Monitoring report form for CDM project activity
(Version 07.0)

MONITORING REPORT		
Title of the project activity	BQS improved cookstoves for Burundi's schools	
UNFCCC reference number of the project activity	9791	
Version number of the PDD applicable to this monitoring report	1.7	
Version number of this monitoring report	1.0	
Completion date of this monitoring report	28/10/2019	
Monitoring period number	1	
Duration of this monitoring period	01/06/2014 – 31/12/2018	
Monitoring report number for this monitoring period	MR1	
Project participants	Burundi Quality Stoves S.A. Shell Trading International Limited	
Host Party	Burundi	
Applied methodologies and standardized baselines	AMS-I.E – "Switch from non-renewable biomass for thermal applications by the user" – Version 05.0	
Sectoral scopes	1. Energy industries (renewable/ non renewable sources)	
Amount of GHG emission reductions or net anthropogenic GHG removals achieved by the project activity in this monitoring period	Amount achieved before 1 January 2013	Amount achieved from 1 January 2013
	-	435,595
Amount of GHG emission reductions or net anthropogenic GHG removals estimated ex ante for this monitoring period in the PDD	463,674	

SECTION A. Description of project activity

A.1. General description of project activity

Burundi Quality Stoves (BQS) has developed an improved cookstoves project for schools of Burundi. The small scale CDM project activity aims at:

1. Distributing institutional improved cookstoves (ICS) and/or refurbishing former masonry stoves in schools of Burundi to replace currently used old masonry stoves and open fire three-stone system (and traditional stoves); and
2. Switching from non-renewably logged trees to a sustainable energy supply: briquettes made of renewable biomass waste.

Compared to the currently used three-stone fires or traditional stoves, the advanced technology of ICS and refurbished masonry stoves allows quicker heating-up, longer cooking and heat retaining with less fuel wood as well as lower combustion fumes. It results in saving wood-fuel and associated expenses. Along with the diffusion of such a stove to replace currently inefficient cooking systems, a renewable biomass supply-chain is set up, by sourcing unutilized biomass residues to produce renewable biomass briquettes and market it to the participating schools in replacement of their non-renewable woodfuel.

The implementation of 907 stoves in 284 schools, supplied with 12,586 tonnes of renewable biomass briquettes, and the associated awareness and training campaigns in schools has helped halving these communities' fuel use 3 and turning it 100% renewable. Over this first monitoring period, the project has saved 435,595 tCO_{2e} greenhouse gas emissions by reducing the use of non-renewable biomass within the country, thus slowing down deforestation.

A.2. Location of project activity

Host Party: The Republic of Burundi is the host country.
Region/State/Province: All provinces, starting by Bujumbura province.
City/Town/Community etc.: All schools communities' locations, starting by Bujumbura.
Physical/ Geographical location: The project is to take place in schools in Burundi, starting with Bujumbura province. As a reference, Bujumbura city centre's geo-coordinates are 3°22'34" S and 29°21'36" E.
The country-wide geographical area corresponds to the area where renewable biomass is distributed and used in replacement of the former non-renewable woodfuel in ICS.

The list of all participating schools included is provided in Annex 1

A.3. Parties and project participants

Parties involved	Project participants	Indicate if the Party involved wishes to be considered as project participant (Yes/No)
Burundi	BURUNDI QUALITY STOVES S.A.	No
United Kingdom of Great Britain and Northern Ireland	SHELL TRADING INTERNATIONAL LIMITED	No

A.4. References to applied methodologies and standardized baselines

The approved baseline and monitoring methodology applied to the project activity is Version 05 of AMSI.E – "Switch from non-renewable biomass for thermal applications by the user", EB 68.

A.5. Crediting period type and duration

The project activity applies a renewable crediting period of 7 years. This is the first renewable crediting period, lasting from 01/06/2014 – 31/05/2021.

SECTION B. Implementation of project activity

B.1. Description of implemented project activity

Since January 2016, the project activity has implemented 907 institutional improved cooking stoves in 284 schools spread over 16 communes in 4 provinces (Bubanza, Bujumbura, Cibitoke, and Gitega) supplied with over 12,500 tonnes of renewable briquettes during the first monitoring period. The fixed masonry stoves, mostly installed in batches of two or three per school kitchen, have an average thermal efficiency of 44.8% and an average firepower of 32.78 kW_{th}[1].

Compared to the formerly used traditional stoves, the advanced design of the institutional improved cookstoves employed in the project allows quicker heating-up, longer cooking and heat retaining with less woodfuel as well as lower combustion fumes:

v.s.

The project consists in switching 100% of the fuel consumption of the boarding schools of Burundi from non-renewable biomass consumption for thermal applications into renewable sources, thanks to innovative production of briquettes made of renewable biomass wastes in Bujumbura with briquetting machines Jumbo 90.

The school canteens program benefits to over 200,000 students as per 2018/19 schools population, with the following triple impacts:

- Stimulate schools enrolment in food-insecure areas;
- Reduce school dropouts;
- Favour children's completion of study cycle

B.2. Post-registration changes

B.2.1. Temporary deviations from the registered monitoring plan, applied methodologies, standardized baselines or other methodological regulatory documents

N/A

B.2.2. Corrections

N/A

[1] As per CRUEA Water Boiling tests performed on April 14th, 2019.

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

TBC

B.2.4. Inclusion of monitoring plan

N/A

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

N/A

B.2.6. Changes to project design

N/A

B.2.7. Changes specific to afforestation or reforestation project activity

N/A

SECTION C. Description of monitoring system

Sales Agreement

Before any kitchen i is included in the project, a sales agreement between the project proponent and the responsible of woodfuel supply of each kitchen was signed, displaying the following information:

• Name and location of the kitchen
• Number of persons depending on the kitchen
• Agreement that the kitchen cede all its Carbon Emissions Reductions rights to BQS
• A warranty on the improved cooking stoves installed in the kitchen
• Information regarding the unique identification of stoves
• Installation and training terms
• Briquette supply exclusivity
• Maintenance services

Monitoring organization

BQS is responsible for overall monitoring management. All collected data is double-checked based on the sales agreements. The project monitoring database includes the selling date of each ICS and each renewable biomass delivery and help calculate the emission reductions attributable to each monitoring period. These records enable to determine the status of the CDM project activity: the number of ICS installed, the quantity of renewable biomass distributed, information on baseline and previous monitoring surveys and verification results. Double counting is avoided thanks to the unique identification of each stove included in the project as well as using appropriate record keeping procedures.

The Project Manager coordinate and endorse the overall responsibility for all CDM monitoring of the project, including:

- Develop, approve, execute, and improve the CDM Monitoring/Reporting Procedures;
- Organize in schools seminar to inform and train the monitoring staff to the monitoring procedures;
- Ensure that logistics is available and properly suited to efficiently perform the monitoring;
- Communicate and coordinate the monitoring work of all business units;
- Validate and electronically archive all monitoring data on a monthly basis throughout the crediting period (and conserve it at least for 2 further years);
- Calculate and report the emission reductions; and
- Coordinate the DOE work during the verification audit.

Monitoring Plan

Parameters monitored as per methodology AMS-I.E (Version 05):

- ✓ $N_{ICS/,j,y}$ Total number of ICS distributed or replaced by an equivalent appliance in year y
- ✓ $Op\_kitchen_{i,y}$ Operating status of kitchen i in year y
- ✓ $M_{renewable.biomass,y}$ Quantity of renewable biomass consumed by the project in year y.
- ✓ $Npers / kitchen_{i,y}$ Number of person dependant on kitchen i in the year y

The following figure shows the monitoring framework described.

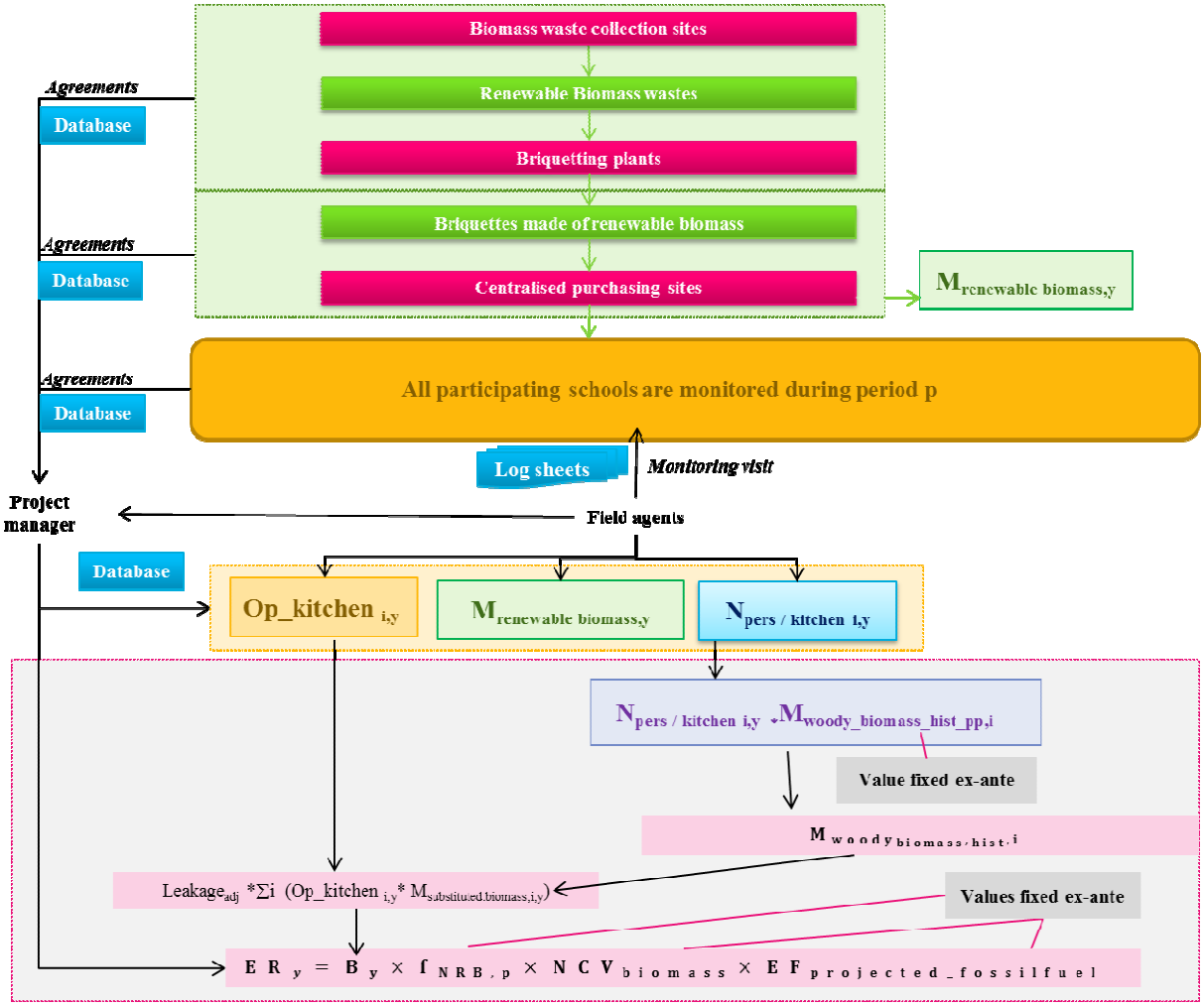

Figure 1: *Monitoring flowchart*

SECTION D. Data and parameters

D.1. Data and parameters fixed ex ante

Data/Parameter	P_j
Unit	kW_{th}
Description	Useful thermal output capacity of the ICS/masonry stove
Source of data	Performance test results from the manufacturer
Value(s) applied	*2.49 for medium size ICS* *4.82 for large size ICS* *and estimated ex-ante at 11 for refurbished masonry stoves*

Choice of data or measurement methods and procedures	Useful thermal output of the ICS has been estimated by Water Boiling Test by the Turkish supplier. Tests results have been made available to the DOE. Regarding masonry stoves, they will be restored, uniquely identified and certified by relevant entities (for example a nationally accredited laboratory such as the University research centre on Alternative Energies (CRUEA)) in order to determine their useful power and efficiency for complying with small scale limit and automatic additionality. Before inclusion of each refurbished masonry stove relevant entities will deliver a certification document per masonry stove restored with its specific useful power and identification number. Effective output of refurbished masonry stoves has been estimated ex-ante based on the measured specification of a double-pot masonry stove tested by ONIL (report provided).
Purpose of data/parameter	Small-scale threshold, debundle compliance and automatic additionality compliance
Additional comments	Ex-post thermal capacity of the 907 ICS at 32.78kWth/stove amount to 29,73 MWth

Data/Parameter	$f_{NRB,y}$
Unit	Fraction
Description	Fraction of biomass used in the absence of the CDM project in year *y* that can be established as non-renewable biomass
Source of data	Table 2 of Information Note EB 67 Annex 22
Value(s) applied	0.77
Choice of data or measurement methods and procedures	National default value.
Purpose of data/parameter	Calculation of baseline emissions
Additional comments	The value has been approved by the DNA of Burundi the 6th September 2012[2]

Data/Parameter	$NCV_{biomass}$
Unit	TJ/tonne
Description	Net calorific value of the non-renewable woody biomass that is substituted
Source of data	2006 IPCC Guidelines for National Greenhouse Gas Inventories
Value(s) applied	0.015
Choice of data or measurement methods and procedures	According to methodology AMS-I.E, the Net Calorific Value of the non-renewable woody biomass that is substituted has to be taken as IPCC default for wood fuel.
Purpose of data/parameter	Calculation of baseline emissions
Additional comments	-

Data/Parameter	$EF_{projected\_fossilfuel}$
Unit	tCO_2/TJ
Description	Emission factor for the substitution of non-renewable woody biomass by similar consumers
Source of data	2006 IPCC Guidelines for National Greenhouse Gas Inventories
Value(s) applied	81.6

[2] http://cdm.unfccc.int/DNA/fNRB/index.html

Choice of data or measurement methods and procedures	As indicated by the methodology AMS-I.E, this value represents the emission factor of the substitution fuels likely to be used by similar users, on a weighted average basis. It is assumed that the mix of present and future fuels used would consist of a solid fossil fuel (lowest in the ladder of fuel choices), a liquid fossil fuel (represents a progression over solid fuel in the ladder of fuel use choices) and a gaseous fuel (represents a progression over liquid fuel in the ladder of fuel use choices). Thus a 50% weight is assigned to coal as the alternative solid fossil fuel (96 tCO_2/TJ) and a 25% weight is assigned to both liquid and gaseous fuels (71.5 tCO_2/TJ for Kerosene and 63.0 tCO_2/TJ for Liquefied Petroleum Gas (LPG).
Purpose of data/parameter	Calculation of baseline emissions
Additional comments	-

Data/Parameter	$\mathbf{M_{woody\_biomass\_hist\_pp,,i}}$
Unit	tonnes/ capita at the site *i*
Description	Historical consumption of woody biomass per person dependent on the kitchen *i* (tonnes per person)
Source of data	Derived from historical data: Letter from Education ministry (03.09.2012)
Value(s) applied	1.28
Choice of data or measurement methods and procedures	As permitted by the methodology AMS-I.E, this was derived from historical records of fifteen schools s' wood fuel's consumption. The average historical consumption of school has been divided by the historical number of person per school in order to get the historical consumption of woodfuel per capita. In order to convert the data from stere into ton of woodfuel, a conservative factor of 0.35 (GTZ-HERA, Manual for Programs and Projects to Implement Cooking Energy Interventions, 2012) has been used (1 stere = 0.35 ton of woodfuel).
Purpose of data/parameter	Calculation of baseline emissions
Additional comments	-

Data/Parameter	$\mathbf{Leakage_{adj}}$
Unit	fraction
Description	Net to gross adjustment factor to account for leakages
Source of data	Methodology AMS-I.E Version 05
Value(s) applied	0.95
Choice of data or measurement methods and procedures	In case this leakage adjustment factor is applied, it is not required to survey the use/diversion of non-renewable woody biomass saved under the project activity by non-project households/users that previously used renewable energy sources.
Purpose of data/parameter	Calculation of leakage emissions
Additional comments	-

Data/Parameter	$\mathbf{EF_{EL,j,y}}$
Unit	tCO_2/MWh
Description	Emission factor for electricity generation for source *j* in year *y*
Source of data	"Tool to calculate baseline, project and/or leakage emissions from electricity consumption" (Version 01)
Value(s) applied	1.3
Choice of data or measurement methods and procedures	Option A2: Use a conservative default value of 1.3 tCO2/MWh
Purpose of data/parameter	Calculation of leakage emissions
Additional comments	-

Data/Parameter	$TDL_{j,y}$
Unit	-
Description	Average technical transmission and distribution losses for providing electricity to the briquetting machine
Source of data	"Tool to calculate baseline, project and/or leakage emissions from electricity consumption" (Version 01)
Value(s) applied	0.20
Choice of data or measurement methods and procedures	Use as default values of 20% for option: (a) project or leakage electricity consumption sources;
Purpose of data/parameter	Calculation of leakage emissions
Additional comments	-

Data/Parameter	SEC_{briq}
Unit	MWh/tonne
Description	Default value for the specific quantity of electricity consumed per tonne of briquettes produced
Source of data	Estimated ex-ante based on historic specific electricity consumption per ton of briquettes produced.
Value(s) applied	0.038
Choice of data or measurement methods and procedures	The specific electricity consumption is estimated ex-ante based on historic data of electricity consumption per tonne of briquettes produced
Purpose of data/parameter	Calculation of leakage emissions
Additional comments	Specific consumption provided by the constructor is 35-38 kWh/ Metric tonne of Biomass. In order to be conservative, a value of 38 kWh/tonne is chosen

D.2. Data and parameters monitored

Data/Parameter	Op_kitchen i,y
Unit	-
Description	Operating status of kitchen i (equipped with ICS/refurbished masonry stoves) in year *y*
Measured/calculated/ default	Measured
Source of data	Estimates based on surveys then monitored. Calculated based on Statistical average of monitoring findings.
Value(s) of monitored parameter	As provided kitchen by kitchen, year by year, in monitoring spreadsheet provided to the DOE
Monitoring equipment	A physical check will be performed by the CDM project proponent at least once every two years (biennial) in accordance with the monitoring plan.
Measuring/reading/recording frequency	At least annually
Calculation method (if applicable)	The operational status of each kitchen in the year y is reflected by the parameter (Op_kitchen i,y) at a value of 1 if kitchen i still operates the improved cookstoves and a value of 0 otherwise.
QA/QC procedures	-
Purpose of data/parameter	Calculation of baseline emissions
Additional comments	Guidance for monitoring are provided to field agents in order to determine the operating status of each kitchen during monitoring session with specific conditions to comply with.

Data/Parameter	$M_{renewable.biomass,y}$
Unit	tonnes/year
Description	Quantity of renewable biomass consumed by the project activity in year *y*.
Measured/calculated/ default	*2014-2015* - *2016* 3 738 000 *2017* 3 140 000 *2018* 5 038 000
Source of data	BQS delivery notes
Value(s) of monitored parameter	As provided kitchen by kitchen, year by year, in monitoring spreadsheet provided to the DOE
Monitoring equipment	At each distribution site a delivery notes is made for each batch of briquettes sold containing the following information: distribution site, production site, school provided and quantity of biomass. The delivery notes are kept and collected for monitoring the quantity of renewable biomass consumed by the project from each production site.
Measuring/reading/recording frequency	Every month
Calculation method (if applicable)	-
QA/QC procedures	The quantity is cross checked with school's receipt
Purpose of data/parameter	Leakage emissions and Methodology requirements
Additional comments	The parameter is used for monitoring leakage emissions from electricity consumption.

Data/Parameter	$N_{pers / kitchen\ i,y}$
Unit	pers/year
Description	Number of person dependant on kitchen *i* in the year *y*
Measured/calculated/ default	Measured
Source of data	Education ministry records
Value(s) of monitored parameter	School-year 2014-2015: - School-year 2015-2016: - School-year 2016-2017: 185 519 School-year 2017-2018: 205 817 School-year 2018-2019: 213 240
Monitoring equipment	Number of persons dependant on kitchen *i* will be inquired and recorded during each monitoring period
Measuring/reading/recording frequency	At least annually
Calculation method (if applicable)	-
QA/QC procedures	Data will be cross check with relevant literature. Database will be periodically checked by the project proponent.
Purpose of data/parameter	Calculation of baseline emissions
Additional comments	For ex-post emission calculation, the population (occupancy) of each school is monitored.

Data/Parameter	$N_{ICS/,j,y}$
Unit	number
Description	Total number of ICS (medium and large) (distributed and furbished mansonry stoves) or replaced by an equivalent appliance in year *y*
Measured/calculated/ default	Measured

Source of data	Order and delivery records
Value(s) of monitored parameter	907
Monitoring equipment	-
Measuring/reading/recording frequency	At installation
Calculation method (if applicable)	Measured
QA/QC procedures	Cross-check with monitored operational figures
Purpose of data/parameter	Used to record the number/location of each stove distributed and verify the compliance with small scale limit
Additional comments	Capped in compliance with the small-scale limit with regard to thermal energy power output of the stoves as detailed in B.2. $\sum$ $\mathbf{N_{ICS/,j,y}}$ (j indicating masonry stove refurbished)* P_j + $\mathbf{N_{ICS/,j,y}}$ (j indicating ICS distributed medium or large* P_j < 45 MW_{th}

D.3. Implementation of sampling plan

This section is not relevant, as no sampling plan is involved since all participating school sites are exhaustively monitored in the Project.

SECTION E. Calculation of emission reductions or net anthropogenic removals

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

Baseline Emissions of the project activity are calculated as:

$$ER_y = B_y * f_{NRB,y} * NCV_{biomass} * EF_{projected\_fossilfuel} \quad \textbf{(1)}$$

Where:

ER_y	Emission reductions during the year *y* in tCO_2e
B_y	Quantity of woody biomass that is substituted or displaced in tonnes
$f_{NRB,y}$	Fraction of woody biomass used in the absence of the project activity in year *y* that can be established as non-renewable biomass using survey methods or government data or approved default country specific fraction of non-renewable woody biomass (f_{NRB}) values available on the CDM website[3]
$NCV_{biomass}$	Net calorific value of the non-renewable woody biomass that is substituted (IPCC default for wood fuel, 0.015 TJ/tonne)
$EF_{projected\_fossilfuel}$	Emission factor for the substitution of non-renewable woody biomass by similar consumers. Use a value of 81.6 tCO_2/TJ.

Determination of By:

B_y is determined as per option (a) approach:

(a) Calculated as the product of the number of appliances multiplied by the estimate of average annual consumption of woody biomass substituted per appliance (tonnes/year); This can be derived from historical data or estimated using survey methods.

[3] Default values endorsed by designated national authorities and approved by the Board are available at <http://cdm.unfccc.int/DNA/fNRB/index.html>

B_y is determined based on the sum of woody biomass substituted by each kitchen[4] in the year *y* ($M_{substituted\ biomass,i,y}$) in tonnes/kitchen/y taking into consideration the operating status of each kitchen as follows:

$$B_y = Leakage_{adj} * \Sigma i(Op\_kitchen_{i,y} * M_{substituted\_biomass,i,y}) \quad \textbf{(2)}$$

Where:

B_y	Quantity of woody biomass that is substituted or displaced in tonnes in year *y*
$Op\_kitchen_{,i,y}$	Operating status of kitchen *i* (equipped with ICS) in year *y*
$M_{substituted\_biomass,i,y}$	Quantity of woody biomass that is substituted by operating kitchen *i* in year *y* (tonnes/kitchen *i*/y)
$Leakage_{adj}$	Net to gross adjustment factor to account for leakages

Operating status of kitchen *i* in the year *y* ($Op\_kitchen_{,i,y}$)

The operational status of each kitchen in the year *y* is reflected by the parameter ($Op\_kitchen_{\ i,y}$) at a value of 1 if kitchen *i* still operates the ICS and a value of 0 otherwise.

Quantity of woody biomass that is substituted by kitchen i in the year y ($M_{substituted\ biomass,i,y}$)

The quantity of woody biomass that is substituted by kitchen *i* in the year *y* ($M_{substituted\_biomass,i,y}$) is calculated as follows:

$$M_{substituted\_biomass,i,y} = M_{woody\_biomass\_hist,i} \quad \textbf{(3)}$$

Where:

$M_{substituted\_biomass,i,y}$	Quantity of woody biomass that is substituted by kitchen *i* in the year *y* (tonnes/kitchen i/y)
$M_{woody\_biomass\_hist,i}$	Historical consumption of woody biomass using three stones open fire / traditional stoves / former masonry stoves in the absence of the project activity by kitchen *i* (tonnes/kitchen *i)*

Historical consumption of woody biomass using three stones open fire / traditional stoves / former masonry stoves in the absence of the project activity ($M_{woody\_biomass\_hist,i}$)

The historical consumption of woody biomass using three stones open fire, traditional stoves or old masonry stoves in the absence of the project activity by kitchen i (tonnes/kitchen *i*) is determined as follows:

$$M_{woody\_biomass\_hist,i} = M_{woody\_biomass\_hist\_pp,i} * N_{pers/kitcheni,y} \quad \textbf{(4)}$$

Where:

$M_{woody\_biomass\_hist,i}$	Historical consumption of woody biomass by kitchen *i* (tonnes/kitchen *i)*
$M_{woody\_biomass\_hist\_pp,i}$	Historical consumption of woody biomass per person dependant on the kitchen *i* (tonnes per person)
$N_{pers/kitchen\ i,y}$	Number of person dependent on kitchen *i* in the year *y* (pers/year)

[4] In the project activity, one appliance is defined as one kitchen, i.e. the entire premises whereby cooking activities are performed in the school. One kitchen may be composed of a variable number of stoves, however each school site identified in the project activity operates one kitchen, which overall fuelwood consumption and project briquettes consumption will be monitored.

Historical consumption of woody biomass per person dependant on the kitchen *i* (tonnes per person) ($M_{woody\_biomass\_hist\_pp,i}$)

The Historical consumption per person per school was determined ex ante by dividing the mean historical woodfuel consumption by the historical number of person per school. Data used for baseline calculation are provided in the table below (Education Ministry, September 2012).

	Mean Historical consumption of Wood	Average Number of person per school	$M_{woody\_biomasshist,i\_perpers}$	$M_{woody\_biomass\_hist,\_pp,i}$
School	*Stere/day/school*	*Person*	*tonnes per capita per day*	*tonnes per capita per year*
School *i*	9.3	612	0.0053	1.28

Number of persons dependent on kitchen i in the year *y* (pers/year) ($N_{pers/kitchen\ i,y}$)

In order to take into consideration the occupancy rate of each school, the number of person dependant on kitchen *i* is monitored ex-post along all monitoring period.

School-year 2014-2015	School-year 2015-2016	School-year 2016-2017	School-year 2017-2018	School-year 2018-2019
-	-	185 519	205 817	213 240

Non-renewable woody biomass fraction ($f_{NRB,y}$)

The schools's kitchens are fired with non-renewable wood fuel. The non-renewable biomass fraction ($f_{NRB,y}$) was taken at its national default value of 77%, as approved by the CDM Executive Board at its 67th meeting and lately by the Burundi's DNA the 6 September 2012[5].

Emission factor for relevant substitution fossil fuel ($EF_{projected\_fossilfuel}$)

According to methodology AMS-I.E, the Emission Factor of the substitution fuel likely to be used by similar consumers has to be taken at 81.6 tCO_2/TJ.

Net calorific value of the substituted non-renewable woody biomass ($NCV_{biomass}$)

According to methodology AMS-I.E, the Net Calorific Value of the non-renewable woody biomass that is substituted has to be taken as IPCC default for wood fuel, 0.015 TJ/tonne.

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

A. Shifts of pre-project activities

As the renewable biomass used is all from residue/waste, this emission source is not applicable to this project.

B. Emissions related to the production of the biomass

As the renewable biomass used is all from residue/waste, this emission source is not applicable to this project.

[5] http://cdm.unfccc.int/DNA/fNRB/index.html

E.3. Calculation of leakage emissions

C. Competing uses for the biomass

The Project activity's biomass supply involves agro-industrial wastes (sugar cane wastes, sawmills residues…) which are widely available in the region and currently burnt without energy purpose, therefore this source of leakage can be neglected. The biomass used in the project activity could not be used for other purposes in the absence of the project.

"The data from agricultural sector of Burundi estimates that every year a theoretical potential of 1,127,302 tonnes of biomass wastes are not used" p84. Less than 36,000 t of biomass (wet basis) is needed per year for all BQS's projects. The surplus of renewable biomass for the project is more than 100%. Thus this source of leakage can be neglected.

Methodology AMS-I.E further indicates that leakage related to the non-renewable woody biomass saved by the project activity shall be assessed based on *ex post* surveys of users and the areas from which this woody biomass is sourced (using 90/30 precision for a selection of samples).

➔ Alternatively, B_y is multiplied by a net to gross adjustment factor of 0.95 to account for leakages, in which case surveys are not required.

If the equipment currently being utilised is transferred from outside the boundary to the project boundary, leakage is to be considered.

➔ The improved cook stoves to be disseminated in the project don't include any second-hand equipment but exclusively brand new ones, therefore no currently utilised equipment will be transferred from outside the boundary to the project activity.

Emissions related to the transformation of renewable biomass wastes into briquettes

Furthermore, potential leakage emissions arise from the electricity consumption from the briquetting machines processing the transformation from renewable biomass into briquettes.

➔ This emissions source is calculated as per the tool '*Tool to calculate baseline, project and/or leakage emissions from electricity consumption*'.

Leakage emissions from electricity consumption

Leakage emissions from consumption of electricity are calculated as follows:

$$LE_{EC,y} = \sum_{j} EC_{PJ,j,y} * EF_{EL,j,y} * (1 + TDL_{j,y}) \quad \textbf{(5)}$$

Where:

$LE_{EC,y}$	Leakage emissions from electricity consumption in year *y* (tCO_2/yr)
$EC_{PJ,j,y}$	Quantity of electricity consumed by the project electricity consumption source *j* in year *y* (MWh/yr)
$EF_{EL,j,y}$	Emission factor for electricity generation for source *j* in year *y* (tCO_2/MWh)
$TDL_{j,y}$	Average technical transmission and distribution losses for providing electricity to source *j* in year *y*
j	Sources of electricity consumption in the project

Quantity of electricity consumed by the project ($EC_{PJ,j,y}$)

The quantity of electricity consumed by the project $EC_{PJ,j,y}$ is calculated based on a default value for the specific quantity of electricity consumed per ton of briquettes produced SEC_{briq} (MWh/ton) multiplied by the quantity of briquettes supplied to the project activity $M_{renewable.biomass,,y}$.

Quantity of renewable biomass consumed by the project activity in year y ($M_{renewable.biomass,y}$**)**

Quantity of renewable biomass consumed by the project activity in year y:

Year	$M_{renewable.biomass,y}$ (tons)
2014	-
2015	-
2016	3 738 000
2017	3 140 000
2018	5 038 000

Emission factor for electricity generation ($EF_{EL,j,y}$***)***

➔ Option A2 chosen: *conservative default value of 1.3 tCO_2/MWh.*

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

➔ Option chosen: *default values of 20%*.

Leakage emissions from transportation of biomass

➔ Transportation of renewable biomass wastes from collection sites to the briquetting plant is neglected as the briquetting plants are operated close to the residues provision sites.

Moreover, taking into consideration that:

- the average distance of collection of renewable biomass for the Project activity is shorter than the mean distance of origin of previously used biomass in the baseline and;
- AMS-I.C methodology mentions that "If biomass residues are transported over a distance of more than 200 kilometres (one way) due to the implementation of the project activity then this leakage source attributed to transportation shall be considered, otherwise it can be neglected." For the proposed project, the residues will never be transported over a distance more than 200 km (one way) thus can be neglected.

Therefore no additional leakage emissions from transportation need to be accounted for.

Full calculations for this monitoring period is presented in the spreadsheets attached to the monitoring report.

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

	Baseline GHG emissions or baseline net GHG removals (t CO_2e)	**Project GHG emissions or actual net GHG removals (t CO_2e)**	**Leakage GHG emissions (t CO_2e)**	**GHG emission reductions or net anthropogenic GHG removals (t CO_2e)**		
				Before 01/01/2013	**From 01/01/2013**	**Total amount**
Total	435,595	-	746	-	435,595	435,595

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

Amount achieved during this monitoring period (t CO_2e)	Amount estimated ex ante for this monitoring period in the PDD (t CO_2e)
435,595	463,674

E.5.1. Explanation of calculation of "amount estimated ex ante for this monitoring period in the PDD"

161,633 tCO_{2e} for 2 years and 4 months based on PDD estimate of 99 schools, extrapolated to actual project extent of 284 schools.

E.6. Remarks on increase in achieved emission reductions

N/A

E.7. Remarks on scale of small-scale project activity

The combined scale of the activities belonging to the same small-scale project type (Type I) remained under the limit of that type every year given that the conservative amount of improved cooking devices installed (907 ICS) at 32.78kWth/stove totals 29.73 MW_{th} which was below the small-scale threshold of 45 MW_{th}.

N°	PROVINCE	COMMUNE	SCHOOL
1	CIBITOKE	BUGANDA	RUHEMBE I
2			RUHEMBE II
3			BIHAHE I
4			BIHAHE II
5			BUGANDA I
6			BUGANDA II
7			MURAMBI
8			NDAVA TRANS
9			KAGONGO
10			GATERI
11			RUHAGARIKA
12			CUNYU
13			MBUBI
14		RUGOMBO	EP RUGEREGERE
15			RUKANA I
16			RUSORORO
17			MIKASHU
18			RUVUMERA
19			RUSIGA
20			BUSERUKO
21			KIRAMIRA
22			RUKANA II
23			RUVYAGIRA
24			MUSENYI
25			MPARAMBO
26			CUZWE
27			BUHINYUZA
28		BUKINANYANA	BITARE
29			KABERE
30			MASANGO
31			NYAMYEHA
32			NYARUHISHI
33			SEHE
34			GIKENENE
35			BUMBA II
36			BUMBA III
37			BUGARAMA
38			NYAMIRAMBO

39			NDORA
40			KIBATI
41			GIHANGO
42			MUNYINYA
43			BUTARA
44			NYAVYAMO
45			BUKINANYANA
46			GAHABURA
47			RUZIBA
48			MPARO
49			SHIMWE
50	**BUJUMBURA**	**KABEZI**	CUMBA
51			GITANGA
52			GASERU
53			GAKUNGWE
54			MICHAELLA
55			GATONGO
56			KIMINA
57			MASAMA I
58			MASAMA II
59			MIGERA
60			NYAMUZI I
61			NYAMUZI II
62			NYAMUZI III
63			RUGEMBE
64			ITYAZO
65			MUTUMBA I
66			MUTUMBA II
67			MUTUMBA III
68			NYAMUGARI
69		**KANYOSHA**	KIROMBWE I
70			KIROMBWE II
71			KIROMBWE III
72			KIROMBWE IV
73			KIYENZI I
74			KIYENZI II
75			NYAMABOKO I
76			NYAMABOKO II
77			RARO I
78			RARO II

79			COGA I
80			COGA II
81			BIGWA I
82			BIGWA II
83			GITONGO
84			SOROREZO
85		**MUTIMBUZI**	BUHOMBA
86			MARAMVYA III
87			BUGOMA
88			RUKARAMU I
89			RUKARAMU II
90			VUGIZO
91	**BUBANZA**	**GIHANGA**	MUGERERO
92			NYESHANGA
93			KAGWEMA
94			MUYANGE
95			NDAVA BUSONGO
96			BURAMATA
97			MPANDA - VILLAGE 5
98			KIZINA
99			RUMOTOMOTO
100			RUGUNGA
101			MUDUBUGU
102			EP Mahoro
103			GIHUNGWE I ET II
104			BWIZA BWA NINGA
105		**RUGAZI**	KIRENGANE
106			NYAGATOBE
107			TEBERO
108			EP BUHANZA
109			EP RUCE I, II et SHANGO
110			EP BUGANYA
111			EP KIBUYE I
112			EP KIBUYE II
113			EP GASENYI
114			RUGAZI II
115			RUGAZI I
116			RUZENGA
117			RUBIZA
118			MANEGE

119			KIBENGA
120			MBUYE I
121			NYUNZWE
122			MABUYE II
123			BUMBA
124			RUZIBIRA
125			BUGANDA
126			RUSEKABUYE I
127			RUSEKABUYE II
128			MUGERI
129			KIVYUKA I
130			KIVYUKA II
131			ECOFO MIVYIRU I
132			ECOFO MIVYIRU II
133			ECOFO MUYEBE I
134		**MUSIGATI**	ECOFO MUYEBE II
135			ECOFO MUYEBE III
136			ECOFO KAYANGE
137			EP MPISHI
138			ECOFO BUKINGA
139			EP MUNANIRA
140			ECOFO NGONYI
141			EP MUKUNGU I
142			EP MUKUNGU II
143			KANAZI
144			GAHISE
145			TITI
146			BUTANUKA
147			BUTEMBE
148			MASHA
149			GATAGURA
150			RUBIRA
151		**MPANDA**	MURENGEZA II
152			RUZIBA
153			GAHWAZI
154			MAHWA
155			NYOMVYI
156			NYENDAGO
157	**GITEGA**	**BURAZA**	BUBAJI
158			BUGEGA

159			BUHINYUZA I
160			BUHINYUZA II
161			BUTEMBA
162			BURIZA
163			GASHUBI
164			GITARAMUKA I
165			GITARAMUKA II
166			KIGOTI
167			MAZA
168			MIGEZI
169			MUKA
170			NDAGO
171			NDAVA II
172			NYAKABUYE I
173			NYAKABUYE II
174			NYARUNAZI
175			RABIRO I
176			RABIRO II
177			RUBIRA
178			RUFUNZWE
179			RWEZA
180			BUGA
181			BUGUMBASHA
182			BUHUNJA
183			GASASA
184			GASENYI
185			JANJA
186			KAROBA
187			KIGATI
188			MARAMVYA
189		**MAKEBUKO**	MARAMVYA
190			MUHORORO
191			MUMURI
192			MURENDA
193			MWARO-MAVUVU
194			MWARO-NGUNDU
195			MWUMBA
196			NYAMAGANDIKA
197			RUTANGANIKA
198			RUTOVU

199			Ste MARIE ASSUMPTA de MUMURI
200			SIMBA
201		**NYARUSANGE**	BIKINGI
202			BUKORO
203			GITARAMUKA
204			JURWE
205			KIGARA
206			MASARE
207			MUYANGE
208			MUZIMA
209			NKONDO
210			NYAMAZI
211			NYARUBENGA
212			NYARUSANGE
213			NYARUTANGA
214			TYE
215		**BUGENDANA**	KAREMBA
216			KIVOGERO
217			KIZIGURO
218			MWURIRE
219			NKANDA I
220			NKANDA II
221			NTUNDA
222			JENDA
223			RUSHANGA
224			RWINGIRI
225			WINTEKO I
226			WINTEKO II
227			BITARE
228			BUGENDANA I
229			BUGENDANA II
230			BUHORO
231			BUSANGANA
232			CARIRE
233			CISHWA I
234			CISHWA II
235			CUNYWE
236			GATERAMA
237			KAREHE
238			KIRIMBI I

239			KIRIMBI II
240			KIVUVU I
241			KIVUVU II
242			MIGINA
243			MUGERA I
244			MUGERA II
245			MUGERA III
246			MUGITEGA
247			MUKORO
248			MUNYINYA
249			MUTOYI I
250			MUTOYI II
251			MUVUNAMBOGO
252			NYAKERU I
253			NYAKERU II
254			NYAMAGANA
255			RUTONGANIKWA I
256			RUTONGANAIKWA II
257			CUZU
258		**RYANSORO**	KABUYE
259			KARAGO
260			KINYONZO
261			KIRANZIRA
262			MUGANO
263			MURAMA I
264			MURAMA II
265			MUYUGA
266			NDAVA
267			NTUNDA
268			NYAKARAMBO I
269			NYAKARAMBO II
270			RWEZA
271			RWOGA
272			RYANSORO
273		**MUTAHO**	GATABATABA
274			GITONGO I
275			GITONGO II
276			GITONGO III
277			GITOGO IV
278			MASANGO

279			MURIRIMBO
280			NYANGUNGU I
281			NYANGUNGU II
282			RWISABI I
283			RWISABI II
284			RWISABI III

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Document information

Version	*Date*	*Description*
07.0	31 May 2019	Revision to: • Ensure consistency with version 02.0 of the "CDM project standard for project activities" (CDM-EB93-A04-STAN); • Add a section on remarks on the observance of the scale limit of small-scale project activity during the crediting period; • Add "changes specific to afforestation or reforestation project activity" as a possible post-registration changes; • Clarify the reporting of net anthropogenic GHG removals for A/R project activities between two commitment periods; • Make editorial improvements.
06.0	7 June 2017	Revision to: • Ensure consistency with version 01.0 of the "CDM project standard for project activities" (CDM-EB93-A04-STAN); • Make editorial improvements.
05.1	4 May 2015	Editorial revision to correct version numbering.
05.0	1 April 2015	Revisions to: • Include provisions related to delayed submission of a monitoring plan; • Provisions related to the Host Party; • Remove reference to programme of activities; • Overall editorial improvement.
04.0	25 June 2014	Revisions to: • Include the Attachment: Instructions for filling out the monitoring report form (these instructions supersede the "Guideline: Completing the monitoring report form" (Version 04.0)); • Include provisions related to standardized baselines; • Add contact information on a responsible person(s)/ entity(ies) for completing the CDM-MR-FORM in A.6 and Appendix 1; • Change the reference number from *F-CDM-MR* to *CDM-MR-FORM*; • Editorial improvement.
03.2	5 November 2013	Editorial revision to correct table in page 1.
03.1	2 January 2013	Editorial revision to correct table in section E.5.
03.0	3 December 2012	Revision required to introduce a provision on reporting actual emission reductions or net GHG removals by sinks for the period up to 31 December 2012 and the period from 1 January 2013 onwards (EB 70, Annex 11).
02.0	13 March 2012	Revision required to ensure consistency with the "Guidelines for completing the monitoring report form" (EB 66, Annex 20).

Version	*Date*	*Description*
01.0	28 May 2010	EB 54, Annex 34. Initial adoption.

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