CDM proposed standardized baseline form
(Version 01.0)

(To be used by a designated national authority (DNA) when submitting a proposed standardized baseline in accordance with the "Procedure for submission and consideration of standardized baselines".)

SECTION 1: GENERAL INFORMATION	
DNA submitting this form:	Federal Democratic Republic of Ethiopia
Developer of the standardized baseline: *(Parties, project participants, international industry organizations or admitted observer organizations)*	Ambachew F. Admassie ; for Ethan Bio-Fuels Pvt. Ltd. Co. (Project Participant)
Party or Parties to which the standardized baseline applies:	Ethiopia
Sector to which the proposed standardized baseline applies: *(the sector according to the definition of sector in the "Guidelines for the establishment of sector specific standardized baselines")*	Cement Sector, Clinker Output

SECTION 2: LIST OF DOCUMENTS TO BE ATTACHED TO THIS FORM *(please check)*

☐ An assessment report presenting how the data was collected, processed and compiled to establish the proposed standardized baselines;

As per Section 9 of "Procedure for submission and consideration of Standardized Baselines" V01.0, Assessment report is not required as this is the first proposed Standardized Baseline by the Host country with less than 10 registered CDM project activities.

☐ Where the proposed standardized baseline applies to a group of Parties, letters of approval of all the DNAs of the Parties to which the standardized baseline applies;

The proposed Standardized Baseline is submitted for a single Host Country i.e Ethiopia

☐ Additional documentation supporting the submission (e.g. relevant data, documentation, statistics, studies, calculation tables, etc.), when applicable.

Spreadsheet of aggregation data for the region, DNA QC report, and response serving as bridge between raw data and spreadsheet, the responses to the requests for clarification of findings as well as scanned copies of raw data on clinker production collected for each relevant cement plant in the Host Country.

Name of authorized officer signing for the DNA:	Mr Dessalegne Mesfin, Deputy Director General, Federal Environmental Protection Authority, FDRE
Date and signature for the DNA:	12/07/2013
Name and contact details of the focal point(s) for any follow up communication: *(all communication regarding procedural or technical issues will be sent to the focal point(s))*	Mr. Ambachew F. Admassie: Tel:00251-911-218626, Email: ethanbiofuelsltd@gmail.com, For PP. Mr. Dereje Agonafir, (For DNA office), EPA Email: derejeagonafir@yahoo.com
SECTION BELOW TO BE COMPLETED BY THE UNFCCC SECRETARIAT	
CDM-PSB ID number:	

Date when the form was received at UNFCCC secretariat:	
Have all Parties for which the standardized baseline is applicable fewer than 10 registered CDM project activities as of 31 December 2010? (Y/N):	
CDM-PSB ID number and version: *(to be completed by UNFCCC)*	

CLEAN DEVELOPMENT MECHANISM PROPOSED STANDARDIZED BASELINE (CDM-PSB) (VERSION 01.0)

"Standardized baselines for clinker production in Ethiopia"

Submission date: July 11, 2013

Version Number: 03

Source

If the standardized baseline was developed using a methodological approach contained in an approved methodology or tool please provide the name, number (if applicable) and version of the approved methodology or tool used.

If it was developed using the "*Guidelines for the establishment of sector specific standardized baselines*" please state the version of the guidelines used.

If a table of calculation is available for the development of the standardized baseline, please state the version of the table used, and submit it with this form.

It was developed using the "*Guidelines for the establishment of sector specific standardized baselines*" version 02.0. Moreover quick start threshold values for non priority sectors under, "Work program on standardized baselines" Version 01.0 is applied.

- *Additionality*: Regarding Additionality, the standardized Baseline has provided Standardized Additionality criteria using the Guideline.
- *Baseline*: Regarding Baseline Scenario, the standardized Baseline has provided Standardized Baseline using the Guideline.
- *Baseline Emission*: Regarding Baseline Emission, the Standardized Baseline have drawn relevant algorithms;
    - From Baseline Emission sections of ACM 0015V3 (Eq 1 to 9) and Standardized it to Emission Factor
    - From Baseline Emission sections of ACM 003V3 (Eq 12) and Standardized it to Emission Factor
- *Project Emission*: Regarding Project Emission, the Standardized Baseline have drawn relevant algorithms
    - From Project Emission section of ACM 0015V3 and conservatively simplified it
    - From Project Emission sections of ACM 003V3, taking into account relevant assumptions

- *Leakage*: Regarding Leakage Emission, the Standardized Baseline have drawn relevant algorithms
    - From Leakage Emission section of ACM 0015V3 and conservatively simplified it taking Ex-ante CM grid emission factor of host country into account (i.e 0.00tCO_2/MWh)
    - From Leakage Emission sections of ACM 003V3, taking into account relevant assumptions
- *Monitoring*: Regarding Monitoring Parameters, the Standardized Baseline has drawn relevant monitoring tables from ACM 0015V3 and ACM 003V3 removing parameters that are irrelevant as a result of standardization of Baseline and simplification of algorithms.

Hence this standardized Baseline is a complete methodology document, without any need to cross refer any other Methodology or Tool.

- *Data*: Regarding quality of data used for establishing standardized baseline; primary data, data officially obtained by DNA for CDM purpose, and data collected by other Government Authorities have been used.
- *Level of Aggregation*: The host country is considered as the Region taking only plants built in the last five calendar years before the submission year of the standardized baseline were included in the analysis. Although there were no public plants built in the last ten years, they will not be included in the aggregation even in case they penetrate in future. Public and quasi public clinker facilities in the host country are established with state/non commercial funding, obtain state collateral / guarantee against foreign loan and mostly operate in different market circumstances than private investment. Disaggregation helps to compare similar investment circumstances in one level playfield.
- General information

1. Pet coke, coal and HFO have been utilized by the relevant Cement kilns in the host country historically. There is no domestic source of fossil kiln fuel in the host country.
2. Cement kilns in the host country historically utilize a combination of limestone and clay for clinker production and some insignificant (<1% sand) as kiln stabilizer. All cement kilns are clustered around source of the major clinker raw material i.e limestone.
3. Refurbishment of existing plants or erection of new better performing clinker kilns can be eligible project activities.

Type of standardized baseline approach

The standardized baseline is developed for:

■ Additionality demonstration;

■ Baseline identification;

■ Baseline emission estimation

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

This section should only be completed when the standardized baseline is developed using the "Guidelines for the establishment of sector specific standardized baselines".

Applicability of the standardized baseline

The Standardized Baseline is applicable for a single as well as multiple measures on existing as well as new cement clinker kilns.

Please provide the following information:

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

  Ethiopia is a big country with north-south and east-west distance more than 1000km each. The standardized Baseline is established taking the Host Country as Region taking into consideration similar circumstances and that there is no evident geographic restriction on product marketing across the nation.

- The sector(s) to which the 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.

  The sector to which the standardized baseline is applied is the cement sector.

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

  The output identified is CLINKER.

- The measure to which the standardized baseline is applicable:

  ■ Fuel switch; or

  ■ Switch of technology with or without change of energy source (including energy efficiency improvement); or

  ☐ Methane destruction; or

  ☐ Methane formation avoidance

Additionality demonstration

Please explain how the “Guidelines for the establishment of sector specific standardized baselines” were applied to demonstrate Additionality and develop a positive list of project activities that are deemed additional. Follow the steps and guidance of the “Guidelines for the establishment of sector specific standardized baselines”. Document all underlying data, data sources, assumptions, calculation steps and outcomes in a clear and transparent manner.

All the steps in Section V of the “Guidelines for the establishment of sector specific standardized baselines” are applied. Project participants shall apply the following steps for Additionality Demonstration:

Additionality Criteria: Positive list of fuels /feed stocks and technologies is selected as Additionality Criteria, determined by the fast start thresholds approved for Additionality by the CDM Executive Board (i.e. 90%) under, “Work program on standardized baselines” Version 01.0.

i. Kiln Fuel switch

Kiln fuels with carbon intensity less than that of Pet coke (which is the fuel with least carbon intensity among the fuels used to produce 90% (X_a = 90%) of the clinker produced by plants in the region) and facing barrier(s) are included in positive lists. Ethiopia doesn’t extract oil or coal and hence users import all types of kiln fuel. Switch to any of such fuel type(s) is Additional.

Positive list: fossil kiln fuel with emission intensity better than Pet Coke, alternative kiln fuels, biomass kiln fuels

ii. Feedstock switch:

Limestone and Clay are both carbonated raw materials regardless of the proportion. Since all (100%) cement Clinker kilns utilizes limestone and clay in the host country historically as well as anywhere else by norm, this is a common factor in all types of kilns. The spread sheet confirms also that all of the clinker in the host country used Limestone and clay as feedstock for clinker production. Switch to any feedstock with less carbon intensity than Limestone and clay and having a landed cost higher than $1.73/ton is Additional.

Positive list: feedstock that may emerge with evolution of knowledge

iii. Technology switch

Kiln technologies with carbon intensity lesser than the carbon intensity of the best kiln technology (VSK with SKC of 5.43GJ/t Clinker as historically operated by Jema taking the emission factor of the identified baseline kiln fuel (Pet Coke), among those used to produce aggregately 90% (X_a=90%) of the total clinker produced by plants in the cement region, and facing barrier(s) or less commercially attractive (Ex: with their capital investment cost per unit of rated daily output higher than that of the above kiln (i.e $31,000) are included in positive lists. The Switch to any of such technology types with better kiln emission intensity than that of the above kiln is Additional.

Where barriers are referred, PP’s shall only use Access to Finance as a legitimate barrier as follows.

For Private clinker facility CDM applicants; the most important barrier for private investors in the host country is not comparative commercial attractiveness i.e levelized cost. It is rather the hurdle to access initial investment capital. Hence if there is no private capital market in the Host Nation or if there is no rating by rating agency (Ex: Standard & Poor) by the time of application of the project activity for CDM application to DNA, then the barrier for access to financing upfront cost is automatically deemed confirmed to exist.

For Public/quasi public clinker facility CDM Applicants: if equity has been placed by the entity but there is no signed funding agreement by the time of application of the project activity for CDM LOA application to DNA, then the barrier for access to financing upfront cost is confirmed to exist.

Positive list: existing kiln retrofit, newly erected rotary kilns of multiple staged pre-heaters

Baseline identification

Please explain how the "*Guidelines for the establishment of sector specific standardized baselines*" were applied to identify the baseline for the measures. Follow the steps and guidance of the "*Guidelines for the establishment of sector specific standardized baselines*". Document all underlying data, data sources, assumptions, calculation steps and outcomes in a clear and transparent manner.

All steps in Section V of the "Guidelines for the establishment of sector specific standardized baselines" are applied. Project participants shall apply the following steps for Baseline Demonstration:

Baseline identification Criteria: Positive list of fuels /feed stocks and technologies is selected as baseline identification criteria, determined by the thresholds approved as fast start for Baselines by the CDM Executive Board (i.e. 90%) under, "Work program on standardized baselines" Version 01.0.

The DNA preferred that once the baseline is established measure by measure in Step 1, an aggregate baseline is further established in Step 2, so that the baseline emission factor would be one aggregate number per unit product through combining the results of the baseline identification process below. This will help

1. To provide one emission factor for the entire kiln operation and encourage any single or combination of measures with the intention to reduce emission intensity per unit product

2. To help take into account the effect of one measure on the other aspect so that the resultant effect reflects the performance of the kiln; Ex fuel/feedstock switch may affect kiln efficiency performance

Step 1: *Identification of individual baseline,*

Project participants shall apply the following Baselines Identified:

i. **Kiln Fuel switch**

Pet Coke, the kiln fuel with the lowest carbon intensity among the fuels contributing to produce in aggregate 90% (X_b=90%) of the Clinker output produced by plants in the region, is the baseline kiln fuel. 2006 IPCC Default fuel emission factor of Pet Coke for stationary combustion in manufacturing industries is 97.5Kg CO_2/GJ

ii. **Feedstock switch for clinker manufacturing**:

100% of the clinker produced in the host country and traditionally everywhere use Limestone and Clay as feedstock for clinker production. Limestone and clay is the baseline feedstock.

iii. **Kiln technology switch/retrofit measure**:

VSK Clinker kiln (as operated by Jema with three years average SKC_{BSL} value of 5.43 GJ/t taking the fuel emission factor of Pet Coke), the kiln technology with the least carbon intensity among the kiln technologies contributing to produce in aggregate 90% (Xb=90%) of the Clinker output produced by plants in the region, is the baseline kiln technology for clinker manufacturing. Comparison of this value with the result from Para 48C has also been made to check environmental integrity.

In combining all and following Para 46 of the "*Guidelines for the establishment of sector specific standardized baselines*" version 02.0, the baseline emission for each of the CDM measure should follow the step 2 "*Identification of Aggregate Baseline scenario*". This will also help to capture any likelihood of cross effects that each measure may have on the other. The carbon emission factor for the measure will be calculated taking the above identified values, identified as per the above procedure inserted in the relevant algorithms (Eq 1 to 8 below).

Step 2: *Identification of Aggregate Baseline scenario*

For CDM project activity measure involving either of the following,

1) Feedstock switch
2) Fuel switch
3) technology switch
4) both kiln efficiency (retrofit or new kiln erection) and kiln fuel switch
5) both feedstock switch and fuel switch
6) both feedstock switch and kiln efficiency
7) feedstock switch, kiln efficiency and fuel switch

The baseline scenario is identified as the aggregate baseline as follows:

VSK Clinker Kiln (as operated by Jema with three years average SKC_{BSL} value of 5.43GJ/t), utilizing Pet Coke as kiln fuel and limestone & clay as feedstock, is the Baseline Scenario for clinker manufacturing. The aggregate baseline emission factor would be calculated using the identified baseline technology specific performance efficiency (5.43 GJ/t) and the emission factor of Pet Coke (97.5KgCO_2/GJ) in the relevant algorithms from Eq. 1 to 8 including the algorithms for calcinations of limestone and clay.

Baseline emission factor estimation (if applicable)

Please explain how the "*Guidelines for the establishment of sector specific standardized baselines*" were applied to determine a baseline emission factor. Follow the steps and guidance of the "*Guidelines for the establishment of sector specific standardized baselines*". Document all underlying data, data sources, assumptions, calculation steps and outcomes in a clear and transparent manner.

1. **Emission Factor related to fuel consumption**

Emission from kiln associated with fuel consumption can vary because of

a. *Fuel type*: The GHG intensity of the fuel type used in the kiln even when the kiln technology and service level are kept constant.
b. *Kiln performance*: Efficiency of the kiln technology even when the fuel type or service levels are kept constant.

Both of these factors can be captured under the Baseline Emission factor by taking the emission factor of the baseline fuel identified under baseline identification taking kiln technology of the identified baseline plant. The value of fuel emission factor will be taken from the latest version of the IPCC default factors of the fuel type identified.

The Baseline Emission is calculated as follows:

$$BE_{FC\_Calcin} = SKC_{BSL} \cdot \frac{\sum\left(FC_{i,Calcin,y} \cdot NCV_i \cdot EF_{CO2,i}\right)}{\sum\left(FC_{i,Calcin,y} \cdot NCV_i\right)} \cdot CLNK_y \quad \textbf{(1)}$$

Simplified:

$$BE_{FC} = SKC_{BSL} \cdot CLNK_y . EFCo_{2,BL} \quad \textbf{(2)}$$

Where:

BE_{FC}	=	Baseline emission from fossil fuels displaced by alternative fuels or less carbon intensive fossil fuels in year *y* (tCO_2)
$EF_{CO2,BL,y}$	=	Carbon dioxide emissions factor for the Pet Coke in year *y* (tCO_2/GJ)

Substituting the values

BE_{FC}= 5.43 GJ/tClinker *.0 975tCO_2/GJ * $CLNK_y$

$EF_{FC} = BE_{FC}/CLNK_y = 0.529$ tCO_2/clinker

2. Emission Factor related to feedstock consumption

Emission from kiln associated with feedstock consumption can vary because of

a) *Kiln performance*: rate of fuel consumption for calcinations process. This factor has already been captured above

b) *Process emission*: *process emission from calcinations process* (EF_{Calcin} *)*

Process emission from Calcinations process

The calcinations emission factor (EF_{fs}) due to process emission from feedstock calcinations in baseline kiln (tCO_2/t clinker) is a [1]combination of emission factor of (a) limestone de-carbonization (Calcinations) for clinker production ($BE_{calcin}/CLNK_y$) and (b) emission factor for CKD dust ($BE_{Dust}/CLNK_y$) as outline below.

a) Emission factor (Limestone/Clay de-carbonization) for clinker production = $BE_{Calcin}/CLNK_y$

$$BE_{Calcin} = \frac{CLNK_y}{CLNK_{BSL}} \cdot \Big(0.785 \cdot \left(CaO_{CLNK,BSL} \cdot CLNK_{BSL} - CaO_{RM,BSL} \cdot RM_{BSL} \right) + 1.092 \cdot \left(MgO_{CLNK,BSL} \cdot CLNK_{BSL} - MgO_{RM,BSL} \cdot RM_{BSL} \right) \Big) \quad \ldots\ldots(3)$$

Where:

BE_{Calcin}	=	Baseline CO_2 emissions from calcination of calcium carbonate and magnesium carbonate (tCO_2)
0.785	=	Stoichiometric emission factor for CaO (tCO_2/tonnes of CaO)
1.092	=	Stoichiometric emission factor for MgO (tCO_2/tonnes of MgO)
$CaO_{RM,BSL}$	=	Non-carbonated CaO content in the raw materials in the baseline (tonnes of CaO/tonnes of raw material). These non-carbonated sources must be different from the non-carbonated materials used in the project activity
$CaO_{CLNK,BSL}$	=	CaO content in the clinker produced in the baseline (tonnes of CaO/tonnes of clinker)
$MgO_{RM,BSL}$	=	Non-carbonated MgO content in the raw materials in the baseline (tonnes of MgO/tonnes of raw material). These non-carbonated sources must be different from the non-carbonated materials used in the project activity
$MgO_{CLNK,BSL}$	=	MgO content in the clinker produced in the baseline (tonnes of MgO/tonnes of clinker)

[1] IPCC *Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories,CO_2 EMISSIONS FROM CEMENT PRODUCTION, 2. 2, page 177*

RM_{BSL}	=	Annual consumption of raw materials in the baseline (tonnes)
$CLNK_{BSL}$	=	Annual production of clinker in the baseline (tonnes). It is equal to the annual clinker production in year y.
$CLNK_y$	=	Annual production of clinker in the year *y* (tonnes)

Assuming the negative effect of [2]impurities in limestone and clay (InCaO= $CaO_{RMBSL}.RM_{BSL}$) equals the positive effect of [3]MgO component in clinker, equation becomes;

$$BE_{Calcin} = \frac{CLNK_y}{CLNK_{BSL}} \cdot \left(\ 0.785 \cdot \left(CaO_{CLNK,BSL} \cdot CLNK_{BSL} \right) \right) \qquad \text{......(4)}$$

$BE_{Calcin} = 0.785*CaO_{CLNK,BSL} * CLNK_y$

$BE_{Calcin}/CLNK_y = 0.785*CaO_{CLNK,BSL}$...**(5)**

Where, $CaO_{CLNK,BSL}$ is the %CaO of the clinker produced in project activity.

Conservatively, $BE_{Calcin}/CLNK_y$ = 0.507 tCO2/t clinker (IPCC default taking 64.6% for CaO)

b) Emission factor for CKD production = $BE_{Dust}/CLNK_y$

$$BE_{Dust} = \frac{\left\{ \left(C_{BSL} \cdot ByPass_{BSL} \right) + \frac{C_{BSL} \cdot d_{BSL}}{\left[C_{BSL} \cdot (1 - d_{BSL}) + 1 \right]} \cdot CKD_{BSL} \right\}}{CLNK_{BSL}} \cdot CLNK_y \qquad \text{...............(6)}$$

Where:

BE_{Dust}	=	Baseline CO_2 emissions factor due to discarded dust from bypass and dedusting units (CDK) system (tCO_2)
C_{BSL}	=	Baseline calcination emissions factor due to both de-carbonization reaction and fuel consumption in clinker production (tCO2/tonne of clinker)
$ByPass_{BSL}$	=	Annual production of Bypass dust leaving kiln system (tonnes)
CKD_{BSL}	=	Annual production of CKD dust leaving kiln system in the baseline (tonnes)
d_{BSL}	=	CKD calcination rate (released CO_2 expressed as a fraction of the total carbonate CO_2 in the raw materials)
$CLNKBSL$	=	Annual production of clinker in the baseline (tonnes)
$CLNK_y$	=	Annual production of clinker in the year *y* (tonnes)

Where the parameter C_{BSL} should be calculated as follows:

[2] Example: A default value of 2% for InCaO is already approved in ACM 0005 V07.1

[3] Ethiopian standard allows a 3% MgO content in clinker but conservatively chosen not to consider associated baseline emission

$$C_{BSL} = \frac{BE_{Calcin} + BE_{FC\_Calcin}}{CLNKy} \quad \textbf{(6.a)}$$

Where:

C_{BSL}	=	Baseline calcination factor due to both de-carbonization reaction and fuel consumption in clinker production (tCO2/tonne of clinker).
BE_{Calcin}	=	Baseline CO_2 emissions from calcination of $CaCO_3$ and $MgCO_3$ (tCO_2)
BE_{FC_Calcin}	=	Baseline CO_2Emission due to kiln fuel consumption using kiln efficiency of the baseline kiln for clinker production (tCO_2)
$CLNK_y$	=	Annual production of clinker in year y.

and

SKC_{BSL} = the baseline specific kiln consumption of the identified baseline technology plant

$\mathbf{EF}_{CO2,i}$ = the emission factor of the identified baseline fuel

C_{BSL}= (0.507 tCO_2/clinker * $CLNK_y$ + 0.529 tCO_2/clinker * $CLNK_y$)/ $CLNK_y$

= 1.036

Conservatively assuming all bypass dust is recycled ($ByPass_{BSL}$= 0) and full calcinations of dust, d_{BSL} =1, equation simplifies to;

BE_{Dust}= C_{BSL} * CKD_y ....**(6.b)**

[4]IPCC suggests that the CO_2 from lost CKD is commonly between 2-6% of the clinker produced. Conservatively taking 2% for the baseline plant,

BE_{Dust}= C_{BSL} * 2%* CLNKy

Kiln dust emission factor = BE_{Dust}/ $CLNK_y$ = 0.02 * C_{BSL} ………………..**(6.c)**

Aggregate Baseline Emission factor for Clinker feedstock calcinations process (tCO_2/t Clinker): the aggregate emission factor for calcinations is the sum of the emission from calcinations process and that from kiln dust;

EF_{fS} = 0.507 tCO2/t + 0.02 * C_{BSL} .... **(7)**

= .507 + .02 (1.036)

= .528 tCO2/t

[4] IPCC *Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories,CO_2 EMISSIONS FROM CEMENT PRODUCTION, 2. 6. 2, page 179*

The aggregate emission factor (EF_{Agg}) is the sum of the emission factor related to fuel consumption (EF_{FC}) and that related to feedstock consumption (EF_{FS}).

The results are tabulated below:

Unit	Emission source	EF_{FC}	EF_{fs}	EF_{Agg}
tCO_2/t Clinker	Emission factor	0.529	0.528	1.057

Table 001 summary table of Aggregate Emission Factor per unit clinker production

Any Clinker output produced with clinker kiln through investing in better kiln fuel, kiln technology, retrofit or raw material and resulting in emission factor better than the aggregate emission factor set in the table above will be able to claim emission reductions for the amount of clinker they produce.

$BE_y = EF_{Agg} * CLNK_y$ **(8)**

Note 1:

- Although VSK kiln doesn't have a waste heat recovery/recycle option, it is conservatively assumed that baseline technology used sun driers and project technology utilizes waste heat from rotary kiln or sun dryer to dry raw materials. Ethiopia is a tropical nation.

- All of the cement plants in the host country are connected to the grid. It is conservatively assumed that all baseline technology and project technology are connected to national grid. The grid emission factor is nearly zero. Moreover no plant has captive power plant except a small emergency generator set rarely utilized. PP's may also set the corresponding value for project emission to zero.

- Since aggregate Standardized Emission Intensity at clinker level (output) has been provided, PPs will not be able earn emissions reductions credits unless the resulting aggregate project clinker emission intensity is less than the baseline emission intensity. Hence cross effects of one measure on the other are properly taken into account.

Use of the standardized baseline with an approved methodology

Please explain how the standardized baseline will be used with the relevant approved methodology (ies) or an approved tool, i.e. which (parts of) the approved methodology(ies) or the approved tool are replaced by the standardized baseline. Note that a standardized baseline derived from the "*Guidelines for the establishment of sector specific standardized baselines*" will usually replace the sections on demonstration of additionality, identification of the baseline scenario and the determination of baseline emissions, while the methodology sections on applicability, project boundary, project emissions, leakage emissions and provision to monitor project and leakage emissions may not be affected by the use of the standardized baseline. If an approved methodology is not available, a new methodology should be submitted to be used with the standardized baseline, following the relevant procedures ("*Procedure for the submission and consideration of a proposed new baseline and monitoring methodology for large scale CDM project activities*" or "*Procedures for the submission and consideration of a proposed new small scale methodology*").

Approach

a) Applicability Conditions

All other Applicability conditions of the existing methodology ACM0015V3 and ACM003 V07.4.1 prevail except that this standardized baseline can be used for kiln retrofit as well as new project plants and hence historical data are not required from the project plant.

b) Baseline Scenario, Baseline Emission, Additionality and

The Additionality criteria, Baseline Scenario and Baseline Emission factors have been established by this standardized baseline. The Baseline Emission will be calculated from the established Emission Factor and the Service Level of the project activity.

c) "Project Emissions", "Leakage"

The algorithms of "Project Emissions" & "Leakage" have been extracted from relevant sections of the above methodologies.

a) Simplifications

Algorithms have been simplified taking eminent parameters into account. Ex: the negligible grid emission factor of the Host Country grid helps to eliminate all algorithms related to grid electricity.

The extracted Algorithms for Project Emission, Leakage Emission and Emission Reduction are provided in subsequent sections below.

Project Emissions

The Project Emission is the combination of alternative fuel consumption in the project kiln ($PE_{AF,y}$) and the calcinations of feedstock in the project kiln ($PE_{FS,y}$).

$$PE_y = PE_{AF,y} + PE_{FS,y} \quad \textbf{(9)}$$

Project Emission from alternative fuel consumption in the project kiln ($PE_{AF,y}$)

Project emissions from alternative fuel consumption in the project kiln (PE_y) include project emissions from the use of alternative fuels and/or less carbon intensive fossil fuels ($PE_{k,y}$), project emissions from additional electricity and/or fossil fuel consumption as a result of the project activity ($PE_{EC,y}$ and $PE_{FC,y}$), project emissions from combustion of fossil fuels for transportation of alternative fuels to the project plant ($PE_{T,y}$), and, if applicable, project emissions from the cultivation of renewable biomass at the dedicated plantation ($PE_{BC,y}$):

$$\mathrm{PE}_{\mathrm{AF,y}} = PE_{k,y} + PE_{FC,y} + PE_{EC,y} + PE_{T,y} + PE_{BC,y} \quad \textbf{(10)}$$

Where:

$PE_{AF,y}$	=	Project emissions during the year *y* (tCO_2e)
$PE_{k,y}$	=	Project emissions from combustion of alternative fuels and/or less carbon intensive fossil fuels in the project plant in year *y* (tCO_2)
$PE_{FC,y}$	=	Project emissions from additional fossil fuel combustion as a result of the project activity in year *y* (tCO_2)
$PE_{EC,y}$	=	Project emissions from additional electricity consumption as a result of the project activity in year *y* (tCO_2)
$PE_{T,y}$	=	CO_2 emissions during the year *y* due to transport of alternative fuels to the project plant (tCO_2)
$PE_{BC,y}$	=	Project emissions from the cultivation of renewable biomass at the dedicated plantation in year *y* (tCO_2e)

Project emissions are calculated in the following steps:

Step 1. Calculate project emissions from the use of alternative fuels and/or less carbon intensive fossil fuels.

Step 2. Calculate project emissions from additional electricity and/or fossil fuel consumption as a result of the project activity.

Step 3. Calculate project emissions from combustion of fossil fuels for transportation of alternative fuels to the project plant.

Step 4. Calculate project emissions from the cultivation of renewable biomass at the dedicated plantation.

Step 1: Calculate project emissions from the use of alternative fuels and/or less carbon intensive fossil fuels

Project emissions from the use of alternative fuels and/or less carbon intensive fossil fuels in the project plant are calculated as follows:

$$PE_{k,y} = \sum_{k} FC_{PJ,k,y} \times NCV_{k,y} \times EF_{CO2,k,y} \qquad \textbf{(11)}$$

Where:

$PE_{k,y}$	=	Project emissions from combustion of alternative fuels and/or less carbon intensive fossil fuels in the project plant in year *y* (tCO_2)
$FC_{PJ,k,,y}$	=	Quantity of alternative fuel or less carbon intensive fossil fuel type *k* used in the project plant in year *y* (tons)
$EF_{CO2,k,,y}$	=	Carbon dioxide emissions factor for alternative or less carbon intensive fossil fuels type *k* in year *y* (tCO_2/GJ)
$NCV_{k,,y}$	=	Net calorific value of the alternative or less carbon intensive fossil fuel type *k* in year *y* (GJ/tonne)
k	=	Alternative fuel types and less carbon intensive fossil fuel types used in the project plant in year *y*

Step 2: Calculate project emissions from additional electricity and/or fossil fuel consumption as a result of the project activity

The use of alternative fuels or less carbon intensive fossil fuels may result in additional fossil fuel and/or electricity consumption at the project site or off-site. This may include, *inter alia*, the following emission sources:

- Drying or mechanical treatment of the fuels;
- On-site transportation of the fuels;
- Flue gas treatment required as a result of the project activity.

Project participants should identify in the CDM-PDD all relevant emission sources for additional fuel combustion and electricity generation and, if applicable, explain any changes in monitoring reports.

CO_2 emissions from on-site combustion of fossil fuels ($PE_{FC,y}$) should be calculated using the latest approved version of the "Tool to calculate project or leakage CO_2 emissions from fossil fuel combustion". For each fossil emission source *j*, the fuel consumption of each fuel type *i* ($FC_{i,j,y}$) should be monitored, consistent with the guidance in the tool. If the project plant uses waste heat to dry fuel and raw materials this value is set as zero.

CO_2 emissions from on-site electricity consumption ($PE_{EC,y}$) is considered negligible due to negligible grid emission factor of the host country grid.

Step 3: Project emissions from combustion of fossil fuels for transportation of alternative fuels to the project plant

Project participants shall determine CO_2 emissions resulting from transportation of alternative fuels to the project plant. In many cases transportation is undertaken by vehicles. Project participants may choose between two different approaches to determine emissions: an approach based on distance and vehicle type (Option 1) or on fuel consumption (Option 2).

Option 1:

Emissions are calculated on the basis of distance and the number of trips (or the average truck load):

$$PE_{T,y} = N_y \times AVD_y \times EF_{km,CO2,y} \quad \textbf{(12)}$$

or

$$PE_{T,y} = \frac{\sum_k AF_{T,k,y}}{TL_y} \times AVD_y \times EF_{km,CO2,y} \quad \textbf{(13)}$$

Where:

$PE_{T,y}$	=	CO_2 emissions during the year *y* due to transport of alternative fuels to the project plant (tCO_2/yr)
N_y	=	Number of truck trips during the year *y*
AVD_y	=	Average round trip distance (from and to) between the alternative fuel supply sites and the site of the project plant during the year *y* (km)
$EF_{km,CO2,y}$	=	Average CO_2 emission factor for the trucks measured during the year *y* (tCO_2/km)
$AF_{T,k,y}$	=	Quantity of alternative fuel type *k* that has been transported to the project site during the year *y* (mass or volume units)
TL_y	=	Average truck load of the trucks used (tons or liter) during the year *y*
k	=	Types of alternative fuels used in the project plant and that have been transported to the project plant in year *y*

Option 2:

Emissions are calculated based on the actual quantity of fossil fuels consumed for transportation:

$$PE_{T,y} = \sum_i FC_{TR,i,y} \times NCV_{i,y} \times EF_{CO2,FF,i,y} \quad \textbf{(14)}$$

Where:

$PE_{T,y}$	=	CO_2 emissions during the year *y* due to transport of alternative fuels to the project plant (tCO_2/yr)
$FC_{TR,i,y}$	=	Fuel consumption of fuel type *i* in trucks for transportation of alternative fuels during the year *y* (mass or volume units)
$NCV_{i,y}$	=	Net calorific value of fossil fuel type *i* (GJ/mass or volume unit)
$EF_{CO2,FF,i,y}$	=	CO_2 emission factor for fossil fuel type *i* in year *y* (tCO_2/GJ)
i	=	Fossil fuel types used for transportation of alternative fuels to the project plant in year *y*

Step 4: Calculate project emissions from the cultivation of renewable biomass at the dedicated plantation

Where renewable biomass from a dedicated plantation is used as alternative fuel, project emissions from the cultivation of the renewable biomass ($PE_{BC,y}$) shall be calculated as:

$$PE_{BC,y} = PE_{FC,PL,y} + PE_{FP,y} + PE_{FA,y} + PE_{BB,y} + PE_{IR,y} \quad \textbf{(15)}$$

Where:

$PE_{BC,y}$	=	Project emissions from the cultivation of renewable biomass at the dedicated plantation in year *y* (tCO_2e)
$PE_{FC,PL,y}$	=	Project emissions related to fossil fuel consumption at the plantation during agricultural operations in year *y* (tCO_2/yr). This emission source should be calculated using the latest approved version of the "Tool to calculate project or leakage CO_2 emissions from fossil fuel combustion"
$PE_{FP,y}$	=	Project emissions related to the production of synthetic fertilizer that is used at the dedicated plantation in year *y* (tCO_2e/yr). This emission source should be calculated using the procedures provided in the latest approved version of the baseline and monitoring methodology AM0042. In case of using organic fertilizers (compost), emissions from production of organic fertilizers are negligible and assumed to be zero
$PE_{FA,y}$	=	Project emissions related to the application of fertilizers at the plantation in year *y* (tCO_2e/yr). This emission source should be calculated using the procedures provided in the latest approved version of the baseline and monitoring methodology AM0042
$PE_{BB,y}$	=	Project emissions arising from field burning of biomass at the plantation site (tCO_2e/yr). This emission source should be calculated using the procedures provided in the latest approved version of the baseline and monitoring methodology AM0042. In case the land has been previously used for agriculture, it is conservatively assumed that all plantations (vegetation, trees, etc.) on the land prior to project implementation have been burnt and emissions are estimated accordingly using the same procedures provided in the latest approved version of the baseline and monitoring methodology AM0042
$PE_{IR,y}$	=	Project emissions from irrigation of the plantation should be estimated as per the procedure given in Step 2 above. Emissions from fuel combustion due to irrigation ($PE_{FC,IR,y}$) are estimated as per the "Tool to calculate project or leakage CO_2 emissions from fossil fuel combustion" while emissions from electricity consumption due to irrigation ($PE_{EC,IR,y}$) are estimated as per the "Tool to calculate baseline, project and/or leakage emissions from electricity consumption"

In case of conversion of land from crop land to forest land, soil carbon is likely to increase. Consistent with guidance by EB 20, as contained in Annex 8 to the meeting report, the change in soil carbon is assumed to be zero and no CERs are claimed for such increase.

$PE_y = PE_{AF,y} + PE_{FS,y}$

Project Emission from calcinations of feedstock in the project kiln ($PE_{FS,y}$)

Project emission from the calcinations of feedstock in the project kiln ($PE_{FS,y}$) shall be expressed as CO_2 emission factor per ton of clinker produced, as follows:

$$PE_{FS,y} = PE_{Calcin,y} + PE_{FC\_Calcin,y} + PE_{Dust,y} + PE_{FC\_Dry,y} + PE_{Elec\_Grid,y} + PE_{Elec\_SG,y} \quad \textbf{(16)}$$

Where:

$PE_{FS,y}$	=	Project emissions in the year *y* (tCO_2)
$PE_{Calcin,y}$	=	Project CO_2 emissions from calcination of calcium carbonate and magnesium carbonate in the year *y* (tCO_2)
$PE_{FC\_Calcin,y}$	=	Project CO_2 emissions from for combustion of fossil fuels in clinker production in the year *y* (tCO_2)
$PE_{Dust,y}$	=	Project CO_2 emissions due to discarded dust from bypass and de-dusting units (CDK) system in the year *y* (tCO_2)
$PE_{FC\_Dry,y}$	=	Project CO_2 emissions due to fuel consumption for drying of raw material or fuel preparation in the year *y* (tCO_2)
$PE_{Elec\_Grid,y}$	=	Project CO_2 emissions factor for the grid electricity consumption for clinker production in the year *y* (tCO_2)
$PE_{Elec\_SG,y}$	=	Project CO_2 emissions for self-generated electricity used for clinker production in the year *y* (t CO_2)

(a) Project emissions from calcination of carbonates ($PE_{Calcin,y}$)

For estimation of CO_2 emissions resulting from calcination, only the proportion of calcium oxides and magnesium oxides present in the produced clinker will be considered. Measured values of CaO and MgO contents, corrected for the non-carbonate sources (for example, deducting any calcium that comes from use of calcium silicates or fly ash used as raw materials) shall be used. CO_2 emissions from calcination with correction for non-carbonate sources shall be determined as follows:

$$PE_{Calcin,y} = 0.785 \cdot \left(CaO_{CLNK,y} \cdot CLNK_y - CaO_{RM,y} \cdot RM_y\right) + \\ +1.092 \cdot \left(MgO_{CLNK,y} \cdot CLNK_y - MgO_{RM,y} \cdot RM_y\right) \quad \textbf{(17)}$$

Where:

$PE_{Calcin,y}$	=	Project CO_2 emissions from calcination of calcium carbonate and magnesium carbonate in the year *y* (tCO_2)
0.785	=	Stoichiometric emission factor for CaO (tCO_2/tonnes of CaO)
1.092	=	Stoichiometric emission factor for MgO (tCO_2/tonnes of MgO)
$CaO_{RM,y}$	=	Non-carbonated CaO content in the raw materials in the year *y* (tonnes of CaO/tonnes of raw material)
$CaO_{CLNK,y}$	=	CaO content in the clinker produced in the year *y* (tonnes of CaO/tonnes of clinker)
$MgO_{RM,y}$	=	Non-carbonated MgO content in the raw materials in the year *y* (tonnes of MgO/tonnes of raw material)
$MgO_{CLNK,y}$	=	Product of the MgO content in the clinker produced in the year *y* (tonnes of MgO/tonnes of clinker)
RM_y	=	Annual consumption of raw materials in the year *y* (tonnes)
$CLNK_y$	=	Annual production of clinker in the year *y* (tonnes)

(b) Project emissions from combustion of fossil fuels in the kiln for calcination ($PE_{FC\_Calcin,y}$)

$$PE_{FC\_Calcin,y} = SKC_y \cdot \frac{\sum\left(FC_{i,Calcin,y} \cdot NCV_i \cdot EF_{CO2,i}\right)}{\sum\left(FC_{i,Calcin,y} \cdot NCV_i\right)} \cdot CLNK_y \quad \textbf{(18)}$$

Where:

$PE_{FC\_Calcin,y}$	=	Project CO_2 emissions from combustion of fossil fuels in clinker production in the year *y* (tCO_2)
SKC_y	=	Specific Kiln Calorific Consumption for the year *y* (GJ/tonnes of clinker)
$FC_{i,Calcin,y}$	=	Fuel type *i* consumed for calcination in clinker production during the year *y* (mass or volume units)
$EF_{CO2,i}$	=	CO_2 emission factor for fuel type *i* (tCO_2/GJ)
$CLNK_y$	=	Annual production of clinker in the year *y* (tonnes)
NCV_i	=	Net calorific value of the fuel type *i* (GJ/mass or volume units)

(c) Project emissions due to discarded dust from bypass and dedusting units (CDK) system ($PE_{Dust,y}$)

If there is a discarded dust from the bypass and dedusting unit (CDK), the emissions due to discarded dust shall be determined as follows:

$$\mathrm{PE}_{\mathrm{Dust,y}} = \left(\mathrm{C_y} \cdot \mathrm{ByPass_y}\right) + \frac{\mathrm{C_y} \cdot \mathrm{d_y}}{\left[\mathrm{C_y} \cdot (1 - \mathrm{d_y}) + 1\right]} \cdot \mathrm{CKD_y} \quad \textbf{(19)}$$

Where:

$PE_{Dust,y}$	=	Project CO_2 emissions factor due to discarded dust from bypass and dedusting units (CDK) system in the year *y* (tCO_2)
C_y	=	Project calcination factor due to both de-carbonization reaction and fuel consumption in clinker production (tCO2/tonne of clinker)
$ByPass_y$	=	Annual production of Bypass dust leaving kiln system (tonnes)
CKD_y	=	Annual production of CKD dust leaving kiln system (tonnes)
d_y	=	CKD calcination rate (released CO_2 expressed as a fraction of the total carbonate CO_2 in the raw materials)

The parameter C_y should be calculated as follows:

$$\mathrm{C_y} = \frac{\mathrm{PE_{Calcin,y}} + \mathrm{PE_{FC\_Calcin,y}}}{\mathrm{CLNK_y}} \quad \textbf{(20.a)}$$

Where:

C_y	=	Project calcination factor due to both de-carbonization reaction and fuel consumption in clinker production (tCO2/tonne of clinker)
$PE_{Calcin,y}$	=	Project CO_2 emissions from calcination of calcium carbonate and magnesium carbonate in the year *y* (tCO_2)
$PE_{FC\_Calcin,y}$	=	Project CO_2 emissions from fuel consumption in clinker production in the year *y* (tCO_2)
$CLNK_y$	=	Annual production of clinker in the year *y* (tonnes)

(d) Project emissions from fuel consumption for drying of raw material or fuel preparation ($PE_{FC\_Dry,y}$)

$$PE_{FC\_Dry,y} = \sum \left(FC_{Dry\_Addl,i,y} \cdot EF_{CO2,i} \cdot NCV_i \right) \quad (20)$$

Where:

$PE_{FC\_Dry,y}$	=	Project CO_2 emissions factor due to fuel consumption for drying of raw material or fuel preparation in the year *y* (tCO_2)
$FC_{Dry\_Addl,I,y}$	=	Fossil fuel *i* consumed for drying raw materials or fuel preparation in the year *y* (mass or volume units)
$EF_{CO2,i}$	=	CO_2 emission factor for fuel type *i* (tCO_2/GJ)
NCV_i	=	Net calorific value of the fuel type *i* (GJ/mass or volume units)

(f) Project emissions from self-generation of electricity for clinker production ($PE_{Elec\_SG,y}$):

$$PE_{Elec\_SG,y} = \left(EC_{RM.SG,y} + EC_{Feed,SG,y} + EC_{KO,SG,y} \right) \cdot EF_{CO2,Elec\_SG} \quad (21)$$

Where:

$PE_{Elec\_SG,y}$	=	Project CO_2 emissions for self-generated electricity used for clinker production in the year *y* (t CO_2).
$EC_{RM,SG,y}$	=	Self-generated electricity consumed for raw materials grinding (MWh)
$EC_{Feed,SG,y}$	=	Self-generated electricity consumed for fuel feeding (MWh)
$EC_{KO,SG,y}$	=	Self-generated electricity consumed for kiln operation (MWh)
$EF_{CO2,Elec\_SG,y}$	=	CO_2 emission factor of self generated electricity (tCO_2/MWh)

CO_2 emission factor for self-generated electricity ($EF_{CO2,Elec\_SG,y}$) shall be determined as the generation-weighted average emissions per electricity unit (tCO_2/MWh) of all self-generating sources in the project boundary serving the facility.

$$EF_{CO2,Elec\_SG,y} = \frac{\sum_{i,j} F_{i,j} \cdot COEF_i}{\sum_j GEN_j} \quad (22)$$

Where:

$EF_{CO2,Elec\_SG,y}$	=	CO_2 emission factor of self generated electricity (tCO_2/MWh)
$F_{i,j}$	=	Amount of fuel i consumed by relevant power sources *j* (mass or volume units)
j	=	On-site power sources
$COEF_i$	=	CO_2 emission coefficient of fuel *i* (tCO_2/mass or volume units)
GEN_j	=	Electricity generated by the source *j* (MWh)

The CO_2 emission coefficient $COEF_i$ is obtained as:

$$COEF_i = NCV_i \cdot EF_{CO_2,i} \cdot OXID_i \quad (23)$$

Where:

$COEF_i$	=	CO_2 emission coefficient of fuel *i* (tCO_2/mass or volume units)
NCV_i	=	Net calorific value of the fuel type *i* (GJ/mass or volume units)
$OXID_i$	=	Oxidation factor of the fuel *i* (see Table 1-4 in the 2006 IPCC Guidelines, Vol. 2, page 1.25, for default values)
$EF_{CO2,i}$	=	CO_2 emission factor for fuel type *i* (tCO_2/GJ)

Leakage Emissions

1. Leakage related to alternative fuel use,

For this type of project activity, two leakage sources have to be considered:

- In case of project activities using biomass residues, the project activity may result in an increase in emissions from fossil fuel combustion or other sources due to diversion of biomass residues from other uses to the project plant as a result of the project activity;
- In case of project activities using (a) less carbon intensive fossil fuel(s), leakage may result from fuel extraction, processing, liquefaction, transportation, re-gasification and distribution of fossil fuels outside of the project boundary. This includes mainly fugitive CH_4 emissions and CO_2 emissions from associated fuel combustion and flaring.

Leakage emissions are calculated as follows:

$$LE_y = LE_{BR,y} + LE_{FF,upstream,y} \quad \textbf{(24)}$$

Where:

LE_y	=	Leakage emissions during the year *y* (tCO_2e/yr)
$LE_{BR,y}$	=	Leakage emissions related to the use of biomass residues during the year *y* (tCO_2)
$LE_{FF,upstream,y}$	=	Upstream leakage emissions from fossil fuel use in year *y* (tCO_2e)

Leakage emissions are calculated in two steps:

Step 1. Calculation of leakage emissions related to the use of biomass residues.

Step 2. Calculation of upstream leakage emissions from fossil fuel use

Step 1: Calculation of leakage emissions related to the use of biomass residues

This step is only applicable if biomass residues are used in the project plant. In this case, project participants shall demonstrate that the use of the biomass residues does not result in increased fossil fuel consumption elsewhere. For this purpose, project participants shall assess as part of the monitoring the supply situation for the types of biomass residues used in the project plant. The following options may be used to demonstrate that the biomass residues used in the project plant did not increase fossil fuel consumption elsewhere:

L_1 Demonstrate that at the sites where the project activity is supplied from, with biomass residues, the biomass residues have not been collected or utilized (e.g. as fuel, fertilizer or feedstock) but have been dumped and left to decay, land-filled or burnt without energy generation (e.g. field burning) prior to the implementation of the project activity. Demonstrate that this practice would continue in the absence of the CDM project activity, e.g. by showing that in the monitored period no market has emerged for the biomass residues considered or by showing that it would still not be feasible to utilize the biomass residues for any purposes (e.g. due to the remote location where the biomass residue is generated). This approach is applicable to situations where project participants use only biomass residues from specific sites and do not purchase biomass residues from or sell biomass residues to a market

L_2 Demonstrate that there is an abundant surplus of the biomass residue in the region of the project activity which is not utilized. For this purpose, demonstrate that the quantity of available biomass residue of type *k* in the region is at least 25% larger than the quantity of biomass residues of type *k* that are utilized (e.g. for energy generation or as feedstock), including the project plant

L_3 Demonstrate that suppliers of the type of biomass residue in the region of the project activity are not able to sell all of their biomass residues. For this purpose, project participants shall demonstrate that the ultimate supplier of the biomass residue (who supplies the project) and a representative sample of suppliers of the same type of biomass residue in the region had a surplus of biomass residues (e.g. at the end of the period during which biomass residues are sold), which they could not sell and which is not utilized

Where project participants wish to use approaches L_2 or L_3 to assess leakage effects, they shall clearly define the geographical boundary of the region and document it in the CDM-PDD. In defining the geographical boundary of the region, project participants should take the usual distances for biomass residue transports into account, i.e. if biomass residues are transported up to 50 km, the region may cover a radius of 50 km around the project activity. In any case, the region should cover a radius around the project activity of at least 20 km but not more than 200 km. Once defined, the region should not be changed during the crediting period(s).

Project participants shall apply a leakage penalty to the type of biomass residues k, for which project participants can not demonstrate with one of the approaches above that the use of the biomass does not result in leakage. The leakage penalty aims at adjusting emission reductions for leakage effects in a conservative manner, assuming that this quantity of biomass residue is substituted by the most carbon intensive fuel in the country.

If for a certain type of biomass residue *k* used in the project activity, leakage effects cannot be ruled out with one of the approaches above, leakage effects for the year *y* shall be calculated as follows:

$$LE_{BR,y} = EF_{CO2,LE} \times \sum_{k} FC_{PJ,k,y} \times NCV_{k,y} \qquad \textbf{(25)}$$

Where:

$LE_{BR,y}$	=	Leakage emissions during the year *y* (tCO_2/yr)
$EF_{CO2,LE}$	=	CO_2 emission factor of the most carbon intensive fuel used in the country (tCO_2/GJ)
$FC_{PJ,k,y}$	=	Quantity of biomass residue type *k* used in the project plant in year *y* (tons)
$NCV_{k,y}$	=	Net calorific value of the biomass residue type *k* in year *y* (GJ/ton of dry matter)
k	=	Types of biomass residues for which leakage effects could not be ruled out with one of the approaches L_1, L_2 or L_3 above

Step 2: Calculation of upstream leakage emissions from fossil fuel use

Upstream leakage emission from fossil fuel use may result from fuel extraction, processing, liquefaction, transportation, re-gasification and distribution of fossil fuels outside of the project boundary. This includes mainly fugitive CH_4 emissions and CO_2 emissions from associated fuel combustion and flaring. In this methodology, the following leakage emission sources shall be considered:

- Fugitive CH_4 emissions associated with fuel extraction, processing, liquefaction, transportation, re-gasification and distribution of (the) less carbon intensive fossil fuel(s) *k* used in the project plant and of the fossil fuel(s) *i* that would in the absence of the project activity be used;
- In the case LNG is used in the project plant: CO_2 emissions from fuel combustion / electricity consumption associated with the liquefaction, transportation, re-gasification and compression into a natural gas transmission or distribution system.

Thus, upstream leakage emissions from fossil fuel use are calculated as follows:

$$LE_{FF,upstream,y} = LE_{CH4,y} + LE_{LNG,CO2,y} \qquad \textbf{(26)}$$

Where:

$LE_{FF,upstream,y}$	=	Upstream leakage emissions from fossil fuel use in year *y* (tCO_2e)
$LE_{CH4,y}$	=	Leakage emissions due to fugitive upstream CH_4 emissions in the year *y* (tCO_2e)
$LE_{LNG,CO2,y}$	=	Leakage emissions due to fossil fuel combustion / electricity consumption associated with the liquefaction, transportation, re-gasification and compression of LNG into a natural gas transmission or distribution system during the year *y* (tCO_2e)

2. Fugitive methane emissions

For the purpose of determining fugitive methane emissions associated with the production – and in case of natural gas, the transportation and distribution of the fuels – project participants should use the following equation:

$$LE_{CH4,y} = \left[\sum_k \left(FC_{PJ,k,y} \times NCV_{k,y} \times EF_{k,upstream,CH4}\right) - \sum_i FC_{BL,i,y} \times NCV_{i,y} \times EF_{i,upstream,CH4}\right] \times GWP_{CH4} \qquad \textbf{(27)}$$

Where:

$LE_{CH4,y}$	=	Leakage emissions due to fugitive upstream CH_4 emissions in the year *y* (tCO_2e)
$FC_{PJ,k,y}$	=	Quantity of less carbon intensive fossil fuel type *k* used in the project plant in year *y* (mass or volume unit)
$FC_{BL,i,y}$	=	Quantity of fossil fuel type *i* displaced in the project plant as a result of the project activity in year *y* (mass or volume unit)
$NCV_{k,y}$	=	Net calorific value of less carbon intensive fossil fuel type *k* in year *y* (GJ/mass or volume unit)
$NCV_{i,y}$	=	Net calorific value of fossil fuel type *i* in year *y* (GJ/mass or volume unit)
$EF_{k,upstream,CH4}$	=	Emission factor for upstream fugitive methane emissions from production, transportation and distribution of less carbon intensive fuel type *k* (t CH_4 / GJ)
$EF_{i,upstream,CH4}$	=	Emission factor for upstream fugitive methane emissions from production, transportation and distribution of fossil fuel type *i* (t CH_4 / GJ)
GWP_{CH4}	=	Global warming potential of methane valid for the relevant commitment period

k = Less carbon intensive fossil fuel types used in the project plant in year *y*
i = Fossil fuel types displaced in the project plant as a result of the use of alternative fuels or less carbon intensive fossil fuels under the project activity

The quantities and types of fossil fuels *i* that are displaced as a result of the project activity ($FC_{BL,i,y}$) should be determined consistent with the guidance above on the determination of the baseline CO_2 emission factor ($EF_{CO2,BL,y}$), as follows:

$$FC_{BL,i,y} \times NCV_{i,y} = S_{i,y} \times \sum_k FC_{PJ,k,y} \times NCV_{k,y} \quad \textbf{(28)}$$

Where:

$FC_{BL,i,y}$ = Quantity of fossil fuel type *i* displaced in the project plant as a result of the project activity in year *y* (mass or volume unit)
$NCV_{i,y}$ = Net calorific value of fossil fuel type *i* in year *y* (GJ/mass or volume unit)
$S_{i,y}$ = Share of fossil fuel type *i* (on an energy basis) in the fossil fuel mix that is displaced in the project plant as a result of the use of alternative fuels or less carbon intensive fossil fuels under the project activity, determined consistently with the determination of $EF_{CO2,BL,y}$
$FC_{PJ,k,y}$ = Quantity of less carbon intensive fossil fuel type *k* used in the project plant in year *y* (mass or volume unit)
$NCV_{k,y}$ = Net calorific value of less carbon intensive fossil fuel type *k* in year *y* (GJ/mass or volume unit)
i = Fossil fuel types displaced in the project plant as a result of the use of alternative fuels or less carbon intensive fossil fuels under the project activity
k = Less carbon intensive fossil fuel types used in the project plant in year *y*

Where reliable and accurate national data on fugitive CH_4 emissions associated with the production, and in case of natural gas, the transportation and distribution of the fuels is available, project participants should use this data to determine average emission factors by dividing the total quantity of CH_4 emissions by the quantity of fuel produced or supplied respectively.[5] Where such data is not available, project participants may use the default values provided in Table 3 below. In case of natural gas, the natural gas emission factor for the location of the project should be used, except in cases where it can be shown that the relevant system element (gas production and/or processing/transmission/distribution) is predominantly of recent vintage and built and operated to international standards, in which case the US/Canada values may be used.

Note that the emission factor for fugitive upstream emissions for natural gas should include fugitive emissions from production, processing, transport and distribution of natural gas, as indicated in Table 3 below.

Note further that in case of coal the emission factor is provided based on a mass unit and needs to be converted in an energy unit, taking into account the net calorific value of the coal.

[5] GHG inventory data reported to the UNFCCC as part of national communications can be used where country-specific approaches (and not IPCC Tier 1 default values) have been used to estimate emissions.

Table 1: Default emission factors for fugitive CH_4 upstream emissions

Activity	Unit	Default emission factor	Reference for the underlying emission factor range in Volume 3 of the *1996 Revised IPCC Guidelines*
Coal			
Underground mining	t CH4 / kt coal	13.4	Equations 1 and 4, p. 1.105 and 1.110
Surface mining	t CH4 / kt coal	0.8	Equations 2 and 4, p.1.108 and 1.110
Oil			
Production	t CH4 / PJ	2.5	Tables 1-60 to 1-64, p. 1.129 - 1.131
Transport, refining and storage	t CH4 / PJ	1.6	Tables 1-60 to 1-64, p. 1.129 - 1.131
Total	t CH4 / PJ	4.1	
Natural gas			
USA and Canada			
Production	t CH4 / PJ	72	Table 1-60, p. 1.129
Processing, transport and distribution	t CH4 / PJ	88	Table 1-60, p. 1.129
Total	t CH4 / PJ	160	
Eastern Europe and former USSR			
Production	t CH4 / PJ	393	Table 1-61, p. 1.129
Processing, transport and distribution	t CH4 / PJ	528	Table 1-61, p. 1.129
Total	t CH4 / PJ	921	
Western Europe			
Production	t CH4 / PJ	21	Table 1-62, p. 1.130
Processing, transport and distribution	t CH4 / PJ	85	Table 1-62, p. 1.130
Total	t CH4 / PJ	105	
Other oil exporting countries / Rest of world			
Production	t CH4 / PJ	68	Table 1-63 and 1-64, p. 1.130 and 1.131
Processing, transport and distribution	t CH4 / PJ	228	Table 1-63 and 1-64, p. 1.130 and 1.131
Total	t CH4 / PJ	296	

Note: The emission factors in this table have been derived from IPCC default Tier 1 emission factors provided in Volume 3 of the 1996 Revised IPCC Guidelines, by calculating the average of the provided default emission factor range.

3. CO_2 emissions from LNG

Where applicable, CO_2 emissions from fuel combustion/electricity consumption associated with the liquefaction, transportation, re-gasification and compression of LNG into a natural gas transmission or distribution system ($LE_{LNG,CO2,y}$) should be estimated by multiplying the quantity of natural gas used in the project with an appropriate emission factor, as follows:

$$LE_{LNG,CO2,y} = FC_{PJ,NG,y} \times NCV_{NG,y} \times EF_{CO2,upstream,LNG} \tag{29}$$

Where:

$LE_{LNG,CO2,y}$	=	Leakage emissions due to fossil fuel combustion/electricity consumption associated with the liquefaction, transportation, re-gasification and compression of LNG into a natural gas transmission or distribution system during the year *y* (tCO_2e)
$FC_{PJ,NG,y}$	=	Quantity of natural gas used in the project plant for electricity generation in the year *y* (m^3)
$NCV_{NG,y}$	=	Net calorific values of natural gas in the project plant in year *y* (GJ/m^3)
$EF_{CO2,upstream,LNG}$	=	Emission factor for upstream CO_2 emissions due to fossil fuel combustion/electricity consumption associated with the liquefaction, transportation, re-gasification and compression of LNG into a natural gas

transmission or distribution system (tCO_2/GJ)

Where reliable and accurate data on upstream CO_2 emissions due to fossil fuel combustion/electricity consumption associated with the liquefaction, transportation, re-gasification and compression of LNG into a natural gas transmission or distribution system is available, project participants should use this data to determine an average emission factor. Where such data is not available, project participants may assume a default value of 6 tCO_2/TJ as a rough approximation.[6]

Where total net leakage effects from upstream emissions are negative ($LE_{FF,upstream,y} < 0$), project participants should assume $LE_{FF,upstream,y} = 0$.

4. Leakage related to feedstock calcinations,

The following emission sources shall be considered as leakage under this measure:

- Any incremental increase in transportation of clinker raw material (limestone, clay and iron ore), fuels (fossil fuels and alternative fuels) and new alternative materials (blast furnace slag, fly ash, waste ash from fuel combustion in thermal power plants, gypsum and others) from offsite locations to the project plant site. Any decrease in transport-related emissions for existing clinker raw materials and fuels change shall not be accounted;
- Emissions due to transport of alternative raw materials will be accounted as leakage;

Another possible leakage is due to the diversion of alternative raw materials from existing uses. The project proponents shall demonstrate that the quantities of alternative raw materials used in the project are surplus. For this purpose the project participants need to conduct a survey to demonstrate that the alternative raw materials are available in the region by at least 1.5 times the demand for the same alternative raw materials from all existing users including the project plant. Otherwise, this methodology is not applicable.

The leakage from the project activity is expressed as:

$$LE_y = LE_{trans,y} \tag{30}$$

Where:

LE_y	=	CO_2 emissions due to leakage during the year y (tCO_2)
$LE_{trans,y}$	=	CO_2 leakage due to transportation of new materials during the year y (tCO_2)

(a) Leakage due to transportation of new alternative raw materials (LE_{trans})

Transport-related emissions for alternative raw materials shall be determined as follows:

[6] This value has been derived on data published for North American LNG systems. "Barclay, M. and N. Denton, 2005. Selecting offshore LNG process. <http://www.fwc.com/publications/tech_papers/files/LNJ091105p34-36.pdf> (10th April 2006)".

$$LE_{Trans,y} = \frac{\left[FC_{Trans,i} \cdot Dist \cdot NCV_i \cdot EF_{CO2,i}\right]}{\left(Q_{Trip} \cdot 1000\right)} \cdot ALTM_y \quad (31)$$

Where:

$LE_{trans,y}$	=	CO_2 leakage due to transportation of new materials during the year *y* (tCO_2)
$FC_{Trans,i}$	=	Fuel consumption of the vehicle per kilometer (mass or volume unit of fuel/kilometer)
$Dist$	=	Distance between the source of fuel and the project activity plant (km)
$EF_{CO2,i}$	=	CO_2 emission factor for fuel type *i* (tCO_2/GJ)
Q_{trip}	=	Quantity of alternative materials carried in one trip per vehicle (tonnes)
$ALTM_y$	=	Annual consumption of alternative materials in raw materials in year *y* (tonnes)
NCV_i	=	Net calorific value of the fuel type *i* (GJ/mass or volume units)

Emission reductions

Quantification of CO_2 emission reductions for year *y* following project implementation shall be calculated as follows:

$$ER_y = BE_y - PE_y - LE_y \quad (32)$$

Where:

ER_y	=	Emission reductions in year *y* due to project activity (tCO_2)
BE_y	=	Baseline emissions of CO_2 in the project activity plant (tCO_2)
PE_y	=	Emissions of CO_2 in the project activity plant in year *y* (tCO_2)
LE_y	=	CO_2 emissions due to leakage (tCO_2)

b) Monitoring tables

The “Data and parameters to be monitored” pages in the “Monitoring” section of the referenced methodologies have largely been extracted

Data and parameters monitored

Data / Parameter:	$FC_{PJ,k,y}$, and $FC_{PJ,NG,y}$
Data unit:	Mass or volume units
Description:	Quantity of alternative fuel or less carbon intensive fossil fuel of type *k* ($FC_{PJ,k,y}$), any natural gas ($FC_{PJ,NG,y}$), used for electricity generation in the project plant in year *y*
Source of data:	Measurements
Measurement procedures (if any):	Use mass or volume meters. The consistency of metered fuel consumption quantities should be cross-checked by an annual energy balance that is based on purchased quantities and stock changes. Where the purchased fuel invoices can be identified specifically for the CDM

	project, the metered fuel consumption quantities should also be cross-checked with available purchase invoices from the financial records
Monitoring frequency:	Recorded continuously and aggregated at least annually
QA/QC procedures:	According to ISO 9000 or similar quality systems
Any comment:	-

Data / Parameter:	$EF_{CO2,k,y}$ and $EF_{CO2,FF,i,y}$
Data unit:	tCO_2/GJ
Description:	Weighted average CO_2 emission factor for alternative or less carbon intensive fuels of type *k* ($EF_{CO2,k,y}$) and for fossil fuel of type *i* ($EF_{CO2,FF,i}$) in year *y*
Source of data:	For fossil fuels and for wastes originating from fossil sources for which W3 has been identified as the most likely baseline scenario, the following data sources should be used: **Data source** / **Conditions for using the data source**: a) Values provided by the fuel supplier in invoices — This is the preferred source. b) Measurements by the project participants — If a) is not available c) Regional or national default values — If a) is not available These sources can only be used for liquid fuels and should be based on well documented, reliable sources (such as national energy balances). d) IPCC default values at the upper/lower limit[7] of the uncertainty at a 95% confidence interval as provided in table 1.4 of Chapter1 of Vol. 2 (Energy) of the 2006 IPCC Guidelines on National GHG Inventories — If a) is not available $EF_{CO2,k,y}$ is zero for the following alternative fuels: - Wastes originating from fossil sources where W1 has been identified as the most plausible baseline scenario; - Biomass residues; - Renewable biomass[8]

[7] To be conservative, choose the upper limit where project emissions are calculated and the lower limit where baseline emissions are calculated.

[8] In case of waste originating from fossil sources and baseline scenario W1, the waste would also be combusted in the absence of the project activity, without displacing any fossil fuels. In case of biomass residues it is assumed that CO_2 emissions from surplus biomass residues do not lead to changes of carbon pools in the LULUCF sector and that the biomass residues are available in surplus. If this condition is not met any more during the crediting period, CO_2 emissions are taken into account by applying a leakage penalty (see leakage section). In case of renewable biomass, emissions from the cultivation of the biomass are estimated separately ($PE_{BC,y}$).

Measurement procedures (if any):	For a) and b): Measurements should be undertaken in line with national or international fuel standards
Monitoring frequency:	For a) and b): The CO_2 emission factor should be obtained for each fuel delivery, from which weighted average annual values should be calculated For c): Review appropriateness of the values annually For d): Any future revision of the IPCC Guidelines should be taken into account
QA/QC procedures:	According to ISO 9000 or similar quality systems
Any comment:	For a): If the fuel supplier does provide the NCV value and the CO_2 emission factor on the invoice and these two values are based on measurements for this specific fuel, this CO_2 factor should be used. If another source for the CO_2 emission factor is used or no CO_2 emission factor is provided, Options b), c) or d) should be used

Data / Parameter:	$NCV_{k,y}$, $NCV_{i,y}$ and $NCV_{NG,y}$
Data unit:	GJ/mass or volume units
Description:	Weighted average net calorific value of the alternative or less carbon intensive fuel types *k* ($NCV_{k,y}$), fossil fuel types *i* ($NCV_{i,y}$), including natural gas ($NCV_{NG,y}$), in year *y*
Source of data:	The following data sources may be used if the relevant conditions apply:

Data source	**Conditions for using the data source**
a) Values provided by the fuel supplier in invoices	This is the preferred source.
b) Measurements by the project participants	If a) is not available
c) Regional or national default values	If a) is not available These sources can only be used for liquid fossil fuels and should be based on well documented, reliable sources (such as national energy balances).
d) IPCC default values at the upper limit of the uncertainty at a 95% confidence interval as provided in Table 1.2 of Chapter 1 of Vol. 2 (Energy) of the 2006 IPCC Guidelines on National GHG Inventories	If a) is not available This source may only be used for fossil fuels.

Measurement procedures (if any):	For a) and b): Measurements should be undertaken in line with national or international fuel standards
Monitoring frequency:	For a) and b): The NCV should be obtained for each fuel delivery, from which weighted average annual values should be calculated For c): Review appropriateness of the values annually For d): Any future revision of the IPCC Guidelines should be taken into account

QA/QC procedures:	Verify if the values under a), b) and c) are within the uncertainty range of the IPCC default values as provided in Table 1.2, Vol. 2 of the 2006 IPCC Guidelines. If the values fall below this range collect additional information from the testing laboratory to justify the outcome or conduct additional measurements. The laboratories in a), b) or c) should have ISO17025 accreditation or justify that they can comply with similar quality standards
Any comment:	-

Data / Parameter:	$PE_{FC,y}$
Data unit:	tCO_2
Description:	Project emissions $PE_{FC,y}$ from additional fossil fuel combustion as a result of the project activity in year *y*
Source of data:	As per the "Tool to calculate project or leakage CO_2 emissions from fossil fuel combustion"
Measurement procedures (if any):	As per the "Tool to calculate project or leakage CO_2 emissions from fossil fuel combustion"
Monitoring frequency:	As per the "Tool to calculate project or leakage CO_2 emissions from fossil fuel combustion"
QA/QC procedures:	As per the "Tool to calculate project or leakage CO_2 emissions from fossil fuel combustion"
Any comment	-

Data / Parameter:	$BE_{CH4,B2,y}$
Data unit:	tCO_2
Description:	Baseline methane emissions avoided during the year *y* from preventing disposal of biomass residues at a solid waste disposal site during the period from the start of the project activity to the end of the year *y*
Source of data:	As per the methodological tool "Emissions from solid waste disposal sites"
Measurement procedures (if any):	As per the methodological tool "Emissions from solid waste disposal sites"
Monitoring frequency:	As per the methodological tool "Emissions from solid waste disposal sites"
QA/QC procedures:	As per the methodological tool "Emissions from solid waste disposal sites"
Any comment:	-

Data / Parameter:	N_y
Data unit:	-
Description:	Number of truck trips during the year *y*
Source of data:	Transportation data logs
Measurement procedures (if any):	-
Monitoring frequency:	Continuously
QA/QC procedures:	Check consistency of the number of truck trips with the quantity of biomass combusted, e.g. by the relation with previous years
Any comment:	Applicable if Option 1 is chosen to estimate CO_2 emissions from transportation. Project participants have to monitor either this parameter or the average truck load TL_y

Data / Parameter:	AVD_y
Data unit:	Km
Description:	Average round trip distance (from and to) between the alternative fuel supply sites and the site of the project plant during the year *y*
Source of data:	Transportation data logs
Measurement procedures (if any):	-
Monitoring frequency:	Continuously
QA/QC procedures:	Check consistency of distance records provided by the truckers by comparing recorded distances with other information from other sources (e.g. maps).
Any comment:	Applicable if Option 1 is chosen to estimate CO_2 emissions from transportation. If alternative fuels are supplied from different sites, this parameter should correspond to the mean value of km traveled by trucks that supply the alternative fuels to the plant

Data / Parameter:	$EF_{km,CO2,y}$
Data unit:	tCO_2/km
Description:	Average CO_2 emission factor for the trucks measured during the year *y*
Source of data:	Conduct sample measurements of the fuel type, fuel consumption and distance traveled for all truck types. Calculate CO_2 emissions from fuel consumption by multiplying with appropriate net calorific values and CO_2 emission factors. For net calorific values and CO_2 emission factors, use reliable national default values or, if not available, (country-specific) IPCC default values. Alternatively, choose emission factors applicable for the truck types used from the literature in a conservative manner (i.e. the higher end within a plausible range)
Measurement procedures (if any):	-
Monitoring frequency:	At least annually
QA/QC procedures:	Cross-check measurement results with emission factors referred to in the literature
Any comment:	Applicable if Option 1 is chosen to estimate CO_2 emissions from transportation

Data / Parameter:	$AF_{T,k,y}$
Data unit:	Mass or volume units
Description:	Quantity of alternative fuel type *k* that has been transported to the project site during the year *y*.
Source of data:	Measurements by project participants
Measurement procedures (if any):	Use mass or volume meters The consistency of metered fuel consumption quantities should be cross-checked by an annual energy balance that is based on purchased quantities and stock changes. Where the purchased fuel invoices can be identified specifically for the CDM project, the monitored quantities should also be cross-checked with available

	purchase invoices from the financial records
Monitoring frequency:	Recorded continuously and reported monthly and adjusted according to stock change
QA/QC procedures:	According to ISO 9000 or similar quality systems
Any comment:	-

Data / Parameter:	TL_y
Data unit:	Mass or volume units
Description:	Average truck load of the trucks used during the year *y*
Source of data:	Transportation data logs.
Measurement procedures (if any):	-
Monitoring frequency:	Continuously
QA/QC procedures:	-
Any comment:	Applicable if Option 1 is chosen to estimate CO_2 emissions from transportation. Project participants have to monitor either the number of truck trips N_y or this parameter

Data / Parameter:	$FC_{TR,i,y}$
Data unit:	Mass or volume units
Description:	Fuel consumption of fuel type *i* in trucks for transportation of alternative fuels during the year *y*
Source of data:	Fuel purchase receipts or fuel consumptions meters in the trucks
Measurement procedures (if any):	-
Monitoring frequency:	Continuously, aggregated annually
QA/QC procedures:	Cross-checked the resulting CO_2 emissions for plausibility with a simple calculation based on the distance approach (Option 1)
Any comment:	-

Data / Parameter:	$P_{clinker/quicklime,y}$
Data unit:	Tons
Description:	Production of clinker or quicklime in year *y*
Source of data:	Production data logs at the project site
Measurement procedures (if any):	Weighing feeders
Monitoring frequency:	Recorded/calculated and reported monthly
QA/QC procedures:	According to ISO 9000 or similar quality systems
Any comment:	-

Data / Parameter:	$EF_{CO2,LE}$
Data unit:	tCO_2/GJ
Description:	Carbon dioxide emission factor of the most carbon intensive fuel used in the country
Source of data:	Identify the most carbon intensive fuel type from the national

	communication, other literature sources (e.g. IEA). Possibly consult with the national agency responsible for the national communication / GHG inventory. If available, use national default values for the CO_2 emission factor. Otherwise, IPCC default values may be used
Measurement procedures (if any):	-
Monitoring frequency:	Annually
QA/QC procedures:	-
Any comment:	-

Data / Parameter:	$EF_{k,upstream,CH4}$ and $EF_{i,upstream,CH4}$
Data unit:	tCH_4/GJ
Description:	Emission factor for upstream fugitive methane emissions from production, transportation and distribution of less carbon intensive fuel type *k* ($EF_{k,upstream,CH4}$) and of fossil fuel type *i* ($EF_{i,upstream,CH4}$)
Source of data:	See below
Measurement procedures (if any):	Where reliable and accurate national data on fugitive CH_4 emissions associated with the production, transportation and distribution of the fuels is available, project participants should use this data to determine average emission factors by dividing the total quantity of CH_4 emissions by the quantity of fuel produced or supplied respectively. Where such data is not available, project participants may use the default values provided in Table 3 in this methodology. In case of natural gas, the natural gas emission factor for the location of the project should be used, except in cases where it can be shown that the relevant system element (gas production and/or processing/transmission/distribution) is predominantly of recent vintage and built and operated to international standards, in which case the US/Canada values may be used. Note that the emission factor for fugitive upstream emissions for natural gas should include fugitive emissions from production, processing, transport and distribution of natural gas, as indicated in the Table 3 in this methodology. Note further that in case of coal the emission factor is provided based on a mass unit and needs to be converted in an energy unit, taking into account the net calorific value of the coal
Monitoring frequency:	Annually
QA/QC procedures:	-
Any comment:	-

Data / Parameter:	$EF_{CO2,upstream,LNG}$
Data unit:	tCO_2/GJ
Description:	Emission factor for upstream CO_2 emissions due to fossil fuel combustion / electricity consumption associated with the liquefaction, transportation, re-gasification and compression of LNG into a natural gas transmission or distribution system
Source of data:	See below

Measurement procedures (if any):	Where reliable and accurate data on upstream CO_2 emissions due to fossil fuel combustion / electricity consumption associated with the liquefaction, transportation, re-gasification and compression of LNG into a natural gas transmission or distribution system is available, project participants should use this data to determine an average emission factor Where such data is not available, project participants may assume a default value of 6 tCO_2/TJ as a rough approximation
Monitoring frequency:	Annually
QA/QC procedures:	-
Any comment:	-

Data / Parameter:	Biomass residue type k
Data unit:	-
Description:	Demonstration that the biomass residue type *k* from a specific source would continue not to be collected or utilized, e.g. by an assessment whether a market has emerged for that type of biomass residue (if yes, leakage is assumed not be ruled out) or by showing that it would still not be feasible to utilize the biomass residues for any purposes
Source of data:	Information from the site where the biomass is generated
Measurement procedures (if any):	-
Monitoring frequency:	Annually
QA/QC procedures:	-
Any comment:	Monitoring of this parameter is applicable if approach L_1 is used to rule out leakage

Data / Parameter:	Biomass residue type k
Data unit:	Tons
Description:	Quantity of biomass residues of type *k* that are utilized (e.g. for energy generation or as feedstock) in the defined geographical region
Source of data:	Surveys or statistics
Measurement procedures (if any):	-
Monitoring frequency:	Annually
QA/QC procedures:	-
Any comment:	Monitoring of this parameter is applicable if approach L_2 is used to rule out leakage

Data / Parameter:	Biomass residue type k
Data unit:	Tons
Description:	Quantity of available biomass residues of type *k* in the region
Source of data:	Surveys or statistics
Measurement procedures (if any):	--
Monitoring frequency:	Annually

QA/QC procedures:	-
Any comment:	Monitoring of this parameter is applicable if approach L_2 is used to rule out leakage

Data / Parameter:	Biomass residue type k
Data unit:	-
Description:	Availability of a surplus of biomass residue type *k* (which can not be sold or utilized) at the ultimate supplier to the project and a representative sample of other suppliers in the defined geographical region.
Source of data:	Surveys
Measurement procedures (if any):	-
Monitoring frequency:	Annually
QA/QC procedures:	-
Any comment:	Monitoring of this parameter is applicable if approach L_3 is used to rule out leakage

Data / Parameter:	$EF_{burning,CH4,k,y}$
Data unit:	tCH_4/GJ
Description:	CH_4 emission factor for uncontrolled burning of the biomass residue type *k* during the year *y*
Source of data:	Undertake measurements or use referenced and reliable default values (e.g. IPCC)
Measurement procedures (if any):	-
Monitoring frequency:	Review of default values: annually Measurements: once at the start of the project activity
QA/QC procedures:	Cross-check the results of any measurements with IPCC default values. If there is a significant difference, check the measurement method and increase the number of measurements in order to verify the results
Any comment:	Monitoring of this parameter for project emissions is only required if CH_4 emissions from biomass combustion are included in the project boundary. Note that a conservative factor shall be applied, as specified in the baseline methodology

Data / Parameter:	$ALTM_y$
Data unit:	Tonne alternative materials
Description:	Annual consumption of alternative materials in raw materials in year *y*
Source of data:	It will be registered as part of inventories control
Measurement procedures (if any):	Weighbridge/Stockpile control data
Monitoring frequency:	Per trip
QA/QC procedures:	These data will be collected as part of normal logistic level operations. QA/QC requirements according to ISO 9000 or similar quality systems
Any comment:	---

Data / Parameter:	*$ByPass_y$*
Data unit:	Tones
Description:	Annual production of Bypass dust leaving kiln system in year *y*
Source of data:	It will be measured as part of normal operations
Measurement procedures (if any):	Weighfeeders/Weighbridge
Monitoring frequency:	Monthly
QA/QC procedures:	These data will be collected as part of normal plant level operations. QA/QC requirements according to ISO 9000 or similar quality systems
Any comment:	---

Data / Parameter:	*$CaO_{CLINK,y}$*
Data unit:	tonnes of CaO/tonnes of clinker).
Description:	CaO content in the clinker produced in the year *y*
Source of data:	It will be measured as part of laboratory quality control procedure
Measurement procedures (if any):	Sampling
Monitoring frequency:	Monthly
QA/QC procedures:	These data will be collected as part of normal plant level operations. QA/QC requirements according to ISO 9000 or similar quality systems
Any comment:	---

Data / Parameter:	*$CaO_{RM,y}$*
Data unit:	tonnes of CaO/tonnes of raw material
Description:	Non-carbonated CaO content in the raw materials in the year *y*
Source of data:	It will be measured as part of laboratory quality control procedure
Measurement procedures (if any):	Sampling
Monitoring frequency:	Monthly
QA/QC procedures:	These data will be collected as part of normal plant level operations. QA/QC requirements according to ISO 9000 or similar quality systems
Any comment:	---

Data / Parameter:	*CKD_y*
Data unit:	Tones
Description:	Annual production of CKD dust leaving kiln system
Source of data:	It will be measured as part of normal operations
Measurement procedures (if any):	Weighfeeders/Weighbridge
Monitoring frequency:	Monthly
QA/QC procedures:	These data will be collected as part of normal plant level operations. QA/QC requirements according to ISO 9000 or similar quality systems
Any comment:	---

Data / Parameter:	*$CLNK_y$*
Data unit:	Tones

Description:	Annual production of clinker in the year *y*
Source of data:	It will be measured with field instruments and checked with inventories control procedure
Measurement procedures (if any):	Weighfeeders/Stockpile control
Monitoring frequency:	Monthly
QA/QC procedures:	These data will be collected as part of normal plant level operations. QA/QC requirements according to ISO 9000 or similar quality systems
Any comment:	---

Data / Parameter:	d_y
Data unit:	Fraction
Description:	CKD calcination rate (released CO_2 expressed as a fraction of the total carbonate CO_2 in the raw materials)
Source of data:	It will be measured as part of normal operations
Measurement procedures (if any):	Sampling
Monitoring frequency:	Monthly
QA/QC procedures:	These data will be collected as part of normal plant level operations. QA/QC requirements according to ISO 9000 or similar quality systems
Any comment:	Alternatively, this parameter could be estimated or taken simply as 1

Data / Parameter:	*Dist*
Data unit:	Km
Description:	Distance between the source of fuel and the project activity plant
Source of data:	It will be registered on logistic department as part of inventories control
Measurement procedures (if any):	Logistic records or purchased tickets
Monitoring frequency:	Per trip
QA/QC procedures:	These data will be collected as part of normal logistic level operations. QA/QC requirements according to ISO 9000 or similar quality systems
Any comment:	---

Data / Parameter:	$EC_{Feed,SG,y}$
Data unit:	MWh
Description:	Self-generated electricity consumed for fuel feeding
Source of data:	It will be measured with field instruments and checked with production control procedures
Measurement procedures (if any):	Field/automatic instruments
Monitoring frequency:	Monthly
QA/QC procedures:	These data will be collected as part of normal plant level operations. QA/QC requirements according to ISO 9000 or similar quality systems
Any comment:	Zero if only emergency generator installed

Data / Parameter:	$EC_{KO,SG,y}$
Data unit:	MWh

Description:	Self-generated electricity consumed for kiln operation
Source of data:	It will be measured with field instruments and checked with production control procedures
Measurement procedures (if any):	Field/automatic instruments
Monitoring frequency:	Monthly
QA/QC procedures:	These data will be collected as part of normal plant level operations. QA/QC requirements according to ISO 9000 or similar quality systems
Any comment:	Zero if only emergency generator installed

Data / Parameter:	$EC_{RM,SG,y}$
Data unit:	MWh
Description:	Self-generated electricity consumed for raw materials grinding
Source of data:	It will be measured with field instruments and checked with production control procedures
Measurement procedures (if any):	Field/automatic instruments
Monitoring frequency:	Monthly
QA/QC procedures:	These data will be collected as part of normal plant level operations. QA/QC requirements according to ISO 9000 or similar quality systems
Any comment:	Zero if only emergency generator installed

Data / Parameter:	$FC_{Dry\ addl,i,y}$
Data unit:	mass or volume units
Description:	Fossil fuel ‘i’ consumed for drying raw materials or fuel preparation in the year *y*
Source of data:	It will be measured with field instruments and checked with inventories control procedure
Measurement procedures (if any):	Weighfeeders/Weighbridge/Stockpile control
Monitoring frequency:	Monthly
QA/QC procedures:	These data will be collected as part of normal plant level operations. QA/QC requirements according to ISO 9000 or similar quality systems
Any comment:	Zero if waste heat is used
Data / Parameter:	$FC_{i,Calcin,y}$
Data unit:	mass or volume units
Description:	Fossil kiln Fuel type *i* consumed for calcination in clinker production during the year *y*
Source of data:	It will be measured with field instruments and checked with inventories control procedure
Measurement procedures (if any):	Weighfeeders/Stockpile control
Monitoring frequency:	Monthly
QA/QC procedures:	These data will be collected as part of normal plant level operations. QA/QC requirements according to ISO 9000 or similar quality systems
Any comment:	This is other than the alternative or less carbon intensive fuel used in project activity

Data / Parameter:	$FC_{Trans,i}$
Data unit:	mass or volume unit of fuel/kilometer
Description:	Fuel consumption of the vehicle per kilometer
Source of data:	Estimated as part of fuel consumption evaluation of logistic department or data from external suppliers
Measurement procedures (if any):	Logistic registered data or third part
Monitoring frequency:	Annually
QA/QC procedures:	These data will be collected as part of normal logistic level operations. QA/QC requirements according to ISO 9000 or similar quality systems
Any comment:	---

Data / Parameter:	GEN_j
Data unit:	MWh
Description:	Electricity (MWh) generated by the source *j*
Source of data:	It will be measured with field instruments and checked with inventories control for self generation
Measurement procedures (if any):	Field /automatic instruments
Monitoring frequency:	Monthly
QA/QC procedures:	These data will be collected as part of normal plant level operations. QA/QC requirements according to ISO 9000 or similar quality systems
Any comment:	---

Data / Parameter:	$F_{i,j,y}$
Data unit:	mass or volume units
Description:	Amount of fuel i consumed by relevant power sources *j*
Source of data:	It will be measured with field instruments and checked with inventories control for self power generation
Measurement procedures (if any):	Weighfeeders/Weighbridge/Stockpile control
Monitoring frequency:	Monthly
QA/QC procedures:	These data will be collected as part of normal plant level operations. QA/QC requirements according to ISO 9000 or similar quality systems
Any comment:	---

Data / Parameter:	$MgO_{CLNK,y}$
Data unit:	tonnes of MgO/tonnes of clinker
Description:	Product of the MgO content in the clinker produced in the year *y*
Source of data:	It will be measured as part of laboratory quality control procedure
Measurement procedures (if any):	Sampling
Monitoring frequency:	Monthly
QA/QC procedures:	These data will be collected as part of normal plant level operations. QA/QC requirements according to ISO 9000 or similar quality systems
Any comment:	---

Data / Parameter:	$MgO_{RM,y}$
Data unit:	tonnes of MgO/tonnes of raw material
Description:	Non-carbonated MgO content in the raw materials in the year *y*
Source of data:	It will be measured as part of laboratory quality control procedure
Measurement procedures (if any):	Sampling
Monitoring frequency:	Monthly
QA/QC procedures:	These data will be collected as part of normal plant level operations. QA/QC requirements according to ISO 9000 or similar quality systems
Any comment:	---

Data / Parameter:	RM_y
Data unit:	Tonnes
Description:	Annual consumption of Non-carbonated raw materials in the year *y*
Source of data:	It will be measured with field instruments and checked with inventories control procedure
Measurement procedures (if any):	Weighfeeders/Weighbridge/Stockpile control
Monitoring frequency:	Monthly
QA/QC procedures:	These data will be collected as part of normal plant level operations. QA/QC requirements according to ISO 9000 or similar quality systems
Any comment:	---

Data / Parameter:	SKC_y
Data unit:	GJ/tonnes of clinker
Description:	Specific Kiln Calorific Consumption for the year *y*
Source of data:	Calculated as part of project emission results
Measurement procedures (if any):	Plant records
Monitoring frequency:	Monthly
QA/QC procedures:	QA/QC requirements according to ISO 9000 or similar quality systems
Any comment:	---

Data / Parameter:	Q_{trip}
Data unit:	Tones
Description:	Quantity of alternative materials carried in one trip per vehicle
Source of data:	It will be registered on logistic department as part of inventories control
Measurement procedures (if any):	Weighbridge data and purchase receipts
Monitoring frequency:	Per trip
QA/QC procedures:	These data will be collected as part of normal logistic level operations. QA/QC requirements according to ISO 9000 or similar quality systems
Any comment:	---

Data / Parameter:	$EF_{CO2,i}$
Data unit:	tCO_2/GJ

<table>
<tr><td>Description:</td><td>CO_2 emission factor for the fossil fuel type i</td></tr>
<tr><td>Source of data:</td><td>The following data sources may be used if the relevant conditions apply:
<table>
<tr><th>Data source</th><th>Conditions for using the data source</th></tr>
<tr><td>(a) Values provided by the fuel supplier in invoices</td><td>This is the preferred source</td></tr>
<tr><td>(b) Measurements by the project participants</td><td>If (a) is not available</td></tr>
<tr><td>(c) Regional or national default values</td><td>If (a) is not available

These sources can only be used for liquid fuels and should be based on well documented, reliable sources (such as national energy balances)</td></tr>
<tr><td>(d) IPCC default values at the upper limit of the uncertainty at a 95% confidence interval as provided in table 1.4 of Chapter 1 of Vol. 2 (Energy) of the 2006 IPCC Guidelines on National GHG Inventories</td><td>If (a) is not available</td></tr>
</table>
</td></tr>
</table>

<table>
<tr><td>Measurement procedures (if any):</td><td>For (a) and (b): Measurements should be undertaken in line with national or international fuel standards
For (a): If the fuel supplier does provide the NCV value and the CO_2 emission factor on the invoice and these two values are based on measurements for this specific fuel, this CO_2 factor should be used. If another source for the CO_2 emission factor is used or no CO_2 emission factor is provided, Options (b), (c) or (d) should be used</td></tr>
<tr><td>Monitoring frequency:</td><td>For (a) and (b): The emission factor should be obtained for each fuel delivery, from which weighted average annual values should be calculated
For (c): Review appropriateness of the values annually
For (d): Any future revision of the IPCC Guidelines should be taken into account</td></tr>
<tr><td>QA/QC procedures:</td><td>---</td></tr>
<tr><td>Any comment:</td><td>---</td></tr>
</table>

<table>
<tr><td>Data / Parameter:</td><td>NCV_i</td></tr>
<tr><td>Data unit:</td><td>GJ/mass or volume units</td></tr>
<tr><td>Description:</td><td>Weighted average net calorific value for fuel type i</td></tr>
<tr><td>Source of data:</td><td>The following data sources may be used if the relevant conditions apply:
<table>
<tr><th>Data source</th><th>Conditions for using the data source</th></tr>
<tr><td>(a) Values provided by the fuel supplier in invoices</td><td>This is the preferred source</td></tr>
<tr><td>(b) Measurements by the project participants</td><td>If (a) is not available</td></tr>
</table>
</td></tr>
</table>

	(c) Regional or national default values	If (a) is not available These sources can only be used for liquid fuels and should be based on well documented, reliable sources (such as national energy balances).
	(d) IPCC default values at the upper limit of the uncertainty at a 95% confidence interval as provided in Table 1.2 of Chapter 1 of Vol. 2 (Energy) of the 2006 IPCC Guidelines on National GHG Inventories	If (a) is not available
Measurement procedures (if any):	For (a) and (b): Measurements should be undertaken in line with national or international fuel standards	

Monitoring frequency:	For (a) and (b): The NCV should be obtained for each fuel delivery, from which weighted average annual values should be calculated
	For (c): Review appropriateness of the values annually
	For (d): Any future revision of the IPCC Guidelines should be taken into account	

QA/QC procedures:	Verify if the values under (a), (b) and (c) are within the uncertainty range of the IPCC default values as provided in Table 1.2, Vol. 2 of the 2006 IPCC Guidelines. If the values fall below this range collect additional information from the testing laboratory to justify the outcome or conduct additional measurements. The laboratories in (a), (b) or (c) should have ISO17025 accreditation or justify that they can comply with similar quality standards
Any comment:	Note that for the NCV the same basis (pressure and temperature) should be used as for the fuel consumption

Data / Parameter:	$OXID_i$
Data unit:	Fraction
Description:	Oxidation factor of the fuel *i*
Source of data:	Refer to the Table 1-4 in the 2006 IPCC Guidelines, Vol. 2, page 1.25, for default values
Measurement procedures (if any):	---
Monitoring frequency:	---
QA/QC procedures:	---
Any comment:	---

All of the monitoring parameters related to baseline are found redundant due to standardised baseline emission factor. Moreover parameters related to grid electricity have been omitted as their multiplication with negligible emission factor results negligible value. In total more than 52 parameters have been omitted from referenced methodologies while the remaining parameters to be monitored are less in number than the parameters omitted (i.e more than 50% of total parameters do not need monitoring!).

Parameters omitted due to the Standardized Baseline or already substituted by default values or omitted from conservative simplification are included in the following table.

	Omitted Monitoring Parameters	Approved Methodology
1	$ByPass_{BSL}$, CKD_{BSL}, SKC_{BSL}	ACM0015 V3
2	RM_{BSL}, $MgO_{RM,BSL}$, $CaO_{RM,BSL}$, $MgO_{CLNK,BSL}$, $CaO_{CLNK,BSL}$	ACM0015 V3
3	$EC_{Cto,BSL}$,d_{BSL},$CTO_{BSL,m}$,$CLNK_{BSL\_CNSM,m}$,$CLNK_{BSL}$	ACM0015 V3
4	$EC_{RM,SG}$, $EC_{KO,Grid}$, $EC_{KO,SG}$, $EC_{Feed,SG}$,$EC_{RM,Grid}$,$EC_{Feed,Grid}$	ACM0015 V3
5	d_y,$FC_{Dry,i}$	ACM0015 V3
6	$EC_{KO,Grid,y}$, $EC_{RM,Grid,y}$, $EC_{Feed,Grid,y}$, $EC_{Cto,y}$, $EC_{Conv,y}$, $CTO_{m,y}$, $CLNK_{CONSM,m,y}$,	ACM0015 V3
7	Daily $FF_{ex\ i}$, Daily $\%AMC_{ex}$, Daily SKC_{ex} , Daily $CLNK_{ex}$,$\%AMC_y$, $\overline{SKC}_j$, SKC_{ex} optimal range, $\%AMC_{ex}$ optimal range, $\overline{\%AMCex}$, $SKC_{y,measured}$, $\overline{SKC}_{ex}$	ACM0015 V3
8	$P_{clinker/quicklime,x}$, $P_{clinker/quicklime,x-1}$ and $P_{clinker/quicklime,x-2}$, $FC_{i,x}$, $FC_{i,x-1}$ and $FC_{i,x-2}$	ACM003V07.4.1
9	$P_{clinker/quicklime,x-1}$ and $P_{clinker/quicklime,x-2}$, $FC_{i,x-1}$ and $FC_{i,x-2}$	ACM003V07.4.1
10	NCV_i, $EF_{CO2,FF,i}$	ACM003V07.4.1
11	*Annex I (lab procedure)*	ACM0015 V3

Validity of the standardized baseline

Please state the period of time for which the standardized baseline is valid. Please note that Appendix I of the “Guidelines for the establishment of sector specific standardized baselines” provide interim values for data vintage and the frequency of update.

Data Vintage

Average of annual data from existing plants has been used. Data vintage of three subsequent calendar years available before the submission calendar year of this standardized baseline. In cases where such performance data for three calendar years is not available due to very recent year of establishment of the sample plant, the performance data available (one or two years) have been used in calculation of averages.

Eligibility

This standardized baseline will serve to promote low carbon investment and/or practice. It will primarily stimulate leapfrogging older clinker kiln technologies while retrofit of existing kilns is also encouraged, to achieve de-carbonization compared to the set GHG emission intensity benchmark for clinker production in the Host Country. Project participants that fulfil either of the following are eligible and can use this standardized baseline to apply for CDM registration.

- PPs that applied for Letter of endorsement or LOA for any CDM measure related to cement kiln before the submission date of the Standardised Baseline, i.e July 12, 2012

- All PPs whose plants started commercial operation or renovation after the first submission date of this Standardised Baseline, i.e July 12, 2012

Frequency of Update

The Host country is a CDM underrepresented region and also an LDC where such intensive data collection is commonly challenging. It is also believed that a reliable level of certainty of baseline will be required to drive confidence towards low carbon investments and practices lasting longer. It is proposed the standardized baseline will be updated seven years after approval date of this standardized baseline. However we are flexible to abide by the Boards decision.

Plants that use an existing Standardized Baseline can either use the original SB for a fixed crediting period or in case of renewable crediting period; use the revised SB available at the renewal.

Plants with CDM application that request for LOA after the end of Validity period of the most recent SB shall use the revised Standardized Baseline that will possibly have revised benchmark after assessing new set of data and threshold level.

Future potential for multiple use of this SB Protocol

This standardized Baseline has currently been submitted specifically for crediting under the Clean Development Mechanisms of the Kyoto Protocol. However the Host Country may also propose to directly apply it as Baseline and MRV protocol for Project Developers (Executing Entities) to access other emerging and future International Carbon Finance types in the future.

SECTION B: STANDARDIZED BASELINE DEVELOPED USING A METHODOLOGICAL APPROACH CONTAINED IN AN APPROVED METHODOLOGY OR TOOL

This section should only be completed when the standardized baseline is developed using a methodological approach to estimate baseline emissions contained in an approved methodology or tool. An example for this is the application of the “Tool to calculate the emission factor for an electricity system” to estimate the emission factor for a electric grid.

Applicability of the standardized baseline

Please state the host country(ies) or region(s) within a host country to which the standardized baseline is applicable. In case of region(s) within a host country, please document transparently the geographical boundaries of the region (e.g. provinces, electric grids, etc).

Baseline emission estimation

Please explain how the methodological approach contained in the approved methodology or tool was applied to estimate the baseline emissions of a project activity in (a) country(ies) or region. Follow the steps and guidance of the approved methodologies or tools. Document all underlying data, data sources, assumptions, calculation steps and outcomes in a clear and transparent manner. Note that the underlying methodology or tool has to provide a methodological approach to derive the baseline emissions for a country or region in order to apply this step. This applies, for example, to the methodological tool “Tool to determine the emission factor of an electricity system”.

Use of the standardized baseline with an approved methodology

Please explain how the standardized baseline will be used with the relevant approved methodology (ies) or approved tool, i.e. which (parts of) the approved methodology (ies) or the approved tool are replaced by the standardized baseline.

Validity of the standardized baseline

Please state the vintage of the parameters used to derive the standardized baseline, in accordance with the requirements contained in the approved methodology or tool.

REFERENCES AND ANY OTHER INFORMATION

1. Data QA/QC (as per guideline for QA/QC of data used in Establishment of SB)

The guidance stated regarding data delivery protocol under Appendix 1 of the guideline has been successfully applied.

A. Purpose of data collection

All data was collected for CDM purpose including for standardized baselines establishment. All cement plants with clinker kiln operating in the host country and built recently (in last five years) are covered under data collection.

B. Confidentiality

Data will be treated confidential in order to assure continued cooperation from plants (Ex: at renewal).

C. Help Desk

Please contact the relevant focal point to facilitate this.

D. Data Types

All relevant data for the purpose are collected for clinker output.

E. Data acquisition/aggregation

Data acquisition/ aggregation has been made in accordance with the sub-regions (cement regions) identified under 1 above.

F. Traceability

All data input into the spreadsheet can be traced back to the original data archived in scanned copy of officialised document (from primary and secondary sources) or to other source information.

G. Delivery requirements

All delivery requirements have been met by data providers except a case. In such cases the most conservative alternate value has been set as per the relevant clause in the data QA/AC guidance.

H. Quality Control (QC) report

The format for this report in accordance with appendix 2 of the guideline is annexed separately.

2. References

The following references were used to establish the standardized baseline.

- All relevant guidelines approved by CDM EB
- Primary data (data collected from relevant cement plants with kilns in the region)
- Data collected by DNA and other ministries (Ministry of Industry, Investment Authority)
- Purchase contract of a VSK plant

3. Sustainability of the Standardized Baseline

On the one hand, relevant facilities in the host country will be encouraged use this methodology to apply for crediting under the CDM as well as other mechanisms since it is a very robust and yet reasonably streamlined protocol. It is believed to reduce at least 60% of the efforts, costs and timelines compared to accreditation using conventional CDM methodologies.

On the other hand, this Standardized Baseline has been developed with initiation and enormously significant effort from the developer of the standardized baseline. The developer was only assisted for relevant data acquisition and QA/QC elements through existing institution of the Ethiopian DNA office and other sectoral Government institutions. Although conventional CDM methodologies are public goods without any Intellectual property owner, there is no rule in case of country specific SB which has a different feature.

Typically Standardized Baselines are applicable only for a specific Host Country and its elements regarding how to maintain sustainable innovation need to be enhanced to provide incentives for SB developers. In this regard, the Host Country DNA wishes to simply name the final approved Standardized Baseline after its developer as a token of acknowledgements for exceptional contributions made. It is therefore named “Ambachew Admassie Clinker GHG Baseline & MRV Protocol” which can be used interchangeably or together with the official title submitted.

Moreover we do not as well object with any (and even encourage) intellectual property assignment and/or commercial return mechanism to the SB developer (Ethan Bio-Fuels PLC) while encouraging streamlining guidance from the UNFCCC process or the CDM Executive Board; specifically to Standardized Baselines applicable to specific Host Country (ies) that are developed by identifiable SB developers, developed without grant funding. Such approach using market means will actually critically help us to achieve the sustainability of bringing in new SBs in other sectors as well as maintaining existing ones through periodically updating, than always seeking support from grant sources.

Acknowledgement:

The DNA of Ethiopia commends the UNFCCC secretariat for the close follow up, assistance during the SB development and the initial assessment cost relief.

We also acknowledge the Ministry of Industry of Ethiopia for the unique sectoral cooperation and assistance on data acquisition; that was instrumental to the process of the realization of this first ever proposed Standardized Baseline protocol in the sector under the CDM.

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History of the document

Version	Date	Nature of revision(s)
01.0	23 March 2012	Initial publication.
Decision Class: Regulatory **Document Type**: Form **Business Function**: Methodology		