Proposed standardized baseline submission form (Version 03.0)

To be used by a designated national authority (DNA) when submitting a proposed standardized baseline in accordance with the "Procedure: Development, revision, clarification and update of standardized baselines" (CDM-EB63-A28-PROC).

INFORMATION TO BE COMPLETED BY THE DNA	
Title of the proposed standardized baseline:	Standardized baseline for brick sector in Colombia
Name(s) of the Party or Parties to which the proposed standardized baseline applies:	Republic of Colombia
DNA submitting this form:	DNA of Colombia – Climate Change Division of the Ministry of Environment and Sustainable Development of Colombia
Is the proposed standardized baseline submitted by a single Party or group of Parties? *(If the Party had 10 or fewer registered CDM project activities as of 31 December 2010, or each Party of the group of Parties had 10 or fewer registered CDM project activities as of 31 December 2010, has the Party or each Party of the group of Parties used the option to omit the assessment report more than twice in past submissions of a proposed standardized baseline?)*	☒ Single Party ☐ Group of Parties

Attachments:

☒ Additional documentation supporting the submission (e.g. relevant data, statistics, studies, calculation tables, quality control report, etc.), where applicable

☒ Data used to establish the proposed standardized baseline in a sector-specific data template

☒ An assessment report prepared by a designated operational entity (DOE)

☐ Letters of approval of all the DNAs of the Parties to which the proposed standardized baseline applies, where the standardized baseline applies to a group of Parties

Name of authorized officer signing for the DNA:	Rodrigo Suarez Castaño – Head of the Climate Change Division
Date (DD/MM/YYYY) and signature for the DNA:	19/07/2016
Contact information of the focal point(s) of the DNA: *(Names, e-mail addresses and phone contacts for procedural and technical communication on the submission)*	Rodrigo Suarez Castaño rsuarez@minambiente.gov.co Sebastian Carranza Tovar scarranza@minambiente.gov.co phone: +57 (1) 332 3400 Ext. 2411
Name(s) of the proponent(s) of the proposed standardized baseline:	DNA of Colombia – Climate Change Division of the Ministry of Environment and Sustainable

	Development of Colombia
Affiliation of the proponent(s): *(The definition of "admitted observer organization" can be found at https://cdm.unfccc.int/Reference/Guidclarif/glos_CDM.pdf)*	☒ Party ☐ Project Participant (PP) ☐ International Industry Organization ☐ Admitted Observer Organization
Contact information of the focal point(s) of the proponent(s): *(Names, e-mail addresses and phone contacts for procedural and technical communication on the submission. This section does not need to be completed if the DNA(s) is(are) the proponent(s) of the proposed standardized baseline.)*	Rodrigo Suarez Castaño rsuarez@minambiente.gov.co Sebastian Carranza Tovar scarranza@minambiente.gov.co phone: +57 (1) 332 3400 Ext. 2411
INFORMATION TO BE COMPLETED BY THE SECRETARIAT AND THE PROPONENT(S)	
Further inputs requested from the proponent(s) on the proposed standardized baseline: ***(List of additional information and/or modifications that are required to prepare a draft standardized baseline, if applicable.)***	
Response from the proponent(s): ***(If there are changes in the proposed standardized baseline form as a result of changes carried out, submit the changes in the highlighted text).***	

Proposed standardized baseline submission form
CDM-PSB-FORM (Version 03.0)

Title: STANDARDIZED BASELINE FOR THE SECTOR OF BRICK PRODUCTION IN COLOMBIA

Submission date (*dd/mm/yyyy***): 19/07/2016**

Version number: 2.0

Approaches

Check below all the approaches used to develop the proposed standardized baseline and state the version and/or the reference (number, title, version) if applicable.

☒ The approach contained in the "Guidelines for the establishment of sector specific standardized baselines" (Version: 02.0)

☐ A methodological approach contained in an approved, proposed new or revised baseline and monitoring methodology (reference:_____)

☐ A methodological approach contained in an approved, proposed new or revised methodological tool (reference :_____)

☐ The approach contained in the "Guideline: Establishment of standardized baselines for afforestation and reforestation project activities under the CDM" (version: _____)

Combination of the approaches (if applicable)

Provide a justification for the necessity and the appropriateness of the combination if more than one approach was used for the development of the proposed standardized baseline.

New or revised methodology or methodological tool (if applicable)

N/A. The proposed SBL will be used on conjunction with the approved small-scale methodology AMSIII.Z

Elements to be standardized

☒ Additionality

☒ Baseline/baseline land-use scenario

☒ Baseline emission/removal parameter

☐ Land eligibility (applicable only to afforestation and reforestation project activities)

SECTION A: PROPOSED STANDARDIZED BASELINE DEVELOPED USING THE APPROACH CONTAINED IN THE "GUIDELINES FOR THE ESTABLISHMENT OF SECTOR SPECIFIC STANDARDIZED BASELINES"

Applicability of the proposed standardized baseline

- *The host country(ies) or region(s) within a host country to which the proposed standardized baseline is applicable. In case of disaggregation by region(s) within a host country, document transparently the geographical boundaries of the region (e.g. provinces, electric grids, etc.).*

  This proposed Standardized Baseline will be applicable to the Republic of Colombia

- *Other factors for disaggregation (e.g. output capacity, age of facilities) relating to the applicability of the proposed standardized baseline, if applicable.*

  N/A

- *The sector(s) to which the proposed standardized baselines is applied. Note that a sector refers to a segment of a national economy that delivers defined output(s) (e.g. clinker production, domestic/household energy supply). The sector is characterized by the output(s) O_i it generates.*

  This Standardized Baseline will be applied to the brick sector in Colombia, which is divided in two groups in accordance with the size of enterprises, as follows:

G1	*Micro and small enterprises (It is included "Chircales" in Artisanal and Mechanized way)*[1].
G2	*Medium and large sizes of enterprises*[2].

- *The output to which the proposed standardized baseline is applied, i.e. the goods or services with comparable quality, properties, and application areas (e.g. clinker, lighting, residential cooking).*

  The outputs are Brick and Tiling (named in Spanish: Toletes, Tejas de barro, Tablón prensado, cuarterón, adoquín, Farol, Bloques)

- *The measure(s) to which the proposed standardized baseline is applicable is/are:*

  ☐ *Fuel and feedstock switch*

  ☒ *Switch of technology with or without change of energy source (including energy efficiency improvement)*

[1] Micro and small enterprises have the following characteristics:
- Production between 600 and 10,000 tons/year;
- Number of employees between 1 and 50

[2] Medium and large enterprises have the following characteristics:
- Production above 10,000 tons/year;
- Number of employees above 50

☐ *Methane destruction*

☐ *Methane formation avoidance*

Additionality standardization

The applicable version of the EB65 – Annex 23 (*"Guidelines for the establishment of sector specific standardized baselines"*) indicates that for the standardization of additionality for *"Measure 2: Switch of technology with or without change of energy sources (including energy efficiency improvement)"* it is necessary to arrange in a descending order of carbon intensity the cumulative percent of output *Oi*, produced based on different technologies. In doing so, Technologies that have lower greenhouse gas intensity than any of the technologies used to produce aggregately more than *Ya%* of the output *Oi* of the sector and are less commercially attractive than any of these technologies, are deemed additional.

For the purpose of this SBL, *Ya% is equal to 90%*, following the Appendix I from the guidelines.

The DNA of Colombia has hired CAEM (Corporación Ambiental Empresarial) to develop this SBL. CAEM has update and realistic information of more than 280 brick industries that represent 80% of the Colombia's production. Information from regional authorities, universities and technological centres, among others, were also incorporated in the development of this SBL.

The study from CAEM[3] shows that the brick sector in Colombia produces bricks and similar products with different references and dimensions, such as Rowlocks, Block #3, Block #4, Block #5, Block #6, brick, mood tiles, tablón prensado, cuarterón, cobble, Farol, Gran formato and it is considered that these products have similar uses and qualities (products *Oi*).

CAEM's study also shows that the most commonly used brick kilns in Colombia are Pampa (Arabic) and Fuego Dormigo kilns, followed by the Hives as illustrated in the picture below:

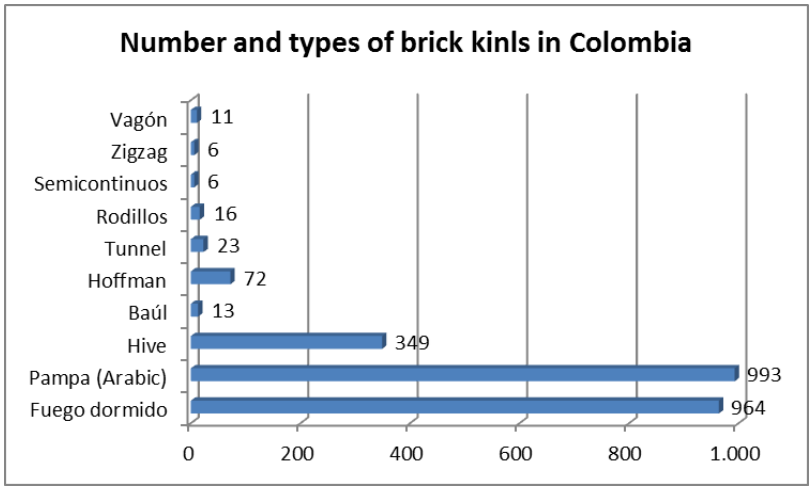

Figure 1. Number and types of bricks kilns in Colombia

The use of efficient technologies is directly related to the size of the industry – *Pampa (Arabic)* and *Fuego Dormido* kilns are commonly observed in *chircales artesanales* (artisanal production, with a very low energy efficiency and high consumption of fuel and, consequently, high CO_2 emissions), whereas the other types of kilns as observed in medium to large industries (semi-mechanical or mechanical

[3] Deliverable 3 (Etapa de construcción de la línea base y análisis de mecanismos de mercado) from the Consultancy contract #170 to estimate a standaredized baseline for CDM projects, to demonstrate its additionality in the brick sector in Colombia

production). Regarding the fuel consumed, it was identified that coal is the one commonly used by all types of kilns (except for the Pampas), as illustrated in the picture below:

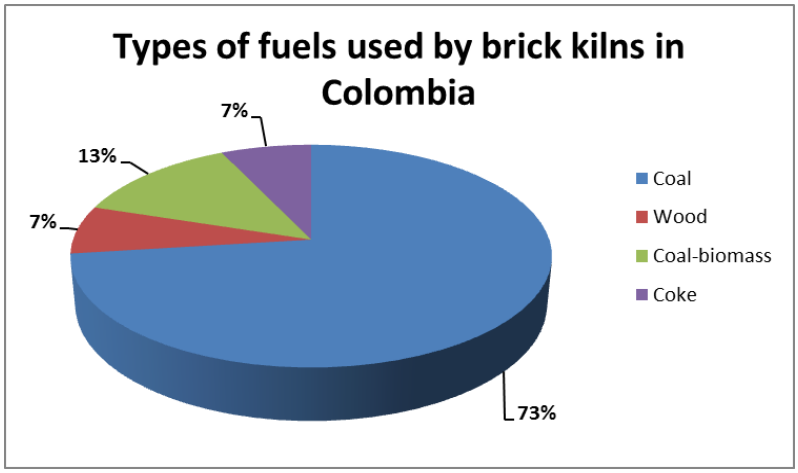

Figure 2. Types of fuels used by brick kilns in Colombia

Still on the Pampa kilns, CAEM has identified that type of fuel consumed is, for each department:
- Valle del Cauca: wood;
- Cesar: wood;
- Antioquia: some use coal+biomass (coffee husk, wood, guamo, coffe firewood) and some use only coal;
- Cundinamarca: coal[4];
- Norte de Santander: coal

The brick sector in Colombia is, therefore, heterogeneous and can be better explained through the size of the industry, which justifies the development of this SBL by dividing the brick sector in Colombia in two groups in accordance with the size of enterprises, as follows:

G1	*Micro and small enterprises (It is included "Chircales" in Artisanal and Mechanized way)*[1].
G2	*Medium and large sizes of enterprises*[2].

CAEM has revised the below listed information based on primary sources (site-visits) and secondary sources (environmental authorities and other studies related to the sector's energetic efficiency):

1) Brick industries / number of plants
2) Geographical location (city, district)
3) Sizes (Micro/Medium/Large) (Artisanal/Mechanized)
4) Technology (Types and number of kilns/efficiency)
5) Amount and types of fuels consumed
6) Production efficiencies (energy/amount of clay)
7) Production costs per unit
9) Types of products (tiles/Blocks #)

Next, with the information compiled, a statistical analysis was conducted with the following characteristics:

• **Universe:** Brick industries in Colombia

[4] Through the site-visits, it was identified that some brick industries have introduced technologies to use Natural Gas, however they keep using coal since the supply of Natural Gas is not (in the end, a mix Natural Gas-Coal is used)

• **Target Population:** active brick kilns in the cities belonging to the departments of Huila, Boyacá, Cundinamarca, Cesar, Norte de Santander, Valle del Cauca and Antioquia. 80% of the brick production in Colombia is mostly concentrated in 4 regions – Bogotá and Cundinamarca, Norte de Santander, Antioquia and Valle del Cauca)[5].

• **Sampling Frame:** a list with the names of 823 brick industries.

• **Date:** Information collected from 2011 to 2013.

The results are shown in the tables below:

Table 1. Existing technologies for brick production in Colombia

From lower to higher carbon intensity

Tecnology/Efficiency	Low efficiency	Medium efficiency	High Efficiency
	Intermitents	**Semi-continuous**	**Continuous**
Types of Kilns	- Fuego dormido (1) - Pampa (Arabic) (1) - Baul (2) (3) - Hives (4)	- Vagón (5) - Zig-Zag (5) - Intermitent (5)	- Hoffman (6) - Zig-Zag continuous (6) -Multiple Chambers (6) - Tunnel (6) - Rodrillos (6)
Common Practice	(1) Artisanal *Chircales* (2) Mechanized *Chircales* (3) Small non-mechanized industries (4) Small mechanized industries	(5) Medium mechanized industries (5.000-10.000 ton/year of production)	(6) Large industries (over 10.000 tons/year of production) – possible usage of gas and other fuels

Table 2. Type of fuel associated with the available technologies and its characteristics

Tecnology/Efficiency	Low efficiency	Medium efficiency	High Efficiency
	Intermitents	**Semi-continuous**	**Continuous**
Types of Kilns	- Fuego dormido (1) - Pampa (Arabic) (1) - Baul (2) (3) - Hives (4)	- Vagón (5) - Zig-Zag (5) - Intermitent (5)	- Hoffman (6) - Zig-Zag continuous (6) -Multiple Chambers (6) - Tunnel (6) - Rodrillos (6)
Characteristics	One or several independent chambers	Optimizes the use of the waste energy to heat the chambers. Contains charging cars to facilitate the loadings and unloadings.	Uses the waste heat to heat the raw bricks. Contains lower energy and conservation consumption, if compared with other types of kilns. Manuel fuel feeding or with the support of carbojet

[5] CAEM, 2013. Oportunidades para reducir las emisiones contaminantes SLCPS en el sub-sector de producción de ladrillos en Colombia, Convenio específico de colaboración entre la Universidad Autónoma Metropolitana de México y la Corporación Ambiental y Empresarial - CAEM, Colombia, informe final.

Fuels used	Coal Wood Biomass		Gas Diesel Coal Electricity

The table below presents the outcome of the site-visits and other available documents (environmental authorities and other studies related to the sector's energetic efficiency) on the common technologies and fuels used by surveyed brick industries.

Table 3. Common Practice – technologies and fuels used for the production of *Oi*

Department	Representativity of the information	Number of plants	Relevant product (Oi)	Less relevant product	Relevant fuel	Less relevant fuel	Type of Kiln	Size of the industry	Production (amount of bricks/batch)
Cesar	100%	6	Rowlock 30 x 15 x 9		Wood	Wood	Pampa	Micro and small	60,000
Huila	61%	82	Block #4	Rowlock	Mix of fosil with biomass. Coffee husk, Coal, Wood, guamo, coffee woodfire	Coal and ACPM	Pampa (Arabic)	Micro and small	1,157,900
		1	Block #4		Coal		Hive	Micro and small	12,000
		2	Brick Tablón rayado Mood tiles Tablón prensado Cuarterón Cobble Block #4		Coal	Coffee husk	Semi-continuous chamber	Small and Medium	91,200
		2	Brick Tablón rayado Mood tiles Tablón prensado Cuarterón Cobble Block #4		Coal		Hoffman	Large	1,194
Boyacá	98.8%	381	Rowlock	Block #5	Coke		Fuego Dormido	Micro and Small	12,000
		29	Block #4 y #5	only Block #5	Coal	Coke	Hive	Micro and Amall	436,506
		1	Block #4 and #5		Coal		Vagón	Micro and Amall	12,000
		5	Block #4 and #5		Coal		Hoffman	Medium	2,038
		1	Block #4 and #5		Coal		Tunnel	Medium	980
Cundinamarca	69.1%	2	Rowlock		Coal		Pampa (Arabic)	Micro	-
		101	Rowlock	Tejas	Coal		Fuego Dormido	Micro	3,983,000
		8	Block #4	Cobble and Block #5	Coal		Baúl	Micro and Amall	52,000
		47	Block #4 and #5	Tolete, Block de gran formato, cobble	Coal		Hive	Micro and Amall	1,235,778
		11	Block #4 and #5	Block #3, Cobble	Coal		Semi-continuous	Small	148,467
		4	Block #4 and #5	Cobble	Coal		Zig-Zag	Small	200,000

		27	Block #4	Block #3, Block #5, Cobble, Gran Formato	Coal		Hoffman	Medium	11,043
		9	Block #4	Block #3, #5 and #6, Cobble, Gran Formato and prensado	Coal		Tunnel	8 Medium 1 Large	5,295
Norte de Santander	100%	1	Tiles		Coal		Pampa (Arabic)	Micro	15,000
		74	Block #4	Enchapes, Tableta, Tiles	Coal		Hive	71 Small 3 Medium	1,851,000
		2	Tableta		Coal		Hoffman	Medium	235
		3	Block #4 y Tableta		Coal		Tunnel	2 Medium 1 Large	3,000
		2	Tableta		Coal		Rodillos	2 Large	3,500
Valle del Cauca-Cauca	85.71%	148	Farol, Rowlock	Baldosa de barro, Tiles, Matera	Wood	Coal, Coffee husk, guadua, wood	Pampa (Arabic)	Micro	6,198,420
		1	Farol		Coal and macadamia		Vagón	Small	400,000
		5	Farol	Bricks	Coal	Coffee husk	Hoffman	Medium	3,347
		2	Bricks	Tiles	Coal		Tunnel	1 Medium 1 Large	6,200
Antioquia	28%	2	Bricks		Coal	Cobble	Pampa (Arabic)	1 Micro 1 Small	334,000
		1	Bricks		Coal		Hive	1 Small	-
		5	Bricks		Coal		Vagón	5 Smalll	945,417
		1	Bricks		Coal		Zig-Zag	Small	501
		1	Bricks		Coal		Hoffman	Small	1,166
		12	Bricks		Coal		Tunnel	1 Micro 3 Small 7 Medium	5,456

The carbon intensity of different types of technologies (kilns) was determined by CAEM as follows:

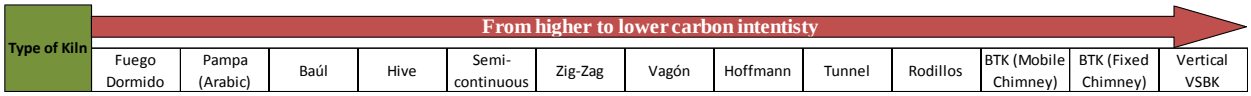

Figure 3. Carbon intensity of different types of kilns

Based on the tables above, the cumulative percent of output *Oi* (based on technologies) was arranged in descending order of carbon intensity of the technologies for the group G1, as follows:

Table 4. Determination of cummulative production of bricks in industries belonging to G1 in descending order of carbon intensity

Type of kiln	Production of Oi/batch in micro and small industries	% of production of bricks in micro and small industries
Fuego dormido	3,995,000	23.301%
Pampa (Arabic)	7,765,320	45.292%
Baúl	52,000	0.303%
Hive	3,535,284	20.620%
Semi-continuous	239,667	1.398%
Zig-Zag	200,501	1.169%
Vagon	1,357,417	7.917%
Hoffman	-	0.000%
Tunnel	-	0.000%
Total	**17,145,188**	**100%**

The graphic below illustrates the table above, highlighting the value *Ya* (90%):

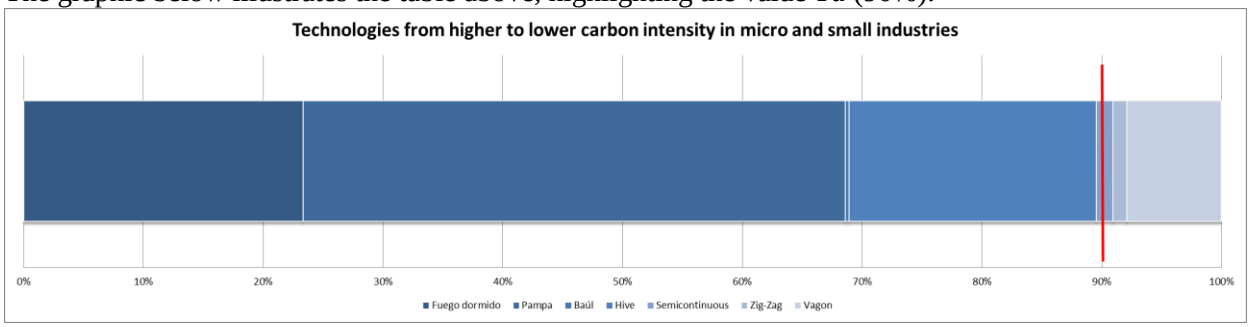

Figure 4. Determination of *Ya* for industries belonging to group G1

Therefore, technologies that represent more than 90% of the national production on a descending order of carbon intensity are kilns type Zig-Zag, Hoffman, Continuous chambers, Tunnel and others with higher efficiency.

Based on the same tables above, the cumulative percent of output *Oi* (based on technologies) was arranged in descending order of carbon intensity of the technologies for the group G2, as follows:

Table 5. Determination of cummulative production of bricks in industries belonging to G2 in descending order of carbon intensity

Type of kiln	Production of Oi/batch in micro and small industries	% of production of bricks in micro and small industries
Fuego dormido	-	0.000%
Pampa (Arabic)	-	0.000%
Baúl	-	0.000%

Hive	-	0.000%
Semi-continuous	-	0.000%
Zig-Zag	-	0.000%
Vagon	-	0.000%
Hoffman	19,023	47.612%
Tunnel	20,931	52.388%
Total	**39,954**	**100%**

The graphic below illustrates the table above, highlighting the value *Ya* (90%):

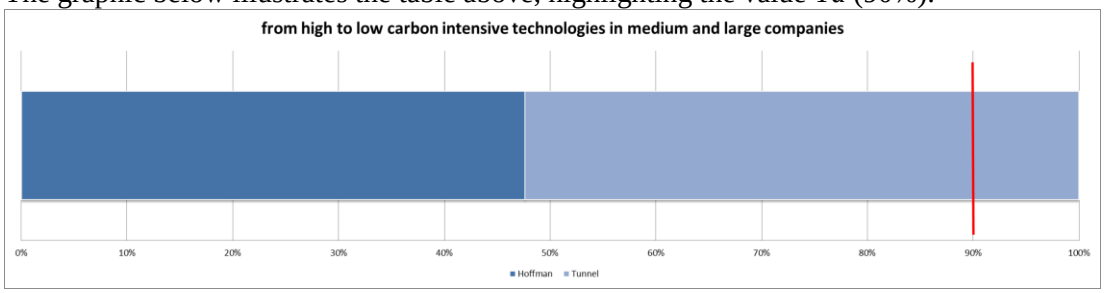

Figure 5. Determination of *Ya* for industries belonging to group G2

Therefore, technologies that represent more than 90% of the national production on a descending order of carbon intensity are kilns type BTK with mobile chimney, BTK with fixed chimney and Vertical.
Regarding the commercial attractiveness, CAEM has determined the cost per unit of each type of kiln based on relevant studies and national data, as indicated in the table below:

Table 6. Cost of production per unit of different types of technologies

Type of kiln	Cost of the kiln ($)	Cost per unit ($Col)[6]
Fuego dormido	5,000,000[7]	122
Pampa (Arabic)	15,000,000[7]	
Baúl	15,000,000[8]	282
Hive	70,000,000[8]	
Semi-continuous	500,000,000[7]	
Vagon	190,000,000[8]	
Zig-Zag	600,000,000[8]	
Hoffman	700,000,000[8]	
Tunnel	1,100,000,000[9]	1,080

It can be observed that the production cost through the use of technologies more efficient that semi-continuous kilns is significantly higher, considering that the in the figures "production cost /unit" takes into account the technological conversion cost. Additionally, an important barrier is the resistance of the brick sector in Colombia to accept the technological conversion – a sector that is very traditional and, therefore, faces some resistance to implement new technologies that results in reconfiguring their processes.
Regarding the existence of national or sub-national regulation mandating the use of these technologies and the Board's clarifications on the consideration of national and or sectoral policies and circumstances,

[6] The production costs are based on information from the study EELA (2011)

[7] Sourced from http://www.redladrilleras.net/documentos_galeria/MEMORIA%20DESCRIPTIVA%20HORNO%20MULTICAMARAS.pdf

[8] The costs for the different types of kilns and for the production in the baseline were based on studies from CAEM, developed under the Energy Efficiency program of brick industries in Nemocón and based on quotations from the brick industry's machinery suppliers MAQUILOB and METALURGICA SANTANDER.

[9] Value calculated based on the energetic balance of Tunnel kiln based on the study *"Modelamiento y simulación de un horno túnel industrial"*, sourced from http://www.bdigital.unal.edu.co/1882/1/71265369.2010.pdf; for the calculation, it is assumed that the parameters that reduce the efficiency of the Tunnel kiln are the energy losses and the heating of the "dead mass".

there is a regulation (Resolución 909/2008 from the MADS) enforcing the construction of ducts or chimneys for all activities that discharge contaminants to the atmosphere and these activities shall comply with the minimum permissible emissions of SOx, NOx, CO and dust; however this regulation ***does not specify*** the type of technology that has to be implemented.

The EB has clarified the definition of "national and/or sectoral policies and circumstances" as follows:

"A baseline scenario shall be established taking into account relevant national and/or sectoral policies and circumstances, such as sectoral reform initiatives, local fuel availability, power sector expansion plans, and the economic situation in the project sector" (EB22 – Annex 3, Paragraph 4).

The assessment of the compliance with this clarification will be made through the following topics:

(a) Assessment of Sectoral reform initiatives:
There are no reform initiatives for the brick sector in Colombia, except for punctual regulations such as the one enforcing the level of emissions from brick industries (see explanation above).

(b) Local fuel availability
According to information from CAEM, the brick sector in Colombia has consumed the following amounts of fuels:

Table 7. Consumptiom of fossil fuels by the brick industry on 2011

Energetic Source	Unit	Annual energy consumption	NCV[10]	Fuel Consumed
Coal	Tcal/año	295.58	7,000 kcal/kg	42,226 ton
Natural Gas	Tcal/año	277.66	8,300 kcal/m^3	33,453,012 m^3

According to the energetic balance of Colombia from 2013 (base-year 2012)[11], the internal offer of coal and natural gas were equal to 43,546 Tcal of coal (6,220,857 tons) and 107,567 Tcal of natural gas (around 13,000,000,000 m^3). Therefore, both fuels were abundant in the country to supply the brick sector.

(c) Power sector expansion plans
This is not applicable to the brick sector

(d) Economic situation in the project sector
According to information form ProExportm, with data from DANE and from the Ministry of Trade, Industry and Tourism, on 2011 Colombia has exported around U$ 342,5 millions of construction material (an increase of 10.2% with reference to 2010[12]), from which 50%[13] (U$171.2 millones) correspond to sales of products made of clay, ceramic and stones.

According with a study presented by TNA, it was estimated that on 2012 the country has produced around 4.5 million tons of bricks, being 50% of the production concentrated in the 60 big industries, representing around U$ 100 millions on sales[14] on 2.7% of the total existing industries.

The sector is also responsible for the generation of around 29.000 jobs (0.14% of the national labor), being 42.4% direct jobs, 43.4% indirect jobs and 13.7% temporary jobs.

[10] Source: Manual de Estadísticas Energéticas de OLADE, 2011 – Table 35
[11] Balance Minero Energético 2013, sourced from http://www.upme.gov.co/GeneradorConsultas/Consulta_Balance.aspx?IdModulo=3
[12] Tomado de: http://www.proexport.com.co/node/4072
[13] Calculated based on the report PROEXPORT COLOMBIA, Materiales de Construcción Nov/2012.
[14] Sourced from http://www.en-obra.com.co/panorama.htm, Edición 15.

It can be concluded that there are no national and/or sectoral policies and circumstances that create perverse incentives that may impact host Parties' contributions to the ultimate objective of the Convention.

Therefore, following the requirements of paragraphs 27 and 28 from EB65 – Annex 23, the technologies that are additional for the production of brick in Colombia for the group G1 and G2 are:

Table 8 . Brick kilns types that are deemed additional for groups G1 and G2

Group G1	Group G2
Zig-Zag kiln Hoffman kiln Continuous Chambers kiln Tunnel kiln Others more efficient kilns	BTK kiln with mobile chimney BTK kiln with fixed chimney Vertical kiln.

Baseline identification

Baseline identification was done in accordance with paragraphs 29 and 30 from EB65 – Annex 23, taking into account the technologies with the highest emission factors and contributing to produce in aggregate 90% of the output *Oi* produced in the sector. The technology with the lowest carbon emission factor among them is the baseline technology. The results for G1 and G2 are presented below:

Group G1
In accordance with Figure 4, the technology of baseline for micro and small enterprises is: **Furnaces Type semi-continuous or other type of furnaces with comparable energy efficiency.**

Group G2
In accordance with Figure 5, the technology of baseline for medium and large enterprises is: **Furnaces Type Tunnel or other type of furnaces with a comparable energy efficiency.**

Baseline parameter standardization

The emission factor for the ***semi-continuous kiln*** was determined based on the average of data taken from survey conducted at the department of Cundinamarca for 4 brick industries – the amount of monthly clay consumed, the monthly amount of fuel consumed and the NCV of coal consumed. The results were:

Table 9. Data used to calculate the emission factor of baseline semi-continuous brick kilns

Brick industry	Amount of clay consumed (t_{clay}/month) A	Amount of coal consumed (t_{coal}/month) B	Net calorific value of the coal (MJ/t_{coal}) C	CO2 emission factor of the coal (kgCO_2e/TJ) D
Ladrillera 19	520	64		
Ladrillera 137	600	48		
Ladrillera 140	1,412	82		
Ladrillera 164	150	20		
Ladrillera 165	228	20		
AVERAGE	**520**	**48**	**29,865.00**	**94,600**

The emission factor was calculated as the product of B x C / (A x D x 1,000), which is equal to **260.79 $tCO_2e/t_{clay\ consumed}$.**

Similarly, the emission factor for the ***Tunnel kiln*** was determined based on the average of data taken from survey conducted at the departments of Boyacá (2 brick industries), Cundinamarca (9 brick industries), Norte de Santander (2 brick industries), Valle del Cauca (2 brick industries) and Antioquia (12 brick industries) – the amount of monthly clay consumed, the monthly amount of fuel consumed and the NCV of coal consumed. The results were:

Table 10. Data used to calculate the emission factor of baseline tunnel brick kilns

Brick industry	Production (t_{clay}/month) A	Amount of coal consumed (t_{coal}/month) B	Net calorific value of the coal (MJ/t_{coal}) C	Average efficiency of tunnel technology (MJ/t_{clay}) AVG(B) x C / AVG(A)
Ladrillera 399 (Boyacá)	280	29.42	29,428.33	1,766.90
Ladrillera 401 (Boyacá)	700	29.42		
Ladrillera 5 (Cundinamarca)	3,600	208.8	29,865.00	1,732.17
Ladrillera 132 (Cundinamarca)	1,800	104.4		
Ladrillera 134 (Cundinamarca)	360	20.88		
Ladrillera 140 (Cundinamarca)	1,412	82		
Ladrillera 147 (Cundinamarca)	1,800	104.4		
Ladrillera 151 (Cundinamarca)	2,700	313.2		
Ladrillera 173 (Cundinamarca)	1,875	108.75		
Ladrillera 189 (Cundinamarca)	1,080	57		
Ladrillera 190 (Cundinamarca)	3,951	229.158		
Ladrillera 7 (Norte de Santander)	2,880	167	30,569.38	2,230.61
Ladrillera 35 (Norte de Santander)	2,880	253.3		
Ladrillera 4 (Valle del Cauca)	11,520	668.2	25,076.67	1,454.45
Ladrillera 5 (Valle del Cauca)	6,000	348.0		
Ladrillera 1 (Antioquia)	5,500	319	21,876.36	1,268.83
Ladrillera 2 (Antioquia)	1,800	104		
Ladrillera 5 (Antioquia)	4,200	244		
Ladrillera 8 (Antioquia)	3,420	198		
Ladrillera 9 (Antioquia)	904	52		
Ladrillera 11	6,000	348		

(Antioquia)				
Ladrillera 15 (Antioquia)	5,000	290		
Ladrillera 17 (Antioquia)	2,700	157		
Ladrillera 21 (Antioquia)	6,000	348		
Ladrillera 23 (Antioquia)	6,000	348		
Ladrillera 26 (Antioquia)	6,000	348		
Ladrillera 27 (Antioquia)	6,000	348		
AVERAGE				**1,732.17**

The emission factor was calculated as the product of D x 94,600 ($kgCO_2e/TJ$) /1,000, which is equal to **163.863 $tCO_2e/t_{clay\ consumed}$.**

Baseline technology	Baseline emission factor (tCO_2/t_{clay})
G1: Furnaces Type semi-continuous	**$EF_{BL,\ G1}$ = 260.790**
G2: Furnaces Type Tunnel	**$EF_{BL,\ G2}$ = 163.863**

Use of the proposed standardized baseline with approved or proposed new or revised methodology(ies)

This proposed SBL has been developed following to together with the methodology **AMS-III.Z** "*Fuel Switch, process improvement and energy efficiency in brick manufacture*", replacing the following sections:

SECTION: 2. Scope, applicability and entry into force

SUB-SECTION: 2.1. Scope

Original text	Replacement by the SBL
Paragraph: 2. The methodology comprises one or more technology/measures listed below in brick production facilities: (a) Shift to an alternative brick production technology/process or installation of a new brick production technology/process; (b) Complete/partial substitution of fossil fuels or non-renewable biomass (NRB) with renewable biomass (including biomass from dedicated plantations or solid biomass residues such as sawdust and food industry organic liquid residues); (c) Complete/partial substitution of high carbon fossil fuels with low carbon fossil fuels; (d) Reduce the consumption of fossil fuels or NRB due to improvement of the production process.	Paragraph: 2. The methodology comprises one or more technology/measures listed below in brick production facilities: (d) Reduce the consumption of fossil fuels or NRB due to improvement of the production process.

SECTION: 5. Baseline methodology
SUB-SECTION: 5.2. Baseline emissions

Original text	Replacement by the SBL
Paragraph: 21. The emissions are calculated as below: $BE_y = SEC_{BL} \times EF_{BL} \times P_{PJ,y}$ Equation (1) Where: - BE_y = The annual baseline emissions from fossil fuels or NRB displaced by the project activity in tCO_2e in year y (of the crediting period) - SEC_{BL} = Specific energy consumption of brick production in the baseline, TJ per unit volume or mass unit (kg or m3) - EF_{BL} = The emission factor of baseline fuel(s), in t CO_2/TJ - $P_{PJ,y}$ = The annual net production of the facility in year y, in kg or m^3	Paragraph: 21. The emissions are calculated as below: $BE_y = EF_{BL,G1} \times P_{PJ,y}$ Equation (1.1) $BE_y = EF_{BL,G2} \times P_{PJ,y}$ Equation (1.2) Where: - BE_y = The annual baseline emissions from fossil fuels or NRB displaced by the project activity in tCO_2e in year y (of the crediting period) - EF_{G1} = Baseline emission factor for semi-continuous brick kilns, for micro and small industries - EF_{G2} = Baseline emission factor for tunnel brick kilns, for medium and large industries

Validity of the proposed standardized baseline

Appendix I of "Guidelines for the establishment of sector specific standardized baselines" determines the following interim values used for the data vintage, the frequency of update and for Xa, Xb, Ya, Yb.

Sectors	Xa	Xb	Ya	Yb	Data vintage	Frequency of updates
Other sectors	90%	90%	90%	90%	Most recent 3 years	3 years

Deviations from the guidelines (if applicable)

N/A

References and any other relevant information

N/A

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Document information

Version	*Date*	*Description*
03.0	1 September 2015	Revision to: • Reflect updated requirements in the version 04.0 of “Procedure: Development, revision, clarification and update of standardized baselines” (CDM-EB63-A28-PROC) ; • Include editorial improvement.
02.0	1 December 2013	The document title has changed from “Proposed standardized baseline form” (F-CDM-PSB) to “Proposed standardized baseline submission form” (CDM-PSB-FORM). Revision to: • Reflect updated requirements in the “Procedure: Development, revision, clarification and update of standardized baselines” • Include editorial improvement
01.0	23 March 2012	Initial publication.

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