# Monitoring report form for CDM project activity (Version 07.0)

*Complete this form in accordance with the instructions attached at the end of this form.*

| MONITORING REPORT | | |
|---|---|---|
| **Title of the project activity** | Institutional Improved Cook Stoves For Schools And Institutions In Uganda | |
| **UNFCCC reference number of the project activity** | 10345 | |
| **Version number of the PDD applicable to this monitoring report** | 3.0 | |
| **Version number of this monitoring report** | 01.0 | |
| **Completion date of this monitoring report** | 15/10/2020 | |
| **Monitoring period number** | 02 | |
| **Duration of this monitoring period** | 01/06/2019 - 31/03/2020 | |
| **Monitoring report number for this monitoring period** | 01 | |
| **Project participants** | Simoshi Limited | |
| **Host Party** | Uganda | |
| **Applied methodologies and standardized baselines** | AMS.II.G, version 08.0<br>ASB0016 Standarised baseline “Institutional Cook Stoves in Uganda”, version 01.0 | |
| **Sectoral scopes** | 3: Energy demand | |
| **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 |
| | 0 | 4,157 |
| **Amount of GHG emission reductions or net anthropogenic GHG removals estimated ex ante for this monitoring period in the PDD** | Period2: 01/06/2019 – 31/03/2020 | 30,895 |

## SECTION A. Description of project activity

### A.1. General description of project activity

The purpose of this project activity is the dissemination of institutional improved cook stoves (IICS) in schools and institutions in Uganda. The IICS disseminated are manufactured by Uganda Stove Manufacturers Limited (Ugastove). The model is the portable rocket firewood IICS of different sizes that meet the minimum thermal efficiency requirement of 20%. The different IICS sizes are conditioned by the saucepan capacity and range from 30 litres and up to 450 litres.

These IICS are more efficient in transferring heat to the cooking pots, thus requiring less fuel to prepare the same meal. This efficiency is translated into fuel savings compared to traditional stoves used in Uganda. By reducing fuel consumption, the project activity reduces greenhouse gas emissions from the use of fuel. This reduction in fuel consumption is estimated and corresponding CO2 emission reductions are calculated from these savings.

The on-going support Simoshi provides to all schools includes continuous monitoring and training of kitchen staff, annual free maintenance for all IICS, advice on kitchen infrastructure improvements and hygiene. Simoshi takes a holistic approach in the school kitchen environment, that includes interventions in the whole chain of actors and activities involved, from the supply of firewood, through the use of energy efficient stoves, the kitchen infrastructure and hygiene/sanitation practices. Simoshi has developed a relationship of trust with all participating schools, as they witness the overall benefits accrued from the use of an IICS.

Simoshi Limited (Simoshi) is the project participant of this project activity. As such, it coordinates the efforts to select the IICS manufacturer, promote, sell and distribute the IICS in Uganda and comply with the requirements of this project activity.

### A.2. Location of project activity

The project boundary of this project includes whole Republic of Uganda (Uganda) including its 111 districts and the city of Kampala.

Uganda is a landlocked country in East Africa. It is bordered to the east by Kenya, to the north by South Sudan, to the west by the Democratic Republic of the Congo, to the southwest by Rwanda, and to the south by Tanzania. The southern part of the country includes a substantial portion of Lake Victoria, shared with Kenya and Tanzania.

The latitude and longitude denominations of Uganda are 1° 00 North and 32° 00 East.

The coordinates of Simoshi's office in Kampala are: latitude 0.2063 N and longitude 32.5657 E.

Figure 1 – Map of Uganda

### A.3. Parties and project participants

| Parties involved | Project participants | Indicate if the Party involved wishes to be considered as project participant (Yes/No) |
|---|---|---|
| Uganda (host Party) | Simoshi Limited | No |

### A.4. References to applied methodologies and standardized baselines

- AMS.II.G "Energy efficiency measures in thermal applications of non-renewable biomass" Version 8.0[1]
- Methodological tool "Project and leakage emissions from biomass" Version 02.0
- Methodological tool "Demonstration of additionality of small-scale project activities" Version 10.0
- ASB0016 Standarised baseline 'Institutional Cook Stoves in Uganda', Version 01.0
- General guidance on leakage in biomass project activities (version 03)

### A.5. Crediting period type and duration

Renewable crediting period with the start and end dates 01/03/2017 to 29/02/2024. The first crediting period is 7 years. The number of renewal periods is 2.

## SECTION B. Implementation of project activity

### B.1. Description of implemented project activity

IICS are more efficient than traditional stoves as they reduce heat loss. The Ugastove portable firewood rocket IICS has shown to use significantly less firewood to cook the same amount of food in comparison to traditional stoves, hence schools reporting to having reduced their firewood expenditures by at least 50% per school term. The Ugastove rocket-stove design is portable IICS, it includes a chimney provision, and has a single saucepan provision with capacities that range from 30 litres up to 450 litres capacity.

**Rocket stove design**: Its principle features focus on achieving efficient fuel combustion at a high temperature by ensuring a good air draft into the fire, controlled use of fuel, complete combustion, and the efficient use of the resultant heat. IICS using rocket principles can be very simple or complex. It include the following design components: an L-shaped, insulated combustion chamber; a small fuel-feed opening to restrict the amount of fuel added to the stove at one time; and a small gap between the stove and cooking pot to improve heat transfer by forcing hot flue gases against the sides of the pot[2].

[1] http://cdm.unfccc.int/methodologies/DB/UFM2QB70KFMWLVO7LJN8XD1O2RKHEK

[2] Technical description based on; USAID 2010. Fuel-efficient stove programs in humanitarian settings

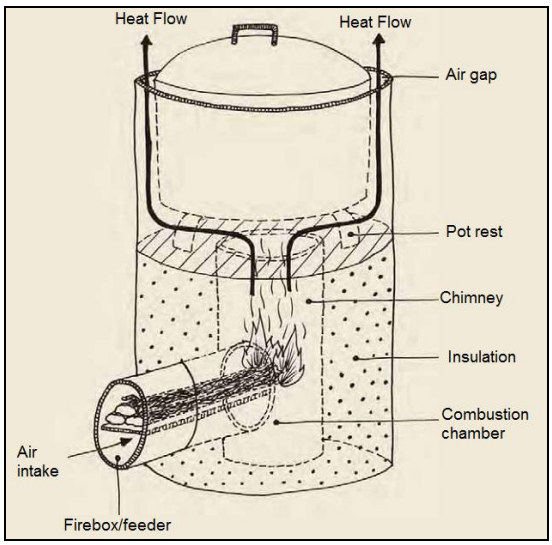


Figure 2 - Diagram rocket stove design[3]

During implementation, Simoshi has:

- Tested IICS Ugastove model of 30 litres capacity according to the project activity requirements
- Procured IICS from the manufacturer Ugastove, market, sold and distributed IICS to schools and institutions
- Quarterly examined all schools/institutions and their IICS population and maintained the IICS when required
- Kept records of sales and schools/institutions as per the monitoring plan
- Kept current with regards to the UNFCCC requirements
- Organised and collected all necessary information from schools and institutions for monitoring purposes
- Provided technical and administrative support to schools and institutions to guarantee compliance of IICS and record keeping with the project activity requirements
- Managed the execution of CER agreements and distribution of the benefits
- Been responsible for the monitoring activities and data management required during the lifetime of the project activity
- Maintained a database of sales records used to compute CERs and ensure that no double-counting of IICS sales occurred using the specially designed Kenga IT infrastructure
- Been the focal point for CER registration and verification

IICS are sold through payment schemes that include three equal instalments, at no interest rate, allowing schools and institutions to comfortably pay back their debt throughout the year. Schools and institutions did not need to search for money outside their budget or secure financial loans, as they used the money saved from firewood not consumed to pay back to Simoshi.

National and international donors also supported some of the participating schools/institutions by covering partially or totally the cost of the IICS.

When purchasing the IICS, the school/institution filled a sales agreement with Simoshi that contains, among others, information about the IICS model, price and payment, the name, location/address and phone number of the school/institution. This information allows the identification and the monitoring of the IICS and its usage. By filling the sales agreement, the school/institution has agreed to discontinue the use of the traditional stove, and to use the IICS

[3] Adapted from a diagram by Peter Scott, http://www.hedon.info/GettingTechnologiesToTheMarket

instead. By signing the sales agreement, the school/institution was aware of and willing to give up its rights on emission reductions and transfer all carbon rights to Simoshi.

Additional measures help to track the IICS and confirm they are in operation, they are correctly used by the kitchen staff, with no traditional appliances found in place. Such measures include:

- annual maintenance schemes of the IICS population,
- the collection of the number of children and school staff together with the amount of firewood spent in Ugandan shilling per school term (three times a year),
- the condition of the IICS and the air quality in the kitchen as per the Kitchen Information Update (quarterly),
- the training of the kitchen staff together with the kitchen training assessment as per the Kitchen Training Manual (quarterly).

### B.2. Post-registration changes

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

No.

#### B.2.2. Corrections

No.

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

No.

#### B.2.4. Inclusion of monitoring plan

No.

#### 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

No.

#### B.2.6. Changes to project design

No.

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

No.

## SECTION C. Description of monitoring system

Simoshi has been responsible for surveying the schools/institutions prior the installation of the IICS, the sale of the IICS, the collection of all Sales Agreement data, for internally verifying the information in the Sales Agreements, and the creation of this Monitoring Report. Simoshi has been responsible for data entry into the Sales Records and for ensuring that the information in the Sales Agreements is complete and correct. The total amount of Sales Agreements reveals the quantity of IICS sold and schools and institutions included at the end of this Monitoring Period. The electronic database through the dedicated Kenga IT infrastructure records the start and end dates of each selling year y for each IICS (t fraction), and used to calculate the emission reductions attributable to each Monitoring Period. Appropriate record keeping procedures have been implemented to

ensure that each Monitoring Period dataset can be transparently attributed to the project activity, preventing any occurrences of double-counting. Hence, the project database and Kenga IT infrastructure keeps records on the duration of previous Monitoring Periods, the school/institution surveys, and verification activities.

In order to account for drop-off in use (U)[4] and continued use of pre-project devices, the IICS deployed have been monitored through systematic verification. Monitoring included a combination of the following activities or events:
(a) an annual IICS maintenance/repair event when required
(b) customer inspections resulting from loan or hire purchase agreements when schools paying for their IICS
(c) double verified records of Simoshi's Project Officers and data entry on Kenga IT infrastructure
(d) collection of population served – students and school/institution staff - and amount of firewood spent in Ugandan Shillings in each school/institution three times per year
(e) continuous training of kitchen staff on the appropriate use of the IICS following the "Kitchen Management Technique"
(f) information collection on a quarterly basis of cooking appliances used by the school/institution in the "Kitchen Information Update" form

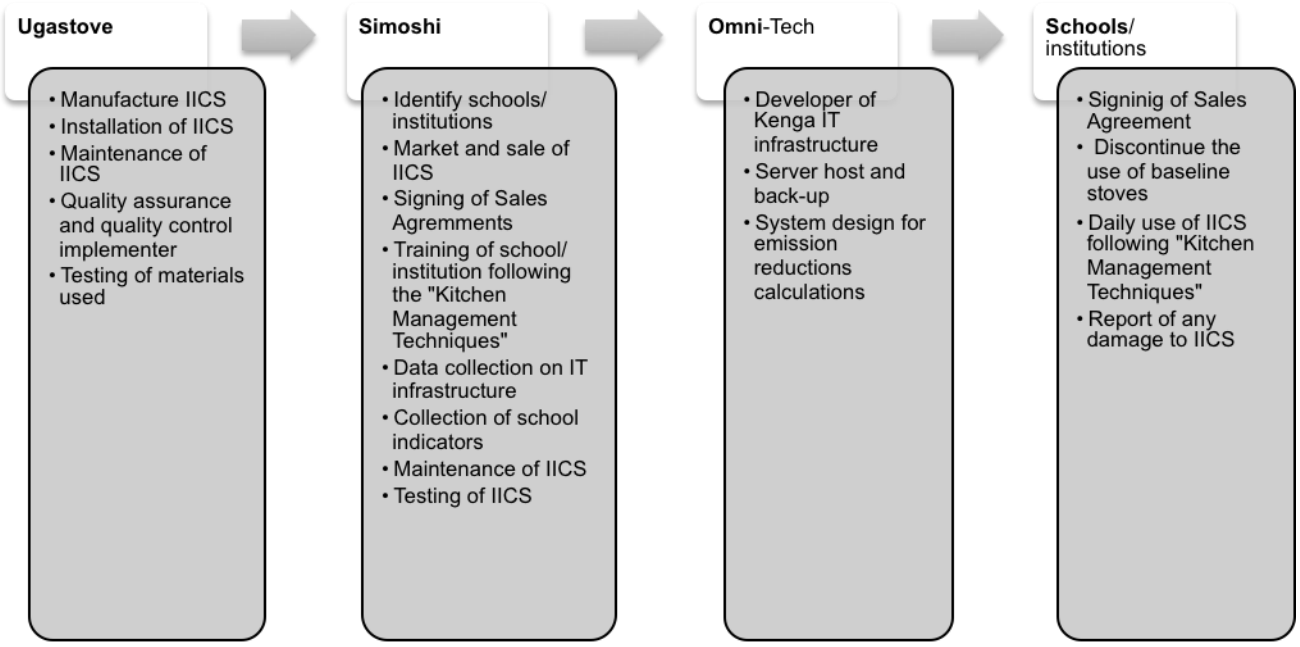


Figure 3 – Operational sturcture and key responsabilities

**Requirements for replacement of traditional stoves[5]**
Monitoring practices ensures that either the replaced low efficiency appliances are disposed of and are not used or found in the kitchen environment within the boundary or within the region. Whenever a low efficiency appliance was found in place and in use, Simoshi ensured the school/institution discontinued its use and replaced it with a Ugastove IICS.

Monitoring procedures
Simoshi checked that replaced low efficiency appliances have been dismantled and are no longer in use by the schools/institutions within the project boundary.

During usage surveys, if evidence of use of traditional cooking appliances was found in schools/institutions that have purchased an IICS only during peak cooking needs (e.g. for

[4] See AMS-II.G., 6.1, table 8

[5] AMS II.G., 6.1., table 9

celebrations) then it was assumed that there is no adjustment needed because the baseline study is performed in schools/institutions during normal cooking conditions and data from peak cooking has not been taken into account in the $B_{old}$ calculations.

**Monitoring procedures for efficiency or fuel consumption of IICS**

In general, a cohort is defined as the year that an IICS model is sold in or gone through maintenance in the same year.

Cohorts of IICS that are older than the expected normal lifetime of the IICS may or may not be included in the monitoring, and accordingly regarded in the calculation of emission reductions. For example, the Ugastove portable firewood IICS has got a 10-year lifetime[6]. After its 10 years of use from the time of the IICS's commissioning date, Simoshi will assess whether the IICS will go through a complete overhaul to continue being used under the same serial number, or will be completely replaced with a new IICS. For this Monitoring Period, the first IICS were installed during March 2016 hence all IICS have been included.

The project activity has conducted systematic verification for the usage rate and continued use of pre-project devices, hence no sampling has been carried out and no categorization in batches is necessary in regards to these two parameters.

The WBT option has been chosen for calculating the IICS thermal efficiency used in By,savings. The simplified approach has been selected (for details see section 6.1, table 11 of the methodology). The tests have been conducted by the PP.[7]

PP has carried out WBTs on all 30 litres IICS capacity and applied conservatively the lowest resulted thermal efficiency across all IICS sizes.[8] The SSC WG considered that applying the lowest efficiency found in IICS with saucepan capacities of 30 litres for IICS with saucepan capacities larger than 30 litres would be a conservative approach when the IICS designs and maintenance practices are comparable.

The sampling frame consists of all schools/institutions and its corresponding IICS from the first batch. The first batch is defined as the first year (i.e. from 26/03/2016 [9] to 25/03/2017) in which schools/institutions were included in the project and IICS disseminated to those institutions[10]. The IICS disseminated in the period from 26/03/2016 to 25/03/2017 represent the first and oldest age group amongst the overall population. An institution which has been identified as non-user does not make part of the sampling frame.

The project activity has decided to take a census approach and tested all the twelve IICS of 30 litres capacity from the first batch from 26/03/2016 to 25/03/2017. Results from this first batch will be applied to all subsequent batches. The efficiency of the project devices of the school/institution of this first batch will be monitored annually through a census approach and the results will be applied correspondingly to all subsequent batches.

Simoshi has systematically conducted quality checks on its IICS orders to the IICS manufacturer Ugastove, following the Quality Assurance and Quality Control Manual, assuring a good quality

[6] The same has been confirmed by the manufacturer of the IICS. The confirmation letter has been presented to the DOE during validation.

[7] This is in line with the response given from the SSG WG to Request for Clarification SSC_726.

[8] This is in line with the response given from the SSG WG to Request for Clarification SSC_725.

[9] 26/03/2016 is defined as the project start date, i.e. the date when the first stoves were disseminated to an institution.

[10] The 2nd batch will include institutions and IICS disseminated in the time period from 26/03/2017 to 25/03/2018, the 3rd batch will consist of the time period from 26/03/2018 to 25/03/2019 and so on.

management system is in place. Simoshi has ensured that IICS models from the selected IICS Ugastove manufacturer follows Simoshi's Quality Assurance and Quality Control Manual (which includes consistency in manufacturing practices and materials used) and Simoshi's Maintenance Manual that demonstrates comparable maintenance and repair practices on all IICS included under the project activity.

**Data collection**

Simoshi collects the data necessary for the monitoring and for the emission reductions calculation. Data is managed through an electronic database and an especially dedicated Kenga IT infrastructure – developed by Omni-Tech Limited - that can directly attribute the data to each school/institution, thereby allowing unambiguous determination of the emission reductions attributable to the project activity.

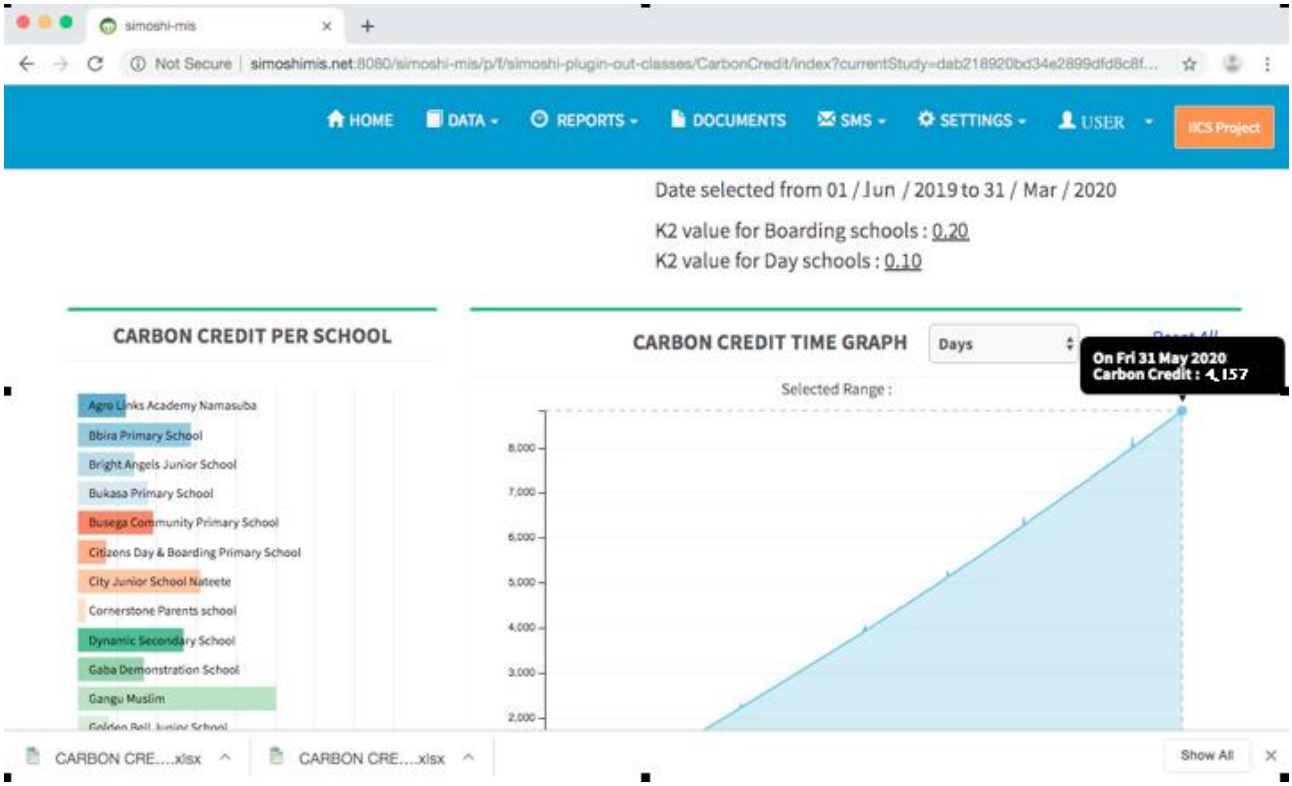


Figure 4 – Screenshot of Kenga IT infrastructure for ER calculations

**Data archiving**

Sales Agreements are stored by Simoshi, with an original copied kept by each participating school/institution. A back-up of the project database is also stored on an electronic medium by Simoshi and remotely by the Kenga IT infrastructure provider, Omni-Tech Limited. All data monitored and required for verification and issuance is kept for at least two years after the end of the crediting period or the last issuance of CERs for the project activity, whichever is later.

**Training**

Simoshi provided the necessary training to its staff and the parties involved in the monitoring to ensure that the data recorded is complete and accurate.

**Quality Assurance/Quality Control Procedures**

Different quality control and quality assurance measures have been put in place by Simoshi to ensure that all emission reductions are real. Surveys and testing have been carried out and Simoshi has checked the consistency of the results. Simoshi has ensured the studies are accurate and that a conservative approach has been taken.

Simoshi's project officer and Simoshi's data clerk have checked Sales Agreements two levels – when collecting and completing the information on site, and when entering the information on the

Kenga IT infrastructure. Missing or wrong data has been corrected if errors made. All IICS under the project activity have been traced and monitored following the monitoring plan.

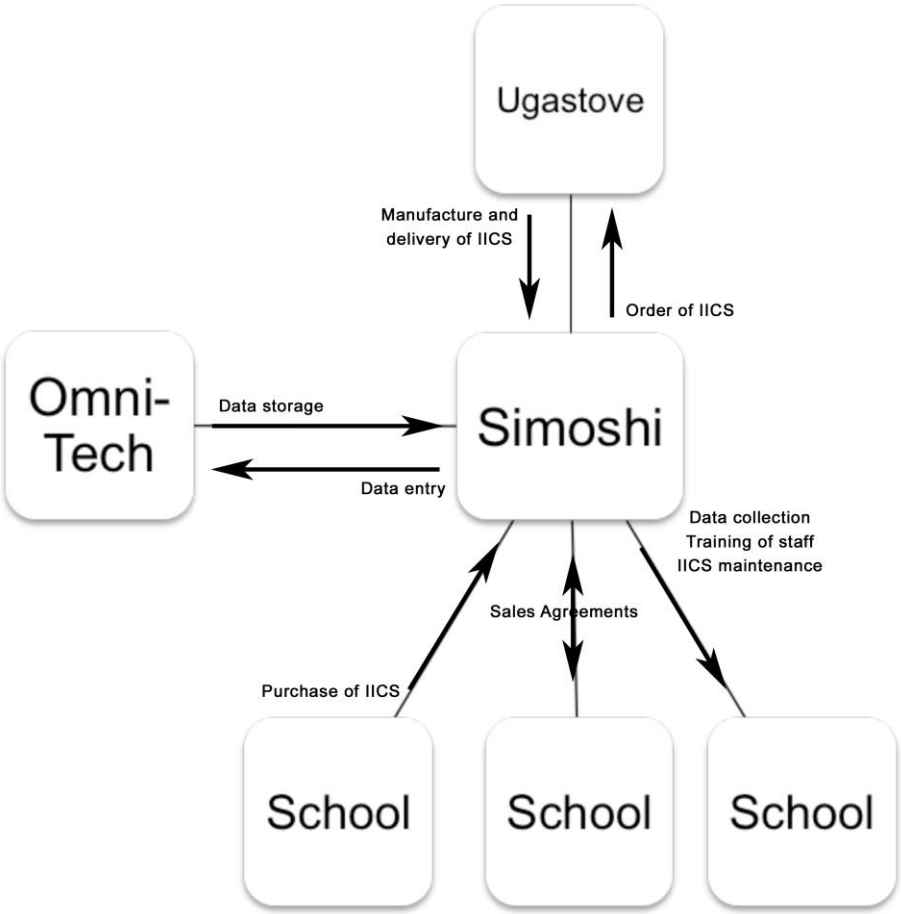


Figure 5 – Sales monitoring flowchart

## SECTION D. Data and parameters

### D.1. Data and parameters fixed ex ante

| Data / Parameter | **Bold,p** |
|---|---|
| Unit | Tonnes/person/year |
| Description | Annual quantity of woody biomass that would have been used per person in the school/institution in the absence of the project activity to generate useful thermal energy equivalent to that provided by the project devices |
| Source of data | Standardized baseline ASB0016 'Institutional cook stoves in Uganda', version 01.0 |
| Value(s) applied | Boarding schools: 0.38<br>Day schools: 0.19<br>Prisons, plantation estates and hospitals: 0.59 |
| Choice of data or Measurement methods and procedures | Default values as per ASB0016 |
| Purpose of data | Calculation of baseline emissions |
| Additional comment | |

| Data / Parameter | $f_{NRB,y}$ |
|---|---|
| Unit | Fraction |

| | |
|---|---|
| Description | Fraction of woody biomass saved by the project activity in the year y that can be established as non-renewable biomass |
| Source of data | https://cdm.unfccc.int/DNA/fNRB/index.html and Standardised Baseline for Institutional Cook Stove in Uganda (version 01.0) |
| Value(s) applied | 0.82 |
| Choice of data or Measurement methods and procedures | Default values as per https://cdm.unfccc.int/DNA/fNRB/index.html |
| Purpose of data | Calculation of baseline emissions |
| Additional comment | |

| | |
|---|---|
| Data / Parameter | **NCV** biomass |
| Unit | TJ/tonne |
| Description | Net calorific value of the non-renewable woody biomass that is substituted |
| Source of data | IPCC default 2006 (volume 2, chapter 1, Table 1.2) |
| Value(s) applied | 0.0156 |
| Choice of data or Measurement methods and procedures | IPCC Default value |
| Purpose of data | Calculation of baseline emissions |
| Additional comment | |

| | |
|---|---|
| Data / Parameter | **EF**projected fossil-fuel |
| Unit | tCO2/TJ |
| Description | Emission factor for the substitution of non-renewable woody biomass by similar consumers |
| Source of data | IPCC |
| Value(s) applied | 81.6 |
| Choice of data or Measurement methods and procedures | Default value in accordance with paragraph 15 of AMS-II.G (version 08) |
| Purpose of data | Calculation of baseline emissions |
| Additional comment | As per AMS-II.G |

| | |
|---|---|
| Data / Parameter | $LEy$ |
| Unit | Factor |
| Description | Net to gross adjustment factor to account for leakage |
| Source of data | AMS-II.G (version 08), paragraph 32 |
| Value(s) applied | 0.95 |
| Choice of data or Measurement methods and procedures | Default value in accordance with proposed value for multiplying $By,savings,i$ by a net gross adjustment value |
| Purpose of data | To reduce the need for surveys |
| Additional comment | |

| | |
|---|---|
| Data / Parameter | $\eta_{old}$ |

| | |
|---|---|
| Unit | Fraction |
| Description | Efficiency of the baseline appliance being replaced |
| Source of data | Standardised Baseline for Institutional Cook Stoves in Uganda (version 01.0) |
| Value(s) applied | 0.12 |
| Choice of data or Measurement methods and procedures | Default value according to the Standardised Baseline, ASB0016: Institutional Cook Stoves in Uganda (version 01.0) |
| Purpose of data | Calculation of baseline emissions |
| Additional comment | |

## D.2. Data and parameters monitored

| **Data/Parameter** | $\eta_{new,i,j}$ |
|---|---|
| Unit | Fraction |
| Description | Efficiency of the IICS of each type i and batch j being deployed as part of the project activity |
| Measured/calculated/ default | Measured value using the WBT on the first batch of 30 litres capacity IICS. 25.61% (30 litres Ugastove IICS) used[11] |
| Source of data | WBT reports |
| Value(s) of monitored parameter | The most conservative value among the results of efficiency tests conducted on cook stoves of sizes equal to or smaller than 30 litres capacity have been used for stoves that are larger than 30 litres capacity in lieu of actual testing of the efficiency of stoves that are above 30 litres capacity (for details, please see ER calculation excel spreadsheet) |

| Test | Result |
|---|---|
| Test 1 SL0000036 | 22.67 |
| Test 2 SL0000044 | 27.33 |
| Test 3 SL0000054 | 25.00 |
| Test 4 SL0000060 | 26.33 |
| Test 5 SL0000066 | 24.67 |
| Test 6 SL0000104 | 25.00 |
| Test 7 SL0000088 | 27.00 |
| Test 8 SL0000102 | 28.67 |
| Test 9 SL0000103 | 30.00 |
| Test 10 SL0000120 | 27.00 |
| Test 11 SL0000089 | 22.00 |
| Test 12 SL0000069 | 21.67 |
| Average | 25.61% |

[11] Using the thermal efficiency of the 30 l size for ER calculation is deemed to be plausible and conservative, since literature and 3rd party experience indicate that efficiency increases by increasing the saucepan capacities (for further details, please see Request for Clarification SSC_725)

<table>
<tr><td>Monitoring equipment</td><td>
<table>
<tr><td></td><td>Weighing scale</td></tr>
<tr><td>Type</td><td>TCS</td></tr>
<tr><td>Accuracy class</td><td>150 kg capacity by 0.01 kg</td></tr>
<tr><td>Calibration date</td><td>14/09/2020</td></tr>
<tr><td>Calibration entity</td><td>UNBS</td></tr>
<tr><td>Certificate number</td><td>01201657</td></tr>
<tr><td>Serial number</td><td>66286</td></tr>
<tr><td>Calibration frequency</td><td>Before annual monitoring</td></tr>
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<table>
<tr><td></td><td>Digital thermometer</td></tr>
<tr><td>Type</td><td>SL-TH01 Model TME 2000</td></tr>
<tr><td>Accuracy class</td><td>-200° C to 1372° C by 0.1° C</td></tr>
<tr><td>Calibration date</td><td>14/09/2020</td></tr>
<tr><td>Calibration entity</td><td>UNBS</td></tr>
<tr><td>Certificate number</td><td>02200505</td></tr>
<tr><td>Serial number</td><td>SL-DTH01</td></tr>
<tr><td>Calibration frequency</td><td>Before annual monitoring</td></tr>
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<tr><td></td><td>Moisture meter</td></tr>
<tr><td>Type</td><td>STOVE ONLINE</td></tr>
<tr><td>Accuracy class</td><td>5 – 50%</td></tr>
<tr><td>Calibration date</td><td>14/09/2020</td></tr>
<tr><td>Calibration entity</td><td>UNBS</td></tr>
<tr><td>Certificate number</td><td>06200424</td></tr>
<tr><td>Serial number</td><td>CP/1/215</td></tr>
<tr><td>Calibration frequency</td><td>Before annual monitoring</td></tr>
</table>
</td></tr>
<tr><td>Measuring/reading/recording frequency</td><td>Annually</td></tr>
<tr><td>Calculation method<br>(if applicable)</td><td>PP has opted to carry out WBTs on 30 litres IICS capacity and apply conservatively the resulted thermal efficiency across all IICS sizes.[12] The SSC WG considered that applying the lowest efficiency found in IICS with saucepan capacities of 30 litres for IICS with saucepan capacities larger than 30 litres would be a conservative approach when the IICS designs and maintenance practices are comparable.<br>A census approach was taken and all 12 disseminated IICS of 30 litres capacity from the first batch were tested following the WBT version 4.2.3, with three tests conducted on every IICS. All testing equipment was calibrated at the Uganda National Bureau of Standards.</td></tr>
<tr><td>QA/QC procedures</td><td>-</td></tr>
<tr><td>Purpose of data/parameter</td><td>Calculation of emission reductions</td></tr>
<tr><td>Additional comments</td><td>Applicable for calculating By,savings</td></tr>
</table>

| **Data/Parameter** | $t_{fraction\ i}$ |
|---|---|
| Unit | Fraction of 365 for Institutions<br>Fraction of 236 for Schools |
| Description | Fraction of the days in use in year y of the IICS installed |

[12] This is in line with the response given from the SSG WG to Request for Clarification SSC_725.

| | |
|---|---|
| Measured/calculated/ default | Simoshi keeps a paper and electronic record of the sales date, and the IICS is considered to be in use from the commissioning date, which is the date on which the IICS is put into use for the first time. **t**fraction,i is calculated by the number of days the IICS is in use in the respective year divided by 236 (in case of schools) and 365 (for any other institution).The number of operational IICS each year has been summarised in a table and justified by comparing the efficiency savings of each school and the project activity's scale limit of savings of 180 GWhth per year. This factor is calculated through the electronic database and the Kenga IT infrastructure. |
| Source of data | Derived from sales records |
| Value(s) of monitored parameter | ER calculation spreadsheet (column T of tab ER calculations) |
| Monitoring equipment | - |
| Measuring/reading/recording frequency | Continuously (reported annually) |
| Calculation method (if applicable) | - |
| QA/QC procedures | Sales records are stored by Simoshi as physical evidence and in an electronic database and the Kenga IT infrastructure, where the information of each IICS and school/institution is recorded.<br>Every three months, Simoshi monitors all sold IICS through physical inspection/verification monitoring events. These monitoring events include a combination of the following activities or events:<br>(a) School/institution inspections resulting from the collection of payments from credit agreements<br>(b) Inspection of IICS to ensure the IICS are performing in optimal manner<br>(c) Training of kitchen staff to ensure the IICS are operated in optimal manner following Simoshi's "Kitchen Management Techniques"<br>(d) Collection of number of children/staff annually enrolled in schools/institutions together with the firewood expenditure in Ugandan shillings |
| Purpose of data/parameter | Calculation of baseline emissions |
| Additional comments | - |

| **Data/Parameter** | **Date of commissioning of project device i** |
|---|---|
| Unit | Date |
| Description | Actual date of commissioning of the project device |
| Measured/calculated/ default | - |
| Source of data | Sales records/electronic database and Kenga IT infrastructure |
| Value(s) of monitored parameter | Date |
| Monitoring equipment | not applicable |
| Measuring/reading/recording frequency | Continuously (reported annually) |
| Calculation method (if applicable) | - |
| QA/QC procedures | Simoshi completes the commissioning date in the Sales Agreement and its database and Kenga IT infrastructure that confirms when the IICS has been put in use. The commissioning date is provided by the kitchen staff and the school/institution officials as of when they agree to put the IICS in use. Simoshi confirms this date is true through an on-site visit. |
| Purpose of data/parameter | The date of commissioning of project device i is used to determine the fraction of the days in use in year y of the IICS installed |

| | |
|---|---|
| Additional comments | No categorization of institutions/IICS in batches and ER will be calculated for each institution separately. ER credits are claimed from the commissioning date onwards, however earliest with the registration date of the project at UNFCCC |

| **Data/Parameter** | $N_{y,inst}$ |
|---|---|
| Unit | Number of people in the school/institution in year y |
| Description | Number of people in the school/institution that consume food cooked by IICS |
| Measured/calculated/ Default | Calculated from monitored values on all schools and institutions |
| Source of data | Derived from records collected from the school/institution |
| Value(s) of monitored parameter | 744 (for details please see column N row 172, from tab Ny Term Information Update of ER calculation spreadsheet) |
| Monitoring equipment | not applicable |
| Measuring/reading/recording frequency | Three times a year |
| Calculation method (if applicable) | The PP collects the number of children and staff enrolled during the first visit on the initial baseline survey. This number is updated in the IT Kenga infrastructure three times per year during each school term. |
| QA/QC procedures | The form "Term Information Update" is completed for each school/institution three times per year and contains the detailed information of number of people attending, type (day or boarding) and it is signed and officially stamped by the school/institution. The average of the information in the three 'Term Information Update' sheets of the respective year has been taken for the number of people in the school/institution in year y and automatically updated and calculated using the Kenga IT infrastructure and the Excel spreadsheet for emission reduction calculations. |
| Purpose of data/parameter | Calculation of emission reductions |
| Additional comments | - |

| **Data/Parameter** | $\mu_y$ |
|---|---|
| Unit | Fraction |
| Description | Adjustment to account for any continued use of pre-project devices during the year y |
| Measured/calculated/ Default | Calculated from monitored values on all schools and institutions |
| Source of data | Monitoring/usage surveys |
| Value(s) of monitored parameter | 1 |
| Monitoring equipment | - |
| Measuring/reading/recording frequency | Quarterly |
| Calculation method (if applicable) | - |
| QA/QC procedures | Simoshi collects information in the form "Kitchen Information Update" from each school/institution on a quarterly basis to ensure that (i) all IICS are in use, (ii) the condition of the IICS and whether they need maintenance/repair, and (iii) no traditional stoves are seen in use. |
| Purpose of data/parameter | Calculation of emission reductions |

| | |
|---|---|
| Additional comments | Throughout the monitoring period, the project devices have always been found in use in all of the quarterly 'Kitchen Information Updates', while no pre-project devices were found in use in any of the participating school/institution's kitchens. |

| **Data/Parameter** | $U_{y,inst}$ |
|---|---|
| Unit | Fraction |
| Description | Usage rate of stoves in institution in year y |
| Measured/calculated/ Default | Calculated from monitored values on all schools and institutions |
| Source of data | Usage surveys |
| Value(s) of monitored parameter | 1 |
| Monitoring equipment | - |
| Measuring/reading/recording frequency | Quarterly |
| Calculation method (if applicable) | - |
| QA/QC procedures | Simoshi collects information in the form "Kitchen Information Update" from each school/institution on a quarterly basis to ensure that (i) all IICS are in use, (ii) the condition of the IICS and whether they need maintenance/repair, and (iii) no traditional stoves are seen in use. If a school/institution does not use all of its IICS, Simoshi has asked for the reasons and take immediate corrective actions (if needed) to repair or replace those IICS not in use. |
| Purpose of data/parameter | Calculation of emission reductions |
| Additional comments | Throughout the monitoring period, the project devices have always been found in use in all of the quarterly 'Kitchen Information Updates'. |

### D.3. Implementation of sampling plan

None. The PP has taken a census approach. All 12 IICS of 30 litres capacity were tested for thermal efficiency belonging to the first batch from 26/03/2016 to 25/03/2017 following the Water Boiling Test. The entire IICS population is quarterly monitored for various usage surveys.

## SECTION E. Calculation of emission reductions or net anthropogenic removals

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

Since the biomass consumption ($B_{old,i}$) is presented on a per capita basis, therefore the computation for emission reductions is based on the population served instead of number of IICS. In other words, the parameter $N_{y,i}$ is interpreted as population served (e.g. number of children and staff served in a school/institution). $Bold,i$ is determined on a per capita basis and further denominated as $B_{old,p}$.

The values of $B_{old,p}$ for various schools and institutions are shown in the table below and are taken from the approved standardized baseline ASB0016: Institutional Cook Stoves in Uganda.

| Institution Type | Value of $Bold,p$ (tonnes/person/year |
|---|---|
| Boarding Schools | 0.38 |
| Day Schools | 0.19 |
| Prisons, Plantation Estates and Hospitals | 0.59 |

The table below shows a day school scenario on how emission reductions were calculated for St. Kizito Ladybird School Gangu, with IICS deployed during the year 2020, commissioning date 30/01/20, and end of monitoring period on 31/03/2020. All IICS were found in use ($\mu_y$, inst), with no pre-project devices found in use on site either ($\mu_y$).

| Type | Num. of people | Baseline efficiency | IICS thermal efficiency | *Bold* ,p | $By,savings,i$ | $Ny,i$ | fNRB | NCV biomass | EF | Tfraction, i | Leakage |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Day | 309 | 12% | 25.61% | 0.19 | 0.11 | 309 | 0.82 | 0.0156 | 81.6 | 0.17 | 0.95 |
| Boarding | 15 | 12% | 25.61% | 0.38 | 0.20 | 15 | 0.82 | 0.0156 | 81.6 | 0.17 | 0.95 |

30/01/20 – 31/03/20= 62 days of IICS operation for year 2020

T fraction, i= 62/365
= 0.17 days

$Ny,i$= 309 individuals
Where $By,savings,i$ = 0.19 X (1- 12/25.61)
= 0.10

$Ny,i$= 15 individuals
Where $By,savings,i$ = 0.38 X (1- 12/25.61)
= 0.20

$$ERy,i = By,savings,i \times Ny,i \times \mu_y \times fNRB,y \times NCVbiomass \times EFprojected\_fossilfuel * t_{fraction,i} - LEy$$

Emission reductions for 2020 (day) = 0.10 x 309 x 1 x 0.82 x 0.0156 x 81.60 x 0.17 x 0.95
= 5.26

Emission reductions for 2020 (boarding) = 0.20 x 15 x 1 x 0.82 x 0.0156 x 81.60 x 0.17 x 0.95
= 0.51

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

Not applicable, as the methodology AMS.II.G version 8.0 does not consider project emissions.

### E.3. Calculation of leakage emissions

In order to account for leakage, $B_{y,savings,i}$ was multiplied by a net to gross adjustment factor of 0.95 in line with paragraph 32 of the methodology. Hence no surveys in regards to leakage are required.

Leakage as per paragraph 33 is not applicable to the project activity. No devices currently being utilised outside the project boundary are transferred to the project activity. Biomass is predominantly used for cooking on three stone fire or traditional metal stoves. Since three stone fire is abundantly and available for free and traditional inefficient metal stoves can be easily and cheaply purchased, there is no reason why those devices should come from outside of the project boundary where they are currently used.

Paragraph 22 of the methodology is not applicable since the same is only relevant for projects having more than one device in households. Since the given project activity however targets schools and other institutions, and ER calculation is based on the number of people served in a school/ institution and not on the number of stoves, the paragraph is not applicable.

## 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** | 4,157 | Not applicable | 0 | 0 | 4,157 | 4,157 |

## 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 $CO_2e$) | |
|---|---|---|
| 4,157 | Period2: 01/06/2019 – 31/03/2020 | 30,895 |

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

The IICS disseminated in the project activity are appliances with different saucepan capacities, for efficiency improvements in the thermal application of non-renewable biomass. It is assumed that in the absence of the project activity, in accordance with AMS-II.G, the baseline scenario would be the use of fossil fuels for meeting similar thermal energy needs.

According to the applied methodology, emission reductions have been calculated as per the following equation.

The calculation of emission reductions is based on the number of individuals served (in the case of a school based on the average number of children attending on a day and boarding basis, and including the number of staff also working in the school) instead of number of project devices. This is also due to the fact that $B_{old}$ values in the standardized baseline ASB0016 are provided in tonnes/person/year.

$$ERy,i = By,savings,i \times Ny,i \times \mu_y \times fNRB,y \times NCVbiomass \times EFprojected\_fossilfuel * t_{fraction,i} - LEy$$

Where:
$By,savings,i$ = Quantity of woody biomass that is saved per person in year *y* (calculated value)

$Ny,i$ = Number of individuals served in year y

$\mu_y$ = Adjustment to account for any continued use of pre-project devices during the year y when applying equations 6 and 8 of the methodology (fraction). Use 1.0 in other cases

$fNRB,y$ = Fraction of woody biomass saved by the project activity in year *y* that can be established as non-renewable biomass using survey methods or government data or default country specific fraction of non-renewable woody biomass (fNRB) values available on the CDM

website[13] The parameter value may be fixed ex ante at the beginning of each crediting period (default value 82%)

$NCVbiomass$ = Net calorific value of the non-renewable woody biomass that is substituted (IPCC default for wood fuel, 0.0156 TJ/tonne)

$EFprojected\_fossilfuel$ = Emission factor for the fossil fuels projected to be used for substitution of non-renewable woody biomass by similar consumers[14]. Use a value of 81.6 t CO2/TJ

$t_{fraction,I}$ = Fraction of the days in use in year y of the IICS installed

$LEy$ = Leakage emissions in the year *y*

Option 3: Water Boiling Test (WBT) as per paragraph 20 of the methodology was used to calculate $By,savings,i$ in woody biomass

$B_{y,savings,i} = B_{old,i} \times (1 - \eta old / \eta new,i)$

Where:

$B_{old,i}$ = Annual quantity of woody biomass that would have been used per person in the school/institution in the absence of the project activity to generate useful thermal energy equivalent to that provided by the project devices

$\eta old$ = Efficiency of the baseline system/s being replaced by project devices of type i.

$\eta new,i$ = Efficiency of the system being deployed as part do the project activity (fraction), as determined using the Water Boiling Test (WBT) protocol. Use weighted average values if more than one type of system is being introduced by the project activity.

Emission reductions for this monitoring period have been estimated based on registered PDD.

### E.6. Remarks on increase in achieved emission reductions

The actual emission reductions are lower compared to the ex-ante calculations because the number of schools/institutions included under the Project Activity is lower than anticipated, while the monitoring period is also shorter.

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

[14] 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 per cent weight is assigned to coal as the alternative solid fossil fuel (96 t CO2/TJ) and a 25 per cent weight is assigned to both liquid and gaseous fuels (71.5 t CO2/TJ for kerosene and 63.0 t CO2/TJ for liquefied petroleum gas (LPG).

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

None.

### Document information

| *Version* | *Date* | *Description* |
|---|---|---|
| 07.0 | 31 May 2019 | Revision to:<br>• Ensure consistency with version 02.0 of the “CDM project standard for project activities” (CDM-EB93-A04-STAN);<br>• Add a section on remarks on the observance of the scale limit of small-scale project activity during the crediting period;<br>• Add "changes specific to afforestation or reforestation project activity" as a possible post-registration changes;<br>• Clarify the reporting of net anthropogenic GHG removals for A/R project activities between two commitment periods;<br>• Make editorial improvements. |
| 06.0 | 7 June 2017 | Revision to:<br>• Ensure consistency with version 01.0 of the “CDM project standard for project activities” (CDM-EB93-A04-STAN);<br>• Make editorial improvements. |
| 05.1 | 4 May 2015 | Editorial revision to correct version numbering. |
| 05.0 | 1 April 2015 | Revisions to:<br>• Include provisions related to delayed submission of a monitoring plan;<br>• Provisions related to the Host Party;<br>• Remove reference to programme of activities;<br>• Overall editorial improvement. |
| 04.0 | 25 June 2014 | Revisions to:<br>• Include the Attachment: Instructions for filling out the monitoring report form (these instructions supersede the "Guideline: Completing the monitoring report form" (Version 04.0));<br>• Include provisions related to standardized baselines;<br>• Add contact information on a responsible person(s)/ entity(ies) for completing the CDM-MR-FORM in A.6 and Appendix 1;<br>• Change the reference number from *F-CDM-MR* to *CDM-MR-FORM*;<br>• 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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