PROJECT REVIEW REPORT

This project review report includes findings raised during Verra's review of the project specified below. The VVB must address the findings before the project request can be considered for approval by Verra. The project review report will be made publicly available on the Verra Registry. Confidential information may be provided in separate attachments.

Project ID	2673
Project Name	UpEnergy - Social and Climate Impact Programme- Nigeria-1
Review Type	Registration and Verification Approval
Program(s)	VCS Program
Verification Period	07-May-2022 to 31-October-2022
Project Proponent	UpEnergy Group
Methodology	VMR0006 - VCS Methodology: VMR0006: Methodology for Installation of High Efficiency Firewood Cookstoves, Version: Version 1.1
VVB	Earthood Services Private Limited
Assessment Criteria	VCS standard Version 4.4
Date of First Issue	2 August 2023
Date of Second Issue	28 November 2023
Date of Third Issue	30 January 2024
Review Conclusion	Approve
Date of Final Issue	26 April 2024

FINDINGS

1.	Title: Adequacy of local stakeholder consultation		
	Issue The grouped project covers entire Nigeria, but section 2.2 of the project description states that only one physical meeting for local stakeholders was done on 23rd June 2022 where 60 people participated. Joint Validation and verification report (VVR) in section 3.3.2 states that email invite, newspaper advertisement and Linkedin/social media announcement notifying the date, time and location of the event were sent out to invite stakeholders for the meeting. Action Required 1. The VVB must clarify how has it determined one physical meeting to be adequate to capture local stakeholder feedback for a project that plans to cover entire country of Nigeria. 2. Given that distance between Abuja and some of the farthest places in Nigeria could be approx. 1000 km, VVB must clarify what measures did project proponent take to maximize participation from stakeholders and how did it deem them adequate to not require further local stakeholder meetings as project expands to different states in Nigeria. Program Rule(s) *VCS Joint Validation & Verification Report Template v4.2, Section 3.3.2* *VCS Standard v4.4, section 3.18.3*	**Round 1** VVB Response The VVB has interviewed the local stakeholders who attended the physical meeting to confirm the mode of invitation and representativeness of the those who attended the meeting. The interviewees confirmed that apart from direct invites, open invitations were sent through newspaper and social media advertisements thereby ensuring the inclusivity. The attendants of the meeting included the members such as community representatives and NGOs with widespread reach among the local communities in different regions of the host country, thus the VVB confirmed that the meeting was inclusive and representative. Furthermore, the email and phone number along with social media as the mode of communication shared by the PP ensured that any input/grievance can be shared by those who could not attend the meeting physically, thereby making adequate arrangements to capture feedback from the entire country. PP representatives have undertaken the initiative to organise community kitchens amongst the clusters in order to further train women and maintain an ongoing communication channel for feedback therefore the further justification for another LSC at state/district level was not sought. Thus, the VVB confirmed that the LSC was inclusive and conducted in line with the guidelines of VCS Standard v4.4, section 3.18.3 Verra Response The VVB explained why the LSC process is considered to be adequate for the whole of Nigeria, given that invitations were	Closed

		sent through national channels and those not able to travel were allowed to provide their feedback as well. The finding is closed.	

2.	Title: Insufficient justification of the baseline scenario		
	Issue The project proponent mentions under Section 3.4 of the project description that the *"baseline scenario is the continued use of non-renewable biomass fuel (charcoal) by the target population to meet similar thermal energy needs"*. However, the joint validation and verification report (VVR) in section 3.4.4 states that "*baseline scenario is the continued use of non-renewable wood fuel (firewood/charcoal) or fossil fuel (coal/kerosene) by the target population to meet similar thermal energy needs"*. There is inconsistency in baseline scenario described in PD and Joint VVR. Further, the joint VVR in section 3.4.4 states that "*The baseline scenario has been determined by PP through a baseline assessment survey conducted across rural and urban areas of all key geographical demographics of Nigeria"*. Neither VVB nor PP have discussed as to how it is appropriate to consider urban and rural population as homogenous group. Action Required 1. The VVB must clearly state the baseline scenario and ensure consistency with information in Joint PD &MR. Further, VVB must clarify if baseline scenario is continued use of single fuel i.e., charcoal OR are multiple fuels used in baseline scenario. 2. The VVB must clarify: a. the sampling approach used by PP to carry out baseline survey. b. If simple random sampling has been used, VVB must	**Round 1** VVB Response 1. Section 3.4.4 of VVR reads as "The baseline scenario for ICS has been identified using the methodology VMR0006 "Methodology for Installation of High Efficiency Firewood Cookstoves version 1.1". As per section 6 of applied methodology, the baseline scenario is the continued use of non-renewable wood fuel (firewood/charcoal) or fossil fuel (coal/kerosene) by the targeted population to meet similar thermal energy needs as provided by project cookstoves in absence of project activity, thus the reference to multiple fuels was made in the description. The description is now rephrased to omit this reference. • The baseline study conducted by the PP to determine the type of stove and fuels being used in the baseline confirms that both firewood and charcoal stoves exist in the baseline scenario. • The PP has conducted KPT for both firewood and charcoal end users to determine the amount of fuel consumed. • The PP has missed to include the reference to the firewood stoves since only charcoal stoves were distributed during the first monitoring period, the same is now included in the revised Joint PD &MR. • VVB confirmed during the site-visit that the baseline scenario of the project activity includes only non-renewable biomass (charcoal/firewood) and does not include any fossil fuels such as kerosene.	Closed

	clarify how it has determined homogeneity between urban and rural population to accept simple random sampling approach. c. Further, VVB must clarify the mix of urban and rural households in 11 samples it picked for interview to confirm baseline scenario. Also clarify homogeneity in baseline fuel, baseline stove, types of meals and cooking patterns observed across 11 samples chosen by VVB. d. The VVB must ensure that the PD contains the information on the survey performed to determine the baseline scenario. e. The VVB must clarify how the acceptance sampling to the 11 samples to confirm the baseline scenario and monitoring parameters has been conducted given that during the site visit, the VVB only performed remote interviews through telephone calls. f. The VVB must ensure that all end users contacted to cross-check the sampling procedures are listed in the revised validation and verification report. Program Rule(s) *VCS Standard v4.4, section 3.13*	2. The baseline survey has been conducted by the PP to determine the baseline scenario, the results of the study conducted in collaboration with International Centre for Energy, Environment and Development (ICEED) has been shared by the PP as the baseline assessment report and the same has been reviewed by the VVB to confirm that traditional charcoal / firewood stoves are being used in the baseline scenario. a) PP in collaboration with ICEED has conducted a baseline survey of 165 households spread across rural, semi-urban and urban areas in Nigeria and targeting all the key geographical areas of Nigeria, i.e., Northern Region, Southwest Region and Southeast Region. In line with the urban / rural demographic breakup of Nigeria [1], the considered 165 samples were split into 2 strata i.e., 47% to be sampled from urban areas, and rest 53% to be sampled from rural areas. The sample selection of households from the identified key localities was done through a combination of stratified and random sampling. b) PP has not adopted the simple random sampling approach as sample selection was done through a combination of stratified and random sampling as explained in point a. c) The details of the 11 sampled baseline households inspected by the VVB during the onsite assessment are now included under section 2.3 of the Joint VVR. VVB has ensured that the sampled 11 baseline households have mix of urban & rural. The 11 samples were randomly chosen consisting of 7 from rural areas and 4 from urban areas. The VVB has observed that the baseline fuel type consisted of both	

[1] https://population.un.org/wup/Publications/Files/WUP2014-Highlights.pdf (refer page # 25)

		firewood and charcoal stoves in the rural areas whereas the urban areas had only charcoal stoves, the types of meals and cooking patterns to be almost homogenous between the urban & rural strata. d) The details of baseline survey conducted by the PP are included under section 3.4 of revised joint PDMR e) The VVB has undertaken a physical site visit to 22 households (11 baseline & 11 implementation), and the telephonic interviews were conducted only with the participant of the local stakeholder consultation. The details of the acceptance sampling applied, and the interviews conducted are enumerated under section 2.4 and 2.3 of the JVVR. f) The details of the 22 sampled households (11 baseline & 11 implementation) inspected by the VVB during the onsite assessment previously mention under section 2.4 are now included under section 2.3 of the Joint VVR. The 11 samples for baseline confirmation include the details of the fuel type and their location i.e.., rural/urban. The 11 samples for implementation include the stove IDs verified during the site visit.	
		<u>Verra Response</u> The VVB explained that during the current monitoring period, only charcoal ICS were distributed, but this may change in the future. However, the VVB shall inform the PP that if there are changes in the project description documents after the registration, the same will need to be described in a PD deviation following the VCS Standard ver. 4.5 section 3.21. Further, section 3.4 of the revised Joint PD-MR was updated to include information on the surveys. The Joint VVR was updated to include information on the cross-checks.	

		The finding is closed.	

3.	Title: Lack of information on parameters fixed ex-ante		
	Issue Joint VVR in section 3.4.6 states that "*sample size of 165 was considered for Baseline assessment survey and Baseline KPT were conducted at 90 households, which comprised of 45 Charcoal and 45 Firewood users*". It is not clear whether baselines surveys OR baseline KPTs were source of parameter B_{old}, which is fixed ex-ante. Joint VVR in section 3.4.6 states that "*efficiency of the baseline stove is sourced from the baseline assessment report which consists of the records of the WBT conducted on baseline stoves*". Reference to the serial number of evidence as per Appendix I is not given in the Joint VVR for parameter ηold. Action Required 1. VVB must clarify whether baseline surveys or baseline KPTs are source for value of B_{old} = 5.46 tonnes/year mentioned in the joint PD&MR. If the source is KPT then VVB must further clarify: a. How it has determined the sample size of 90 to be adequate in line with Option (b) as per section 8.4 of the methodology. b. Since the baseline fuel as mentioned in joint PD&MR is charcoal why were 45 KPTs done on firewood users. 2. VVB must clarify the sampling approach used by PP for the	**Round 1** VVB Response 1) PP has conducted KPTs to determine the baseline fuel consumption (B_{old}) value for both charcoal and firewood separately. The outcome of the study is as tabulated below, Baseline Fuel | B_{old} (tonnes/y/HH) | B_{old} in Eq. fuel wood (tonnes/y/HH) Charcoal | 0.91 | 5.46 Firewood | 4.37 | 4.37 a) In line with the Option (b) of the section 8.4 of the methodology PP has adopted the sampling approach described in the latest version of CDM document 'Sampling and surveys for CDM project activities and programme of activities. And hence the sample size for baseline KPT has been determined using the "Sampling and surveys for CDM project activities and programmes of activities, Version 09.0" which adopts the Student's t-distribution method if the parameter of interest is a numeric mean value. The required sample size was calculated to be 27 each for both charcoal and firewood households. Hence the actual sample size considered for KPT for both charcoal and firewood households were 45 each which is more than the required sample size /adequate and in-line	Closed

	baseline surveys and KPTs. 3. VVB must clarify how it has validated the baseline survey and KPTs to be representative of entire Nigeria. 4. VVB must provide information on; names and geographical coverage of 11 samples it picked for interview to confirm baseline scenario. 5. For parameter ηold, VVB must confirm if they have checked the calculations to ascertain value of 16.5% mentioned in joint PD&MR. VVB must mention in joint VVR, the sampling information to determine the efficiency of the baseline stove. Program Rule(s) *VCS Joint Validation & Verification Report, v4.2, Section 3.4.6*	with the CDM Sampling requirement; the results thus obtained have met the reliability criteria of 95/10 for large scale project activities. b) PP has undertaken the KPTs for firewood users as well, with the intention to displace the inefficient / traditional firewood stoves with improved firewood cookstove in the project boundary in the future monitoring periods, when the PP gets the technology to build improved firewood cookstove locally as confirmed through the interviews with the PP representatives. In this context, PP has now revised the baseline scenario for the project in the joint PDMR to include the reference of their intent to distribute the improved firewood stoves. However, during the 1st monitoring period, the project activity replaced only the baseline traditional / inefficient charcoal stoves with the charcoal-based ICS; Hence the baseline fuel consumption of **B_{old} = 5.46 tonnes/year** is only considered to calculate the emission reductions for the first monitoring period. In future monitoring periods the B_{old} value for respective displaced baseline fuels will be used for emission reduction calculations, based on the distribution of firewood / charcoal-based ICS. 2) PP in collaboration with ICEED has conducted a baseline survey of 165 households spread across rural, semi-urban and urban areas in Nigeria. The sample selection of households from the identified key localities was done through a combination of stratified and random sampling. PP has also done KPTs for 90 households within the 165 surveyed households (45 each for charcoal and firewood users) to determine the B_{old} value by adopting a combination of spatial distribution and random sampling approach.	

		3) PP has conducted baseline surveys and KPTs at 3 major states namely Kano, Ebonyi & Lagos targeting all the key geographical areas of Nigeria, i.e, Northern Region, Southeast Region and Southwest Region for their cultural, ethnic, cooking practice and strategic considerations as highlighted in the Baseline Survey Report. The selection of regions for the baseline survey is strategically done to represent of entire scenario of Nigeria. 4) The details of the baseline households interviewed are included under section 2.3 of the Joint VVR with additional information. 5) PP has conducted WBTs for 14 samples to determine η_{old} parameter for baseline charcoal stoves in line with the "Sampling and surveys for CDM project activities and programmes of activities, Version 09.0". The minimum sample size requirement for the study is determined to be 12 by adopting Student's t-distribution method and obtained results are fulfilling the 95/10 reliability criteria. The default value of 10% from VMR 0006 v1.1 is used for determining the η_{old} for three stone / traditional firewood stoves. The information is now included under section 3.4 of the Joint PDMR joint PD&MR. The sampling details and results of the baseline survey, KPT and WBT are included in under section 3.4 the joint PD&MR	
		<u>Verra Response</u> <u>Issue:</u> 1. The revised Joint PD-MR states that the results for both the efficiency of the baseline stove and the parameter Bold comply with the reliability criteria of 95/10,	

		however, this was not demonstrated in the revised documentation, as the results of the tests were not provided. 2. Further, the revised PD includes values for Bold for firewood stoves to be distributed, without including any further information on the other sections of the PD on the distribution of firewood stoves. 3. The sample information for the determination of the efficiency of the project stove was not provided. <u>Action required:</u> 1. The VVB must ensure that the revised documents include all required information that was used to calculate the parameters: Efficiency of the baseline stove and the value of Bold. Further, the VVB is required to provide its expert opinion on the values achieved, and compare them with other external sources. 2. The VVB must consider that if the project description includes no information on the distribution of firewood cookstoves (such as number of stoves to be distributed, model type, distribution schedule, efficiency of the project stove, etc.), then the PD cannot include a value for Bold for firewood cookstoves. Thus, all references to firewood cookstoves shall be eliminated from the PD, unless a full description of the expected distribution is included in all sections of the PD. 3. The VVB must ensure that all information regarding the determination of the ICS efficiency is included based on the WBT. Further, the VVB shall include an assessment of how the efficiency calculation complies with the methodology requirements, and provide its expert opinion on the value achieved, and compare with literature review. The finding remains open.	

		VVB Response 1. The results of the reliability analysis for the parameters baseline fuel consumption (B_{old}) & baseline stove efficiency (η_{old}) are now included under section 3.4 of the revised Joint PD-MR. VVB has reviewed the calculations and confirms that the obtained results meet the reliability criteria of 95/10. The VVB has compared the values of η_{old} & B_{old} determined by the PP through independent research with publicly available reports. For the parameter B_{old} recent scientific research work by Ibrahim Sufiyan, Muhammad K.D, Umar Musa U (2021) [2] establishes the per capita charcoal consumption as 224.4 kg/capita/annum, this translates to 6.05 tonnes wood equivalent for charcoal/HH/annum considering the average HH size of Nigeria to be 4.5 capita/HH[3]. Hence the B_{old} value of 5.46 tonnes / HH/ annum, determined through the baseline KPT study conducted by the PP is found to be within the comparable range. Also, the parameter η_{old} value of 16.5% evaluated by the PP is found to be comparable and conservative with the value 15% as per the study conducted by Usman, Ojonimi Yusuf[4]. Based on the comparison, the values of η_{old} & B_{old} determined and applied by the PP are found acceptable by the VVB. 2. PP has revised the design structure of the project activity to include only improved charcoal stoves being installed under the project activity. The Project description has	

[2] https://jwbm.com.my/archives/1jwbm2021/1jwbm2021-22-26.pdf

[3] https://www.africageoportal.com/maps/fbb3c5c5fa9f4429be56af8b11ef4643/about

[4] https://afribary.com/works/experimental-performance-evaluation-of-charcoal-stove#overview

		been revised accordingly and all the references of the firewood stoves have been removed in the latest version of joint PD-MR. VVB has confirmed that all the project documentation viz., Joint PD-MR, Ex-Ante estimation, additionality analysis and ER estimation of MP 1 have only the details related to the improved charcoal stoves and all the references to firewood stoves are removed as per VERRA's comment. The FVR has been revised accordingly. 3. The requisite sampling information, test results obtained, reliability checks etc. for the project stove is included under Section 7.5 of Joint PD-MR. The same is also included in the ER sheet for MP 1. VVB has checked the calculation details of the project stove efficiency, adequacy of sample size and reliability of the results and confirmed to be satisfactory and in line with methodological requirement. The efficiency values of project ICS obtained from the WBT conducted is also compared with its maximum design thermal efficiency value from the technical specification sheet and found to be within the pre-determined limits. Verra Response: The revised documents include the information on the sampling procedure and results to obtain the parameters Bold and efficiency of the baseline stove. The revised documents do not include any reference to the introduction of improved cookstoves burning firewood. The finding is closed.	

4.	**Title: Lack of clarity on Project ownership**		
	Issue	**Round 1** VVB Response	Closed

	Section 6.3 of the joint PD&MR states "*A carbon waiver including a warranty card will be distributed with each stove distributed. The CME makes every effort to retrieve this information (paper form or electronically but cannot guarantee the collection of information for waivers and warranties with every stove due to challenges such as high rates of illiteracy and logistical challenges.*" Action Required 1. In absence of project proponent's ability to collect all the warranty cards which act as agreement between end-user and PP, VVB must confirm how it has validated that ownership of entire project clearly lies with UpEnergy Group. Program Rule(s) *VCS Standard v4.4, section 3.6.17 (5)*	The carbon waiver receipt cites "UpEnergy subsidizes the stove for you by selling the emission reductions achieved when you use the stove. By purchasing this product at a carbon subsidized price, regardless of whether you provide your signature, you hereby assign and transfer all right, title and interest to carbon offsets arising from its use of UpEnergy and hereby permanently waive any claim or right to such off sets", thus the VVB confirmed that the ownership lies with UpEnergy. During the physical site visit the end-users confirmed that they received these cards but the same could not be reproduced by all for physical inspection, however the soft copy of the same was shared by the PP. Additional information on gathering and recording this information is now included under Section 6.3 of the joint PD&MR. Verra Response The VVB confirmed that the PP had soft copies of all waivers, however, the originals were not always available to cross-check. The finding is closed.	

5.	Title: Value of parameter μ_y		
	Issue Mean value of parameter μ_y has been determined to be 0.36 but value used in calculation of emission reductions is 0.06. This is not clear. Action Required 1. VVB must clarify why value for parameter μy of 0.06 has been used for emission reduction calculations when mean value determined for this parameter is 0.36. 2. In section 4.1 of joint VVR, VVB states that "*As checked from the monitoring survey results/15/ carried out for the first monitoring period, the end users were using the pre-project*	**Round 1** VVB Response The usage survey for MP 1 has revealed out of 115 project ICS users 19 HH have reported parallel usage of baseline stoves, thus implies 16.5% of the representative population uses both project and baseline technology. The survey also reveals that these 19 HH uses the baseline stove to an extent 36% - meaning out of total cooking events 64% are carried out by project device and rest only 36% is being met by baseline stoves in these 19 HH. μy value represents this 36% dependency on the baseline stove, while extrapolating it to the entire surveyed population the weighted average baseline stoves usage factor is calculated to be	Closed

	devices at around 6.0% of the total cooking events". VVB must clarify, how it has determined the accuracy of value of 6%. VVB must elaborate upon questions asked by PP in the monitoring surveys and through the cross-check performed by the VVB on the sampling procedure. Program Rule(s) *VCS Joint Project Description & Monitoring Report, v4.2, Section 7.5*	6% as shown below, Weight average baseline usage rate = (μy * % of HH parallelly using baseline stove) = (36% x 16.5%) = 6% Verra Response The VVB explained why the parameter μ_y has been calculated as 6%. The finding is closed.	

6.	Title: Additionality		
		Round 1	
	Issue All relevant assumptions such as the financial indicator, input values and discount rate, including sensitivity analysis have not been listed in joint PD&MR. Action Required 1. VVB must ensure that the project description list all financial indicators, input values and discount rate used in investment analysis, including sensitivity analysis in the joint PD&MR, section 3.5. 2. The VVB must ensure that all the additionality demonstration is included in the revised version of the documents, in a way to allow a third person to replicate the calculations. Program Rule(s) *VCS Joint Project Description & Monitoring Report, v4.2, Section 3.5*	VVB Response Section 3.5 of the joint PDMR is now updated by including the description of all the financial indicators and sensitivity analysis. The updated additionality working sheet is shared by the PP post including the sensitivity analysis and the same has been reviewed by the VVB. Verra Response The revised documentation provided some more information on the additionality assessment, however, there is still information missing on the determination of the additionality of the project, given that the project is charging the end user for the cookstove provided. Issue raised: 1.- There is no information on the investment decision date, as required by the CDM Tool 27. 2.- The Joint PD-MR states that the ICS has a cost of 6500 Niara, and that is equivalent to 13.5 USD per unit, however, it is not clear the date of the exchange rate applied, the rate used, and how it is applicable at the time of the investment decision. 3.- The Joint PD-MR states that the PP considered a sale price of 12.6 USD during the first 25,000 ICS and subsequently 5 USD. However, it is not clear how the VVB validated this information.	Closed

		4.- The total investment value is not clear given that the PP states that they may be replacing firewood stoves as well, and there is no information on the price of the firewood stove. 5.- Given the very small difference between the value paid by the PP for the ICS (6500 Niara) and the value that will be charged to the end user (6000 Niara), the VVB is required to provide further assessment of how this project is considered additional and implemented due to the carbon credits. When responding, the VVB is required to consider the effect of wholesale purchasers on the final price. 6.- The VVB must ensure that all requirements of the CDM Tool 27 are correctly applied in the NPV calculation. 7.- There is no VVB assessment of all documents used to check the values applied in the investment analysis, including those of the O&M costs. Further, the VVB did not provide its expert opinion on the values used and compare the costs with other sources and literature review. 8.- There is no VVB assessment of the sensitivity analysis performed by the PP as a response to the present PRR, as no adjustments have been made to the revised validation and verification report. 9.- There is no VVB assessment of the discount rate and inflation rate applied by the PP in the investment analysis. 10.- The NPV calculation was not provided. 11. In the sensitivity analysis, the VVB did not compare the values used in the investment analysis with those actually incurred, as the project is already implemented. <u>Action required:</u> The VVB is required to address all the findings raised above, and to provide an independent third-party assessment of the investment analysis performed to demonstrate the additionality of the project, including reference to external third-party documents. The finding remains open. <u>VVB Response</u> 1. PP has included the investment decision date in the latest version of Joint	

		PD-MR and also has shared the necessary proof for investment decision date. 2. PP has worked out the financial model in USD alone as mentioned in the Joint PD-MR and considered manufacturing cost of 13.5 USD/ICS equivalent to 5600 Naira / ICS (415 Naira/USD during investment decision period Apr 2022) based on their own manufacturing experiences and initial estimates sought from the local suppliers. The VVB has cross checked the cost of ICS unit procured through purchase invoices from suppliers and the same is stated in the Joint FVR as 6500 Naira. The VVB has noted this increase in the cost per unit due to variable market conditions. 3. The FVR states that the VVB has verified the sale price of 12.6 USD from the sale receipts and through physical interviews for the initial ICS distributed under the grouped project activity and thus verified the Revenue @ 12.6 USD per unit. The VVB has received the declaration from the PP that that 95% of stoves (after first 25,000 stoves) to be installed under the group project will be sold at a further subsidized rate of up to $5 each and since until the current verification only 1,648 stoves were distributed the VVB has raised a FAR #1 in the Joint Validation & Verification report, for the verifying VVB to ensure the ICS is distributed at a lower price up to 5 USD, which obligates the verifying VVB to confirm the sale price of ICS included under the Grouped project activity. The details of the FAR is given in the Appendix IV of Joint Validation & Verification Report. Furthermore, the VVB to be noted that the even considering the sale price of ICS at 12.6 USD for the entire distribution the NPV works out to be negative and faces investment barrier. 4. PP has revised the design description and removed all of the reference related to firewood in the Joint PD & MR based on the comment from VERRA. Further VVB has checked the additionality analysis and all the costs considered are related to charcoal stoves only. 5. The cost analysis comparison sheet provided by the PP demonstrates that 6500 Naira is only “COGS-Cost of Goods” and does not include the additional marketing, distribution, data and other overhead cost of project implementation. It is important to note that the ICS will be sold at a price	

of 12.6 USD (6000 Naira), only during the pilot phase of the grouped project activity i.e., till 25,000 distributions and rest of the projected 475,000 ICS will be distributed at a further subsidized price of up to 5 USD during the full-scale distribution activity. Further, it was evidenced that even considering the entire ICS distribution at a sale price of 12.6 USD, the NPV of the project activity works out to be negative. due to additional costs involved in making the ICS available to the HHs doorsteps, so the gross margin for the product is negative without carbon finance.

6. VVB confirms that the PP has meet all the requirements of CDM tool 27 to carry out the financial analysis to demonstrate the additionality of the project like applying input values relevant to investment decision time, sensitivity analysis, application of appropriate inflation & discount rates etc.
7. VVB has cross checked all the parameters that are used in the financial analysis through the following sources,

#	Parameter	Source	Cross verified with
1	ICS manufacturing cost	Quotes from suppliers	Supplier Invoices
2	Implementation cost	Project feasibility report*	Financial reports
3	O&M cost	Project feasibility report*	Financial reports
4	ICS distribution cost	Project feasibility report*	Receipts & End User Interviews
5	Inflation rate	International Monetary Fund	International Monetary Fund
6	Discount rate	Company's financial decision	Company's financial decision

		* Vetted by independent financial auditor 8. VVB has included its assessment on the sensitivity analysis performed by the PP in the updated joint FVR. 9. VVB has checked and confirmed that PP has used a discount rate of 20% adopted as per company level benchmark and are in line with the market value and inflation rate is sourced from the reliable source viz., International Monetary Fund (IMF)[5]. 10. The additionality analysis sheet is shared along with PRR-2 responses. 11. VVB has verified the documents like ICS distribution receipts, purchase orders for ICS manufacturing cost and current financial reports for operating cost and found the considerations and assumptions in the additionality analysis are comparable to the actuals. Verra Review: The documents were reviewed to include some of the information required. Issue raised: 1. The VVB states that the exchange rate at the moment of the investment decision (April 2022) was 0.0022 NGN per USD, and that the SmartHome Cookstove had a cost of 6500 Niara. Thus, the cost of the Cookstove in USD is 14.5. However, in June 2022 the exchange rate in Nigeria changed dramatically, and it would result in 7.15 USD per cookstove. However, the change in the exchange rate was not discussed in the additionality assessment, even if only a very small portion of the total investment was done at the time of the investment decision (only 1,648 were distributed from the estimated 500,000). 2. The revised Joint PDMR includes 13,9 million USD for software development and database maintenance, 16,5 million USD for overhead costs and 3,8 million USD for project management. Given	

[5] https://www.imf.org/external/datamapper/PCPIPCH@WEO/OEMDC/ADVEC/WEOWORLD/NGA

		that the O&M costs exceed by far the implementation costs, the VVB shall explain how this is aligned with the usual project costs for cookstove projects. 3. Further, the VVB must provide its expert opinion on the O&M costs included in the Joint PDMR, and and provide a detailed explanation of the assessment performed to cross-check the O&M costs. 4. In order to evaluate the sensitivity analysis, the VVB is required to provide an assessment of the investment and O&M costs considering the change in the exchange rate during June 2022. 5. From the investment analysis, it is not clear if the stove will be distributed at a price fixed in USD or at a price fixed in the local currency, which could have an impact on the additionality of the project. Action required: 1. The VVB is required to address all the findings raised above and to provide an independent third-party assessment of the investment analysis performed to demonstrate the additionality of the project, including reference to external third-party documents. 2. The VVB is required to update the validation and verification report accordingly. The finding remains open. VVB Response 1. The VVB would like to clarify the major input costs (ICS manufacturing, transportation, storage, distribution and overheads (local) costs) are transacted in the local currency i.e., Naira. Since the project revenue is also realised in local currency, therefore PP has made a corollary approach (Additionality Model-Naira v1.0) for evaluating the additionality in the local currency Naira and by eliminating the global cost components mostly denominated in USD. PP has still maintained the financial analysis in terms of USD in the Joint PDMR, since the project feasibility report which played a	

		key role in the project's investment decision had the financials in USD. In line with the comment above the PP has reworked the investment analysis considering FOREX rate at three different scenarios during 1) Aprill 2022 (Investment decision date) 2) June 2023 (FOREX change) 3) January 2024 (Recent time) and the resulting project NPV is negative in all three different FOREX rate scenarios, thus it demonstrates that the change is FOREX having a negligible impact on project NPV analysis and the actualised project cost. The VVB conducted an independent assessment and confirmed the inflationary impact of the FOREX change, thus resulting in increased ICS manufacturing cost (COGS) and local operating costs. This was further confirmed from the latest ICS Purchase Order dated 04 Dec 2023 shared by the PP which reflected a ~15% increase from the earlier invoices. 2. VVB would like to highlight that since this project is one of the very few cookstove projects that shows the greater details of investment analysis in the publicly available project design document, therefore a comparison with other registered project is not deemed appropriate. However, to avoid the uncertainties due to FOREX rates, all the aforementioned input costs have been eliminated in the corollary model Additionality Model-Naira v1.0 and the O&M costs are revised. Thereby demonstrating a negative NPV in both Global & Local scenarios. 3. The major cost components namely ICS Manufacturing, Transport & Storage, Distribution, local overheads etc. used in the analysis have been verified from the project feasibility study and cross checked by VVB with the actual payment invoices and company's recent financial statements, the costs considered are found to be comparable with the financial additionality model. However certain global components like project management, software and data management that are internal and cannot be objectively justified via external / third party evidence, form a significant share of the costs and impact the project finance to a larger extent. As explained in the above response, PD has performed another version of the project's additionality model with local currency, excluding the global costs like project management, software and data	

management to check the impact of these on the project's NPV; as demonstrated in this model, the project's NPV is still negative, making the project financially additional. VVB has duly verified the PD's revised additionality working (Additionality Model-Naira v1.0) and revised the validation report to adapt to the local currency model.

4. As detailed in the previous response, VVB would like to clarify that the ICS manufacturing, transportation, storage, distribution and overheads (local) costs are transacted in the local currency Naira and rest of the global costs such as project management, data management and software development are expensed in USD, thus the exchange rate change has de minimis effect on the manufacturing and local O&M cost. PD has included the revised additionality analysis (Additionality Model-Naira v1.0), which has addressed the concerns on FOREX fluctuations and simplification of O&M cost accounting and proved the project is financially additional. PD has also carried out the sensitivity analysis for the revised additionality working and demonstrated the project NPV with 10% +/- variations of the key financial components. VVB concludes the effect on FOREX rate and O&M cost are no longer impacting the project's additionality analysis.
5. VVB would like to clarify the PP distributes the project ICS at a subsidized price in Naira. PP has maintained the status quo on revenue side by distributing the ICS at the same Naira price levels despite fluctuations in FOREX rate and increased COGS due to local inflation. VVB has duly conducted an independent third-party assessment with team consisting of the financial expert and corroborates the investment analysis performed by PP.

   Further to summarize the investment analysis the unit cost and revenue of project ICS has been worked out based on simple cost analysis as enumerated in the table below,

S No	Component	Value (Naira/Project Stove)
Cost		
1	ICS Manufacturing	6,500
2	Tax @ 7.5%	488

3	Transport & Storage	1,273
4	Distribution	1,409
5	Replacement / failure rate @1%	65
8	Overheads (Local)	1,364
6	Data management *	0
7	Software development*	0
9	Project Management (Global)*	0
10	**Total Unit Cost of Project ICS**	**11,098**
Revenue		
1	Unit price of ICS distribution	6,000
2	Net Revenue	-5,098
NPV		**Negative**

**Global cost components like project management, software and data management that are internal and cannot be objectively justified via external / third party evidence, form a significant share of the costs and impact the project finance to a larger extent. However, it is considered as "Zero" for sake of simplification.*

Verra Response:

The VVB clarified that the project NPV is still negative even without considering the O&M components like project management, software and data management that are internal and cannot be objectively justified via external/third-party evidence.

Further, the VVB raised FAR1 to check the sale price from the highly subsidized batch once the project is further implemented.

The finding is closed and no further action is required.

7	**Further information and assessment on the calculation of fNRB**		
	Issue The project description does not include the details related to the calculation of the fNRB, as required in CDM Tool 30 version 4. Further, as per the information provided in the validation report related to the ex-ante calculation of fNRB it is not clear: (a) If it has been estimated using the most recent historical year for which data is available. (b) How H has been calculated as per Section 3.1 of the TOOL30, v.04.0. (c) How RB has been calculated as per Section 3.2 of the TOOL30, v.04.0. Further, there is no information on: (d) the comparison of the calculated value of fNRB against the values for fNRB reported in relevant scientific literature (including the minimum requirements as per para. 6-a-i of the TOOL30 ver.4) and justify any differences and. Action item 1) The VVB must ensure that the project proponent calculates the fNRB in line with the requirements of TOOL30, v.04.0 and includes all the related information on the project description. 2) The VVB must further elaborate on how it verified that the fNRB has been calculated in line with the TOOL30, v.04.0.	**Round 1** VVB Response The Project description now includes the details related to the calculation of the fNRB under appendix 2. (a) PP has calculated the fNRB using the CDM tool 30 v4 by considering the most recent input values that are available. Further details of the fNRB calculations are elaborated hereunder. (b) The sources for the total consumption of woody biomass (H) are now included under section 3.4.6 of the validation report. **total consumption of woody biomass (H) is determined using:** • Woody biomass for Energy Applications in domestic and industrial segments for the 2020 vintage from "Energy Statistics Database" from United Nation's Database • Commercial woody biomass consumption for non-energy applications (e.g., construction, furniture) i.e., Roundwood consumption from FAO Statistics Food & Agriculture Organization of United Nations for the latest available vintage 2019 (c) The details of the calculation of the Quantity of renewable biomass available in the applicable area (RB) is now included under section 3.4.6 of the validation report and appendix 2 of the joint PD&MR. **Quantity of renewable biomass** available in the applicable area **(RB)** has been calculated • Mean Annual Increment (MAI) of woody biomass growth Woody biomass values for forest and other areas are sourced from IPCC report i.e., 2019 Refinement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories • The land area details of forests and other lands with vegetation are sourced from FAO from Food & Agriculture Organization of United Nations for the latest available	Closed

	Program rule(s) TOOL30, v.04.0 Background information TOOL30, v.04.0: para. 6-b): ¨*...The project participants shall compare and analyse the calculated values against the values for fNRB reported in relevant scientific literature and justify any differences. This analysis shall be included in the appropriate section of the PDD. The relevant scientific literature should include at least: (i) Bailis, R.; Drigo, R.; Ghilardi, A. & Masera, O. (2015). The carbon footprint of traditional woodfuels. Nature Climate Change, 5(3), pp. 266–272*¨.	vintage 2020. • The information regarding protected forests and forests with long-term management plan are sourced from Global Forest Resources Assessment, 2020, FAO, Nigeria • The "geographically remote area" i.e., forests/other wooded lands that are beyond the average distance travelled to collect fuelwood has been sourced from the peer reviewed literature Maina, Y. B. Umar, N. K. and Egbedimame, A. B. 2020. An Empirical Analysis of the Impact of Household Fuel Wood Consumption on the Environment in Nigeria. Journal of the Environment, Vol. 14, No. 3 September 2020. (d) The comparison of the calculated value of fNRB against the values for fNRB reported in relevant scientific literature is now included under appendix 2 parameter 8 along with the justification. Verra Response The revised documentation included further information on the source of data used to determine the value of fNRB and some explanations on the comparison with other literature review. Issue raised: 1. The explanations provided do not justify the difference between the value of fNRB achieved for the present project of 90%, and the value as estimated in Bailis et all, of 40%. 2. Further, the PP only compared with one other source of literature, however, the methodology requires, at least, the quoted literature. Action required:	

1. The VVB must ensure to provide an assessment on the influence the factors mentioned could have in the value achieved of Fraction of non-renewable biomass, in order to explain a 50% difference in the values.
2. The VVB must ensure to provide further analysis with other relevant scientific literature.
3. The VVB must provide its expert opinion on the value achieved by the project.

The finding remains open.

VVB Response:

1. At the outset VVB would like to confirm that PP has only referred the literature quoted in the CDM tool 30 v4 "Bailis, R.; Drigo, R.; Ghilardi, A. & Masera, O. (2015). The carbon footprint of traditional woodfuels. Nature Climate Change, 5(3), pp. 266–272." which estimates the fNRB value for Nigeria as 49.5% by averaging out values of Low / high plantation productivity variants. (Please refer page no 72[6]). Further, as mentioned in the joint PD-MR the relevant scientific literature quoted as per CDM tool is dated back to 2015 and the data points used in this research work is further older as 2009 (PI refer pg no 34, 41 & 91). The table given below enumerates factual comparisons between the reference year of the literature & recent period i.e., 2009 vis-à-vis 2020,

#	Parameter	2009	2020	Remarks

[6] https://www.researchgate.net/publication/271503594_The_Carbon_Footprint_of_Traditional_Woodfuels

1	Population[7]	156,595,758	208,327,405	33% increase
2	Fuel wood demand[8]	210,432 k m^3	260,913 k m^3	24% increase
3	Total Forest Area[9]	23,423.28 kha	21,626.95 kha	7.6% decrease

On taking the above factors into considerations, which shall eventually lead to increase in the non-renewability fraction of biomass in Nigeria, thus it is evident that the quoted literature in CDM tool is less relevant to the current scenario and hence it is not deemed to be fair / rational comparison.

2. VVB would like to mention that the literature quoted in the CDM tool 30 is the only available literature on the estimation of fNRB value for Nigeria. VVB would also like to quote the fNRB values used in the other cookstove projects based on their own analysis using CDM tool 30 for Nigeria are as given below,

#	Project Reference	Carbon Registry	fNRB Vlaues
1	GS7312	Gold Standard	93%

[7] https://data.worldbank.org/indicator/SP.POP.TOTL?locations=NG

[8] https://data.un.org/Data.aspx?d=EDATA&f=cmID%3AFW

[9] https://www.fao.org/faostat/en/#compare

			2	GS11260	Gold Standard	96%
			3	VCS 4225	VERRA	91%

3. VVB has conclude based on the above facts and comparison of fNRB value from the other projects, the fNRB value calculated by PP using CDM tool 30 seems to be valid and reasonable.

Verra Response

The VVB provided reasons on why the parameter fNRB is much higher than the one provided by Bailis et al.

The finding is closed.