




**Validation report form for inclusion of component
project activities
(Version 03.0)**

BASIC INFORMATION

Title and UNFCCC reference number of the programme of activities (PoA)	Ghana Improved Cookstove Project by EWP in Republic of Korea UNFCCC Ref: 10576	
Version number of the validation report	02	
Completion date of the validation report	31/10/2020	
Version numbers of the PoA-DD to which this report applies	02	
Title and reference number of each CPAs to be included	CPA Ref. no.	Title
	CPA 005	Ghana Improved Cookstove Project by EWP in Republic of Korea – CPA 005
	CPA 006	Ghana Improved Cookstove Project by EWP in Republic of Korea – CPA 006
	CPA 007	Ghana Improved Cookstove Project by EWP in Republic of Korea – CPA 007
	CPA 008	Ghana Improved Cookstove Project by EWP in Republic of Korea – CPA 008
	CPA 009	Ghana Improved Cookstove Project by EWP in Republic of Korea – CPA 009
	CPA 010	Ghana Improved Cookstove Project by EWP in Republic of Korea – CPA 010
	CPA 011	Ghana Improved Cookstove Project by EWP in Republic of Korea – CPA 011
	CPA 012	Ghana Improved Cookstove Project by EWP in Republic of Korea – CPA 012
	CPA 013	Ghana Improved Cookstove Project by EWP in Republic of Korea – CPA 013
	CPA 014	Ghana Improved Cookstove Project by EWP in Republic of Korea – CPA 014
	CPA 015	Ghana Improved Cookstove Project by EWP in Republic of Korea – CPA 015
	CPA 016	Ghana Improved Cookstove Project by EWP in Republic of Korea – CPA 016
	CPA 017	Ghana Improved Cookstove Project by EWP in Republic of Korea – CPA 017
	CPA 018	Ghana Improved Cookstove Project by EWP in Republic of Korea – CPA 018
	CPA 019	Ghana Improved Cookstove Project by EWP in Republic of Korea – CPA 019
	CPA 020	Ghana Improved Cookstove Project by EWP in Republic of Korea – CPA 020

Applied methodologies and standardized baselines for each CPA	CPA Ref. no.	Applied methodologies and standardized baselines
	CPA 005	AMS II.G "Energy efficiency measures in thermal applications of non-renewable biomass" Version-10
	CPA 006	AMS II.G "Energy efficiency measures in thermal applications of non-renewable biomass" Version-10
	CPA 007	AMS II.G "Energy efficiency measures in thermal applications of non-renewable biomass" Version-10
	CPA 008	AMS II.G "Energy efficiency measures in thermal applications of non-renewable biomass" Version-10
	CPA 009	AMS II.G "Energy efficiency measures in thermal applications of non-renewable biomass" Version-10
	CPA 010	AMS II.G "Energy efficiency measures in thermal applications of non-renewable biomass" Version-10
	CPA 011	AMS II.G "Energy efficiency measures in thermal applications of non-renewable biomass" Version-10
	CPA 012	AMS II.G "Energy efficiency measures in thermal applications of non-renewable biomass" Version-10
	CPA 013	AMS II.G "Energy efficiency measures in thermal applications of non-renewable biomass" Version-10
	CPA 014	AMS II.G "Energy efficiency measures in thermal applications of non-renewable biomass" Version-10
	CPA 015	AMS II.G "Energy efficiency measures in thermal applications of non-renewable biomass" Version-10
	CPA 016	AMS II.G "Energy efficiency measures in thermal applications of non-renewable biomass" Version-10
	CPA 017	AMS II.G "Energy efficiency measures in thermal applications of non-renewable biomass" Version-10
	CPA 018	AMS II.G "Energy efficiency measures in thermal applications of non-renewable biomass" Version-10
	CPA 019	AMS II.G "Energy efficiency measures in thermal applications of non-renewable biomass" Version-10
	CPA 020	AMS II.G "Energy efficiency measures in thermal applications of non-renewable biomass" Version-10
Sectoral scopes for each CPA	CPA Ref. no.	Sectoral scopes (indicate mandatory and conditional sectoral scopes)

	CPA 005	03- Energy Demand	
	CPA 006	03- Energy Demand	
	CPA 007	03- Energy Demand	
	CPA 008	03- Energy Demand	
	CPA 009	03- Energy Demand	
	CPA 010	03- Energy Demand	
	CPA 011	03- Energy Demand	
	CPA 012	03- Energy Demand	
	CPA 013	03- Energy Demand	
	CPA 014	03- Energy Demand	
	CPA 015	03- Energy Demand	
	CPA 016	03- Energy Demand	
	CPA 017	03- Energy Demand	
	CPA 018	03- Energy Demand	
	CPA 019	03- Energy Demand	
	CPA 020	03- Energy Demand	
	Coordinating/managing entity (CME)	Climate Change Center	
	Host Parties	The Republic of Ghana	
	Estimated amount of annual average greenhouse gas (GHG) emission reductions or GHG removals by sinks in the crediting period (tCO₂e), per CPA	CPA Ref. no.	tCO₂e
		CPA 005	75,797
CPA 006		71,558	
CPA 007		70,865	
CPA 008		59,167	
CPA 009		68,825	
CPA 010		68,835	
CPA 011		68,819	
CPA 012		78,966	
CPA 013		88,417	
CPA 014		86,541	
CPA 015		79,620	
CPA 016		39,096	
CPA 017		14,660	
CPA 018		36,653	
CPA 019		23,213	
CPA 020		8,551	
Name and UNFCCC reference number of the DOE	4K Earth Science Private. Limited UNFCCC Ref No. CDM-E-0069		
Name, position and signature of the approver of the validation report			

	S. Jagajothi Director
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SECTION A. Executive summary

>> Climate Change Center (CME) has commissioned 4KES to perform the validation of the proposed 16 CPA Inclusions (from CPA 005 to CPA 020):

PoA Title:	Ghana Improved Cookstove Project by EWP in Republic of Korea
CPAs Titles:	<ol style="list-style-type: none"> 1. Ghana Improved Cookstove Project by EWP in Republic of Korea – CPA 005 2. Ghana Improved Cookstove Project by EWP in Republic of Korea – CPA 006 3. Ghana Improved Cookstove Project by EWP in Republic of Korea – CPA 007 4. Ghana Improved Cookstove Project by EWP in Republic of Korea – CPA 008 5. Ghana Improved Cookstove Project by EWP in Republic of Korea – CPA 009 6. Ghana Improved Cookstove Project by EWP in Republic of Korea – CPA 010 7. Ghana Improved Cookstove Project by EWP in Republic of Korea – CPA 011 8. Ghana Improved Cookstove Project by EWP in Republic of Korea – CPA 012 9. Ghana Improved Cookstove Project by EWP in Republic of Korea – CPA 013 10. Ghana Improved Cookstove Project by EWP in Republic of Korea – CPA 014 11. Ghana Improved Cookstove Project by EWP in Republic of Korea – CPA 015 12. Ghana Improved Cookstove Project by EWP in Republic of Korea – CPA 016 13. Ghana Improved Cookstove Project by EWP in Republic of Korea – CPA 017 14. Ghana Improved Cookstove Project by EWP in Republic of Korea – CPA 018 15. Ghana Improved Cookstove Project by EWP in Republic of Korea – CPA 019 16. Ghana Improved Cookstove Project by EWP in Republic of Korea – CPA 020
Methodology Applied:	AMS II.G "Energy efficiency measures in thermal applications of non-renewable biomass" Version-10
Sectoral scopes:	03- Energy Demand

General description of CPAs:

The CPAs (16 CPAs: CPA 005 to CPA 020) involves installation of energy efficient biomass based Improved Cooking Stoves (ICSs) in the households located within The Republic of Ghana.

The purpose of the CPAs is to reduce woodfuel (firewood and charcoal) consumption of households by distributing and using improved cook stoves (hereinafter referred to as "ICS"), thus the programme contributes to reducing greenhouse gas (GHG) and provides a healthy environment and sustainable development of Ghana.

As the CME, Climate Change Center (CCC), manages to produce and distribute high thermal efficient ICSs to selected beneficiaries (households) in Ghana at no cost. The program is subsidized by the Korea East-West Power Company (EWP). This CPA does not receive any public funding from Parties included in Annex I to the Convention. In the baseline scenario, households continue to using woodfuel in traditional and/or conventional cook stoves. The project ICS are more efficient, emits less emissions, needs less woodfuel and safer than baseline stoves such as traditional (including three stone) and/or conventional cook stoves. Thus, this activity will lead to reduce CO₂ emissions.

The project ICS is similar to the 'Jiko type' cook stove already existing on the market in Africa, but local name is "Gyapa" in Ghana. All project ICS produces in Ghana and made of cast iron and ceramic material which is portable. The efficiency of project ICS is remarkably improved, thus the cost to a household of buying fuel decreases. The colour of the project ICS is Grey/Ash whiles ICS on the market is usually black. Each ICS is embossed with a unique serial number that also traces back to the manufacturer of the ICS.

The estimated ICS distribution and the estimated annual emission reduction from each CPA is as follows.

CPA Ref No.	Estimated distribution	ICS	Estimated average reduction	annual emission	Estimated emission reduction in the first crediting period (7 years)

		Unit: tCO ₂ e/year	Unit: tCO ₂ e
CPA 005	31,019	75,797	530,582
CPA 006	29,285	71,558	500,910
CPA 007	29,001	70,865	496,055
CPA 008	24,214	59,167	414,171
CPA 009	28,166	68,825	481,778
CPA 010	28,170	68,835	481,848
CPA 011	28,164	68,819	481,738
CPA 012	32,316	78,966	552,766
CPA 013	36,184	88,417	618,923
CPA 014	35,416	86,541	605,792
CPA 015	32,584	79,620	557,341
CPA 016	16,000	39,096	273,677
CPA 017	6,000	14,660	102,625
CPA 018	15,000	36,653	256,572
CPA 019	9,500	23,213	162,494
CPA 020	3,500	8,551	59,862

The CPAs will be implemented in several districts and households in the region of Ghana. Below table summarizes the location of the CPAs:

CPA Ref No.	Region	District
CPA 005	Central region in the Republic of Ghana	The 11 Districts in Central Region: Effutu Municipal, Agona East, Agona West Municipal, Ajumako-Enyan-Essiam, Asikuma - Odoben – Brakwa, Awutu Senya East Municipal, Awutu-Senya, Ekumfi, Gomoa East, Gomoa West, Mfantseman Municipal
CPA 006	Eastern region in the Republic of Ghana	The 9 Districts in Eastern Region: Akyemansa District, Ayensuano District, Birim Central Municipal District, Birim North District, Birim South District, Denkyembour District, Kwaebibirem District, Upper West Akim District, West Akim Municipal District
CPA 007	Eastern region in the Republic of Ghana	The 9 Districts in Eastern Region: Akwapim North Municipal District, Akwapim South District, Atiwa District, East Akim Municipal District, Lower Manya Krobo Municipal District, New Juaben Municipal District, Nsawam - Adoagyire Municipal District, Suhum Municipal District, Yilo Krobo Municipal District
CPA 008	Eastern region in the Republic of Ghana	The 8 Districts in Eastern Region: Asuogyaman District, Fanteakwa District, Kwahu Afram Plains North District, Kwahu Afram Plains South District, Kwahu East District, Kwahu South District, Kwahu West Municipal District, Upper Manya Krobo District
CPA 009	Accra region in the Republic of Ghana	The 6 Districts in Accra Region: Accra Metropolitan, Ga Central Municipal, Ga South Municipal or Weija Municipal, Ga West Municipal, La Dade-Kotopon Municipal, Okaikwei North Municipal
CPA 010	Accra region in the Republic of Ghana	The 7 Districts in Accra Region: Adenta Municipal, Ashaiman Municipal, Ayawaso East Municipal, Ga East Municipal, La-Nkwantanang-Madina, Ledzokuku-Krowor Municipal, Tema Metropolitan
CPA 011	Accra region in the Republic of Ghana	The 5 Districts in Accra Region: Ada East, Ada West, Kpone - Katamanso, Ningo – Prampam, Shai - Osudoku
CPA 012	Volta region in the Republic of Ghana	The 8 Districts in Volta Region: Akatsi North District, Akatsi South District, Central Tongu District, Keta Municipal District, Ketu South Municipal District, Ketu North District, North Tongu District, South Tongu District
CPA 013	Volta region in the Republic of Ghana	The 9 Districts in Volta Region: Adaklu District, Afadzato South District (Afadjato District), Agotime-Ziope District, Ho Municipal District, Ho West District, Hohoe Municipal District, Kpando Municipal District, North Dayi District, South Dayi District
CPA 014	Western region in the Republic	The 7 Districts in Western Region: Ahanta West District, Ellembelle District, Jomoro District, Mpohor District, Nzema East Municipal District, Sekondi-

	of Ghana	Takoradi Metropolitan District, Tarkwa Nsuaem Municipal District
CPA 015	Western region in the Republic of Ghana	The 6 Districts in Western Region: Wassa East District, Prestea-Honi Valley District, Shama District, Wasa-Amenfi East District, Wasa-Amenfi Central District, Wasa-Amenfi West District
CPA 016	Western North, Ahafo and Bono region in the Republic of Ghana	The 26 Districts in Western North, Ahafo and Bono Region: (Western North) Aowin, Bia East, Bia West, Bodi, Juaboso, Sefwi-Akontombra, Sefwi-Anhwiaso-Bekwai-Bibiani, Sefwi-Wiawso, Suaman, (Ahafo) Asunafo North District, Asunafo South District, Asutifi North District, Asutifi South District, Tano North District, Tano South District, (Bono) Banda District, Berekum District, Dormaa Central District, Dormaa East District, Dormaa West District, Jaman North District, Jaman South District, Sunyani District, Sunyani West District, Tain District, Wenchi District
CPA 017	Northern region in the Republic of Ghana	The 14 Districts in Northern Region: Karaga District, Kpandai District, Kumbungu, Mion, Nanumba North district, Nanumba South district, Saboba District, Sagnarigu District, Savelugu Nanton, Tamale Metropolitan, Tatale-Sanguli District, Tolon District, Yendi Municipal District, Zabzugu District
CPA 018	North East, Upper East and Upper West region in the Republic of Ghana	The 29 Districts in North East, Upper East and Upper West Region: Bunkpurugu Nakpanduri District, Chereponi District, East Mamprusi District, Mamprugu Moagduri District, West Mamprusi District, Yendi Municipal District, Bawku Municipal District, Bawku West District, Binduri District, Bolgatanga Municipal District, Bongo District, Builsa North District, Builsa South District, Garu Tempene District, Kassena Nankana East District, Kassena Nankana West District, Nabdam District, Talensi District, Dafiama Bussief District, Jirapa District, Lambussie Karni District, Lawra District, Nadowli-Kaleo District, Nandom District, Sisaala West District, Sissala East District, Wa East District, Wa Municipal District, Wa West District
CPA 019	Oti and Bono East region in the Republic of Ghana	The 18 Districts in Oti and Bono East Region: (Oti) Jasikan District, Biakoye District, Kadjebi District, Krachi East Municipal District, Krachi Nchumuru District, Krachi West District, Nkwanta North District, Nkwanta South District, (Bono East) Atebubu-Amantin Municipal District, Kintampo North Municipal District, Kintampo South, Nkoranza North District, Nkoranza South District, Pru District, Sene East District, Sene West District, Techiman Municipal District, Techiman North District
CPA 020	Savannah region in the Republic of Ghana	The 6 Districts in Savannah Region: Bole District, Central Gonja District, East Gonja District, North Gonja District, Sawla-Tuna-Kalba District, West Gonja District

Scope of Validation, Validation Process and Conclusion:

The scope of the validation is defined as an independent and objective review of the CPA design documents, the project's baseline study and monitoring plan and other relevant documents. The information in these documents is reviewed against the latest version of CDM Validation and Verification Standard, Project Cycle Procedure and Project Standard, Kyoto Protocol requirements and UNFCCC rules.

The report is based on the assessment of the CPA design document, PoA design document, PoA validation report, application of standard auditing techniques including but not limited to desk review, follow up actions (e.g., electronic (WhatsApp/Skype) video or e-mail interviews) and also the review of the applicable approved methodological and relevant tools, guidance and CDM decisions.

The review of the CPA design documentation and the subsequent follow-up interviews have provided 4KES with sufficient evidence to determine the project's fulfilment of all the stated criteria. In our opinion, the project meets all applicable UNFCCC requirements for the CDM.

SECTION B. Validation team, technical reviewer and approver**B.1. Validation team member**

No.	Role	Type of resource	Last name	First name	Affiliation (e.g. name of central or other office of DOE or outsourced entity)	Involvement in			
						Desk/document review	On-site inspection	Interviews	Validation findings
1.	Team Leader & Technical Expert (3.1)	IR	Sharma	Chetan Swaroop	Central office	✓		✓	✓
5.	Local Expert	EI	Bright	Amponsem	Central office	✓			

B.2. Technical reviewer and approver of the validation report

No.	Role	Type of resource	Last name	First name	Affiliation (e.g. name of central or other office of DOE or outsourced entity)
1.	Technical reviewer (TA 3.1)	IR	R	Narendra Kumar	Central Office
2	Approver	IR	S	Jagajothi	Central Office

SECTION C. Means of validation**C.1. Desk/document review**

>> The validation is performed primarily as a document review of the CPA Design Document version 01, dated 28/07/2020 for CPA 005 to CPA 020 and the CPA Design Document version 1.4 (final), dated 27/10/2020 for all the 16 CPAs /01/. The assessment is performed by a validation team using a validation protocol. The cross checks between information provided in the CPA-DDs and information from sources other than those used, if available, the validation team's sectoral or local expertise and, if necessary, independent background investigations.

In particular, the project's baseline, the monitoring plan (MP) and the project's compliance with relevant UNFCCC and host country criteria are validated in order to confirm that the project design as documented is sound and reasonable and meets the stated requirements and identified criteria. The validation is seen as necessary to provide assurance to stakeholders of the quality of the project and its intended generation of certified emission reduction (CER).

UNFCCC criteria refers to the Kyoto Protocol criteria and the CDM rules and modalities and related decisions by the COP/MOP and the CDM Executive Board.

C.2. On-site inspection

As a result of the COVID-19 pandemic, taking into account the rules of relevant national and local authorities (local to the DOE offices as well as to locality of the site visits), World Health Organization (WHO) recommendations, policies of the DOE, considering the DOE contract timeline and other relevant travel restrictions and guidance (for example, a requirement to self-isolate upon return from specific countries), the DOE has skipped the on-site visit. However as per the CDM EB, the DOE may use other standard auditing techniques for validation or verification as referred to in sections 7.1.3 and 10.1.3 of the VVS-PoA/05/.

As per para 184 of CDM validation and verification standard for programmes of activities version 02/05/, Validation team has used the following alternative means for its assessment and to justify that they are sufficient for the purpose of validation of 16 CPAs (CPA 005 to CPA 020). Along with desk review, audit team has conducted remote audit interview corresponding to 16 CPAs (CPA 005 to CPA 020) as follows:

- A complete desk review of the PoA-DD, submitted CPA-DDs (initial and final versions) of all the 16 CPAs, as well as all applicable country legal requirement and supportive evidences have been checked by the validation team.
- Validation team has performed Skype interview with Climate Change Center (CME), The Ministry of Energy (CPA implementor), SUDRA and Radiant Beam (ICS manufacturers), Green-ENS (Project Coordinator), DS&S (ICS Production Manager), Consulting Firm (WECOS), Baseline Users, fnrb developer in order to check implementation, current situation, baseline practice, fnrb calculation, management system of the CPAs, project technology, location, training provided, start date, eligibility criteria etc. No project ICS was distributed till the time of the interview. Few randomly selected baseline users were interviewed in order to assess the baseline practice and usage of cooking stoves in the baseline.
- Validation team has performed WhatsApp interview with randomly selected Local stakeholders to check the Local stakeholder consultation process conducted at PoA level.
- Cross-check evaluation, for information received from interviews, under the scope of all information and references provided in CPA-DDs and supporting documents.

Details of interviewees, topics covered and additional information presented in the below section “C.3 Interviews”

Validation team has also checked the site visit requirements mentioned in the VVS for PoA Version 02/05/ and concluded that no-site visit is required at this stage of CPA inclusions to PoA. The justification for not conducting the on-site visit as per VVS PoA Version 02 /05/ have been mentioned below:

VVS PoA Version 02/05/ Requirements	Validation team Justification
Para 29 (b) (b) Follow-up actions (e.g. on-site inspection and telephone or e-mail interviews), including: (i) Interviews with relevant stakeholders in the host country, such as personnel with knowledge of the project design and implementation; (ii) Cross checks between information provided by interviewed personnel (i.e. by checking sources or other interviews) to ensure that no relevant information has been omitted;	Validation team has done the follow-up actions by: 1. WhatsApp/Skype interviews of CME, CPA Implementer, ICS Manufacturer, Project Coordinator, ICS production manager, consulting firm, fnrb developer, Baseline users and Local stakeholders. 2. Cross checks between information provided by interviewed personnel (i.e. by checking sources) to ensure that no relevant information has been omitted.
Para 30 It is mandatory for the DOE to conduct an on-site inspection at validation for the proposed CDM project activity if: (a) Its estimated annual average of greenhouse gas	The validation team has not considered the site visit as mandatory due to the following reasons which are in line with the VVS PoA Version 02 Requirements. 1. For each CPA to be included (out of 16 CPAs),

<p>(GHG) emission reductions or net anthropogenic GHG removals is more than 100,000 t CO₂ eq; or</p> <p>(b) There is pre-project information that is relevant to the requirements for registration of the project activity and may not be traceable after the registration.</p>	<p>the estimated annual average of GHG emission reductions or net anthropogenic GHG removals is less than 100,000 t CO₂ eq.</p> <p>2. Also there is no pre-project information that is relevant to the requirements for inclusion of CPAs and may not be traceable after the inclusion.</p> <p>3. Lastly but not the least, the validation team had conducted a remote audit via WhatsApp/Skype video call to crosscheck information related to baseline, project implementation and compliance of CPA 005 to CPA 020 with inclusion eligibility criteria (as applicable) etc. No project ICS was distributed till the time of the interview. Few randomly selected baseline users were interviewed in order to assess the baseline practice and usage of cooking stoves in the baseline.</p> <p>Hence, for the proposed CPAs, it is not mandatory to conduct the physical on-site visit is justified.</p>
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Duration of on-site inspection: DD/MM/YYYY				
No.	Activity performed on-site	Site location	Date	Team member

C.3. Interviews

No.	Interviewee			Date	Subject	Team member
	Last name	First name	Affiliation			
1.	Lee	Jung-Hyun	Manager, Climate Change Center (CME), Korea office	19/08/2020	<ul style="list-style-type: none"> Emission reduction calculation Monitoring plan CPA source of financing Implementation, Operation and Management of specific CPA; PoA (Technology, Location) Local laws and regulations in host country applicable to the project activity. Training, Project boundary LSC Double 	Chetan Swaroop Sharma (Team Leader & Technical Expert (3.1)) (Skype interview)
2.	Ga Yeong	Kim	Researcher, Climate Change Center (CME), Korea office	19/08/2020		
3.	Jae Hyun	Nam	Lead consultant, Consulting Firm, WECOS	19/08/2020		
4.	Kyou Hyun	Choi	Consultant, Consulting Firm, WECOS	19/08/2020		
5.	Jae Heon	Lee	Communication manager, Project Coordinator, Green-ENS	19/08/2020		
6.	Abdulai	Nasurulai	CDM Project Manager, Green-ENS (Project Coordinator)	19/08/2020		
7.	Rahman	Abdul	CEO, ICS production manager, DS&S	19/08/2020		
8.	Setn Mahu	Ing.	Deputy Director Renewable Energy, The Ministry of Energy, Ghana (CPA Implementer)	19/08/2020		
9.	Sylvester Dadzie	Seth	fNRB Developer	19/08/2020		

					counting etc. • Baseline, eligibility criteria, start date etc. • baseline fuel, baseline scenario • fnrb calculation etc.	
10.	TITIATI	Atsu	CEO, Sustainable Development & Relief (SUDRA) (ICS Manufacturer)	19/08/2020	• Technical specifications of ICS • Life time of ICS	Chetan Swaroop Sharma (Team Leader & Technical Expert (3.1)) (Skype interview)
11.	Asamoah Asante	Bismark	Production Manager, Radiant Beam Ltd. (ICS Manufacturer)	19/08/2020	• Training provided to worker • Manufacturing process • Quality Assurance/Quality Control etc.	Chetan Swaroop Sharma (Team Leader & Technical Expert (3.1)) (Skype interview)
12.	Wilson	Michelle	Local stakeholder	19/08/2020	Local stakeholder consultation process	Chetan Swaroop Sharma (Team Leader & Technical Expert (3.1)) (WhatsApp interview)
13.	Barnasko	Esther	Local stakeholder	19/08/2020		
14.	Agyeibea Darko	Veronica	Local stakeholder	19/08/2020		
15.	Darko	Joseph	Local stakeholder	19/08/2020		
16.	Ofosu	Mavis	Baseline user	19/08/2020	• Baseline cooking technology • Baseline fuel type	Chetan Swaroop Sharma (Team Leader & Technical Expert (3.1)) (Skype interview)
17.	Botchway	Nora	Baseline user	19/08/2020		

C.4. Sampling approach

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Not applicable. No sampling was applied as no ICS was distributed till the time of interview i.e. 19/08/2020.

C.5. Clarification requests (CLs), corrective action requests (CARs) and forward action requests (FARs) raised

Areas of validation of compliance (SECTION D)	No. of CL	No. of CAR	No. of FAR
Titles of the CPAs and corresponding generic CPAs	00	00	00
Compliance with CPA-DD form	00	02	00
General description of the CPAs	01	00	00
Application of methodologies and standardized baselines	00	00	00

• Reference to methodologies and standardized baselines	01	00	00
• Project boundary, sources and GHGs	00	00	00
• Baseline scenario	00	00	00
Estimation of emission reductions or net anthropogenic removals	00	00	00
• Equations and parameters applied to calculate GHG emission reductions or net anthropogenic GHG removals	01	00	00
• Data and parameters fixed ex ante	02	01	00
• Ex ante calculation of GHG emission reductions or net anthropogenic GHG removals	00	00	00
• Summary of ex ante estimates of GHG emission reductions or net anthropogenic GHG removals	00	00	00
Monitoring plan			
• Data and parameters to be monitored	00	01	00
• Description of the monitoring plan	01	00	00
Start date, crediting period type and duration	00	01	00
Environmental impacts	00	00	00
Local stakeholder consultation	00	00	00
Eligibility for inclusion	00	01	00
Others (please specify)	00	00	00
Total	06	06	00

SECTION D. Validation findings

D.1. Proposed CPAs and corresponding generic CPAs

CPA title and reference number	Version number of the CPA-DD	Host Party	Generic CPA title, identification/reference number	Version number of the PoA-DD into which the CPA is included
Title: Ghana Improved Cookstove Project by EWP in Republic of Korea – CPA 005 Reference No.: 10576-P1-0005-CP1	1.4	The Republic of Ghana	Title: Ghana Improved Cookstove Project by EWP in Republic of Korea – CPA # Ref. No.: Generic CPA 01	2.0
Ghana Improved Cookstove Project by EWP in Republic of Korea – CPA 006 Reference No.: 10576-P1-0006-CP1	1.4	The Republic of Ghana	Title: Ghana Improved Cookstove Project by EWP in Republic of Korea – CPA # Ref. No.: Generic CPA 01	2.0
Ghana Improved Cookstove Project by EWP in Republic of Korea – CPA 007 Reference No.: 10576-P1-0007-CP1	1.4	The Republic of Ghana	Title: Ghana Improved Cookstove Project by EWP in Republic of Korea – CPA # Ref. No.: Generic CPA 01	2.0

Ghana Improved Cookstove Project by EWP in Republic of Korea – CPA 008 Reference No.: 10576-P1-0008-CP1	1.4	The Republic of Ghana	Title: Ghana Improved Cookstove Project by EWP in Republic of Korea – CPA # Ref. No.: Generic CPA 01	2.0
Ghana Improved Cookstove Project by EWP in Republic of Korea – CPA 009 Reference No.: 10576-P1-0009-CP1	1.4	The Republic of Ghana	Title: Ghana Improved Cookstove Project by EWP in Republic of Korea – CPA # Ref. No.: Generic CPA 01	2.0
Ghana Improved Cookstove Project by EWP in Republic of Korea – CPA 010 Reference No.: 10576-P1-0010-CP1	1.4	The Republic of Ghana	Title: Ghana Improved Cookstove Project by EWP in Republic of Korea – CPA # Ref. No.: Generic CPA 01	2.0
Ghana Improved Cookstove Project by EWP in Republic of Korea – CPA 011 Reference No.: 10576-P1-0011-CP1	1.4	The Republic of Ghana	Title: Ghana Improved Cookstove Project by EWP in Republic of Korea – CPA # Ref. No.: Generic CPA 01	2.0
Ghana Improved Cookstove Project by EWP in Republic of Korea – CPA 012 Reference No.: 10576-P1-0012-CP1	1.4	The Republic of Ghana	Title: Ghana Improved Cookstove Project by EWP in Republic of Korea – CPA # Ref. No.: Generic CPA 01	2.0
Ghana Improved Cookstove Project by EWP in Republic of Korea – CPA 013 Reference No.: 10576-P1-0013-CP1	1.4	The Republic of Ghana	Title: Ghana Improved Cookstove Project by EWP in Republic of Korea – CPA # Ref. No.: Generic CPA 01	2.0
Ghana Improved Cookstove Project by EWP in Republic of Korea – CPA 014 Reference No.: 10576-P1-0014-CP1	1.4	The Republic of Ghana	Title: Ghana Improved Cookstove Project by EWP in Republic of Korea – CPA # Ref. No.: Generic CPA 01	2.0

Ghana Improved Cookstove Project by EWP in Republic of Korea – CPA 015 Reference No.: 10576-P1-0015-CP1	1.4	The Republic of Ghana	Title: Ghana Improved Cookstove Project by EWP in Republic of Korea – CPA # Ref. No.: Generic CPA 01	2.0
Ghana Improved Cookstove Project by EWP in Republic of Korea – CPA 016 Reference No.: 10576-P1-0016-CP1	1.4	The Republic of Ghana	Title: Ghana Improved Cookstove Project by EWP in Republic of Korea – CPA # Ref. No.: Generic CPA 01	2.0
Ghana Improved Cookstove Project by EWP in Republic of Korea – CPA 017 Reference No.: 10576-P1-0017-CP1	1.4	The Republic of Ghana	Title: Ghana Improved Cookstove Project by EWP in Republic of Korea – CPA # Ref. No.: Generic CPA 01	2.0
Ghana Improved Cookstove Project by EWP in Republic of Korea – CPA 018 Reference No.: 10576-P1-0018-CP1	1.4	The Republic of Ghana	Title: Ghana Improved Cookstove Project by EWP in Republic of Korea – CPA # Ref. No.: Generic CPA 01	2.0
Ghana Improved Cookstove Project by EWP in Republic of Korea – CPA 019 Reference No.: 10576-P1-0019-CP1	1.4	The Republic of Ghana	Title: Ghana Improved Cookstove Project by EWP in Republic of Korea – CPA # Ref. No.: Generic CPA 01	2.0
Ghana Improved Cookstove Project by EWP in Republic of Korea – CPA 020 Reference No.: 10576-P1-0020-CP1	1.4	The Republic of Ghana	Title: Ghana Improved Cookstove Project by EWP in Republic of Korea – CPA # Ref. No.: Generic CPA 01	2.0

D.2. Compliance with CPA-DD form


Means of validation	The CPA DDs (16 CPAs) applied the component project design document form component project activities (CDM-CPA-DD-FORM) version 03/10/, which is a valid form available on UNFCCC/CDM website. The validation team confirms that the CPA-DDs are completed in accordance with the Instructions for filling out the component project activity design document /10/ form for CDM component project activities. Same is confirmed from
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	https://cdm.unfccc.int/Reference/PDDs_Forms/index.html#proj_cycle . Relevant information was provided by the CME (Climate Change Center) and the CPA Implementer (The Ministry of Energy, Ghana) in the applicable CPA-DD sections.
Findings	CAR 01 and CAR 02 were raised and successfully closed. Refer to Appendix 4 for further details.
Conclusion	The assessment team confirms that the CPA-DDs are prepared in accordance with the latest valid template and Instructions for filling out the component project design document form available on the UNFCCC CDM website. CPA-DDs have been prepared in line with the generic CPA-DD template approved during PoA validation.

D.3. General description of the CPAs

Means of validation	<p>The CPAs (16 CPAs: CPA 005 to CPA 020) involves installation of energy efficient biomass based Improved Cooking Stoves (ICSs) in the households located within The Republic of Ghana.</p> <p>The purpose of the CPAs is to reduce woodfuel (firewood and charcoal) consumption of households by distributing and using improved cook stoves (hereinafter referred to as "ICS"), thus the programme contributes to reducing greenhouse gas (GHG) and provides a healthy environment and sustainable development of Ghana.</p> <p>Climate Change Center (CCC), manage to produce and distribute high thermal efficient ICSs to selected beneficiaries (households) in Ghana at no cost as verified from the CME during Skype interview. The program is subsidized by the Korea East-West Power Company (EWP). This CPA does not receive any public funding from Parties included in Annex I to the Convention as verified from the declaration from CME /34/. The ICSs will replace three stone or conventional inefficient cookstoves as verified by the CME and CPA Implementer. In the baseline scenario, households continue to using woodfuel in traditional and/or conventional cook stoves. The project ICS are more efficient, emits less emissions, needs less woodfuel and safer than baseline stoves such as traditional (including three stone) and/or conventional cook stoves. Thus, this activity will lead to reduce CO₂ emissions.</p> <p>The project ICS is similar to the 'Jiko type' cook stove already existing on the market in Africa, but local name is "Gyapa" in Ghana. All project ICS produces in Ghana and made of cast iron and ceramic material which is portable. The metal and ceramic material ICS is portable, whereas, the clay/brick, or clay/stone (conventional) stove is generally high mass and location fixed. The efficiency of project ICS is remarkably improved, thus the cost to a household of buying fuel decreases. The colour of the project ICS is Grey/Ash whiles ICS on the market is usually black. Each ICS is embossed with a unique serial number that also traces back to the manufacturer of the ICS. This serial number would be used for data collection, monitoring and evaluation.</p> <p>The technical details of the ICS (to be distributed) is in compliance with the PoA-DD /26/. The technical specifications of ICS have been verified from the Production manual /26/.</p> <p>The size of the cookstove would be uniform throughout the period of the project, and product specification is as below;</p> <ul style="list-style-type: none"> • Pot Type Support; Flat or Round, Sandglass Shaped • Unit Size(cm): Top Diameter 32.0cm (±1.0), Height 27.0cm (±1.0) • Thickness of the Metal Body: 0.4mm gauge and above • Thickness of the clay liner: 3.5cm (±1.0) • Unit Weight: about 10 kilograms • Assembly type: Fully Assembled • Fuel Type: Charcoal • Thermal Efficiency: 32% (avg, WBT)
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- Pot Diameter Capacity: up to 30cm (recommended)
- Estimated Lifespan: up to 5 years

ICS	Efficiency	Materials	Portability	Type of Fuel
	32%	Cast Iron & Ceramic Material	Easily Movable & Portable	Charcoal

As discussed with CME (CCC) and CPA Implementer, only one type of model will be distributed and only one stove per household will be distributed throughout all the 16 CPAs. The ICS user is selected by CPA Implementer based on the Target Group defined in the PoA (i.e. households who have conventional cookstoves). The ICS households to each CPA are unique and does not involve in other CPAs of the PoA as checked from interview with CCC and CI.

The lifespan of the ICS is 5 years according to the ICS manufacturer /28/. ICSs will be replaced every 5 years throughout the crediting period of the CPAs.

A Water Boiling Test (WBT) for the project ICS was conducted by the national standard body i.e. Regional Testing and Knowledge Center (RTKC), CSIR Ghana and confirm the efficiency as 32% /23/. The test is in compliance with the applied methodology AMS-II.G. Version 10 /08/ and the PoA-DD /03/ and hence acceptable to the validation team. Lab test report /23/ validated to confirm the efficiency chosen. The decrease in efficiency every year is applied 2.4 percent as per para 32 (a) of the applied methodology /08/.

There are two manufacturer SUDRA and Radiant Beam of the project ICS. From the interview with ICS Manufacturers, it was confirmed that ICS will maintain the same quality during the ICS production as per the Production manual for cook stove /26/. In order to distinguish, track and monitor ICSs in the CPA, all ICSs will be given a unique serial number which has been verified from CME interview.

At the time of distribution, every end-user will fill out and sign conformity letter to ensure the end-user's participation to and tracking by the project. Conformity letter /20/ also confirm the CER ownership rights. The location information of each ICS will be recorded in the electrical database tool /22/.

Out of the 16 CPAs to be included, the distribution of the ICS has only started under 3 CPAs i.e. CPA 009, CPA 013 and CPA 014. The CPA start date for the three CPAs (CPA 009, CPA 013 and CPA 014) has been confirmed from the conformity letter for the first ICS distribution in each CPA /20/. For the remaining CPAs, the expected ICS distribution date has been mentioned as the start date which has been verified from the CPA-DDs /01/ and found OK.

Validation team has found the CPAs start date in compliance with the eligibility criteria stipulated in the PoA DD/03/. The start date of the PoA is 14/01/2020 which is before the start date of the CPAs to be included /01/.

The proposed CPAs will only distribute ICS which will qualify as micro-scale units i.e. microscale threshold of 1,800 MWh_{th} of annual energy savings per appliance. Validation team has checked the submitted sheets /31/ for the energy saving from each ICS (11.76 MWh_{th}/y) and found below the microscale threshold of 1,800 MWh_{th} of annual energy savings per appliance.

As each ICS unit to be distributed under the proposed CPAs will qualify as micro scale units, the CPAs does not need to demonstrate fulfilment with the debundling

requirement (version 09 of the "Tool for Demonstration of additionality of microscale projects" /14/).

The estimated ICS distribution and the estimated annual emission reduction from each CPA is as follows.

CPA Ref No.	Estimated ICS distribution	Estimated annual average emission reduction Unit: tCO ₂ e/year	Estimated emission reduction in the first crediting period (7 years) Unit: tCO ₂ e
CPA 005	31,019	75,797	530,582
CPA 006	29,285	71,558	500,910
CPA 007	29,001	70,865	496,055
CPA 008	24,214	59,167	414,171
CPA 009	28,166	68,825	481,778
CPA 010	28,170	68,835	481,848
CPA 011	28,164	68,819	481,738
CPA 012	32,316	78,966	552,766
CPA 013	36,184	88,417	618,923
CPA 014	35,416	86,541	605,792
CPA 015	32,584	79,620	557,341
CPA 016	16,000	39,096	273,677
CPA 017	6,000	14,660	102,625
CPA 018	15,000	36,653	256,572
CPA 019	9,500	23,213	162,494
CPA 020	3,500	8,551	59,862

The physical and geographical boundary of PoA /03/ is entire host country i.e. Ghana as validated by interviewing the CME Representative and CPA Implementer. The PoA has not received any public funding as confirmed by interviewing the representative of CME.

CME has chosen a crediting period of 7 years which can be renewed twice. It was found in line with the PoA-DD /03/.

Geographical Locations of CPAs:

The CPAs will be implemented in several districts and households in the region of Ghana. Below table summarizes the location of the CPAs:

CPA Ref No.	Region	District
CPA 005	Central region in the Republic of Ghana	The 11 Districts in Central Region: Effutu Municipal, Agona East, Agona West Municipal, Ajumako-Enyan-Essiam, Asikuma - Odoben – Brakwa, Awutu Senya East Municipal, Awutu-Senya, Ekumfi, Gomoa East, Gomoa West, Mfantseman Municipal
CPA 006	Eastern region in the Republic of Ghana	The 9 Districts in Eastern Region: Akyemansa District, Ayensuano District, Birim Central Municipal District, Birim North District, Birim South District, Denkyemba District, Kwaebibirem District, Upper West Akim District, West Akim Municipal District
CPA 007	Eastern region in the Republic of Ghana	The 9 Districts in Eastern Region: Akwapim North Municipal District, Akwapim South District, Atiwa District, East Akim Municipal District, Lower Manya Krobo Municipal District, New Juaben Municipal District, Nsawam - Adoagyire Municipal District, Suhum Municipal

			District, Yilo Krobo Municipal District
	CPA 008	Eastern region in the Republic of Ghana	The 8 Districts in Eastern Region: Asuogyaman District, Fanteakwa District, Kwahu Afram Plains North District, Kwahu Afram Plains South District, Kwahu East District, Kwahu South District, Kwahu West Municipal District, Upper Manya Krobo District
	CPA 009	Accra region in the Republic of Ghana	The 6 Districts in Accra Region: Accra Metropolitan, Ga Central Municipal, Ga South Municipal or Weija Municipal, Ga West Municipal, La Dade-Kotopon Municipal, Okaikwei North Municipal
	CPA 010	Accra region in the Republic of Ghana	The 7 Districts in Accra Region: Adenta Municipal, Ashaiman Municipal, Ayawaso East Municipal, Ga East Municipal, La-Nkwantanang-Madina, Ledzokuku-Krowor Municipal, Tema Metropolitan
	CPA 011	Accra region in the Republic of Ghana	The 5 Districts in Accra Region: Ada East, Ada West, Kpone - Katamanso, Ningo – Prampam, Shai - Osudoku
	CPA 012	Volta region in the Republic of Ghana	The 8 Districts in Volta Region: Akatsi North District, Akatsi South District, Central Tongu District, Keta Municipal District, Ketu South Municipal District, Ketu North District, North Tongu District, South Tongu District
	CPA 013	Volta region in the Republic of Ghana	The 9 Districts in Volta Region: Adaklu District, Afadzato South District (Afadjato District), Agotime-Ziope District, Ho Municipal District, Ho West District, Hohoe Municipal District, Kpando Municipal District, North Dayi District, South Dayi District
	CPA 014	Western region in the Republic of Ghana	The 7 Districts in Western Region: Ahanta West District, Ellembele District, Jomoro District, Mpohor District, Nzema East Municipal District, Sekondi-Takoradi Metropolitan District, Tarkwa Nsuaem Municipal District
	CPA 015	Western region in the Republic of Ghana	The 6 Districts in Western Region: Wassa East District, Prestea-Honi Valley District, Shama District, Wasa-Amenfi East District, Wasa-Amenfi Central District, Wasa-Amenfi West District
	CPA 016	Western North, Ahafo and Bono region in the Republic of Ghana	The 26 Districts in Western North, Ahafo and Bono Region: (Western North) Aowin, Bia East, Bia West, Bodi, Juaboso, Sefwi-Akontombra, Sefwi-Anhwiaso-Bekwai-Bibiani, Sefwi-Wiawso, Suaman, (Ahafo) Asunafo North District, Asunafo South District, Asutifi North District, Asutifi South District, Tano North District, Tano South District, (Bono) Banda District, Berekum District, Dormaa Central District, Dormaa East District, Dormaa West District, Jaman North District, Jaman South District, Sunyani District, Sunyani West District, Tain District, Wenchi District
	CPA 017	Northern region in the Republic of Ghana	The 14 Districts in Northern Region: Karaga District, Kpandai District, Kumbungu, Mion, Nanumba North district, Nanumba South district, Saboba District, Sagnarigu District, Savelugu Nanton, Tamale Metropolitan, Tatale-Sanguli District, Tolon District, Yendi Municipal District, Zabzugu District
	CPA 018	North East, Upper East and Upper West	The 29 Districts in North East, Upper East and Upper West Region: Bunkpurugu Nakpanduri District, Chereponi District, East Mamprusi District, Mamprugu Moagduri District, West Mamprusi District, Yendi

		region in the Republic of Ghana	Municipal District, Bawku Municipal District, Bawku West District, Binduri District, Bolgatanga Municipal District, Bongo District, Builsa North District, Builsa South District, Garu Tempene District, Kassena Nankana East District, Kassena Nankana West District, Nabdam District, Talensi District, Dafiama Bussief District, Jirapa District, Lambussie Karni District, Lawra District, Nadowli-Kaleo District, Nandom District, Sisaala West District, Sissala East District, Wa East District, Wa Municipal District, Wa West District
	CPA 019	Oti and Bono East region in the Republic of Ghana	The 18 Districts in Oti and Bono East Region: (Oti) Jasikan District, Biakoye District, Kadjebi District, Krachi East Municipal District, Krachi Nchumuru District, Krachi West District, Nkwanta North District, Nkwanta South District, (Bono East) Atebubu-Amantin Municipal District, Kintampo North Municipal District, Kintampo South, Nkoranza North District, Nkoranza South District, Pru District, Sene East District, Sene West District, Techiman Municipal District, Techiman North District
	CPA 020	Savannah region in the Republic of Ghana	The 6 Districts in Savannah Region: Bole District, Central Gonja District, East Gonja District, North Gonja District, Sawla-Tuna-Kalba District, West Gonja District
Findings	CL 01 were raised and successfully closed. Refer to Appendix 4 for further details.		
Conclusion	<p>The assessment team confirms that:</p> <p>(a) The project description as mentioned in CPA DDs validated by reviewing the supporting evidence and same has been also confirmed by interviewing the technical personnel involved in project.</p> <p>(b) Based on discussion above the assessment team confirms that project description provided in CPA DDs /01/ is complete and accurate, hence complies with VVS V02 for PoAs/05/.</p> <p>(c) The validation team has conducted various interviews as per the details provided under Section C.3 above.</p>		

D.4. Application of methodologies and standardized baselines

D.4.1. Reference to methodologies and standardized baselines

Means of validation	<p>The registered PoA /03/ applied the approved methodology AMS-II.G., version 10 /08/.</p> <p>All the 16 CPAs have justified for the applicability criteria of the applied methodology and tools: AMS-II.G. "Energy Efficiency Measures in Thermal Applications of Non-Renewable Biomass", Version 10.0.</p> <p>Validation team has assessed the meth applicability criteria by means of document review and interviews and found that CPAs have properly justified and comply with the applicability criteria.</p>
Findings	CL 02 were raised and successfully closed. Refer to Appendix 4 for further details.
Conclusion	The applied methodology is applicable in the context of the proposed CPAs /01/ and in line with the PoA DD/03/.

D.4.2. Project boundary, sources and GHGs

Means of validation	The project boundary of all the CPAs are in line with the PoA and methodology applied/08/.																																									
	As per para 14 of the applied methodology AMS-II.G. Version 10 /08/, the CPA project boundary is the physical, geographical site of the efficient devices that utilize biomass.																																									
	The CPAs are located in Ghana, which is within the geographical boundary of the registered PoA. The project boundary was validated by reviewing the CPA-DDs /01/ and interview.																																									
	The validation team was able to confirm that all the identified emission sources which are impacted by the project are addressed by the approved methodology /08/ and can be seen in the table below.																																									
	<table><tr><th colspan="2">Source</th><th>GHG</th><th>Included?</th><th>Justification/Explanation</th></tr><tr><td rowspan="3">Baseline</td><td rowspan="3">Combustion of non-renewable biomass for cooking in baseline devices</td><td>CO₂</td><td>Yes</td><td>Major emission source</td></tr><tr><td>CH₄</td><td>No</td><td>Minor emission source excluded as conservative measure</td></tr><tr><td>N₂O</td><td>No</td><td>Minor emission source excluded as conservative measure</td></tr><tr><td rowspan="6">Project activity</td><td rowspan="3">Implementation of energy efficient ICSs resulting in decrease of combustion of non-renewable biomass for cooking</td><td>CO₂</td><td>Yes</td><td>Major emission source</td></tr><tr><td>CH₄</td><td>No</td><td>Minor emission source excluded as conservative measure</td></tr><tr><td>N₂O</td><td>No</td><td>Minor emission source excluded as conservative measure</td></tr><tr><td rowspan="3">Leakage (Diversion of non-renewable biomass saved under the project activity by non-project households that previously used renewable source)</td><td>CO₂</td><td>Yes</td><td>Major emission source</td></tr><tr><td>CH₄</td><td>No</td><td>Minor emission source excluded as conservative measure</td></tr><tr><td>N₂O</td><td>No</td><td>Minor emission source excluded as conservative measure</td></tr></table>					Source		GHG	Included?	Justification/Explanation	Baseline	Combustion of non-renewable biomass for cooking in baseline devices	CO ₂	Yes	Major emission source	CH ₄	No	Minor emission source excluded as conservative measure	N ₂ O	No	Minor emission source excluded as conservative measure	Project activity	Implementation of energy efficient ICSs resulting in decrease of combustion of non-renewable biomass for cooking	CO ₂	Yes	Major emission source	CH ₄	No	Minor emission source excluded as conservative measure	N ₂ O	No	Minor emission source excluded as conservative measure	Leakage (Diversion of non-renewable biomass saved under the project activity by non-project households that previously used renewable source)	CO ₂	Yes	Major emission source	CH ₄	No	Minor emission source excluded as conservative measure	N ₂ O	No	Minor emission source excluded as conservative measure
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		CH ₄	No	Minor emission source excluded as conservative measure																																						
		N ₂ O	No	Minor emission source excluded as conservative measure																																						
Findings	No findings raised.																																									
Conclusion	<p>The GHG emission reduction occurring within the project boundary is CO2 and no other gases are involved during the project. The same has been verified during the course of validation. This has been validated in accordance with VVS V02 for CDM PoAs /05/.</p> <p>The assessment team confirms that the GHG emissions as a result of the implementation of the proposed CPAs which is not addressed by the applied methodology, i.e. AMS-II.G., version 10 are deemed to contribute less than 1% of the overall expected average annual emissions reductions.</p>																																									

D.4.3. Baseline scenario

Means of validation	<p>According to para 21 of the applied methodology AMS-II.G. Version 10 /08/, baseline scenario is "It is assumed that in the absence of the project activity, the baseline scenario would be the projected use of fossil fuels to meet similar thermal energy needs as those provided by the project devices."</p>
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	<p>The prevalent baseline fuel for traditional cookstove is woodfuel (Firewood/Charcoal) in accordance with the PoA-DD /03/. The assessment team has performed the following steps to assess the requirements for baseline identification:</p> <ul style="list-style-type: none"> • Initial desk review • WhatsApp/Skype interviews • Background information/ knowledge from similar projects and/ or technologies • $f_{NRB,y}$ value <p>The baseline scenario is in accordance with para 21 of the applied methodology AMS-II.G., Version 10 i.e.</p> <p><i>It is assumed that in the absence of the project activity, the baseline scenario would be the projected use of fossil fuels to meet similar thermal energy needs as those provided by the project devices.</i></p> <p>The ICS user is selected by CPA Implementer (The Ministry of Energy, Ghana) based on the Target Group defined in the PoA (i.e. using conventional cookstoves).</p>
Findings	No findings raised.
Conclusion	<p>Based on the validated assumptions used for project activity calculations, validation team considers that the identified baseline scenario for the PoA is reasonable. Furthermore, the baseline scenario identified for the specific CPA is reasonable and in accordance with the PoA-DD.</p> <p>Taking the definition of the baseline scenario into account, Validation team confirms that all relevant CDM requirements, including relevant and/or sectoral policies and circumstances, have been identified correctly in the specific case CPA-DDs.</p> <p>4KES confirms the following statements:</p> <ol style="list-style-type: none"> All the assumptions and data used by the CME are listed in the CPA-DDs, including their references and sources; All documentation used is relevant for establishing the baseline scenario and correctly quoted and interpreted in the CPA-DDs /01/; Assumptions and data used in the identification of the baseline scenario are justified appropriately, supported by evidence, and can be deemed reasonable; Relevant national and/or sectoral policies and circumstances are considered and listed in the CPA-DDs /01/ and generic CPA-DD; The approved baseline methodology has been correctly applied to identify the most reasonable baseline scenario, and the identified baseline scenario reasonably represents what would occur in the absence of the proposed CDM PoA/CPA. The CPA-DDs provides a description of the identified baseline scenario, including a description of the technology that would be employed and/or the activities that would take place in the absence of the proposed PoA.

D.5. Estimation of emission reductions or net anthropogenic removals

D.5.1. Equations and parameters applied to calculate GHG emission reductions or net anthropogenic GHG removals

Means of validation	<p>The following equations and parameters of the applied methodology AMS-II.G. Version 10 have been used under all the 16 CPAs.</p> <ol style="list-style-type: none"> Equation 1 and 2 of the applied methodology have been used for the ER calculation which is found OK. For the calculation of <i>By,savings,i,j</i>, option 3 (Para 27, equation 6) of the applied methodology AMS-II.G. Version 10 /08/ has been used which is in compliance with the registered PoA-DD /03/. For the calculation of <i>Bold,i,j</i>, equation 9&10 (Para 29) of the applied methodology AMS-II.G. Version 10 /08/ have been used which is in compliance with the registered PoA-DD /03/. The loss in efficiency of the project devices has been determined based on para 32(a) of the applied methodology AMS-II.G. Version 10 /08/ which is in compliance with the registered PoA-DD /03/. <i>Bold,i,j</i> is multiplied by a net to gross adjustment factor of 0.95 to account for leakages, thereby eliminating the need for ex-post surveys to determine leakages, as per para 34 of the applied methodology AMS-II.G. Version 10 /08/ which is in compliance with the registered PoA-DD /03/. As per para 35&36 of the applied methodology AMS-II.G. Version 10 /08/, Project activities switching from baseline device using firewood to efficient project device using charcoal has taken into account the leakage effects related to the charcoal production. A default value of 0.030 t CH₄/t charcoal has been used in accordance with “AMS-III.BG.: Emission reduction through sustainable charcoal production and consumption”. This is in compliance with the PoA-DD /03/. <p>The equations and parameters presented in the CPA-DDs /01/ and ER sheets /02/ have been assessed as correct and in line with the applied methodology AMS-II.G. Version 10 /08/ and the registered PoA-DD /03/.</p>
Findings	CL 03 were raised and successfully closed. Refer to Appendix 4 for further details.
Conclusion	<p>The assessment team confirms that all estimates of the baseline emissions, project emissions and Leakage emissions can be replicated using the data and parameter values provided in the generic CPA DD /01/ and is complete and accurate, hence complies with VVS V02 for PoAs/03/.</p> <p>The validation team confirms that</p> <p>(a) The baseline methodology and corresponding tool(s) have been applied correctly to calculate project emissions, baseline emissions, leakage and emission reductions;</p> <p>(b) All estimates of the baseline emissions can be replicated using the data and parameter values provided in the CPA DDs /01/.</p>

D.5.2. Data and parameters fixed ex ante

Means of validation	The data/parameters fixed ex-ante in the CPA-DDs /01/ are defined as follows:			
	Parameters	Value	Unit	Source/Justification
	<i>Bold,p</i>	a)	tonnes/person/year	Fixed values are in compliance with the applied methodology i.e. AMS-II.G. Version 10 /08/ and the PoA-DD /03/.
	Annual quantity of woody biomass that would have been used per person in the household in the	Charcoal: 0.180 tonnes/year		
		b)		
		Firewood: 0.500 tonnes/year		
				Validation team has checked the source

	absence of the project activity to generate useful thermal energy equivalent to that provided by the project devices			of the data and found acceptable. Values are fixed at the CPA level for all the 16 CPAs.
	<i>Np,HH</i> Average number of persons served per household prior to project implementation	3.8	Number	Fixed value is in compliance with the applied methodology i.e. AMS-II.G. Version 10 /08/ and the PoA-DD /03/. Validation team has checked the source of the data and found acceptable. Value is fixed at the CPA level for all the 16 CPAs.
	<i>Bold,HH</i> Annual quantity of woody biomass that would have been used in the household in the absence of the project activity to generate useful thermal energy equivalent to that provided by the project devices	a) Charcoal: 4.104 tonnes/year b) Firewood: 1.900 tonnes/year	tonnes/household/year	Fixed values are in compliance with the applied methodology i.e. AMS-II.G. Version 10 /08/ and the PoA-DD /03/. The values are calculated by multiplying <i>Bold,p</i> and <i>Np,HH</i> . Validation team has checked the source of the data and found acceptable. Values are fixed at the CPA level for all the 16 CPAs.
	<i>Bold,i,j</i> Annual quantity of woody biomass that would have been used in the absence of the project activity to generate useful thermal energy equivalent to that provided by the project device type i and batch j	a) Charcoal: 4.104 tonnes/year b) Firewood: 1.900 tonnes/year	tonnes/year	Fixed values are in compliance with the applied methodology i.e. AMS-II.G. Version 10 /08/ and the PoA-DD /03/. Calculated as <i>Bold,HH</i> / <i>Nd,HH</i> . In this program only one ICS (Jiko type) will be distributed to one household, thus <i>Bold,i,j</i> equals <i>Bold,HH</i> . This is also

				<p>verified by the CME and CPA Implementer during the remote interview.</p> <p>Hence acceptable.</p> <p>Values are fixed at the CPA level for all the 16 CPAs.</p>
	$f_{NRB,y}$ (Fraction of woody biomass saved by the project activity in year y that can be established as non-renewable biomass)	79.80%	Fraction	<p>This value is fixed at CPA level for all the 16 CPAs which is in compliance with the applied methodology i.e. AMS-II.G. Version 10 /08/ and the PoA-DD /03/.</p> <p>The calculation of the $f_{NRB,y}$ has been done based on the tool "Calculation of the fraction of non-renewable biomass", Version 2.0 /15/. The steps of the tool has been correctly followed to calculate the $f_{NRB,y}$. The calculation of $f_{NRB,y}$ has been done by a independent Ghana individual "Mr. Seth Sylvester Dadzie". Validation team has checked the CV /37/ of Mr. Seth and found that he is qualified to do the job. Further he was also interviewed through skype and found that he is well aware of the rules and regulations of Ghana.</p> <p>Validation team has checked the source of the data and found acceptable.</p>
	$EF_{\text{projected_fossilfuel}}$ (Emission factor for the fossil fuels projected)	63.7	tCO ₂ /TJ	<p>Default value as per applied methodology AMS-II.G. version 10.0 /08/.</p>

	to be used for substitution of non-renewable woody biomass by similar consumers)			<p>This value is fixed at PoA level which is in compliance with the applied methodology i.e. AMS-II.G. Version 10 /08/ and the PoA-DD /03/.</p> <p>Validation team has checked the source of the data and found acceptable.</p>
	NCV_{biomass} (Net calorific value of the non-renewable woody biomass, briquettes or charcoal used in project devices)	0.0156	TJ/tonne	<p>Default value as per applied methodology AMS-II.G. version 10.0 /08/.</p> <p>This value is fixed at PoA level which is in compliance with the applied methodology i.e. AMS-II.G. Version 10 /08/ and the PoA-DD /03/.</p> <p>Validation team has checked the source of the data and found acceptable.</p>
	η_{old} (Efficiency of the device being replaced)	0.1	Fraction	<p>The ICS user is selected by CPA Implementer and are distributed to Traditional 3 stones or other conventional devices as per the Target Group defined in the PoA-DD /03/ i.e. households who have conventional cookstoves.</p> <p>Fixed value is in compliance with the applied methodology i.e. AMS-II.G. Version 09 /08/ and the PoA-DD /03/.</p>
	Leakage (Leakage adjustment factor)	0.95	Fraction	<p>Default value as per applied methodology AMS-II.G. version 10.0 /08/.</p> <p>This value is fixed at PoA level which is in compliance with the applied methodology i.e. AMS-II.G. Version</p>

				10 /08/ and the PoA-DD /03/. Validation team has checked the source of the data and found acceptable.
	The above ex-ante parameters are in accordance with applied methodology and shall be used in the specific CPA-DDs /01/ for the ER calculations in addition to the ex-post monitoring parameters. The same is also in line with the registered PoA-DD /03/, hence found correct by the assessment team.			
Findings	CL 04, CL 05, CAR 03 were raised and successfully closed. Refer to Appendix 4 for further details.			
Conclusion	<p>The assessment team confirms that all estimates of the baseline emissions, project emissions and Leakage emissions can be replicated using the data and parameter values provided in the generic CPA DD /03/ and is complete and accurate, hence complies with VVS V02 for PoAs/05/.</p> <p>The assessment team confirms that:</p> <p>(a) All assumptions and data used by the project participants are listed in the CPA DD, including their references and sources;</p> <p>(b) All documentation used by project participants as the basis for assumptions and source of data is correctly quoted and interpreted in the CPA DD;</p> <p>(c) All values used in the CPA DD are considered reasonable in the context of the proposed CPA.</p>			

D.5.3. Ex ante calculation of GHG emission reductions or net anthropogenic GHG removals

Means of validation

Based on the above formulae/equations, ex ante emission reductions have been estimated as follows:

Under the CPAs, woodfuel (firewood and charcoal) is the baseline fuel and project ICS only use charcoal fuel. Thus, separate $B_{old,HH}$ and $B_{y,savings,i,j}$ are calculated for baseline fuel i.e. firewood and charcoal. Below is the emission reduction in the first year of CPAs.

$B_{old,HH_charcoal}$ = 4.104 tonnes/HH/year

$B_{old,HH_firewood}$ = 1.900 tonnes/HH/year

The planned ICS distribution for each CPA is as follows:

CPA No.	Parameter	Notation	Value	Units
CPA 005	Number of project devices of type i and batch j operating during year y	$N_{y,i,j}$	31,019	Number
CPA 006			29,285	Number
CPA 007			29,001	Number
CPA 008			24,214	Number
CPA 009			28,166	Number
CPA 010			28,170	Number
CPA 011			28,164	Number
CPA 012			32,316	Number
CPA 013			36,184	Number
CPA 014			35,416	Number
CPA 015			32,584	Number
CPA 016			16,000	Number

CPA 017			6,000	Number
CPA 018			15,000	Number
CPA 019			9,500	Number
CPA 020			3,500	Number

Parameter	Notation	Value	Units
Fraction of woody biomass saved by the project activity in year y that can be established as non-renewable biomass	$f_{NRB,y}$	79.80%	Fraction
Adjustment to account for any continued use of pre-project devices during year y	μ_y	0.8	Fraction
Net calorific value of the non-renewable woody biomass, briquettes or charcoal used in project devices	$NCV_{biomass}$	0.0156	TJ/tonnes
Emission factor for the fossil fuels projected to be used for substitution of non-renewable woody biomass by similar consumers	$EF_{projected_fossilfuel}$	63.7	tCO ₂ /TJ
Efficiency of the device being replaced	η_{old}	0.1	Fraction
Efficiency of the device of each type i and batch j implemented as part of the project activity	$\eta_{new,i,j}$	0.32	Fraction
Leakage adjustment factor	LAF	0.95	Fraction

According to the methodology, $B_{old,HH}$ equals $B_{old,i,j}$ when only one project device per household is distributed.

For CPA 005 to CPA 020:

$$\begin{aligned}
 B_{y,savings,i,j_charcoal} &= 2.680 \text{ tonnes/HH/year} \\
 &= B_{old,i,j} \times L_y \times \left[1 - \left(\frac{\eta_{old,i,j}}{\eta_{new,i,j}}\right)\right] \\
 &= 4.104 \text{ tonnes/HH/year} \times 0.95 \times [1-(0.1/0.32)]
 \end{aligned}$$

$$\begin{aligned}
 B_{y,savings,i,j_firewood} &= 1.240 \text{ tonnes/HH/year} \\
 &= B_{old,i,j} \times L_y \times \left[1 - \left(\frac{\eta_{old,i,j}}{\eta_{new,i,j}}\right)\right] \\
 &= 1.900 \text{ tonnes/HH/year} \times 0.95 \times [1-(0.1/0.32)]
 \end{aligned}$$

As per applied methodology AMS-II.G. version 10, para 32 (a) and SSC_789¹ (14 Aug, 20), the calculated values for the ICS efficiency rate for 5 years are applied in this CPA. The stove efficiency decreases linearly over time, i.e. at a constant rate which is equal to the difference between the initial and final efficiencies divided by the lifespan of the project device in number of years. The final value after the end of the life span will be set as 20%. The life span of project ICS is 5 years and efficiency at the first year is 32%. Thus, efficiency of project ICS will be

¹ <https://cdm.unfccc.int/methodologies/SSCmethodologies/clarifications/17080>

linearly reduced by 2.4%. Project ICS efficiency rate and $B_{y,savings,i,j}$ for every year are calculated as below;

[Year] Day	[Year 1] Day 1 – 365	[Year 2] Day 366 - 730	[Year 3] Day 731 - 1095	[Year 4] Day 1096 - 1460	[Year 5] Day 1461 - 1825
ICS Efficiency Rate (%)	32.0	29.6	27.2	24.8	22.4
$B_{y,savings,i,j_charcoal}$ (tonnes/HH/year)	2.680	2.581	2.465	2.326	2.158
$B_{y,savings,i,j_firewood}$ (tonnes/HH/year)	1.240	1.195	1.141	1.077	0.999

The number of users who switched baseline fuel from firewood to charcoal are estimated as 30% in this CPA, and leakage due to fuel switch to charcoal has been considered for these stoves. These emissions are calculated by using a default value of 0.030 t CH₄/t charcoal in accordance with “AMS-III.BG.” which is in accordance with the registered PoA-DD /03/. Thus, emission reductions (hereinafter referred to as “ER”) of the CPAs for the first year are as follows;

$$ER_y = B_{y,savings,i,j} \times N_{y,i,j} \times \mu_y \times f_{NRB,y} \times NCV_{biomass} \times EF_{projected_fossilfuel} - \text{Leakage}$$

Leakage =

$$\left(\eta_{old,i,j} \div \eta_{new,i,j} \right) \times B_{old,i,j_firewood} \div 6 \text{ kg} \times SMG_{y,b} \times 25 \text{ CO}_2/\text{CH}_4 \times N_{y,i,j_firewood}$$

- 6 kg = a default wood to charcoal conversion factor of 6 kg of firewood (wet basis) per kg of charcoal (dry basis)
- $SMG_{y,b}$ = Specific methane generation for the baseline charcoal generation process in the year y (tonnes CH₄/t charcoal product); a default value of 0.030 t CH₄/t charcoal used.

CP A No.	Total ICS to be distribut ed	ICS distribut ed for the charcoal baseline (70% of Total ICSSs)	ICS distribut ed for the firewood baseline (30% of Total ICSSs)	First Year ER by switchin g charcoal to charcoal fuel tCO ₂ e/y ear	First Year ER by switchin g firewood to charcoal fuel tCO ₂ e/y ear	First Year <i>Leakage_{firewood}</i> for 30% of total ICS (Leakage due to fuel switch from firewood to charcoal) tCO ₂ e/year	First Year Emissio n Reductio n tCO ₂ e/y ear
CP A 005	31,019	21,713	9,306	68,630	12,918	691	81,547
CP A 006	29,285	20,499	8,786	64,792	12,195	653	76,986
CP A 007	29,001	20,300	8,701	64,163	12,079	646	76,241
CP	24,214	16,949	7,265	53,571	10,085	540	63,655

	A 008							
	CP A 009	28,166	19,716	8,450	62,317	11,729	628	74,046
	CP A 010	28,170	19,719	8,451	62,326	11,731	628	74,057
	CP A 011	28,164	19,714	8,450	62,311	11,729	628	74,040
	CP A 012	32,316	22,621	9,695	71,499	13,458	720	84,956
	CP A 013	36,184	25,328	10,856	80,055	15,070	806	95,124
	CP A 014	35,416	24,791	10,625	78,358	14,749	789	93,106
	CP A 015	32,584	22,808	9,776	72,090	13,571	726	85,660
	CP A 016	16,000	11,200	4,800	35,400	6,663	357	42,062
	CP A 017	6,000	4,200	1,800	13,275	2,498	134	15,773
	CP A 018	15,000	10,500	4,500	33,188	6,247	334	39,434
	CP A 019	9,500	6,650	2,850	21,019	3,956	212	24,974
	CP A 020	3,500	2,450	1,050	7,744	1,458	78	9,201
	<p>The calculation is demonstrated in ER sheets/02/ and validated by assessment team in line with the methodology /08/ and registered PoA-DD /03/ and found correct. The ex-ante parameters included in the equation are validated above. The parameters $N_{y,i,j}$, μ_y and $\eta_{new,i,j}$ are part of monitoring plan and will be monitored.</p>							
	Findings	No findings raised.						
	Conclusion	<p>The assessment team confirms that</p> <p>(a) All assumptions and data used by the CME are listed in the CPA DDs/01/, including their references and sources;</p> <p>(b) All documentation used by CME as the basis for assumptions and source of data is correctly quoted and interpreted in the CPA DDs/01/;</p> <p>(c) All values used in the CPA DDs/01/ are considered reasonable in the context of the proposed CPAs and is complete and accurate, hence complies with VVS V02 for PoAs/05/.</p>						

D.5.4. Summary of ex ante estimates of GHG emission reductions or net anthropogenic GHG removals

Means of validation	<p>The detailed calculation as per the methodology is presented in the ER spread sheet of each CPA provided by the CME /02/ and validated by the validation team.</p> <p>Since new ICS will be replaced after life span (i.e. 5 years) is ended, thus new ICS efficiency i.e. 32% is applied to calculate ER from 6th year in the crediting period</p>
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which is found acceptable.

The final summary is given below:

The ex-ante estimates of the GHG emission reductions are as follows:

For CPA 005:

Year	Baseline emissions (t CO ₂ e)	Project emissions (t CO ₂ e)	Leakage (t CO ₂ e)	Emission reductions (t CO ₂ e)
Year 1	82,238	0	691	81,547
Year 2	79,209	0	747	78,462
Year 3	75,646	0	813	74,833
Year 4	71,384	0	892	70,492
Year 5	66,226	0	987	65,239
Year 6	82,238	0	691	81,547
Year 7	79,209	0	747	78,462
Total	536,150	0	5,568	530,582
Total number of crediting years	7			
Annual average over the crediting period	76,592	0	796	75,797

For CPA 006:

Year	Baseline emissions (t CO ₂ e)	Project emissions (t CO ₂ e)	Leakage (t CO ₂ e)	Emission reductions (t CO ₂ e)
Year 1	77,639	0	653	76,986
Year 2	74,780	0	705	74,075
Year 3	71,416	0	768	70,648
Year 4	67,392	0	842	66,550
Year 5	62,522	0	932	61,590
Year 6	77,639	0	653	76,986
Year 7	74,780	0	705	74,075
Total	506,168	0	5,258	500,910
Total number of crediting years	7			
Annual average over the crediting period	72,309	0	752	71,558

For CPA 007:

Year	Baseline emissions (t CO ₂ e)	Project emissions (t CO ₂ e)	Leakage (t CO ₂ e)	Emission reductions (t CO ₂ e)
Year 1	76,887	0	646	76,241
Year 2	74,055	0	699	73,356
Year 3	70,723	0	760	69,963
Year 4	66,739	0	834	65,905
Year 5	61,916	0	923	60,993

Year 6	76,887	0	646	76,241
Year 7	74,055	0	699	73,356
Total	501,262	0	5,207	496,055
Total number of crediting years	7			
Annual average over the crediting period	71,608	0	744	70,865

For CPA 008:

Year	Baseline emissions (t CO ₂ e)	Project emissions (t CO ₂ e)	Leakage (t CO ₂ e)	Emission reductions (t CO ₂ e)
Year 1	64,195	0	540	63,655
Year 2	61,831	0	583	61,248
Year 3	59,049	0	635	58,414
Year 4	55,722	0	696	55,026
Year 5	51,696	0	771	50,925
Year 6	64,195	0	540	63,655
Year 7	61,831	0	583	61,248
Total	418,519	0	4,348	414,171
Total number of crediting years	7			
Annual average over the crediting period	59,788	0	622	59,167

For CPA 009:

Year	Baseline emissions (t CO ₂ e)	Project emissions (t CO ₂ e)	Leakage (t CO ₂ e)	Emission reductions (t CO ₂ e)
Year 1	74,674	0	628	74,046
Year 2	71,923	0	678	71,245
Year 3	68,688	0	738	67,950
Year 4	64,818	0	810	64,008
Year 5	60,134	0	896	59,238
Year 6	74,674	0	628	74,046
Year 7	71,923	0	678	71,245
Total	486,834	0	5,056	481,778
Total number of crediting years	7			
Annual average over the crediting period	69,547	0	723	68,825

For CPA 010:

Year	Baseline emissions (t CO ₂ e)	Project emissions (t CO ₂ e)	Leakage (t CO ₂ e)	Emission reductions (t CO ₂ e)
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Year 1	74,685	0	628	74,057
Year 2	71,934	0	679	71,255
Year 3	68,698	0	738	67,960
Year 4	64,828	0	810	64,018
Year 5	60,143	0	897	59,246
Year 6	74,685	0	628	74,057
Year 7	71,934	0	679	71,255
Total	486,907	0	5,059	481,848
Total number of crediting years	7			
Annual average over the crediting period	69,558	0	723	68,835

For CPA 011:

Year	Baseline emissions (t CO ₂ e)	Project emissions (t CO ₂ e)	Leakage (t CO ₂ e)	Emission reductions (t CO ₂ e)
Year 1	74,668	0	628	74,040
Year 2	71,917	0	678	71,239
Year 3	68,682	0	738	67,944
Year 4	64,813	0	810	64,003
Year 5	60,129	0	896	59,233
Year 6	74,668	0	628	74,040
Year 7	71,917	0	678	71,239
Total	486,794	0	5,056	481,738
Total number of crediting years	7			
Annual average over the crediting period	69,542	0	723	68,819

For CPA 012:

Year	Baseline emissions (t CO ₂ e)	Project emissions (t CO ₂ e)	Leakage (t CO ₂ e)	Emission reductions (t CO ₂ e)
Year 1	85,676	0	720	84,956
Year 2	82,521	0	778	81,743
Year 3	78,809	0	847	77,962
Year 4	74,368	0	929	73,439
Year 5	68,995	0	1,028	67,967
Year 6	85,676	0	720	84,956
Year 7	82,521	0	778	81,743
Total	558,566	0	5,800	552,766
Total number of crediting years	7			
Annual average over the crediting period	79,795	0	829	78,966

For CPA 013:

Year	Baseline emissions (t CO ₂ e)	Project emissions (t CO ₂ e)	Leakage (t CO ₂ e)	Emission reductions (t CO ₂ e)
Year 1	95,930	0	806	95,124
Year 2	92,397	0	871	91,526
Year 3	88,241	0	948	87,293
Year 4	83,269	0	1,040	82,229
Year 5	77,252	0	1,151	76,101
Year 6	95,930	0	806	95,124
Year 7	92,397	0	871	91,526
Total	625,416	0	6,493	618,923
Total number of crediting years	7			
Annual average over the crediting period	89,345	0	928	88,417

For CPA 014:

Year	Baseline emissions (t CO ₂ e)	Project emissions (t CO ₂ e)	Leakage (t CO ₂ e)	Emission reductions (t CO ₂ e)
Year 1	93,895	0	789	93,106
Year 2	90,437	0	853	89,584
Year 3	86,369	0	928	85,441
Year 4	81,503	0	1,018	80,486
Year 5	75,613	0	1,127	74,486
Year 6	93,895	0	789	93,106
Year 7	90,437	0	853	89,584
Total	612,149	0	6,357	605,792
Total number of crediting years	7			
Annual average over the crediting period	87,449	0	909	86,541

For CPA 015:

Year	Baseline emissions (t CO ₂ e)	Project emissions (t CO ₂ e)	Leakage (t CO ₂ e)	Emission reductions (t CO ₂ e)
Year 1	86,386	0	726	81,660
Year 2	83,204	0	785	82,419
Year 3	79,461	0	854	78,607
Year 4	74,984	0	937	74,047
Year 5	69,566	0	1,037	68,529
Year 6	86,386	0	726	85,660
Year 7	83,204	0	785	82,419
Total	563,191	0	5,850	557,341

Total number of crediting years	7			
Annual average over the crediting period	80,455	0	836	79,620

For CPA 016:

Year	Baseline emissions (t CO ₂ e)	Project emissions (t CO ₂ e)	Leakage (t CO ₂ e)	Emission reductions (t CO ₂ e)
Year 1	42,419	0	357	42,062
Year 2	40,857	0	386	40,471
Year 3	39,019	0	420	38,599
Year 4	36,821	0	460	36,361
Year 5	34,160	0	509	33,651
Year 6	42,419	0	357	42,062
Year 7	40,857	0	386	40,471
Total	276,552	0	2,875	273,677
Total number of crediting years	7			
Annual average over the crediting period	39,507	0	411	39,096

For CPA 017:

Year	Baseline emissions (t CO ₂ e)	Project emissions (t CO ₂ e)	Leakage (t CO ₂ e)	Emission reductions (t CO ₂ e)
Year 1	15,907	0	134	15,773
Year 2	15,321	0	145	15,176
Year 3	14,632	0	158	14,474
Year 4	13,807	0	173	13,634
Year 5	12,810	0	191	12,619
Year 6	15,907	0	134	15,773
Year 7	15,321	0	145	15,176
Total	103,705	0	1,080	102,625
Total number of crediting years	7			
Annual average over the crediting period	14,815	0	155	14,660

For CPA 018:

Year	Baseline emissions (t CO ₂ e)	Project emissions (t CO ₂ e)	Leakage (t CO ₂ e)	Emission reductions (t CO ₂ e)
Year 1	39,768	0	334	39,434
Year 2	38,303	0	362	37,941
Year 3	36,580	0	393	36,187
Year 4	34,519	0	431	34,088

Year 5	32,025	0	478	31,547
Year 6	39,768	0	334	39,434
Year 7	38,303	0	362	37,941
Total	259,266	0	2,694	256,572
Total number of crediting years	7			
Annual average over the crediting period	37,038	0	385	36,653

For CPA 019:

Year	Baseline emissions (t CO ₂ e)	Project emissions (t CO ₂ e)	Leakage (t CO ₂ e)	Emission reductions (t CO ₂ e)
Year 1	25,186	0	212	24,974
Year 2	24,259	0	229	24,030
Year 3	23,167	0	249	22,918
Year 4	21,862	0	273	21,589
Year 5	20,282	0	303	19,979
Year 6	25,186	0	212	24,974
Year 7	24,259	0	229	24,030
Total	164,201	0	1,707	162,494
Total number of crediting years	7			
Annual average over the crediting period	23,457	0	244	23,213

For CPA 020:

Year	Baseline emissions (t CO ₂ e)	Project emissions (t CO ₂ e)	Leakage (t CO ₂ e)	Emission reductions (t CO ₂ e)
Year 1	9,279	0	78	9,201
Year 2	8,937	0	85	8,852
Year 3	8,535	0	92	8,443
Year 4	8,054	0	101	7,953
Year 5	7,472	0	112	7,360
Year 6	9,279	0	78	9,201
Year 7	8,937	0	85	8,852
Total	60,493	0	631	59,862
Total number of crediting years	7			
Annual average over the crediting period	8,641	0	91	8,551

The ex-ante estimates have been confirmed through the emission reductions excel sheet /02/ and CPA-DD /01/ and found correct.

Findings

No findings raised.

Conclusion

The assessment team confirms that all estimates of the baseline emissions, project

emissions and Leakage emissions can be replicated using the data and parameter values provided in the CPA DDs/01/.

D.6. Monitoring plan

D.6.1. Data and parameters to be monitored

Means of validation	The parameters (For CPA 005 to CPA 020) that are to be monitored ex-post are:			
	Parameter, Unit	Value	Description	Source/Justification
	$N_{y,i,j}$ (Unit: Number)	31,019	Number of project devices of type i and batch j operating during year y	<p>The number of project devices distributed are recorded and stored in the Project Database of specific-CPAs. Validation team has checked the distribution database /21/ and found OK.</p> <p>All ICSs under the PoA will be replaced every five (lifetime of ICS) years which is also verified from the interview of CCC and CI. The number of ICSs operating under the CPA will be Measured directly or based on a representative sample. Sampling survey will be carried out according to the sampling plan mentioned in Section B.5.2 of this CPA-DDs /01/.</p> <p>The monitoring frequency will be At least once every two years (biennial).</p> <p>The parameter and the monitoring are in compliance with the applied methodology. Also, the monitoring procedures considered for the monitoring parameter found to be appropriate and feasible.</p>
	μ_y (Unit: Fraction)	80% (estimated, but to be monitored)	Adjustment to account for any continued use of pre-project devices during year y	<p>The sampled households will be checked for presence of baseline stove and if it was being used along with project stove for cooking. For samples where baseline stove was found not being used, $\mu_y = 1.0$. The surveys would be designed to capture the cooking habits and stove usage of households in the region, including quantification of use of baseline devices, by formulating questions and/or collecting evidences to</p>

				<p>determine the frequency of usage of both the project devices and baseline devices.</p> <p>Sampling survey will be carried out according to the sampling plan mentioned in Section B.5.2 of this CPA-DDs /01/.</p> <p>The monitoring frequency will be At least once every two years (biennial).</p> <p>The parameter and the monitoring are in compliance with the applied methodology. Also, the monitoring procedures considered for the monitoring parameter found to be appropriate and feasible.</p>
	$\eta_{new,i,j}$ (Unit: Fraction)	32%	Efficiency of the device of each type i and batch j implemented as part of the project activity	<p>A Water Boiling Test (WBT) for the project ICS was conducted by the national standard body i.e. Regional Testing and Knowledge Center (RTKC), CSIR Ghana and confirm the efficiency as 32% /23/. The test is in compliance with the applied methodology AMS-II.G. Version 10 /08/ and the PoA-DD /03/ and hence acceptable to the validation team. Lab test report /23/ validated to confirm the efficiency chosen. The decrease in efficiency every year is applied 2.4 percent as per para 32 (a) of the applied methodology /08/.</p> <p>The parameter and the monitoring are in compliance with the applied methodology. Also, the monitoring procedures considered for the monitoring parameter found to be appropriate and feasible.</p>
	Life Span (Unit: Number of years)	5	The operating life time of the project device.	<p>The operating life time of the project device has been verified from the manufacturer specification /28/. This is fixed and recorded at the time of commissioning/distribution of ICS.</p> <p>All ICSs under the PoA will be replaced every five</p>

				<p>(lifetime of ICS) years which is also verified from the interview of CCC and CI.</p> <p>The parameter and the monitoring are in compliance with the applied methodology. Also, the monitoring procedures considered for the monitoring parameter found to be appropriate and feasible.</p>
	Date of commissioning of batch j (Unit: Date)	Refer to the distribution record database	The CME may opt to group the device in "batch" and the latest date of commissioning of a device within the batch shall be used as the date of commissioning for the entire batch.	To establish the date of commissioning, the CPA Implementers may opt to group the devices in "batches" and the latest date of commissioning of a device within the batch shall be used as the date of commissioning for the entire batch.
	$N_{d,HH}$ (Unit: Number)	1	Number of project devices distributed per household	<p>Number of project devices distributed per household will be recorded at the time of commissioning/distribution.</p> <p>This monitoring parameter is recorded in the electrical database tool /22/.</p> <p>The parameter and the monitoring are in compliance with the applied methodology. Also, the monitoring procedures considered for the monitoring parameter found to be appropriate and feasible.</p>
Findings	CAR 04 was raised and successfully closed. Refer to Appendix 4 for further details.			
Conclusion	<p>Assessment team confirms that -</p> <p>The parameters determined ex-post have been presented correctly according to the requirements in accordance with the applied methodology/08/ and the registered PoA-DD /03/.</p>			

D.6.2. Description of the monitoring plan

Means of validation	<p>The monitoring plan described in the CPA DDs is in compliance with the applied Methodology /08/ and PoA DD /03/. The assessment team has reviewed all the parameters in the monitoring plan against the requirements of the applied methodology and confirmed that no deviation was observed. The procedures have been reviewed by the assessment team through document review and interviews with the respective department's personnel. The information provided has allowed the assessment team to confirm that the proposed monitoring plan is feasible within the project design. The relevant points of monitoring plan have been discussed with the CME and CPA implementer. Specifically, these points include the monitoring methodology, data management, and the quality assurance and quality control procedures to be implemented in the context of the project. Therefore, the CME/CPA Implementer will be able to implement the monitoring plan and the achieved emission reductions can be reported ex-post and verified.</p> <p>During the interviews, it was found that the monitoring plan of the CPA-DD is based on the overarching CME management system, and defines roles/responsibilities and internal arrangements in detail and in the context of the PoA. The details of monitoring and management system with roles and responsibilities are mentioned in the CPA-DD /01/ and also confirmed during the interview.</p> <p><u>Quality Assurance/Quality Control</u></p> <p>The CME will ensure that the monitoring personnel have reviewed, understood and have agreed to follow the monitoring plan procedures. A quality control and assurance strategy will be documented. The same was confirmed through the interviews with CME & CPA Implementer.</p> <p>The DOE is of the opinion that sufficient provisions are established to monitor the project activity and to obtain unbiased, reliable measurement of the data during the collection/measurement. The personnel to be engaged will be adequately trained and qualified and the credentials and/or training materials for the sampling personnel can be checked by the verifying DOE at verification stage.</p> <p>The sampling approach presented in CPA-DDs /01/ is in accordance with the Guidelines for Sampling and Surveys for CDM Project Activities and Programme of Activities /11/ and appropriate for the type of the project. The same is presented in the section B.5.2 of the CPA-DDs /01/. Validation team has found the sampling approach feasible and consistent with the registered PoA-DD /03/.</p> <p>The monitoring plan will be conducted in accordance with the requirements of the following CDM documents:</p> <ul style="list-style-type: none"> • AMS-II.G. Version 10 • Guidelines for Sampling and Surveys for CDM Project Activities and Programme of Activities Version 04.0 <p>The above monitoring plan has been checked by the submitted documents and through the interviews of the CME/CPA Implementer.</p>
Findings	CL 06 was raised and successfully closed. Refer to Appendix 4 for further details.
Conclusion	<p>The assessment team confirms that:</p> <p>a) The monitoring plan based on the approved monitoring methodology, AMS- II. G., Version 10/08/ is included in the PoA-DD/03/ and CPA-DDs/01/ and is correctly applied to the CPA. The monitoring plan has been found to be in compliance with the requirements of the applied methodology. The monitoring plan will give opportunity for real measurements of achieved emission reductions.</p> <p>b) The assessment team considers that monitoring arrangements described in the monitoring plan is feasible within the project design and the CME will be capable to implement the monitoring plan.</p> <p>c) The assessment team by assessing Guidelines for sampling and surveys for CDM project activities and programme of activities /11/ confirms that the sampling plan is appropriate and plausible and is following the applicable requirements.</p>

D.7. Start date, crediting period type and duration

Means of validation	<p>Out of the 16 CPAs to be included, the distribution of the ICS has only started under 3 CPAs i.e. CPA 009, CPA 013 and CPA 014. The CPA start date for the three CPAs (CPA 009, CPA 013 and CPA 014) has been confirmed from the conformity letter for the first ICS distribution in each CPA /20/. For the remaining CPAs, the expected ICS distribution date has been mentioned as the start date which has been verified from the CPA-DDs /01/ and found OK.</p> <p>Validation team has found the CPAs start date in compliance with the eligibility criteria stipulated in the PoA DD/03/. The start date of the PoA is 14/01/2020 which is before the start date of the CPAs to be included /01/.</p> <p>The CPA DDs (from CPA 005 to CPA 020) mention the CPA start date as mentioned in the below table which is after the start date of the PoA and after the date of the local stakeholder consultation.</p> <table border="1" data-bbox="451 651 1390 1749"> <thead> <tr> <th>CPA Title</th><th>Start date of CPA and Start date of crediting period</th></tr> </thead> <tbody> <tr> <td>Ghana Improved Cookstove Project by EWP in Republic of Korea – CPA 005</td><td>07/12/2020 (Expected distribution date)</td></tr> <tr> <td>Ghana Improved Cookstove Project by EWP in Republic of Korea – CPA 006</td><td>07/12/2020 (Expected distribution date)</td></tr> <tr> <td>Ghana Improved Cookstove Project by EWP in Republic of Korea – CPA 007</td><td>07/12/2020 (Expected distribution date)</td></tr> <tr> <td>Ghana Improved Cookstove Project by EWP in Republic of Korea – CPA 008</td><td>07/12/2020 (Expected distribution date)</td></tr> <tr> <td>Ghana Improved Cookstove Project by EWP in Republic of Korea – CPA 009</td><td>30/09/2020</td></tr> <tr> <td>Ghana Improved Cookstove Project by EWP in Republic of Korea – CPA 010</td><td>07/12/2020 (Expected distribution date)</td></tr> <tr> <td>Ghana Improved Cookstove Project by EWP in Republic of Korea – CPA 011</td><td>07/12/2020 (Expected distribution date)</td></tr> <tr> <td>Ghana Improved Cookstove Project by EWP in Republic of Korea – CPA 012</td><td>07/12/2020 (Expected distribution date)</td></tr> <tr> <td>Ghana Improved Cookstove Project by EWP in Republic of Korea – CPA 013</td><td>16/10/2020</td></tr> <tr> <td>Ghana Improved Cookstove Project by EWP in Republic of Korea – CPA 014</td><td>21/10/2020</td></tr> <tr> <td>Ghana Improved Cookstove Project by EWP in Republic of Korea – CPA 015</td><td>07/12/2020 (Expected distribution date)</td></tr> <tr> <td>Ghana Improved Cookstove Project by EWP in Republic of Korea – CPA 016</td><td>07/12/2020 (Expected distribution date)</td></tr> <tr> <td>Ghana Improved Cookstove Project by EWP in Republic of Korea – CPA 017</td><td>16/11/2020 (Expected distribution date)</td></tr> <tr> <td>Ghana Improved Cookstove Project by EWP in Republic of Korea – CPA 018</td><td>07/12/2020 (Expected distribution date)</td></tr> <tr> <td>Ghana Improved Cookstove Project by EWP in Republic of Korea – CPA 019</td><td>07/12/2020 (Expected distribution date)</td></tr> <tr> <td>Ghana Improved Cookstove Project by EWP in Republic of Korea – CPA 020</td><td>07/12/2020 (Expected distribution date)</td></tr> </tbody> </table> <p>The CPA-DDs propose a crediting period of 7 years (which is renewable twice) which has been chosen by the CME for the PoA. The start date is in accordance with the definition of start date in Glossary - CDM terms, Version 10 /39/, which appears to be the first real action and financial commitment by the CPA Implementer, the validation team considers the above dates as the start date of the component project activities for CPA 005 to CPA 020.</p> <p>Start date of crediting period is opted is Actual date of first ICS distribution for the CPA 009, CPA 013 & CPA 014 and expected ICS distribution date for the remaining CPAs, which is found reasonable and realistic.</p>	CPA Title	Start date of CPA and Start date of crediting period	Ghana Improved Cookstove Project by EWP in Republic of Korea – CPA 005	07/12/2020 (Expected distribution date)	Ghana Improved Cookstove Project by EWP in Republic of Korea – CPA 006	07/12/2020 (Expected distribution date)	Ghana Improved Cookstove Project by EWP in Republic of Korea – CPA 007	07/12/2020 (Expected distribution date)	Ghana Improved Cookstove Project by EWP in Republic of Korea – CPA 008	07/12/2020 (Expected distribution date)	Ghana Improved Cookstove Project by EWP in Republic of Korea – CPA 009	30/09/2020	Ghana Improved Cookstove Project by EWP in Republic of Korea – CPA 010	07/12/2020 (Expected distribution date)	Ghana Improved Cookstove Project by EWP in Republic of Korea – CPA 011	07/12/2020 (Expected distribution date)	Ghana Improved Cookstove Project by EWP in Republic of Korea – CPA 012	07/12/2020 (Expected distribution date)	Ghana Improved Cookstove Project by EWP in Republic of Korea – CPA 013	16/10/2020	Ghana Improved Cookstove Project by EWP in Republic of Korea – CPA 014	21/10/2020	Ghana Improved Cookstove Project by EWP in Republic of Korea – CPA 015	07/12/2020 (Expected distribution date)	Ghana Improved Cookstove Project by EWP in Republic of Korea – CPA 016	07/12/2020 (Expected distribution date)	Ghana Improved Cookstove Project by EWP in Republic of Korea – CPA 017	16/11/2020 (Expected distribution date)	Ghana Improved Cookstove Project by EWP in Republic of Korea – CPA 018	07/12/2020 (Expected distribution date)	Ghana Improved Cookstove Project by EWP in Republic of Korea – CPA 019	07/12/2020 (Expected distribution date)	Ghana Improved Cookstove Project by EWP in Republic of Korea – CPA 020	07/12/2020 (Expected distribution date)
CPA Title	Start date of CPA and Start date of crediting period																																		
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Ghana Improved Cookstove Project by EWP in Republic of Korea – CPA 020	07/12/2020 (Expected distribution date)																																		

Findings	CAR 05 was raised and successfully closed. Refer to Appendix 4 for further details.
Conclusion	The start dates and the crediting period type has been validated and found to be correct.

D.8. Environmental impacts

Means of validation	EIA has been performed at PoA level.
Findings	Not Applicable
Conclusion	Not Applicable

D.9. Local stakeholder consultation

Means of validation	Local stakeholder consultation has been conducted at PoA level.
Findings	Not Applicable
Conclusion	Not Applicable

D.10. Eligibility for inclusion

Means of validation	No.	Eligibility criterion Category	Eligibility criterion Required condition	Supporting evidence for inclusion	Means of validation/Findings/Conclusion
	1.	Geographical boundary	All CPAs included in this PoA will be located in the host country – The Republic of Ghana	The ICS location information will be recorded in the electrical database tool.	The project boundary was validated and confirmed by CME and CPA Implementer during the skype interview and it was confirmed that all the 16 CPAs will be distributed within Ghana. The geographical boundaries mentioned in the CPA DDs /01/ for the CPAs was found adequate and was cross checked with the distribution plan /36/ and electrical database tool screenshots /22/.
	2.	Double counting	Carbon emission reductions claimed by the CPA should be unique and not counted more than once. Each ICS shall be assigned a unique serial number which shall be displayed at the beneficiary location to identify each stove uniquely.	The unique serial number on ICSs will be recorded in electrical database tool.	As verified from the Skype interview of CME and CPA Implementer, the unique numbering will be given to each distributed ICS and the same would be recorded in Conformity Letter signed at the time of ICS distribution /20/ and the electrical database tool /21/. Validation team has verified that ICS has a unique numbering and it is recorded on the Conformity Letter /20/ and the electrical database tool /21/. Therefore, the criterion met.
	3.	Exclusiveness of CPA	The CPA shall not be previously: 1. Registered as a CDM	Confirmation by the CME	The assessment team has reviewed the ICS distribution plan /36/ and confirmed with the CPA Implementer that the

			project activity 2. Included as a CPA in any other registered PoA, or deregistered as a CPA of a PoA		<p>districts chosen for all the CPAs as well as the households in the districts are never involved in other stove replacement projects.</p> <p>Further Validation team has also checked the UNFCCC website and confirm that CPAs are not registered as CDM projects in Ghana, not included under other registered PoAs nor have been deregistered.</p> <p>Therefore, the criterion met.</p>
	4.	Specifications of Technology/Measure	<p>Specification of the Technology/measure shall include the type, capacity and other key features of the design of the system.</p> <p>1. Capacity – The ICS to be distributed in this PoA is “microscale CDM unit”, thus the demonstration for threshold conditions is not required. Thermal / combustion energy efficiency is more than 20%. The test result will be submitted to DOE in the specific CPAs.</p> <p>2. Size or dimension - The type of ICS in this programme is Jiko, and dimension will be as follows, but not limited to: Top diameter 27.0 cm (±1.0) x Height 32.0 cm (±1.0)</p>	<p>The specifications of Technology/Measure will be presented by the following evidences respectively:</p> <p>1. The ICS efficiency will be measured or estimated by the one of options as stated in the data/parameter table 11, AMS-II.G. (Version 10), at the time of the inclusion of the CPA, and the test results will be submitted to the DOE.</p> <p>2. Size or dimension will be written in the ICS manual or instruction.</p>	<p>The ICS user is selected by CPA Implementer based on the Target Group defined in the PoA (i.e. households who have conventional cookstoves).</p> <p>The thermal efficiency of the ICS distributed in each CPAs will have efficiency of more than 20% in compliance with the applied methodology/08/.</p> <p>1. The national standard body (Regional Testing and Knowledge Center (RTKC), CSIR Ghana) efficiency test report /23/ concluded the efficiency of project cook stove as 32%. Validation team has checked the test report and found in compliance with the PoA-DD /03/ and applied methodology AMS-II.G. Version 10 /08/.</p> <p>2. The size of the ICS to be distributed under the CPAs has been mentioned under section A.3 of the CPA-DDs /01/ which has been verified from the ICS production manual /26/ and found consistent. The dimensions are in compliance with the PoA-DD /03/ and hence accepted.</p>

			<p>3. Operation - The ICS' fuel type is charcoal and portable type.</p> <p>4. Other key design features – Material will be cast iron and ceramic material. The serial number will be printed on each ICS.</p>	<p>3. Operation information will be written in the ICS manual or instruction.</p> <p>4. The ICS manual or instruction gives key design information including ICS material, serial number and other features.</p>	<p>3. Validation team has verified the ICS production manual /26/, CPA-DD /01/ and can confirm that the project ICS are charcoal based and portable.</p> <p>4. Validation team has verified the ICS production manual /26/, CPA-DD /01/ and can confirm that Material will be cast iron and ceramic material. The serial number will be printed on each ICS.</p> <p>Therefore, the criterion met.</p>
	5.	Start date	Conditions that the start date of CPA will be after the PoA start date.	Record of end user agreement, registration details, installation report, etc. for the first ICS installed in the CPA.	<p>Out of the 16 CPAs to be included, the distribution of the ICS has only started under 3 CPAs i.e. CPA 009, CPA 013 and CPA 014. The CPA start date for the three CPAs (CPA 009, CPA 013 and CPA 014) has been confirmed from the conformity letter for the first ICS distribution in each CPA /20/.</p> <p>For the remaining CPAs, the expected ICS distribution date has been mentioned as the start date which has been verified from the CPA-DDs /01/ and found ok.</p> <p>Validation team has found the CPAs start date in compliance with the eligibility criteria stipulated in the PoA DD/03/. The start date of the PoA is 14/01/2020 which is before the start date of the CPAs to be included /01/.</p> <p>Therefore the criterion met.</p>
	6.	Applicability of the methodology	<p>Each CPA complies with the applicability and other requirements outlined in followed methodologies:</p> <ul style="list-style-type: none"> AMS-II.G. (Version 10.0) TOOL19 (Version 09.0) 	<p>CPA-DDs applying the followed version of methodologies:</p> <ul style="list-style-type: none"> AMS-II.G. (Version 10.0) TOOL19 (Version 09.0) TOOL21 	<p>The national standard body (Regional Testing and Knowledge Center (RTKC), CSIR Ghana) efficiency test report /23/ concluded the efficiency of project cook stove as 32%.</p> <p>The ICS distributed under CPAs will have efficiency improvements in thermal applications as verified from Technical</p>

		<ul style="list-style-type: none"> • TOOL21 (Version 13.0) • TOOL30 (Version 02.0) 	(Version 13.0) • TOOL30 (Version 02.0)	specifications /26/ of ICS. Therefore, the criterion met. Based on the sectoral expertise, assessment team concludes that the methodology adopted for conducting the efficiencies were in compliance with the applied methodology /08/.
7.	Additionality	In this PoA, the additionality of project activity is demonstrated with the investment barrier in line with para 10 of TOOL21. In addition, according to the TOOL19, the ICS is deemed as "microscale CDM unit".	The ICSs to be distributed in this proposed PoA are free of charge. This content can be obtained from the agreement.	The additionality of the CPAs is proved at the PoA level /03/. In this PoA, the additionality of CPAs is demonstrated with the investment barrier in line with para 10 of TOOL21 /12/. CPAs would not have occurred anyway due to the investment barrier according to "TOOL21: Demonstration of additionality of small-scale project activities" (Version 13.0) /12/ as mentioned in the PoA-DD /03/. Validation team has checked the conformity letters /20/ and can confirm that the ICS are distributed free of cost. This was also confirmed during skype interview with CME and CPA Implementer. Hence CPAs are additional.
8.	Compliance of each unit with the microscale threshold	According to the Tool 19: Demonstration of additionality of microscale project activities (Version 09.0), each of the units contained in the CPA satisfy the condition to qualify as a microscale CDM unit.	Each CPA will show that microscale CDM unit through emission reduction calculation sheet or corresponding section in CPA-DD.	The proposed CPAs will only distribute ICS which will qualify as micro-scale units i.e. microscale threshold of 1,800 MWh _{th} of annual energy savings per appliance. Validation team has checked the submitted sheets /31/ for the energy saving from each ICS (11.76 MWh _{th} /y) and found below the microscale threshold of 1,800 MWh _{th} of annual energy savings per appliance.
9.	Public funding	This program is exclusively subsidized by EWP. Affirmation that public funding from annex 1 parties	Declaration from the CME that no funds for official development assistance will be used for program implementation.	Based on the CME declaration /34/, assessment team confirms that no public funding or ODA was received nor diverted for implementation of the CPAs as mentioned

			does not result in a diversion of official development assistance.		in the respective CPA-DDs /01/.
10	Target group and distribution mechanism	The households who have conventional cookstoves are the target group, and the ICSs will be directly distributed through the CME or the CI.	Target group and distribution information to be reported in CPA-DD will be recorded in the electrical database tool.	<p>Validation team has checked the conformity letters signed by ICS users at the time of ICS distribution /20/ and confirm that the ICS are being distributed to users who are currently using traditional stoves (Traditional 3 stones or other conventional devices) which is in compliance with the PoA-DD /03/ and eligibility criteria.</p> <p>The distribution mechanism is appropriately defined in the PoA DD and it is categorically mentioned that the distribution mechanism is the direct distribution of ICS through the CME or the CI. This was further confirmed through skype interviews by the validation team.</p>	
11	Sampling	CPAs under the program will adhere to all requirements as mentioned in “Standard: Sampling and surveys for CDM project activities and program of activities” (Version 08.0).	CPAs will follow monitoring plan described in CPA-DD section I.7.2.	Sampling has been defined under section B.5.2 of the CPA-DDs /01/ and found in compliance with the PoA-DD /03/, Applied methodology AMS-II.G. Version 10 /08/ and “Guidance for sampling and surveys for CDM project activities and programme of activities” Version 04 /11/. The same is assessed in detail in section D.6.2 of this report. Hence the condition is fulfilled.	
12	Local stakeholder consultation/ Environmental impact analysis	At the PoA level the LSC is conducted, and no requirements related to environmental impact analysis is required.	Not applicable as performed at the PoA level.	<p>The LSC is already conducted at PoA level and validated by validation team.</p> <p>Hence, this criterion is not applicable.</p>	
13	Combination of Methodologies	Not applicable because the proposed PoA is based on single methodology.	Not applicable. Methodology AMS-II.G. (Version 10.0) applied in this PoA.	Since only one methodology AMS-II.G. (Version 10.0) has been applied. Hence, this criterion is not applicable.	
14	Small-scale threshold check	Not applicable. The ICS to be	Not applicable	Para 124(m) of CDM PS PoA /06/ describes that the	

			distributed in this PoA as defined "microscale CDM unit", the threshold condition is not required.		condition is not required if generic CPA consists solely of units that qualify as microscale CDM unit as defined in tool19 /14/. Hence, this criterion is not applicable.
	15	Debundling check	Not applicable. The ICS to be distributed in this PoA as defined "microscale CDM unit", the debundling check is not required.	Not applicable	As each ICS unit to be distributed under the proposed CPAs will qualify as micro scale units, the CPAs does not need to demonstrate fulfilment with the debundling requirement (version 09 of the "Tool for Demonstration of additionality of microscale projects" /14/). Hence, this criterion is not applicable.
	16	CER ownership	Each CPA will assure ownership of the CERs is secured by the CME.	The default contract for end users includes the provision that emission reductions generated under the PoA are owned by the CME.	Validation team has checked the conformity letters signed at the time of ICS distribution /20/ and can confirm that the ownership of the CERs is secured by the CME.
Findings	CAR 06 was raised and successfully closed. Refer to Appendix 4 for further details.				
Conclusion	Validation team confirms that the all eligibility criteria included in PoA DD, version 2.0 /03/ are adequately included in CPAs and all criteria met the requirement of PoA DD.				

SECTION E. Internal quality control

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The validation report prepared by team leader is reviewed by an independent technical reviewer (having competence of relevant technical area himself/herself or through an independent technical area expert) to confirm the internal procedures established by 4KES are duly followed and the validation report/opinion is reached in an objective manner and complies with the applicable CDM requirements.

The technical review team is collectively required to possess the technical expertise of all the technical area/sectoral scope the project activity relates to. All team members of technical review team are independent of the validation team. The independent technical reviewer(s) may approve or reject the draft validation report. The findings may be identified even at this stage, which needs to be satisfactorily resolved, before submit final report to UNFCCC. The final approval decision is taken by the Head of the DOE/Director.

The final decision is authorized by the Director, 4KES, once the report is finalized by the Head of the DOE/DOE Manager.

SECTION F. Validation opinion

>>4K Earth Science Private Limited has been contracted by Climate Change Center (CME) to undertake inclusion of CPA 005 to CPA 020 to the registered PoA 'Ghana Improved Cookstove Project by EWP in Republic of Korea' (UNFCCC Ref #10576) in Ghana.

1. Ghana Improved Cookstove Project by EWP in Republic of Korea – CPA 005
2. Ghana Improved Cookstove Project by EWP in Republic of Korea – CPA 006
3. Ghana Improved Cookstove Project by EWP in Republic of Korea – CPA 007

4. Ghana Improved Cookstove Project by EWP in Republic of Korea – CPA 008
5. Ghana Improved Cookstove Project by EWP in Republic of Korea – CPA 009
6. Ghana Improved Cookstove Project by EWP in Republic of Korea – CPA 010
7. Ghana Improved Cookstove Project by EWP in Republic of Korea – CPA 011
8. Ghana Improved Cookstove Project by EWP in Republic of Korea – CPA 012
9. Ghana Improved Cookstove Project by EWP in Republic of Korea – CPA 013
10. Ghana Improved Cookstove Project by EWP in Republic of Korea – CPA 014
11. Ghana Improved Cookstove Project by EWP in Republic of Korea – CPA 015
12. Ghana Improved Cookstove Project by EWP in Republic of Korea – CPA 016
13. Ghana Improved Cookstove Project by EWP in Republic of Korea – CPA 017
14. Ghana Improved Cookstove Project by EWP in Republic of Korea – CPA 018
15. Ghana Improved Cookstove Project by EWP in Republic of Korea – CPA 019
16. Ghana Improved Cookstove Project by EWP in Republic of Korea – CPA 020

Host Party: The Republic of Ghana

The validation was performed in accordance with the UNFCCC criteria for the Clean Development Mechanism, latest version of Validation and Verification Standard and related Standards/Guidance and host country criteria, as well as criteria given to provide for consistent project operations, monitoring and reporting. In our opinion, the project meets all relevant UNFCCC, CDM criteria and all relevant host country criteria.

The review of the final CPA-DD and the subsequently performed follow-up interviews with representatives of the project participant has provided the validation team with sufficient evidence to determine CPAs (CPA 005 to CPA 020) compliance with the CPA inclusion criteria mentioned in the registered PoA-DD.

The proposed CDM CPAs as part of registered PoA will result in reductions of greenhouse gas (GHG) emissions that are real, measurable and give long-term benefits to the mitigation of climate change. In our opinion, the project meets all relevant UNFCCC, CDM criteria and all relevant host country criteria.

The CPAs correctly applies methodology AMS-II.G. “Energy efficiency measures in thermal applications of non-renewable biomass” ver. 10. It is demonstrated that the project is not a likely baseline scenario. The emission reductions attributable to the project are hence additional to any that would occur in the absence of the project activity.

The estimated emission reductions from each CPA are given below. tCO₂e/year.

CPA Ref No.	Estimated distribution	ICS	Estimated average annual emission reduction Unit: tCO ₂ e/year	Estimated emission reduction in the first crediting period (7 years) Unit: tCO ₂ e
CPA 005	31,019		75,797	530,582
CPA 006	29,285		71,558	500,910
CPA 007	29,001		70,865	496,055
CPA 008	24,214		59,167	414,171
CPA 009	28,166		68,825	481,778
CPA 010	28,170		68,835	481,848
CPA 011	28,164		68,819	481,738
CPA 012	32,316		78,966	552,766
CPA 013	36,184		88,417	618,923
CPA 014	35,416		86,541	605,792
CPA 015	32,584		79,620	557,341
CPA 016	16,000		39,096	273,677
CPA 017	6,000		14,660	102,625
CPA 018	15,000		36,653	256,572
CPA 019	9,500		23,213	162,494
CPA 020	3,500		8,551	59,862

In summary, it is the opinion of 4KES that the CPAs (CPA 005 to CPA 020) shall be included in the registered PoA “Ghana Improved Cookstove Project by EWP in Republic of Korea” (PoA No.10576).

Appendix 1. Abbreviations

Abbreviations	Full Texts
BE	Baseline Emissions
CAR	Corrective Action Request
CDM	Clean Development Mechanism
CER	Certified Emission Reduction
CI	CPA Implementer
CL	Clarification request
CoP	Conference of Parties
CPA	Component Project Activity
CME	Coordinating/Managing Entity
DD	Design Document
DNA	Designated National Authority
DOE	Designated Operational Entity
DR	Document Review
EB	Executive Board
EIA	Environmental Impact Assessment
ER	Emission Reductions
FAR	Forward Action Request
GHG	Greenhouse gas(es)
GSC	Global Stakeholder Consultation
ICS	Improved Cook Stove
IPCC	Intergovernmental Panel on Climate Change
KP	Kyoto Protocol
LSC	Local Stakeholder Consultation
LE	Leakage Emissions
LoA	Letter of Approval/Authorization
IPCC	Intergovernmental Panel on Climate Change
MoM	Minutes of Meeting
MOP	Meeting of Parties
MoC	Modalities of Communication
MoV	Means of Verification
MP	Monitoring Plan
MW	Mega Watt
NCV	Net Calorific Value
ODA	Official Development Assistance
PCIA	Partnership for clean indoor air
PoA	Programme of Activities
PE	PoA Emissions
QA/QC	Quality Assurance/Quality Control
RfR	Request for Registration
SD	Sustainable Development
T&C	Technical & Certification
UNFCCC	United Nations Framework Convention on Climate Change
VVS	Validation & Verification Standard
WBT	Water Boiling Test

Appendix 2. Competence of team members and technical reviewers

Certificate of Competence

Name	<input checked="" type="checkbox"/> Mr. <input type="checkbox"/> Ms.	Chetan Swaroop Sharma				
Qualification Procedure	Fulfills the requirement as per the appointment of personnel procedure of 4KES for Validation and Verification of CDM/VCS/GS/GHG Projects.					
Appointed to work as:						
	CDM Validator/Verifier	Team Leader	Team Member	Technical Expert	Technical Reviewer	Financial Expert
Appointed	Yes	Yes	Yes	Yes	Yes	No
Appointed Date	13-06-2020					
Authorized to work as Technical Expert for:						
Authorized Technical Area	Sectoral Scope		TA Code	Technical Area within the scope		
	Energy industries (renewable - / non-renewable sources)		1.1	Thermal energy generation		
	Energy industries (renewable - / non-renewable sources)		1.2	Renewables		
	Energy distribution		2.1	Energy distribution		
	Energy demand		3.1	Energy demand		
	Waste handling and disposal		13.1	Solid waste and wastewater		
Authorized to work as Local Expert for:						
Country/Countries	India					
Compliance check by: Anand S. R.						

<u>Certificate of Competence</u>						
Name	<input checked="" type="checkbox"/> Mr. <input type="checkbox"/> Ms.	Bright Amponsem				
Qualification Procedure	Fulfills the requirement as per the appointment of personnel procedure of 4KES for Validation and Verification of CDM/VCS/GS/GHG Projects.					
Appointed to work as:						
	CDM Validator/Verifier	Team Leader	Team Member	Technical Expert	Technical Reviewer	Financial Expert
Appointed	-	-	-	-	-	-
Appointed Date	14-07-2020					
Authorized to work as Technical Expert for:						
Authorized Technical Area	Sectoral Scope		TA Code	Technical Area within the scope		
Authorized to work as Local Expert for:						
Country/Countries	Ghana					
Compliance check by: Anand S. R.						

<u>Certificate of Competence</u>						
Name	<input checked="" type="checkbox"/> Mr. <input type="checkbox"/> Ms.	Ma Paa Puratchikkanal				
Qualification Procedure	Fulfills the requirement as per the appointment of personnel procedure of 4KES for Validation and Verification of CDM/VCS/GS/GHG Projects.					
Appointed to work as:						
	CDM Validator/Verifier	Team Leader	Team Member	Technical Expert	Technical Reviewer	Financial Expert
Appointed	Yes	Yes	Yes	Yes	Yes	No

<i>Appointed Date</i>	29-07-2019		
Authorized to work as Technical Expert for:			
<i>Authorized Technical Area</i>	Sectoral Scope	TA Code	Technical Area within the scope
	Energy industries (renewable - / non-renewable sources)	1.1	Thermal energy generation
	Energy industries (renewable - / non-renewable sources)	1.2	Renewables
	Energy demand	3.1	Energy demand
	Construction	6.1	Construction
	Waste handling and disposal	13.1	Solid waste and wastewater
	Agriculture	15.1	Agriculture
Authorized to work as Local Expert for:			
<i>Country/Countries</i>	India		
<u>Compliance check by:</u> Anand S. R.			

Appendix 3. Documents reviewed or referenced

No.	Author	Title	References to the document	Provider
1.	Climate Change Center	/1.1/ Initial CPA-DDs for CPA 005 to CPA 020 /1.2/ Final CPA-DDs for CPA 005 to CPA 020	Version 01, dated 28/07/2020 for CPA 005 to CPA 020 Version 1.4, dated 27/10/2020 for CPA 005 to CPA 020	Climate Change Center
2.	Climate Change Center	Draft spread sheets for Emission Reduction Calculation for CPA 005 to CPA 020. Final spread sheets for Emission Reduction Calculation for CPA 005 to CPA 020.	Corresponding to CPA DDs version 01 for CPA 005 to CPA 020 Corresponding to CPA DDs version 1.4 for CPA 005 to CPA 020	Climate Change Center
3.	3.1 Climate Change Center	Registered PoA DD for the PoA Ref. No. 10576 “Ghana Improved Cookstove Project by EWP in Republic of Korea”.	Version 2.0, dated 27/05/2020	UNFCCC Website
	3.2 Korean Foundation for Quality (KFQ)	Validation report for the PoA Ref. No. 10576 “Ghana Improved Cookstove Project by EWP in Republic of Korea”.	Version 1.2, dated 29/05/2020	UNFCCC Website
4.	4KES and Climate Change Center	Validation contract between 4KES and Climate Change Center	Dated 13/07/2020	Climate Change Center
5.	UNFCCC	CDM VVS for CDM PoAs	Version 02	UNFCCC Website
6.	UNFCCC	CDM PS for CDM PoAs	Version 02	UNFCCC Website
7.	UNFCCC	CDM PCP for CDM PoAs	Version 02	UNFCCC Website
8.	UNFCCC	AMS-II.G. “Energy efficiency measures in thermal applications of non-renewable biomass”	Version 10	UNFCCC Website
9.	UNFCCC	Instruction to fill the CPA design document	Version 03	UNFCCC Website
10.	UNFCCC	CDM-CPA-DD-FORM	Version 03	UNFCCC Website
11.	UNFCCC	Guidance for sampling and surveys for CDM project activities and programme of activities	Version 04	UNFCCC Website
12.	UNFCCC	TOOL21: Demonstration of additionality of small-scale project activities	Version 13	UNFCCC Website
13.	UNFCCC	Standard: Sampling and surveys for CDM project activities and programme of activities	Version 08	UNFCCC Website
14.	UNFCCC	TOOL19: Demonstration of additionality of microscale project activities	Version 09	UNFCCC Website

15.	UNFCCC	TOOL30: Calculation of the fraction of non-renewable biomass	Version 02	UNFCCC Website
16.	UNFCCC	AMS-III.BG.: Emission reduction through sustainable charcoal production and consumption	Version 3.0	UNFCCC Website
17.	UNFCCC	Guideline: General guidelines for SSC CDM methodologies	Version 23	UNFCCC Website
18.	Climate Change Center	Technical review record to include the proposed CPAs (CPA 005 to CPA 020)	-	Climate Change Center
19.	Green ENS	Training records	13/12/2019 and 28/09/2020	Climate Change Center
20.	Climate Change Center	First conformity letter signed by household who has received project device under the CPA 009, CPA 013 and CPA 0014 (First Conformity letter)	-	Climate Change Center
21.	Climate Change Center	Stove distribution record database (Electrical database tool and user manual)	-	Climate Change Center
22.	Climate Change Center	Snap shots of the Electrical database tool	-	Climate Change Center
23.	WBT Test, Regional Testing and Knowledge Center (RTKC), Boundary road, East Legon, Accra, Ghana Council for Scientific and Industrial Research Institute of Industrial Research	Efficiency test report for project ICS by national standard laboratory Certificate No. RTKC-2020-05, date of testing 12-16 October 2020	Dated 16/10/2020	Climate Change Center
24.	Daily Supplies and Services Ltd. (DS&S)	Payment record for cookstoves order	-	Climate Change Center
25.	Green ENS	Inspection of the site for raw material used for ICS production.	June & July 2020	Climate Change Center
26.	Climate Change Center, Green ENS and DS&S	Technical/manufacturer specifications of the ICSs (Production Manual)	August 2020	Climate Change Center
27.	Climate Change Center and DS&S	Contract between CME and Project manager DS&S for distribution of ICS in Ghana	Dated 19/02/2020	Climate Change Center
28.	Climate Change Center, Green ENS and DS&S	Supportive for lifespan of ICS cookstoves	August 2020	Climate Change Center
29.	Climate Change Center, Green ENS and DS&S	Production manual for project ICS	August 2020	Climate Change Center
30.	Climate Change Center	Program Management Manual	August 2020	Climate Change Center
31.	Climate Change Center	Justification with microscale capacity (Excel sheet)	-	Climate Change Center
32.	GREEN ENS INC.	ICS Manual or instruction: MANUAL FOR USE OF CHARCOAL IMPROVED COOK STOVE	August 17, 2020	Climate Change Center

33.	Climate Change Center and CI (The Ministry of Energy, Ghana)	CME agreement with CI (The Ministry of Energy, Ghana)	Jan 2020	Climate Change Center
34.	Climate Change Center	ODA declaration from CME	27/08/2020	Climate Change Center
35.	Ministry of Environment, Science, Technology & Innovation (DNA of Ghana)	Letter of Approval from Host country Ghana	LoA dated 19/05/2020, ref. No. A/21	UNFCCC Website
36.	Climate Change Center	CPA Regions and Districts in Ghana (ICS distribution plan)	21/07/2020	Climate Change Center
37.	Mr. SETH SYLVESTER DADZIE	Resume of the individual who calculated the fnrb	-	Climate Change Center
38.	Climate Change Center	Local stakeholder/ CPA Implementer/ CME/ ICS Manufacturer/ Consulting firm (WECOS)/ Project Coordinator, Green-ENS/ ICS production manager, DS&S/ fNRB Developer/ Baseline user interview records	19/08/2020	Climate Change Center
39.	UNFCCC	Glossary - CDM terms, Version 10	-	UNFCCC Website

Appendix 4. Clarification requests, corrective action requests and forward action requests

Table 1. CLs from this validation

CL ID	01	Section no.	D.3	Date: 16/08/2020
Description of CL				
1. Under section A.3 of the CPA-DDs, CME has mentioned as follows.				
<p>“Size of the cookstove</p> <p>The size of the cookstove would be uniform throughout the period of the project. The top diameter of the cookstove would be 27.0cm (+/- 1.0), the height would also be 32.0cm (+/- 1.0). However, the size of the improved cookstove in this CPA can be changed upon the required thermal efficiency. The thickness of the clay liner should be known by all the manufacturers as it plays a vital role in achieving the thermal efficiency required for this particular project.”</p> <p>Considering the specific CPAs, CME need to clarify the bold lines and provide the thickness of the clay corresponding to each CPA.</p>				
2. Under section A.3 of the CPA-DDs, CME has mentioned as follows.				
<p>The metal sheet that would be used in forming the cookstove need to be of aluminium zinc composition (aluminium zinc material) with a thickness level of 0.4mm gauge and above. However, the thickness level also can be modified upon the required thermal efficiency.</p> <p>Considering the specific CPAs, CME need to clarify the bold lines and provide the specific information corresponding to each CPA.</p>				
CME response				Date: 26/09/2020

As for the size of ICS (cookstove), CME did not clarify the thickness of the clay corresponding to each CPA in the previous CPA-DD (version 1.0). Thus, CME provides detailed information of ICS regarding the thickness of the clay in the revised CPA-DD as follows;

"The size of the cookstove in this CPA is considered a medium. The top diameter is 32.0cm (+/- 1.0) and the height is 27.0cm (+/- 1.0). The thickness of the clay liner is 3.5cm (+/- 1.0), the height is 9.0cm (+/- 1.0), top diameter is 28.0cm (+/- 1.0), bottom diameter is 23.0cm (+/- 1.0), and the inner diameter is 21.0cm (+/- 1.0)."

Documentation provided by CME

Revised CPA-DD

DOE assessment

Date: 29/09/2020

1. Need to submit the technical specification document for the details mentioned above. Not closed.
2. No response for point no.2. also supportive document for the same is missing. Not closed.

CME response

Date: 07/10/2020

CME will provide the ICS specification with test result of project ICS efficiency rate.

Documentation provided by CME

-

DOE assessment

Date: 08/10/2020

Response for point no. 2 is missing. Also will be reviewed once supportive document is received. Not closed.

CME response

Date: 28/10/2020

1. CME submitted technical specification document with revised CPA-DD.
2. CME submitted technical specification document and manual.

Documentation provided by CME

technical specification document and manual

DOE assessment

Date: 28/10/2020

The dimensions of the cookstove to be distributed under the 16 CPAs has been mentioned in the revised CPA-DDs /01/ and found in compliance with the PoA-DD /03/. The mentioned dimensions have been verified from the production manual /26/. It was verified from the manufacturers that the dimensions of the cookstoves would be uniform throughout the period of the project. Hence this CL is closed.

CL ID	02	Section no.	D.4.1	Date: 16/08/2020
Description of CL				
As per para 33 of the applied methodology AMS-II.G. Version 10, If the life span of devices is less than the crediting period, it shall be demonstrated that the devices shall be replaced after the life span has ended. In such cases, if it cannot be demonstrated that the project devices will be replaced with new devices, no emission reductions can be claimed beyond the life span of the project devices.				
CME need to clarify how the above requirement has been met.				
CME response				Date: 26/09/2020
CME revised section C.3.3. as follows;				
"The crediting period is 7 years, renewable. The project devices will be replaced after the life span has ended."				
Documentation provided by CME				
Revised CPA-DD				
DOE assessment				Date: 28/10/2020
Correction has been done in the revised CPA-DDs /01/ and found in compliance with the applied methodology AMS-II.G. Version 10 /08/. Hence this CL is closed.				

CL ID	03	Section no.	D.5.1	Date: 16/08/2020
Description of CL				
Under section B.4.1 of the CPA-DDs, CME has mentioned as follows:				
<p>"<i>B_{y,savings,i,j}</i> shall be determined using Project activities switching from baseline device using firewood to efficient project device using charcoal shall take into account the leakage effects related to the charcoal production. A default value of 0.030 t CH₄/t charcoal may be used in accordance with AMS-III.BG. "Emission reduction through sustainable charcoal production and consumption". is described in section I.6.3."</p>				
CME need to clarify the applicability of the bold lines as according to the section B.3 of the CPA-DD, prevalent baseline fuel for conventional cookstove is deemed as woodfuel (firewood and charcoal).				
CME response				Date: 21/10/2020

CME calculated the leakage from firewood to charcoal fuel in emission reduction sheet, and it is deducted from total emission reduction.	
Documentation provided by CME	
Revised CPA-DD and ER sheet	
DOE assessment	Date: 28/08/2020
Validation team has checked the revised CPA-DDs /01/, ER sheets /02/ and found that leakage (for switching from baseline device using firewood to efficient project device using charcoal) related to the charcoal production has been calculated as per the default value of 0.030 t CH ₄ /t charcoal mentioned in the PoA DD /03/ which is found correct. Hence this CL is closed.	

CL ID	04	Section no.	D.5.2	Date: 16/08/2020
Description of CL				
For the ex-ante parameter η_{old} (under section B.4.2 of the CPA-DDs), Validation team has found the following.				
As per the applied methodology AMS-II.G. Version 10.0, ex-ante parameter η_{old} need to be Fixed for each individual household when included in the project activity database. CME need to clarify how the above requirement has been met.				
CME response				Date: 28/10/2020
CME will check the formal cookstove whether it is compliance with requirement of AMS-II.G. methodology to use default value, 10%, when CME and/or CI distribute project ICSSs.				
Documentation provided by CME				
-				
DOE assessment				Date: 28/10/2020
Validation team has checked the CME response and found OK. Hence this CL is closed.				

CL ID	05	Section no.	D.5.2	Date: 16/08/2020
Description of CL				
From the fNRB calculation under the ER sheets, Validation team has found the following:				
1. For the calculation of $MAI_{forest,i}$, all the ecological zones are not used.				
2. CME need to submit the source for the values used for $F_{forest,i}$, $F_{other,i}$ and P_{forest} , P_{other} .				
3. For the calculation of $MAI_{forest,i}$ and $MAI_{other,i}$, weighted average based on the forest area of two different age categories (i.e. above and below 20 years) should be used if such data is available however simple average has been used by the CME.				
4. For the calculation of HW_{region} , average household charcoal consumption could not be verified from the source provided.				
5. The value of N_{region} could not be verified, CME need to provide the exact reference of the source.				
6. CME need to provide the source of "wood density" and "The wood removed for energy production purposes, regardless whether for industrial, commercial or domestic use" used for calculation of TI_{region} .				
CME response				Date: 26/09/2020
As for fNRB Value, CME provide revised calculation sheet to DOE.				
Documentation provided by CME				
Ghana fNRB_WECOS.xlsx				
DOE assessment				Date: 28/10/2020
Correction has been done and found OK. This value is fixed at CPA level for all the 16 CPAs which is in compliance with the applied methodology i.e. AMS-II.G. Version 10 /08/ and the PoA-DD /03/.				
The calculation of the $f_{NRB,y}$ has been done based on the tool "Calculation of the fraction of non-renewable biomass", Version 2.0 /15/. The steps of the tool has been correctly followed to calculate the $f_{NRB,y}$.				
Validation team has checked the source of the data and found acceptable. Hence this CL is closed.				

CL ID	06	Section no.	D.6.2	Date: 16/08/2020
Description of CL				
1. Under section B.5.2 of the CPA-DDs, CME has mentioned individual CPA for the sampling. CME need to clarify whether sampling would be done for each CPA or for group of CPAs.				
2. Under section B.5.2 of the CPA-DDs, sampling size and Sampling frame for the operating efficiency of distributed ICS ($\eta_{new,i,j}$) is not defined.				
CME response				Date: 07/10/2020
CME revised "CPA XXX" to group of CPAs or CPAs in the section B.5.2 and B.5.3 of the CPA-DD				
Documentation provided by CME				
Revised CPA-DD				

DOE assessment	Date: 08/10/2020
1. CME has clarified that the sampling would be done for the group of the CPAs which is found OK. Hence this part of CL is closed.	
2. Efficiency is being measured by national body. Results awaited. Not closed.	
CME response	Date: 21/10/2020
CME submitted ICS test result to DOE	
Documentation provided by CME	
ICS test result	
DOE assessment	Date: 28/08/2020
2. A Water Boiling Test (WBT) for the project ICS was conducted by the national standard body i.e. Regional Testing and Knowledge Center (RTKC), CSIR Ghana and confirm the efficiency as 32% /23/. The test is in compliance with the applied methodology AMS-II.G. Version 10 /08/ and the PoA-DD /03/ and hence acceptable to the validation team. Lab test report /23/ validated to confirm the efficiency chosen. Since the efficiency of the project device is based on certification by a national standards body or an appropriate certifying agent recognized by that body, this is in compliance with the applied methodology AMS-II.G. Version 10 /08/ and no sampling required. Hence this part of CL is closed.	

Table 2. CARs from this validation

CAR ID	01	Section No.	D.2	Date: 16/08/2020
Description of CAR				
On page 1 of the submitted CPA-DDs, the details under the heading "Title and reference number of the corresponding generic CPA" is not in compliance with the generic CPA-DD under the registered PoA-DD.				
CME response				Date: 07/10/2020
CME revised as below: [Title] Ghana Improved Cookstove Project by EWP in Republic of Korea – Generic CPA XXX [Reference Number] Generic CPA XXX				
Documentation provided by CME				
Revised CPA DDs				
DOE assessment				Date: 28/10/2020
Corrections have been done in the revised CPA-DDs /01/ and found in compliance with the PoA-DD /03/. Hence this CAR is closed.				

CAR ID	02	Section No.	D.2	Date: 16/08/2020
Description of CAR				
1. Under section A.1 of the submitted CPA-DDs, CME need to describe the baseline scenario. (As per the requirement of "Attachment. Instructions for completing this form" available under Component project activity design document form (Version 09.0)).				
2. The mentioned crediting period i.e. 5 years (Under section A.1 of the submitted CPA-DDs) is not consistent with section J of the registered PoA-DD.				
3. Under section A.1 of the submitted CPA-DDs, CME need to demonstrate that the CPA qualifies for a microscale project type (As per the requirement of "Attachment. Instructions for completing this form" available under Component project activity design document form (Version 09.0)).				
4. Under section A.2 of the submitted CPA-DDs, CME need to describe the information allowing for the unique identification of the CPAs (As per the requirement of "Attachment. Instructions for completing this form" available under Component project activity design document form (Version 09.0)).				
5. Under section A.7 of the CPA-DDs, CME need to declare whether A registered CDM project activity or a CPA under a registered CDM PoA whose crediting period has or has not expired (hereinafter referred to as former project) exists in the same geographical location as the proposed CPA however the same is not clear from the submitted CPA-DDs. (As per the requirement of "Attachment. Instructions for completing this form" available under Component project activity design document form (Version 09.0)).				
CME response				Date: 26/09/2020

As for the CAR 02-1, CME did not clearly describe the baseline scenario in the previous CPA-DD (version 01.0). Thus, CME submitted revised version as follows:

"In the baseline scenario, households continue to using woodfuel in traditional and/or conventional cook stoves. The project ICS are more efficient, emits less emissions, needs less woodfuel and safer than baseline stoves such as traditional (including three stone) and/or conventional cook stoves. Thus, this activity will lead to reduce CO₂ emissions."

As for the CAR 02-2, in the previous CPA-DD (version 01.0), CME mentioned crediting period 5 years in the section C.3.3., which is not consistent with section J of the registered PoA-DD. Thus, CME submitted revised version as follows:

"The crediting period is 7 years, renewable"

As for the CAR 02-3, In the previous CPA-DD (version 01.0), CME did not clearly demonstrate that the CPA qualifies for a microscale project type. Thus, CME submitted a calculation sheet (attachment) for microscale justification.

As for the CAR 02-4, In the previous CPA-DD (version 01.0), CME did not clearly describe that the information allowing for the unique identification of the CPAs. Thus, CME submitted an attachment to describe specific CPA regions including districts and communities' information.

As for the CAR 02-5, in the previous CPA-DD (version 01.0), CME didn't clearly declare whether A registered CDM project activity or a CPA under a registered CDM PoA whose crediting period has or has not expired (hereinafter referred to as former project) exists in the same geographical location as the proposed CPA however the same is not clear from the submitted CPA-DDs. Thus, CME researched all previous PoAs and PAs in Ghana, especially cookstove project, and submitted revised section A.7 in PoA (version 01.1)

Documentation provided by CME

CAR 02-1: Revised CPA-DD (Version 01.1)

CAR 02-2: Revised CPA-DD (Version 01.1)

CAR 02-3: Microscale ICS_Calculation_Emission_Reduction.xlsx

CAR 02-4: 20200821_CPA Regions and Districts in Ghana_WECOS.docx

CAR 02-5: Revised CPA-DD (Version 01.1)

DOE assessment

Date: 29/09/2020

1. Correction has been done in the revised CPA-DDs /01/ and found OK. Hence this part of CAR is closed.
2. Not yet corrected in section A.1 of the CPA-DDs /01/. Not closed.
3. Not closed. No demonstration has been done under section A.1 of the CPA-DDs /01/. Also the calculation are not provided under the submitted er sheet /02/.
4. Correction has been done in the revised CPA-DDs /01/ and found OK. CME has mentioned the region and districts for each CPA to uniquely identify them. Hence this part of CAR is closed.
5. Correction has been done in the revised CPA-DDs /01/ and found OK. Hence this part of CAR is closed.

CME response

Date: 07/10/2020

CME revised as below;

2. tCO_{2e}/5yr -> tCO_{2e}/7yr

3. recalculated in the emission reduction calculation sheet

Documentation provided by CME

Revised CPA-DDs and ER sheets

DOE assessment

Date: 28/10/2020

2. Correction has been done in the revised CPA-DDs /01/ and found OK. Now the crediting period is mentioned as 7 years. Hence this part of CAR is closed.
3. Correction has been done in the revised CPA-DDs /01/ and found OK. Hence this part of CAR is closed.

CAR ID	03	Section No.	D.5.2	Date: 16/08/2020
Description of CAR				
Under section B.4.2 of the CPA-DDs, CME need to provide the link of the source for the ex-ante parameters B _{old,p} , N _{p,HH} .				
CME response				Date: 28/10/2020

The link of the source for the ex-ante parameters $B_{old,p}$. For Charcoal: 180kg/capita/y - "National value: "Food and agriculture organization of the united nations, the charcoal transition, (2017): 139." http://www.fao.org/3/a-i6935e.pdf For firewood: 500kg/capita/y - "Firewood Consumption per capita: Energy Services for the Millennium Development Goals, p.36" http://lutw.org/wp-content/uploads/Energy-services-for-the-millennium-development-goals.pdf The link of the source for the ex-ante parameters $N_{p,HH}$. Household size: 3.8 person /HH - Household size: Ghana Maternal Health Survey 2017 p.10 https://www.dhsprogram.com/pubs/pdf/FR340/FR340.pdf			
Documentation provided by CME			
Revised CPA-DDs			
DOE assessment			Date: 28/10/2020
Corrections have been done in the revised CPA-DDs /01/ and found OK. Validation team has checked the link for the ex-ante parameters and found acceptable. Hence this CAR is closed.			

CAR ID	04	Section No.	D.6.1	Date: 16/08/2020
Description of CAR				
Under section B.5.1 of the CPA-DDs, The value for the monitoring parameters $N_{y,i,j}$, μ_y and $\eta_{new,i,j}$ is missing.				
CME response				Date: 26/09/2020
CME applied the values as follows; - $N_{y,i,j}$: 31,081 (for CPA 005) - μ_y : 80% - $\eta_{new,i,j}$: 32%				
Documentation provided by CME				
Revised CPA-DDs				
DOE assessment				Date: 28/10/2020
Corrections have been done in the revised CPA-DDs /01/ and found OK. The values for the ex-post parameters are indicative and will be monitored. Hence this CAR is closed.				

CAR ID	05	Section No.	D.7	Date: 16/08/2020
Description of CAR				
1. Under section C.1 of the CPA-DDs, CME need to mention the start date. 2. Under section C.3.2 of the CPA-DDs, CME need to mention the crediting period start date.				
CME response				Date: 26/09/2020
As for the CAR 05-1, CME revised star date as follows; "XX/10/2020 (CPA inclusion date) As for the CAR 05-2, CME revised star date as follows; "12/08/2020 (PoA registration date)				
Documentation provided by CME				
CPA-DD (version 01.1)				
DOE assessment				Date: 29/09/2020
1. Not closed. Start date is not yet defined. 2. Not closed. Crediting period start date is not yet defined according to the start date.				
CME response				Date: 21/10/2020
Crediting period date will be ICS distribution date as per ICS distribution plan, and CME submitted ICS distribution plan to DOE.				
Documentation provided by CME				
Revised CPA-DDs				
DOE assessment				Date: 28/10/2020

<p>1. Corrections have been done in the revised CPA-DDs /01/ and found OK. Out of the 16 CPAs to be included, the distribution of the ICS has only started under 3 CPAs i.e. CPA 009, CPA 013 and CPA 014. The CPA start date for the three CPAs (CPA 009, CPA 013 and CPA 014) has been confirmed from the conformity letter for the first ICS distribution in each CPA /20/. For the remaining CPAs, the expected ICS distribution date has been mentioned as the start date which has been verified from the CPA-DDs /01/ and found OK.</p> <p>Validation team has found the CPAs start date in compliance with the eligibility criteria stipulated in the PoA DD/03/. The start date of the PoA is 14/01/2020 which is before the start date of the CPAs to be included /01/. Hence this part of CAR is closed.</p> <p>2. Corrections have been done in the revised CPA-DDs /01/ and found OK. Start date of crediting period is opted is Actual date of first ICS distribution for the CPA 009, CPA 013 & CPA 014 and expected ICS distribution date for the remaining CPAs, which is found reasonable and realistic. Hence this part of CAR is closed.</p>
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CAR ID	06	Section No.	D.10	Date: 16/08/2020
Description of CAR				
Under section F of the CPA-DDs:				
1. Justification for point no. 2, 3 & 4 corresponding to the Eligibility criterion – Category 4 “Specifications of Technology/Measure” are not provided.				
2. Justification for the Eligibility criterion – Category 8 “Compliance of each unit with the microscale threshold” is not clear. Since the CPAs are type II, Accordingly micro scale threshold should be justified.				
CME response				Date: 26/09/2020
As for the CAR 06-1, In the previous CPA-DD (version 01.0), CME did not provide detailed Specifications of Technology/Measure. Thus, CME will submit ICS specification when the ICS efficiency test result is provided.				
As for the CAR 06-2, In the previous CPA-DD (version 01.0), CME did not clearly demonstrate that the CPA qualifies for a microscale project type. Thus, CME submitted a calculation sheet (attachment) for microscale justification.				
Documentation provided by CME				
CAR 06-1: CME will submit ICS specification				
CAR 06-2: Microscale ICS_Calculation_Emission_Reduction.xlsx				
DOE assessment				Date: 29/09/2020
1. Not yet closed. No justification provided. Also no document provided.				
2. Not closed. The calculation for the microscale is not correct.				
CME response				Date: 07/10/2020
CME added and revised as below;				
1. In addition, The CME provides ICS specification of technology/measure and manual as evidence materials to prove size or dimension, operation information, design of ICS.				
2. Recalculated in the emission reduction calculation sheet				
Documentation provided by CME				
Revised CPA-DDs and ER sheets, ICS specification of technology/measure and manual				
DOE assessment				Date: 08/10/2020
1. The supportive documents are pending. Not closed.				
2. Correction has been done in the revised CPA-DDs /01/ and found OK. Validation team has checked the submitted sheets /31/ for the energy saving from each ICS (11.76 MWh _{th} /y) and found below the microscale threshold of 1,800 MWh _{th} of annual energy savings per appliance. Hence this part of CAR is closed.				
CME response				Date: 21/10/2020
CME submitted ICS specification and test result of ICS efficiency to DOE.				
Documentation provided by CME				
Efficiency test for ICS				
DOE assessment				Date: 28/10/2020
1. Corrections have been done in the revised CPA-DDs /01/ and found OK. The dimensions of the cookstove have been verified from the production manual /26/ and the efficiency has been verified from the national lab test results /23/. Hence this part of CAR is closed.				

Table 3. FARs from this validation

FAR ID	Xx	Section No.		Date: DD/MM/YYYY
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Description of FAR	
CME response	Date: DD/MM/YYYY
Documentation provided by CME	
DOE assessment	Date: DD/MM/YYYY

Document information

<i>Version</i>	<i>Date</i>	<i>Description</i>
03.0	31 May 2019	Revision to: <ul style="list-style-type: none"> Ensure consistency with version 02.0 of the “CDM validation and verification standard for programmes of activities” (CDM-EB93-A08-STAN); Make editorial improvements.
02.0	29 December 2017	Revision to align with the requirements of the “CDM validation and verification standard for programme of activities” (version 01.0).
01.0	4 May 2015	Initial publication.
Decision Class: Regulatory Document Type: Form Business Function: Registration Keywords: component project activity, validation report		