



Monitoring report form for CDM programme of activities
(Version 04.0)

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

MONITORING REPORT

Title of the PoA	PoA for the Reduction of emission from non-renewable fuel from cooking at household level		
UNFCCC reference number of the PoA	7359		
Version numbers of the PoA-DD applicable to this monitoring report	23.3		
Version number of this monitoring report	1		
Completion date of this monitoring report	07/06/2021		
Monitoring period number	MP6		
Duration of this monitoring period	CPA reference no.	Start of Monitoring Period	End of Monitoring Period
	7359-P1-0027-CP1	01/01/2021	27/05/2021
	7359-P1-0028-CP1	01/01/2021	27/05/2021
	7359-P1-0029-CP1	01/01/2021	27/05/2021
	7359-P1-0030-CP1	01/01/2021	27/05/2021
	7359-P1-0031-CP1	01/01/2021	27/05/2021
	7359-P1-0032-CP1	01/01/2021	27/05/2021
	7359-P1-0033-CP1	01/01/2021	27/05/2021
	7359-P1-0034-CP1	01/01/2021	27/05/2021
	7359-P1-0042-CP1	01/01/2021	27/05/2021
	7359-P1-0047-CP1	01/01/2021	27/05/2021
	7359-P1-0060-CP1	01/01/2021	27/05/2021
	7359-P1-0061-CP1	01/01/2021	27/05/2021
	7359-P1-0062-CP1	01/01/2021	27/05/2021
	7359-P1-0063-CP1	01/01/2021	27/05/2021
	7359-P1-0064-CP1	01/01/2021	27/05/2021
	7359-P1-0065-CP1	01/01/2021	27/05/2021
	7359-P1-0066-CP1	01/01/2021	27/05/2021
Monitoring report number for this monitoring period	1		
Coordinating/managing entity	Green Development AS		

	Host Party of the PoA	Is this the host Party of a CPA covered in this monitoring report? (yes/no)		
Host Parties	Federal Democratic Republic of Ethiopia	No		
	Republic of Kenya	Yes		
	Republic of Madagascar	Yes		
	Republic of Malawi	No		
	Republic of Mozambique	No		
	Federal Republic of Nigeria	No		
	Republic of Uganda	No		
	Republic of Zambia	No		
	Republic of Chad	No		
	Dominican Republic	No		
	Ivory Coast	No		
	Republic of Liberia	No		
	Republic of Namibia	No		
	Republic of Rwanda	No		
	Republic of Sierra Leone	No		
	Republic of Ghana	No		
	Republic of Zimbabwe	No		
	Federal Republic of Somalia	No		
	Republic of South Africa	No		
	Applied methodologies and standardized baselines	AMS I.E., Version 04 - Switch from Non-Renewable Biomass for Thermal Applications by the User. Standardized baseline is not applicable.		
Sectoral scopes	Sectoral Scope: 01 Energy industries (renewable - / non-renewable sources)			
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 until 31 December 2020	Amount achieved from 1 January 2021	
	7359-P1-0027-CP1 0 tCO ₂ e 7359-P1-0028-CP1 0 tCO ₂ e 7359-P1-0029-CP1 0 tCO ₂ e 7359-P1-0030-CP1 0 tCO ₂ e 7359-P1-0031-CP1 0 tCO ₂ e 7359-P1-0032-CP1 0 tCO ₂ e 7359-P1-0033-CP1 0 tCO ₂ e 7359-P1-0034-CP1 0 tCO ₂ e 7359-P1-0042-CP1 0 tCO ₂ e 7359-P1-0047-CP1 0 tCO ₂ e 7359-P1-0060-CP1 0 tCO ₂ e 7359-P1-0061-CP1 0 tCO ₂ e 7359-P1-0062-CP1 0 tCO ₂ e 7359-P1-0063-CP1 0 tCO ₂ e 7359-P1-0064-CP1 0 tCO ₂ e 7359-P1-0065-CP1 0 tCO ₂ e 7359-P1-0066-CP1 0 tCO ₂ e Total Batch of CPAs. 0 tCO₂e	0 tCO ₂ e 0 tCO ₂ e 0 tCO ₂ e 0 tCO ₂ e 0 tCO ₂ e 0 tCO ₂ e 0 tCO ₂ e 0 tCO ₂ e 0 tCO ₂ e 0 tCO ₂ e 0 tCO ₂ e 0 tCO ₂ e 0 tCO ₂ e 0 tCO ₂ e 0 tCO ₂ e 0 tCO ₂ e 0 tCO ₂ e 0 tCO₂e	8,927 tCO ₂ e 0 tCO ₂ e 0 tCO ₂ e 0 tCO ₂ e 0 tCO ₂ e 0 tCO ₂ e 0 tCO ₂ e 6,615 tCO ₂ e 16,691 tCO ₂ e 23,324 tCO ₂ e 24,090 tCO ₂ e 1,131 tCO ₂ e 133 tCO ₂ e 9,287 tCO ₂ e 6,662 tCO ₂ e 30,804 tCO ₂ e 16,321 tCO ₂ e 143,987 tCO₂e	
	Amount of GHG emission reductions	CPA ID Expected ER from CPAs included in Monitoring Report		
		7359-P1-0027-CP1 36,211 tCO ₂ e		

or net anthropogenic GHG removals estimated ex ante for this monitoring period in the CPA-DDs for the CPAs covered in this monitoring report	7359-P1-0028-CP1	19,966 tCO ₂ e
	7359-P1-0029-CP1	20,320 tCO ₂ e
	7359-P1-0030-CP1	19,862 tCO ₂ e
	7359-P1-0031-CP1	19,944 tCO ₂ e
	7359-P1-0032-CP1	19,670 tCO ₂ e
	7359-P1-0033-CP1	19,495 tCO ₂ e
	7359-P1-0034-CP1	18,488 tCO ₂ e
	7359-P1-0042-CP1	48,180 tCO ₂ e
	7359-P1-0047-CP1	56,240 tCO ₂ e
	7359-P1-0060-CP1	124,000 tCO ₂ e
	7359-P1-0061-CP1	124,000 tCO ₂ e
	7359-P1-0062-CP1	120,000 tCO ₂ e
	7359-P1-0063-CP1	60,000 tCO ₂ e
	7359-P1-0064-CP1	8,596 tCO ₂ e
	7359-P1-0065-CP1	42,983 tCO ₂ e
	7359-P1-0066-CP1	41,469 tCO ₂ e
	Total	783,664 tCO₂e

PART I Monitoring of programme of activities (PoA)

SECTION A. Description of PoA

A.1. General description of PoA

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The goal of the PoA is to reduce the demand for wood and charcoal and to contribute to sustainable development.

The purpose of the PoA is to use carbon finance for the dissemination of solutions that will reduce the use of non-renewable fuel for cooking. The project activity reduces CO₂ emission by replacing the use of non-renewable fuel for cooking with clean renewable fuel for cooking. The solutions may include solutions that provide clean drinking water to the households so that they do not need to boil water and / or providing households with cookstoves using renewable fuel.

The technology and equipment include ethanol stoves, biogas stoves, and water purification systems. ER is achieved from the distribution of ethanol stoves only for the CPAs included in the batch of CPAs included in this monitoring report.

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
Title: PoA for the Reduction of emission from non-renewable fuel from cooking at household level. Identification: Part II of PoA-DD,	PoA-DD, version 23.3, dated 11/02/2021	01 Energy industries (renewable - / non-renewable sources)	AMS I.E., Version 04 – Switch from Non-Renewable Biomass for Thermal Applications by the User
-	-	-	-
-	-	-	-

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)
CPA-MA-001-Ambhohidratrimo 7359-P1-0001-CP1	Version 23.3	Title: PoA for the Reduction of emission from non-renewable fuel from cooking at household level. Identification: Part II of PoA-DD, version 23.3, dated 11/02/2021.	Renewable crediting period 01/01/2013 - 31/12/2019	No (excluded)
CPA-MA 002 Atsinanana 1 7359-P1-0002-CP1	Version 23.3	Title: PoA for the Reduction of emission from non-renewable fuel from cooking at household level. Identification: Part II of PoA-DD, version 23.3, dated 11/02/2021.	Renewable crediting period 28/05/2014 - 27/05/2021	No (excluded)
CPA-MA-003 Antananarivo Renivohitra 4 7359-P1-0003-CP1	Version 23.3	Title: PoA for the Reduction of emission from non-renewable fuel from cooking at household level. Identification: Part II of PoA-DD, version 23.3, dated 11/02/2021.	Renewable crediting period 28/05/2014 - 27/05/2021	No (excluded)
CPA-MA- 004 Vakinankaratra 1 7359-P1-0004-CP1	Version 23.3	Title: PoA for the Reduction of emission from non-renewable fuel from cooking at household level. Identification: Part II of PoA-DD, version 23.3, dated 11/02/2021.	Renewable crediting period 28/05/2014 - 27/05/2021	No (excluded)
CPA-MA-005 Vakinankaratra 2 7359-P1-0005-CP1	Version 23.3	Title: PoA for the Reduction of emission from non-renewable fuel from cooking at household level. Identification: Part II of PoA-DD, version 23.3, dated 11/02/2021.	Renewable crediting period 28/05/2014 - 27/05/2021	No (excluded)
CPA-MA- 006 Vakinankaratra 3 7359-P1-0006-CP1	Version 23.3	Title: PoA for the Reduction of emission from non-renewable fuel from cooking at household level. Identification: Part II of PoA-DD, version 23.3, dated 11/02/2021.	Renewable crediting period 28/05/2014 - 27/05/2021	No (excluded)
CPA-MA- 007 Vakinankaratra 4 7359-P1-0007-CP1	Version 23.3	Title: PoA for the Reduction of emission from non-renewable fuel from cooking at household level. Identification: Part II of PoA-DD, version 23.3, dated 11/02/2021.	Renewable crediting period 28/05/2014 - 27/05/2021	No (excluded)
CPA-MA-008	Version	Title: PoA for the Reduction	Renewable	No (excluded)

Atsinanana 2 7359-P1-0008-CP1	23.3	of emission from non-renewable fuel from cooking at household level. Identification: Part II of PoA-DD, version 23.3, dated 11/02/2021.	crediting period 28/05/2014 - 27/05/2021	
CPA-MA-009 Alaotra Mangoro 7359-P1-0009-CP1	Version 23.3	Title: PoA for the Reduction of emission from non-renewable fuel from cooking at household level. Identification: Part II of PoA-DD, version 23.3, dated 11/02/2021.	Renewable crediting period 28/05/2014 - 27/05/2021	No (excluded)
CPA-MA-010 Haute Matsiatra 1 7359-P1-00010-CP1	Version 23.3	Title: PoA for the Reduction of emission from non-renewable fuel from cooking at household level. Identification: Part II of PoA-DD, version 23.3, dated 11/02/2021.	Renewable crediting period 28/05/2014 - 27/05/2021	No (excluded)
CPA-MA-011 Haute Matsiatra 2 7359-P1-0011-CP1	Version 23.3	Title: PoA for the Reduction of emission from non-renewable fuel from cooking at household level. Identification: Part II of PoA-DD, version 23.3, dated 11/02/2021.	Renewable crediting period 28/05/2014 - 27/05/2021	No (excluded)
CPA-MA-012 Haute Matsiatra 3 7359-P1-0012-CP1	Version 23.3	Title: PoA for the Reduction of emission from non-renewable fuel from cooking at household level. Identification: Part II of PoA-DD, version 23.3, dated 11/02/2021.	Renewable crediting period 28/05/2014 - 27/05/2021	No (excluded)
CPA-MA-013 Antananarivo Avaradrano 7359-P1-0013-CP1	Version 23.3	Title: PoA for the Reduction of emission from non-renewable fuel from cooking at household level. Identification: Part II of PoA-DD, version 23.3, dated 11/02/2021.	Renewable crediting period 28/05/2014 - 27/05/2021	No (excluded)
CPA-MA-014 Bongolava 7359-P1-0014-CP1	Version 23.3	Title: PoA for the Reduction of emission from non-renewable fuel from cooking at household level. Identification: Part II of PoA-DD, version 23.3, dated 11/02/2021.	Renewable crediting period 28/05/2014 - 27/05/2021	No (excluded)
CPA-MA-015 Itasy 7359-P1-0015-CP1	Version 23.3	Title: PoA for the Reduction of emission from non-renewable fuel from cooking at household level. Identification: Part II of PoA-DD, version 23.3, dated 11/02/2021.	Renewable crediting period 28/05/2014 - 27/05/2021	No (excluded)

CPA-MA-016 Analamanga 1 7359-P1-0016-CP1	Version 23.3	Title: PoA for the Reduction of emission from non-renewable fuel from cooking at household level. Identification: Part II of PoA-DD, version 23.3, dated 11/02/2021.	Renewable crediting period 28/05/2014 - 27/05/2021	No (excluded)
CPA-MA-017 Analamanga 2 7359-P1-0017-CP1	Version 23.3	Title: PoA for the Reduction of emission from non-renewable fuel from cooking at household level. Identification: Part II of PoA-DD, version 23.3, dated 11/02/2021.	Renewable crediting period 28/05/2014 - 27/05/2021	No (excluded)
CPA-MA-018 Analamanga 3 7359-P1-0018-CP1	Version 23.3	Title: PoA for the Reduction of emission from non-renewable fuel from cooking at household level. Identification: Part II of PoA-DD, version 23.3, dated 11/02/2021.	Renewable crediting period 28/05/2014 - 27/05/2021	No (excluded)
CPA-MA-019 Antananarivo Renivohitra 1 7359-P1-0019-CP1	Version 23.3	Title: PoA for the Reduction of emission from non-renewable fuel from cooking at household level. Identification: Part II of PoA-DD, version 23.3, dated 11/02/2021.	Renewable crediting period 28/05/2014 - 27/05/2021	No (excluded)
CPA-MA-020 Antananarivo Renivohitra 2 7359-P1-0020-CP1	Version 23.3	Title: PoA for the Reduction of emission from non-renewable fuel from cooking at household level. Identification: Part II of PoA-DD, version 23.3, dated 11/02/2021.	Renewable crediting period 28/05/2014 - 27/05/2021	No (excluded)
CPA-MA-021 Antananarivo Renivohitra 3 7359-P1-0021-CP1	Version 23.3	Title: PoA for the Reduction of emission from non-renewable fuel from cooking at household level. Identification: Part II of PoA-DD, version 23.3, dated 11/02/2021.	Renewable crediting period 28/05/2014 - 27/05/2021	No (excluded)
CPA-MA-022 Antananarivo Renivohitra 5 7359-P1-0022-CP1	Version 23.3	Title: PoA for the Reduction of emission from non-renewable fuel from cooking at household level. Identification: Part II of PoA-DD, version 23.3, dated 11/02/2021.	Renewable crediting period 28/05/2014 - 27/05/2021	No (excluded)
CPA-MA 023 Antananarivo Renivohitra 6 7359-P1-0023-CP1	Version 23.3	Title: PoA for the Reduction of emission from non-renewable fuel from cooking at household level. Identification: Part II of PoA-DD, version 23.3, dated	Renewable crediting period 28/05/2014 -	No (excluded)

		11/02/2021.	27/05/2021	
CPA-ET-001 LIBEN ZONE 7359-P1-0024-CP1	Version 23.3	Title: PoA for the Reduction of emission from non- renewable fuel from cooking at household level. Identification: Part II of PoA- DD, version 23.3, dated 11/02/2021.	Renewable crediting period 28/05/2014 - 27/05/2021	No
CPA-ET-002 GULELE 7359-P1-0025-CP1	Version 23.3	Title: PoA for the Reduction of emission from non- renewable fuel from cooking at household level. Identification: Part II of PoA- DD, version 23.3, dated 11/02/2021.	Renewable crediting period 28/05/2014 - 27/05/2021	No
CPA-ET-003 KOLFE KERANYO 7359-P1-0026-CP1	Version 23.3	Title: PoA for the Reduction of emission from non- renewable fuel from cooking at household level. Identification: Part II of PoA- DD, version 23.3, dated 11/02/2021.	Renewable crediting period 28/05/2014 - 27/05/2021	No
CPA-KE-001 KIBERA 7359-P1-0027-CP1	Version 23.3	Title: PoA for the Reduction of emission from non- renewable fuel from cooking at household level. Identification: Part II of PoA- DD, version 23.3, dated 11/02/2021.	Renewable crediting period 28/05/2014 - 27/05/2021	Yes
CPA-KE-002 NAIVASHA 7359-P1-0028-CP1	Version 23.3	Title: PoA for the Reduction of emission from non- renewable fuel from cooking at household level. Identification: Part II of PoA- DD, version 23.3, dated 11/02/2021.	Renewable crediting period 28/05/2014 - 27/05/2021	Yes
CPA-KE-003 KILIFI A 7359-P1-0029-CP1	Version 23.3	Title: PoA for the Reduction of emission from non- renewable fuel from cooking at household level. Identification: Part II of PoA- DD, version 23.3, dated 11/02/2021.	Renewable crediting period 28/05/2014 - 27/05/2021	Yes
CPA-KE-004 KILIFI B 7359-P1-0030-CP1	Version 23.3	Title: PoA for the Reduction of emission from non- renewable fuel from cooking at household level. Identification: Part II of PoA- DD, version 23.3, dated 11/02/2021.	Renewable crediting period 28/05/2014 - 27/05/2021	Yes
CPA-KE-005 MOMBASA 7359-P1-0031-CP1	Version 23.3	Title: PoA for the Reduction of emission from non- renewable fuel from cooking at household level. Identification: Part II of PoA-	Renewable crediting period 28/05/2014	Yes

		DD, version 23.3, dated 11/02/2021.	- 27/05/2021	
CPA-KE-006 KWALE 7359-P1-0032-CP1	Version 23.3	Title: PoA for the Reduction of emission from non-renewable fuel from cooking at household level. Identification: Part II of PoA-DD, version 23.3, dated 11/02/2021.	Renewable crediting period 28/05/2014 - 27/05/2021	Yes
CPA-KE-007 LAMU 7359-P1-0033-CP1	Version 23.3	Title: PoA for the Reduction of emission from non-renewable fuel from cooking at household level. Identification: Part II of PoA-DD, version 23.3, dated 11/02/2021.	Renewable crediting period 28/05/2014 - 27/05/2021	Yes
CPA-KE-008 KISUMU 7359-P1-0034-CP1	Version 23.3	Title: PoA for the Reduction of emission from non-renewable fuel from cooking at household level. Identification: Part II of PoA-DD, version 23.3, dated 11/02/2021.	Renewable crediting period 28/05/2014 - 27/05/2021	Yes
CPA-ML-001 LILONGWE 7359-P1-0035-CP1	Version 23.3	Title: PoA for the Reduction of emission from non-renewable fuel from cooking at household level. Identification: Part II of PoA-DD, version 23.3, dated 11/02/2021.	Renewable crediting period 28/05/2014 - 27/05/2021	No
CPA-MO-001 MAPUTO CITY 7359-P1-0036-CP1	Version 23.3	Title: PoA for the Reduction of emission from non-renewable fuel from cooking at household level. Identification: Part II of PoA-DD, version 23.3, dated 11/02/2021.	Renewable crediting period 28/05/2014 - 27/05/2021	No
CPA-MO-002 MAPUTO PROVINCE 7359-P1-0037-CP1	Version 23.3	Title: PoA for the Reduction of emission from non-renewable fuel from cooking at household level. Identification: Part II of PoA-DD, version 23.3, dated 11/02/2021.	Renewable crediting period 28/05/2014 - 27/05/2021	No
CPA-NI-001 OYO STATE 7359-P1-0038-CP1	Version 23.3	Title: PoA for the Reduction of emission from non-renewable fuel from cooking at household level. Identification: Part II of PoA-DD, version 23.3, dated 11/02/2021.	Renewable crediting period 28/05/2014 - 27/05/2021	No
CPA-NI-002 DELTA STATE 7359-P1-0039-CP1	Version 23.3	Title: PoA for the Reduction of emission from non-renewable fuel from cooking at household level.	Renewable crediting period	No

		Identification: Part II of PoA-DD, version 23.3, dated 11/02/2021.	28/05/2014 - 27/05/2021	
CPA-UG-001 KIRA TOWN 7359-P1-0040-CP1	Version 23.3	Title: PoA for the Reduction of emission from non-renewable fuel from cooking at household level. Identification: Part II of PoA-DD, version 23.3, dated 11/02/2021.	Renewable crediting period 28/05/2014 - 27/05/2021	No
CPA-ZA-001 LUSAKA 7359-P1-0041-CP1	Version 23.3	Title: PoA for the Reduction of emission from non-renewable fuel from cooking at household level. Identification: Part II of PoA-DD, version 23.3, dated 11/02/2021.	Renewable crediting period 28/05/2014 - 27/05/2021	No
CPA-MA-024 MADAGASCAR 7359-P1-0042-CP1	Version 23.3	Title: PoA for the Reduction of emission from non-renewable fuel from cooking at household level. Identification: Part II of PoA-DD, version 23.3, dated 11/02/2021.	Renewable crediting period 28/05/2014 – 27/05/2021	Yes
CPA- CA-001-Chad 7359-P1-0043-CP1	Version 23.3	Title: PoA for the Reduction of emission from non-renewable fuel from cooking at household level. Identification: Part II of PoA-DD, version 23.3, dated 11/02/2021.	Renewable crediting period 28/05/2014 – 27/05/2021	No
CPA- ET-004-Ethiopia 7359-P1-0044-CP1	Version 23.3	Title: PoA for the Reduction of emission from non-renewable fuel from cooking at household level. Identification: Part II of PoA-DD, version 23.3, dated 11/02/2021.	Renewable crediting period 28/05/2014 – 27/05/2021	No
CPA-GA-001 GHANA 7359-P1-0045-CP1	Version 23.3	Title: PoA for the Reduction of emission from non-renewable fuel from cooking at household level. Identification: Part II of PoA-DD, version 23.3, dated 11/02/2021.	Renewable crediting period 28/05/2014 – 27/05/2021	No
CPA-IC-001 IVORY COAST 7359-P1-0046-CP1	Version 23.3	Title: PoA for the Reduction of emission from non-renewable fuel from cooking at household level. Identification: Part II of PoA-DD, version 23.3, dated 11/02/2021.	Renewable crediting period 28/05/2014 – 27/05/2021	No
CPA-KE-009 KENYA 7359-P1-0047-CP1	Version 23.3	Title: PoA for the Reduction of emission from non-renewable fuel from cooking	Renewable crediting period	Yes

		at household level. Identification: Part II of PoA-DD, version 23.3, dated 11/02/2021.	28/05/2014 – 27/05/2021	
CPA- LI-001-LIBERIA 7359-P1-0048-CP1	Version 23.3	Title: PoA for the Reduction of emission from non-renewable fuel from cooking at household level. Identification: Part II of PoA-DD, version 23.3, dated 11/02/2021.	Renewable crediting period 28/05/2014 – 27/05/2021	No
CPA- ML-002-Malawi 7359-P1-0049-CP1	Version 23.3	Title: PoA for the Reduction of emission from non-renewable fuel from cooking at household level. Identification: Part II of PoA-DD, version 23.3, dated 11/02/2021.	Renewable crediting period 28/05/2014 – 27/05/2021	No
CPA- MO-003-MOZAMBIQUE 7359-P1-0050-CP1	Version 23.3	Title: PoA for the Reduction of emission from non-renewable fuel from cooking at household level. Identification: Part II of PoA-DD, version 23.3, dated 11/02/2021.	Renewable crediting period 28/05/2014 – 27/05/2021	No
CPA- NA-001-Namibia 7359-P1-0051-CP1	Version 23.3	Title: PoA for the Reduction of emission from non-renewable fuel from cooking at household level. Identification: Part II of PoA-DD, version 23.3, dated 11/02/2021.	Renewable crediting period 28/05/2014 – 27/05/2021	No
CPA- NI-003-NIGERIA 7359-P1-0052-CP1	Version 23.3	Title: PoA for the Reduction of emission from non-renewable fuel from cooking at household level. Identification: Part II of PoA-DD, version 23.3, dated 11/02/2021.	Renewable crediting period 28/05/2014 – 27/05/2021	No
CPA- RW-001-Rwanda 7359-P1-0053-CP1	Version 23.3	Title: PoA for the Reduction of emission from non-renewable fuel from cooking at household level. Identification: Part II of PoA-DD, version 23.3, dated 11/02/2021.	Renewable crediting period 28/05/2014 – 27/05/2021	No
CPA- SL-001-Sierra Leone 7359-P1-0054-CP1	Version 23.3	Title: PoA for the Reduction of emission from non-renewable fuel from cooking at household level. Identification: Part II of PoA-DD, version 23.3, dated 11/02/2021.	Renewable crediting period 28/05/2014 – 27/05/2021	No
CPA- UG-002-Uganda 7359-P1-0055-CP1	Version 23.3	Title: PoA for the Reduction of emission from non-	Renewable crediting	No

		renewable fuel from cooking at household level. Identification: Part II of PoA-DD, version 23.3, dated 11/02/2021.	period 28/05/2014 – 27/05/2021	
CPA- ZA-002-Zambia 7359-P1-0056-CP1	Version 23.3	Title: PoA for the Reduction of emission from non-renewable fuel from cooking at household level. Identification: Part II of PoA-DD, version 23.3, dated 11/02/2021.	Renewable crediting period 28/05/2014 – 27/05/2021	No
CPA- ZB-001-Zimbabwe 7359-P1-0057-CP1	Version 23.3	Title: PoA for the Reduction of emission from non-renewable fuel from cooking at household level. Identification: Part II of PoA-DD, version 23.3, dated 11/02/2021.	Renewable crediting period 28/05/2014 – 27/05/2021	No
CPA- SO-001-Somalia 7359-P1-0058-CP1	Version 23.3	Title: PoA for the Reduction of emission from non-renewable fuel from cooking at household level. Identification: Part II of PoA-DD, version 23.3, dated 11/02/2021.	Renewable crediting period 01/07/2015 – 30/06/2022	No
CPA- SA-001-South Africa 7359-P1-0059-CP1	Version 23.3	Title: PoA for the Reduction of emission from non-renewable fuel from cooking at household level. Identification: Part II of PoA-DD, version 23.3, dated 11/02/2021.	Renewable crediting period 01/01/2015 – 31/12/2021	No
CPA-MA-25-Madagascar Ethanol Stove Program 7359-P1-0060-CP1	Version 23.3	Title: PoA for the Reduction of emission from non-renewable fuel from cooking at household level. Identification: Part II of PoA-DD, version 23.3, dated 11/02/2021.	Renewable crediting period 03/08/2016 – 02/08/2023	Yes
CPA-MA-26-Madagascar Ethanol Stove Program 7359-P1-0061-CP1	Version 23.3	Title: PoA for the Reduction of emission from non-renewable fuel from cooking at household level. Identification: Part II of PoA-DD, version 23.3, dated 11/02/2021.	Renewable crediting period 01/01/2018 – 31/12/2024	Yes
CPA-MA-27-Madagascar Ethanol Stove Program 7359-P1-0062-CP1	Version 23.3	Title: PoA for the Reduction of emission from non-renewable fuel from cooking at household level. Identification: Part II of PoA-DD, version 23.3, dated 11/02/2021.	Renewable crediting period 01/01/2019 – 31/12/2025	Yes
CPA-MA-28-	Version	Title: PoA for the Reduction	Renewable	Yes

Madagascar Ethanol Stove Program 7359-P1-0063-CP1	23.3	of emission from non-renewable fuel from cooking at household level. Identification: Part II of PoA-DD, version 23.3, dated 11/02/2021.	crediting period 01/01/2020 – 31/12/2026	
CPA-KE-011 Kenya Ecoeye Mombasa project 7359-P1-0064-CP1	Version 23.3	Title: PoA for the Reduction of emission from non-renewable fuel from cooking at household level. Identification: Part II of PoA-DD, version 23.3, dated 11/02/2021.	Renewable crediting period 01/11/2017 – 31/10/2024	Yes
CPA-KE-010 Kenya Samsung Mombasa project 7359-P1-0065-CP1	Version 23.3	Title: PoA for the Reduction of emission from non-renewable fuel from cooking at household level. Identification: Part II of PoA-DD, version 23.3, dated 11/02/2021.	Renewable crediting period 01/11/2017 – 31/10/2024	Yes
CPA-KE-012 Kenya Samsung project 7359-P1-0066-CP1	Version 23.3	Title: PoA for the Reduction of emission from non-renewable fuel from cooking at household level. Identification: Part II of PoA-DD, version 23.3, dated 11/02/2021.	Renewable crediting period 15/03/2018 – 14/03/2025	Yes

A.2. Coordinating/managing entity

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Havard Norstebo

Phone: +47 93630730

E-mail: hn@greendevlopment.no

Green Development AS

Wergelandsveien 27

0167 Oslo

Norway

SECTION B. Implementation of PoA

B.1. Description of implemented PoA

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The PoA was implemented in accordance with the CDM PoA DD.

Project activities was implemented with a number of Local Project Implementation Partners in the CPAs in which project activities have been implemented.

The local Project Implementation Partners (LPIP) provide the solutions to the Project Participating households. The LPIP registered the Project Participating households with the standard end user contract provided by CME.

CME has contracts with the LPIP stipulating how the income from the carbon credits will be shared between CME and LPIP.

The standard end user contract was provided in two formats, as specified in the CDM PoA DD:

1. Written end user contract
2. Smartphone application

All the project participating households are then registered in an electronic database where all project participating households are provided with a unique ID and where all relevant information is stored, including:

- Unique ID
- Name of representative for project participating household
- Address of Project participating household
- CPA
- LPIP
- Date of registration
- Type of solution provided
- Person responsible for the end user to be filled out (LPIP) (for smartphone application)
- Phone number, when available
- Picture of representative from Project Participating household (only available for households registered with smartphone application)

Deployed solutions

The households included in the CPAs in which ER is claimed are using ethanol stoves.

No emission reductions are claimed from the use of biogas system or solution that provide clean drinking water to households.

It has been confirmed through the monitoring of the representative sample of households that all households have been included in the program after the start date of the program¹.

It has been confirmed that all the households selected for monitoring, where ER is claimed, are operational and that the households confirm that they are part of the program.

The deployed ethanol stoves have a thermal efficiency of 65% and use denatured ethanol as cooking fuel. The stoves have adjustable power output. At maximum power the stoves have a thermal output of 1.6 kW. The stoves have been provided as single burners and double burners. The double burners have thermal output of 1.6 kW on each of the burners, giving total thermal output of 3.2 kW. Around 99% of all the stoves distributed are Safi Ethanol Stoves, and the remaining stoves are "Dometic Stoves", provided by Clean Cook AB. The performance of the stoves is provided in product specifications and has also been confirmed by a stove test commissioned by the World Bank and carried out by certified stove test laboratory.

Registration of project participating households.

Households are registered by a standardized end user contract or with a smartphone application. As the use of the smartphone application was only explicitly approved in the PRC of CDM PoA DD on 10/02/2014, the households registered prior to this date were registered with paper-based end user contracts. When a smartphone could not be used for practical reasons, then a paper contract was used in accordance with the PoA DD. When a paper-based contract is used, the contract is then registered with the smart phone application, and a picture of the paper-based contract is then taken as an alternative to taking picture of the representative from the project participating household.

¹ Monitoring was carried out by 3rd party consultant. The consultants that carried out the monitoring is engaged by CME to conduct the monitoring and to support quality assurance processes when the Local Project Implementation partners fail to provide such support as required. The consultants have received training and instruction on how to carry out the monitoring and which households should be monitored. The start date of the program is 30/11/2012, which is the registration date of the PoA 7359.

Sampling for the batch of CPAs

The single sampling plan was done for the batch of CPAs. The selection of households to be monitored was done by CME in accordance with the CDM PoA monitoring description. All the households registered, at the time of selection of households to be monitored in the CPAs included in this monitoring report, were copied into a spreadsheet and then random selection function in excel was used to select the households to be monitored.

The households were selected randomly. Random sampling was used to select sufficient number of households to be monitored according to the previous monitoring report, in accordance with the guidelines. The process of selecting household to be monitored, was witnessed by other staff engaged by CME.

Table – Distribution of households Monitored

CPA reference no.	Households Monitored
7359-P1-0027-CP1	2
7359-P1-0028-CP1	0
7359-P1-0029-CP1	0
7359-P1-0030-CP1	0
7359-P1-0031-CP1	0
7359-P1-0032-CP1	0
7359-P1-0033-CP1	0
7359-P1-0034-CP1	3
7359-P1-0042-CP1	5
7359-P1-0047-CP1	8
7359-P1-0060-CP1	15
7359-P1-0061-CP1	0
7359-P1-0062-CP1	0
7359-P1-0063-CP1	0
7359-P1-0064-CP1	6
7359-P1-0065-CP1	19
7359-P1-0066-CP1	6
Total	64

The consultants engaged to carry out the monitoring, visited each of the selected households twice, with exactly one week in between these two visits. The monitoring was then carried out according to the monitoring plan described in the PoA DD and CPA DDs. The consultant then registered the information on a monitoring form and submitted this for Quality Assurance.

The quality assurance manager then forwarded the monitoring forms, that were correctly and completely filled out, to CME which then registered all the monitored data in the spreadsheet for calculating the emission reductions. The emission reductions for each of the monitored households is then calculated automatically by Excel. CME double checked all the monitoring forms and all the registered monitoring data for additional quality purposes.

It should be clarified that households were selected randomly among all the households registered in the batch of CPAs included in this monitoring report at the time of selection of households to be monitored. This means that households were not selected based on which of the CPAs in the batch of CPA that they were registered. As a result, there are a number of CPAs included in the batch of CPAs in which no household were selected for monitoring. In some CPAs no project activity has started, or only very few households have been included, and as a result no household may have been selected from these CPAs.

Required minimum sample size

The minimum required sample size, in accordance with the PoA DD, and the CPA DDs, should be sufficient to meet the 95/10 confidence level. During the previous monitoring survey, a minimum sample size of 63.1 samples would have been needed to reach the 95/10 confidence level. This

was rounded up to 64 sample, which is the sample size used for the monitoring survey for this monitoring report.

The formula to calculate the required sample size where:

$$n \geq \frac{1.96^2}{(N-1) + 0.1^2 + 1.96^2 v}$$

Where: $V = \left(\frac{SD}{mean} \right)^2$

n = Sample size – number of households needed to be included in sample.

N = Total number of households that can reply to a particular parameter

Mean = To be estimated or calculated prior to monitoring

SD. = To be estimated or calculated prior to monitoring

1.96. = Represents the 95% confidence required

0.1. = represents the 10% relative precision.

The minimum required sample size was calculated in accordance with the is 95/10 is calculated as:

$$n \geq \frac{1.96^2}{(N-1) + 0.1^2 + 1.96^2 V}$$

The confidence level of 95/10 was achieved.

Table - Calculation of required sample size

Monitored households nr.	1	2	63	64	Count		Sum monitored	Average monitored	Standard Deviation	V-Value	Sample size required to achieve 95/10 confidence level	Actual sample size used for each of the parameters monitored
	CPA-MA-24-Madagascar - 3459	CPA-MA-24-Madagascar - 3836	CPA-KE-012-SAMSUNG-1480	CPA-KE-012-SAMSUNG-2529								
Households Identification Reference	87949	88335	106798	108471								
Monitored values												
Fuel at start of monitoring survey	12	12	12	12								
Fuel at end of monitoring survey	4.8	5.75	9	6.8								
Adjustment factor	7%	4%	5%	5%	64		4.83	0.08	0.02	0.05	19	64
ET _{stove,units}	1.00	1.00	1.00	1.00	64		64.00	1.00	-	0.00	0	64
ET _{usage} (liter pure denaturated alcohol per day)	0.96	0.86	0.41	0.71	63		44.19	0.70	0.268	0.15	56	64
BG _{stove,units}	0.00	0.00	0.00	0.00	0		0.00		-			
BG _{usage} (m ³ per day)	0.00	0.00	0.00	0.00	0		0.00		-			
People in household	6.00	6.00	1.00	6.00	64		300.00	4.69				
N _{day} (Number of people drinking purified water)	0.00	0.00	0.00	0.00	0		0.00		-			
QDW _{day} (Volume of water per person is drinking per day, in liter)	0.00	0.00	0.00	0.00	0		0.00		-			
BG _{stove,capacity} (kW)	0.00	0.00	0.00	0.00	0		0.00		-			
ET _{stove,capacity} (kW)	1.60	1.60	1.60	1.60	64		129.60	2.03	0.72	0.12	48	64
Thermal output water purification system (Kw)	0.00	0.00	0.00	0.00	0		0.00		-			
BG _{stove,efficiency} (% efficiency)	0.00	0.00	0.00	0.00	0		0.00		-			
ET _{stove,efficiency} (% efficiency)	65.00	65.00	65.00	65.00	64		4160.00	65.00	-	0.00	0	64
W _{quality} (1 represent water that meet quality requirement)	0	0	0	0	0		0.00		-			
Thermal output (Kw)	1.60	1.60	1.60	1.60	64		129.60	2.03	0.72	0.12	48	64

The data in the above table is from “spreadsheet for calculations” that has been submitted to DOE as supporting document to this monitoring report. See Tab “Monitoring data”.

Table - The thermal output of each CPA is less than the 45 MW small scale CDM threshold

Thermal Output by CPA							
		Houesholds provided with ethanol stoves	Thermal output of ethanol stove (kW)	Total thermal output per CPA (kW)	Total thermal output per CPA in MW	Max thermal ouput per	Actual thermal output is below maximum
CPA name	CPA number						
Kenya-CPA-KE-001-Kibera	7359-P1-0027	2004	2.03	4058.10	4.06	45	Yes
Kenya-CPA-KE-008-Kisumu	7359-P1-0034	1485	2.03	3007.13	3.01	45	Yes
Madagascar-CPA-MA-24	7359-P1-0042	3747	2.03	7587.67	7.59	45	Yes
Kenya-CPA-KE-009-Kenya	7359-P1-0047	5236	2.03	10602.90	10.60	45	Yes
Madagascar-CPA-MA-25	7359-P1-0060	5408	2.03	10951.20	10.95	45	Yes
Madagascar-CPA-MA-26	7359-P1-0061	254	2.03	514.35	0.51	45	Yes
Madagascar-CPA-MA-27	7359-P1-0062	30	2.03	60.75	0.06	45	Yes
Madagascar-CPA-MA-28	7359-P1-0063	2085	2.03	4222.13	4.22	46	Yes
Kenya-CPA-KE-011-Ecoeye	7359-P1-0064	1496	2.03	3029.40	3.03	46	Yes
Kenya-CPA-KE-010-Samsung	7359-P1-0065	6915	2.03	14002.88	14.00	46	Yes
Kenya-CPA-KE-012-Samsung	7359-P1-0066	3664	2.03	7419.60	7.42	46	Yes
Total		32324					

As can be seen from the table above, which can also be found in the “Spreadsheet for calculations” under tab “Thermal output”, the total thermal output for each the CPAs included in this Monitoring Report is less than the 45 MW threshold in accordance with the Eligibility criteria of the PoA DD and the CPA DDs.

No household has equipment that has a thermal output of more than 3.20 kW. This is below the threshold for inclusion in the program in accordance with the Eligibility criteria, and also below the threshold for de-bundling check.

B.2. Post-registration changes to PoA

B.2.1. Corrections

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PRC to PoA DD with PRC reference number PRC-7359-001

- Correction to the document version number and the date of the completion of the CDM PoA DD.
- Correct from Ethanol to Denatured Alcohol to clarify that ethanol which has not been denatured will not be included in the program. CDM PoA DD version 10 allowed could be understood to allow for un-denatured ethanol to be used by the program. Such un-denatured ethanol could be used for drinking, which could contribute to negative social impacts. By requiring that the liquid fuel used by the projects are to be denatured, the risk of negative social impacts is greatly reduced. CDM PoA DD version 11 and 12 has hence required that the liquid fuel must be denatured. It has been clarified that the chemical composition of the ethanol will not change in other ways than what is caused by adding a bittering agent at the rate of 1 to 100 000. Correct to clarify the geographical limitation of each CPA within the CDM PoA DD
- Correction of spellings including change from Kw to kW as a number of spelling mistakes have been found in CDM PoA DD version 10.
- Correction to clarify the required purified water standards. In the CDM PoA DD version 10 it was simply stating that the water shall meet WHO standards. A correction has been made to provide a specific WHO standard for drinking water and specified that national standards shall be used when available in accordance with the methodology.
- Correction with regards to end user agreements. In CDM PoA DD version 10 it was no specification with regards to the format of the end user agreement. The CDM PoA DD version 11 and 12 has clarified that the end user agreements could be a contract signed by each individual end user, it could be a contract generated by a smart phone application.
- Correction to the data management. In CDM PoA DD version 10 it was stated that the data should be stored. In CDM PoA DD version 11 and 12 it has been specified that the data might be stored electronically and that end user contracts might be submitted

to the Project Participant through any means that technology will allow for that provide a safe and verifiable registration of end user households included in the program.

- Correction related to reference to Program Management Manual. In CDM PoA DD version 10 it was on several occasions referred to the Program Management Manual, but the issues which was previously referred to in this manual has been included in CDM PoA DD version 11 and 12 and the reference to the Program Management Manual has hence been removed.
- Correction related to the stakeholder consultation. In CDM PoA DD version 10 it was referred to Word Bank or other 3rd party to assist with the stakeholder consultation. This has been removed in CDM PoA DD version 11 and 12 as it is accepted that the Project Participant might conduct the stakeholder consultation on their own without the assistance from 3rd parties.
- Corrections to the baseline scenario. In CDM PoA DD version 10 it was simply assumed that all household boiled their water in the baseline scenario if that was the predominant solutions in the project area. A correction has been made in CDM PoA DD version 11 and 12 so that emission reductions will only be claimed for getting purified water, where it can be confirmed from the end user contracts that the household did boil their water in the baseline scenario
- Corrections have been made to Appendix 1 in the CDM PoA DD. Version 11 and 12 has been corrected to give the updated email address of contact person.
- Corrections have been made to annex 4 in the CDM PoA DD. Part of the annex has been removed as it is not correctly representing all CPAs in the CDM PoA.

The corrections listed above was approved by the CDM EB prior to this Monitoring Report. The correction was approved by the CDM EB on 14/02/2014 with effective approval date 10/02/2014.

PRC to PoA DD with PRC reference number PRC-7359-003

1. Minor spelling and removing of space between words and paragraphs.
2. Change of fonts used in the document where different fonts were initially used.
3. Using the latest format of the CDM POA DD (Version 8.1 which is used for this document)
4. Correction to the document version number and the date of the completion of the PoA DD.
5. Moved the summary of the PRC that was done in version 13 of this document from the main text, to this appendix.
6. Included information in sections of the PoA DD form version 8.1, which was not part of the PoA DD form for used for version 13 of the PoA DD.
7. Clarified that denatured alcohol might also be sources from sugar factories and other entities, that make ethanol as a by-product from their main business, in addition to purchase from micro distilleries (does not change the requirement to document that the fuel is renewable).
8. Eligibility criteria 3 has been corrected with "The water purification system is using non-renewable energy source" to "The water purification system is using renewable energy sources". The corrections to the EC do not have any impact on additionality or any other requirements for eligibility criteria's and does not impact ER calculations.
9. Updated the contact information.
10. Clarified the conditions for the credit facility that CME seek to provide to expand the program.
11. Included explanation that income from CER sales to pay for aftersales support to ensure that the system remain operational
12. Addition of text in footnote under section A.3 to state, "the most cost-efficient solutions most suitable for the local conditions might be used as long as they still remain within the framework described in this document and comply with the methodology. These shall include the use of membrane-based systems for household water purification systems, Community based water purification systems using filtering technology".
13. Republic of Korea has been included as an Annex 1 party to the PoA in section A.5.

14. The statement “Due to the almost limitless potential supply of denatured alcohol, the ethanol stoves are expected to provide most of the emission reduction from the SSC-PoA”, has been removed.
15. The technology deployed, based on local conditions, shall be identified and described at the time of CPA implementation and inclusion and shall also be described as part of the monitoring process, for each household selected for monitoring.
16. A table has been included in appendix 5, to provide guideline on how to determine if ethanol is considered renewable energy and to calculate potential leakage in accordance with General guidance on leakage in biomass project.
17. Section I.7.1 and section I.7.3 has been updated with regards to how to determine if ethanol is considered renewable energy and to calculate potential leakage in accordance with General guidance on leakage in biomass project.

PRC to PoA DD version 22, with reference number PRC-7359-005

Change in value of NCV_{biogas} . The value was changes from 0.000215 TJ/m³ to 0.0000215 TJ/m³

The corrections listed above was approved by the CDM EB prior to the end of the Monitoring Period. Effective approval date: 02/04/2020.

PRC to PoA DD version 23.3, with reference number PRC-7359-020

Corrections include

1. Minor spelling and removing of spaces between words and paragraphs.
2. Change of fonts used in the document where different fonts were initially used.
3. PoA-DD revised as per the latest template (Version 09) guidelines.

The corrections listed above was approved by the CDM EB prior to the end of the Monitoring Period. Effective approval date: 21/04/2021.

B.2.2. Inclusion of monitoring plan

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Not applicable.

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

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Permanent changes to the registered monitoring plan of PoA DD with PRC reference number is PRC-7359-001

- Changes of sampling process of the monitoring process. CDM PoA DD version 10 simply referred to a process in the Program Management Manual, that was an appendix to CDM PoA DD. The sampling process has now been included in the CDM PoA DD version 11 and 12. Furthermore, corrections to the sampling process have been made based on new standards and guidelines from the Executive Board.
- Change of the confidence level of the sample size. In CDM PoA DD version 10 a confidence level of 90/10 was given. In CDM PoA DD version 11 and 12 it has been specified that a higher level of confidence level, namely 95/10 should be used when a group of several CPAs are included in the same monitoring process in accordance with new guidelines from the Executive board.
- Change has been made in the definition of $ET_{usage,y}$. In CDM PoA DD version 10 it was defined as consumption multiplied with the purity of the fuel. In CDM PoA DD version 11 and 12 it has been corrected to be defined as consumption of fuel multiplied with the purity of the fuel determined by the energy content of the fuel

- Change related to sample size. In the CDM PoA DD version 10 it was referred to a required sample size of 68. In CDM PoA DD version 11 and 12 it has been corrected to specify that the sample size of 68 only refers to the required sample size for the baseline study and not for the sample size for the annual monitoring.
- Change to the monitoring process. In CDM PoA DD version 10 the monitoring process was described in detail in the Program Management Manual. In CDM PoA DD version 11 and 12 the monitoring process has been included into the CDM PoA DD. The monitoring process has not been changed.
- Change to the monitoring form. In CDM PoA DD version 10 the monitoring form was given in the Program Management Manual. In CDM PoA DD version 11 the monitoring form was included in the CDM PoA DD. In CDM PoA DD version 12 the monitoring form was updated to include a confirmation that the households that get purified water as part of the program, no longer boil their water. This correction was done to avoid claiming emission reductions from households that continue to boil their water after receiving purified water by solutions provided by the program.
- Change has been made with regards to the representative sampling. In CDM PoA DD version 11 and 12 it has been updated to reflect new standards and guidelines by the executive board.
- Changes to Eligibility Criteria 17. This change is in accordance with paragraph 133 of projects cycle procedures.
- Changes to Geographical boundary of the program. This change is in accordance with paragraph 131 of project cycle procedures.

The permanent changes to the registered monitoring listed above was approved by the CDM EB prior to this Monitoring Report. The permanent changes to the registered monitoring was approved by the CDM EB on 17/02/2014, with effective approval date 10/02/2014.

Permanent changes to the registered monitoring plan of PoA DD, with PRC reference number PRC-7359-003

1. Revision in monitoring frequency of the ex-post parameters from Annual to at least biennial. (except for ET_{stove, Capacity,y} and BG_{stove, Capacity,y}, which will be monitored annually).
2. Addition of text to indicate scanned (soft) copies of baseline survey forms might be provided to CME rather than sending the original survey forms by regular post.
3. Addition of provision to account for failure to reach required confidence/precision level at the time of verification in accordance with latest version of CDM rules and regulations available at the time of verification.
4. Addition of text to indicate that random selection of households to be monitored, could be done with the use of random selection in excel, from all project participating households in the CPA or batch of CPA included in the program at the time of selection of household to be monitored.
5. Addition of text to clarify that water test to confirm that drinking water supplied by the program meet the required WHO's interim performance targets on household's water treatment, can additionally be done by a certified laboratory on-site during the monitoring process.
6. Deletion of text with reference to number (20) and volume (10 litre) of empty water containers for monitoring purpose to households that use purified water.
7. Change in personnel responsible for calculation of emission reductions for the CPA from Recording and Data Manager to CME.
8. Addition of a row to provide for the name of a person from the household that has been monitored in the Monitoring Form.

Any additional requirements in the Monitoring plan specified in the PoA DD after PRC, shall apply to all CPAs even if such additional requirements are not specified in CPAs that has been included in the program prior to the PRC.

The PRC does not change the calculation of the ER or the application of the additionality or eligibility of the program to the compliance with the deployed methodology or compliance with any CDM rules and regulations.

The above PRC was registered in PoA 7359 version 22, which was registered on 20/05/2018.

Permanent changes to the registered monitoring plan of PoA DD version 23,.3 with PRC reference number PRC-7359-020 was approved by the CDM EB on 21/04/2021.

- 1.Revision in monitoring frequency of ex-post parameters “BG_{stove, Capacity,y}”, “BG_{usage,y}” and “ET_{stove, Capacity,y}” from “annual” to “at least once in two years” and updating of the required confidence level to 95/10 for biennial sampling
- 2.Following statement has been included to be in compliance with the monitoring form in the latest version of the PoA DD, which specify that it shall be confirmed if the system is operational or not.
“Check that the appliances are still operating or are replaced by an equivalent in service appliance”

B.2.4. Changes to programme design

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- 1.Change in measurement methods and procedures for parameter QDW_{p,y} to indicate that monitoring of random sample of project participating households will be done according to the monitoring process as described in the Monitoring Plan in place of Program management manual.
- 2.Inclusion of text to indicate that 95/5² confidence level shall be applied in case of biennial monitoring. Furthermore, sample size shall be sufficient to obtain 95/5 confidence level in case annual or biennial sampling is performed for group of CPAs under the PoA.

Permanent changes to the registered monitoring plan of PoA DD, with PRC reference number PRC-7359-003

The permanent changes to the registered monitoring listed above was approved by the CDM EB prior to this Monitoring Report. The permanent changes to the registered monitoring was approved by the CDM EB on 22/05/2018, with effective approval date 20/05/2018.

B.2.5. Changes specific to afforestation or reforestation activities

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Not applicable

PART II Monitoring of CPAs

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SECTION C. Implementation of CPAs

C.1. Description of implemented CPAs

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The implemented project activity in which ER is claimed, only includes the distribution of ethanol stoves.

² As part of the latest PRC, the required confidence level was changed to 95/10.

Out of the batch of CPAs included in this MR, 11 CPAs have project activities implemented. The rest of the CPAs included in the batch of CPAs included in this MR have no project activities started in which ER is claimed.

The status of the 11 CPAs in which project activities have been implemented, are as following:

- 7359-P1-0027-CP1 (Kenya-Kibera)
A total of 2,004 households have been provided with ethanol stoves in this CPA. See “spreadsheet for calculation”, tab “Households registered” cell AE32332
Monitoring of Co-benefits of this project has been carried out in addition to the MR for ER. The co-benefit monitoring included reduction in Black Carbon ER and reduction in indoor pollution as well as economic value, reduction of deforestation and lives saved was calculated by this study.
<http://www.starckplus.com/images/climatecare/ClimateCare-Safi-Development-Value-Report-Kibera.pdf>

https://climate-solutions.net/images/HAP_Report_2016_10_31.pdf
- 7359-P1-0034-CP1 (Kenya-Kisumu)
A total of 1,485 households have been provided with ethanol stoves in this CPA. See “spreadsheet for calculation”, tab “Households registered” cell AE32333.
- 7359-P1-0042-CP1 (Madagascar)
3,747 households have been included in this CPA in which CERs are claimed. See “spreadsheet for calculation”, tab “Households registered” cell AE32334.

The ethanol in Madagascar was provided by micro distilleries that produces ethanol from sugarcane. The sugarcane has been grown sustainably, and the micro distillery does not use any non-renewable energy for the production of the ethanol. Additional ethanol was provided from The Royal Swaziland Sugar Corporation. This ethanol was made from molasses, a by-product from sugar production.
- 7359-P1-0047-CP1 (Kenya)
5,236 households have been included in this CPA. See “spreadsheet for calculation”, tab “Households registered” cell AE32,335.
The ethanol used in Kenya was purchased from Mumias sugar company, and the ethanol was produced from a by-product from sugar production (molasses) and hence no additional sugarcane was grown to produce the fuel. This ethanol source also provided ethanol to the project activities in the other CPAs in Kenya.
- 7359-P1-0060-CP1 (Madagascar)
5,408 households have been included in this CPA. See “spreadsheet for calculation”, tab “Households registered” cell AE32336.
- 7359-P1-0061-CP1 (Madagascar)
254 households have been included in this CPA. See “spreadsheet for calculation”, tab “Households registered” cell AE32337.
- 7359-P1-0062-CP1 (Madagascar)
30 households have been included in this CPA. See “spreadsheet for calculation”, tab “Households registered” cell AE32,338.
- 7359-P1-0063-CP1 (Madagascar)
2085 households have been included in this CPA. See “spreadsheet for calculation”, tab “Households registered” cell AE32339.
- 7359-P1-0064-CP1 (Kenya – Mombasa. Implemented and financed by EcoEye Co., Ltd.)

1,497 households have been included in this CPA, and these stoves have all been provided with ethanol stoves provided and financed by EcoEye Co., Ltd. See “spreadsheet for calculation”, tab “Households registered” cell AE32340.

EcoEye Co., Ltd., which is the project implementer for this project, has fully financed the project and the project implementation. Total project costs per ethanol stove is €100. This project will expand to include more than 2000 households provided with ethanol stoves, all fully financed by the project implementer, EcoEye Co., Ltd.

- 7359-P1-0065-CP1 (Kenya – Mombasa. Implemented and financed by Samsung Electronics Co, Ltd.)
6,915 households have been included in this CPA, all provided with ethanol stoves provided and financed by Samsung Electronics Co., Ltd. See “spreadsheet for calculation”, tab “Households registered” cell AE32341.

Samsung Electronics Co., Ltd., which is the project implementer for this project, has fully financed the project and the project implementation. Total project costs per ethanol stove is €100. This project will expand to include more than 10,000 households provided with ethanol stoves, all fully financed by the project implementer, Samsung Electronics Co., Ltd.

- 7359-P1-0066-CP1 (Kenya. Implemented and financed by Samsung Electronics Co, Ltd.)
3,664 households have been included in this CPA, all provided with ethanol stoves provide and financed by Samsung Electronics Co., Ltd. See “spreadsheet for calculation”, tab “Households registered” cell AE32,342.

Samsung Electronics Co., Ltd., which is the project implementer for this project, has fully financed the project and the project implementation. This project will expand to include more than 10,000 households provided with ethanol stoves, all fully financed by the project implementer, Samsung Electronics. Total project costs per ethanol stove is €100. By providing an alternative to charcoal, the demand for charcoal will be reduced which will reduce one of the main sources of financing of terrorist organizations in East Africa, which is known to obtain major income from illegal production and sales of Charcoal³.

No project activities have started in the other CPAs included in the batch of CPAs included in this Monitoring Report. ER is claimed from 32,324 households only. See “spreadsheet for calculation, tab “Households registered” cell AE32343 which summarize the number of households in referred to in the bullet points above.

Confirmation that a household is exclusive to the CPA is confirmed in end user contract. This is confirmed by every household included in the program. Confirmation that a unique ID has been assign to each project participating household and that this is exclusive to the CPA has been provided in the spreadsheet for MR for calculation. Unique ID is listed under tab “Households registered”, column “S”.

No household has been included in any of the following CPAs included in this Monitoring report;

- CPA 7359-0028. The project start date is 01/07/2013 in accordance with the CPA DD, section A.8.1 Start date of the CPA. The start date of the crediting period is 28/05/2014 in accordance with the start date of crediting period on the UNFCCC web page. No equipment has been provided to households in this CPA as no project activities been implemented.
- CPA 7359-0029. The project start date is 01/07/2013 in accordance with the CPA DD, section A.8.1 Start date of the CPA. The start date of the crediting period is 28/05/2014 in accordance with the start date of crediting period on the UNFCCC web page. Two

³ Charcoal trade provides annual financing of between \$111 million and \$298 million to militia and terrorist groups in Africa. <https://www.unenvironment.org/news-and-stories/press-release/illegal-trade-wildlife-and-timber-products-finances-criminal-and>

households have been included in this CPA, but no ER is claimed from these households. The cost of doing a PRC for the CPA exceeded the value of the CERs hence it has been decided not to claim any further CERs from this CPA.

- CPA 7359-0030. The project start date is 01/07/2013 in accordance with the CPA DD, section A.8.1 Start date of the CPA. The start date of the crediting period is 28/05/2014 in accordance with the start date of crediting period on the UNFCCC web page. No equipment has been provided to households in this CPA as no project activities been implemented.
- CPA 7359-0031. The project start date is 01/07/2013 in accordance with the CPA DD, section A.8.1 Start date of the CPA. The start date of the crediting period is 28/05/2014 in accordance with the start date of crediting period on the UNFCCC web page. Three households have been included in this CPA, but no ER is claimed from these households. The cost of doing a PRC for the CPA exceeded the value of the CERs hence it has been decided not to claim any further CERs from this CPA.
- CPA 7359-0032. The project start date is 01/07/2013 in accordance with the CPA DD, section A.8.1 Start date of the CPA. The start date of the crediting period is 28/05/2014 in accordance with the start date of crediting period on the UNFCCC web page. No equipment has been provided to households in this CPA as no project activities been implemented.
- CPA 7359-0033. The project start date is 01/07/2013 in accordance with the CPA DD, section A.8.1 Start date of the CPA. The start date of the crediting period is 28/05/2014 in accordance with the start date of crediting period on the UNFCCC web page. No equipment has been provided to households in this CPA as no project activities been implemented.

The registration of all the households that are part of the CDM PoA can be found in <http://www.greendevlopment.no/participants>

Relevant dates for the project activity

Start of process of preparing CDM PoA DD	15/05/2011
PoA registration date	30/11/2012
Start of first Monitoring Period	28/05/2014
Exclusion of CPAs due to cost of delayed issuance process ⁴	09/09/2016
Date of withdrawal of initial MR and VR submitted to UNFCCC	12/10/2016
End of first Monitoring period	02/05/2017
End of second Monitoring Period	30/06/2018
End of Third Monitoring Period	31/05/2019
End of forth monitoring period	15/04/2020
Start of this Monitoring Period	01/01/2021
Approval date of latest version of PoA DD (PRC Approved)	21/04/2021
Approval date of latest version of CPA DD (PRC Approved)	26/04/2021
Start of Monitoring Survey	20/02/2021
End of Monitoring Survey	03/05/2021
End of this Monitoring Period	27/05/2021

C.2. Location of CPAs

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Location details of each CPA of the PoA are included below. In line with the MR filling guideline as contained in the MR Form, the following table provides details of Host Party, Region/state/province, etc., City/town/community, etc. and Physical/geographical location. These details are same as provided in the CPA DD of each registered CPA.

⁴ CPA 7359-0001 was excluded on 27/05/2016 while CPA 7359-0002 to CPA 7359-0023 was excluded from the program on 09/09/2016. The CPAs were excluded due to the delayed issuance process, which forced the CME to reduce its ambitious expansion plan.

a. Host Party(ies);

7359-P1-0027-CP1	Republic of Kenya
7359-P1-0028-CP1	Republic of Kenya
7359-P1-0029-CP1	Republic of Kenya
7359-P1-0030-CP1	Republic of Kenya
7359-P1-0031-CP1	Republic of Kenya
7359-P1-0032-CP1	Republic of Kenya
7359-P1-0033-CP1	Republic of Kenya
7359-P1-0034-CP1	Republic of Kenya
7359-P1-0042-CP1	Republic of Madagascar
7359-P1-0047-CP1	Republic of Kenya
7359-P1-0060-CP1	Republic of Madagascar
7359-P1-0061-CP1	Republic of Madagascar
7359-P1-0062-CP1	Republic of Madagascar
7359-P1-0063-CP1	Republic of Madagascar
7359-P1-0064-CP1	Republic of Kenya
7359-P1-0065-CP1	Republic of Kenya
7359-P1-0066-CP1	Republic of Kenya

b. Region/ State/ Province, etc.;

7359-P1-0027-CP1	District of Nairobi
7359-P1-0028-CP1	County of Nakuru
7359-P1-0029-CP1	County of KILIFI
7359-P1-0030-CP1	County of KILIFI
7359-P1-0031-CP1	County of MOMBASA
7359-P1-0032-CP1	County of KWALE
7359-P1-0033-CP1	County of LAMU, TANA RIVER , TAITA
7359-P1-0034-CP1	County of KISUMU
7359-P1-0042-CP1	The CPA include all of Madagascar
7359-P1-0047-CP1	The CPA include all of Kenya
7359-P1-0060-CP1	The CPA include all of Madagascar
7359-P1-0061-CP1	The CPA include all of Madagascar
7359-P1-0062-CP1	The CPA include all of Madagascar
7359-P1-0063-CP1	The CPA include all of Madagascar
7359-P1-0064-CP1	County of Mombasa
7359-P1-0065-CP1	County of Mombasa
7359-P1-0066-CP1	The CPA include all of Kenya

c. City/ Town/ Community, etc.;

7359-P1-0027-CP1	District of LANGATA
7359-P1-0028-CP1	District of Naivasha
7359-P1-0029-CP1	District of Ganze, Bahari, Kaloleni ,Rabai
7359-P1-0030-CP1	Districts of Magarini , Malindi
7359-P1-0031-CP1	Districts of Mvita, Likoni, Kisauni, Changamwe
7359-P1-0032-CP1	Districts of Matuga, Kinango, Msabweni
7359-P1-0033-CP1	County of LAMU, TANA RIVER , TAITA TAVETA
7359-P1-0034-CP1	Kisumu West, Kisumu Central, Kisumu East, Seme, Nyando, Muhoroni, Nyakach
7359-P1-0042-CP1	Project activity is not limited to any city, Town or Community but include households throughout Madagascar
7359-P1-0047-CP1	Project activity is not limited to any city, Town or Community but include households throughout Kenya

	Project activity is not limited to any city, Town or Community but include households throughout Madagascar
7359-P1-0060-CP1	
7359-P1-0061-CP1	Project activity is not limited to any city, Town or Community but include households throughout Madagascar
7359-P1-0062-CP1	Project activity is not limited to any city, Town or Community but include households throughout Madagascar
7359-P1-0063-CP1	Project activity is not limited to any city, Town or Community but include households throughout Madagascar
7359-P1-0064-CP1	All of Mombasa county, including Districts of Mvita, Likoni, Kisauni, Changamwe.
7359-P1-0065-CP1	All of Mombasa county, including Districts of Mvita, Likoni, Kisauni, Changamwe.
7359-P1-0066-CP1	Project activity is not limited to any city, Town or Community but include households throughout Kenya

The specific location of each of the households included in each of the CPAs are registered. See "Spreadsheet for calculations", tab "Households registered" column "C".

- d. Physical/ Geographical location. The geo-coordinates as provided in the MR is representative geo-coordinate either for the host country or the region as specified in the registered CPA DD. The geographical reference can be found by simple web search and the use of Wikipedia

	Latitude	Longitude
7359-P1-0027-CP1	-1.3177	36.7833
7359-P1-0028-CP1	-0.6812	36.9656
7359-P1-0029-CP1	-3.8166	39.6166
7359-P1-0030-CP1	-3.0166	40.1333
7359-P1-0031-CP1	-4.0166	39.6666
7359-P1-0032-CP1	-4.1666	39.4333
7359-P1-0033-CP1	-3.3833	38.5666
7359-P1-0034-CP1	-0.1111	34.7666
7359-P1-0042-CP1	-18.642	46.6172
7359-P1-0047-CP1	-0.0235	37.9061
7359-P1-0060-CP1	18.6420	46.6172
7359-P1-0061-CP1	18.6420	46.6172
7359-P1-0062-CP1	18.6420	46.6172
7359-P1-0063-CP1	18.6420	46.6172
7359-P1-0064-CP1	-4.0166	39.6666
7359-P1-0065-CP1	-4.0166	39.6666
7359-P1-0066-CP1	0.0235	37.9061

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

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Not applicable.

C.3.2. Corrections

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Corrections approved on 26.04.2021.

PRC-7359-007, PRC-7359-08, PRC-7359-010, PRC-7359-011, PRC-7359-012, PRC-7359-013, PRC-7359-014, PRC-7359-016, PRC-7359-017 and PRC-7359-018.

- Use of latest version of the form. This include updating the eligibility criteria in accordance with the latest version of the PoA DD.
- Updated the value of the ex-ante parameter “NCVbiogas” of the CPA-DDs to be in line the PoA DD.
- Update the monitoring process description to check that the appliances are still operating or are replaced by an equivalent in service appliance, in accordance with the methodology and the latest version of the PoA DD.
- Update the start of the crediting period in accordance with the start of the crediting period as listed on the UNFCCC webpage.
- Provided further clarification of the technology in accordance with the registered PoA DD.
- Clarified that monitoring survey should be done at least every two years, in accordance with the methodology and the PoA DD.
- Corrected Eligibility Criteria 3.3 to be in compliance with the PoA DD, when applicable.
- Include parameters that is listed in the PoA DD when applicable. These parameters are not relevant to the CPA as it related to the use of biogas stoves and providing purified drinking water, neither of which is or will be included in this CPA. The parameters are included simply so as to be similar to the PoA DD and the other registered CPA DD
- Editorial corrections.

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

>>

Not applicable.

C.3.4. Inclusion of monitoring plan

>>

Not applicable.

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

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Permanent changes to the registered monitoring plan, approved on 26.04.2021.

PRC-7359-007, PRC-7359-08, PRC-7359-010, PRC-7359-011, PRC-7359-012, PRC-7359-013, PRC-7359-014, PRC-7359-016, PRC-7359-017 and PRC-7359-018.

The following permanent changes to the registered monitoring plan have been made so as to be in compliance with the latest version of the PoA DD.

1. Clarified that monitoring survey should be done at least every two years.
2. Addition of text to clarify that during 7 days of monitoring period household can alternatively be provided with 12 litres of denatured alcohol in place of 20 litres in accordance with the registered PoA DD.
3. Households that use purified water will be given clean but empty water containers.

C.3.6. Changes to project design

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Not applicable.

C.3.7. Changes specific to afforestation or reforestation CPA

>>

Not applicable.

SECTION D. Description of monitoring system of CPAs

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The monitoring process included monitoring of emission reduction in all CPAs included in the batch of CPAs included in this Monitoring Report.

The monitoring system consisted of 3 major steps;

1. Registration of Project Participating households.
2. Monitoring of emission reduction from a sample of project participating households.
3. Multiply the average emission reduction calculated from the monitoring in point 2 above, with the total number of registered Project participating households in point 1 above.

Step 1 - Registration of Project Participating Households

The registration of project participating households was done by the Local Project Implementation Partners. A contract was signed with each project participating household and the contract information was then registered in our database. The contract was submitted in one of two optional formats:

1. By the use of a smartphone application. The registered data was then submitted automatically to the database of project participating households.
2. By a physical paper contract. The contract was then scanned and sent to the CME or alternatively registered by the smart phone application with a picture of the signed end user contract, rather than a picture of a representative of the household.

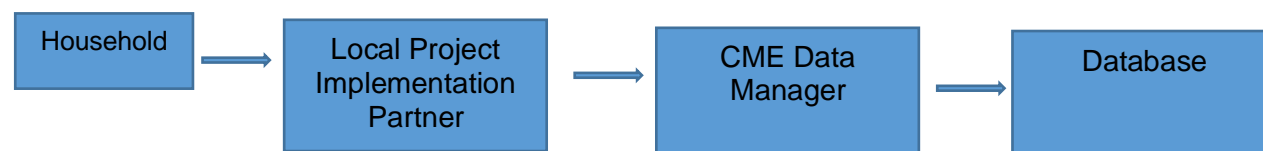
Whenever a household has been registered in the database for project participating households, it is automatically given a Unique ID. The smart phone application is designed such that the same person cannot be registered twice, and no household is registered with the same ID as another household.

Illustration of the two solutions for registering households in the database of project participating households

Data has been registered in the database by the use of one of the following two methods;

Illustration C.1 – Registration of households with the use of smartphone application.

Registration was done by the Local Project Implementation Partner by the use of a smartphone application that the Local Project Implementation Partner had installed in his or her smartphone.

Illustration C.2 – Registration of households with the use of paper contract.

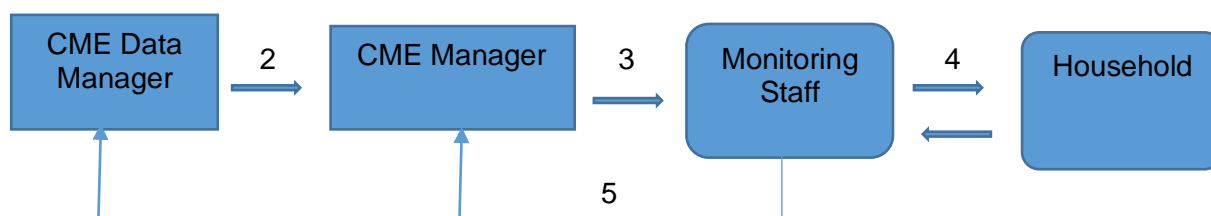
The database of project participating households is continuously updated with new project participating households. The data has been copied from this database into a spreadsheet as backup and to be able to document the households registered at various times, including the end of each monitoring period.

Step 2 - Monitoring of emission reduction from sample of project participating households

The monitoring of emission reduction from the sample of households was done according to the following process;

1. CME Manager decided on the time for monitoring.
2. CME Manager selected the sample of households to be monitored (in line with the provisions of monitoring plan of the PoA) and gave this to the Monitoring consultants.
3. Monitoring consultants were informed of which households they should monitor.
 - a. The monitoring consultants were provided with training and instructions on how to conduct the monitoring process.
 - b. The monitoring consultants were provided with the monitoring forms, and the equipment needed to carry out the monitoring and the list of households they should monitor.
4. Monitoring consultants visited the households selected for sampling and carried out the monitoring process. The data collected from the monitoring process of each households was then registered in the monitoring form.
5. The monitoring consultants sent the monitoring form for each household monitored to CME Data Manager
6. CME Manager registered all the data from the monitoring forms in the spreadsheet for calculation of emission reduction. See spreadsheet for calculation of ER.
7. The CME Manager used the data from this spreadsheet to calculate emission reduction from the project activities.

Illustration C.3 - Monitoring process step 2 to 5.



The households selected for sampling were selected from all the CPAs in which project activity had started at the time of selection of households to be monitored.

Step 3 - Multiplying the average emission reduction calculated from the monitoring, with the total number of registered Project participating households

Emission reduction from the project activities for the claimed monitoring period was determined by multiplying the average emission reduction from each of the households monitored, with the total number of households registered in the database of project participating households at the time of completion of the Monitoring Report.

SECTION E. Data and parameters**E.1. Data and parameters fixed ex ante**

Data/parameter	$f_{NRB,y}$
Unit	Fraction
Description	Fraction of woody biomass used in the absence of the project activity in year y that can be established as non-renewable biomass.
Source of data	7359-P1-0027-CP1 7359-P1-0028-CP1 7359-P1-0029-CP1 7359-P1-0030-CP1 7359-P1-0031-CP1 7359-P1-0032-CP1 7359-P1-0033-CP1 7359-P1-0034-CP1 7359-P1-0047-CP1 7359-P1-0064-CP1 7359-P1-0065-CP1 7359-P1-0066-CP1 http://cdm.unfccc.int/Panels/ssc_wg/meetings/037/ssc_37_an14.pdf 7359-P1-0042-CP1 7359-P1-0060-CP1 7359-P1-0061-CP1 7359-P1-0062-CP1 7359-P1-0063-CP1 EB 67, annex 22 "Information note default values of fraction of non-renewable biomass for least developed countries and small island developing states"
Value(s) applied	7359-P1-0027-CP1 – 0.92 7359-P1-0028-CP1 – 0.92 7359-P1-0029-CP1 – 0.92 7359-P1-0030-CP1 – 0.92 7359-P1-0031-CP1 – 0.92 7359-P1-0032-CP1 – 0.92 7359-P1-0033-CP1 – 0.92 7359-P1-0034-CP1 – 0.92 7359-P1-0042-CP1 – 0.72 7359-P1-0047-CP1 – 0.92 7359-P1-0060-CP1 – 0.72 7359-P1-0061-CP1 – 0.72 7359-P1-0062-CP1 – 0.72 7359-P1-0063-CP1 – 0.72 7359-P1-0064-CP1 – 0.92 7359-P1-0065-CP1 – 0.92 7359-P1-0066-CP1 – 0.92
Choice of data or measurement methods and procedures	Nationally approved methods. If no nationally approved methods are available to determine f_{NRB} , Default values might be used for the Least Developed Countries included in the SSC PoA.
Purpose of data/parameter	Calculation of baseline emissions or baseline net GHG removals.
Additional comments	None

Data/parameter	EF _{projected_fossilfuel}
Unit	tCO ₂ /TJ
Description	Emission factor for the substitution of non-renewable biomass that is substituted.
Source of data	Default value in methodology. See section I.6.2 PoA DD
Value(s) applied	81.6
Choice of data or measurement methods and procedures	Not applicable.
Purpose of data/parameter	Calculation of baseline emissions or baseline net GHG removals.
Additional comments	None

Data/parameter	NCV _{biomass}
Unit	TJ/tonne
Description	Net Calorific Value of the non-renewable biomass that is substituted.
Source of data	Default value in methodology. See section I.6.2 PoA DD
Value(s) applied	0.015
Choice of data or measurement methods and procedures	Not applicable.
Purpose of data/parameter	Calculation of baseline emissions or baseline net GHG removals.
Additional comments	None

Data/parameter	NCV _{denatured alcohol}
Unit	TJ / m ³
Description	Energy Content of denatured alcohol.
Source of data	2006 IPCC Guidelines for National Greenhouse Gas inventories combined with default density of ethanol. See section I.6.2 PoA DD
Value(s) applied	0.0213

Choice of data or measurement methods and procedures	<p>“Pure ethanol and alcoholic beverages are heavily taxed as a psychoactive drug, but ethanol has many uses that do not involve consumption by humans. To relieve the tax burden on these uses, most jurisdictions waive the tax when an agent has been added to the ethanol to render it unfit to drink. These include bittering agents such as denatonium benzoate and toxins such as methanol, naphtha, and pyridine. Products of this kind are called denatured alcohol”.</p> <p>http://en.wikipedia.org/wiki/Ethanol</p> <p>Denatured alcohol will consist mostly Ethanol. Net calorific value of ethanol is 27.0 TJ/Gg according to 2006 IPCC Guidelines for National Greenhouse Gas inventories. Volume 2 – Energy, Chapter 1 – Introduction, Table 1.2 “Default Net Calorific Values (NCVs)”.</p> <p>Density of ethanol is 0.789 g/cm³ http://en.wikipedia.org/wiki/Ethanol</p> <p>NCV for ethanol is hence calculated as (27.0 * 0.789 / 1000) = 0.0213 TJ / m³</p> <p>Denatured alcohol will consist of a mix of ethanol and other types of alcohol or toxins or bittering agents. Ethanol or methanol shall always be the predominant type of fuel in the denatured alcohol mix that will be used by the project.</p>
Purpose of data/parameter	Calculation of baseline emissions or baseline net GHG removals.
Additional comments	None

Data/parameter	NCV _{biogas}
Unit	TJ/m ³
Description	Energy content of the biogas.
Source of data	IPCC default value. See Section I.6.2 PoA DD
Value(s) applied	0.0000215
Choice of data or measurement methods and procedures	<p>Default energy value of biogas is used in other methodologies. AMS-I.I</p> <p>“Biogas/biomass thermal application for households/small users”. version 04. The default value a is described as;</p> <p>“Net calorific value of the biomass (GJ/unit mass or volume, dry basis). For biogas, use default value: 0.0215 GJ/m³ biogas (assuming NCV of the methane: 0.0359 GJ/m³, default methane content in biogas: 60%)” 0.0215 GJ/m³ equals 0.0000215 TJ/m³ http://cdm.unfccc.int/methodologies/SSCmethodologies/approved</p>
Purpose of data/parameter	Calculation of baseline emissions or baseline net GHG removals.
Additional comments	None

Data/parameter	NCV _{Charcoal}
Unit	TJ/Tonne
Description	Energy content of Charcoal.
Source of data	IPCC default value. See Section I.6.2 PoA DD
Value(s) applied	0.0295

Choice of data or measurement methods and procedures	Not applicable.
Purpose of data/parameter	Calculation of baseline emissions or baseline net GHG removals.
Additional comments	None

Data/parameter	η_{old}
Unit	Fraction.
Description	Efficiency of system being replaced.
Source of data	Baseline survey. See section D.6.2 CPA DDs
Value(s) applied	7359-P1-0027-CP1: 0.10 7359-P1-0028-CP1: 0.10 7359-P1-0029-CP1: 0.10 7359-P1-0030-CP1: 0.10 7359-P1-0031-CP1: 0.10 7359-P1-0032-CP1: 0.10 7359-P1-0033-CP1: 0.10 7359-P1-0034-CP1: 0.10 7359-P1-0042-CP1: 0.10 7359-P1-0047-CP1: 0.10 7359-P1-0060-CP1: 0.10 7359-P1-0061-CP1: 0.10 7359-P1-0062-CP1: 0.10 7359-P1-0063-CP1: 0.10 7359-P1-0064-CP1: 0.10 7359-P1-0065-CP1: 0.10 7359-P1-0066-CP1: 0.10
Choice of data or measurement methods and procedures	Not applicable.
Purpose of data	Calculation of baseline emissions or baseline net GHG removals.
Additional comments	None

Data/parameter	WB_{LB}
Unit	Kg/litre
Description	Mass of woody biomass that would have been required to boil one litre of water.
Source of data	Laboratory test. See Section D.6.2 CPA DDs
Value(s) applied	0.4356
Choice of data or measurement methods and procedures	Water boiling test done according to standard procedures.
Purpose of data/parameter	Calculation of baseline emissions or baseline net GHG removals.
Additional comments	None

Data/parameter	$WB_{LB,Charcoal}$
Unit	Kg/litre
Description	Mass of Charcoal that would have been required to boil one litre of water.
Source of data	Laboratory test. See Section D.6.2 CPA DDs.
Value(s) applied	0.2041

Choice of data or measurement methods and procedures	Water boiling test done according to standard procedures.
Purpose of data/parameter	Calculation of baseline emissions or baseline net GHG removals.
Additional comments	None

Data/parameter	C _{CF}
Unit	Number
Description	Charcoal conversion factor.
Source of data	<p>7359-P1-0027-CP1 7359-P1-0028-CP1 7359-P1-0029-CP1 7359-P1-0030-CP1 7359-P1-0031-CP1 7359-P1-0032-CP1 7359-P1-0033-CP1 7359-P1-0034-CP1 7359-P1-0047-CP1 7359-P1-0064-CP1 7359-P1-0065-CP1 7359-P1-0066-CP1 Protecting and restoring forest carbon in tropical Africa, Chapter 6: Wood fuels and forests in tropical Africa</p> <p>7359-P1-0042-CP1 7359-P1-0060-CP1 7359-P1-0061-CP1 7359-P1-0062-CP1 7359-P1-0063-CP1 “Diagnostic Du Secteur Energie a Madagascar” Ministry of Energy, June 2012. Page 21</p>
Value(s) applied	<p>7359-P1-0027-CP1: 10 7359-P1-0028-CP1: 10 7359-P1-0029-CP1: 10 7359-P1-0030-CP1: 10 7359-P1-0031-CP1: 10 7359-P1-0032-CP1: 10 7359-P1-0033-CP1: 10 7359-P1-0034-CP1: 10 7359-P1-0042-CP1: 12 7359-P1-0047-CP1: 10 7359-P1-0060-CP1: 12 7359-P1-0061-CP1: 12 7359-P1-0062-CP1: 12 7359-P1-0063-CP1: 12 7359-P1-0064-CP1: 10 7359-P1-0065-CP1: 10 7359-P1-0066-CP1: 10</p>
Choice of data or measurement methods and procedures	Not applicable.
Purpose of data/parameter	Calculation of baseline emissions or baseline net GHG removals.
Additional comments	None

Data/parameter	C _P
Unit	Fraction.
Description	Portion of woody biomass that is used in the form of Charcoal in the project area.
Source of data	Baseline survey. See Section D.6.2 CPA DDs
Value(s) applied	7359-P1-0027-CP1: 1.00 7359-P1-0028-CP1: 0.97 7359-P1-0029-CP1: 0.99 7359-P1-0030-CP1: 0.96 7359-P1-0031-CP1: 0.97 7359-P1-0032-CP1: 0.95 7359-P1-0033-CP1: 0.94 7359-P1-0034-CP1: 0.88 7359-P1-0042-CP1: 0.82 7359-P1-0047-CP1: 0.8556 7359-P1-0060-CP1: 0.82 7359-P1-0061-CP1: 0.82 7359-P1-0062-CP1: 0.82 7359-P1-0063-CP1: 0.82 7359-P1-0064-CP1: 0.97 7359-P1-0065-CP1: 0.97 7359-P1-0066-CP1: 0.82
Choice of data or measurement methods and procedures	Not applicable.
Purpose of data/parameter	Calculation of baseline emissions or baseline net GHG removals.
Additional comments	None

Data/parameter	LF
Unit	Fraction
Description	Net to gross adjustment factor of 0.95 to account for leakage.
Source of data	Default value in methodology. See section I.6.2 PoA DD
Value(s) applied	0.95
Choice of data or measurement methods and procedures	Not applicable.
Purpose of data/parameter	Calculation of baseline emissions or baseline net GHG removals.
Additional comments	The LF is found in the spreadsheet for Calculations, tab "Monitoring Data", row 35.

Data/parameter	Thermal output of water purification systems
Unit	kW
Description	Thermal energy output from water purification system.
Source of data	Community water purification system product description. See section I.6.2 PoA DD
Value(s) applied	0.5
Choice of data or measurement methods and procedures	The value of 0.5 kW is based on the thermal output of the equipment used to boil the water, e.g. the baseline stoves. The value of 0.5 kW will be used as a default value in the program.
Purpose of data/parameter	Calculation of baseline emissions or baseline net GHG removals.

Additional comments	Calculate the CPA thermal output to ensure that it is within the 45 MW limit for small-scale projects.
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E.2. Data and parameters monitored

Data/parameter	ET _{stoves, units,y}
Unit	Number
Description	Average number of ethanol stoves used by project participating households in year y.
Measured/calculated/default	Calculated
Source of data	Simple random sampling.
Value(s) of monitored parameter	1.00
Monitoring equipment	Not Applicable
Measuring/reading/recording frequency	Once in two years
Calculation method (if applicable)	The value is found by adding the sum of the households using ethanol stoves in each of the CPAs included in the program. The data is provided from the database of all project participating households using the various technologies in each CPA. In this database the households are registered with the kind of solutions they use.
QA/QC procedures	The number of households that use ethanol stoves in the project area have been cross checked with the sales records from the ethanol stove suppliers.
Purpose of data/parameter	Calculation of baseline emissions or baseline net GHG removals.
Additional comments	<p>A total of 30,775 households is registered as using ethanol stoves. This value can be found in "Spreadsheet for calculations" in Tab "Households registered" in cell AB30792.</p> <p>The value of 1.00 can be found in the "Spreadsheet for calculations" in tab "Monitoring data" in cell BS9.</p> <p>The 95/10 confidence/precision has been used to determine minimum required sample size.</p>

Data/parameter	ET _{usage,y}
Unit	Litres
Description	Average daily denatured alcohol usage by project participating households in year y.
Measured/calculated/default	Measured
Source of data	Monitoring of a simple random sample of project participating households.
Value(s) of monitored parameter	0.70
Monitoring equipment	Not applicable
Measuring/reading/recording frequency	Once in two years
Calculation method (if applicable)	The usage of denatured alcohol has been physically recorded in a representative number of households over a period of 7 days.

QA/QC procedures	<p>The QA/QC procedures has been done in compliance with the CPA DD. This means that the volume of ethanol in which ER is claimed has been adjusted for purity of the fuel used.</p> <p>The purity of the denatured alcohol has been measured and registered by the representative sample of households monitored for $ET_{usage,y}$.</p>
Purpose of data/parameter	Calculation of baseline emissions or baseline net GHG removals.
Additional comments	<p>The volume of ethanol was determined by multiplying the monitored usage, with the % of purity of the fuel.</p> <p>The value of the parameter refers to the average value from the households selected for monitoring and which was registered as using an ethanol stove.</p> <p>The 95/10 confidence/precision has been used to determine minimum required sample size in accordance with the temporary deviation and the latest version of the methodology</p> <p>The QA/QC procedures related to the $ET_{usage,y}$ should be seen in connection with the Additional Comments. Pure ethanol has a default NCV of 0.0213TJ/m³, but if the fuel used is not pure ethanol, the NCV has to be adjusted. If the fuel contains 95% ethanol and 5% water, the NCV would be $0.0213 \times 0.95 = 0.020235$ TJ/m³. The same result will be achieved to adjust for lower NCV, by multiply the volume of fuel with the purity, rather than multiply the NCV with the purity.</p> <p>The purity of the ethanol is determined by a “Hydrometer” also referred to as a “Alco meter”. This device measures the purity or strength of the fuel. This is measured based on the density of the fuel, based on the knowledge that the density of ethanol is lower than the density of water, which is the main non-ethanol component in the fuel.</p> <p>The sample size was found to be sufficient to meet the 95/10 confidence level.</p> <p>The values are found in the “Spreadsheet for calculations” in tab “Monitoring Data” in cell BS10.</p>

Data/parameter	$ET_{stove, Capacity,y}$
Unit	kW
Description	Average thermal capacity of ethanol stove used by the project participating households.
Measured/calculated/ default	Measured
Source of data	The thermal capacity of the types of stoves deployed has been determined by a qualified laboratory, commissioned by the World Bank to carry out the stove test. The type of stoves used by each household that was monitored was registered as part of the monitoring survey, and hence the thermal capacity of the stove used by the households that was monitored is known.
Value(s) of monitored parameter	2.03
Monitoring equipment	Not applicable.
Measuring/reading/ recording frequency	Once in two years

Calculation method (if applicable)	The average thermal capacity of ethanol stove used by the project participating household is calculated by adding the thermal capacity of the ethanol stoves used by the households selected for monitoring and dividing this number with the number of households selected for monitoring.
QA/QC procedures	None
Purpose of data/parameter	Calculation of baseline emissions or baseline net GHG removals.
Additional comments	<p>Three types of ethanol stoves have been deployed by the projects.</p> <p>The single burner Safi Stove model 101 has thermal output of 1.6 kW. The double burner Safi Stove model 102 has thermal output of 3.2 kW.</p> <p>The double burner CleanCook M2 has thermal output of 3.0 kw.</p> <p>The 95/10 confidence/precision has been used to determine minimum required sample size in accordance with the methodology</p> <p>The value is found in the "Spreadsheet for calculations" in tab "Monitored Data" in cell BS17.</p> <p>This value does not impact the ER but is only used to determine if the total thermal output of the installed equipment in each CPA is below the small-scale threshold. The calculation has been based on the assumption that all households use double burner which has a thermal capacity of twice that of a single burner. This is conservative. See spreadsheet for calculation version, tab "Thermal output".</p>

Data/parameter	ET _{stove, Efficiency, y}
Unit	Percentage
Description	Average thermal efficiency of ethanol stove used by the project participating household.
Measured/calculated/default	Calculated
Source of data	Monitoring of a simple random sample of project participating households. The source of data for each type of stove is provided by the stove supplier or in absence of such information, the value is determined by a qualified laboratory.
Value(s) of monitored parameter	65.00
Monitoring equipment	Not applicable
Measuring/reading/recording frequency	Once in two years
Calculation method (if applicable)	The average ethanol stove efficiency is calculated by adding the ethanol stove efficiency of the ethanol stoves used by the households selected for monitoring and dividing this number with the number of households selected for monitoring.
QA/QC procedures	None
Purpose of data/parameter	Calculation of baseline emissions or baseline net GHG removals.
Additional comments	<p>Both of the two types of ethanol stoves deployed by the projects, have the same thermal efficiency of 65% in accordance to a stove test carried out by an independent laboratory on behalf of the World Bank.</p> <p>The value is found in the spreadsheet in the spreadsheet for calculations, tab "Monitoring Data" in cell BS20.</p>

Data/parameter	BG _{Stoves, units,y}
Unit	Number
Description	Average number of biogas stoves used by project participating households in year y.
Measured/calculated/default	Calculated
Source of data	Random sampling
Value(s) of monitored parameter	0
Monitoring equipment	Not applicable
Measuring/reading/recording frequency	Once in two years
Calculation method (if applicable)	The value is found by adding the sum of the households using biogas stoves in each of the CPAs included in the program. The data is provided from the database of all project participating households using the various technologies in each CPA. In the database the households are registered with the solutions they use.
QA/QC procedures	Not applicable
Purpose of data/parameter	Calculation of baseline emissions or baseline net GHG removals.
Additional comments	No ER is claimed from households provided with biogas stoves from the batch of CPAs included in this MR. The value is therefore 0.

Data/parameter	BG _{usage,y}
Unit	M ³
Description	Average daily biogas usage per project participating household in year y.
Measured/calculated/default	Measured of a random sample of project participating households.
Source of data	Monitoring of stratified random sampling
Value(s) of monitored parameter	0
Monitoring equipment	Not applicable as no emission reduction is claimed from households using biogas stoves as part of this monitoring report.
Measuring/reading/recording frequency	Once in two years
Calculation method (if applicable)	The average biogas usage is calculated by adding the biogas usage of the households selected for monitoring and dividing this number with the number of households selected for monitoring.
QA/QC procedures	Biogas meters will be calibrated annually.
Purpose of data/parameter	Calculation of baseline emissions or baseline net GHG removals.
Additional comments	No ER is claimed from households provided with biogas stoves from the batch of CPAs included in this MR. The value is therefore 0.

Data/parameter	BG _{stove, Capacity,y}
Unit	kW
Description	Average thermal capacity of biogas stove used by the project participating households
Measured/calculated/default	Calculated
Source of data	Measured of a random sample of project participating households.

Value(s) of monitored parameter	0.
Monitoring equipment	Not applicable.
Measuring/reading/recording frequency	Once in two years
Calculation method (if applicable)	The average biogas stove capacity is calculated by adding the biogas stove capacity of the biogas stoves used by the households selected for monitoring and dividing this number with the number of households selected for monitoring.
QA/QC procedures	None
Purpose of data/parameter	Calculation of baseline emissions or baseline net GHG removals.
Additional comments	Calculate the CPA thermal output capacity to ensure that it is within the 45 MW limit for small-scale projects. No ER is claimed from households provided with biogas stoves from the batch of CPAs included in this MR. The value is therefore 0.

Data/parameter	BG _{stove, Efficiency, y}
Unit	Percentage
Description	Average thermal efficiency of biogas stove used by the project participating households.
Measured/calculated/default	Calculated
Source of data	Monitoring of a random sample of project participating households.
Value(s) of monitored parameter	0.
Monitoring equipment	Not applicable
Measuring/reading/recording frequency	Once in two years
Calculation method (if applicable)	The average biogas stove efficiency is calculated by adding the biogas stove efficiency of the biogas stoves used by the households selected for monitoring and dividing this number with the number of households selected for monitoring.
QA/QC procedures	None
Purpose of data/parameter	Calculation of baseline emissions or baseline net GHG removals.
Additional comments	No ER is claimed from households provided with biogas stoves from the batch of CPAs included in this MR. The value is therefore 0.

Data/parameter	N _{p, y}
Unit	Number
Description	Average number of people in project participating households drinking purified water provided by the equipment supplied by the program.
Measured/calculated/default	Calculated
Source of data	Monitoring of a random sample of project participating households.
Value(s) of monitored parameter	0
Monitoring equipment	Not applicable
Measuring/reading/recording frequency	Once in two years

Calculation method (if applicable)	The number of people in the households drinking purified water is calculated by multiplying the number of people in households drinking purified water with the number of households provided with purified water.
QA/QC procedures	None
Purpose of data/parameter	Calculation of baseline emissions or baseline net GHG removals.
Additional comments	No ER is claimed from households provided with drinking water from the batch of CPAs included in this MR. The value is therefore 0.

Data/parameter	QDW _{p,y}
Unit	Litre/Day
Description	Average number of litre of purified water used by each person in project participating households in year y.
Measured/calculated/default	Measured
Source of data	Monitoring of a random sample of project participating households.
Value(s) of monitored parameter	0
Monitoring equipment	Not Applicable.
Measuring/reading/recording frequency	Once in two years
Calculation method (if applicable)	The average drinking water consumption for each person is calculated by adding the average water consumption per person for each of the households selected for monitoring which is registered as being provided with drinking water and dividing this with the number of households selected for monitoring that used water provided by the program.
QA/QC procedures	The value will be capped at 5.5, in accordance with the methodology.
Purpose of data/parameter	Calculation of baseline emissions or baseline net GHG removals.
Additional comments	No ER is claimed from households provided with drinking water from the batch of CPAs included in this MR. The value is therefore 0.

Data/parameter	W _{Quality,y}
Unit	Yes or No
Description	Water Quality – to conform that purified water meet national or WHO interim microbiological standards for drinking water in year y.
Measured/calculated/default	Calculated
Source of data	Monitoring of a random sample of project participating households.
Value(s) of monitored parameter	0 (No)
Monitoring equipment	Not Applicable.
Measuring/reading/recording frequency	Once in two years.
Calculation method (if applicable)	The average water quality value is calculated by adding the values for the households that it is confirmed that receive purified water that meet the required water quality standard, and dividing this number with the number of households selected for sampling

QA/QC procedures	<p>The measurement of the water samples was carried out by a national laboratory to confirm if the water met the required quality to ensure compliance of the microbiological water quality either with:</p> <ul style="list-style-type: none"> • The community microbiological water purification systems shall provide purified water that meet applicable national microbiological standards/guidelines or WHO's interim performance targets on households' water treatment and have energy output of less than 50 kW. • The Household microbiological water purification systems shall provide purified water that meet applicable national microbiological standards/guidelines or WHO's interim performance target on household water treatment. <p>The water quality was monitored on sample basis for contamination with thermotolerant (faecal) coliforms or coli (E. coli). A presence/absence test for E. coli colony forming units (CFU) of more than 100 units per 100 ml of water or an equivalent quantitative test for E. coli CFU was used. A presence of up to 100 E. coli CFU/100 ml was perceived to be acceptable in accordance with the POA DD.</p>
Purpose of data/parameter	Calculation of baseline emissions or baseline net GHG removals.
Additional comments	No ER is claimed from households provided with drinking water from the batch of CPAs included in this MR. The value is therefore 0.

E.3. Implementation of sampling plan

>>

A single sampling plan was done for all the CPAs included in the batch of CPAs included in this monitoring report.

a) The following CPAs were included in the sampling plan;

7359-P1-0027-CP1
 7359-P1-0028-CP1
 7359-P1-0029-CP1
 7359-P1-0030-CP1
 7359-P1-0031-CP1
 7359-P1-0032-CP1
 7359-P1-0033-CP1
 7359-P1-0034-CP1
 7359-P1-0042-CP1
 7359-P1-0047-CP1
 7359-P1-0060-CP1
 7359-P1-0061-CP1
 7359-P1-0062-CP1
 7359-P1-0063-CP1
 7359-P1-0064-CP1
 7359-P1-0065-CP1
 7359-P1-0066-CP1

The sampling was done for the batch of CPAs included in this monitoring report and hence not done separately for each CPA.

b) Random sampling was used. The households were selected randomly from all the project participating households included in the batch of CPAs included in the Monitoring Report, at the time of selection of households to be monitored.

c) The following parameters were collected during the sampling survey;

- a. $ET_{\text{stoves, units, y}}$
- b. $ET_{\text{usage, y}}$
- c. $ET_{\text{stove, Capacity, y}}$
- d. $ET_{\text{stove, Efficiency, y}}$

The parameters were selected from each of the households monitored as part of the monitoring survey.

- d) The collected date was registered in the spreadsheet for calculation of Emission Reductions. The calculations of ER were then done automatically by Excel.
- e) Random selection function in Excel was used to select the households to be subject to the sampling survey. This in accordance with the PoA DD, and to ensure that the selection of households to be monitored was random.
- f) The quality assurance process has first been done by quality assurance manager and then by CME. The quality assurance process includes checking if the households monitored have been included in the list of households selected for monitoring, and then checking if the monitoring form has been completely and correctly filled out. The quality assurance manager confirms to CME, that she has checked and controlled all the monitoring forms, and she provide feedback to both the monitoring staff and to CME whenever there are issues found with the monitoring form

The spreadsheet for calculation of the ER and with all the monitoring data from the monitoring survey has been enclosed with the Monitoring Report.

SECTION F. Calculation of emission reductions or net anthropogenic removals

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

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Please note that the methodology AMS I.E version 4 does not provide specific equations for calculation of baseline emission or leakage, only for emission reductions. The emission reduction is calculated the following:

Emission reductions would be calculated as:

$$ER_y = ER_{y, \text{Denatured alcohol}} + ER_{y, \text{Biogas}} + ER_{y, \text{Water}}$$

Where

$$ER_{y, \text{Denature alcohol}} = B_{y, \text{Denatured alcohol}} * f_{NRB, y} * NCV_{\text{biomass}} * EF_{\text{projected_fossilfuel}}$$

$$ER_{y, \text{Biogas}} = B_{y, \text{Biogas}} * f_{NRB, y} * NCV_{\text{biomass}} * EF_{\text{projected_fossilfuel}}$$

$$ER_{y, \text{Water}} = B_{y, \text{Water}} * f_{NRB, y} * NCV_{\text{biomass}} * EF_{\text{projected_fossilfuel}}$$

ER_y	=	Emission reductions during the year y, in tCO ₂ e
B_y	=	Quantity of biomass that is substituted or displaced in tonnes
$f_{NRB, y}$	=	Fraction of biomass used in the absence of the project activity in year y, that can be established as non-renewable biomass.
NCV_{biomass}	=	Net calorific value of the non-renewable woody biomass that is substituted (IPCC default for wood fuel, 0.015 TJ/tonnes)
$EF_{\text{projected_fossil fuel}}$	=	Emission factor for the substitution on non-renewable biomass by similar consumers. Use a default value of 81.6 tCO ₂ /TJ

Step 1: B_y is determined:

B_y , must be calculated separately for the stoves (ethanol and biogas) and for the purified water consumed (drinking purified water from household water purification systems plus the purified water from the community water purification systems).

Hence B_y is the sum of $B_{y,biogas} + B_{y,Denatured\ alcohol} + B_{y,purifiedWater}$;

$$B_{y,Biogas} = (((HG_{p,y,Biogas} / (NCV_{biomass} * \eta_{old})) * (1 - C_P)) + ((HG_{p,y,Biogas} / (NCV_{Charcoal} * \eta_{old})) * (C_P * C_{CF}))) * LF$$

$$B_{y,Denatured\ alcohol} = (((HG_{p,y,Denatured\ alcohol} / (NCV_{Biomass} * \eta_{old})) * (1 - C_P)) + ((HG_{p,y,Denatured\ alcohol} / (NCV_{Charcoal} * \eta_{old})) * (C_P * C_{CF}))) * LF$$

$$B_{y,PurifiedWater} = (((N_{p,y} * QDW_{p,y} * WB_{LB} * 365 * 10^{-3}) * (1 - C_P)) + ((N_{p,y} * QDW_{p,y} * WB_{LB,Charcoal} * 365 * 10^{-3}) * (C_P * C_{CF}))) * LF * W_{quality,y}$$

Where:

$B_{y,Biogas}$ = Quantity of woody biomass that is substituted or displaced in ton as a result of the biogas used by the project in year y.

$HG_{p,y,Biogas}$ = Quantity of thermal energy generated by the biogas used by the project participating households in year y measured in TJ.

$NCV_{Biomass}$ = Net Calorific Value of the non-renewable woody biomass that is substituted.

$NCV_{Charcoal}$ = Net Calorific Value of the non-renewable woody biomass that is used in the form of charcoal and which is substituted.

η_{old} = Efficiency of the old stoves that has been replaced by the project.

$B_{y,Denatured\ alcohol}$ = Quantity of woody biomass that is substituted or displaced in ton as a result of the denatured alcohol used by the project in year y.

$HG_{p,y,Denatured\ alcohol}$ = Quantity of thermal energy generated by the denatured alcohol used by the project participating households in year y, measured in TJ.

$B_{y,PurifiedWater}$ = Quantity of woody biomass that is displaced in ton as a result of the purified water replacing the need to boil water.

$N_{p,y}$ = Total number of people in the project area that get purified water as a result of the project activity.

$QDW_{p,y}$ = Volume of drinking purified water in litres per person per day.

WB_{LB} = Mass of woody biomass that would have been required to boil one litre of water (kg/litre).

$WB_{LB,Charcoal}$ = Mass of woody biomass that is used in the form of charcoal that has been required to boil one litre of water (kg/litre).

C_{CF} = Charcoal Conversion Factor

C_P = Portion of woody biomass that is used in the form of charcoal in the project area.

LF = Net to gross adjustment factor of 0.95 to account for leakage.

$W_{quality,y}$ = Portion of purified water that meet WHO standards for drinking water in year y.

Step 2. $HG_{p,y}$ is determined

HG_{py} calculations;

$$HG_{p,y,Biogas} = NCV_{Biogas} * BG_{Usage,y} * BG_{Stoves,Units,y} * (BG_{stove,efficiency} / 100) * 365$$

$$HG_{p,y,Denatured\ alcohol} = NCV_{Denatured\ alcohol} * ET_{Usage,y} / 1000 * ET_{Stoves,Units,y} * (ET_{stove,efficiency} / 100) * 365$$

Where

$HG_{p,y}$ = Quantity of thermal energy generated by the new renewable energy technology in the project area in year y (TJ).

NCV_{Biogas}	=	Net Calorific Value of Biogas. Based on default value.
$BG_{\text{Usage},y}$	=	Average Biogas usage in m^3 per day per in year y (multiplied by 365 to get annual consumption per user).
$BG_{\text{Stoves,Units},y}$	=	Biogas stoves in use in the project area in year y.
$NCV_{\text{Denatured alcohol}}$	=	Net Calorific Value of denatured alcohol. Based on default value.
$ET_{\text{Usage},y}$	=	Average denatured alcohol usage per litre per household in year y. Divided by 1000 to get value in m^3 .
$ET_{\text{Stoves,Units},y}$	=	Ethanol stoves in use in the project area in year y.

Step 3. Determine the average emission reduction from project participating households.

Emission reduction is calculated from the project participating households selected for monitoring. The total emission reduction from these households is divided by the number of households that have been subject to sampling in order to determine the average emission reduction per project participating household.

The calculations of the emission from each of the 64 households selected for the monitoring survey can be found in "Spreadsheet for calculation" in tab "Monitoring Data" and in tab ER Summary.

Table F.1 – Table for calculations of average emission reductions from each household monitored

CDM-PoA-MR-FORM

	1	2	63	64						
Monitored households nr.	1	2	5	6			Count		Sum monitored	Average monitored
	CPA-MA-24-Madagascar - 3459	CPA-MA-24-Madagascar - 3836	CPA-KE-012-SAMSUNG-1480	CPA-KE-012 - SAMSUNG-2529						
Households Identification Reference	87949	88335	106798	108471						
Monitored values										
Fuel at start of monitoring survey	12	12	12	12						
Fuel at end of monitoring survey	4.8	5.75	9	6.8						
Adjustment factor	7%	4%	5%	5%			64		4.83	0.08
ET _{stoves,units}	1.00	1.00	1.00	1.00			64		64.00	1.00
ET _{Usage} (Liter pure denaturated alcohol per day)	0.96	0.86	0.41	0.71			63		44.19	0.70
BG _{Stoves,Units}	0.00	0.00	0.00	0.00			0		0.00	
BG _{Usage} (m ³ per day)	0.00	0.00	0.00	0.00			0		0.00	
People in household	6.00	6.00	1.00	6.00			64		300.00	4.69
N _{p,y} (Number of people drinking purified water)	0.00	0.00	0.00	0.00			0		0.00	
QDW _{p,y} (Volume of water per person is drinking per day, in liter)	0.00	0.00	0.00	0.00			0		0.00	
BG _{stove,capacity} (kW)	0.00	0.00	0.00	0.00			0		0.00	
ET _{stove,capacity} (kW)	1.60	1.60	1.60	1.60			64		129.60	2.03
Thermal output water purification system (Kw)	0.00	0.00	0.00	0.00			0		0.00	
BG _{stove,efficiency} (% efficiency)	0.00	0.00	0.00	0.00			0		0.00	
ET _{stove,efficiency} (% efficiency)	65.00	65.00	65.00	65.00			64		4160.00	65.00
W _{quality} (1 represent water that meet quality requirement)	0	0	0	0			0		0.00	
Thermal output (Kw)	1.60	1.60	1.60	1.60			64		129.60	2.03
Predetermined values										
f _{NRB,y} (ratio of biomass which is non-renewable)	0.72	0.72	0.92	0.92			64		54.88	0.86
n _{old} (average efficiency of old stoves)	0.10	0.10	0.10	0.10			64		6.40	0.10
C _p (Portion of woody biomass that is used in the form of Charcoal in the project area)	0.82	0.82	0.97	0.97			64		57.95	0.91
C _{cf} (number of kg of wood neede to make a kg of charcoal)	12.00	12.00	10.00	10.00			64		680.00	10.63
NCV _{denaturated alcohol} (TJ / m3)	0.0213	0.0213	0.0213	0.0213			64		1.36	0.02
NCV _{biomass} (TJ / tonne)	0.015	0.015	0.015	0.015			64		0.96	0.02
NCV _{biogas} (TJ / m3)	0.0000215	0.0000215	0.0000215	0.0000215			64		0.00	0.00
NCV _{Charcoal} (TJ / tonne)	0.0295	0.0295	0.0295	0.0295			64		1.89	0.03
EF _{projected_fossilfuel} (tCO2/TJ)	81.6	81.6	81.6	81.6			64		5222.40	81.60
LF (Fraction to account for leakage)	0.95	0.95	0.95	0.95			64		60.80	0.95
HG _{Biogas,y} (TJ)	0.0000	0.0000	0.0000	0.0000			0		0.00	0.00
HG _{denaturated alcohol,y} (TJ)	0.0019	0.0017	0.0008	0.0014			63		0.09	0.00
WB _{LB} (Kg/Litre)	0.44	0.44	0.44	0.44			64		27.88	0.44
WB _{LB,Charcoal} (Kg / Litre)	0.20	0.20	0.20	0.20			64		13.06	0.20
Calculations										
B _{y,denaturated alcohol} (Tonne)	6.17	5.53	2.51	4.36			63			4.35
B _{y,biogas} (Tonne)	0.00	0.00	0.00	0.00						0.00
B _{y,water} (Tonne)	0.00	0.00	0.00	0.00						0.00
B _{y, project} (Tonne)	6.17	5.53	2.51	4.36			63			4.35
ER _{y,denaturated alcohol} (CO2e)	5.44	4.87	2.83	4.91			63			4.57
ER _{y,biogas}	0.00	0.00	0.00	0.00						0.00
ER _{y,Water} (CO2e)	0.00	0.00	0.00	0.00						0.00
ER _{y,ProjectTotal} (CO2e)	5.44	4.87	2.83	4.91			63			4.57

Step 4. Determine total CPA emission reduction.

Total emission reduction from the CPA is determined by multiplying the average emission reduction per project participating households monitored, with the total number of project participating households at the time of the verification. Average ER from each household is 4.455 tCO₂ and this is multiplied with 32,324 which is the number of households included in the batch of CPAs. This give a total ER of 143,992.80 and this has been rounded down to 143,987 in order to have whole number of ER from each CPA. See table below.

Table F.2 - Summary of calculation of ER from CPAs in which project activities is implemented

Emission Reduction achieved in each of the 11 implemented CPAs						
CPA name	CPA number	Average ER HH	HH	ER	ER rounded down	
Kenya-CPA-KE-001-Kibera	7359-P1-0027-CP1	4.455	2,004	8,927.16	8,927	tCo2e
Kenya-CPA-KE-008-Kisumu	7359-P1-0034-CP1		1,485	6,615.19	6,615	tCo2e
Madagascar-CPA-MA-24	7359-P1-0042-CP1		3,747	16,691.65	16,691	tCo2e
Kenya-CPA-KE-009-Kenya	7359-P1-0047-CP1		5,236	23,324.66	23,324	tCo2e
Madagascar-CPA-MA-25	7359-P1-0060-CP1		5,408	24,090.86	24,090	tCo2e
Madagascar-CPA-MA-26	7359-P1-0061-CP1		254	1,131.49	1,131	tCo2e
Madagascar-CPA-MA-27	7359-P1-0062-CP1		30	133.64	133	tCo2e
Madagascar-CPA-MA-28	7359-P1-0063-CP1		2,085	9,287.99	9,287	tCo2e
Kenya-CPA-KE-011-Ecoeye	7359-P1-0064-CP1		1,496	6,664.19	6,664	tCo2e
Kenya-CPA-KE-010-Samsung	7359-P1-0065-CP1		6,915	30,804.05	30,804	tCo2e
Kenya-CPA-KE-012-Samsung	7359-P1-0066-CP1		3,664	16,321.92	16,321	tCo2e
Total in which ER is claimed				32,324	143,992.80	143,987

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

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There are no project emissions. Actual net GHG removal by sink is the same as the baseline net GHG removal by sink as described in the table above.

F.3. Calculation of leakage emissions

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Potential leakage is accounted for by multiplying with a net to gross adjustment factor which is one of the alternatives in the registered PoA-DD.

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

CPA UNFCCC reference number	Baseline GHG emissions or baseline net GHG removals (t CO ₂ e)	Project GHG emissions or actual net GHG removals (t CO ₂ e)	Leakage GHG emissions (t CO ₂ e)	GHG emission reductions or net anthropogenic GHG removals (t CO ₂ e)			
				Before 01/01/2013	From 01/01/2013 until 31/12/2020	From 01/01/2021	Total amount
7359-P1-0027-CP1	8,927	0	0	0	0	8,927	8,927
7359-P1-0028-CP1	0	0	0	0	0	0	0
7359-P1-0029-CP1	0	0	0	0	0	0	0
7359-P1-0030-CP1	0	0	0	0	0	0	0
7359-P1-0031-CP1	0	0	0	0	0	0	0
7359-P1-0032-CP1	0	0	0	0	0	0	0
7359-P1-0033-CP1	0	0	0	0	0	0	0
7359-P1-0034-CP1	6,615	0	0	0	0	6,615	6,615
7359-P1-0042-CP1	16,691	0	0	0	0	16,691	16,691
7359-P1-0047-CP1	23,324	0	0	0	0	23,324	23,324

7359-P1-0060-CP1	24,090	0	0	0	0	24,090	24,090
7359-P1-0061-CP1	1,131	0	0	0	0	1,131	1,131
7359-P1-0062-CP1	133	0	0	0	0	133	133
7359-P1-0063-CP1	9,287	0	0	0	0	9,287	9,287
7359-P1-0064-CP1	6,664	0	0	0	0	6,664	6,664
7359-P1-0065-CP1	30,804	0	0	0	0	30,804	30,804
7359-P1-0066-CP1	16,321	0	0	0	0	16,321	16,321
Total	143,987	0	0	0	0	143,987	143,987

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

CPA UNFCCC reference number	Amount achieved during this monitoring period (t CO ₂ e)	Amount estimated ex ante for this monitoring period in the CPA-DD (t CO ₂ e)
7359-P1-0027-CP1	8,927 tCO ₂ e	36,211 tCO ₂ e
7359-P1-0028-CP1	0 tCO ₂ e	19,966 tCO ₂ e
7359-P1-0029-CP1	0 tCO ₂ e	20,320 tCO ₂ e
7359-P1-0030-CP1	0 tCO ₂ e	19,862 tCO ₂ e
7359-P1-0031-CP1	0 tCO ₂ e	19,944 tCO ₂ e
7359-P1-0032-CP1	0 tCO ₂ e	19,670 tCO ₂ e
7359-P1-0033-CP1	0 tCO ₂ e	19,495 tCO ₂ e
7359-P1-0034-CP1	6,615 tCO ₂ e	18,488 tCO ₂ e
7359-P1-0042-CP1	16,691 tCO ₂ e	48,180 tCO ₂ e
7359-P1-0047-CP1	23,324 tCO ₂ e	56,240 tCO ₂ e
7359-P1-0060-CP1	24,090 tCO ₂ e	124,000 tCO ₂ e
7359-P1-0061-CP1	1,131 tCO ₂ e	124,000 tCO ₂ e
7359-P1-0062-CP1	133 tCO ₂ e	120,000 tCO ₂ e
7359-P1-0063-CP1	9,287 tCO ₂ e	60,000 tCO ₂ e
7359-P1-0064-CP1	6,662 tCO ₂ e	8,596 tCO ₂ e
7359-P1-0065-CP1	30,804 tCO ₂ e	42,983 tCO ₂ e
7359-P1-0066-CP1	16,321 tCO ₂ e	41,469 tCO ₂ e
Total	143,987 tCO₂e	783,664 tCO₂e

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

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The ex-ante calculations are based on the ex-ante ER in the CPA DDs included in this Monitoring report. The calculation of the ex-ante ER in each CPA is calculated by the ex-ante emission reduction in 2021 multiplied by 146/365. 146 is the number of days in the monitoring period and 365 is the number of days in a year.

F.6. Remarks on increase in achieved emission reductions

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ER achieved is lower than ex-ante ER in all the CPAs included in this Monitoring Report. Achieved ER is lower than the ex-ante emission reduction because lower ER from each household, compared to when the CPAs were registered. Furthermore, fewer number of households than expected have been included in each of the CPAs.

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

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Each project (CPA) under the SSC-PoA are implemented in a limited geographical area such as a country, county or a district. The emission reduction from each CPA is within the limits of 45 MW thermal capacity according to General Guidelines to SSC CDM Methodologies version 17, EB 61, Annex 21. Reference to paragraph 4, b, specifying that cookstoves using biofuel might have a thermal capacity of 45 MW. Total thermal output from each CPA is calculated by multiplying the average thermal output from the ethanol stoves with the number of project participating households registered in each CPA. The thermal output remains under the limit for the monitoring period and will remain under the limit every year during the crediting period.

The projects use renewable energy and is a small-scale project type I.

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Document information

<i>Version</i>	<i>Date</i>	<i>Description</i>
04.0	6 April 2021	Revision to: <ul style="list-style-type: none"> • Reflect the “Clarification: Regulatory requirements under temporary measures for post-2020 cases” (CDM-EB109-A01-CLAR).
03.0	31 May 2019	Revision to: <ul style="list-style-type: none"> • 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.
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