



**Monitoring report form for CDM programme of activities
(version 01.0)**

Complete this form in accordance with the Attachment "Instructions for filling out the monitoring report form for CDM programme of activities" at the end of this form.

MONITORING REPORT

Title of the programme of activities (PoA)	DelAgua Public Health Program in Eastern Africa	
UNFCCC reference number of the PoA	PoA 9626	
Version number(s) of the PoA-DD(s) applicable to this monitoring report	Version 2.4	
Coordinating/managing entity (CME)	DelAgua Health Rwanda Limited	
Version number of this monitoring report	1.1	
Completion date of this monitoring report	01/11/2016	
Monitoring period number and dates covered by this monitoring report	Monitoring Period # 3 15/9/2015 - 06/11/2016	
Monitoring report number for this monitoring period	1	
Host Party(ies)	Host Party(ies) of the PoA	Is this a host Party to a specific-case CPA covered in this monitoring report?(yes/no)
	Rwanda	No
Sectoral scope(s)	Sectoral Scope – 3. Energy Demand	
Selected methodology(ies)	AMS-III.AV. Low greenhouse gas emitting safe drinking water purification systems, Version 04 AMS II.G, Energy efficiency measures in thermal applications of non-renewable biomass, Version 05	
Selected standardized baseline(s)	NA	
Total amount of GHG emission reductions or net GHG removals by sinks for all specific-case CPAs in the PoA covered in this monitoring report	GHG emission reductions or net GHG removals by sinks reported up to 31 December 2012	GHG emission reductions or net GHG removals by sinks reported from 1 January 2013 onwards
	0	146736

PART I - Programme of activities

SECTION A. Description of PoA

A.1. Brief description of the PoA

This PoA involves the distribution of LifeStraw® Family units and/or EcoZoom Dura high-efficiency cook stoves to households in the Republic of Rwanda, exclusive of those households in the case of the water filters that have existing running water in their homes.

The LifeStraw® Family is a point-of-use water filter that helps people access safe drinking water at home and outside. The LifeStraw® Family is an instant microbiological purifier that delivers at least 18,000 liters of EPA-quality drinking water. The LifeStraw® Family reduces the use and demand for firewood for water treatment by boiling. This directly leads to reduced CO₂ emissions.

The EcoZoom Dura is a high-efficiency, family-sized cook stove based on the 'rocket stove' concept of operation. These stoves are considerably more efficient than the standard three-stone-fire and reduce the use of NRB for cooking. Additionally, these stoves can achieve a complete burn of combustible materials resulting in little to no smoke, greatly improving indoor air quality.

These technologies are distributed directly to households. Distributions are coordinated and managed by DelAgua Health Rwanda Limited, in collaboration with the Rwandan Ministry of Health.

A.1.1. Generic CPA(s)

Title, identification/reference number and/or version number of the generic CPA(s) of the PoA	Sectoral scope(s)	Applied methodology(ies) or combination of methodologies and/or standardized baseline(s)
CPA XXX - DelAgua Rwanda Public Health Program: CPAXX, [Socioeconomic Classification] in YY District in the ZZ Province of the Republic of Rwanda	Sectoral Scope – 3. Energy Demand	AMS-III.AV. Low greenhouse gas emitting safe drinking water purification systems, Version 04 AMS II.G, Energy efficiency measures in thermal applications of non-renewable biomass, Version 05

A.1.2. Specific-case CPA(s) covered in this monitoring report

SECTION B.

Title, identification/ reference number and version number of the generic CPA to which the specific-case CPA applies	Crediting period dates of the specific-case CPA	Is this specific-case CPA covered in this monitoring report? (yes/no)
CPA001 - DelAgua Rwanda Public Health Program: Rubavu District, Western Province, Republic of Rwanda	15/9/2014 - 14/9/2021	Yes
CPA002 - DelAgua Rwanda Public Health Program: CPA002, Ubedehe 1& 2 in Karongi District in the Western Province of the Republic of Rwanda	15/9/2014 - 14/9/2021	Yes

CPA003 - DelAgua Rwanda Public Health Program: CPA003, Ubedehe 1& 2 in Ngororero District in the Western Province of the Republic of Rwanda	15/9/2014 - 14/9/2021	Yes
CPA004 - DelAgua Rwanda Public Health Program: CPA004, Ubedehe 1& 2 in Nyabihu District in the Western Province of the Republic of Rwanda	15/9/2014 - 14/9/2021	Yes
CPA005 - DelAgua Rwanda Public Health Program: CPA005, Ubedehe 1& 2 in Nyamasheke District in the Western Province of the Republic of Rwanda	15/9/2014 - 14/9/2021	Yes
CPA006 - DelAgua Rwanda Public Health Program: CPA006, Ubedehe 1& 2 in Rutsiro District in the Western Province of the Republic of Rwanda	15/9/2014 - 14/9/2021	Yes
CPA007 - DelAgua Rwanda Public Health Program: CPA007, Ubedehe 1& 2 in Rusizi District in the Western Province of the Republic of Rwanda	15/9/2014 - 14/9/2021	Yes
CPA008 - DelAgua Rwanda Public Health Program: CPA008, Ubedehe 1& 2 in Bugesera District in the Eastern Province of the Republic of Rwanda	19/4/2016 - 18/4/2023	Yes
CPA009 - DelAgua Rwanda Public Health Program: CPA009, Ubedehe 1& 2 in Burera District in the Northern Province of the Republic of Rwanda	19/4/2016 - 18/4/2023	Yes
CPA010 - DelAgua Rwanda Public Health Program: CPA010, Ubedehe 1& 2 in Gatsibo District in the Eastern Province of the Republic of Rwanda	19/4/2016 - 18/4/2023	Yes
CPA011 - DelAgua Rwanda Public Health Program: CPA011, Ubedehe 1& 2 in Rulindo District in the Northern Province of the Republic of Rwanda	19/4/2016 - 18/4/2023	Yes
CPA012 - DelAgua Rwanda Public Health Program: CPA012, Ubedehe 1& 2 in Kayanza District in the Eastern Province of the Republic of Rwanda	19/4/2016 - 18/4/2023	Yes
CPA013 - DelAgua Rwanda Public Health Program: CPA013, Ubedehe 1& 2 in Kirehe District in the Eastern Province of the Republic of Rwanda	19/4/2016 - 18/4/2023	Yes

CPA014 - DelAgua Rwanda Public Health Program: CPA014, Ubedehe 1& 2 in Ngoma District in the Eastern Province of the Republic of Rwanda	19/4/2016 - 18/4/2023	Yes
CPA015 - DelAgua Rwanda Public Health Program: CPA015, Ubedehe 1& 2 in Nyagatare District in the Eastern Province of the Republic of Rwanda	19/4/2016 - 18/4/2023	Yes
CPA016 - DelAgua Rwanda Public Health Program: CPA016, Ubedehe 1& 2 in Rwamagana District in the Northern Province of the Republic of Rwanda	19/4/2016 - 18/4/2023	Yes

SECTION C.

A.2. Contact information of the coordinating/managing entity (CME) and/or responsible persons(s)/entity(ies)

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DelAgua Health Rwanda Limited. See appendix 1 for contact details.

SECTION D. Implementation of PoA

D.1. Implementation of the management system of the PoA

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The management system is based on EB 65, Annex 3 “Standard for Demonstration of Additionality, Development of Eligibility Criteria, and Application of Multiple Methodologies for Programme of Activities”, Version 3.0, and is comprised of the following element:

- (a) A clear definition of roles and responsibilities of personnel involved in the process of inclusion of CPAs, including a review of their competencies;

CPA Implementer is responsible for developing the CPA-DD, and for gathering all required documentation to demonstrate compliance with the eligibility criteria. The CPA-DD and supporting documentation will be submitted to the Program Director of DelAgua. The Program Director, or a suitably trained designate, will be responsible the process of inclusion of CPAs.

- (b) *Records of arrangement for training and capacity development for personnel;*

The CME trained all staff involved in distribution, education and monitoring activities. The CME will ensure training of all on-site staff with respect to adherence to the Monitoring Plan of the project activity. Records of the training will be kept for at least 2 years after the end of the crediting period of the relevant project activity.

- (c) *Procedures for technical review of inclusion of CPAs;*

All CPAs are owned and managed by DelAgua, the CME. The Program Director of DelAgua designated appropriately trained technical staff to draft the CPA-DD and to gather sufficient

documentation to demonstrate compliance with the eligibility criteria defined in section B.2 above. The documentation will be reviewed and approved by the Program Director of DelAgua.

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

All CPAs were implemented by the CME, thus ensuring that the operator is aware of and agrees that the water filter and/or high efficiency stove distribution is included in this PoA confirms that no emission reduction benefit from the project shall be claimed by it through any other instrument either as a standalone project or as a CPA to any other PoA.

(e) Records and documentation control process for each CPA under the PoA;

The monitoring plan for this project is closely derived from the methodologies. A database for the project activity was maintained continuously. The monitoring plan consists of checking a representative sample of all appliances at least once every two years to ensure that they are still operating or are replaced by an equivalent in service appliance.

A POA-level project database was maintained recording the distribution of each initial water filter and cookstove issued, subsequent replacements, as well as detailed data on the representative sample surveyed for monitoring purposes. The database will be accessible to the project proponent, appropriate partners, and the verification DOE. The database includes the following:

- Unique identification number
- Installation date
- First and last name
- Contact details of user (where available)
- Baseline cooking fuel source
- Baseline stove type
- Date of replacement of filter and/or stove units
- Monitored parameters

Additionally, the CME has kept:

- CPA-DDs and supporting documentation
- Training records (the PoA training program is described further in section B.2)
- Database backups

The database is available to select a random, representative sample from for monitoring and verification purposes. This sample set will be integrated into the database to include additional monitoring parameters as required or as appropriate.

(f) Measures for continuous improvements of the PoA management system;

An internal audit of all distribution, monitoring and education records was conducted in preparation for the third verification. Distribution records were reviewed and cleaned to ensure accuracy, and the monitoring survey was reviewed by senior staff to ensure that the requirements of the monitoring plan were met. Senior staff reviewed revisions to the verification survey questions resulting from three Forward Action Requests issued during the second verification. These revisions are discussed in section B.2 below.

D.2. Implementation of single sampling plan(s)

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a.Objectives and Reliability Requirement

The objective for each parameter is defined in the tables below. A single sampling plan was implemented for all CPAs, and therefore the results for each parameter must meet 95/10 confidence/precision.

b.Target Population & Sampling Frame

The target population is the end-users who receive project technologies under a CPA within the PoA, and that share the characteristics outline below. As described in section XX, end-users fell into two groups, and so the target population is adjusted accordingly.

-Region

1. For Group 1: Beneficiary HHs were located in the 7 districts of Rwanda's Western Province
2. For Group 2: Beneficiary HHs were located in all CPAs

-Combination of project technology.

1. For Group 1: All beneficiary HHs received a stove and a filter
2. For Group 2: All beneficiary HHs received a stove

-Model of project technology

1. For Group 1: All beneficiary HHs received a Vestergaard Lifestraw Family, 2.0, and an EcoZoom Dura coosktove.
2. For Group 2: All beneficiary HHs received an EcoZoom Dura cookstove

-Installation year (by technology)

1. For Group 1: All technologies were installed between 15 September, 2014 and 12 December, 2014
2. For Group 2: All technologies were installed between 15 January, 2016 and 1 November, 2016

-Target group

- 1.All technologies were distributed to households

-Socioeconomic level

- 1.All technologies were distributed to Ubedehe 1 & 2 households.

As the beneficiary HHs share the above characteristics, the project population is homogenous and the sampling frame is the PoA database.

c.Sampling Method

Simple random sampling was utilized.

d.Sample Size

In accordance with the *Standard for sampling and surveys for CDM project activities and programme of activities*, the sample size was chosen to meet the required reliability (95/10 confidence/precision, as the sampling plan covers a group of CPAs). Ex-ante sample sizes were estimated for each parameter using survey results from the previous (second) monitoring period. Sample sizes were calculated for each surveyed parameter using simple random sampling. The largest ex-ante sample size was used for survey implementation. Ex-ante calculations determined that 160 surveys would need to be conducted for Group 1 and 160 surveys would need to be conducted for Group 2. DelAgua randomly selected 260 households in each group; including a buffer to account for potential nonresponse. In total, 320 households were surveyed. Sample size calculations are provided to the DOE for review.

e.Sampling Frame

The sampling frame is the portion of the population that shares the key characteristics described above in section b, and is selected from the PoA level database. Samples were selected using a random number generator in Excel. Records of the sampling frame will be maintained for a period of 2 years after the lifetime of the PoA.

Data:

f. Field Measurements

Parameters that were measured via surveys are identified in section G above. All surveyed parameters are measured via in-person survey. A single survey was developed to address all monitored parameters, so that a single survey was administered to all randomly selected households. Survey questions are made available to the DOE for review.

g. QA/QC

The data collected during monitoring is verified and controlled in the following way:

- Surveys are conducted by trained staff. Surveyors in Western Province had previously conducted verification surveys during the first and second monitoring period, and therefore were not retrained prior to this third round of surveys. These surveyors were provided with a printout of the verification survey, including training notes. A refresher training was held on October 9th and 10th, to review the changes to the verification survey. The refresher training included one day of classroom training to review surveys in depth, followed by one day of supervised field training where staff practiced surveys in actual households. Records of the trainings are available to the DOE.
- All ex-ante and monitored data parameters were collected on smart-phone based surveys, and surveys are uniform across all surveyors.
- Unknown to the surveyors, the database analysis includes verification of “valid” surveys including by a.) verifying household consent is received and b.) that the survey duration, as recorded by Internet time, is no shorter or longer than a reasonable value.
- Data validation is conducted on the database to ensure that values are numerically consistent, i.e. multiple choice values add up to 100% of respondents.

Data was downloaded from the PoA database, and assessed for outliers. A data point was considered an outlier if it was more than 1.5 times the inner quartile range. Datapoints identified as outliers were removed from the dataset, with the exception of two surveyed parameters - the number of days that stoves are not working and the number of days that filters are not working. Removing outliers from these two surveyed parameters would have set the minimum and maximum values to 0 (suggesting no downtime). To be conservative, we did not remove outliers for these surveyed parameters. The two surveyed parameters are used to calculate the Operating Fraction for stoves and filters, respectively.

The dataset is provided to the DOE for review.

h. Analysis

Once outliers were removed, the mean/proportion value was calculated, and the reliability of the results were assessed. This analysis is provided to the DOE.

SECTION E. Post-registration changes to the PoA (including the generic CPA(s))

E.1. Corrections

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NA

E.2. Inclusion of a monitoring plan to the registered PoA-DD (including its generic CPA-DD(s)), if a monitoring plan was not included at the time of registration>>
NA**E.3. Permanent changes to the monitoring plan as described in the registered PoA-DD, applied methodology, or applied standardized baseline**

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E.4. Changes to the programme design of the registered PoA-DD (including corresponding changes to project design of the generic CPA-DD(s)) and updates to the eligibility criteria for inclusion of specific-case CPAs in the PoA>>
NA**E.5. Types of changes specific to afforestation and reforestation activities**>>
NA**PART II - Specific-case component project activity(ies)****SECTION F. Description of specific-case CPA(s)**

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Each CPA involves the distribution of water filters and/or high-efficiency cook stoves in an established district in an established province in Rwanda. The distributions were coordinated and managed by DelAgua. Distributions occurred in two groups. Under Group 1, stoves and filters were distributed to 100906 households within 72 sectors of CPAs 1-7, during the first monitoring period. Group 2 included distribution of stoves to 202325 households in CPAs 1-16; 161300 households were located in CPAs 8-16, and 41,025 households were located within 24 sectors of CPA 1-7 that did not receive technologies under Group 1. Group 2 distributions occurred throughout 2016. The number of technologies distributed within each district/CPA is as follows:

District	Total Households Group 1	Total Households Group 2
CPA001 - Rubavu	10582	7315
CPA002 - Karongi	14548	4728
CPA003 - Ngororero	17912	5820
CPA004 - Nyabihu	10734	3076
CPA005 - Nyamasheke	13963	5961
CPA006 - Rutsiro	16867	6619
CPA007 - Rusizi	16300	7506
CPA008 - Bugesera	0	24199
CPA009 - Burera	0	22553
CPA010 - Gatsibo	0	21845
CPA011 - Rulindo	0	17623
CPA012 - Kayanza	0	13711

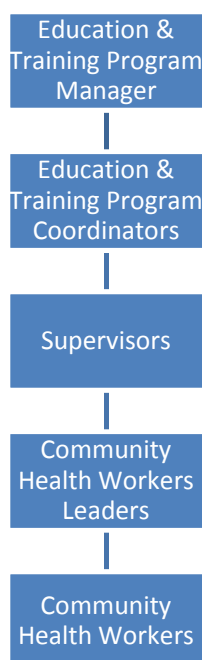
CPA013 - Kirehe	0	13994
CPA014 - Ngoma	0	16022
CPA015 - Nyagatare	0	15647
CPA016 - Rwamagana	0	15706
Total	100906	202325

F.1. Brief description of implemented specific-case CPA(s)

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As described above, distributions are separated into two groups, depending on the time period that technologies were distributed (Group 1 distributions took place in 2014, while Group 2 distributions occurred in 2016), and the combination of technologies provided to the household (Group 1 distributions included stoves and filters, while Group 2 distributions included stoves only). As required by the monitoring plan, monitoring was conducted separately for each group.

Distributions were coordinated and managed by CME staff, and utilized the Rwandan Ministry of Health's network of collaboration with Community Health Workers (CHWs). The structure of the team responsible for technology distribution was as follows:



Beneficiary households were identified based on Ubudehe lists developed by local authorities and approved by the government of Rwanda. Product distribution occurred at the cell level, and involved a two-step process; the initial distribution, and HH visits.

The initial distributions were implemented by teams of trained CHWs (see training program below), and the team was overseen by supervisors. HHs came to a central distribution point, where they received a training on the use of technologies. Following this training, each beneficiary HH received a filter and stove, and CHWs collected basic HH identification information on smart phones. The information collected during the initial distributions includes the following:

- Installation date
- Family name
- Contact details of user (where available)
- Socio-economic level (according to the Rwandan Ubudehe approach).

- Water filter barcode
- High efficiency stove barcode

Following the initial distribution, CHWs then visited each beneficiary HH, to conduct an in-home training to reinforce the proper use and maintenance of the technology, to respond to beneficiary questions about the program, and to conduct a household survey to collect more detailed information, including

- Baseline cooking fuel source
- Baseline stove type

Three different trainings were conducted in preparation for distributions. The sixteen District Managers (DMs) received a one-week training conducted by the Education and Training Program Manager & Coordinators. The DMs, ETPM and ETPCs then conducted 2.5 day trainings in each district for the CHWs. Following the first day of the CHW training, a CHW leader was selected, and these individuals received an additional ½ day of training.

The CHW training focused on:

- Household Visit Communication Tools, including use of the smart phone for data collection surveys
- Technology Trainings
- Distribution Meeting Training
- Basics of conducting a survey
- Basics of communication

The supervisor training focused on the above elements, as well as the following:

- Leadership and Communication Training
- Administrative Tasks

F.2. Geographical references or other means of identification of the location of the specific-case CPA(s)

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Each specific case CPA is located in a different district in the Western, Northern and Eastern Provinces of Rwanda, as follows:

- CPA001 – Rubavu
- CPA002 – Karongi
- CPA003 – Ngororero
- CPA004 - Nyabihu
- CPA005 – Nyamasheke
- CPA006 - Rutsiro
- CPA006 - Rutsiro
- CPA007 - Rusizi
- CPA008 – Bugesera
- CPA009 - Burera
- CPA010 - Gatsibo
- CPA011- Rulindo
- CPA012 – Kayanza
- CPA013 - Kirehe
- CPA014 – Ngoma
- CPA015 – Nyagatare
- CPA016 - Rwamagana

SECTION G. Post-registration changes to specific-case CPA(s)**G.1. Temporary deviations from registered monitoring plan, applied methodology or applied standardized baseline**

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NA

G.2. Corrections

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NA

G.3. Changes to the start date of the crediting period of the specific-case CPA(s)

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NA

G.4. Inclusion of a monitoring plan into the specific-case CPA(s) that was not included at registration

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NA

G.5. Permanent changes to the monitoring plan as described in the registered specific-case CPA-DD(s), applied methodology or standardized baseline

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NA

G.6. Changes to project design of the specific-case CPA(s)

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NA

G.7. Types of changes specific to afforestation and reforestation specific-case CPA(s)

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NA

SECTION H. Description of the monitoring system of specific-case CPA(s)

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The monitoring plan for this project is closely derived from the methodologies. A database for the project activity as maintained by the CME, and a representative sample of all appliances was monitored to ensure that they are still operating or are replaced by an equivalent in service appliance.

The project database as populated during the initial distribution of technologies, and was updated based on subsequent replacements. The database was made accessible to the project proponent, appropriate partners, and the verification DOE. The database includes the following:

- Unique CPA identification number

- Installation date
- Family name
- Contact details of user (where available)
- Socio-economic level (according to the Rwandan Ubudehe approach).
- Baseline cooking fuel source
- Baseline stove type
- Date of replacement of filter or cook stove units
- Monitored parameters, for each HH selected in the verification sample

The monitoring surveys established the time to end of life of the filters distributed, based on the rated capacity divided by the average number of people in the household, divided by the average volume of water consumed per person per day. In this way, the PP will establish the need to replace filter units in CPA regions. The monitoring survey also established usage rates and performance of the filter units. Likewise, monitoring surveys will include examination of the cookstove installations and verification that they are in an operational condition. Therefore, should some filter or stove units not be replaced appropriately, this will be accounted for and appropriately deducted from emission reduction claims.

SECTION I. Data and parameters

I.1. Data and parameters fixed ex ante, at registration, inclusion or renewal of crediting period

Data / Parameter	EF _{projected_fossilfuel}
Unit	tCO ₂ /TJ
Description	Emission factor for the projected fossil fuel consumption in the baseline, when NRB is displaced.
Source of data	AMS-II.G & AMS-III.AV
Value(s) applied	81.6 tCO ₂ /TJ
Choice of data or measurement methods and procedures	Methodological default
Purpose of data	Calculation of baseline emissions for AMS-III.AV Calculation of emission reductions from AMS-II.G
Additional comment	-

Data / Parameter	LF
Unit	Fraction
Description	Leakage factor applied to account for increase in NRB use outside the project boundary
Source of data	Default value
Value(s) applied	.95
Choice of data or measurement methods and procedures	Methodological default
Purpose of data	Calculation of leakage
Additional comment	-

Data / Parameter	$f_{NRB,y}$
Unit	Fraction
Description	Fraction of biomass used in the absence of the project activity in year y that can be established as non renewable biomass.
Source of data	Default values are used as published in EB 67 Annex 22 "Default Values for Fraction of Non-Renewable Biomass for Least-Developed Countries and Small Island Developing States".
Value(s) applied	Rwanda: 0.98
Choice of data or measurement methods and procedures	Methodological default
Purpose of data	Calculation of baseline emissions.
Additional comment	-

Data / Parameter	$w_b ; old$
Unit	%
Description	Efficiency of the cookstove and/or water boiling systems being replaced
Source of data	Methodological Default
Value(s) applied	10 %
Choice of data or measurement methods and procedures	According to the methodology, conventional stoves that do not contain a grate or chimney can be assumed to have an efficiency of 10%. The validating DOE confirmed this value was appropriate for the target group of the CPAs included in this monitoring period.
Purpose of data	Calculation of baseline emissions.
Additional comment	To ensure that emission reductions are conservatively estimated, the type of baseline fuel shall be recorded during initial distribution (see monitored parameter BS below). Only baseline fuels that displace biomass shall be credited.

Data / Parameter	$EF_{projected_fossilfuel}$
Unit	tCO ₂ /TJ
Description	Emission factor for the projected fossil fuel consumption in the baseline, when the displaced fuel is kerosene.
Source of data	2006 IPCC Guidelines for National Greenhouse Gas Inventories, Table 2.2
Value(s) applied	71.9 tCO ₂ /TJ
Choice of data or measurement methods and procedures	Methodological default
Purpose of data	Calculation of baseline emissions
Additional comment	-

Data / Parameter	WH
Unit	(kJ/L °C)
Description	Specific heat of water
Source of data	AMS.III.AV default value
Value(s) applied	4.186
Choice of data or measurement methods and procedures	Methodological default
Purpose of data	Calculation of baseline emissions.
Additional comment	-

Data / Parameter	T _i
Unit	°C
Description	Initial temperature of water
Source of data	AMS.III.AV default value
Value(s) applied	20
Choice of data or measurement methods and procedures	Methodological default
Purpose of data	Calculation of baseline emissions.
Additional comment	-

Data / Parameter	T _f
Unit	°C
Description	Final temperature of water
Source of data	AMS.III.AV default value
Value(s) applied	100
Choice of data or measurement methods and procedures	Methodological default
Purpose of data	Calculation of baseline emissions.
Additional comment	-

Data / Parameter	WHE
Unit	(kJ/L)
Description	Latent heat of water evaporation
Source of data	AMS.III.AV default value
Value(s) applied	2260
Choice of data or measurement methods and procedures	Methodological default
Purpose of data	Calculation of baseline emissions.
Additional comment	Used for water treatment calculation.

Data / Parameter	Xboil
Unit	Fraction
Description	The proportion of total population for which the common practice of water boiling is or would have been water boiling.
Source of data	Default value for Case 1
Value(s) applied	100%
Choice of data or measurement methods and procedures	According to the methodology, this parameter is only reported for Case 2 CPAs. Therefore, a value of 100% is applied, as all CPAs are Case 1.
Purpose of data	Calculation of emissions
Additional comment	

Data / Parameter	IMP _{frac}
Unit	Fraction
Description	Determination of CPAs that fall under Case 1 or Case 2 (a proportion of the included population using an improved drinking-water source equal to or less than 60%).
Source of data	Baseline water quality study conducted independently by the London School of Hygiene and Tropical Medicine in September and October 2012
Value(s) applied	18.9%
Choice of data or measurement methods and procedures	Third party survey conducted by the London School of Hygiene and Tropical Medicine
Purpose of data	Required to validate emission reductions.
Additional comments	-

Data / Parameter	Case 1/Case 2
Unit	Dimensionless
Description	CPAs fall under Case 1 if they are implemented in rural or urban areas and the proportion of the populations using an improved drinking-water source is equal to or less than 60% If the CPA does not fall under Case1, it is Case 2
Source of data	See IMPfrac parameter
Value(s) applied	Case 1
Choice of data or Measurement methods and procedures	As IMPfrac is <60%, all CPAs are Case 1
Purpose of data	Calculation of baseline emissions
Additional comment	-

Data / Parameter	NCVbiomass
Unit	TJ/tonne
Description	Net calorific value of the non-renewable woody biomass that is substituted
Source of data	IPCC default value for wood fuel
Value(s) applied	0.015
Choice of data or measurement methods and procedures	IPCC default
Purpose of data	Calculation of emission reductions.
Additional comment	Used for the cook stove calculation.

Data / Parameter	CE
Unit	Binary value
Description	Indication of whether cross-effects must be accounted for.
Source of data	CPA Implementation Plan
Value(s) applied	1
Choice of data or measurement methods and procedures	As cook stoves and water filters were distributed under all CPAs, then CE=1 and cross-effects were accounted for in households that utilize both products.
Purpose of data	Parameter determines whether B_{old} must be adjusted for cross-effects.
Additional comments	-

Data / Parameter	B _{PP}
Unit	Kg / person
Description	Per capita quantity of woody biomass used in the absence of the project activity in tonnes (prior to adjustment for cross-effects).
Source of data	Energy Water and Sanitation Authority (EWSA), "Biomass Use Survey in Urban and Rural Areas in Rwanda", Contract No. 11.07.054/24C/11/EARP-DIR/EK/sm, May 2012
Value(s) applied	377.6 kg/pp w/o adjustment for cross-effects
Choice of data or measurement methods and procedures	To account for cross-effects, B _{PP} is reduced to remove biomass consumption that would have been for water treatment purposes. This process is described in Section H.
Purpose of data	Calculation of emission reductions.
Additional comment	<p>If a HH receives & utilizes both water filters and cookstove, B_{PP} is reduced to remove biomass consumption that would have been for water treatment purposes.</p> <p>B_{pp} is multiplied by the total number of persons that are cooked for on each stove (see monitored parameter N), to determine B_{old}. B_{old} is further adjusted to account for the continued use of traditional stoves in the project activity (see monitored parameter U).</p>

I.2. Data and parameters monitored

(Copy this table for each piece of data and parameter)

Parameters common to III.AV and II.G

Data / Parameter	Operating fraction (OF)
Unit	Fraction
Description	Fraction of the monitoring period that a technology has been deployed for
Measured/calculated/default	Measured
Source of data	Project database
Value(s) of monitored parameter	OFs for each group and technology are found in Appendix 2
Monitoring equipment	Verification Survey
Measuring/reading/recording frequency	Annually

Calculation Method (if applicable)	Parameter value was calculated as the average operating period of all similar technologies distributed within each CPA, discounted by the average amount of time that products were not in working order. The average operating period was determined as follows: (average distribution date in CPA –start date of monitoring period) / total days in monitoring period The amount of time that products were not in working order was determined by survey.
QA/QC procedures	Survey conducted according to requirements described in Section B.2
Purpose of data	Calculation of baseline emissions.
Additional comments	-

Data / Parameter	$N_{y,i}$
Unit	Units
Description	Total number of technologies of type I distributed prior to the end of the monitoring period
Measured/Calculated/Default	Measured
Source of data	Project database
Value(s) applied	Parameter values are described in Appendix 2
Monitoring Equipment	Distribution records recorded on smart-phones
Measuring/reading/recording frequency	Annually
Calculation Method	Parameter value will be calculated directly from the project database.
QA/QC procedures	N/A
Purpose of data	Calculation of baseline and project emissions.
Additional comments	-

Data / Parameter	OC _{y,i}
Unit	Fraction
Description	Operational check, or the fraction of technologies of type I that are still in service in year y
Measured/calculated/default	Measured
Source of data	Verification surveys
Value(s) applied	For Group 1 83.66 % for water filters 98.92 % for stoves For Group 2 83.66 % for water filters 98.92 % for stoves
Monitoring equipment	Verification survey results recorded on smart-phone
Measuring/reading/recording frequency	To be checked at least every two years (biennial).
Calculation method (if applicable)	Household surveys were administered in accordance with the sampling plan described in section B. 2.
QA/QC procedures	Please reference section B. 2 for the detailed sampling plan
Purpose of data	Calculation of baseline emissions.
Additional comments	Units that are found to be out of operation in the course of sampling shall be replaced, and the project database shall be updated to reflect this in order to avoid double-counting.

Data / Parameter	HH _{size}
Unit	# of people
Description	Number of persons that utilize each of the functional project appliances
Measured/calculated/default	Measured
Source of data	Household surveys
Value(s) applied	For Group 1 4.84 occupants For Group 2 4.84 occupants
Monitoring equipment	Survey results recorded on smart-phone
Measuring/reading/recording frequency	Annual
Calculation method (if applicable)	Average value of all HHs that have operational products, as determined via self-reported surveys

QA/QC procedures	Please reference section B.2 for the detailed sampling plan.
Purpose of data	Calculation of baseline emissions.
Additional comments	<p>For AMS-II.G, this parameter is multiplied by the average per capita quantity of biomass used in the absence of the project activity (see parameter $B_{old,PP}$) to determine B_{old}.</p> <p>For AMS-III.AV, the ex-ante value of HH_{size} was multiplied by the number of households targeted to determine the population serviced by the project equipment (paragraph 18(a) in AMS-III.AV). Following CPA inclusion, this parameter is required to be monitored biennially, and only for Case 2 populations. However, this parameter is necessary to adjust biomass consumption for cross-effects, as described in Section B.2 above. Therefore, this parameter is monitored for all CPAs on an annual basis. As this is conservative relative to the methodological requirements, it is deemed acceptable.</p> <p>The total quantity of purified water (QPWy) shall be divided by HH_{size}, to determine QPW_{PP}, which is used to adjust biomass consumption to account for cross-effects as described in Section B.2.</p>

Data / Parameter	Baseline System (BS)
Unit	Fraction
Description	Fraction of population for which the baseline fuel displaced is biomass
Measured/calculated/default	Measured
Source of data	Household surveys
Value(s) applied	For Group 1 & Group 2 100 %
Monitoring equipment	Verification survey results recorded on smart-phone
Measuring/reading/recording frequency	<p>According to the registered monitoring plan, this parameter is recorded at initial distribution and then confirmed during first household visit. These records suggest that 100% of HHs utilize biomass.</p> <p>In addition, the CME included this question in the monitoring surveys. The monitoring surveys suggest that this value is 98.92%. As the staff who conducted the monitoring survey received more extensive training, and since these results are more conservative, the results of the monitoring survey are applied for this verification.</p>
Calculation method (if applicable)	The baseline fuel was recorded for all end-users that received project technologies during the initial distribution. No sampling was required.
QA/QC procedures	Baseline fuel will be recorded at initial distribution, and then confirmed during first household visit.
Purpose of data	Calculation of baseline emissions
Additional comments	Emission reductions were discounted by the fraction of the population that does not use biomass.

Parameters used exclusively for III.AV

Data / Parameter	QPW _y
Unit	Litres
Description	Quantity of purified water in year y
Measured/calculated/default	Calculated from measured parameters
Source of data	Household survey
Value(s) applied	For Group 1 2040.12 litres/year/HH For Group 2 2040.12 litres/year/HH
Monitoring equipment	Verification survey results recorded on smart-phone
Measuring/reading/recording frequency	Annually
Calculation method (if applicable)	Self-reported surveys were administered, according to the sampling plan discussed in section B.2. Verification survey determined QPW per HH per day. This is then multiplied by HH size and 365 to determine QPW _y . As stated in AMS-III.AV, this value shall not exceed the equivalent of 5.5 litres/person/day.
QA/QC procedures	Please reference section B.2 for the detailed sampling plan
Purpose of data	Calculation of baseline emissions
Additional comments	QPW _y was divided by the total number of persons that are supplied with purified water (see monitored parameter HH _{size}), to determine QPW _{PP} , which is used to adjust biomass consumption to account for cross-effects as described in Section B.2.

Data / Parameter	Water Quality Monitoring
Unit	Fraction
Description	Fraction of LifeStraw® Family units that are in compliance with the water quality requirements of the methodology.
Measured/calculated/default	Default
Source of data	Date of issue of LifeStraw® Family and certificate of quality for associated batch by manufacturer.
Value(s) applied	1
Monitoring Equipment	NA
Measuring/reading/recording frequency	Annually
Calculation method (if applicable)	<p>The LifeStraw® Family manufacturer guarantees compliance with EPA standards for microbiological contamination. As designed and produced, the LifeStraw® Family uses size exclusion to ensure that microbiological contamination is not present in treated water. As the filter clogs, the flowrate is reduced. Therefore, a filter at its end-of-life cannot pass water that is untreated. This is a fail-safe indicator of the end-of-life.</p> <p>Therefore, the water quality compliance of this technology is achieved via an annual operational check of the units in place, per the $OC_{y,l}$ parameter described above, and ensuring that each shipment of water filters is accompanied with a Certificate of Quality (COQ).</p>
QA/QC procedures	Manufacturer certificate of quality for each batch of LifeStraw® Family units produced: http://www.vestergaard-frandsen.com/lifestraw/lifestraw-family/certificate-of-quality
Purpose of data	Calculation of baseline emissions
Additional comments	<p>The LifeStraw® Family conforms to US EPA microbiological water quality standards, as allowed by the methodology. Each LifeStraw® Family batch produced is issued a Certificate of Quality by the manufacturer that demonstrates compliance of the batch with EPA standards. An example is shown here: http://www.vestergaard-frandsen.com/lifestraw/lifestraw-family/certificate-of-quality</p> <p>Annual emission reductions shall be discounted by water quality fraction.</p>

Data / Parameter	SDW _{frac}
Unit	Fraction
Description	Proportion of CPA population served by a public distribution network of safe drinking water. The CPA total project area is defined by the project proponent to be households within a delineated geographical boundary within a country, minus those households that have running water within their households. Surveys will establish the proportion of households that have running water, and are therefore excluded from the total CPA project area.
Measured/calculated/default	Measured
Source of data	Household surveys determine the fraction of the population within district who have access to running water in homes. These households were excluded from carbon credit calculations associated with the water filters.
Value(s) applied	For Group 1 0 % For Group 2 0 %
Monitoring equipment	Verification survey results recorded on smart-phone
Measuring/reading/recording frequency	Annual
Calculation method (if applicable)	Self-reported surveys were administered accordance with the sampling plan described in Section B.2
QA/QC procedures	Surveys followed the sampling plan described in Section B.2.
Purpose of data	Calculation of baseline emissions
Additional comments	In case the SDW is made available through the public distribution network, no claim for emission reductions can be made for that proportion of the CPA area.

Parameters used exclusively for II.G

Data / Parameter	new,y									
Unit	Fraction									
Description	Efficiency of the system being deployed as part of the project activity in year y.									
Measured/calculated/default	Calculated									
Source of data	Water boiling tests were conducted to determine the efficiency of stoves in the field for 1 year.									
Value(s) applied	For Group 1 28.645% For Group 2 28.645%									
Monitoring equipment	Verification survey results recorded on smart-phone									
Measuring/reading/recording frequency	Annually									
Calculation method (if applicable)	<p>A weighted average is applied to account for the use of a pot skirt. The household survey determined the percent of cooking on a project stove that was done with and without the pot skirt. These results were combined with the WBT results for stoves in the field one-year to determine the average efficiency of stoves during the monitoring period. Ex-ante calculations determined that 1 stove had to be sampled, though tests were conducted on 2 stoves to improve accuracy. In accordance with the WBT Protocol v4.2.3, 3 tests were conducted on each of these stoves with the pot skirt, and 3 tests were conducted on each stove without the pot skirt. The tests with pot skirt determined average efficiency to be 29%. The tests of stoves without a pot skirt determined the average efficiency to be 14%. The results met the required 95/10 confidence/precision. The combined results are as follows:</p> <table border="1"> <thead> <tr> <th></th><th>Stove Efficiency, based on water boiling test results</th><th>% Usage (Monitoring Survey)</th></tr> </thead> <tbody> <tr> <td>w/ Pot Skirt</td><td>29%</td><td>96%</td></tr> <tr> <td>w/o Pot Skirt</td><td>14%</td><td>4%</td></tr> </tbody> </table> <p>*Based on the above values, the weighted average efficiency value is 28.645% for group 1 stoves.</p>		Stove Efficiency, based on water boiling test results	% Usage (Monitoring Survey)	w/ Pot Skirt	29%	96%	w/o Pot Skirt	14%	4%
	Stove Efficiency, based on water boiling test results	% Usage (Monitoring Survey)								
w/ Pot Skirt	29%	96%								
w/o Pot Skirt	14%	4%								

QA/QC procedures	WBTs were conducted by a DelAgua supervisor, who was previously trained by a Senior Program Manager (who had been trained on WBTs by Berkely Air), and had conducted the WBTs for the previous monitoring period. Water boiling tests were conducted according to version 4.2.3 of the Water Boiling Test (dated 19 March 2014), made available by the Partnership for Clean Indoor Air (PCIA). 3 tests were conducted on 2 stoves with pot skirts, and 3 tests were conducted on 2 stoves without pot skirts.. The results met the required 95/10 confidence/precision
Purpose of data	Calculation of project emissions
Additional comments	-

Data / Parameter	U
Unit	%
Description	Fraction of total cooking that continues to be done on the baseline stove in the project scenario.
Measured/calculated/default	Measured
Source of data	Monitoring survey
Value(s) applied	For Group 1 62.71% For Group 2 62.71%
Monitoring equipment	Verification survey results recorded on smart-phone
Measuring/reading/recording frequency	To be checked biennially.
Calculation method (if applicable)	<p>Parameter was measured via monitoring surveys. Please reference section B.2 for the detailed sampling plan for sampling procedure, and below for how it is applied for this parameter:</p> <p>During on-going monitoring surveys, households were asked as to their frequency of use of the improved stove versus the baseline stove in the wet and dry season. 36.45% of cooking was done on baseline stoves during the dry season, while 37.63% of cooking was done on baseline stoves in the wet season. According to the Rwandan Meteorological Agency, The 'long rains' occur over March, April and May (MAM) and the 'short rains' occur in September, October, November and December (SOND). Therefore, 71% of the monitoring period was in the wet season, resulting in a weighted average project stove usage of 62.71%, and weighted average baseline stove usage of 37.29%. Baseline fuel consumption was adjusted to account for the average continued use of the baseline stove.</p>

QA/QC procedures	Please reference section B.2 for the detailed sampling plan
Purpose of data	Calculation of project
Additional comments	-

I.3. Implementation of specific-case CPA level sampling plan

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A single sampling plan was implemented for the PoA, as described above.

SECTION J. Calculation of GHG emission reductions or net GHG removals by sinks

J.1. Calculation of baseline emissions or baseline net GHG removals by sinks

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Baseline emissions for water filters (AMS-III.AV)

The following changes were made to the calculation of baseline emissions for water filters, as compared to the registered PoA-DD:

1. Ongoing monitoring determined that several HHs continued to boil water after introduction of the water filter. Therefore, baseline emissions were discounted by the percent of households that boiled water after filtering. See parameter BAF in the calculations below.

$$BE_{y,water_treatment} = BE_{y,l} * N_{y,i}$$

Where:

$BE_{y,water_treatment}$ Baseline emissions during the year y in tCO₂e

$BE_{y,l}$ Baseline emissions per water filter of type l , *calculated as below*

$N_{y,l}$ Number of project devices of type l operating in year y , *monitored*

$$BE_{y,l} = QPW_y * SEC * f_{NRB,y} * EF_{projected_fossilfuel} * 10^{-9} * (1 - SDW_{frac}) * X_{BOIL} * BS * OC_{y,l} * OF * BAF$$

Where:

$BE_{y,l}$ Baseline emissions from filters of type l during the year y in (tCO₂e). *Calculated.*

QPW_y Quantity of purified water as established in year y (litres), capped at 5.5 lppd. *Monitored*

SEC Specific energy consumption required to boil one litre of water (kJ/L). *Calculated below.*

$F_{NRB,y}$ Fraction of woody biomass used in the absence of the project activity in year y that can be established as non renewable as per the relevant provisions of AMS-I.E "Switch from Non-Renewable Biomass for Thermal Applications by the User". *Determined at the CPA level*

EF _{projected_fossil_fuel}	Emission factor as per AMS-I.E procedures when NRB is displaced or the emission factor of the fossil fuel substituted (tCO ₂ /TJ). <i>Determined at the CPA level</i>
SDW _{frac}	Proportion of CPA population served by public safe drinking water distribution system, <i>monitored</i> .
X _{boil}	The proportion of total population for which the common practice of water boiling is or would have been water boiling. <i>Determined at the CPA level</i>
BS	Fraction of population for which the baseline fuel displaced is biomass, <i>monitored</i> .
OC _{y,I}	Operational check, or fraction of filters of type I distributed that are operational in year y, <i>Monitored</i> .
OF	Fraction of the monitoring period that the stove was deployed, <i>monitored</i> .
BAF	Fraction of HHs that continue to boil water after introduction of the filter

Specific energy consumption required to boil one litre of water is to be calculated as follows:

$$SEC = [WH * (T_f - T_i) + 0.01 * WHE] / \eta_{wb}$$

Where:

WH Specific heat of water (kJ/L °C). *The default value of 4.186 kJ/L °C is used.*

T_f Final temperature (°C). *The default value of 100 °C is used.*

T_i Initial temperature of water (°C). *A default value of 20 °C will be used.*

WHE Latent heat of water evaporation (kJ/L). *The default value of 2260 kJ/L will be used.*

η_{wb} Efficiency of the water boiling systems being replaced. *Determined at the CPA level*

Emission reduction calculation for stoves (AMS-II.G)

$$ER_{y,cook_stoves} = B_{y,savings} * f_{NRB,y} * NCV_{biomass} * EF_{projected_fossilfuel}$$

Note that this equation incorporates consideration of leakage (Equation 4), and baseline and project emissions (Equation 3), and therefore these elements are not separately calculated.

To streamline the reporting of compliance with the SSC debundling guidelines, this equation is separated into two equations. NRB savings per stove are calculated based on the relevant parameters, and then emission reductions are calculated.

$$ER_{y,cook_stoves} = ER_{y,I} * N_{y,I} \quad (\text{Equation 1})$$

Where:

ER_{y, cook_stoves} Total emission reductions from coosktoves during the year y in (tCO₂e).

ER_{y,I} Emission reductions per cook stove, calculated below.

N_{y,I} Number of project devices of type I operating in year y, *Monitored*

$$ER_{y,I} = B_{adj} * NCV_{biomass} * EF_{projected_fossilfuel} \quad (\text{Equation 2})$$

Where:

$ER_{y,i}$ Emission reductions from cook stove model i during the year y in (tCO₂e).

B_{adj} Adjusted quantity of NRB that is saved in tonnes, after consideration of various discount factors. Calculated below.

$NCV_{biomass}$ Net calorific value of the non-renewable woody biomass that is substituted (IPCC default for wood fuel, 0.015 TJ/tonne). *The IPCC default value for wood, 0.015 TJ/tonne, is used.*

$EF_{projected_fossil\ fuel}$ Emission factor for the substitution of non-renewable woody biomass by similar consumers. Use a value of 81.6 tCO₂/TJ³.

$$B_{adj} = B_{NRB} * OF * (1-U) * OC * BS \text{ (Equation 3)}$$

Where:

B_{NRB} Quantity of NRB that is saved in tonnes

BS Fraction of population for which the baseline fuel displaced is biomass, *monitored*.

U Fraction of cooking that utilizes baseline stoves, *monitored*

OF Fraction of the monitoring period that the stove was deployed, *monitored*.

$OC_{y,i}$ Operational check, or fraction of stoves of type i distributed that are operational, *Monitored*.

$$B_{NRB} = B_{y, savings} * f_{NRB,y} \text{ (Equation 4)}$$

$B_{NRB,i}$ Quantity of NRB that is saved in tonnes by cookstove model i .

$B_{y,savings}$ Quantity of woody biomass that is saved in tonnes. *Calculated below.*

$F_{NRB,y}$ Fraction of woody biomass saved by the project activity in year y that can be established as non-renewable biomass. *Default values are used as published in EB 67 Annex 22 "Default Values for Fraction of Non-Renewable Biomass for Least-Developed Countries and Small Island Developing States"*

$$B_{y,savings} = B_{old} * (1 - \frac{old}{new,y}) \text{ (Equation 5)}$$

Where:

$B_{y,savings}$ Quantity of woody biomass that is saved in tonnes.

B_{old} Quantity of woody biomass used in the absence of the project activity in tonnes. *Calculated as described below.*

old Efficiency of the systems being replaced. *Determined at the CPA level*

new,y

Efficiency of the system being deployed as part of the project activity in year y, as determined using the Water Boiling Test (WBT) protocol. *Determined at the CPA level.*

Bold is calculated as follows:

$$B_{old} = B_{old,PP} * HH_{size} * LF(\text{Equation 6})$$

Where:

$B_{old,PP}$ Per capita quantity of woody biomass used in the absence of the project activity in tonnes. *Determined at the CPA level.*

HH_{size} Average household size in the CPA region. *Monitored*

LF Leakage factor, fixed at .95.

Calculation of Cross-Effects

AMSI.II.AV assumes a baseline water boiling practice on unimproved stoves that is mitigated by a water filter technology. AMSI.II.G assumes a baseline cooking fuel consumption on unimproved stoves that is reduced by a high efficiency stove technology. In order to eliminate cross-effects between these measures in households that utilize both technologies, the baseline fuel consumption on the unimproved stoves, CPAs that utilize both AMSI.II.AV and AMSI.II.G shall adjust B_{old} in order to eliminate potential cross-effects between these measures. This adjustment shall follow the procedure outlined below.

Step 1 – Determine baseline wood consumption per capita

Step 2 – Determine total litres of drinking water consumed per capita

Step 3 – Calculate the energy required to boil one litre of water (SEC). This calculation follows the process described in AMSI.II.AV for the calculation of SEC.

Step 4 – Calculate energy required to boil drinking water, by multiplying SEC (Step 3) by the total litres of drinking water (step 2). This calculation assumes that all drinking water is boiled in the baseline.

Step 5 – Calculate the per capita quantity of wood required to boil drinking water, by dividing per capita energy to boil water (step 4) by the NCV of the baseline fuel source.

Step 6 – Discount the per capita quantity of wood required to boil water by the fraction of the population that does not boil water in the baseline, by multiplying the per capita quantity of wood required to boil water (step 5) by the fraction of the population that boils water in the baseline (as determined by a survey in the project area).

Step 7 – Subtract per capita quantity of wood required to boil water (step 6) from per capita wood consumption (Step 1).

Through this calculation, cross effects are eliminated from CPAs implemented under this PoA.

Step 1 - Determine baseline wood consumption per capita (incl. cooking & water treatment)		Source
377.60	Per capita baseline wood consumption (kg), incl water treatment	Literature
Step 2 - Determine Total Litres Drinking Water Consumed per capita in project area		-
1.16	litres of drinking water consumed per person per day	Survey conducted by CME

421.74	total litres per year	Calculated
Step 3 - Calculation of energy required to boil one litre of water		-
4.19	Specific heat of water	Default Value in AMS-III.AV
100.00	Final temperature of water	Default Value in AMS-III.AV
20.00	Initial temperature of water	Default Value in AMS-III.AV
2260.00	Latent heat of water evaporation	Default Value in AMS-III.AV
0.10	Efficiency of water boiling system being replaced	Survey conducted by CME
3574.80	Specific energy consumption (kJ/L)	Calculated
Step 4 - Calculation of energy required to boil water (if all water was boiled)		-
0.00	Energy to boil water per year (TJ), if all water is boiled	Calculated
Step 5 - Calculation of tonnes wood required to boil water (if all water was boiled)		-
0.02	NCV biomass (TJ/tonne)	IPCC default value
100.51	Total biomass (kg) to boil water per year, if all drinking water is boiled	Calculated
Step 6 - Adjust for suppressed demand		-
0.38	Fraction of population that boils water in baseline	Survey conducted by CME
161.95	Average drinking water boiled per person (Litres)	Calculated
38.60	Total biomass (kg) consumed in baseline for water treatment	Calculated
Step 7 - Adjust baseline per-capita wood consumption for cross effects		-
339.00	Per capita biomass consumption, excl water treatment.	Calculated
Step 8 - Calculate total HH wood consumption (excl. water treatment) in project area		-
4.84	Avg HH size in project area	Survey conducted by CME
1639.90	Cross-effects adjusted wood consumption in baseline area (kg)	Calculated

J.2. All households received a stove and filter. However, some households did not utilize the filter. The cross-effects adjustment was only applied to households that were found to utilize both filters and cookstoves, as determined by the monitored parameter OC_{y,i}. Calculation of project emissions or actual net GHG removals by sinks

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The Lifestraw Family water filter distributed under all CPAs during this monitoring period works uses gravity filtration, and does not involve consumption of fossil fuels or electricity. Therefore, project emissions are 0.

AMS-II.G describes the calculation of emission reductions, and does not require estimation of project emissions separately from baseline emissions. The emission reduction calculation methodology is described in section H.1 above.

J.3. Calculation of leakage

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As established in the monitoring plan, leakage is accounted for through the application of a net to gross adjustment factor of 0.95.

J.4. Summary of calculation of GHG emission reductions or net GHG removals by sinks

Water Filter Summary

Specific-case CPA reference number	Baseline emissions or baseline net GHG removals by sinks (tCO ₂ e)	Project emissions or actual net GHG removals by sinks (tCO ₂ e)	Leakage (tCO ₂ e)	GHG emission reductions or net GHG removals by sinks (tCO ₂ e) achieved in the monitoring period		
				Up to 31/12/2012	From 01/01/2013	Total amount
CPA001	6235	0	312	0	5923	5923
CPA002	8572	0	429	0	8143	8143
CPA003	10554	0	528	0	10026	10026
CPA004	6325	0	317	0	6008	6008
CPA005	8227	0	412	0	7815	7815
CPA006	9939	0	497	0	9442	9442
CPA007	9605	0	481	0	9124	9124
CPA008	0	0	0	0	0	0
CPA009	0	0	0	0	0	0
CPA010	0	0	0	0	0	0
CPA011	0	0	0	0	0	0
CPA012	0	0	0	0	0	0
CPA013	0	0	0	0	0	0
CPA014	0	0	0	0	0	0
CPA015	0	0	0	0	0	0
CPA016	0	0	0	0	0	0
Total	59457	0	2976	0	56481	56481

Stove Summary

Specific-case CPA reference number	Baseline emissions or baseline net GHG removals by sinks (tCO ₂ e)	Project emissions or actual net GHG removals by sinks (tCO ₂ e)	Leakage (tCO ₂ e)	GHG emission reductions or net GHG removals by sinks (tCO ₂ e) achieved in the monitoring period		
				Up to 31/12/2012	From 01/01/2013	Total amount
CPA001	16357	5552	542	0	10263	10263
CPA002	20339	7021	667	0	12651	12651
CPA003	25687	8829	844	0	16014	16014
CPA004	15487	5318	509	0	9660	9660
CPA005	20166	6923	663	0	12580	12580
CPA006	24815	8491	817	0	15507	15507
CPA007	23587	8094	776	0	14717	14717
	10740	3054	385	0	7301	7301
	6077	1728	218	0	4131	4131
	10388	2954	372	0	7062	7062
	3911	1112	140	0	2659	2659

	7172	2040	257	0	4875	4875
	6211	1766	223	0	4222	4222
	7873	2239	282	0	5352	5352
	7937	2257	285	0	5395	5395
	7718	2195	277	0	5246	5246
Total	146438	50228	4818	0	91392	91392

Total Summary

Specific-case CPA reference number	Baseline emissions or baseline net GHG removals by sinks (tCO ₂ e)	Project emissions or actual net GHG removals by sinks (tCO ₂ e)	Leakage (tCO ₂ e)	GHG emission reductions or net GHG removals by sinks (tCO ₂ e) achieved in the monitoring period		
				Up to 31/12/2012	From 01/01/2013	Total amount
CPA001	22592	5552	854	0	16186	16186
CPA002	28911	7021	1096	0	20794	20794
CPA003	36241	8829	1372	0	26040	26040
CPA004	21812	5318	826	0	15668	15668
CPA005	28393	6923	1075	0	20395	20395
CPA006	34754	8491	1314	0	24949	24949
CPA007	33192	8094	1257	0	23841	23841
CPA008	10740	3054	385	0	7301	7301
CPA009	6077	1728	218	0	4131	4131
CPA010	10388	2954	372	0	7062	7062
CPA011	3911	1112	140	0	2659	2659
CPA012	7172	2040	257	0	4875	4875
CPA013	6211	1766	223	0	4222	4222
CPA014	7873	2239	282	0	5352	5352
CPA015	7937	2257	285	0	5395	5395
CPA016	7718	2195	277	0	5246	5246
Total	205895	50228	7794	0	147873	147873

J.5. Comparison of GHG emission reductions or net GHG removals by sinks with estimates in the included CPA-DD(s)

Filter Comparison

Specific-case CPA reference number	Value estimated in ex ante calculation in the included CPA-DD(s)	Actual values achieved by the specific-case CPA(s) during this monitoring period
CPA001	30039	5923

CPA002	11826	8143
CPA003	14793	10026
CPA004	8642	6008
CPA005	11251	7815
CPA006	14549	9442
CPA007	13126	9124
CPA008	0	0
CPA009	0	0
CPA010	0	0
CPA011	0	0
CPA012	0	0
CPA013	0	0
CPA014	0	0
CPA015	0	0
CPA016	0	0
Total	104230	56481

Stove Comparison

Specific-case CPA reference number	Value estimated in ex ante calculation in the included CPA-DD(s)	Actual values achieved by the specific-case CPA(s) during this monitoring period
CPA001	57820	10263
CPA002	22764	12651
CPA003	28473	16014
CPA004	16635	9660
CPA005	21658	12580
CPA006	28004	15507
CPA007	25267	14717
CPA008	39140	7301
CPA009	36186	4131
CPA010	34888	7062
CPA011	28063	2659
CPA012	21959	4875
CPA013	22506	4222
CPA014	25818	5352
CPA015	25042	5395
CPA016	25038	5246
Total	459270	91392

Total Comparison

Specific-case CPA reference number	Value estimated in ex ante calculation in the included CPA-DD(s)	Actual values achieved by the specific-case CPA(s) during this monitoring period
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CPA001	87860	16186
CPA002	34591	20794
CPA003	43267	26040
CPA004	25277	15668
CPA005	32909	20395
CPA006	42554	24949
CPA007	38394	23841
CPA008	39140	7301
CPA009	36186	4131
CPA010	34888	7062
CPA011	28063	2659
CPA012	21959	4875
CPA013	22506	4222
CPA014	25818	5352
CPA015	25042	5395
CPA016	25038	5246
Total	563501	147873

J.6. Remarks on difference from the estimated value in the included CPA-DD(s)

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The actual emission reductions achieved during the monitoring period are less than anticipated in the registered CPA-DDs. This is due to the following factors:

1. The average HH size was estimated to be 5.41 in the CPA-DDs. The actual monitored value was 4.84 occupants.
2. Stove stacking (continued usage of baseline stove in the project scenario) was larger than anticipated in the CPA-DD. The registered value was 0%, compared to a monitored value of 22.14%.
3. WBTs determined the average stove efficiency to be 29.35% for Group 1, and **Error! Reference source not found.** compared to the starting value of 38.1%; the starting value was used to calculate emission reductions in the registered CPA-DD.

Appendix 1. Contact information of coordinating/managing entity and/or responsible persons/entities

Coordinating/managing entity and/or responsible person/entity	<input checked="" type="checkbox"/> Coordinating/managing entity <input type="checkbox"/> Person/entity responsible for completing the CDM-MR-FORM
Organization name	DelAgua Health Rwanda Limited
Street/P.O. Box	P.O. Box 1954
Building	Utexrwa Compound
City	Kigali
State/Region	
Postcode	
Country	Rwanda
Telephone	+250.788.300.360
Fax	
E-mail	james.beaumont@delaguahealth.com
Website	www.delaguahealth.com
Contact person	James Beaumont
Title	CEO
Salutation	Mr.
Last name	Beaumont
Middle name	
First name	James
Department	
Mobile	+44 7879 844899
Direct fax	
Direct tel.	
Personal e-mail	james.beaumont@delaguahealth.com

