **Descarte e aproveitamento dos caroços de açaí das batederiras do Municipio de Laranjal do Jari – AP: uma soluçao possivel**. 1º Congresso Sulamericano de Residuos Solidos e Sustentabilidades, 2018

[8] T. R. CORDEIRO, et al. **Aproveitamento do caroço de açai como fonte de energia termica para as olarias do municipio de Bragança, Pará.**VII Congresso Brasileiro de Gestao Ambiental , 2017.

[9] NASCIMENTO, Vicente Franco et al. **Caracterização de biomassas amazônicas**: ouriço de castanha-do-Brasil, ouriço de sapucaia e caroço do fruto do tucumã: visando sua utilização em processos de termoconversão. 2012.

[10] According to the Brazilian Institute of Geography and Statistics (IBGE).

[11] DIAS et al. **Produçao de briquetes e péletes a partir de resíduos agrícolas, agroindustriais e florestais.** Brasília, DF: **Embrapa Agroenergia**, 2012.

[12] M. F. HENRIQUES JUNIOR et al. **Manual de eficiência energética na indústria de cerâmica vermelha.** Rio de Janeiro: INT / MCTI, 2015. 24 p. ISBN 978-85-99465-07-3

ceramic bricks, which is equivalent to 8 billion bricks per year. Since a Clean kiln can produce 14 million bricks a year, these residues would be enough to supply 570 Clean kilns.

Table 01. Biomass residues originated from the processing of vegetal products, in tonnes, year 2017

	Açaí pits	Babaçu shells	Brazilian nuts shells	Sawdust	TOTAL
FRG	0.80 [13]	0.93 [14]	0.70 [5]	0.09 [15]	
Total – 3 regions	**359,858**	**57,295**	**21,705**	**1,526,670**	**1,965,528**
North	354,526	**2,034**	15,714	1,064,070	1,436,344
Central-West	6	**48**	3,238	61,020	64,312
Northeast	5,326	**55,213**	2,753	401,580	464,872
Acre	2,851	-	2,463	7,020	12,334
Amapá	15,250	1	958	23,490	39,699
Amazonas	17,213	4	7,637	127,890	152,744
Pará	317,660	841	3,346	213,480	535,327
Rondônia	1,276	18	1,065	8,460	10,819
Roraima	269	-	243	21,240	21,752
Tocantins	7	1,170	1	26,820	27,998
Goiás	-	-	-	18,000	18,000
Mato Grosso	6	48	3,238	8,280	11,572
Mato Grosso do Sul	-	-	-	7,920	7,920
Alagoas	-	-	-	7,920	7,920
Bahia	-	77	260	181,440	181,777
Ceará	-	1,033	1,523	388,350	390,906
Maranhão	5,326	48,899	863	95,310	150,398
Paraíba	-	-	-	197,550	197,550
Pernambuco	-	-	-	52,830	52,830
Piauí	-	5,204	108	125,190	130,502
Rio Grande do Norte	-	-	-	15,030	15,030
Sergipe	-	-	-	450	450

Biomass residues obtained from the processing of agriculture products

The processing of agricultural products or agricultural crops is an important source of waste. Among these, two groups stand out: permanent crops and temporary crops.

In permanent crops, the total availability of residues in the regions of greatest interest for this PoA were estimated according to Table 02, with production data from the Brazilian Institute of Geography and Statistics (IBGE), year 2017 – last available data. The most important waste residues are:

a. Cashew. Cashew fruits are processed for extracting the almond, leaving the husks as residues. It has high calorific value and size from 3 to 15 mm[16];

b. Coconuts. The fruits of giant coconut trees are peeled to separate the coconut nuts. The mesocarp and epicarp are located in the middle of the fruit; a part is used to obtain fibers and

[13] SANTOS ET AL., 2018. **Descarte e aproveitamento dos caroços de açaí das batederiras do Municipio de Laranjal do Jari – AP: uma soluçao possivel**. 1º Congresso Sulamericano de Residuos Solidos e Sustentabilidades, 2018

[14] JOSÉ MANUEL CABRAL DE SOUSA DIAS ... [et al.]. **Produçao de briquetes e péletes a partir de resíduos agrícolas, agroindustriais e florestais.** Brasília, DF: **Embrapa Agroenergia**, 2012

[15] According to experts on biomass residues from Associação Plantas do Nordeste (APNE), Mr. Riegelhaupt and Mr. Pareyn, May 2020.

[16] TAVARES, P. T. **Caracterizações física e química de resíduos sólidos da cajucultura e avaliação do potencial energético em processos de conversão térmica**. João Pessoa, 2016

powder. Dried, the husk has up to 200 mm in length and should be chopped to be used in Clean type kilns[17];

c. Coffee. After drying, the coffee fruits are processed to obtain the seed, generating husks as waste. These are particles of a few mm in length, and very low moisture content[18].

Table 02. Production of residues in the processing of permanent crops, in tonnes - Year 2017[19]

	Açaí pits[20]	Cashew husks	Coconut husks	Coffee husks	TOTAL
FRG[21]	0.8	0.18	0.25	1.00	
Central-West	26	-	1,550	16,855	18,431
Northeast	819	9,108	155,686	117,667	283,280
North	26,214	95	32,903	36,778	95,990
Total – 3 regions	**27,060**	**9,203**	**190,139**	**171,301**	**397,703**

Meanwhile, regarding temporary crops, the Table below presents data on rice husk production, according to IBGE[22]. This residue is very dry, with a size of 1 to 3 mm. Due to its high ash content, it tends to generate some difficulties in the burning of ceramic bricks, however it can be mixed with other residues.

Table 03. Production of rice husk, year 2017

	Rice with husk	Rice husk
Central-West	595,278	130,961
Northeast	255,290	56,164
North	743,767	163,629
Total	**11,056,710**	**350,754**

Sources: IBGE (2017), factor of residues generation of 0.22 according to EMBRAPA[23]

Therefore, it is estimated an annual production of around 750 thousand tonnes of biomass residues from permanent and temporary crops, which corresponds to 11 x 10^9 J[24], which could provide thermal energy to produce 5 billion ceramic bricks per year, equivalent to the production capacity of 210 Clean kilns.

[17] EMBRAPA. **Aproveitamento de cascas de coco para geração de energia**: potencialidades e desafios. 2019.

[18] SILVA, J. P. **Caracterização da casca de café (Coffea arábica, L) in natura, e de seus produtos obtidos pelo processo de pirólise**. UNICAMP Campinas, SP: [s.n.], 2012.

[19] According to the Brazilian Institute of Geography and Statistics (IBGE).

[20] Corresponds to harvest of açai permanent plantations in “terra firme”.

[21] According to experts on biomass residues from Associação Plantas do Nordeste (APNE), Mr. Riegelhaupt and Mr. Pareyn, May 2020.

[22] According to the Brazilian Institute of Geography and Statistics (IBGE).

[23] JOSÉ MANUEL CABRAL DE SOUSA DIAS ... [et al.]. **Produçao de briquetes e péletes a partir de resíduos agrícolas, agroindustriais e florestais.** Brasília, DF: **Embrapa Agroenergia**, 2012.

[24] DIAS et al. **Produçao de briquetes e péletes a partir de resíduos agrícolas, agroindustriais e florestais.** Brasília, DF: **Embrapa Agroenergia**, 2012.

A.4. Coordinating/managing entity

Clean Sistemas de Automação Industrial EIRELI. is the coordinating/managing entity (CME) of this PoA.

A.5. Parties and project participants

Parties involved	Project participants	Indicate if the Party involved wishes to be considered as project participant (Yes/No)
Brazil (host)	Clean Sistemas de Automação Industrial EIRELI	No

A.6. Public funding of PoA

Not applicable. No public funding is made available to finance the PoA.

SECTION B. Management system

In accordance with the specific requirements identified in the Standard: "CDM project standard for programmes of activities" (version 02.0)[25], the management of the PoA is described as follows:

Definition of roles and responsibilities

A specific PoA team will be appointed by the CME (Clean Sistemas). The team will be responsible to ensure the CPAs are correctly assessed including satisfying the eligibility criteria requirements.

The team involved in the process of inclusion of CPAs will be composed of:

- Field agent: responsible for identifying new CPAs in the field;
- Technical Coordinator: responsible for analysing the eligibility criteria for inclusion of each CPA in the PoA;
- Technical Analyst: responsible for collecting data of each CPA and for developing CPA-DDs and Monitoring Reports;
- CEO of Clean Sistemas: responsible for analysing the legal status of each CPA and signing contracts for project development.

The team may perform the assessment or outsource the requirement to a third party as long as the responsible entity meets the following requirements:

- Working knowledge of AMS.III.Z – Fuel switching, process improvement and energy efficiency in brick manufacture – Version 06.0;
- Understanding of the PoA management system;
- Basic understanding of CDM gained either through prior experience or relevant training.

Records of arrangements for training and capacity development for personnel

The staff directly involved in the PoA development will receive appropriate training by the CME. All data and records of staff development activities will be stored under the CME's control.

Procedures for technical review of inclusion of CPAs

The technical review of the CPAs' inclusion will be conducted by the Technical Coordinator. Furthermore, each CPA-DD will be reviewed by a CME responsible aside from the document's

[25] Available at: < https://cdm.unfccc.int/Reference/Standards/index.html >. Last visit on 27/11/2019.

author, which may include another designated employee by the CME, or a competent third party to check that the information contained in the CPA is credible, accurate and consistent.

The aim of technical review is to ensure that the CPA meets all requirements and eligibility criteria as defined in the PoA-DD.

The technical reviewer will use the following tools to implement the review:

- Documentary evidence that the candidate plant complies with all applicable environmental regulations, that the CPA is legally registered, and its operations are duly licensed.
- Evidence of the deactivation of the previous kilns, in order to ensure that no firewood will be used for brick manufacturing after the new kiln starts its operation. In case of using wood residues from firewood, such as sawdust or wood chips, the biomass shall be tracked until its origin to guarantee its renewable source according to CDM definitions.
- A specific study or literature on the availability of residues that ensures continuous supply of the amounts and qualities of biomass needed, in order to guarantee a stable and regular operation of the Clean kiln.
- An on-site study verifying that the fuelwood used in the plant during the three years prior to the project starting date was non-renewable
- Applicable CDM standards and guidelines related to PoAs;
- Eligibility and applicability conditions of the applied methodology;
- Generic CPA included in the PoA-DD;
- Previously approved CPA-DDs.

Procedure to avoid double counting (e.g. to avoid the case of including a new CPA that has already been registered either as a CDM project activity or as a CPA of another PoA)

Before a new CPA is included in the PoA, an analysis will be made at the UNFCCC project/programme database to verify whether the project activity is not part of any:

- Standalone CDM project activity;
- Bundled CDM project activity;
- Another registered PoA.

Therefore, before including a new CPA in this PoA it is necessary to analyse all information about it, such as: name, location, crediting period, equipment details, technical description, relevant environmental licenses, etc. This information will be utilized to check if the CPA is already registered in other GHG emission reduction program.

Records and documentation control process for each CPA under the PoA

The CME will keep copies of the relevant PoA documents. All data and records will be stored for at least two years after the end of the crediting period of that CPA.

Measures for continuous improvements of the PoA management system

The PoA management system will be reviewed periodically in order to:

- Ensure the management system is implemented as designed, i.e. processes and procedures are functioning and being effectively executed;
- Ensure the management system is achieving the expected results;
- Identify areas of recurring problems, corrective actions and improvement actions.

The findings from the review will be used to improve the management system.

Provisions to ensure that those operating the CPA are aware of and have agreed that their activity is being subscribed to the PoA

Clean Sistemas will be in charge for all CDM related issues at CPAs level and will guarantee that the personnel operating the CPAs will be properly informed about the PoA. In addition, Clean

Sistemas will carry out trainings for CPA personnel to ensure their responsibilities are known within the PoA management system.

SECTION C. Demonstration of additionality of PoA

The proposed PoA is a voluntary action coordinated by Clean Sistemas de Automação Industrial EIRELI. The coordinating/managing entity shall demonstrate additionality of the proposed CDM PoA by establishing that in the absence of the PoA, none of the implemented CPAs would occur. It is worth mentioning that there is no law or mandatory requirement in Brazil to conduct fuel switching nor the acquisition of efficient technologies by the brick and tiles industries sector.

National legislation only requires consumers of raw materials from forest origin to use them with a Document of Forest Origin (DOF). Native firewood may have DOF when obtained from areas where the suppression of native vegetation has been authorized or from native forests with an authorized and current forest management plan. In the first case, firewood is not renewable biomass according to the CDM definitions; in the second case, it is renewable.

Through financial revenues from the CDM, each CPA under this CDM PoA will have the opportunity to carry out the fuel switching to renewable biomass, in addition to installing the Clean kiln, which will allow the efficient use of renewable biomass. On the other hand, these benefits would not have occurred without the CDM benefits, as the CPA would remain using native firewood as fuel.

According to CDM project standard for programmes of activities, version 02.0, the CME shall include conditions that would systematically demonstrate additionality of CPAs under the proposed CDM PoA in the eligibility criteria for inclusion of CPAs in the PoA, which is available in Section K below. The CME shall demonstrate that compliance with the additionality-related eligibility criteria set in the PoA-DD will ensure that all the relevant additionality-related guidelines, tools or any requirements embedded in the methodologies are met.

Under this small-scale PoA, the additionality of the CPAs will be conducted through the TOOL21: Demonstration of additionality of small-scale project activities, version 13.0 and will be applied in each CPA.

SECTION D. Start date and duration of PoA

D.1. Start date of PoA

The project start date has been defined as 08/03/2019, the date on which the CME officially notified the secretariat and the Brazil DNA of its intention to seek the CDM status.

D.2. Duration of PoA

PoA duration: 7 years and 0 months counting from its start date, three times renewable, totalizing 28 years and 0 months.

SECTION E. Environmental impacts

E.1. Level at which environmental impacts analysis is undertaken

Environmental impact analysis is performed at PoA level.

E.2. Analysis of environmental impacts

The PoA does not cause any environmental negative impacts since all the biomass to be used as fuel for brick manufacturing is agro-industrial or urban residues, presently unused. The programme of activities will improve the local environmental conditions by establishing proper destination for these residues and will indirectly contribute to the reduction of land use changes, by avoiding the use of non-renewable firewood.

Environmental Laws related to the plant activities

This PoA will only include CPAs that are legally registered and do comply to all applicable environmental regulations, ensuring that their operations are duly licensed.

The Environmental National Policy (Política Nacional do Meio Ambiente – PNMA), instituted by the Brazilian Law 6,938/81, establishes that the construction, installation, extension and operation of any business or activity which may exploit natural resources and are considered potentially pollutant, or capable of degrading the environment, will be eligible only if they obtain a previous environmental license. One of the tools of the PNMA to monitor and study the potential impacts generated by these kinds of enterprises, is the Environmental Impact Assessment (EIA). However, an EIA is not required for the implementation of the present project at CPA level.

Besides that, the CONAMA Resolution nº 237/97 establishes that ceramic companies shall have an operational license as well as a clay extraction license, both emitted by competent municipal, state or federal authority, under a valid time.

In addition, this PoA contributes to the National Solid Waste Policy, law 12.305/20[26] due to the development of environmental and business management systems aimed at improving production process and reusing solid waste through improved renewable biomass technology implementation.

A summary of the environmental impacts is presented below:

Environmental Factor	Environmental Impact	Classification
Air	Lesser atmospheric emissions such as particulate material and black carbon, due to the new renewable biomass technology	Positive
Soil	Soil conservation improved due to avoided land clearing and inadequate waste disposal	Positive
Climate	GHG emission reduction	Positive
Water/ hydric resources	Lesser contamination of surface and underground water bodies by organic residues that were previously disposed and that will be used as fuels by the project activities.	Positive
Energy	Use of residual biomass for renewable thermal energy generation.	Positive
Biodiversity	Biodiversity preservation due to native vegetation conservation by avoided land clearing.	Positive

E.3. Environmental impact assessment

According to the summary of the environmental impacts´ analysis developed above, it was concluded that this PoA does not cause any further negative impacts. As demonstrated in Section E.2 above, all identified environmental factors presented positive impacts.

Furthermore, according to CONAMA Resolution nº 237/97[27], an EIA is not necessary for the implementation of activities that involve the fuel switching for renewable biomasses, neither for activities that involve more efficient technologies in red ceramic industries.

[26] Available at: <http://www.planalto.gov.br/ccivil_03/_ato2007-2010/2010/lei/l12305.htm>

[27] Available at: <http://www2.mma.gov.br/port/conama/res/res97/res23797.html> Last visited on: 17/12/2019

SECTION F. Local stakeholder consultation

F.1. Level at which local stakeholder consultation is undertaken

The local stakeholder consultation was undertaken at PoA level once the CPAs will have similar technologies and, therefore, similar impacts. It is worth mentioning that the stakeholder consultation is in line with the Brazilian DNA requirements to issue the Letter of Approval.

F.2. Modalities for local stakeholder consultation

The Local Stakeholder Consultation started on 01/08/2019, when a letter was sent to stakeholders described in the section below. This letter summarized the PoA measures to be implemented, the PoA location and duration, the contribution to sustainable development and invited stakeholders to provide any comments regarding its development. The PoA-DD and the Annex III document (Contributions for sustainable development) were available on Clean's website for 30 days for consultation and comments, in Portuguese language. The PoA-DD was also available in English language.

The following entities were invited to provide comments on the PoA, according to Resolution nº 9, issued on March 20th, 2009 by the Brazilian Designated National Authority (Interministerial Committee on Climate Change (CIM)):

- States' Government and Distrito Federal Government;
    - Acre State Government
    - Alagoas State Government
    - Amapá State Government
    - Amazonas State Government
    - Bahia State Government
    - Ceará State Government
    - Goiás State Government
    - Minas Gerais State Government
    - Mato Grosso State Government
    - Mato Grosso do Sul State Government
    - Maranhão State Government
    - Pará State Government
    - Pernambuco State Government
    - Roraima State Government
    - Rondônia State Government
    - São Paulo State Government
- Legislative Assemblies and Legislative Chamber;
- Federal Environmental Agency;
    - Environment and Natural Resources Brazilian Institute (Instituto Brasileiro do Meio Ambiente e dos Recursos Naturais – IBAMA)
    - Environment Defense Institute
- States' Environmental Agencies
    - Environment State Secretariat
    - Environment State Administration

- Brazilian NGO Forum and Social Movements for the Environment and Development (Fórum Brasileiro de ONGs e Movimentos Sociais para o Meio Ambiente e Desenvolvimento – FBOMS);
- Environment Foundation (Fundação do Meio Ambiente – FATMA)
- Environment Administration Superintendence (Superintendência de Administração do Meio Ambiente – SUDEMA)
- Enviroment State Superintendence (Superintendência Estadual do Meio Ambiente – SEMACE)
- Relevant national institutions whose work is directly or indirectly related to the proposed Programme of Activities.
    - National association of Ceramic Industries (Associação Nacional de Indústria Cerâmica – ANICER)
- State Prosecutors' offices;
    - Tocantins Prosecutors'
    - Piauí Prosecutors'
- Federal Prosecutor's office.

Furthermore, the CME´s e-mail, telephone and address was available for stakeholders' comments. The Local Stakeholder Consultation (LSC) started on 01/08/2019 and was available for 30 days in the Clean website[28] as requested by CDM. However, this webpage will remain open for comments until the registration process of the PoA on the CDM Executive Board, according to Brazilian DNA requirements.

F.3. Summary of comments received

During the LSC period, just one comment was received. On 02/09/2019, the Environmental Company of São Paulo State (Companhia Ambiental do Estado de São Paulo – CETESB) requested to send the invite to provide comments on the PoA and more information by the CETESB´s system itself and stated that in case of further clarifications, they will contact the CME.

F.4. Consideration of comments received

The CME replied to the Environmental Company of São Paulo State (CETESB) as requested. Afterwards, CETESB finalized the consultation and no other contact has been made. More information about this comment and the finalization of the consultation is available in Appendix 6.

SECTION G. Approval and authorization

The Letter of Approval from the host Party (Brazil) for the Programme of Activities was not available at the time of submitting the PoA-DD to the validating DOE.

[28] Information about Local Stakeholder Consultation (LSC) available at <http://www.c-lean.com/documentos/>.

PART II. Generic component project activity (CPA)

SECTION H. Description of generic CPA

H.1. Title of generic CPA

Fuel switching from non-renewable biomass to renewable biomass in ceramic brick industries through the implementation of renewable biomass technologies.

H.2. Reference number of generic CPA

CPA – 01

H.3. Purpose and general description of generic CPA

The proposed [CPA – 01] is part of the "Fuel Switching, Energy Efficiency and Renewable Energy in Ceramic Industries" PoA, a small-scale project activity included under the Project Type III. The objective of the CPA is to promote a fuel switch from non-renewable biomass to renewable biomass residues in brick ceramic industries, by the installation of a new kiln and related technologies.

This CPA will permanently switch from non-renewable native firewood to regionally available biomass residues, which are renewable according to CDM definitions on renewable biomass[29]. Furthermore, this CPA also replaces traditional kilns by the [describe the renewable biomass technology implemented by the CPA].

These technologies will also provide additional benefits to the brick ceramic industries, such as higher productivity, better product quality, lower emissions of air pollutants, and better working conditions for the labour force; besides generating carbon credits and reducing other environmental impacts related to non-renewable biomass consumption. Furthermore, these technologies do not allow the utilization of firewood; they have been designed for the exclusive utilization of comminuted biomass residues to ensure the purpose of this PoA. It is important to note that the chain of custody procedure will guarantee the renewability of the biomass used by the CPA. In case of using wood residues from firewood, such as sawdust or wood chips, the biomass shall be tracked until its origin to guarantee its renewable source according to CDM definitions.

The project activity is located in [please provide (or list) location details], in the [XXX] biome, Brazil.

This CPA was implemented by [please provide (or list) name(s) of company(ies)].

This CPA complies with the PoA eligibility criteria, with all applicable CDM requirements, with the applied methodology, and with the national legislation for ceramic brick manufacturing industries.

By switching from non-renewable firewood to renewable biomass residues through the installation of new and improved technologies, the [CPA-XXX] reduces the amount of greenhouse gases (GHG) emitted into the atmosphere in about [XXX] tCO_2e annually.

This emission reduction involves the modification of an existing facility for renewable energy generation through renewable biomass sources. All equipment and procedures that are not used for drying and burning ceramic devices (such as molding machinery) are considered to lie within the Project Boundary, i.e., the brick manufacturing plant, as they are within the limits of the factory. However, no emissions sources related to these processes and equipment will be considered, since no modifications will result from the project implementation.

H.4. Technologies/measures

[Please, provide more information about the technology utilized by the CPA].

The [describe the new technology or kiln utilized by the CPA] will burn renewable biomass residues such as: [agro-industrial or urban residues] that in the absence of the project would probably be

[29] CDM EB 23, Annex 18 – Definition of Renewable Biomass. Available at: <https://cdm.unfccc.int/EB/023/eb23_repan18.pdf>.

discarded, dumped or left to decay under anaerobic conditions. The use of residues will avoid the use of non-renewable native firewood, which is the case in the baseline scenario.

The remaining lifetime of the baseline equipment is estimated to be [include lifetime of baseline equipment and more information, if applicable]. The existing baseline equipment have been replaced by the CPA technologies described above. The deactivation of these baseline technologies and the application of the chain of custody avoids any possibility of using firewood and therefore ensures GHG emission reductions due to the fuel switching to renewable biomass.

In case of using wood residues from firewood, such as sawdust or wood chips, the biomass shall be tracked until its origin to guarantee its renewable source according to CDM definitions. The tracking until its origin will be identified by invoice or equivalent documents, which specify the type, volume, weight, place of origin, date and kind of transportation. The ceramic industry shall record and provide the information immediately to CLEAN through the monitoring system.

These conditions aggregated with a continuous monitoring system of the information flow and verification of the documents of origin of the biomass by the CME are necessary steps of the chain of custody and guarantee that the CPA uses only residual and renewable biomasses. This system will include the following steps:

1. Registration of legalized renewable biomass suppliers;

2. Acquisition of renewable biomass from registered sources, provided through invoices and tracked until its origin;

3. Control of specific energy consumption during the burning process;

4. Data of monthly verification between biomass consumption, energy consumption, and ceramic production.

The new technology(ies) implemented by this CPA provide(s) low carbon thermal energy while improving product quality. In fact, the service level of project brick is comparable to or better than the baseline brick. It is important to mention that bricks are the same in the project and baseline cases, i.e., no change in raw materials, use of different additives, and/or production process occurred.

The utilization of the new kiln technology(ies) contributes to improvements of local environmental conditions by reducing emissions of particulate matter and black carbon in the kiln exhaust gases as well as by avoiding inadequate waste and residue disposal. Moreover, this CPA complies with all applicable national legislation for ceramic brick manufacturing.

The Clean kiln works with granular, dried and clean biomass which is constantly supplied to the conveying / metering / feeding system to be burnt in the furnaces. When the kiln is assembled the Clean consultants will adjust the system to the specific plant raw materials and fuels. The burning cycle considers the ceramic industry biomass characteristics, such as the particle size, moisture content, calorific value, and other properties and the Consultant will generate a pattern for the burning cycles when the kiln is commisioned.

The Clean burning system features an automated, programmable smart system managed by PLC (Programmed Logic Controller), that receives signals from temperature sensors distributed along the equipment and adjusts fuel and air injection to the burners. Process data are displayed through a Man-Machine Interface (MMI), in an easy to read screen showing temperature, pressure, bricks loaded, burning time, used fuel, fuel consumption per ton of bricks burned, consumed electricity, among other parameters.

All data of the burning cycles will be stored in the cloud and may be accessed at any time. The stored information can be shown as graphs or tables. The data also can be downloaded from the system.

For the proper operation of the kiln, the ceramic industry will have the support of the CME for the maintenance of the kiln. Any changes in the burning cycle parameters can be verified by CME through the system and CME consultants will be available to contact or visit the ceramic industry to check the kiln and its processes.

The production capacity of the project is [XXX] bricks per year and it will reduce consumption of [XXX] tonnes of non-renewable firewood. [Describe the production capacity of the CPA under the project scenario].

Therefore, aside from reducing GHG emissions, this CPA will contribute to the sustainable development, as it promotes the use of renewable energy sources that are currently discarded as waste.

SECTION I. Application of methodologies and standardized baselines

I.1. References to methodologies and standardized baselines

AMS-III.Z Small-scale Methodology: Fuel Switch, process improvement and energy efficiency in brick manufacture, Version 06.0, valid from 24th July 2015 onwards[30].

AMS-II.G. Small-scale Methodology: Energy efficiency measures in thermal applications of non-renewable biomass, Version 11.0, valid from 28th November 2019 onwards.[31]

TOOL03 Methodological tool: Tool to calculate project or leakage CO2 emissions from fossil fuel combustion - version 03.0[32].

TOOL05 Methodological tool: Baseline, project and/or leakage emissions from electricity consumption and monitoring of electricity generation - version 03.0[33].

TOOL07 Methodological tool: Tool to calculate the emission factor for an electricity system - version 07.0[34].

TOOL15 Methodological tool: Upstream leakage emissions associated with fossil fuel use - version 02.0[35].

TOOL16 Methodological tool: Project and leakage emissions from biomass - version 04.0[36].

[30] This version of the methodology is available at: <https://cdm.unfccc.int/methodologies/DB/VLZZ1DVT1QI3KHZKSM6QECOAKNSCXZ>. Last visit on: January 09th, 2019.

[31] This version of the methodology is available at: <https://cdm.unfccc.int/methodologies/DB/ZI2M2X5P7ZLRGFO37YBVDYOW62UHQP> Last visit on: 02/12/2019

[32] Tool to calculate project or leakage CO2 emissions from fossil fuel combustion. Available at: <https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-03-v3.pdf>. Last visit on January 09th, 2019.

[33] Baseline, project and/or leakage emissions from electricity consumption and monitoring of electricity generation. Available at: <https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-05-v3.0.pdf> Last visit on January 09th, 2019.

[34] Tool to calculate the emission factor for an electricity system. Available at: <https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-07-v7.0.pdf>. Last visit on January 09th, 2019.

[35] Upstream leakage emissions associated with fossil fuel use. Available at: <https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-15-v2.0.pdf>. Last visit on January 09th, 2019.

[36] Project and leakage emissions from biomass. Available at: <https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-16-v4.pdf>. Last visit on January 09th, 2019.

TOOL21 Methodological tool: Demonstration of additionality of small-scale project activities - version 13.0[37].

TOOL22 Methodological tool: Leakage in biomass small-scale project activities – version 04.0[38].

TOOL30 Methodological tool: Calculation of the fraction of non-renewable biomass - version 02.0[39].

[37] Demonstration of additionality of small-scale project activities. Available at: < https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-21-v13.0.pdf > Last visit on 02/12/2019.

[38] Leakage in biomass small-scale project activities. Available at: <https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-22-v1.pdf>. Last visit on 09/01/2019.

[39] Calculation of the fraction of non-renewable biomass. Available at: <https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-30-v2.0.pdf>. Last visit on 09/01/2019.

I.2. Applicability of methodologies and standardized baselines

The approved baseline methodology AMS-III.Z (version 06.0) applies to the proposed CPA, based on its applicability criteria, as follows:

§	AMS-III.Z ver 06.0 Applicability Criteria	Justification of Applicability
1	The measures may replace, modify, retrofit or add capacity to systems in existing facilities or be installed in a new facility.	The measures adopted by [CPA-XXX] modify an existing facility for renewable energy generation and the implementation of technologies. The operation of the baseline kilns will be discontinued.
2	The methodology is applicable for the production of: (a) Bricks that are the same in the project and baseline cases; or (b) Bricks that are different in the project case versus the baseline case due to a change(s) in raw materials, use of different additives, and/or production process changes resulting in reduced use or avoidance of fossil fuels for forming, sintering (firing) or drying or other applications in the facility as long as it can be demonstrated that the service level of the project brick is comparable to that of the baseline brick (see paragraph 11). Examples include pressed mud blocks (soil blocks) with cement or lime stabilization and other 'unburned' bricks that attain strength due to fly ash, lime/cement and gypsum chemistry.	Bricks from the baseline and the project scenarios will be the same after fuel switching from non-renewable biomass to renewable biomass residues, once raw materials will be the same and no additives will be utilized.
3	New facilities (Greenfield projects) and project activities involving capacity additions are only eligible if they comply with the requirements for Greenfield projects and capacity increase projects specified in the "General guidelines for SSC CDM methodologies".	[This project activity is a greenfield project and complies with the requirements for Greenfield projects and capacity increase project specified in the "General guidelines for SSC CDM methodologies"] [This project activity involves capacity additions and complies with the requirements for Greenfield projects and capacity increase projects specified in the "General guidelines for SSC CDM methodologies"] [Not applicable. This project activity does not involve capacity increase]
4	The requirements concerning demonstration of the remaining lifetime of the replaced equipment shall be met as described in the "General guidelines for SSC CDM methodologies". If the remaining lifetime of the affected systems increases due to the project activity, the crediting period shall be limited to the estimated remaining lifetime, i.e. the time when the	The remaining lifetime of the baseline brick kiln(s) was described in the Section H.4 above. Such period is estimated by technical and/or expert reports. [In case the remaining lifetime increases, the crediting period will be limited to the estimated remaining kiln(s) lifetime.]

	affected systems would have been replaced in the absence of the project activity.	[Not applicable] The most conservative remaining lifetime of the equipment was considered, according to the "General guidelines for SSC CDM methodologies".
5	For existing facilities, it shall be demonstrated, with historical data, that for at least three years immediately prior to the start date of the project implementation, only fossil fuels or NRB (non-renewable biomass) were used in the brick production systems that are being modified or retrofitted. In cases where small quantities of renewable biomass were used for experimental purposes this can be excluded.	The exclusive use of NRB, as defined by CDM[40], is demonstrated with historical data as requested by the methodology.
6	The renewable biomass utilized by the component project activity shall not be chemically processed (e.g. esterification to produce biodiesel, degumming and/or neutralization by chemical reagents) prior to the combustion but it may be processed mechanically (e.g. pressing, filtering) and/or thermally (e.g. gasification to produce syngas).	The component project activity does not utilize chemically processed renewable biomass.
7	In cases where the component project activity utilizes charcoal produced from renewable biomass as fuel, the methodology is applicable provided that: (a) Charcoal is produced in kilns equipped with a methane recovery and destruction facility; or (b) If charcoal is produced in kilns not equipped with a methane recovery and destruction facility, methane emissions from the production of charcoal shall be considered. A default value of 0.030 t CH_4/t charcoal may be used in accordance with "AMS-III.BG.: Emission reduction through sustainable charcoal production and consumption"; (c) If charcoal is produced from other CDM project activities, it shall be ensured that no double counting of the emission reductions occurs.	Not applicable, the component project activity does not utilize charcoal.

[40] NRB does not comply with any definition of renewable biomass established by CDM EB 23, Annex 18 – Definition of Renewable Biomass. Available at: <https://cdm.unfccc.int/EB/023/eb23_repan18.pdf>.

8	In the case of project activities involving changes in raw materials (including additives), it shall be demonstrated that additive materials are abundant in the country/region, according to the following procedures: (a) Step 1: using relevant literature and/or interviews with experts, a list of raw materials to be utilized is prepared based on the historic and/or present consumption of such raw materials; (b) Step 2: the current supply situation for each type of raw material to be utilized is assessed and their surplus availability is demonstrated using one of the approaches below: (i) Approach 1: demonstrate that the raw materials to be utilized, in the region of the project activity, are not fully utilized. For this purpose, demonstrate that the quantity of material is at least 25 per cent greater than the demand for such materials or the availability of alternative materials for at least one year prior to the project implementation; (ii) Approach 2: demonstrate that suppliers of the raw materials to be utilized, in the region of the project activity, are not able to sell all of their supply of these materials. For this purpose, project participants shall demonstrate that a representative sample of suppliers of the raw materials to be utilized, in the region, had a surplus of materials (e.g. at the end of the period during which the raw material is sold) that they could not sell and that is not utilized.	The component project activity does not involve any changes in raw materials. If any change in raw materials occurs in the future, the availability of material will be demonstrated following the procedures presented in the methodology.
9	This methodology is applicable under the following conditions: (a) The service level of project brick shall be comparable to or better than the baseline brick, i.e. the bricks produced in the brick production facility during the crediting period shall meet or exceed the performance level of the baseline bricks (in terms of, for example dry compressive strength, wet compressive strength, density). An appropriate national standard shall be used to identify the strength class of the bricks; bricks that have compressive strengths lower than the lowest class bricks in the standard are not eligible under this methodology. Project bricks are tested in nationally approved laboratories at six-	The [CPA-XXX] meets all applicability conditions: (a) The CPA will utilize more efficient technologies, which will provide much better service levels of project bricks than the baseline scenario. In addition, CPA bricks will be tested in nationally approved laboratories at six months intervals in order to analyse, at least, the compressive strength class; (b) [Existing facilities included in the CPA involving modification and/or replacement will not influence the production capacity beyond ±10 per cent of the baseline capacity. However, if this situation occurs, it will be demonstrated that the baseline for the added capacity is the same as that for the existing

	month intervals (at a minimum) and test certificates on compressive strength are made available for verification; (b) The existing facilities involving modification and/or replacement shall not influence the production capacity beyond ±10 per cent of the baseline capacity unless it is demonstrated that the baseline for the added capacity is the same as that for the existing capacity in accordance with paragraph 5 above; (c) Measures are limited to those that result in emission reductions of less than or equal to 60 kt CO_2 equivalent annually	capacity, according to the "General guidelines for SSC CDM methodologies"] (c) The CPA's GHG emission reductions will result in less than 60,000 tCO_2e per year. [The conditions of each brick factory within the CPA will be analysed individually.]
10	This methodology is not applicable if local regulations require the use of the proposed technologies or raw materials for the manufacturing of bricks unless widespread noncompliance (i.e. less than 50 per cent of brick production activities in the country comply) of the local regulation evidenced.	There are no local regulations that require the use of the proposed technologies or raw materials for the manufacturing of bricks. This CPA complies with all applicable national legislation for ceramic brick manufacturing.
11	In cases where the component project activity utilizes biomass sourced from dedicated plantations, applicability conditions prescribed in the tool "Project emissions from cultivation of biomass" shall apply. If the component project activity involves reducing the NRB consumption, project participants shall demonstrate that NRB has been used in the project region since 31 December 1989, using survey methods or referring to published literature, official reports or statistics.	The CPA will not utilize biomass sourced from dedicated plantations. Furthermore, will be demonstrated that non-renewable biomass[41] has been used in the project region since 31 December 1989. Such analysis will be conducted through [survey methods, literature, official reports or statistics.] Moreover according to the item 5 above the CPA shall confirm that the firewood used in the firewood used in the plant during the three years prior to the project starting date was non renewable.
12	The following cases are exempted from 'determining the occurrence of debundling' as per the "Guidelines on assessment of debundling for SSC project activities": (a) Project activities that aggregate brick units with holistic production cycles i.e. from raw material procurement to finished product, where each unit is not larger than 5 per cent of the Type III small-scale CDM component project activity thresholds i.e. 3,000 t CO_2e; or (b) Project activities that aggregate brick units, where each unit qualifies as Type III microscale CDM component project activity and the geographic location of the component project activity is a least	Not applicable, the CPA does not involve debundling.

[41] NRB does not comply with any definition of renewable biomass established by CDM EB 23, Annex 18 – Definition of Renewable Biomass. Available at: <https://cdm.unfccc.int/EB/023/eb23_repan18.pdf>.

	developed countries/small island developing states (LDC)/(SIDS) or special underdeveloped zone (SUZ) of the host country as identified by the government in accordance with the guideline on "Demonstrating additionality of microscale project activities".	

I.3. Application of multiple methodologies

Not applicable.

I.4. Project boundary, sources and greenhouse gases (GHGs)

Source		GHG	Included?	Justification/Explanation
Baseline	Emissions from the combustion of non-renewable biomass	CO_2	Yes	The major source of emissions in the baseline.
		CH_4	No	Excluded for simplification. This is conservative.
		N_2O	No	Excluded for simplification. This is conservative.
		Other	No	Not applicable.
Project activity	Emissions from the combustion of renewable biomass	CO_2	Yes	- Included in case of electricity consumption. - Included in case of fossil fuel consumption.
		CH_4	No	Excluded for simplification. This emission source is assumed to be very small.
		N_2O	No	Excluded for simplification. This emission source is assumed to be very small.
		Other	No	Excluded for simplification. This emission source is assumed to be very small.

I.5. Establishment and description of baseline scenario

As per the approved small-scale methodology AMS-III.Z. (Version 06.0), the baseline scenario involves a brick production process based on the use of non-renewable biomass.

In addition, according to methodology AMS-III.Z. (Version 06.0), the [CPA-1] included in the PoA involves the measure(s) listed below:

a) Installation of a new brick production technology/process;
b) Complete/partial substitution of fossil fuels or non-renewable biomass (NRB) with renewable biomass;

It is assumed that in the absence of the project activity, the baseline scenario would be the use of NRB for meeting similar thermal energy needs.

The use of native firewood in the brick ceramic industry shows negative environmental impacts, when sourced from non-renewable and unsustainable sources[42]. Despite the existence of specific legislation for protection of native vegetation, the use of NRB is still a common practice in Brazil, since authorizations for the suppression of native vegetation -*Autorizações de Supressão de Vegetação Nativa*- are commonly issued for diverse activities that require land use change.

According to the National Technology Institute (INT)[43], which analysed the Northeast region in Brazil, the ceramic industry sector remains highly dependent on firewood, which is defined as a NRB by CDM[44] when it does not originate from sustainably managed forest areas, and from anywhere if land use change occurs as the land does not remain a forest after the suppression of native vegetation. As NRB is the cheapest fuel source available, it has been consolidated as the main energy source of this industry sector.

During the last ten years, firewood was the main source of energy for the Brazilian ceramic industry. Around 50% of the thermal energy used came from firewood, and only 1% from waste.[45].Along this period, natural gas replaced fuel oil, and organic wastes were used as alternative or complementary fuels in some types of kilns -but this practice was not widespread-.

Table 2. Distribution of fuel employed at the ceramic sector in Brazil - 2018 (10^3 tep (toe))[46]

10^3 tep (toe)

FONTES	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	*SOURCES*
GÁS NATURAL	1.007	977	1.141	1.288	1.314	1.354	1.339	1.324	1.325	1.326	*NATURAL GAS*
CARVÃO VAPOR	44	31	30	52	35	39	50	62	37	41	*STEAM COAL*
LENHA	2.122	2.081	2.275	2.387	2.458	2.631	2.657	2.312	2.081	2.081	*FIREWOOD*
OUTRAS RECUPERAÇÕES	53	53	58	61	62	65	66	59	54	55	*OTHER WASTES*
ÓLEO DIESEL	8	8	6	31	28	24	26	24	19	17	*DIESEL OIL*
ÓLEO COMBUSTÍVEL	322	322	295	125	113	125	102	59	48	58	*FUEL OIL*
GÁS LIQUEFEITO DE PETRÓLEO	166	176	165	169	161	163	171	173	163	157	*LIQUEFIED PETROLEUM GAS*
OUTRAS DE PETRÓLEO	173	178	195	270	275	289	292	262	223	225	*OTHER PETROLEUM SECUNDARIES*
GÁS CANALIZADO	0	0	0	0	0	0	0	0	0	0	*GASWORKS GAS*
ELETRICIDADE	298	301	319	342	359	380	376	339	322	322	*ELECTRICITY*
OUTRAS NÃO ESPECIFICADAS	0	0	0	0	0	0	0	0	0	0	*OTHERS*
TOTAL	4.193	4.128	4.485	4.724	4.803	5.069	5.079	4.614	4.272	4.280	*TOTAL*

[42] 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, page 37. Available at: <http://www.teses.usp.br/teses/disponiveis/86/86131/tde-14052008-113901/publico/UHLIG_Tese1.pdf>. Last visited on 26/05/2019.

[43] National Technology Institute (Instituto Nacional de Tecnologia). **Projeto EELA no Brasil – Cerâmica Vermelha**. Rio de Janeiro, 2017. 135p. Information on pages 54-58. Available at: <http://www.int.gov.br/docman/biblioteca/1443-livro-cer%C3%A2mica-vermelha-%E2%80%93-projeto-eela-no-brasil/file> Last visited on 17/12/2019.

[44] CDM EB 23, Annex 18 – Definition of Renewable Biomass. Available at: <https://cdm.unfccc.int/EB/023/eb23_repan18.pdf>.

[45] Energy Research Company. National Energy Balance 2018 - Base year 2017. Available at <http://www.epe.gov.br/sites-pt/publicacoes-dados-abertos/publicacoes/PublicacoesArquivos/publicacao-303/topico-419/BEN2018__Int.pdf>. Last visited on 28/01/2019.

[46] Energy Research Company National Energy Balance, 2018 – Base year 2017, page 100. Available at: <http://www.epe.gov.br/sites-pt/publicacoes-dados-abertos/publicacoes/PublicacoesArquivos/publicacao-303/topico-419/BEN2018__Int.pdf>. Last visited on 29/11/2019

Sustainable forest management is a source of renewable woody biomass, and it is presently practised in the Caatinga and Amazonian biomes of North, Northeast and Central West Regions of Brazil.[47]

In the Northeast[48], Sustainable Forest Management Plans (SFMP) supplied 0.71 10^6 DMt $yr^{-1,}$ mostly as firewood from Caatinga, in 2018. The total amount of firewood used by ceramic industries in the Northeast region[49] (2.52 10^6 DMt/year) is much higher than the total supply from sustainable forest management areas.

In the North and Central West regions, SFMP in private and concessioned public lands extracts logs for sawmills. In Pará State, SEMAS authorized the logging of 2.7 10^6 m^3 in private lands; and in 17 federals plus 9 state concessions [50] 0.222 10^6 m^3 were logged in 2016 / 2017. These 3.0 10^6 m^3 of logs represent 1.75 10^6 tons of Dry Matter (DMt)[51].

Therefore, the total availability of firewood from sustainable forest management areas in the North, Northeast and Central West regions of Brazil, which can be considered renewable according to CDM definitions, is around 2.46 10^6 DMt/year. Converting this value to tonnes of oil equivalent (TOE), the energy from renewable sources is around 0.88 10^6 TOE[52]. Considering that this renewable biomass would only be used in ceramic industries, it would represent around 42% of the total TOE consumed by ceramic industries that are originated from firewood sources. Thus, most of the firewood consumed by ceramic industries in these regions of Brazil is non-renewable (58% at least), according to CDM definitions. This figure is similar to the results found by INT (2017) in the Northeast region, where it concludes that 55% of the biomass used by the ceramic sector was of non-renewable origin.

Furthermore, there are no national and/or sectoral policies or regulations that give advantages to more or less emissions intensive technologies or fuels (E+ or E- policies), according to CDM project standard for programmes of activities, paragraph 105.

A barrier to the use of renewable biomass waste as fuel in brickmaking industries has been the lack of modern technologies specifically designed for this fuel. The Clean kiln has overcame this barrier, allowing for the clean, efficient and controlled burning of comminuted biomass residues.

The baseline scenario of this CPA involves the utilization of [Describe the baseline equipment and technologies], which consumed around [XXX] tonnes of non-renewable firewood per month for producing around [XXX] tonnes of ceramic bricks per month. The total production capacity of the CPA in the baseline scenario was around [XXX] tonnes of bricks per month.

According to the applied methodology, the CPA has historical data that demonstrates that only non-renewable biomass was used in the baseline brick production systems for at least three years prior to the start date[53]. In addition, baseline kilns will be replaced by the CPA technologies described

[47] Source: Brazil. Ministério da Agricultura, Pecuária e Abastecimento. **Florestas do Brasil em resumo: 2019.** Serviço Florestal Brasileiro, Brasília/DF. 207 p.

[48] Source: Brazil. Ministério do Meio Ambiente. **Biomassa para energia no Nordeste: atualidade e perspectivas**. Ministério do Meio Ambiente/Programa das Nações Unidas para o Desenvolvimento. Brasília, DF. 2018. 161 p.

[49] Brasil. Ministério do Meio Ambiente. **Biomassa para energia no Nordeste: atualidade e perspectivas**. Ministério do Meio Ambiente/Programa das Nações Unidas para o Desenvolvimento. Brasília, DF. 2018. 161 p.

[50] Boletim SNIF 2019. Ed.1. Disponível em: <http://snif.florestal.gov.br/images/pdf/publicacoes/Boletim-SNIF_Ed1_2019.pdf>

[51] Considering a mean wood density of 0.583 t/m³. - NOGUEIRA, E. M. Densidade de Madeira e Alometria de Árvores em Florestas do 'Arco do Desmatamento': Implicações para Biomassa e Emissão de Carbono a partir de Mudanças de Uso da Terra na Amazônia Brasileira. 2008. 151 f. Doctor Thesis - Curso de Ciências de Florestas Tropicais, INPA, Manaus, 2008.

[52] Considering the IPCC default for wood fuel, 1.5x10-5 TJ/kg according to the applied methodology. Conversion from TJ to toe: http://www.conversaodeunidades.com>

[53] According to the applied methodology, in cases where small quantities of renewable biomass were used for experimental purposes, this can be excluded.

above. Thus, the deactivation of these baseline brick production systems and the application of chain of custody procedures on the renewable biomass used avoid any possibility of using firewood during the crediting period and therefore, it ensures the generation of GHG emission reductions due to the fuel switching to renewable biomass. It is important to note that in case of using wood residues from firewood under the project scenario, such as sawdust or wood chips, the biomass shall be tracked until its origin to guarantee its renewable source according to CDM definitions.

[Describe the service level of baseline and project bricks]. Therefore, the service level of project brick shall be comparable to or better than the baseline brick, i.e. the bricks produced in the brick production facility during the crediting period meet or exceed the performance level of the baseline bricks

I.6. Estimation of emission reductions

I.6.1. Explanation of methodological choices

Baseline Emissions

According to the methodology applied to this component project activity (AMS III.Z, version 06), baseline emissions are the NRB consumption related emissions associated with the system(s), which were or would have otherwise been used, in the brick production facility(ies) in the absence of the CPA. The baseline emissions are calculated as follows:

$$BE_y = SEC_{BL} \times EF_{BL} \times P_{PJ,y} \quad \text{Equation 1}$$

Where:

BE_y = The annual baseline emissions from fossil fuels or NRB displaced by the component project activity in t CO_2e in year y (crediting period)

SEC_{BL} = Specific energy consumption of brick production in the baseline, TJ per volume unit or mass unit (m^3 or kg)

EF_{BL} = The emission factor of baseline fuel(s), in t CO2/TJ

$P_{PJ,y}$ = The annual net production of the facility in year y, in kg or m^3

The following equations are utilized to calculate EF_{BL} and SEC_{BL}:

$$EF_{BL} = \frac{\sum_{j,i} (FC_{BL,i,j} \times NCV_j \times EF_{CO_2,j})}{\sum_{j,i} (FC_{BL,i,j} \times NCV_j)} \quad \text{Equation 1.1}$$

$$SEC_{BL} = \frac{\sum_{j,i} (FC_{BL,i,j} \times NCV_j)}{P_{Hy}} \quad \text{Equation 1.2}$$

Where:

$FC_{BL,i,j}$ = Average annual baseline fossil fuel or NRB consumption value for fuel type *j* combusted in the process *I,* using volume or weight units (kg or m^3). In the case of NRB, it is determined by the total woody biomass consumption multiplied with the fraction of the NRB (fNRB)

NCV_j = Average net calorific value of fuel type *j* combusted, TJ per unit volume or mass unit (kg or m^3). In the case of NRB, the IPCC default for wood fuel,

1.5x10^{-5} TJ/kg base on the gross weight of the wood that is 'air-dried', shall be used

$EF_{CO_2,j}$ = CO2 emission factor of fuel type *j* combusted in the process *i* in tCO2/TJ. In the case of NRB, a default value of 81.6 tCO2/TJ is used, i.e. the emission factor for the fossil fuels projected to be used for substitution of NRB by similar consumers

P_{Hy} = Average annual historical baseline brick production rate, in units of weight or volume, kg or m³

Project Emissions

Project emissions (PEy) are calculated through the equation 02 below. The equations will be applied when suitable. This analysis will be conducted individually for each CPA.

$$PE_y = PE_{ele,y} + PE_{fuel,y} + PE_{cultivation,y} + PE_{TR,y}$$
$$PE_y = PE_{elec,y} + PE_{fuel,y} + PE_{cultivation,y} + PE_{CH4,y}$$

Equation 2

Where:

$PE_{,y}$ = Project emissions in year y (tCO2)

$PE_{ele,y}$ = Project emissions due to electricity consumption in year y (tCO2)

$PE_{fuel,y}$ = Project emissions due to fossil fuel or NRB consumption in year y (tCO2)

$PE_{cultivation,y}$ = Project emissions from cultivation of biomass in a dedicated plantation in year y (t CO2e)

$PE_{CH4,y}$ = Project emissions due to the production of charcoal in kilns not equipped with a methane recovery and destruction facility in year y (tCO2e)

Project emissions are those related to the CO_2 emissions from electricity consumption and fossil fuels consumption. Project emissions are calculated according to the methodological tools, as mentioned at section I.2.

It is worth mentioning that project emissions due to the production of charcoal was disregarded once the use of charcoal does not represent the Brazilian ceramic industries scenario.

The electricity consumption considered here (including auxiliary use) is associated with the biomass treatment and processing. The parameter $PE_{ele,y}$ is calculated according to the following equation:

$$PE_{ele,y} = \sum_j EC_{PJ,j,y} \times EF_{EF,j,y} \times (1 + TDL_{j,y})$$

Equation 2.1

Where:

$EC_{PJ,j,y}$ = Quantity of electricity consumed by the project electricity consumption source j in year y (MWh/yr)

$EF_{EF,j,y}$ = Emission factor for electricity generation for source j in year y (tCO2/MWh)

$TDL_{j,y}$ = Average technical transmission and distribution losses for providing electricity to source j in year y

The parameter $PE_{fuel,y}$ is utilized to calculate the emissions of fossil fuel or NRB consumption (including auxiliary use) associated with the operation of the manufacturing process and biomass treatment and processing. $PE_{fuel,y}$ is calculated according to the following equation:

$$PE_{fuel,y} = FC_{i,j,y} \times COEF_{i,y} \quad \text{Equation 2.2}$$

Where:

$FC_{i,j,y}$ = Quantity of fuel or NRB combusted (tonne/year)

$COEF_{i,y}$ = CO_2 emission coefficient of fuel or NRB (tCO_2/tonne)

The parameter $COEF_{i,j,y}$ is calculated according to the following equation, based on the net calorific value and CO_2 emission factor of the fuel as follows:

$$COEF_{i,y} = NCV_{i,y} \times EF_{CO2,i,y} \quad \text{Equation 2.2.1}$$

Where:

$EF_{CO2,i,y}$ = Upper CO_2 emission factor of fuel (tCO_2/TJ)

$NCV_{i,y}$ = Upper net calorific value of the fuel (TJ/tonne)

The parameter $PE_{cultivation,y}$ is considered for project activities that utilize biomass from dedicated plantations. Biomass from dedicated plantation will not occur, therefore, this source of project emissions is not applicable.

Leakage Emissions

According to the applied methodology AMS III.Z – version 06.0, leakage emissions derived from the diversion of biomass residues from other uses (competing uses) shall be calculated as per the TOOL22 Methodological tool: Leakage in biomass small-scale project activities – version 04.0[54]. In addition, where NRB is involved, the leakage specified in leakage section of AMS-II.G. shall also be considered.

According to TOOL22 Methodological tool: Leakage in biomass small-scale project activities – version 04.0[55] there are three types of leakage emission sources that are potentially significant (>10% of emission reductions) and attributable to the project activities:

A. **Shifts of pre-project activities:** Decreases of carbon stocks, for example as a result of deforestation, outside the land area where the biomass is grown, due to shifts of pre project activities.
B. **Emissions related to the production of the biomass:** The emissions related to the production of biomass will be accounted as project emissions according to the parameters and equations demonstrated before.
C. **Competing uses for the biomass:** The biomass may in the absence of the component project activity be used elsewhere, for the same or a different purpose. The leakage emissions will be evaluated ex ante if there is a surplus of the biomass in the region, which is not utilised. If it is demonstrated (e.g., using published literature, official reports, surveys etc.) at the beginning of each crediting period that the quantity of available biomass in the region (e.g., 50 km radius), is at least 25% larger than the quantity of biomass utilised, then this source of leakage can be neglected otherwise this leakage will be estimated and deducted from the emission reductions.

[Describe the biomass types used, the availability and surplus of each biomass type in the CPA region].

Furthermore, according to methodology AMS II.G – version 11.0, the potential source of leakage due to the use/diversion of non-renewable woody biomass saved under the project activity by non-project households/users that previously used renewable energy sources shall be considered. Such leakage shall be assessed based on ex post surveys of users and the areas from which this woody biomass is sourced.

Alternatively, the quantity of woody biomass that is saved by project activities (in tonnes) may be multiplied by a net to gross adjustment factor of 0.95 to account for leakages, in which case surveys are not required.

In addition, changes involving the production process, the type of raw material and/or additive material, and transportation of this materials will not occur, so this leakage does not apply.

I.6.2. Data and parameters fixed ex ante

Data / Parameter	$FC_{BL,i,j}$
Data unit	Tonne or m³
Description	Average annual baseline fossil fuel or NRB consumption.
Source of data	Value provided by the project participant.

[54] Updated from General guidance on leakage in biomass project activities, which is referenced in the methodology AMS III.Z..

[55] TOOL22 Methodological tool: Leakage in biomass small-scale project activities – version 04.0. Available at: <https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-22-v1.pdf>. Last visit on 27/11/2019.

Value(s) applied	[XXX]
Choice of data or Measurement methods and procedures	The source of data will be the fuel consumption historical data. As recommended by the applied methodology, at least three years of data will be considered. The NRB will be determined by the total woody biomass consumption multiplied with the fraction of the NRB (fNRB).
Purpose of Data	Calculation of baseline emissions.
Additional comment	Data will be kept for two years after the end of the crediting period or of the last issuance of carbon credits for this CPA, whichever occurs later.

Data / Parameter	NCV_j
Data unit	TJ/tonne
Description	Average net calorific value of fuel combusted.
Source of data	Value will be check at: IPCC: Intergovernmental Panel on Climate Change. Available at: <http://www.ipcc-nggip.iges.or.jp/public/2006gl/pdf/2_Volume2/V2_1_Ch1_Introduction.pdf>. Last visited on January 9th, 2019.
Value(s) applied	[XXX]. [In the case of NRB, the IPCC default for wood fuel, $1.5x10^{-5}$ TJ/kg will be used.]
Choice of data or Measurement methods and procedures	The source of data will be the IPCC default values; a reliable organization recognized by the UNFCCC.
Purpose of Data	Calculation of baseline emissions.
Additional comment	Data will be kept for two years after the end of the crediting period or of the last issuance of carbon credits for this CPA, whichever occurs later.

Data / Parameter	$EF_{CO_2,j}$

Data unit	tCO2/TJ
Description	CO_2 emission factor of fuel type j combusted.
Source of data	Value will be checked at: -IPCC: Intergovernmental Panel on Climate Change. Available at: <http://www.ipcc-nggip.iges.or.jp/public/2006gl/pdf/2_Volume2/V2_2_Ch2_Stationary_Combustion.pdf> Last visited on January 9th, 2019.
Value(s) applied	[XXX] [In the case of NRB, a default value of 81.6 t CO_2/TJ will be used.]
Choice of data or Measurement methods and procedures	The source of data will be the IPCC default values; a reliable organization recognized by the UNFCCC.
Purpose of Data	Calculation of baseline emissions.
Additional comment	Data will be kept for two years after the end of the crediting period or of the last issuance of carbon credits for this CPA, whichever occurs later.

Data / Parameter	P_{Hy}
Data unit	kg or m3
Description	Average annual historical baseline brick production.
Source of data	Value provided by the project participant.
Value(s) applied	[XXX]
Choice of data or Measurement methods and procedures	The source of data will be the brick production historical data. According to the applied methodology, at least three years of data will be considered.
Purpose of Data	Calculation of baseline emissions
Additional comment	Data will be kept for two years after the end of the crediting period or of the last issuance of carbon credits for this CPA, whichever occurs later.

Data / Parameter	$TDL_{j,y}$
Data unit	%
Description	Average technical transmission and distribution losses for providing electricity to source j in year y.
Source of data	Baseline, project and/or leakage emissions from electricity consumption and monitoring of electricity generation Available at: <https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-05-v3.0.pdf> Last visit on January 09th, 2019.
Value(s) applied	20%
Choice of data or Measurement methods and procedures	The source of data is the methodological tool default value, as recommended by the applied methodology and by the tool, on data/parameter table 3.
Purpose of Data	Calculation of project emissions.
Additional comment	Applicable only if the industry presents electricity consumption associated with the biomass treatment and processing. Data will be kept for two years after the end of the crediting period or of the last issuance of carbon credits for this CPA, whichever occurs later.

Data / Parameter	$EF_{CO2,i,y}$
Data unit	tCO_2/TJ
Description	Upper CO_2 emission factor of fuel type i.
Source of data	Value will be checked at: -IPCC: Intergovernmental Panel on Climate Change. Available at: <http://www.ipcc-nggip.iges.or.jp/public/2006gl/pdf/2_Volume2/V2_2_Ch2_Stationary_Combustion.pdf> Last visited on January 9th, 2019.
Value(s) applied	[XXX]
Choice of data or Measurement	The source of data is the IPCC default value, as recommended by the applied methodology and by the Tool to calculate project or leakage CO_2

methods and procedures	emissions from fossil fuel combustion, on data/parameter table 5, source of data option d.
Purpose of Data	Calculation of project emissions.
Additional comment	Applicable only if the industry utilizes fossil fuel or NRB associated with the operation of the manufacturing process and biomass treatment and processing. Data will be kept for two years after the end of the crediting period or of the last issuance of carbon credits for this CPA, whichever occurs later.

Data / Parameter	$NCV_{i,y}$
Data unit	TJ/ tonne
Description	Upper net calorific value of the fuel.
Source of data	Value will be check at: IPCC: Intergovernmental Panel on Climate Change. Available at: <http://www.ipcc-nggip.iges.or.jp/public/2006gl/pdf/2_Volume2/V2_1_Ch1_Introduction.pdf>. Last visited on January 9th, 2019.
Value(s) applied	[XXX]
Choice of data or Measurement methods and procedures	The source of data is the IPCC default value, as recommended by the applied methodology and by the Tool to calculate project or leakage CO_2 emissions from fossil fuel combustion, on data/parameter table 4, source of data option d.
Purpose of Data	Calculation of project emissions.
Additional comment	Applicable only if the industry utilizes fossil fuel or NRB associated with the operation of the manufacturing process and biomass treatment and processing. Data will be kept for two years after the end of the crediting period or of the last issuance of carbon credits for this CPA, whichever occurs later.

I.6.3. Modalities for ex ante calculation of emission reductions

Emission Reductions

Emission reductions are calculated as follows:

$$ER_y = BE_y - PE_y - LE_y \qquad \text{Equation 3}$$

Where:

ER_y = Emission reduction in year y (tCO_2e)

BE_y = Baseline emission in year y (tCO_2e)

PE_y = Project emission in year y (tCO_2)

LE_y = Leakage emission in year y (tCO_2)

[For each CPA: Please, provide the CPA specific of GHG emission reductions as per the indicative template below]:

Year	Total Baseline Emissions (tCO_2e)	Total Project Emissions (tCO_2e)	Leakage (tCO_2e)	Total Emission Reductions (tCO_2e)
[xxx]				
[xxx]				
[xxx]				
[xxx]				
[xxx]				
[xxx]				
[xxx]				
Total Emission Reductions (tCO_2e)				
Number of years of the crediting period				
Annual average of estimated emissions reductions for the crediting period (tCO_2e)				

I.7. Monitoring plan

I.7.1. Data and parameters to be monitored

Data/Parameter	$f_{NRB,y}$
Data unit	Percentage
Description	Fraction of woody biomass that can be established as non-renewable biomass (fNRB).

Source of data	Survey methods
Value(s) applied	[XXX]
Measurement methods and procedures	As per the "TOOL30: Calculation of the fraction of non-renewable biomass"
Monitoring frequency	Annually
QA/QC procedures	The monitoring of this parameter will be based on national and international articles and databases every monitoring period. The sources will provide information about the sustainable use of each CPA biome.
Purpose of data	Calculation of baseline emissions.
Additional comment	Data will be kept for two years after the end of the crediting period or of the last issuance of carbon credits for this CPA, whichever occurs later.

Data/Parameter	$P_{PJ,y}$
Data unit	Kg
Description	Annual net production.
Source of data	Onsite measurements. Measurement by project participants.
Value(s) applied	[XXX]
Measurement methods and procedures	Values will be obtained by counting the total production of the considered period for the ceramic factory and data will be gathered on a monthly and yearly basis.
Monitoring frequency	Annually
QA/QC procedures	The ceramic factory has an internal control of the quantity of pieces produced that will be converted to Kg. It will be rechecked according to the biomass employed and the kiln consumption of renewable biomass.
Purpose of data	Calculation of baseline emissions.
Additional comment	Data will be kept for two years after the end of the crediting period or of the last issuance of carbon credits for this CPA, whichever occurs later.

Data/Parameter	$EC_{PJ,j,y}$
Data unit	MWh/yr
Description	Quantity of electricity consumed by the project activity.
Source of data	Onsite measurements. Measurement by project participants.
Value(s) applied	[XXX]
Measurement methods and procedures	Use of electricity meters installed at the electricity consumption sources.
Monitoring frequency	Continuous measurement and at least monthly recording.
QA/QC procedures	In cases where electricity meters are regulated (scenario A), the electricity meter will be subjected to regular maintenance and testing in accordance with the stipulation of the meter supplier and/or as per the requirements set by the grid operators or national requirements. In cases where electricity meters are not regulated (scenario B), the electricity meter will be subjected to regular maintenance and testing in accordance to the stipulation of the meter supplier or national requirements.
Purpose of data	Calculation of project emissions.
Additional comment	Applicable only if the industry presents electricity consumption associated with the biomass treatment and processing. Data will be kept for two years after the end of the crediting period or of the last issuance of carbon credits for this CPA, whichever occurs later.

Data/Parameter	$EF_{EF,j,y}$
Data unit	tCO2/MWh
Description	Emission factor for electricity generation for source j in year y
Source of data	[Conservative default value established by TOOL05 Methodological tool: Baseline, project and/or leakage emissions from electricity consumption and monitoring of electricity generation - version 03.0, Scenario A, Option A2 (Paragraph 20(a))]

	[As per the TOOL07 Methodological tool: Tool to calculate the emission factor for an electricity system - version 07.0. In most cases, please refer to Brazilian DNA[56]]
Value(s) applied	[XXX]
Measurement methods and procedures	No monitoring equipment will be used to determine this parameter.
Monitoring frequency	[As per the TOOL07 - version 07.0, or other specified in TOOL05 – version 03.0, in case default values are used]
QA/QC procedures	[As per the TOOL07 - version 07.0, or other specified in TOOL05 – version 03.0, in case default values are used]
Purpose of data	Calculation of project emissions.
Additional comment	Applicable only if the industry presents electricity consumption associated with the biomass treatment and processing. Data will be kept for two years after the end of the crediting period or of the last issuance of carbon credits for this CPA, whichever occurs later.

Data/Parameter	$FC_{i,j,y}$
Data unit	tonne/year
Description	Quantity of fuel or NRB combusted.
Source of data	Onsite measurements. Measurement by project participants.
Value(s) applied	[XXX]
Measurement methods and procedures	Values will be obtained by counting the total consumption of the considered period for the ceramic factory and data will be gathered on a monthly and yearly basis.
Monitoring frequency	Continuous measurement and at least monthly recording.
QA/QC procedures	When fuel purchase invoices can be identified, measured fuel consumption quantities will be cross-checked with the purchase invoices available from the financial records.
Purpose of data	Calculation of project emissions.
Additional comment	This PoA does not allow the use of NRB in the project scenario. The use of native firewood, independently of its origin, will be classified as

[56] Fatores de emissão da margem de operação pelo método da análise de despacho. Available at <https://www.mctic.gov.br/mctic/opencms/ciencia/SEPED/clima/textogeral/emissao_despacho.html> Last visit on 09/01/2019.

	NRB. If this occurs, the CPA should be excluded from the PoA. This ensures that there will be no use of NRB in the CPA during the crediting period. This parameter is applicable only if the industry utilizes fossil fuel associated with the operation of manufacturing process and biomass treatment and processing. Data will be kept for two years after the end of the crediting period or of the last issuance of carbon credits for this CPA, whichever occurs later.

I.7.2. **Sampling plan**

[If data and parameters to be monitored are to be determined through a sampling approach, please provide a description of how to establish the sampling plan in accordance with the recommended outline for a sampling plan in the "Standard: Sampling and surveys for CDM project activities and programme of activities".]

[No sampling plan is applied.]

I.7.3. **Other elements of monitoring plan**

Clean Sistemas de Automação EIRELI, as the coordinating/managing entity, will set the procedures to verify the CERs generated by the CPAs and will coordinate activities with each CPA implementer individually, i.e., ceramic factories.

The monitoring plan shall ensure that:

- The CPA complies with all applicable environmental regulations, that the CPA is legally registered, and its operations are duly licensed.

- The CPA deactivated the baseline kilns, in order to ensure that no firewood was used for brick manufacturing after the new kiln started its operation.

- The CPA only uses available renewable biomass residues, and non-renewable biomass has not been used since the project start date.

The biomass consumption and brick production will be monitored through a spreadsheet that will be completed by an employee of the ceramic factory at a daily basis. All information necessary to confirm data used to fill the spreadsheet will be available for consultation.

In cases where the ceramic factory utilizes fossil fuel, consumes electricity when utilizing biomass, data will be monitored according to the available evidence (receipts, invoices, electricity bills, transport documentation, for example).

Archives of records will be maintained for at least 2 years after the end of the crediting period of the CPA or after its last issuance – whichever is later. A copy of the PoA Monitoring Database will also be archived in electronic format for the same time.

[Please provide CPA-specific or CPA Implementer-specific information regarding the proposed monitoring plan]

SECTION J. Crediting period type and duration

Type: Renewable

Length of crediting period: 7 years and 0 months

Number of renewals of crediting periods: 2 times

SECTION K. Eligibility criteria for inclusion of CPAs

No.	Eligibility criterion - Category	Eligibility criterion - Required condition	Supporting evidence for inclusion
1	The geographical boundary of the CPA including any time-induced boundary consistent with the geographical boundary set in the PoA;	The CPA will be located within the Brazil´s geographical boundary, in the north, northeast or central-west regions of Brazil, specifically in the Amazon, Caatinga and Cerrado biomes.	Operation license or authorization.
2	Conditions that avoid double counting of emission reductions like unique identifications of product and end-user locations (e.g. programme logo);	The CPA, as whole or part, shall not result in double counting of GHG emission reductions by means of: · Location of each CPA and/or ceramic industry; · Mechanism for ceding of carbon rights to the CME by the brick kiln owner under each CPA; · End user details (name and address); · Individual project system/unit is identifiable by serial/unique identification numbers of system/unit.	- Contract between CME and ceramic factory owner regarding participation of the kiln in the PoA; - End user details of CPA (name and address with precise location, unique identification number) would be used for CPA and its individual units. - A review of other Carbon Standards platforms to prove that no double-counting is occurring
3	Conditions to confirm that CPAs are neither registered as CDM project activities, included in another registered PoAs, nor the project activities that have been deregistered;	· Confirmation from the ceramic industry owner under each CPA that the CPA or the brick kiln(s) in the CPA has not been proposed as an individual CDM project or as a part of any other CDM PoA or any other mechanism to avail climate change mitigation benefits;	A review of other Carbon Standards platforms to prove that the CPA has not been proposed as an individual CDM project or as a part of any other CDM PoA.
4	The specifications of technology/measure including the level and type of service, performance specifications including compliance with testing/certifications;	Paragraph 11 of methodology applied: AMS III.Z. Version 06.0. The fuel switching from non-renewable biomass to renewable biomass in ceramic industries and the implementation of technologies with or without increase in capacity	Contract between CME and ceramic factory owner. Tests in nationally approved laboratories at six months intervals in order to analyse, at least, the compressive strength class of project bricks.
5	Conditions to check the start date of the CPA through documentary evidence;	The date on which the project participants commit to making expenditures for the construction or modification of the main equipment or facility, or for the provision or modification of a service, for the CDM project activity or CPA. Where a contract is signed for such expenditures, it is the date on which the contract is	- Contract between kiln supplier and ceramic factory owner or; -Invoices and/or receipts regarding the main expenditures for the CPA implementation.

		signed. In other cases, it is the date on which such expenditures are incurred. If the CDM project activity or CPA involves more than one of such contracts or incurred expenditures, it is the first of the respective dates. Activities incurring minor pre-project expenses (e.g. feasibility studies, preliminary surveys) are not considered in the determination of the start date. According to the CDM project standard for programmes of activities version 02.0[57], the start date of any proposed CPA will be on or after the start date of the proposed CDM PoA (08/03/2019).	
6	Conditions that ensure compliance with applicability and other requirements of single or multiple methodologies applied by CPAs;	The CPA will satisfy the applicability conditions for simplified baseline and monitoring methodologies as specified in the AMS-III.Z (Version 06.0).	Applicability conditions of AMS-III.Z (Version 06.0) paragraph 3 and supporting evidences. Information described in the CPA-DD
7	The conditions that ensure that the CPA meets the requirements pertaining to the demonstration of additionality as specified in section C above;	TOOL21 Methodological tool: Demonstration of additionality of small-scale project activities Version 13.0 will be utilized to prove the CPA additionality. All necessary parameters to demonstration of additionality of small-scale are available below.	Calculation sheets and references regarding the additionality of the CPA. Information described in the CPA-DD
8	Conditions to ensure the compliance with other requirements of the applied methodologies, the applied standardized baselines and the other applied methodological regulatory documents;	The CPA will satisfy the applicability conditions for simplified baseline and monitoring methodologies as specified in the AMS-III.Z (Version 06.0).	Applicability conditions of AMS-III.Z (Version 06.0) paragraph 3 and supporting evidences. Information described in the CPA-DD
9	The PoA-specific requirements stipulated by the CME including any conditions related to undertaking local stakeholder consultations and environmental impact analysis;	The Local Stakeholder Consultation has been conducted at PoA Level, and the EIA process was performed at PoA level.	Local Stakeholders Consultation and EIA analysis, which were carried out at PoA level.

[57] According to Section 8.3 of this document, paragraph 185, the coordinating/managing entity shall confirm that the start date of the proposed CPA is on or after the start date of the registered CDM PoA. In addition, according to the section 7.5 of the same document, paragraph 40, the coordinating/managing entity may notify the DNA of the host Party of the proposed CDM PoA, and the UNFCCC secretariat of the intention to seek the CDM status for the PoA for the purpose of determining the start date of the PoA.

10	Conditions to provide an affirmation that funding from Annex I Parties, if any, does not result in a diversion of official development assistance;	Confirmation that the CPA is not receiving any funding from Annex I parties. If any, it will be confirmed that it does not result in a diversion of ODA	Confirmation by CME that there is no funding from Annex I parties for the project.
11	Where applicable, target group (e.g domestic/commercia/industrial, rural/urban, grid-connected/off-grid) and distribution mechanisms (e.g. direct installation)	Not Applicable.	Not Applicable.
12	Where applicable, the conditions related to sampling requirements for the PoA in accordance with the "Standard for sampling and surveys for CDM project activities and programme of activities;	Not Applicable.	Not Applicable.
13	Where applicable, the conditions that ensure that every CPA (in aggregate if it comprises of independent subunits) meets the small-scale or microscale threshold and remains within those thresholds throughout the crediting period of the CPA;	The sum of the GHG emissions reductions of the CPA shall be within 60 ktCO2e/year throughout the crediting period.	Calculation sheets and references regarding to the annual emission reductions generated by the CPA.
14	Where applicable, the requirements for the debundling check, in case the CPAs belongs to small-scale or microscale project categories.	Paragraph 15 of TOOL20 Methodological tool - Assessment of debundling for small-scale project activities, Version 04.0.	Ceramic owner confirms by the contract between CME and ceramic factory owner that within the previous 2 years no other of his ceramic industries located in a distance of less than 1 km has been registered as CDM project or included as CDM CPA to a PoA.
15	Requirements to confirm that the CPA complies with national legislation	The CPA confirms that: ● It complies with all applicable environmental regulations; ● The CPA is legally registered, and; ● Brick manufacturing is duly licensed.	Operation license and environmental authorizations regarding brick manufacturing activities.

According to TOOL21 methodological tool, Demonstration of additionality of small-scale project activities - version 13.0, it is necessary to demonstrate that the CPA would not occur due to one of the following scenarios:

a) Investment barrier: a financially more viable alternative to the component project activity would have led to higher emissions;

b) Technological barrier: a less technologically advanced alternative to the component project activity involves lower risks due to the performance uncertainty or low market share of the new technology adopted for the component project activity and so would have led to higher emissions;

c) Barrier due to prevailing practice: prevailing practice or existing regulatory or policy requirements would have led to implementation of a technology with higher emissions;

d) Other barriers: without the component project activity, for another specific reason identified by the project participant, such as institutional barriers or limited information, managerial resources, organizational capacity, financial resources, or capacity to absorb new technologies, emissions would have been higher.

[Please describe which barrier will be used to demonstrate the CPA additionality.]

[In case of investment barrier is used, please refer to the input parameters below in order to conduct the investment analysis.

- *Input parameters in case investment analysis is used for demonstration of additionality*

When investment analysis is used to demonstrate additionality, the analysis is conducted on each CPA. In this case, the main input parameters that will be used in the investment analysis are defined below, with a description of how the values for these parameters will be obtained for each CPA. The additionality of each CPA shall then be assessed by using the actual values, applicable to the CPA at the time of inclusion, in the investment analysis conducted for the purpose of demonstrating the additionality of the CPA.

The most suitable financial indicator 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. However, other indicator could be used, such as cost per production, measured in R$ per thousand of bricks produced. Such indicators are the most appropriate since technology investment and fuel purchase are part of the major cost components for brick production and the variables most affected by this PoA's implementation, which involves fuel switching through acquisition of more efficient technologies.

Therefore, the most important parameters that will be utilized for determining the identified financial indicator, and the description of how these parameters will be obtained, for both baseline and project scenarios, are described in the tables below. These parameters combined determine the total cost for a given output.

Table 2. Main input parameters for performing an investment analysis for this CPA in the baseline scenario

Input parameter	Unit	Description of how parameters will be obtained
Cost of non-renewable biomass	R$/tonne or R$/m³	Receipts, historical data or other documents from ceramic industry regarding the purchase of non-renewable biomass
Quantity of non-renewable biomass consumption	Tonne or m³	Receipts, historical data or other documents from ceramic industry regarding the purchase of non-renewable biomass
Production capacity with baseline kiln(s)	Bricks	Internal reports or other documents
Remaining lifetime of baseline equipment	Years	Expert analysis, internal reports or other documents

Investments in the baseline kiln(s) and other Capital Expenditure (CAPEX). Applicable in cases where baseline kiln(s) shall be replaced/discarded, when remaining lifetime is lower than CPA crediting period	R$	Contracts, invoices, receipts or other documents regarding the investment for the reform/modernization of baseline kiln
Operational Expenditures (OPEX), which include at least: - Labor costs - Electrical energy costs	R$	Invoices, receipts, historical data or other documents from ceramic industry regarding the operational expenditures in the baseline scenario
Dryer consumption of fuel in the baseline, if applicable	Tonne or m³	Receipts, historical data or other documents from ceramic industry regarding the consumption of fuel in the dryer during the baseline scenario
Net Calorific Value (NCV) of each fuel type	TJ/tonne	Scientific articles, technical reports or other literature data
Specific gravity of each fuel type, if necessary	Tonne/m³	Scientific articles, technical reports or other literature data

Table 3. Main input parameters for performing an investment analysis for this CPA in the project scenario

Input parameter	Unit	Description of how parameters will be obtained
Cost of renewable biomass	R$/tonne or R$/m³ for each renewable biomass type	Receipts, invoices or other documents regarding the purchase of renewable biomass
Quantity of renewable biomass consumption	Tonne or m³	Receipts, historical data or other documents from ceramic industry regarding the purchase of renewable biomass
Production capacity with project kiln(s)	Bricks	Internal reports or other documents
Technology investment for the utilization of renewable biomass	R$	Kiln and/or Dryer acquisition contract, invoices, receipts or other documents regarding the investment in new technology (acquisition, installation and operation)
Infrastructure investment and other CAPEX for the utilization of renewable biomass	R$	Invoices, receipts or other documents regarding infrastructure construction
Losses regarding experimental tests with new technology and renewable biomass	R$	Internal reports or other documents
Operational Expenditures (OPEX), which include at least: - Labor costs - Electrical energy costs	R$	Invoices, receipts, historical data or other documents from ceramic industry regarding the operational expenditures in the project scenario
Dryer consumption of fuel in the project scenario, if applicable	Tonne or m³	Receipts, historical data or other documents from ceramic industry regarding the consumption of fuel in the dryer during the project scenario
Net Calorific Value (NCV) of each fuel type	TJ/tonne	Scientific articles, technical reports or other literature data
Specific gravity of each fuel type, if necessary	Tonne/m³	Scientific articles, technical reports or other literature data

Please, include a comparison of the applied financial indicator between the baseline and project scenarios and include a brief analysis.]

[In case access-to-finance barrier is used, please provide relevant justification that the project activity could not access appropriate capital without consideration of the CDM revenues. Best practice examples include but are not limited to, the demonstration of limited access to capital in the absence of the CDM, such as a statement from the financing institution that the revenues from the CDM are critical in the approval of the investment.]

[In case other barrier is used to demonstrate additionality, please provide relevant justification and evidence.]

Appendix 1. Contact information of coordinating/managing entity and project participants

Coordinating/managing entity and/or project participants	X	Coordinating/managing entity
	X	Project participant
Organization name	Clean Sistemas de Automação Industrial EIRELI	
Country	Brazil	
Address	Rua Doutor Bacelar, 368 - conjunto 23 Vila Clementino - São Paulo, SP CEP 04026-001 - Brazil	
Telephone	+55 11 2649 0036	
Fax	-	
E-mail	stefano@c-lean.com	
Website	www.c-lean.com	
Contact person	Stefano Merlin	

Appendix 2. Affirmation regarding public funding

Not applicable.

Appendix 3. Applicability of methodologies and standardized baselines

Not applicable.

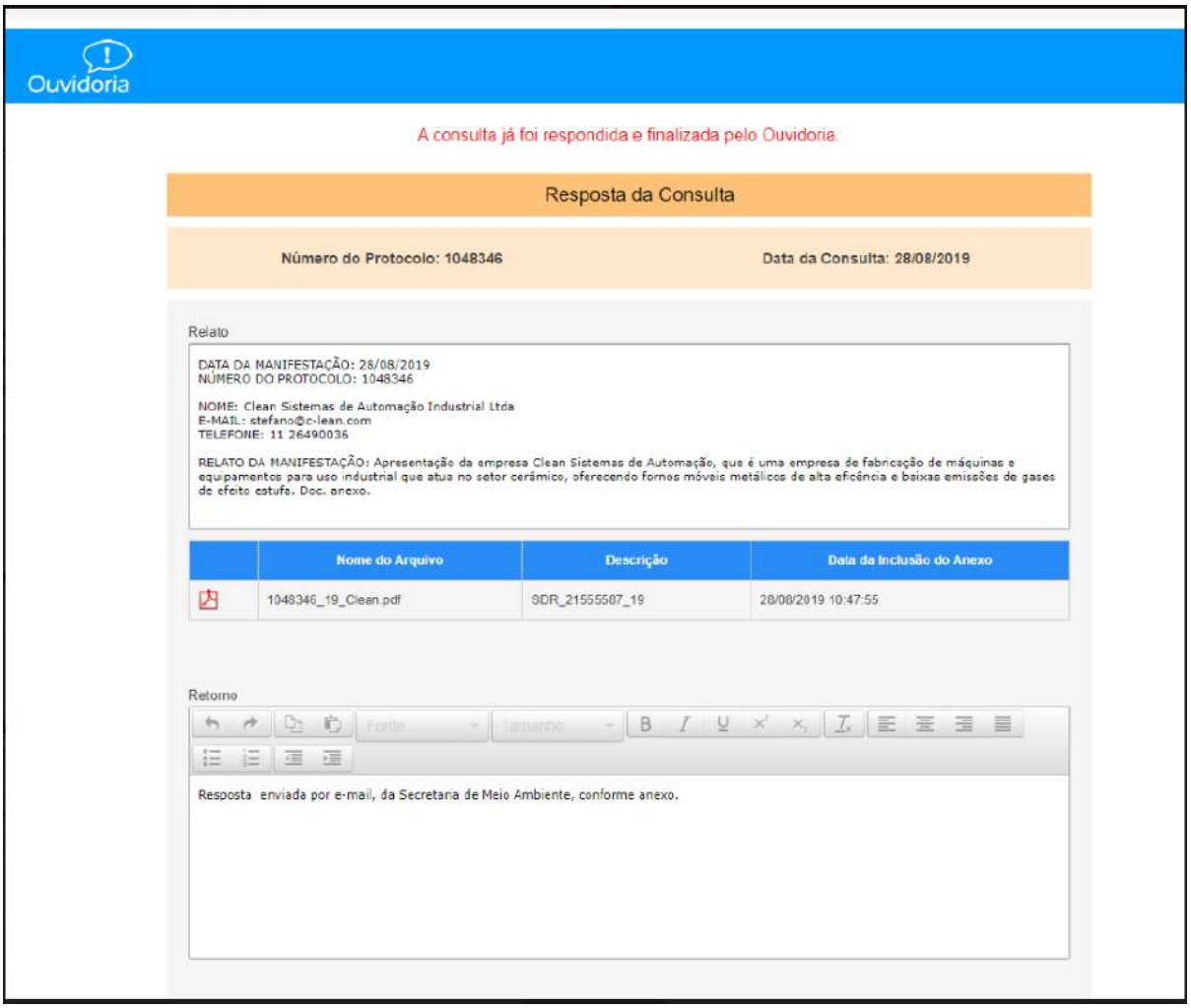
Appendix 4. Further background information on ex ante calculation of emission reductions

Not applicable.

Appendix 5. Further background information on monitoring plan

Not applicable.

Appendix 6. Summary report of comments received from local stakeholders



Appendix 7. Summary of post-registration changes

Not applicable.