Monitoring report form for CDM programme of activities (Version 03.0)

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

MONITORING REPORT		
Title of the PoA	Impact Carbon Global Safe Water Programme of Activities (PoA)	
UNFCCC reference number of the PoA	9948	
Version numbers of the PoA-DD applicable to this monitoring report	7.0	
Version number of this monitoring report	4.0	
Completion date of this monitoring report	19/03/2021	
Monitoring period number	Second monitoring period	
Duration of this monitoring period	23/05/2017 – 22/05/2019 (both days inclusive)	
Monitoring report number for this monitoring period	2	
Coordinating/managing entity	Impact Carbon	
Host Parties	Host Party of the PoA	Is this the host Party of a CPA covered in this monitoring report? (yes/no)
	Rwanda	No
	Uganda	Yes
	Nigeria	No
	Kenya	No
Applied methodologies and standardized baselines	Methodology: AMS-III.AV. Low greenhouse gas emitting safe drinking water production systems (Version 04.0) Standardized Baseline: Not applicable	
Sectoral scopes	3: Energy Demand	
Amount of GHG emission reductions or net anthropogenic GHG removals achieved by all CPAs covered in this monitoring report in this monitoring period	Amount achieved before 1 January 2013	Amount achieved from 1 January 2013
	0 tCO_2e	67,376 tCO_2e
Amount of GHG emission reductions or net anthropogenic GHG removals estimated ex ante for this monitoring period in the CPA-DDs for the CPAs covered in this monitoring report	668,756 tCO_2e	

PART I Monitoring of programme of activities (PoA)

SECTION A. Description of PoA

A.1. General description of PoA

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The purpose of the PoA is dissemination of low-carbon water purification technologies to households, communities, and institutions in Rwanda, Nigeria, Kenya and Uganda. Households throughout Rwanda, Uganda, Nigeria and Kenya lack access to reliably safe drinking water.

In Rwanda, only 36.8% of the population have access to piped water, with only 9.5% population having access to piped water within their homes[1]. Only 51.8% population uses an appropriate treatment method, with boiling being practiced by 47.0% population for water treatment[2]. 83.3% population uses wood or charcoal for cooking and boiling water[3].

In Nigeria, only 9.6% of the population have access to piped water, with only 2.8% population having access to piped water within their homes[4]. Only 4.9% population uses an appropriate treatment method with boiling being practiced by 2.6% population for water treatment[5]. 66.9% population uses wood or charcoal for cooking and boiling water[6].

In Kenya, only 43.6% of the population have access to piped water, with only 27.8% population having access to piped water within their homes[7]. Only 44.5% population uses an appropriate treatment method with boiling being practiced by 23.7% population for water treatment[8]. 73.3% population uses wood or charcoal for cooking and boiling water[9].

In Uganda, only 22.1% of the population have access to piped water, with only 8.1% population having access to piped water within their homes[10]. Only 44.1% population uses an appropriate treatment method with boiling being practiced by 38.3% population for water treatment [11]. 94.8% population uses wood or charcoal for cooking and boiling water[12].

Thus, the PoA by dissemination of low carbon, low cost water purification technologies aim to address the issue of lack of access to safe drinking water in target countries. In the absence of the project activity, the baseline scenario would be the use of non-renewable woody biomass / fossil fuels for boiling water to make it fit for drinking. The water purification systems (WPS), by replacing the use of non-renewable biomass/ fossil fuel for water boiling, reduce equivalent amount of greenhouse gases (GHG) emissions.

Impact Carbon is the Coordinating/Managing Entity (CME) of the PoA.

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[1] Rwanda Demographic and Health survey Report, March 2016, table 2.5

[2] Rwanda Demographic and Health survey Report, March 2016, table 2.5

[3] Rwanda Demographic and Health survey Report, March 2016, table 2.8

[4] Nigeria Demographic and Health survey Report, June 2014, table 2.1

[5] Nigeria Demographic and Health survey Report, June 2014, table 2.1

[6] Nigeria Demographic and Health survey Report, June 2014, table 2.3

[7] Kenya Demographic and Health survey Report, June 2014, table 2.1

[8] Kenya Demographic and Health survey Report, June 2014, table 2.1

[9] Kenya Demographic and Health survey Report, June 2014, table 2.3

[10] Uganda Demographic and Health survey Report, January 2018, table 2.1

[11] Uganda Demographic and Health survey Report, January 2018, table 2.1

[12] Uganda Demographic and Health survey Report, January 2018, table 2.4

A.1.1. Corresponding generic component project activities (CPAs)

Title and reference number of the corresponding generic CPA	Version of the PoA-DD	Sectoral scopes	Applied methodologies and standardized baselines
CPA type 1: Small-scale technologies for household water consumption, no project emissions Date: 18/04/2017	Version: 7.0	Sectoral scope 3: Energy demand	AMS-III.AV: "Low greenhouse gas emitting safe drinking water production systems" Version 04.0
CPA type 2: Technologies for Institutional water consumption, no project emissions Date: 18/04/2017	Version: 7.0	Sectoral scope 3: Energy demand	AMS-III.AV: "Low greenhouse gas emitting safe drinking water production systems" Version 04.0
CPA type 3: Technologies for institutional water consumption, with project emissions Date: 18/04/2017	Version: 7.0	Sectoral scope 3: Energy demand	AMS-III.AV: "Low greenhouse gas emitting safe drinking water production systems" Version 04.0
CPA type 4: Technologies for community water consumption, with no project emissions Date: 18/04/2017	Version: 7.0	Sectoral scope 3: Energy demand	AMS-III.AV: "Low greenhouse gas emitting safe drinking water production systems" Version 04.0
CPA type 5: Technologies for community water consumption, with project emissions Date: 18/04/2017	Version: 7.0	Sectoral scope 3: Energy demand	AMS-III.AV: "Low greenhouse gas emitting safe drinking water production systems" Version 04.0

A.1.2. CPAs included in the PoA

Title and UNFCCC reference number of the CPA	Version of the PoA-DD	Title and reference number of the corresponding generic CPA	Crediting period type and duration	Covered in this monitoring report? (yes/no)
Impact Carbon Global Safe Water Programme of Activities (PoA): CPA 1, Version: 3.0, Ref No.:9948-P1-0001-CP1	Version: 7.0	CPA type 2: Technologies for institutional water consumption,no project emissions	Renewable 30/05/2014 – 29/05/2021	No
Impact Carbon Global Safe Water Programme of Activities (PoA): CPA 2, Version: 3.0, 9948-P1-0002-CP1	Version: 7.0	CPA type 3: Technologies for institutional water consumption, with project emissions	Renewable 30/05/2014 – 29/05/2021	Yes
Impact Carbon Global Safe Water Programme of Activities (PoA): CPA 3, Version: 1.3, 9948-P1-0003-CP1	Version: 7.0	CPA type 3: Technologies for institutional water consumption, with project emissions	Renewable 23/05/2017 – 22/05/2024	No
Impact Carbon Global Safe Water Programme of Activities (PoA): CPA 4, Version: 01.2, 9948-P1-0004-CP1	Version: 7.0	CPA type 3: Technologies for institutional water consumption, with project emissions	Renewable 15/06/2017 – 14/06/2024	No
Impact Carbon Global Safe Water Programme of Activities (PoA): CPA 5, Version: 5.0, 9948-P1-0005-CP1	Version: 7.0	CPA type 2: Technologies for institutional water consumption,no project emissions	Renewable 04/10/2017 – 03/10/2024	No
Impact Carbon Global Safe Water Programme of Activities (PoA): CPA 6, Version: 5.0, 9948-P1-0006-CP1	Version: 7.0	CPA type 2: Technologies for institutional water consumption,no project emissions	Renewable 04/10/2017 – 03/10/2024	No

Impact Carbon Global Safe Water Programme of Activities (PoA): CPA 7, Version: 5.0, 9948-P1-0007-CP1	Version: 7.0	CPA type 2: Technologies for institutional water consumption,no project emissions	Renewable 04/10/2017 – 03/10/2024	No
Impact Carbon Global Safe Water Programme of Activities (PoA): CPA 8, Version: 5.0, 9948-P1-0008-CP1	Version: 7.0	CPA type 2: Technologies for institutional water consumption,no project emissions	Renewable 04/10/2017 – 03/10/2024	No
Impact Carbon Global Safe Water Programme of Activities (PoA): CPA 9, Version: 5.0, 9948-P1-0009-CP1	Version: 7.0	CPA type 2: Technologies for institutional water consumption,no project emissions	Renewable 04/10/2017 – 03/10/2024	No
Impact Carbon Global Safe Water Programme of Activities (PoA): CPA 10, Version: 5.0, 9948-P1-0010-CP1	Version: 7.0	CPA type 2: Technologies for institutional water consumption,no project emissions	Renewable 04/10/2017 – 03/10/2024	No
Impact Carbon Global Safe Water Programme of Activities (PoA): CPA 11, Version: 5.0, 9948-P1-0011-CP1	Version: 7.0	CPA type 2: Technologies for institutional water consumption,no project emissions	Renewable 04/10/2017 – 03/10/2024	No
Impact Carbon Global Safe Water Programme of Activities (PoA): CPA 12, Version: 5.0, 9948-P1-0012-CP1	Version: 7.0	CPA type 2: Technologies for institutional water consumption,no project emissions	Renewable 04/10/2017 – 03/10/2024	No
Impact Carbon Global Safe Water Programme of Activities (PoA): CPA 13, Version: 5.0, 9948-P1-0013-CP1	Version: 7.0	CPA type 2: Technologies for institutional water consumption,no project emissions	Renewable 04/10/2017 – 03/10/2024	No
Impact Carbon Global Safe Water Programme of Activities (PoA): CPA 14, Version: 1.0, 9948-P1-0014-CP1	Version: 7.0	CPA type 3: Technologies for institutional water consumption, with project emissions	Renewable 15/12/2017 – 14/12/2024	Yes
Impact Carbon Global Safe Water Programme of Activities (PoA): CPA 15, Version: 1.0, 9948-P1-0015-CP1	Version: 7.0	CPA type 3: Technologies for institutional water consumption, with project emissions	Renewable 15/12/2017 – 14/12/2024	Yes
Impact Carbon Global Safe Water Programme of Activities (PoA): CPA 16, Version: 5.0, 9948-P1-0016-CP1	Version: 7.0	CPA type 2: Technologies for institutional water consumption,no project emissions	Renewable 15/12/2017 – 14/12/2024	Yes
Impact Carbon Global Safe Water Programme of Activities (PoA): CPA 17, Version: 5.0, 9948-P1-0017-CP1	Version: 7.0	CPA type 2: Technologies for institutional water consumption,no project emissions	Renewable 15/12/2017 – 14/12/2024	Yes
Impact Carbon Global Safe Water Programme of Activities (PoA): CPA 18, Version: 5.0, 9948-P1-0018-CP1	Version: 7.0	CPA type 2: Technologies for institutional water consumption,no project emissions	Renewable 15/12/2017 – 14/12/2024	Yes
Impact Carbon Global Safe Water Programme of Activities (PoA): CPA 19, Version: 5.0, 9948-P1-0019-CP1	Version: 7.0	CPA type 2: Technologies for institutional water consumption,no project emissions	Renewable 15/12/2017 – 14/12/2024	Yes
Impact Carbon Global Safe	Version: 7.0	CPA type 2: Technologies for	Renewable	Yes

Water Programme of Activities (PoA): CPA 20, Version: 5.0, 9948-P1-0020-CP1		institutional water consumption,no project emissions	15/12/2017 – 14/12/2024	
Impact Carbon Global Safe Water Programme of Activities (PoA): CPA 21, Version: 5.0, 9948-P1-0021-CP1	Version: 7.0	CPA type 2: Technologies for institutional water consumption,no project emissions	Renewable 15/12/2017 – 14/12/2024	Yes
Impact Carbon Global Safe Water Programme of Activities (PoA): CPA 22, Version: 5.0, 9948-P1-0022-CP1	Version: 7.0	CPA type 2: Technologies for institutional water consumption,no project emissions	Renewable 15/12/2017 – 14/12/2024	Yes
Impact Carbon Global Safe Water Programme of Activities (PoA): CPA 23, Version: 4.0, 9948-P1-0023-CP1	Version: 7.0	CPA type 2: Technologies for institutional water consumption,no project emissions	Renewable 18/11/2018 – 17/11/2025	No
Impact Carbon Global Safe Water Programme of Activities (PoA): CPA 24, Version: 4.0, 9948-P1-0024-CP1	Version: 7.0	CPA type 2: Technologies for institutional water consumption,no project emissions	Renewable 18/11/2018 – 17/11/2025	No
Impact Carbon Global Safe Water Programme of Activities (PoA): CPA 25, Version: 4.0, 9948-P1-0025-CP1	Version: 7.0	CPA type 2: Technologies for institutional water consumption,no project emissions	Renewable 18/11/2018 – 17/11/2025	No
Impact Carbon Global Safe Water Programme of Activities (PoA): CPA 26, Version: 4.0, 9948-P1-0026-CP1	Version: 7.0	CPA type 2: Technologies for institutional water consumption,no project emissions	Renewable 18/11/2018 – 17/11/2025	No
Impact Carbon Global Safe Water Programme of Activities (PoA): CPA 27, Version: 4.0, 9948-P1-0027-CP1	Version: 7.0	CPA type 2: Technologies for institutional water consumption,no project emissions	Renewable 18/11/2018 – 17/11/2025	No
Impact Carbon Global Safe Water Programme of Activities (PoA): CPA 28, Version: 4.0, 9948-P1-0028-CP1	Version: 7.0	CPA type 2: Technologies for institutional water consumption,no project emissions	Renewable 18/11/2018 – 17/11/2025	No
Impact Carbon Global Safe Water Programme of Activities (PoA): CPA 29, Version: 4.0, 9948-P1-0029-CP1	Version: 7.0	CPA type 2: Technologies for institutional water consumption,no project emissions	Renewable 18/11/2018 – 17/11/2025	No
Impact Carbon Global Safe Water Programme of Activities (PoA): CPA 30, Version: 4.0, 9948-P1-0030-CP1	Version: 7.0	CPA type 2: Technologies for institutional water consumption,no project emissions	Renewable 18/11/2018 – 17/11/2025	No
Impact Carbon Global Safe Water Programme of Activities (PoA): CPA 31, Version: 4.0, 9948-P1-0031-CP1	Version: 7.0	CPA type 2: Technologies for institutional water consumption,no project emissions	Renewable 18/11/2018 – 17/11/2025	No
Impact Carbon Global Safe Water Programme of Activities (PoA): CPA 32, Version: 4.0, 9948-P1-0032-CP1	Version: 7.0	CPA type 2: Technologies for institutional water consumption,no project emissions	Renewable 18/11/2018 – 17/11/2025	No
Impact Carbon Global Safe Water Programme of Activities	Version: 7.0	CPA type 2: Technologies for institutional water	Renewable 18/11/2018 –	No

(PoA): CPA 33, Version: 4.0, 9948-P1-0033-CP1		consumption,no project emissions	17/11/2025	
Impact Carbon Global Safe Water Programme of Activities (PoA): CPA 34, Version: 4.0, 9948-P1-0034-CP1	Version: 7.0	CPA type 2: Technologies for institutional water consumption,no project emissions	Renewable 18/11/2018 – 17/11/2025	No
Impact Carbon Global Safe Water Programme of Activities (PoA): CPA 35, Version: 4.0, 9948-P1-0035-CP1	Version: 7.0	CPA type 2: Technologies for institutional water consumption,no project emissions	Renewable 18/11/2018 – 17/11/2025	No
Impact Carbon Global Safe Water Programme of Activities (PoA): CPA 36, Version: 4.0, 9948-P1-0036-CP1	Version: 7.0	CPA type 2: Technologies for institutional water consumption,no project emissions	Renewable 18/11/2018 – 17/11/2025	No
Impact Carbon Global Safe Water Programme of Activities (PoA): CPA 37, Version: 4.0, 9948-P1-0037-CP1	Version: 7.0	CPA type 2: Technologies for institutional water consumption,no project emissions	Renewable 18/11/2018 – 17/11/2025	No
Impact Carbon Global Safe Water Programme of Activities (PoA): CPA 38 supported by Republic of Korea, Version: 2.0, 9948-P1-0038-CP1	Version: 7.0	CPA type 2: Technologies for institutional water consumption,no project emissions	Renewable 26/04/2019 – 25/04/2026	No
Impact Carbon Global Safe Water Programme of Activities (PoA): CPA 39 supported by Republic of Korea, Version: 2.0, 9948-P1-0039-CP1	Version: 7.0	CPA type 2: Technologies for institutional water consumption,no project emissions	Renewable 26/04/2019 – 25/04/2026	No
Impact Carbon Global Safe Water Programme of Activities (PoA): CPA 40 supported by Republic of Korea, Version: 2.0, 9948-P1-0040-CP1	Version: 7.0	CPA type 2: Technologies for institutional water consumption,no project emissions	Renewable 26/04/2019 – 25/04/2026	No
Impact Carbon Global Safe Water Programme of Activities (PoA): CPA 41 supported by Republic of Korea, Version: 2.0, 9948-P1-0041-CP1	Version: 7.0	CPA type 2: Technologies for institutional water consumption,no project emissions	Renewable 26/04/2019 – 25/04/2026	No
Impact Carbon Global Safe Water Programme of Activities (PoA): CPA 42 supported by Republic of Korea, Version: 2.0, 9948-P1-0042-CP1	Version: 7.0	CPA type 2: Technologies for institutional water consumption,no project emissions	Renewable 26/04/2019 – 25/04/2026	No
Impact Carbon Global Safe Water Programme of Activities (PoA): CPA 43 supported by Republic of Korea, Version: 1.0, 9948-P1-0043-CP1	Version: 7.0	CPA type 2: Technologies for institutional water consumption,no project emissions	Renewable 26/04/2019 – 25/04/2026	No
Impact Carbon Global Safe Water Programme of Activities (PoA): CPA 44 supported by Republic of Korea, Version: 1.0, 9948-P1-0044-CP1	Version: 7.0	CPA type 2: Technologies for institutional water consumption,no project emissions	Renewable 26/04/2019 – 25/04/2026	No
Impact Carbon Global Safe	Version: 7.0	CPA type 2: Technologies for	Renewable	No

Water Programme of Activities (PoA): CPA 45 supported by Republic of Korea, Version: 1.0, 9948-P1-0045-CP1		institutional water consumption,no project emissions	26/04/2019 – 25/04/2026	
Impact Carbon Global Safe Water Programme of Activities (PoA): CPA 46 supported by Republic of Korea, Version: 1.0, 9948-P1-0046-CP1	Version: 7.0	CPA type 2: Technologies for institutional water consumption,no project emissions	Renewable 26/04/2019 – 25/04/2026	No
Impact Carbon Global Safe Water Programme of Activities (PoA): CPA 47 supported by Republic of Korea, Version: 1.0, 9948-P1-0047-CP1	Version: 7.0	CPA type 2: Technologies for institutional water consumption,no project emissions	Renewable 26/04/2019 – 25/04/2026	No
Impact Carbon Global Safe Water Programme of Activities (PoA): CPA 48 supported by Republic of Korea, Version: 1.0, 9948-P1-0048-CP1	Version: 7.0	CPA type 2: Technologies for institutional water consumption,no project emissions	Renewable 26/04/2019 – 25/04/2026	No
Impact Carbon Global Safe Water Programme of Activities (PoA): CPA 49 supported by Republic of Korea, Version: 1.0, 9948-P1-0049-CP1	Version: 7.0	CPA type 2: Technologies for institutional water consumption,no project emissions	Renewable 26/04/2019 – 25/04/2026	No
Impact Carbon Global Safe Water Programme of Activities (PoA): CPA 50 supported by Republic of Korea, Version: 1.0, 9948-P1-0050-CP1	Version: 7.0	CPA type 2: Technologies for institutional water consumption,no project emissions	Renewable 26/04/2019 – 25/04/2026	No
Impact Carbon Global Safe Water Programme of Activities (PoA): CPA 51 supported by Republic of Korea, Version: 1.0, 9948-P1-0051-CP1	Version: 7.0	CPA type 2: Technologies for institutional water consumption,no project emissions	Renewable 26/04/2019 – 25/04/2026	No
Impact Carbon Global Safe Water Programme of Activities (PoA): CPA 52 supported by Republic of Korea, Version: 1.0, 9948-P1-0052-CP1	Version: 7.0	CPA type 2: Technologies for institutional water consumption,no project emissions	Renewable 26/04/2019 – 25/04/2026	No
Impact Carbon Global Safe Water Programme of Activities (PoA): CPA 53 supported by Republic of Korea, Version: 1.0, 9948-P1-0053-CP1	Version: 7.0	CPA type 2: Technologies for institutional water consumption,no project emissions	Renewable 26/04/2019 – 25/04/2026	No
Impact Carbon Global Safe Water Programme of Activities (PoA): CPA 54 supported by Republic of Korea, Version: 1.0, 9948-P1-0054-CP1	Version: 7.0	CPA type 2: Technologies for institutional water consumption,no project emissions	Renewable 26/04/2019 – 25/04/2026	No
Impact Carbon Global Safe Water Programme of Activities (PoA): CPA 55 supported by Republic of Korea, Version: 1.0, 9948-P1-0055-CP1	Version: 7.0	CPA type 2: Technologies for institutional water consumption,no project emissions	Renewable 26/04/2019 – 25/04/2026	No

Impact Carbon Global Safe Water Programme of Activities (PoA): CPA 56 supported by Republic of Korea, Version: 1.0, 9948-P1-0056-CP1	Version: 7.0	CPA type 2: Technologies for institutional water consumption,no project emissions	Renewable 26/04/2019 – 25/04/2026	No
Impact Carbon Global Safe Water Programme of Activities (PoA): CPA 57 supported by Republic of Korea, Version: 1.0, 9948-P1-0057-CP1	Version: 7.0	CPA type 2: Technologies for institutional water consumption,no project emissions	Renewable 26/04/2019 – 25/04/2026	No
Impact Carbon Global Safe Water Programme of Activities (PoA): CPA 58 supported by Republic of Korea, Version: 1.0, 9948-P1-0058-CP1	Version: 7.0	CPA type 2: Technologies for institutional water consumption,no project emissions	Renewable 26/04/2019 – 25/04/2026	No
Impact Carbon Global Safe Water Programme of Activities (PoA): CPA 59 supported by Republic of Korea, Version: 1.0, 9948-P1-0059-CP1	Version: 7.0	CPA type 2: Technologies for institutional water consumption,no project emissions	Renewable 26/04/2019 – 25/04/2026	No
Impact Carbon Global Safe Water Programme of Activities (PoA): CPA 60 supported by Republic of Korea, Version: 1.0, 9948-P1-0060-CP1	Version: 7.0	CPA type 2: Technologies for institutional water consumption,no project emissions	Renewable 26/04/2019 – 25/04/2026	No
Impact Carbon Global Safe Water Programme of Activities (PoA): CPA 61 supported by Republic of Korea, Version: 1.0, 9948-P1-0061-CP1	Version: 7.0	CPA type 2: Technologies for institutional water consumption,no project emissions	Renewable 26/04/2019 – 25/04/2026	No
Impact Carbon Global Safe Water Programme of Activities (PoA): CPA 62 supported by Republic of Korea, Version: 1.0, 9948-P1-0062-CP1	Version: 7.0	CPA type 2: Technologies for institutional water consumption,no project emissions	Renewable 26/04/2019 – 25/04/2026	No
Impact Carbon Global Safe Water Programme of Activities (PoA): CPA 63 supported by Republic of Korea, Version: 1.0, 9948-P1-0063-CP1	Version: 7.0	CPA type 2: Technologies for institutional water consumption,no project emissions	Renewable 26/04/2019 – 25/04/2026	No
Impact Carbon Global Safe Water Programme of Activities (PoA): CPA 64 supported by Republic of Korea, Version: 1.0, 9948-P1-0064-CP1	Version: 7.0	CPA type 2: Technologies for institutional water consumption,no project emissions	Renewable 26/04/2019 – 25/04/2026	No
Impact Carbon Global Safe Water Programme of Activities (PoA): CPA 65 supported by Republic of Korea, Version: 1.0, 9948-P1-0065-CP1	Version: 7.0	CPA type 2: Technologies for institutional water consumption,no project emissions	Renewable 26/04/2019 – 25/04/2026	No
Impact Carbon Global Safe Water Programme of Activities (PoA): CPA 66 supported by Republic of Korea, Version:	Version: 7.0	CPA type 2: Technologies for institutional water consumption,no project emissions	Renewable 26/04/2019 – 25/04/2026	No

1.0, 9948-P1-0066-CP1				
Impact Carbon Global Safe Water Programme of Activities (PoA): CPA 67 supported by Republic of Korea, Version: 1.0, 9948-P1-0067-CP1	Version: 7.0	CPA type 2: Technologies for institutional water consumption,no project emissions	Renewable 26/04/2019 – 25/04/2026	No
Impact Carbon Global Safe Water Programme of Activities (PoA): CPA 68 supported by Republic of Korea, Version: 1.0, 9948-P1-0068-CP1	Version: 7.0	CPA type 2: Technologies for institutional water consumption,no project emissions	Renewable 26/04/2019 – 25/04/2026	No
Impact Carbon Global Safe Water Programme of Activities (PoA): CPA 69 supported by Republic of Korea, Version: 1.0, 9948-P1-0069-CP1	Version: 7.0	CPA type 2: Technologies for institutional water consumption,no project emissions	Renewable 26/04/2019 – 25/04/2026	No
Impact Carbon Global Safe Water Programme of Activities (PoA): CPA 70 supported by Republic of Korea, Version: 1.0, 9948-P1-0070-CP1	Version: 7.0	CPA type 2: Technologies for institutional water consumption,no project emissions	Renewable 26/04/2019 – 25/04/2026	No
Impact Carbon Global Safe Water Programme of Activities (PoA): CPA 71 supported by Republic of Korea, Version: 1.0, 9948-P1-0071-CP1	Version: 7.0	CPA type 2: Technologies for institutional water consumption,no project emissions	Renewable 26/04/2019 – 25/04/2026	No
Impact Carbon Global Safe Water Programme of Activities (PoA): CPA 72 supported by Republic of Korea, Version: 1.0, 9948-P1-0072-CP1	Version: 7.0	CPA type 2: Technologies for institutional water consumption,no project emissions	Renewable 26/04/2019 – 25/04/2026	No
Impact Carbon Global Safe Water Programme of Activities (PoA): CPA 73 supported by Republic of Korea, Version: 1.0, 9948-P1-0073-CP1	Version: 7.0	CPA type 2: Technologies for institutional water consumption,no project emissions	Renewable 26/04/2019 – 25/04/2026	No
Impact Carbon Global Safe Water Programme of Activities (PoA): CPA 74 supported by Republic of Korea, Version: 1.0, 9948-P1-0074-CP1	Version: 7.0	CPA type 2: Technologies for institutional water consumption,no project emissions	Renewable 26/04/2019 – 25/04/2026	No
Impact Carbon Global Safe Water Programme of Activities (PoA): CPA 75 supported by Republic of Korea, Version: 1.0, 9948-P1-0075-CP1	Version: 7.0	CPA type 2: Technologies for institutional water consumption,no project emissions	Renewable 26/04/2019 – 25/04/2026	No
Impact Carbon Global Safe Water Programme of Activities (PoA): CPA 76 supported by Republic of Korea, Version: 1.0, 9948-P1-0076-CP1	Version: 7.0	CPA type 2: Technologies for institutional water consumption,no project emissions	Renewable 26/04/2019 – 25/04/2026	No
Impact Carbon Global Safe Water Programme of Activities (PoA): CPA 77 supported by	Version: 7.0	CPA type 2: Technologies for institutional water consumption,no project	Renewable 26/04/2019 – 25/04/2026	No

Republic of Korea, Version: 1.0, 9948-P1-0077-CP1		emissions		
Impact Carbon Global Safe Water Programme of Activities (PoA): CPA 78 supported by Republic of Korea, Version: 1.0, 9948-P1-0078-CP1	Version: 7.0	CPA type 2: Technologies for institutional water consumption,no project emissions	Renewable 26/04/2019 – 25/04/2026	No
Impact Carbon Global Safe Water Programme of Activities (PoA): CPA 79 supported by Republic of Korea, Version: 1.0, 9948-P1-0079-CP1	Version: 7.0	CPA type 2: Technologies for institutional water consumption,no project emissions	Renewable 26/04/2019 – 25/04/2026	No
Impact Carbon Global Safe Water Programme of Activities (PoA): CPA 80 supported by Republic of Korea, Version: 1.0, 9948-P1-0080-CP1	Version: 7.0	CPA type 2: Technologies for institutional water consumption,no project emissions	Renewable 26/04/2019 – 25/04/2026	No
Impact Carbon Global Safe Water Programme of Activities (PoA): CPA 81 supported by Republic of Korea, Version: 1.0, 9948-P1-0081-CP1	Version: 7.0	CPA type 2: Technologies for institutional water consumption,no project emissions	Renewable 26/04/2019 – 25/04/2026	No
Impact Carbon Global Safe Water Programme of Activities (PoA): CPA 82 supported by Republic of Korea, Version: 1.0, 9948-P1-0082-CP1	Version: 7.0	CPA type 2: Technologies for institutional water consumption,no project emissions	Renewable 26/04/2019 – 25/04/2026	No
Impact Carbon Global Safe Water Programme of Activities (PoA): CPA 83 supported by Republic of Korea, Version: 1.0, 9948-P1-0083-CP1	Version: 7.0	CPA type 2: Technologies for institutional water consumption,no project emissions	Renewable 26/04/2019 – 25/04/2026	No
Impact Carbon Global Safe Water Programme of Activities (PoA): CPA 84 supported by Republic of Korea, Version: 1.0, 9948-P1-0084-CP1	Version: 7.0	CPA type 2: Technologies for institutional water consumption,no project emissions	Renewable 26/04/2019 – 25/04/2026	No
Impact Carbon Global Safe Water Programme of Activities (PoA): CPA 85 supported by Republic of Korea, Version: 1.0, 9948-P1-0085-CP1	Version: 7.0	CPA type 2: Technologies for institutional water consumption,no project emissions	Renewable 26/04/2019 – 25/04/2026	No
Impact Carbon Global Safe Water Programme of Activities (PoA): CPA 86 supported by Republic of Korea, Version: 1.0, 9948-P1-0086-CP1	Version: 7.0	CPA type 2: Technologies for institutional water consumption,no project emissions	Renewable 26/04/2019 – 25/04/2026	No
Impact Carbon Global Safe Water Programme of Activities (PoA): CPA 87 supported by Republic of Korea, Version: 1.0, 9948-P1-0087-CP1	Version: 7.0	CPA type 2: Technologies for institutional water consumption,no project emissions	Renewable 26/04/2019 – 25/04/2026	No
Impact Carbon Global Safe Water Programme of Activities	Version: 7.0	CPA type 2: Technologies for institutional water	Renewable 26/04/2019 –	No

(PoA): CPA 88 supported by Republic of Korea, Version: 1.0, 9948-P1-0088-CP1		consumption,no project emissions	25/04/2026	
Impact Carbon Global Safe Water Programme of Activities (PoA): CPA 89 supported by Republic of Korea, Version: 1.0, 9948-P1-0089-CP1	Version: 7.0	CPA type 2: Technologies for institutional water consumption,no project emissions	Renewable 26/04/2019 – 25/04/2026	No
Impact Carbon Global Safe Water Programme of Activities (PoA): CPA 90 supported by Republic of Korea, Version: 1.0, 9948-P1-0090-CP1	Version: 7.0	CPA type 2: Technologies for institutional water consumption,no project emissions	Renewable 26/04/2019 – 25/04/2026	No
Impact Carbon Global Safe Water Programme of Activities (PoA): CPA 91 supported by Republic of Korea, Version: 1.0, 9948-P1-0091-CP1	Version: 7.0	CPA type 2: Technologies for institutional water consumption,no project emissions	Renewable 26/04/2019 – 25/04/2026	No
Impact Carbon Global Safe Water Programme of Activities (PoA): CPA 92 supported by Republic of Korea, Version: 1.0, 9948-P1-0092-CP1	Version: 7.0	CPA type 2: Technologies for institutional water consumption,no project emissions	Renewable 26/04/2019 – 25/04/2026	No
Impact Carbon Global Safe Water Programme of Activities (PoA): CPA 93 supported by Republic of Korea, Version: 1.0, 9948-P1-0093-CP1	Version: 7.0	CPA type 2: Technologies for institutional water consumption,no project emissions	Renewable 26/04/2019 – 25/04/2026	No
Impact Carbon Global Safe Water Programme of Activities (PoA): CPA 94 supported by Republic of Korea, Version: 1.0, 9948-P1-0094-CP1	Version: 7.0	CPA type 2: Technologies for institutional water consumption,no project emissions	Renewable 26/04/2019 – 25/04/2026	No
Impact Carbon Global Safe Water Programme of Activities (PoA): CPA 95 supported by Republic of Korea, Version: 1.0, 9948-P1-0095-CP1	Version: 7.0	CPA type 2: Technologies for institutional water consumption,no project emissions	Renewable 26/04/2019 – 25/04/2026	No
Impact Carbon Global Safe Water Programme of Activities (PoA): CPA 96 supported by Republic of Korea, Version: 1.0, 9948-P1-0096-CP1	Version: 7.0	CPA type 2: Technologies for institutional water consumption,no project emissions	Renewable 26/04/2019 – 25/04/2026	No
Impact Carbon Global Safe Water Programme of Activities (PoA): CPA 97 supported by Republic of Korea, Version: 1.0, 9948-P1-0097-CP1	Version: 7.0	CPA type 2: Technologies for institutional water consumption,no project emissions	Renewable 26/04/2019 – 25/04/2026	No
Impact Carbon Global Safe Water Programme of Activities (PoA): CPA 98 supported by Republic of Korea, Version: 1.0, 9948-P1-0098-CP1	Version: 7.0	CPA type 2: Technologies for institutional water consumption,no project emissions	Renewable 26/04/2019 – 25/04/2026	No
Impact Carbon Global Safe	Version: 7.0	CPA type 2: Technologies for	Renewable	No

Water Programme of Activities (PoA): CPA 99 supported by Republic of Korea, Version: 1.0, 9948-P1-0099-CP1		institutional water consumption,no project emissions	26/04/2019 – 25/04/2026	
Impact Carbon Global Safe Water Programme of Activities (PoA): CPA 100 supported By Republic of Korea, Version: 1.0, 9948-P1-0100-CP1	Version: 7.0	CPA type 2: Technologies for institutional water consumption,no project emissions	Renewable 26/04/2019 – 25/04/2026	No
Impact Carbon Global Safe Water Programme of Activities (PoA): CPA 101 supported By Republic of Korea, Version: 1.0, 9948-P1-0101-CP1	Version: 7.0	CPA type 2: Technologies for institutional water consumption,no project emissions	Renewable 26/04/2019 – 25/04/2026	No
Impact Carbon Global Safe Water Programme of Activities (PoA): CPA 102 supported By Republic of Korea, Version: 1.0, 9948-P1-0102-CP1	Version: 7.0	CPA type 2: Technologies for institutional water consumption,no project emissions	Renewable 26/04/2019 – 25/04/2026	No

A.2. Coordinating/managing entity

>>
Impact Carbon

SECTION B. Implementation of PoA

B.1. Description of implemented PoA

>>

1. Operational and Management Framework

Impact Carbon is the Coordinating and Managing Entity (CME) for the PoA and Impact Water is CPA Implementer of the CPAs. The Implementation of the PoA followed the following management system:

1. The CME / CPA implementer (CPAI) provided guidance / training / instructions to local sales and distribution partner (SDP) to collect requisite sales / installation data. The SDP sales staff compiled the list of units installed / distributed along with other required information and transferred the same to the electronic database management system at regular intervals managed by CME / CPAI.

2. The SDP operated and managed the electronic database with information on units installed / distributed under the CPAs, as received from the sales staff. The electronic database contains the following information for each installation / distribution:
   - Type of system (UltraFLO / Multi-barrier UV)
   - Unique serial number of the units installed / distributed
   - Date of installation / distribution
   - Address and details of institute and contact detail (if available) of representative
   - Type of Institute (Boarding / Non-boarding)
   - Institute population count (number of students(people) / staff in boarding / non-boarding category)

3. The CME / CPAI ensured that end users (institute) are aware of, and have agreed, that their unit (Ultra Flo / Multi-barrier UV) is being subscribed to the PoA through informational material, trainings, social media and in contractual agreements.

4. The CME / CPAI ensured that there is no double counting of any unit in the electronic database by means of unique serial number (product ID) associated with each unit.

5. The CME / CPAI coordinated all ex-post monitoring activities in the PoA. The CME / CPAI:
   - Implemented the monitoring plan,
   - Determined the sample size as per sampling plan and identified the samples to be monitored (a single sampling plan has been applied to CPA 9948-P1-0002-CP1, 9948-P1-0014-CP1 to 9948-P1-0022-CP1 as detailed in section E.3 below)
   - Provided monitoring templates and training to the SDP for field monitoring

6. SDP recorded the following key parameters in a CPA Monitoring Record as per templates provided by CME /CPAI. Key monitored parameters were:
   - Operational Status of sampled WPS (in use / out of use)
   - Output Water Quality of sampled WPS units (Safe / unsafe)
   - Presence of safe public distribution network

7. The CME / CPAI, with support from external experts, checked and reviewed the monitoring data and calculated the emission reductions based on precision / reliability levels achieved for the monitored parameters prepared the monitoring report.

2. Sampling Approach

A single sampling plan has been carried out for CPA 9948-P1-0002-CP1, 9948-P1-0014-CP1 to 9948-P1-0022-CP1. For more detail, refer section E.3 below.

B.2. Post-registration changes to PoA

B.2.1. Corrections

>>
N/A

B.2.2. Inclusion of monitoring plan

>>
N/A

B.2.3. Permanent changes to the registered monitoring plan, or permanent deviation of monitoring from the applied methodologies, standardized baselines, or other methodological regulatory documents

>>
N/A

B.2.4. Changes to programme design

>>
Two changes to the programme design have been made to the registered PoA and approved prior to end of this monitoring period.

PRC request number	Approval Status	Date of Approval	Description
PRC-9948-002	Approved	03 Jul 17	Expansion of PoA Boundary to include Host Country Nigeria
PRC-9948-001	Approved	08 May 17	Expansion of PoA Boundary to include Host Country Kenya

B.2.5. Changes specific to afforestation or reforestation activities

>>
N/A

PART II Monitoring of CPAs

>>

This Monitoring report covers 10 CPAs in Uganda (from 9948-P1-0002-CP1, 9948-P1-0014-CP1 to 9948-P1-0022-CP1), as listed in section A.1.2. These 10 CPAs are deemed homogeneous due to the following:

1. Have the same project boundary/country (i.e. Uganda)
2. End users of the project technology/equipment have comparable socioeconomic conditions (institution)

Thus, these CPAs have been sub-grouped for monitoring purposes. The following sections of the monitoring report present information pertaining to these 10 CPAs only.

SECTION C. Implementation of CPAs

C.1. Description of implemented CPAs

>>

a) Purpose of the specific-case CPA(s) and the measures taken for GHG emission reductions or net GHG removals by sinks –

Purpose: The CPAs involve installation / distribution of Chlorination based WPS (UltraFLO) and Ultraviolet disinfection based WPS (Multi-barrier UV) for use by institutions in Uganda. The WPSs installed / distributed under the CPAs reduce dependency on the conventional water purification technique (i.e. boiling). Boiling water involves using non-renewable biomass (charcoal and fuelwood) based traditional cook stoves (unimproved) or fossil fuel (coal, kerosene) based stoves. Transition to the project WPSs reduces greenhouse gas emissions by avoidance of non-renewable / fossil fuel for boiling water in the baseline.

b) Description of the technology employed and installed equipment and/or infrastructure

The CPAs involve following two types of WPS.

Description	**UltraFlo** 	**Multi-barrier UV** 
Size / Dimensions	Cartridge Length: ~12 cm Cartridge height: ~10 cm Cartridge circumference: ~22 cm	System Height: ~44cm System Length: ~36 cm System Width: ~19 cm
Application	Piped water	Piped water
Flow rate	20L/min	Small UV: 2-4 L/min Large UV:6-8 L/min
Capacity/lifespan	340,000 L / 5-year expiry	Small UV: 2,044,116 Large UV: 4,088,232
Fixed or Portable	Fixed	Fixed
Removal of E. Coli	99 (2-log)	99 (4-log)
Watts/Voltage	Not applicable	14

The distribution of units over this monitoring period, under the CPAs are as follows:

S.No.	CPA Reference No.	UltraFlo	Multi-barrier UV
1	9948-P1-0002-CP1	0	580
2	9948-P1-0014-CP1	0	184
3	9948-P1-0015-CP1	0	189
4	9948-P1-0016-CP1	12	0
5	9948-P1-0017-CP1	11	0
6	9948-P1-0018-CP1	11	0

S.No.	CPA Reference No.	UltraFlo	Multi-barrier UV
7	9948-P1-0019-CP1	11	0
8	9948-P1-0020-CP1	11	0
9	9948-P1-0021-CP1	11	0
10	9948-P1-0022-CP1	11	0
Total		**78**	**953**

c) Relevant dates for the specific-case CPA(s) (e.g. construction, commissioning, continued operation periods, etc.);

S.No.	CPA Reference No.	Date of installation of first unit in the CPA	Crediting Period Start date
1	9948-P1-0002-CP1	21/06/2014	30/05/2014
2	9948-P1-0014-CP1	01/12/2017	15/12/2017
3	9948-P1-0015-CP1	01/12/2017	15/12/2017
4	9948-P1-0016-CP1	14/06/2018	15/12/2017
5	9948-P1-0017-CP1	06/07/2018	15/12/2017
6	9948-P1-0018-CP1	18/07/2018	15/12/2017
7	9948-P1-0019-CP1	20/07/2018	15/12/2017
8	9948-P1-0020-CP1	26/07/2018	15/12/2017
9	9948-P1-0021-CP1	31/07/2018	15/12/2017
10	9948-P1-0022-CP1	08/08/2018	15/12/2017

d)Total GHG emission reductions or net GHG removals by sinks achieved in this monitoring period for the specific-case CPA(s), including information on how double counting is avoided

Each of the installed systems have a unique ID to avoid double counting. This ID is also mentioned in the Salesforce (the data management system in the PoA) along with the name, address, location and contact details of the institution / institution where the system is installed/distributed. This ensures that each WPS unit can be uniquely identified and double counting is avoided.

Serial No.	CPA Reference No.	Emission Reductions tCO_2e
1	9948-P1-0002-CP1	54,134
2	9948-P1-0014-CP1	5,943
3	9948-P1-0015-CP1	5,575
4	9948-P1-0016-CP1	280
5	9948-P1-0017-CP1	251
6	9948-P1-0018-CP1	210
7	9948-P1-0019-CP1	262
8	9948-P1-0020-CP1	232
9	9948-P1-0021-CP1	250
10	9948-P1-0022-CP1	239
Total		**67,376**

C.2. Location of CPAs

>>

The CPA covers the geographical boundary of Uganda. Uganda lies between 4°N and 2°S latitude and between 29° and 35°east longitude. The map of Uganda, for reference purpose, is as follows:

C.3. Post-registration changes to CPAs

C.3.1. Temporary deviations from the monitoring plans in the included CPA-DDs, applied methodologies, standardized baselines or other methodological regulatory documents

>>
N/A

C.3.2. Corrections

>>
PRC 9948-0003: Corrections were made in CPA 9948-0016 to CPA 9948-0022. The corrections were approved on 02/05/2019.
https://cdm.unfccc.int/PRCContainer/DB/prcp52130222/view

C.3.3. Changes to the start date of the crediting period

>>
N/A

C.3.4. Inclusion of monitoring plan

>>
N/A

C.3.5. Permanent changes to the included monitoring plans, or permanent deviation of monitoring from the applied methodologies, standardized baselines, or other methodological regulatory documents

>>
N/A

C.3.6. Changes to project design

>>
PRC 9948-0003: Changes to the project design were made in CPA 9948-0016 to CPA 9948-0022. The changes were approved on 02/05/2019.
https://cdm.unfccc.int/PRCContainer/DB/prcp52130222/view

C.3.7. Changes specific to afforestation or reforestation CPA

>>
N/A

SECTION D. Description of monitoring system of CPAs

>>

The monitoring system under the CPAs involve following elements to ensure that the CME has unbiased, accurate and reliable monitoring information for the purposes of ex-post ER calculations.

1. **Total Sales Record:** The total sales record documents information of the WPS (UltraFLO Multi-barrier UV) implemented in the beneficiary institution. The total sales record is kept electronically with supporting evidence in form of paper records and/or SMS tracking records. The Total Sales Record contains information related to WPS system, including the following, but not limited to:
   a) Type of system (UltraFLO / Multi-barrier UV)
   b) Unique serial number of the units installed / distributed
   c) Date of installation / distribution
   d) Address and details of institute and contact detail (if available) of representative
   e) Type of Institute (Boarding / Non-boarding)
   f) Institute population count (number of students(people) / staff in boarding / non-boarding category)

2. **Other performance parameters:** The other monitoring parameters are determined via ex-post monitoring surveys on sampling basis or using published literature/data/national reports etc. as detailed in section E.2 and E.3 below. The monitoring period contains two annual monitoring sessions. The first monitoring session(MS#1) covers the monitoring period from 23/05/2017 to 22/05/2018 and the second monitoring session(MS#2) covers the monitoring from 23/05/2018 to 22/05/2019.

SECTION E. Data and parameters

E.1. Data and parameters fixed ex ante

Data/Parameter	Case1 or Case 2
Unit	-
Description	Case 1 or Case 2: Project activities implemented in rural or urban areas of countries with proportion of rural or urban population using an improved drinking-water source equal to or less than 60 % (Case1) or above 60% (Case2).
Source of data	Registered CPA-DD, page 12
Value(s) applied	Case 1
Choice of data or measurement methods and procedures	Established ex-ante in the registered CPA-DDs
Purpose of data/parameter	Calculation of baseline emissions
Additional comments	

Data/Parameter	WH
Unit	kJ/L.^{o}C
Description	Specific Heat of Water
Source of data	AMS-III.AV Version 04.0
Value(s) applied	4.186
Choice of data or measurement methods and procedures	Default Value from methodology
Purpose of data/parameter	Calculation of baseline emissions
Additional comments	-

Data/Parameter	T_f

Unit	^oC
Description	Final Temperature
Source of data	AMS-III.AV Version 04.0
Value(s) applied	100
Choice of data or measurement methods and procedures	Default Value from methodology
Purpose of data/parameter	Calculation of baseline emissions
Additional comments	-

Data/Parameter	T_i
Unit	^oC
Description	Initial Temperature
Source of data	AMS-III.AV Version 04.0
Value(s) applied	20
Choice of data or measurement methods and procedures	Default Value from methodology
Purpose of data/parameter	Calculation of baseline emissions
Additional comments	-

Data/Parameter	WHE
Unit	kJ/L
Description	Latent Heat of Water Evaporation
Source of data	Default value from AMS-III.AV Version 04.0
Value(s) applied	2,260
Choice of data or measurement methods and procedures	-
Purpose of data/parameter	Calculation of baseline emissions
Additional comments	-

Data/Parameter	L
Unit	-
Description	Leakage
Source of data	AMS-I.E. Version 5
Value(s) applied	0.95
Choice of data or measurement methods and procedures	Default Value from methodology
Purpose of data/parameter	Calculation of leakage emissions
Additional comments	-

Data/Parameter	$R_{y,i}$
Unit	Litres / person / day
Description	Average volume of drinking water per person per day
Source of data	WHO Minimum water quantity needed for domestic use in emergencies.
Value(s) applied	3.5 (for boarding schools, prisons) and 2 (for day schools). Refer ER calculator for details
Choice of data or measurement methods and procedures	Fixed ex-ante in the registered PoA-DD / CPA-DDs

Purpose of data/parameter	Calculation of baseline emissions
Additional comments	$N_{y,i}$ multiplied by $R_{y,i}$ shall not exceed the maximum output of the technology

Data/Parameter	$EF_{EL,j,y}$
Unit	tCO_2/MWh
Description	Emission factor for electricity generation for source j in year *y* (tCO_2/MWh)
Source of data	As per the "Tool: Baseline, project and/or leakage emissions from electricity consumption and monitoring of electricity generation"
Value(s) applied	1.3
Choice of data or measurement methods and procedures	Default value from the "Tool: Baseline, project and/or leakage emissions from electricity consumption and monitoring of electricity generation" **Scenario A: Electricity system** In this case, project participants may choose among the following options: Option A1: Calculate the combined margin emission factor of the applicable electricity system, using the procedures in the latest approved version of the Tool to calculate the emission factor for an electricity system ($EF_{EL,j/k/l,y} = EF_{grid,CM,y}$). Option A2: Use the following conservative default values: A value of 1.3 tCO_2/MWh if (a) Scenario A applies only to project and/or leakage electricity consumption sources but not to baseline electricity consumption sources; or (b) Scenario A applies to both baseline and project (and/or leakage) electricity consumption sources; and the electricity consumption of the project and leakage from sources is greater than the electricity consumption of the baseline sources. Option A2 will be used.
Purpose of data/parameter	To calculate project emissions
Additional comments	To be considered only in the case the water purification device consumes electricity

Data/Parameter	$TDL_{j,y}$
Unit	Fraction
Description	Average technical transmission and distribution losses for providing electricity to source j in year y
Source of data	As per the "Tool: Baseline, project and/or leakage emissions from electricity consumption and monitoring of electricity generation"
Value(s) applied	20%
Choice of data or measurement methods and procedures	Default value from the "Tool: Baseline, project and/or leakage emissions from electricity consumption and monitoring of electricity generation"
Purpose of data/parameter	To calculate project emissions
Additional comments	To be considered only in the case the water purification device consumes electricity.

E.2. Data and parameters monitored

Data/Parameter	QPW_y
Unit	Litres/yr
Description	Quantity of purified water in year *y* (litres)
Measured/calculated/ default	Calculated
Source of data	Project sales database and sampling surveys

Value(s) of monitored parameter	Monitoring Event: QPW_y MS1: 153,290,221 MS2: 197,882,390
Monitoring equipment	-
Measuring/reading/recording frequency	Annually
Calculation method (if applicable)	Calculated through Equation (1.a) For Case 1: $QPW_y = \Sigma (T_{y,i} \times N_{y,i} \times R_{y,i} \times 365^{13} \times Water\ Quality_i \times Operational\ Units_i)$
QA/QC procedures	-
Purpose of data/parameter	Calculation of baseline emissions
Additional comments	-

Data/Parameter	η_{wb}
Unit	Fraction
Description	Efficiency of water boiling system being replaced
Measured/calculated/ default	The monitoring parameter ηwb is calculated based on "AMS III.AV Version 04.0 default efficiency value for various stove types combined with survey, national, or regional data to determine the percentage of users using different type of cooking technology in line with registered PoA-DD, page 72 and 82.
Source of data	Default values as per AMS-III.AV Version 04.0 combined with survey, national, or regional data to determine the percent of users using different types of water boiling systems in the baseline scenario.(CITIZENS' SURVEY ON UGANDA VISION 2040[14])
Value(s) of monitored parameter	0.1172
Monitoring equipment	-
Measuring/reading/recording frequency	Continuously

[13] Instead of 365 days, school days as per academic school calander issued by "Ministry of Education & Sports" of "The Republic of Uganda" have been considered for ER calculations, excluding weekend and school holidays, as a conservative measure. Please refer ER calculator, "MS1-MS2 School days" tab for details.

[14] http://ngoforum.or.ug/wp-content/uploads/downloads/2015/06/Citizens-Survey-on-Uganda-Vision-2040.pdf

<table>
<tr><td>Calculation method
(if applicable)</td><td>The type of baseline water boiling systems used by target population will be determined via survey, national, or regional data. Parameter will be determined using the following default values from AMS-III.AV Version 04.0:
<table>
<tr><th>Baseline Water Boiling System</th><th>Default Efficiency Value</th></tr>
<tr><td>Unimproved biomass burning stove (UBBS)</td><td>0.1</td></tr>
<tr><td>Other biomass burning stove (OBBS)</td><td>0.2</td></tr>
<tr><td>Fossil fuel stove (FFS)</td><td>0.5</td></tr>
</table>
If more than one system is encountered, a weighted average value shall be applied, calculated through formula below:

η_{wb} = [Default efficiency of UBBS] * [% of UBBS users] +
[Default efficiency of OBBS] * [% of OBBS users] +
[Default efficiency of FFS] * [% of FFS users]

The data from Citizen Survey of Uganda has been used to demonstrate the distribution of various stove types in Uganda:
<table>
<tr><th>Stove Type</th><th>% of users</th><th>Source</th></tr>
<tr><td>Unimproved</td><td>85.7%</td><td rowspan="3">Table 12, page 23, citizen Survey On Uganda, vision 2040, http://ngoforum.or.ug/wp-content/uploads/downloads/2015/06/Citizens-Survey-on-Uganda-Vision-2040.pdf</td></tr>
<tr><td>Improved</td><td>13.5%</td></tr>
<tr><td>Fossil fuel</td><td>0.9%</td></tr>
</table>
As more than one system is encountered, a weighted average of values is applied, per calculation below:
η_{wb} = (0.1*85.7) + (0.2*13.5) + (0.5*0.9) = 0.1172.</td></tr>
<tr><td>QA/QC procedures</td><td>-</td></tr>
<tr><td>Purpose of data/parameter</td><td>Calculation of baseline emissions</td></tr>
<tr><td>Additional comments</td><td>-</td></tr>
</table>

<table>
<tr><td>Data/Parameter</td><td>$T_{y,i}$</td></tr>
<tr><td>Unit</td><td>Number</td></tr>
<tr><td>Description</td><td>Total distributed water purification systems</td></tr>
<tr><td>Measured/calculated/
default</td><td>Measured</td></tr>
<tr><td>Source of data</td><td>Project Sales database</td></tr>
<tr><td>Value(s) of monitored parameter</td><td>
<table>
<tr><td>Monitoring Event</td><td>UltraFlo</td><td>Multi-barrier Uv</td></tr>
<tr><td>MS1</td><td>0</td><td>693</td></tr>
<tr><td>MS2</td><td>78</td><td>953</td></tr>
<tr><td>Cumulative Total Sales</td><td>78</td><td>953</td></tr>
</table>
</td></tr>
<tr><td>Monitoring equipment</td><td>-</td></tr>
<tr><td>Measuring/reading/recording frequency</td><td>Continuously</td></tr>
<tr><td>Calculation method
(if applicable)</td><td>The total number of units by technology type and date deployed in each specific CPA is tracked in the in the Project Database.</td></tr>
<tr><td>QA/QC procedures</td><td>Project Sales Database is cross-checked with paper records to ensure transparent and robust data.</td></tr>
<tr><td>Purpose of data/parameter</td><td>Calculation of baseline emissions</td></tr>
<tr><td>Additional comments</td><td>In case of Ultra tabs, parameter $T_{y,i}$ is the number of institutions where UltraTABs are being supplied. Thus, each school receiving Ultra tab will be counted as one unit, for the purpose of determining $T_{y,i}$

Thus, number of institutions supplied with UltraTABS and total number of UltraTABs supplied to each of these institutions is monitored.</td></tr>
</table>

Data/Parameter	$N_{y,i}$
Unit	Persons/equipment
Description	The average population serviced by water purification systems
Measured/calculated/ default	Measured
Source of data	Project Sales database
Value(s) of monitored parameter	Monitoring Event: $N_{y,i}$ MS1: 579 MS2: 565
Monitoring equipment	-
Measuring/reading/recording frequency	Continuously
Calculation method (if applicable)	At the time of installation/distribution, the number of people using the unit is recorded in the sales receipt (PO / delivery note).
QA/QC procedures	$N_{y,i}$ multiplied by $R_{y,i}$ shall not exceed the maximum output of the unit [per unit].
Purpose of data/parameter	Calculation of baseline emissions
Additional comments	-

Data/Parameter	Water Quality$_i$
Unit	Proportion
Description	Water quality measurement
Measured/calculated/ default	Measured
Source of data	Sampling surveys
Value(s) of monitored parameter	Monitoring Event: Water Quality$_i$ MS1: 0.98 MS2: 0.95
Monitoring equipment	Aquagenx testing kits
Measuring/reading/recording frequency	Annually
Calculation method (if applicable)	Aquagenx testing kits were used to monitor E.Coli as the indicator organism to test the quality of water
QA/QC procedures	Monitoring staff with prior experience of testing water quality was used
Purpose of data/parameter	Calculation of baseline emissions
Additional comments	-

Data/Parameter	Operational Units$_i$
Unit	Percentage
Description	Percent of the monitoring period in which the units are in use
Measured/calculated/ default	Measured
Source of data	Sampling surveys
Value(s) of monitored parameter	Monitoring Event: Water Quality$_i$ MS1: 95.45% MS2: 95.70%
Monitoring equipment	-
Measuring/reading/recording frequency	Once per verification
Calculation method (if applicable)	Sampling Survey has been done to determine the number of water purification system still in operation by field survey by a dedicated team
QA/QC procedures	Enumerators were trained to assess the use of system at the time of survey
Purpose of data/parameter	Calculation of baseline emissions
Additional comments	-

Data/Parameter	$f_{NRB,y}$
Unit	Fraction
Description	Fraction of woody biomass saved by the project activity in year, y, that can be established as non-renewable biomass using national or local statistics, survey results, studies, maps or other sources of information, such as remote-sensing data.
Measured/calculated/ default	Calculated using the default value of f_{NRB} from UNFCCC CDM Data combined with national or regional data
Source of data	EB 67 Annex 22 Default Values for Fraction of Non-Renewable Biomass for least Developed Countries and Small Island Developing States, combined with survey, national, or regional data to determine the percent of users using woody biomass and fossil fuel in the baseline scenario (Table 9.7 of UNHS, Household Survey Report 2016/17[15])
Value(s) of monitored parameter	0.8304
Monitoring equipment	-
Measuring/reading/recording frequency	Continuously
Calculation method (if applicable)	Description / Value / Source: % of users using NRB / 94.2% / UNHS, HH Survye 2016/17, table 9.7 % of users using fossil fuels / 5.8% / 2016/17, table 9.7 f_{NRB} for non renewable biomass (firewood / charcoal) / 0.82 / EB67, Annex 22 f_{NRB} for foossil fuels / 1.00 / AMS.III.AV Version 04.0 $f_{NRB,y}$ = (94.2*0.82) + (5.8*1.00) = 0.8304
QA/QC procedures	-
Purpose of data/parameter	Calculation of baseline emissions
Additional comments	-

[15] https://www.ubos.org/wp-content/uploads/publications/03_20182016_UNHS_FINAL_REPORT.pdf

<table>
<tr><td>Data/Parameter</td><td>$EF_{projected\_fossilfuel}$</td></tr>
<tr><td>Unit</td><td>tCO_2/TJ</td></tr>
<tr><td>Description</td><td>Emission factor as per AMS-I.E. procedures when NRB is displaced or the emission factor of the fossil fuel substituted</td></tr>
<tr><td>Measured/calculated/ default</td><td>Calculated using the default value of EF_{NRB} from UNFCCC CDM combined with national or regional data</td></tr>
<tr><td>Source of data</td><td>AMS-I.E as referenced by AMS-III.AV Version 04.0 for f_{NRB} and IPCC default values for fossil fuels, combined with survey, national, or regional data to determine the percent of users using woody biomass and fossil fuel(s) in the baseline scenario.</td></tr>
<tr><td>Value(s) of monitored parameter</td><td>80.12</td></tr>
<tr><td>Monitoring equipment</td><td>-</td></tr>
<tr><td>Measuring/reading/recording frequency</td><td>Continuously</td></tr>
<tr><td>Calculation method (if applicable)</td><td>The type of baseline fuel used by target population will be determined via survey, national, or regional data.

Parameter will be determined using the following default values from AMS-I.E as referenced by AMS-III.AV Version 04.0 and IPCC:
<table>
<tr><th>Emission Factor for Baseline Fuels</th><th>Emissions Factor</th><th>Source</th></tr>
<tr><td>EF_{NRB}</td><td>81.6 tCO2/TJ</td><td>AMS-I.E</td></tr>
<tr><td>$EF_{NaturalGas}$</td><td>56.1 tCO2/TJ</td><td>IPCC</td></tr>
<tr><td>$EF_{Kerosene}$</td><td>71.9 tCO2/TJ</td><td>IPCC</td></tr>
<tr><td>EF_{LPG}</td><td>63.1 tCO2/TJ</td><td>IPCC</td></tr>
</table>

If a mixture of woody biomass and fossil fuels is used in the absence of the project activity a weighted average value shall be applied, calculated through the following formula:

$EF_{projected\_fossilfuel}$ = [EF_{NRB}]*[% of users using NRB] +
[$EF_{Natural\ Gas}$]*[% of users using Natural Gas] +
[$EF_{Kerosene}$]*[% of users using Kerosene] +
[EF_{LPG}]*[% of users using LPG]

The data from Citizen Survey of Uganda has been used to demonstrate the distribution of various fuel types in Uganda:
<table>
<tr><th>Fuel Type</th><th>% of Users</th><th>Source</th></tr>
<tr><td>% of users using NRB</td><td>94.2%</td><td rowspan="2">table 9.7 of UNHS, Household Survey Report 2016/17 https://www.ubos.org/wp-content/uploads/publications/03_20182016_UNHS_FINAL_REPORT.pdf</td></tr>
<tr><td>% of users using fossil fuels</td><td>5.8%</td></tr>
</table>

To apply a conservative estimate of CERs, all fossil fuel used is assumed to be Natural Gas, as this fuel has the lowest emission factor. As more than one system is encountered, a weighted average of values is applied, per calculation below:
$EF_{projected\_fossilfuel}$ = (81.6*0.942 + 56.1*0.058) = 80.12</td></tr>
<tr><td>QA/QC procedures</td><td>-</td></tr>
<tr><td>Purpose of data/parameter</td><td>Calculation of baseline emissions</td></tr>
<tr><td>Additional comments</td><td>-</td></tr>
</table>

Data/Parameter	Existence of public distribution network of safe drinking water
Unit	Percentage
Description	Existence of public distribution network of safe drinking water in year *y*
Measured/calculated/ default	Measured
Source of data	Sampling Surveys
Value(s) of monitored parameter	0.00%
Monitoring equipment	-
Measuring/reading/recording frequency	Annually
Calculation method (if applicable)	Sampling Surveys were conducted to assess existence of public distribution network of safe drinking water
QA/QC procedures	-
Purpose of data/parameter	Calculation of baseline emissions
Additional comments	-

Data/Parameter	$EC_{pJ,j,y}$
Unit	MWh/yr
Description	Quantity of electricity consumed by the project electricity consumption source j in year y
Measured/calculated/ default	Calculated
Source of data	Manufacturers' specifications
Value(s) of monitored parameter	0.1226 (Assuming a UV disinfection system with 14-watt capacity being used 24 hours a day for 365 days a year as a conservative measure)
Monitoring equipment	-
Measuring/reading/recording frequency	Annually
Calculation method (if applicable)	As per the "Tool: Baseline, project and/or leakage emissions from electricity consumption and monitoring of electricity generation". Electricity Consumption may be directly monitored or Manufacturers' specifications may be used to calculate electricity consumed by assuming that the technology is operating 24 hours a day all year or applying manufacturers' specification to user reported operation hours
QA/QC procedures	If surveys are conducted annually, they will meet 90/10 confidence and precision, if they are conducted biennially, they will meet 95/10 confidence and precision.
Purpose of data/parameter	Calculation of project emissions
Additional comments	-

E.3. Implementation of sampling plan

>>

A single sampling plan was carried out for CPAs 9948-P1-0002-CP1, 9948-P1-0014-CP1 to 9948-P1-0022-CP1 (covered in this monitoring report).

a) Description of implemented single sampling design

The monitoring period has been covered under two annual monitoring sessions. The first monitoring session(MS#1) covers the monitoring period from 23/05/2017 to 22/05/2018 and the second monitoring session(MS#2) covers the monitoring from 23/05/2018 to 22/05/2019.

The following applies to both monitoring sessions:

(i) Sampling Design

Due to the large number of WPS installed / distributed under these CPAs, it was not economically feasible to monitor each individual WPS unit distributed. Therefore, representative sampling-based monitoring approach was adopted as part of CPA-wide sampling plan. The sampling was therefore based on 95/10 confidence/precision levels:

(ii)Objectives and Reliability Requirements

The objective was to obtain an unbiased and reliable estimate of the proportion value of the following parameters over the course of the monitoring period, and with 95/10 confidence/precision for annual sampling across CPAs.

Sl. No.	Parameter	Description of parameter
1	Water Quality$_i$	Water quality measurement of project WPS
2	Operational Units$_i$	Monitoring to check the operational status of project WPS.
3	Existence of public distribution network of safe drinking water	Existence of public distribution network of safe drinking water in year y

(iii)Target Population

The target population for the parameters stated above are WPS Units installed / distributed in institutions and recorded in the project sales database.

(iv)Sampling Frame:

The target population are WPS Units installed / distributed in institutions and recorded in the project sales database. The parameters for monitoring are homologous (i.e. implemented in institutions), hence a common sampling was followed for all the parameters monitored.

(v)Sampling Method

The required sample sizes were derived using equation (1), (2), (3), (4) and (9) of Appendix 3 of the Guideline: Sampling and surveys for CDM project activities and programmes of activities, Version 04.0 for proportion-based parameter as follows:

$$n \geq \frac{z^2 * N * V}{(N-1) * precision^2 + z^2 * V}$$

Where,

n = number of WPS to be sampled

N = Total number of WPS in the population

z = Constant referring to level of confidence (1.96 for 95 % confidence)

Precision = Required precision (e.g. 10% = 0.1)

$$V = \frac{SD^2}{\overline{p}^2}$$

Where:

$$SD^2 = \frac{\sum_{i=1}^{k} g_i * p_i * (1-p_i)}{N}$$

$$\overline{p} = \frac{\sum_{i=1}^{k} g_i * p_i}{N}$$

Where,

g_i = weight of strata i in the population

p_i = expected proportion of strata i in the population

k = total number of strata in the population

Stratified Random Sampling was applied by dividing the population into two strata (UltraFLO and Multi-barrier UV). The expected parameter values (proportion) were determined based on project developer's knowledge and experience as per para 13(b) and 13(c) of the "Standard: Sampling and surveys for CDM project activities and programmes of activities"

The CPA sub-group population was arranged chronologically for each stratum. The WPS were selected by randomly assigning, in corresponding stratum, a number to each WPS and sorting in increasing order from lower to higher number. Random numbers were generated using online random number generator for each stratum and the numbers obtained were used to identify the samples from the stratum population. A slightly higher number of samples were identified than that required to cover for outliers / non-response and ensure that the desired precision / confidence is achieved. The following tables demonstrate the sample size determined for different parameters in the two monitoring sessions:

Sample size calculations for MS#1

Sample Size - Operational Unitsi			
WPS Type (Sampling Frame)	Total Sales (Sampling Frame Size)	expected operational rate (%)	Calculated Sample Size (n)
Multi-barrier UV	693	95%	30
Sample size determination			
Estimated Operational Unitsi (p)			95%
Estimated Standard Deviation of Operational Unitsi (SD)			21.8%
$V = (SD/p)^2$			0.05
Sample Size required (Operational Unitsi)			30

Sample Size - Water Quality$_i$			
WPS Type (Sampling Frame)	Total Sales (Sampling Frame Size)	expected water quality (Fraction)	Calculated Sample Size (n)
Multi-barrier UV	693	0.95	30
Sample size determination			
Estimated Water Qualityi (p)			0.95
Estimated Standard Deviation of Water Qualityi (SD)			0.218
$V = (SD/p)^2$			0.05
Sample Size required (Water Qualityi)			30

Sample Size - Safe water distribution network			
WPS Type (Sampling Frame)	Total Sales (Sampling Frame Size)	expected SWDN (%)	Calculated Sample Size (n)
Multi-barrier UV	693	95%	30
Sample size determination			
Estimated SWDN (p)			95%
Estimated Standard Deviation of SWDN (SD)			21.8%
$V = (SD/p)^2$			0.05
Sample Size required (SWDN)			30

Sample size calculations for MS#2

Sample Size - Operational Unitsi			
WPS Type (Sampling Frame)	Total Sales (Sampling Frame Size)	expected operational rate (%)	Calculated Sample Size (n)
UltraFlo	78	95%	3
Multi-barrier UV	953	95%	28
Sample size determination			
Estimated Operation Unitsi (p)			95%
Estimated Standard Deviation of Operational Unitsi (SD)			21.8%
$V = (SD/p)^2$			0.05
Sample Size required (Operational Unitsi)			30

Sample Size - Water Quality$_i$			
WPS Type (Sampling Frame)	Total Sales (Sampling Frame Size)	expected water quality (Fraction)	Calculated Sample Size (n)
UltraFLO	78	0.95	3
Multi-barrier UV	953	0.95	28
Sample size determination			
Estimated Water Qualityi (p)			0.95
Estimated Standard Deviation of Water Qualityi (SD)			0.218
$V = (SD/p)^2$			0.05
Sample Size required (Water Qualityi)			30

Sample Size - Safe water distribution network			
WPS Type (Sampling Frame)	Total Sales (Sampling Frame Size)	expected SWDN (%)	Calculated Sample Size (n)
UltraFLO	78	95%	3
Multi-barrier UV	953	95%	28
Sample size determination			
Estimated SWDN (p)			95%
Estimated Standard Deviation of SWDN (SD)			21.8%
$V = (SD/p)^2$			0.05
Sample Size required (SWDN)			30

b) Collected data (electronic spreadsheets may be attached and referenced)

Data was collected by the Impact Water team. The team is well trained for the usage related surveys and water quality tests given prior experience of monitoring WPS devices. Surveyors visited the institute, did visual inspections and interviewed institution representatives to assess usage (operational status) and existence of safe drinking water public distribution network via a monitoring questionnaire. The Monitoring team also collected water samples for water quality testing using Aquagenix test kits. The MS#1 (Surveys and Water Quality Tests) were conducted during 18-11-2018 to 29-11-2018 and the MS#2 (Surveys and Water Quality Tests) were conducted during 03-11-2019 to 29-11-2019.

c) Analysis of the collected data

Data obtained from the surveys / tests were used to estimate proportions values for the parameters described above. The values were then being factored into the emissions reduction calculations.

Summary of Results for MS#1

Sampling Constants	Values
Monitoring period start date	23-05-2017
Monitoring period end date	22-05-2018
Monitoring frequency (years)	1
Level of sampling	PoA
Confidence (%) (90 or 95)	95%
Margin of Error (%)	10%
Z value	1.96

Sl. No.	Parameter	value	Reliability / precision
1	Operational Units$_i$	95.45%	achieved
2	Water Quality$_i$	0.98	achieved
3	Existence of public distribution network of safe drinking water	0.00%	achieved

Summary of Results for MS#2

Sampling Constants	Values
Monitoring period start date	23-05-2018
Monitoring period end date	22-05-2019
Monitoring frequency (years)	1
Level of sampling	PoA
Confidence (%) (90 or 95)	95%
Margin of Error (%)	10%
Z value	1.96

Sl. No.	Parameter	value	Reliability / precision
1	Operational Units$_i$	95.70%	achieved
2	Water Quality$_i$	0.95	achieved
3	Existence of public distribution network of safe drinking water	0.00%	achieved

d) Demonstration of whether the required confidence/precision has been met

The following tables demonstrate the status of precision/confidence for each of the monitored parameters of MS#1 and MS#2:

Precision attained for various parameters in MS#1

Sample Size - Operational Unitsi			
Monitoring Results			
WPS Type (Sampling Frame)	Total Sales (Sampling Frame Size)	Monitored Sample Size (n)	Monitored Operational Rate (%)
Multi-barrier UV	693	44	95.45%
Reliability Check			
Samples Monitored			44
Monitored Opeartional Unitsi (p)			95.45%
Standard Error of Operational Unitsi			3.04%
Relative precision (Margin of error)			6.24%
Result			Ok, acceptable
Lower Bound confidence value			not applicable

Sample Size - Water Quality$_i$			
Monitoring Results			
WPS Type (Sampling Frame)	Total Sales (Sampling Frame Size)	Monitored Sample Size (n)	Monitored Water Quality (Fraction)
Multi-barrier UV	693	42	0.98
Reliability Check			
Samples Monitored			42
Monitored Water Qualityi (p)			0.98
Standard Error of Water Qualityi			0.02
Relative precision (Margin of error)			4.58%
Result			Ok, acceptable
Lower Bound confidence value			not applicable

Sample Size - Safe water distribution network			
Monitoring Results			
WPS Type (Sampling Frame)	Total Sales (Sampling Frame Size)	Monitored Sample Size (n)	Monitored SWDN (%)
Multi-barrier UV	693	42	0%
Reliability Check			
Samples Monitored			42
Monitored SWDN (p)			0.00%
Standard Error of SWDN			0.00%
Relative precision (Margin of error)			0.00%
Result			Ok, acceptable
Lower Bound confidence value			not applicable

Precision attained for various parameters in MS#2

Sample Size - Operational Unitsi			
Monitoring Results			
WPS Type (Sampling Frame)	Total Sales (Sampling Frame Size)	Monitored Sample Size (n)	Monitored Operational Rate (%)
UltraFlo	78	7	100.00%
Multi-barrier UV	953	43	95.35%
Reliability Check			
Samples Monitored			50
Monitored Operational Units (p)			95.70%
Standard Error of Operational Unitsi			2.90%
Relative precision (Margin of error)			5.94%
Result			Ok, acceptable
Lower Bound confidence value			not applicable

Sample Size - Water Quality$_i$			
Monitoring Results			
WPS Type (Sampling Frame)	Total Sales (Sampling Frame Size)	Monitored Sample Size (n)	Monitored Water Quality (Fraction)
UltraFLO	78	7	1.00
Multi-barrier UV	953	41	0.95
Reliability Check			
Samples Monitored			48
Monitored Water Qualityi (p)			0.95
Standard Error of Water Qualityi			0.03
Relative precision (Margin of error)			6.24%
Result			Ok, acceptable
Lower Bound confidence value			not applicable

Sample Size - Safe water distribution network			
Monitoring Results			
WPS Type (Sampling Frame)	Total Sales (Sampling Frame Size)	Monitored Sample Size (n)	Monitored SWDN (%)
UltraFlo	78	7	0%
Multi-barrier UV	953	41	0%
Reliability Check			
Samples Monitored			48
Monitored SWDN (p)			0.00%
Standard Error of SWDN			0.00%
Relative precision (Margin of error)			0.00%
Result			Ok, acceptable
Lower Bound confidence value			not applicable

e) Demonstration of whether the samples were randomly selected and are representative of the population

WPS were selected randomly from each stratum, after arranging them in chronological order by date of sale and assigning a serial number to each institute. Random numbers were used to identify the samples to the monitored. This approach ensured that the entire population had an equal chance of being selected, and hence samples picked are representative of the population.

SECTION F. Calculation of emission reductions or net anthropogenic removals

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

>>

Emission reductions are calculated as follows[16]:

[16] The example calculation pertains to CPA 9948-P1-0002-CP1 only for MS#1 as well as for MS#2. Please refer ER Calculator (tab 'ERs Summary MS1' and ERs Summary MS2') for calculation for each CPA.

Step 1: Calculate the quantity of purified water in year y (QPW_y)

Equation (1.a)

For MS#1

QPW_y	$QPW_y = \Sigma(T_{y,i} \times N_{y,i} \times R_{y,i} \times 365 \times Water\ Quality_i \times Operational\ Units_i)$ = 580 x 593 x 2.67 x 173[17] x 0.98 x 95.45% = 148,086,337 L.

For MS#2

QPW_y	$QPW_y = \Sigma(T_{y,i} \times N_{y,i} \times R_{y,i} \times 365 \times Water\ Quality_i \times Operational\ Units_i)$ = 580 x 592 x 2.67 x 160[18] x 0.95 x 95.70% = 133,858,199 L.

Where,

QPW_y	Quantity of purified water for drinking for all technologies type i in year y (Liters)
$N_{y,i}$	The average population serviced by water purification systems (person/equipment)
$T_{y,i}$	Total distributed water purification systems
$R_{y,i}$	Average volume of drinking water per person per day (Liters/person/day)
Water Quality$_i$	Percent of units that meet water quality requirements
Operational Units$_i$	Percent of the monitoring period in which the units are in use

Step 2: Calculate the specific energy consumption [SEC] required to boil one litre of water.

Equation (2)
For MS#1

SEC	= [WH × (T_f-T_i) + 0.01 × *WHE]/n_{wb}* = [4.186x(100-20)+0.01x2260]/0.1172 = 3050.17 kJ/L.

For MS#2

SEC	= [WH × (T_f-T_i) + 0.01 × *WHE]/n_{wb}* = [4.186x(100-20)+0.01x2260]/0.1172 = 3050.17 kJ/L.

Where,

WH	Specific heat of water (kJ/L ^oC)
T_f	Final temperature (^oC)
T_i	Initial temperature of water (^oC)
WHE	Latent heat of water evaporation (kJ/L)
n_{wb}	Efficiency of water boiling system being replaced (fraction)

[17] Instead of 365 days, 173 days have been applied as the systems were deemed operational for 173 days in the monitoring session 1(MS#1) (due to progressive sales and accounting for school holidays during the monitoring period) for CPA 9948-P1-0002-CP1

[18] Instead of 365 days, 160 days have been applied as the systems were deemed operational for 160 days in the monitoring session 2(MS#2) (due to progressive sales and accounting for school holidays during the monitoring period) for CPA 9948-P1-0002-CP1

Step 3: Calculate baseline emissions.Equation (1)
For MS#1

BE_y	$= QPW_y \times SEC \times f_{NRB,y} \times EF_{projected\_fossilfuel} \times 10^{-9}$ = 148,086,337 x 3050.17 x 0.8304 x 80.12 x 10^{-9} = 30,053 tCO_2e

For MS#2

BE_y	$= QPW_y \times SEC \times f_{NRB,y} \times EF_{projected\_fossilfuel} \times 10^{-9}$ = 133,858,199 x 3050.17 x 0.8304 x 80.12 x 10^{-9} = 27,165 tCO_2e

Where,

BE_y	Baseline emissions during the year y in (tCO_2e)
QPW_y	Quantity of purified water in year y (Liters/yr).
SEC	Specific energy consumption required to boil one litre of water (kJ/L)
$f_{NRB,y}$	Fraction of woody biomass used in the absence of the project activity in year y that can be established as non-renewable. For biomass, the default values of f_{NRB} shall be used from EB67. A survey, national, or regional data is conducted to determine the mix of fuels (% of biomass, % of other fuels) used in the baseline. If a mixture of biomass and other fuels (e.g. fossil fuels) are used, a weighted average renewability factor shall be applied.
$EF_{projected\_fossilfuel}$	Emission factor when NRB is displaced or the emission factor of the fossil fuel substituted Default emission factors from AMS-I.E as referenced in AMS-III.AV version 04.0 and IPCC shall be used. A survey, national, or regional data is conducted to determine the mix of fuels (% of biomass, % of other fuels) used in the baseline. If a mixture of woody biomass and fossil fuels are used in the absence of the project activity a weighted average value shall be applied, as described in parameter box in section E.2

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

>>
PE_y = 0, for type 2 CPAs

For type 3 CPA
For MS#1

PE_y	$=PE_y = T_{y,i} \times EC_{PJ,j,y} \times EF_{EL,j,y} \times (1 + TDL_{j,y})$ =580 * 0.1226 * 1.30 * (1+0.20) =111 tCO_2e

For MS#2

PE_y	$=PE_y = T_{y,i} \times EC_{PJ,j,y} \times EF_{EL,j,y} \times (1 + TDL_{j,y})$ =580 * 0.1226 * 1.30 * (1+0.20) =111 tCO_2e

F.3. Calculation of leakage emissions

>>
Leakage has been calculated using a default 95% leakage adjustment factor to baseline emissions.
For MS#1

L_y	= BE_y * (1-0.95) = 30,053 * (1-0.95) = 1,503 tCO_2e

For MS#2

L_y	= BE_y * (1-0.95) = 27,165 * (1-0.95) = 1,359 tCO_2e

L_y Leakage emission during the year y in (tCO_2e)
BE_y Baseline emissions during the year y in (tCO_2e)

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

CPA UNFCCC reference number	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
9948-P1-0002-CP1	57,218	222	2,862	0	54,134	54,134
9948-P1-0014-CP1	6,306	47	316	0	5,943	5,943
9948-P1-0015-CP1	5,919	48	296	0	5,575	5,575
9948-P1-0016-CP1	295	-	15	0	280	280
9948-P1-0017-CP1	265	-	14	0	251	251
9948-P1-0018-CP1	222	-	12	0	210	210
9948-P1-0019-CP1	276	-	14	0	262	262
9948-P1-0020-CP1	245	-	13	0	232	232
9948-P1-0021-CP1	264	-	14	0	250	250
9948-P1-0022-CP1	252	-	13	0	239	239
Total	**71,262**	**317**	**3,569**	**0**	**67,376**	**67,376**

F.5. Comparison of emission reductions or net anthropogenic removals achieved with estimates in the included CPA-DD

CPA UNFCCC reference number	Amount achieved during this monitoring period (t CO_2e)	Amount estimated ex ante for this monitoring period in the CPA-DD (t CO_2e)
9948-P1-0002-CP1	54,134	30,728
9948-P1-0014-CP1	5,943	19,617
9948-P1-0015-CP1	5,575	19,617
9948-P1-0016-CP1	280	85,542
9948-P1-0017-CP1	251	85,542
9948-P1-0018-CP1	210	85,542
9948-P1-0019-CP1	262	85,542
9948-P1-0020-CP1	232	85,542
9948-P1-0021-CP1	250	85,542
9948-P1-0022-CP1	239	85,542
Total	**67,376**	**668,756**

F.5.1. Explanation of calculation of "amount estimated ex ante for this monitoring period in the CPA-DD"

>>
The ex-ante estimate[19] for the monitoring period has been calculated as follows:
In case of MS#1
= Ex-ante ER as per CPA-DD * duration of monitoring period / days in a year
= (15,365/[20]*(7[21]/365)) + (15,365[22]*(358[23]/365))
= 15,364 tCO_2

In case of MS#2
= Ex-ante ER as per CPA-DD * duration of monitoring period / days in a year
= (15,365/[24]*(7[25]/365)) + (15,365[26]*(358[27]/365))
= 15,364 tCO_2

F.6. Remarks on increase in achieved emission reductions

>>
The emission reductions achieved in the monitoring period is more than the value estimated in ex-ante calculations for CPA 9948-P1-0002-CP1 only, hence the following sections are specific to CPA 9948-P1-0002-CP1.

In case of MS#1

Monitoring session 1(MS#1)	Amount achieved during this monitoring period ($t CO_2e$)	Amount estimated ex ante for this monitoring period in the CPA-DD ($t CO_2e$)
23-05-2017 to 22-05-2018	28,439	15,364

In case of MS#2

Monitoring session 1(MS#2)	Amount achieved during this monitoring period ($t CO_2e$)	Amount estimated ex ante for this monitoring period in the CPA-DD ($t CO_2e$)
23-05-2018 to 22-05-2019	25,695	15,364

[19] The ex-ante example calculation pertains to CPA 9948-P1-0002-CP1 only for both monitoring sessions. Please refer ER Calculator (tab 'Ex Ante Calculation MS1' and 'Ex Ante Calculation MS2') for calculation for other CPA.

[20] Ex-ante ER for year 3 as per CPA-DD (Section B.4.3)

[21] Number of monitoring days in Year 3 = Days(29-05-2017,23-05-2017)+1 = 7

Total Number of days in Year 3 = 365

[22] Ex-ante ER for year 4 as per CPA-DD (Section B.4.3)

[23] Number of monitoring days in Year 4 = Days(22-05-2018,30-05-2017)+1 = 358

Total Number of days in year 4= 365

[24] Ex-ante ER for year 4 as per CPA-DD (Section B.4.3)

[25] Number of monitoring days in Year 4 = Days(29-05-2018,23-05-2018)+1 = 7

Total Number of days in Year 4 = 365

[26] Ex-ante ER for year 5 as per CPA-DD (Section B.4.3)

[27] Number of monitoring days in Year 5 = Days(22-05-2019,30-05-2018)+1 = 358

Total Number of days in year 5= 365

A Comparison of the parameter values as stated in registered CPA-DD vs monitored value in monitoring session 1(MS#1) is given below:

Data / Parameter	Data Unit	Values in registered CPA-DD	Values in MR	Increase / decrease factor	Comment
$T_{y,i}$	Number	525	580	1.10	This is based on actual sales made under the CPA. The CPA still remain below the methodology threshold.
Operational rate	Fraction	90.00%	95.45%	1.06	This is based on actual monitoring records
$R_{y,i}$	L / person / day	2.00	2.67	1.34	The value has increased in MR as a weighted average value has been applied based on share of boarding and non-boarding population in the project schools/ institutions under the CPA. This is completely outside the control of CME / CPAI.
$N_{y,i}$	Persons / technology	275	593	2.16	The increase in $N_{y,i}$ is attributed to different sized schools catered by the CPA (small, medium and large sized schools with student and staff count ranging from ~25 to ~4300) and is outside the control of CME.
Days	number	365	173	0.47	Calculated considering progressive sales under the CPA
Water Quality$_i$	Fraction	0.90	0.98	1.06	This is based on actual monitoring records
f_{NRB}	Fraction	0.83	0.83	1.00	This is almost equivalent to value assumed in the registered CPA-DD
$EF_{projected\_fossil\ fuel}$	tCO_2e/TJ	80.20	80.12	1.00	This is almost equivalent to value assumed in the registered CPA-DD
η_{wb}	Fraction	0.12	0.11	0.98	This is almost equivalent to value assumed in the registered CPA-DD
$EC_{PJ,j,y}$	MWh/yr	0.87	0.12	0.14	The actual product specification confirms the power rating of the device as 14 W maximum. The value has been calculated conservatively assuming 365*24 hours of operation per year.

The variation in the ERs is on account of following reasons:

Sl. No.	Description	Value in CPA-DD	Value in current monitoring period	Increase / decrease factor	Comment
1.	Change in Baseline emissions	16,929	30,053	1.78 (= 30,053/16,929)	The 1.78 times increase in baseline emissions is directly attributed to the combined net impact of increase / decrease factor of various parameters listed above. Given all the aforesaid values are for monitoring parameters (as per the registered monitoring plan), they are likely to differ from the values assumed

					in CPA-DD. This change in outside the control of CME and is based on actual monitoring results during the monitoring period. Lastly, this increase does not compromise the methodology applicability, scale or additionality of the CPA.
2.	Change in project emissions due to electricity consumption	717	111	0.15 (= 111 / 717)	The decrease in project emissions is on account of lower electricity consumption in the project as compared to assumed value in the CPA-DD. The actual product specification confirm the power rating of the UV device as 14 W maximum against 100W assumed in CPA-DD. The project emission value in MR has been calculated conservatively, assuming electricity consumption @365*24 hours of operation per year.

A Comparison of the parameter values as stated in registered CPA-DD vs monitored value in monitoring session 2(MS#2) is given below:

Data / Parameter	Data Unit	Values in registered CPA-DD	Values in MR	Increase / decrease factor	Comment
$T_{y,i}$	Number	525	580	1.10	This is based on actual sales made under the CPA. The CPA still remain below the methodology threshold.
Operational rate	Fraction	90.00%	95.70%	1.06	This is based on actual monitoring records
$R_{y,i}$	L / person / day	2.00	2.67	1.34	The value has increased in MR as a weighted average value has been applied based on share of boarding and non-boarding population in the project schools/ institutions under the CPA. This is completely outside the control of CME / CPAI.
$N_{y,i}$	Persons / technology	275	592	2.15	The increase in $N_{y,i}$ is attributed to different sized schools catered by the CPA (small, medium and large sized schools with student and staff count ranging from ~25 to ~4300) and is outside the control of CME.
Days	number	365	160	0.44	Calculated considering progressive sales under the CPA
Water Quality$_i$	Fraction	0.90	0.95	1.06	This is based on actual monitoring records
f_{NRB}	Fraction	0.83	0.83	1.00	This is almost equivalent to value assumed in the registered CPA-DD
$EF_{projected\_fossilfuel}$	tCO_2e/TJ	80.2	80.12	1.00	This is almost equivalent to value assumed in the registered CPA-DD
η_{wb}	Fraction	0.12	0.1172	0.98	This is almost equivalent to value assumed in the registered CPA-DD
$EC_{PJ,j,y}$	MWh/yr	0.87	0.12	0.14	The actual product specification

					confirms the power rating of the device as 14 W maximum. The value has been calculated conservatively assuming 365*24 hours of operation per year.

The variation in the ERs is on account of following reasons:

Sl. No.	Description	Value in CPA-DD	Value in current monitoring period	Increase / decrease factor	Comment
1.	Change in Baseline emissions	16,929	27,165	1.60 (= 27,165 / 16,929)	The 1.60 times increase in baseline emissions is directly attributed to the combined net impact of increase / decrease factor of various parameters listed above. Given all the aforesaid values are for monitoring parameters (as per the registered monitoring plan), they are likely to differ from the values assumed in CPA-DD. This change in outside the control of CME and is based on actual monitoring efforts during the monitoring period. Lastly, this increase does not compromise the methodology applicability, scale or additionality of the CPA.
2.	Change in project emissions due to electricity consumption	717	111	0.15 (= 111 / 717)	The decrease in project emissions is on account of lower electricity consumption in the project as compared to assumed value in the CPA-DD. The actual product specification confirm the power rating of the UV device as 14 W maximum against 100W assumed in CPA-DD. The project emission value in MR has been calculated conservatively, assuming electricity consumption @365 * 24 hours of operation per year.

F.7. Remarks on scale of small-scale CPAs

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The emission reductions achieved by each CPA is less than the small scale threshold for type III category (60,000 tCO_2e per annum) substantiating that the CPAs are small scale CPAs indeed.

Appendix 1: Contact information (Additional)

Entity responsible for completing the CDM-PoA-MR-FORM	
Organization name	Climate Secure India Private Limited
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Document information

Version	*Date*	*Description*
03.0	31 May 2019	Revision to: • Ensure consistency with version 02.0 of the "CDM project standard for programmes of activities" (CDM-EB93-A07-STAN); • Add a section on remarks on the observance of the scale limit of small-scale CPAs during the crediting periods; • Add "changes specific to afforestation or reforestation activities/CPA" as a possible post-registration changes; • Clarify the reporting of net anthropogenic GHG removals for A/R PoAs between two commitment periods; • Make structural and editorial improvements.
02.0	7 June 2017	Revision to: • Ensure consistency with version 01.0 of the "CDM project standard for programmes of activities (CDM-EB93-A07-STAN); • Make editorial improvements.
01.0	1 April 2015	Initial publication.

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