

Validation report form for renewal of crediting period for Gold Standard project activities																
BASIC INFORMATION																
Title of the project activity	Accion Fraterna Biogas CDM project for rural communities in Anantapur, Andhra Pradesh															
GS Reference Number	GS980															
Scale of the project activity	Small Scale															
Number and duration of the next crediting period	Number of crediting period: 2 Duration of Crediting period: 31/05/2021 to 30/05/2028															
Version number of the validation report	2															
Completion date of the validation report	20/12/2021															
Version number of GS PDD to which this report applies	08															
Project participants	ACCION FRATERNA ECOLOGY CENTRE															
Host Party	India															
Certification Pathway	Impact statements and Products															
Activity Requirements applied	GS4GG															
Product Requirement	GS CER															
Applied Methodology	AMS.I.E. Switch from non-renewable biomass for thermal applications by the user, Version 11															
Sectoral scopes	Sectoral Scope 1: Energy industries (renewable-/non-renewable sources) Sectoral Scope 13: Waste handling and disposal															
Estimated amount of SDG Impact	<table border="1"> <thead> <tr> <th>SDGs</th> <th>Estimated SDG Impact</th> </tr> </thead> <tbody> <tr> <td>SDG 13</td> <td>29,784 tCO₂/annum</td> </tr> <tr> <td>SDG 3</td> <td>100% reduction in indoor air pollution. 100% of surveyed households report reduction in health problems</td> </tr> <tr> <td>SDG5</td> <td>50% reduction in time in fuel wood collection and cooking</td> </tr> <tr> <td>SDG 7</td> <td>i. 15,000 number of biogas units constructed ii. 100% number of units operational</td> </tr> <tr> <td>SDG 8</td> <td>At least 10 jobs created due to the project activity of which at least 50% are women</td> </tr> <tr> <td>SDG 17</td> <td>At least 50% carbon revenue for construction and maintenance of units</td> </tr> </tbody> </table>		SDGs	Estimated SDG Impact	SDG 13	29,784 tCO ₂ /annum	SDG 3	100% reduction in indoor air pollution. 100% of surveyed households report reduction in health problems	SDG5	50% reduction in time in fuel wood collection and cooking	SDG 7	i. 15,000 number of biogas units constructed ii. 100% number of units operational	SDG 8	At least 10 jobs created due to the project activity of which at least 50% are women	SDG 17	At least 50% carbon revenue for construction and maintenance of units
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Name of the VVB	4K Earth Science Private Limited															
Name, position and signature of the approver of the validation report	S. Jagajothi  Director															

SECTION A. Executive summary

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4K Earth Science Private Limited has been contracted by 'ACCION FRATERNA ECOLOGY CENTRE' to perform a validation of the registered GS CDM Project 'Accion Fraterna Biogas CDM project for rural communities in Anantapur, Andhra Pradesh' (UNFCCC Ref #3779 and GS Ref# GS980) in India for renewal of crediting period.

The scope of the validation is defined as an independent and objective review of the revised GS Project Design Document, project's baseline study and monitoring plan and other relevant documents. The information in these documents is reviewed against the Gold standard Principles and Requirements (Version 1.2), CDM validation and verification standard for project activities (version 02), CDM project cycle procedure for project activities (version 02) and CDM project standard for project activities (version 02), Kyoto Protocol requirements and UNFCCC rules.

The report is based on the assessment of the Project design document (PDD) undertaken through stakeholder consultations, application of standard auditing techniques including but not limited to desk review, follow up actions (e.g., on site visit, electronic (telephone or e-mail) interviews) and also the review of the applicable approved methodological and relevant tools, guidance and CDM decisions.

The project activity is the installation of 15,000 biogas plants (digesters) of 2 m³ capacity each for single households in all the mandals of Anantapur District in Andhra Pradesh State, India. The biogas units are fed by cattle dung generated from the households. The biogas stoves replaces the traditional fire wood stoves used for cooking and heating purposes. The project was registered in UNFCCC on 20/01/2012 with 1st crediting period 31/05/2014 – 30/05/2021. The project is currently applying renewal for second crediting period ie, 31/05/2021 to 30/05/2028.

The project correctly applies latest CDM methodology: AMS.I.E. Switch from non-renewable biomass for thermal applications by the user, Version 11. The emission reductions attributable to the project are hence additional to any that would occur in the absence of the project activity.

The estimated SDG impacts from the project are as follows:

SDGs	Estimated SDG Impact
SDG 13	29,784t CO ₂ /annum
SDG 3	100% reduction in indoor air pollution. 100% of surveyed households report reduction in health problems
SDG5	50% reduction in time in fuel wood collection and cooking
SDG 7	i. 15,000 number of biogas units constructed ii. 100% number of units operational
SDG 8	At least 10 jobs created due to the project activity of which at least 50% are women
SDG 17	At least 50% carbon revenue for construction and maintenance of units

The SDG estimation has been checked and it is deemed likely that the stated amount is achievable given the underlying assumptions do not change

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

☒ The project will be recommended to the Gold Standard with a request for renewal of crediting period.

☐ The project is not recommended for renewal of crediting period

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 VVB or outsourced entity)	Involvement in			
						Desk/document review	On-site inspection	Interview(s)	Validation findings
1.	Team Leader/ Technical Expert (1.1 & 13.2)	IR	Narendra Kumar	R	Central Office	x		x	x
2	Local Expert	IR	Anand	S R	Central Office			x	x

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

No.	Role	Type of resource	Last name	First name	Affiliation (e.g. name of central or other office of VVB or outsourced entity)
1.	Technical reviewer	IR	Puratchikkanal	Ma Paa	Central office
2	Approver	IR	Jagajothi	S	Central Office

SECTION C. Means of validation

C.1. Desk/document review

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The report is based on the assessment of the project design document undertaken through stakeholder consultations, application of standard auditing techniques including but not limited to desk review, follow up actions (e.g., on site visit, electronic (telephone or e-mail) interviews) and also the review of the applicable approved methodological and relevant tools, guidance and CDM decisions.

All the documents used for arriving validation conclusion are listed in Appendix 03 and referenced accordingly in validation report

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 and other relevant travel restrictions and guidance (for example, a requirement to self-isolate upon return from specific countries), A DOE may postpone site visits for onsite inspections required by the “CDM validation and verification standard for project activities (version 02.0) (VVS-PA)”.

If the site visits cannot be postponed, a proper justification should be provided by the DOE why the site visits cannot be postponed, including the demonstration of a significant impact of delaying the site visits on the DOE, or project participants or coordinating/ managing entity (e.g. commitment/ timeline as per the validation or verification contract, CER delivery commitment by project participants) reliance on applicable force majeure provisions in the validation or verification contracts, if needed.

The project is a Gold Standard CDM project and as per the Gold standard requirements, the RCP requests shall be submitted before the end of the previous crediting period. Hence, for this project activity, the DOE has committed to complete the CDM and Gold standard validation before end of crediting period ie, 30th May 2021. With the current COVID cases rate in India, the site visit is not expected to happen in near future. Hence the DOE has skipped the on-site visit. Moreover the estimated emission reduction for the project activity is less than 100,000 t CO₂ eq and hence as per the para 31 of CDM validation and Verification standard for PA, v2, the site visit is optional for this project activity. However para 31 & 32 requirements, the DOE may use other standard auditing techniques for validation or verification as referred in sections 7.1.3.1 of the VVS for PA.

Verification team has used the following alternative means for its assessment and to justify that they are sufficient for the purpose of verification. Along with desk review, audit team has conducted remote audit interview (Zoom interview) as follows:

- A complete desk review of the revised PDD, as well as all applicable country legal requirement and supportive evidences have been checked by the verification team.
- Verification team has performed Zoom interview with PP in order to check implementation, validity of current or updated baseline, application of latest methodology, revised monitoring requirements etc.
- Verification team has also performed telephonic interview with end-user to crosscheck the implementation details and other monitoring details.
- Cross checks between information provided by interviewed personnel (i.e. by checking sources) to ensure that no relevant information has been omitted.
- Cross-check evaluation, for information received from interviews, under the scope of all information and references provided in PDD and supporting documents.

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

Duration of on-site inspection: DD/MM/YYYY to DD/MM/YYYY				
No.	Activity performed on-site	Site location	Date	Team member
1.	NA			

C.3. Interviews

No.	Interviewee			Date	Subject	Team member
	Last name	First name	Affiliation			
1.	-	Waheed	Accion Fraterna	19/05/2021	- Roles and responsibilities - End user agreement - Technical details - Revised baseline - Revised monitoring requirement - Stakeholder consultation process	Narendra Kumar R Anand SR
2	-	Nagesh	Accion Fraterna	19/05/2021		
3	-	Anji	Accion Fraterna	19/05/2021		
4	Padmanab	Sudha	FCN	19/05/2021	- Updated Baseline	Narendra

	ha				- assessment - Issues in the PDD - Application of latest methodology - Revised ER estimation	Kumar R Anand SR
5	-	Jayamma	End user-2277, Marthadu	19/05/2021	- Implementation details - Operational status - CER rights - Grievances - SDG benefits	Narendra Kumar R Anand SR
6	K	Vijaya Kumari	End user-1668, Velpumadugu	19/05/2021		
7	K	Anuradha	End user-2315, Duggummarri	19/05/2021		
8	T	Lakshmidevi	End user-2320, Duggummarri	19/05/2021		
9	B	Pullamma	End user-861, Boyakottala	19/05/2021		
10	G	Nagalakshmi	End user-651, Neelampalli	19/05/2021		
11	D	Srilekha	End user-2398, Venkatapuramu	19/05/2021		
12	M	Suvarna	End user-2528, Kanaganepalli	19/05/2021		
13	M	Hemalatha	End user-2260, Chennampalli	19/05/2021		

During the remote audit, the validation team interviewed the biogas users randomly. Apart from verification installation details from project database, the other questions asked by the validation team and the summary of reply received from the stakeholders are given below:

Questions asked by Validation team	Summary of Response by Stakeholders/end users
Is the biogas system is in operating condition now?	All the households visited reported operational condition.
Is there any repairs done for the biogas system?	Few households confirmed that their biogas systems are repaired in the past.
Have you signed end user agreement with Accion Fraterna though which the GS CER rights are transferred to Accion Fraterna?	All households confirmed that they have signed end user agreement with Accion Fraterna. This was intimated to beneficiary at the time of construction of digester.
If any issue with the biogas system or any grievances, to whom you will report to resolve the issue/ grievances?	All households confirmed that either they report to respective village volunteers or case worker of that area. They also confirmed they have the mobile number of the volunteer/case worker.
How useful is the biogas system?	All households confirmed cooking in the biogas smokeless compared to old traditional wood stove. They also confirmed cooking in the biogas system is safer and operation of the system is easy. The households also mentioned that considerable amount of time saved due to the use of biogas system from fuel wood collection, cooking and cleaning utensils.
Do you use any other fuel other than biogas?	All households confirmed that only biogas system is used primarily for cooking. But, few households reported they use LPG which they got through Government scheme, but rarely as the only first cylinder is given free of cost. Few households also reported they use fuel wood some times when the cook outdoors or when the biogas generation is not adequate.
You have any concerns with the biogas	No households reported any concerns over the project.

system/project?	
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C.4. Sampling approach

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PP has conducted Kitchen test on sample basis in the non-project households to determine the updated baseline fuel wood consumption.

The Kitchen test results have been conducted in 141 non-project households. The Kitchen Tests are conducted for 3 continuous days in each household. Validation team checked the appropriateness of test results using the following steps:

- The Method of Kitchen test followed by PP is checked and found to be in accordance with established international/national procedures.
- The Kitchen test results have been crosschecked with the respective Kitchen test monitoring sheet and found no error
- The method of Kitchen test is simple and the PP's staffs are found to be capable of doing the test.

Hence, the validation team accepts the Kitchen test result.

No sampling approach is followed in the validation.

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

Area of validation findings	No. of CL	No. of CAR	No. of FAR
D.1 Compliance with PDD form	-	1	-
D.2 Eligibility of the project under Gold Standard	-	1	-
D.3 Application and selection of methodologies and standardized baselines	-	1	-
D.4 Validity of original baseline or its update	1	1	-
D.5 Contribution to SDGs	-	-	-
D.6 Assessment of SDG outcomes	-	-	-
D.7 Validity of monitoring plan	-	1	-
D.8 Crediting period	-	-	-
D.9 Gold Standard Requirement on Design Certification Renewal	-	-	-
D.10 Assessment of safeguarding principles	-	-	-
D.11 Stakeholder Consultation	-	-	-
D.12 Post-registration changes	-	-	-
Others (please specify)	-	-	-
Total	1	5	-

SECTION D. Validation findings

D.1. Compliance with PDD form

Means of validation	Validation team checked the GS4GG Project Design Document with latest version of 'Gold Standard for the Global Goals Key Project Information & Project Design Document (PDD)' in the GS website (ie, version 1.2. PP used the same latest version for preparation of PDD.
Findings	CAR-01 is raised and closed satisfactorily.
Conclusion	PP prepared the revised PDD based on the version 1.2 of the template. Validation team confirms that final PDD is completed using the valid version of the applicable GS4GG PDD form at the time of submission.

D.2. Eligibility of the project under Gold Standard

Means of validation	(a) Type of project The project is a generation of thermal energy for cooking through use of biogas
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	produced though cattle dung which is a renewable energy. Hence, the project is a renewable energy project which is eligible under Gold Standard. <u>(b) Location of Project</u> The project is located in India. As per the GS4GG requirements, the Projects shall be located in any part of the world and hence the location of the project is found to be okay. Also India is non-annex I country and hence eligible for Gold Standard CDM requirement. <u>(c) Project Area, Project Boundary and Scale:</u> The project area and the project boundary are defined in the PDD. The scale of the project is small scale. As verified from the calculation in the Section A.5, the thermal energy generation from project is 27 MWth which is less than small limit of 45 MWth and hence the scale of the project is mentioned in the PDD is correct. The project is a Gold Standard CDM project and not registered under any other voluntary or compliance standards programme. This is confirmed by PP. Also the validation team checked other voluntary market registry (such as VERRA) and found that the project is not registered under any other mechanism and hence there won't be any double counting issue in this project. The PP has signed an end user agreement with all end users. The end user agreements/20/ are verified and found that the emission reductions rights of the biogas stoves are transferred to PP. PP also confirmed that the each bio-digesters are given a unique ID which is written on the digester units which makes in unique to this project activity. The same is confirmed by verification of the project database and site visit observation. Hence, validation team conclude that there is no chance of double counting of the project credits. <u>(d) Host Country Requirements:</u> The project is installation and operation of 2 m³ biogas units for cooking needs of rural households and it is in compliance with all applicable Host Country's legal, environmental, ecological and social regulations. <u>(e) Contact Details</u> The PP has provided the following details in the PDD (i) name of all participates, (ii) contact details, (iii) the legal registration details and (iv) documentation by the governing jurisdiction. <u>(f) Legal Ownership:</u> Validation team checked sample end user agreement and confirmed that the ownership of GS CER are transferred to the PP. The same is also confirmed during interview with end users. Hence, the emission reduction rights are with 'Accion Fraterna'. <u>(g) Other Rights:</u> There are no other rights to the project activity. <u>(h) Official Development Assistance (ODA) Declaration</u> PP has provided declaration/32/ confirming that the there is no ODA funding involved in this project activity. <u>Ongoing Financial Need</u> Since this is renewal of crediting period, PP has justified the Ongoing Financial Need of the project. As verified from the ERPA, the project was implemented with upfront carbon revenues to construct, monitor, verify, and repair and maintenance of the units, and transaction costs for certification by UNFCCC and GS4GG. The project is still under ERPA period and hence PP is committed to supply GS VER during the 2nd crediting period also. Since the project does not have any other source of income, even after the ERPA period the carbon revenue is necessary in monitoring, repair and maintenance of biogas units. Depending on the revenue and
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	expenses PP also committed a percent of carbon revenue to share with women using biogas units for their environmental services to address climate change. Hence, the carbon finance is essential for this project.
Findings	CAR-05 is raised and closed satisfactorily
Conclusion	PP has justified the eligibility of the project as per the Gold Standard General eligibility requirements. Based on the document review and interview with PP, the validation team confirms that the project is in compliance with the Section 3 requirements of GS4GG Principles Requirements, v1.2 /33/ The PP has provided qualitative narrative that demonstrates how the finance derived Gold Standard Certification is material to the ongoing sustainability of the Project. As per the PP the finance derived Gold Standard Certification contributes are being used to sustain and enhance the project. Validation team checked all relevant documents and interviewed with the PP during site visit and found that the details provided under the ongoing financial need (OFN) are correct.

D.3. Application and selection of methodologies and standardized baselines

Means of validation	For the 1st crediting period, the project applied the following methodology - AMS-I.E. ver. 4 - Switch from non-renewable biomass for thermal applications by the user During this renewal of the crediting period, the latest version of AMS. I.E is used: - AMS-I.E. ver. 11 - Switch from non-renewable biomass for thermal applications by the user The assessment team has validated the documentation referred to in the revised PDD for renewable of crediting period and verified the documentation content for verifying the justification of the applicability of the methodology AMS I.E Version 11/5/ and confirmed that the documentation referred to in the PDD is correctly quoted and interpreted. The applicability of the methodology AMS I.E, version 11 is assessed as below: - The project activity is installation of 2 m³ biogas units in the households which generates thermal energy for cooking and hence replaces the non-renewable biomass which otherwise would have used for the cooking needs in the households. Hence the project applies the technology that displaces use of non-renewable biomass by renewable energy. - As verified from the National Sample survey Report, Government of India, 1983, in Andhra Pradesh, 92.01% of the households were using firewood or non-renewable biomass for cooking. Based on the published literature, official reports and statistics, PP has justified the non-renewable biomass has been used in the project region since 31 December 1989. - PP has allotted unique ID number for each biogas unit. The unique ID number is written on each bio-digester on the unit to distinguish it as part of this project activity. The same is checked during the site visit. This will avoid double counting of emission reductions. Also each of the end user's name and the location i.e. District, Mandal, village in which it is constructed along with the Unique ID are recorded in the project database which will be provided in the ER sheet. PP has signed end user agreement with all the biogas users through which end user accepts transfers of the emission reductions generated from the project activity to the PP, Accion Fraterna and is not transferable to any other entity. Hence, the double counting of emission reduction between end users, distributors and producers of stoves etc is avoided. The assessment team also checked the end user agreements and found to be valid. The same has been explained in the revised CDM-PDD.
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Findings	CAR-02 is raised and closed satisfactorily
Conclusion	The project fulfils all relevant criteria of the applied methodology “AMS-I.E.: Switch from non-renewable biomass for thermal applications by the user” - Version 11. Hence use of the selected methodology is appropriate for this project activity.

D.4. Validity of original baseline or its update

Means of validation	Validation team checked the registered PDD (applicable for 1st CP) and the revised PDD submitted for the validity of original baseline or its update. Validity of the baseline has been assessed as per the Methodological Tool “Assessment of the validity of the original/current baseline and update of the baseline at the renewal of the crediting period” Version 03.0.1/13/ Step 1: Assess the validity of the current baseline for the next crediting period The CDM Project Standard for PA, version 2 requires assessing the impact of new relevant national and/or sectoral policies and circumstances on the baseline. The validity of the current baseline is assessed in the following sub-steps: Step 1.1: Assess compliance of the current baseline with relevant mandatory national and/or sectoral policies The baseline of the project activity is continued use of the fuel wood for cooking in traditional cook stove that were used before the implementation of the biogas system. There are no relevant national and/or sectoral policies and circumstances ever since the project was registered that have an impact on the baseline. No national and sectoral policies that mandate the PP to invest in the project or prevent village households to use traditional cook stove and fuel wood use. Thus, the baseline identified during the validation is still compliance with the relevant mandatory national and/or sectoral policies Step 1.2: Assess the impact of circumstances The baseline scenario identified during the validation of the project activity was generation of thermal energy for cooking in the households from the fuel wood, of which a large part of it was non-renewable biomass. So, in the absence of the project activity, the project households would have continued using the fuel wood for their cooking. The project is completely a voluntary action by the PP. Hence, without the project, the end-users would have continued to use non-renewable biogas in traditional cook stove for cooking. There is no circumstances that affect rural households prevent from fuel wood use for cooking in the traditional cook stove. Since, there is no change in the circumstance and hence the circumstance will not have any impact on the current baseline emission. Step 1.3: Assess whether the continuation of the use of current baseline equipment(s) or an investment is the most likely scenario for the crediting period for which renewal is requested In the absence of the project activity, the baseline scenario in the project boundary is the use of non-renewable biomass for cooking and heating water on traditional cook stoves with low efficiencies. The traditional cook stoves are mostly three stone cook stove or mud stove which are made locally by the households itself and does not involve any cost for purchase of new stoves or repair. No investment would be required for continuation of baseline equipments even now. Even in the present scenario, fuel wood is the common fuel used for cooking & water heating in the Anantapur district. In the project area, PP has also conducted a survey in non-project households during September 2020. As per the survey results/18/, all the rural households in the project area predominantly uses fuel wood for cooking &
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water heating in the traditional wood stove (without chimney or grate). As per National Sample Survey-76th Round report/27/¹, about 44.5% households in India and 18.4% of rural households in Andhra Pradesh still use only fire wood for cooking. Based on a national family health survey for Anantapur District, 2015-16, which is the project region, households using clean fuel for cooking accounts for only 55.9%, thus making 44.1% of households in rural areas still using solid fuels for cooking. Though LPG is promoted by the government through the Deepam Scheme, easy access to firewood without additional costs significantly contributes to continued use of firewood for cooking. This shows that though LPG has been provided with subsidy to the rural communities, the refill is very expensive and rural households are still using traditional stove for cooking².

Hence, during the 2nd crediting period also, the baseline traditional cook stoves and use of fuel wood for cooking would have continued in the absence of the project activity

Step 1.4: Assessment of the validity of the data and parameters

As per para 404 of CDM Validation and Verification standard for PA(version 2), validity of the original baseline or its update is assessed as below:

a) As per the PDD, the following are the baseline parameters that are fixed ex-ante:

- $BC_{BL,HH,y}$ = Quantity of woody biomass that is substituted or displaced in year y (tonnes)
- $f_{NRB,y}$ = Fraction of woody biomass used in the absence of the project activity in year y that can be established as non-renewable biomass (fraction or %)
- $NCV_{biomass}$ = Net calorific value of the non-renewable woody biomass that is substituted
- $EF_{projected_fossil}$ = Emission factor of fossil fuels projected to substitute non-renewable woody biomass by similar consumers (tCO_{2e}/TJ)..

The assessment of the validity of the parameters are provided below:

Ex-ante Parameters	Value for the 1 st Crediting period	Validity for 2 nd Crediting period	Assessment
$BC_{BL,HH,y}$	3.57 tonnes/year/family	Not Valid	For the previous crediting period, $BC_{BL,HH,y}$ (depicted as By in previous PDD) s estimated based on sample survey conducted at the time of validation. Since, this is an old data, the value may not be applicable for the 2 nd crediting period.
$f_{NRB,y}$	0.91	Not valid	For the previous crediting period the $f_{NRB,y}$ was calculated based on the report "Forest Survey of India, 2011, Ministry of Environment and

¹ http://www.mospi.gov.in/sites/default/files/publication_reports/Report_584_final_0.pdf

² <https://energy.economictimes.indiatimes.com/news/oil-and-gas/indias-ujjwala-scheme-provided-lpg-access-but-failed-to-promote-its-use-study/73580017>

				Forests, Government of India. Since, the latest data is now available and also the applied methodology requires $f_{NRB,y}$ to be calculated as per the 'Tool 30: Calculation of the fraction of non-renewable biomass'/16/, the old data estimated for the previous crediting period is no more valid.
	$NCV_{biomass}$	0.015 TJ/tonne	Valid	As per latest version of applied methodology (AMS I.E, version 11), the NCV of biomass is same. However, the value is provided with four decimal accuracy ie, 0.0156 TJ/tonne
	$EF_{projected_fossil}$	81.6 tCO ₂ /TJ	Not Valid	As per the latest version of AMS.I.E methodology, the default emission factor of projected fuel is changed to 64.4 tCO ₂ /TJ for the project region (South Asia). Hence, the emission factor of 81.6 tCO ₂ /TJ is no more valid.
Step 2: Update the current baseline and the data and parameters As determined in step 1.4 above, the flowing fixed parameters needs to be updated: $BC_{BL,HH,y}$ = Average annual consumption of woody biomass per household before the start of the project activity $f_{NRB,y}$ = Fraction of woody biomass used in the absence of the project activity in year y that can be established as non-renewable biomass (f_{NRB}) $EF_{projected_fossil}$ = Emission factor for the substitution of non-renewable woody biomass by similar consumers. <u>$BC_{BL,HH,y}$</u> To check the updated $BC_{BL,HH,y}$ value, PP has conducted the Kitchen test in the non-project households in the project area. Prior to kitchen test, PP has conducted pilot kitchen test in 10 non-project households. Based on the mean (2.01 kg/capita/day) and standard deviation (0.71 kg/capita/day) arrived from the pilot study, the sample size is determined based on the 90/10 confidence/precision level using the below formula: $n = \frac{1.645^2 V}{0.1^2}; \text{ where } V = \left(\frac{SD}{mean} \right)^2$ The sample size at 90/10 confidence/precision level and @80% response rate for infinite sample population it is calculated to be 42 households. However, to get the more accurate results, PP has conducted Kitchen test in 141 non-project households. The Kitchen Tests are conducted for 3 continuous days in each sample household. Average fuel wood consumption for each family is determined from Kitchen Test and per capita fuel wood consumption for each household is estimated based on the respective family size. As per the survey				

result, average per capita fuel wood consumption is 1.93 kg/capita/day and average household size is 4.77.

Also from the survey results, it is found that the precision level achieved in the survey for per capita fuel wood consumption is 4.59% and precision level achieved for family size is 4.01% which are within the required precision level ie,10%. Hence, the validation team finds the sample size considered for the kitchen test is adequate.

PP determined household average the fuel wood consumption using the per capita fuel wood consumption determined through sample survey and the actual household size of the project households as per the district statistics for Anantapur, 2016³, (ie, 4) which more conservative compared the household size determined through sample survey. Hence, the average fuel wood consumption per household per year is estimated to be 2.82 tonnes/year/household. This is found to be much lesser than the fuel wood consumption fixed during the first crediting period. Validation team checked the appropriateness of test results using the following steps:

- The Method of Kitchen test followed by PP is checked and found to be in accordance with established procedures in the host country.
- The Kitchen test results have been crosschecked with the respective Kitchen test monitoring sheet and found no error
- The method of Kitchen test is simple and the PP's staffs are found to be capable of doing the test.

Hence, the validation team accepts the $f_{NRB,y}$ value determined through Kitchen test.

f_{NRB}

In the updated PDD, the $f_{NRB,y}$ is calculated based on the data provided in the FSI report 2019/22/ as per the procedure given in the 'Tool 30: Calculation of the fraction of non-renewable biomass', version 3. The assessment of the same is provided below:

The f_{NRB} is calculated using the below formula

$$f_{NRB} = \frac{NRB}{NRB + RB}$$

Where

f_{NRB} = Fraction of non-renewable biomass in the country/region or project area

NRB = Quantity of non-renewable biomass (t/yr) in the country/region or project area

RB = Quantity of renewable biomass in the country/region or project area

NRB is calculated as below:

$$NRB = H - RB$$

Where

H - Total annual consumption of wood in the absence of the project activity in the country/region/project area (t/year)

H is calculated as below:

³ Handbook of Statistics, Anantapur District, 2016. Page 12.

<https://cdn.s3waas.gov.in/s333e8075e9970de0cfea955afd4644bb2/uploads/2019/07/2019071836.pdf>

$$H = HW_{\text{region}} \times N_{\text{region}} + TI_{\text{region}}$$

- HW_{region} - Average household wood fuel consumption, including fuelwood and charcoal in the country or region (t/yr/household)
- N_{region} - Number of households consuming wood fuel for thermal applications within the country/region (households)
- TI_{region} - Non-domestic woody biomass consumption for energy applications (e.g. commercial, industrial or institutional uses of wood in ovens, boilers etc.) and all woody biomass consumption for non-energy applications (e.g. construction, furniture) that are extracted from forests or land areas in the country/region for which the estimate of fNRB is to be made (t/yr)

RB is calculated as below:

$$RB = \sum (MAI_{\text{forest},i} \times (F_{\text{forest},i} - P_{\text{forest}})) + \sum (MAI_{\text{other},i} \times (F_{\text{other},i} - P_{\text{other}}))$$

- $MAI_{\text{forest},i}$ - Mean Annual Increment of woody biomass growth per hectare in subcategory i of forest areas (t/ha/yr)
- $MAI_{\text{other},i}$ - Mean Annual Increment of woody biomass growth per hectare in subcategory i of other wooded land areas (t/ha/yr)
- $F_{\text{forest},i}$ - Extent of forest in sub-category i (ha)
- $F_{\text{other},i}$ - Extent of other wooded land in sub-category i (ha)
- P_{forest} - Extent of non-accessible area (e.g. protected area where extraction of wood is prohibited, geographically remote area) within forest areas (ha)
- P_{other} - Extent of non-accessible area (e.g. protected area where extraction of wood is prohibited, geographically remote area) within other wooded land areas (ha)
- i - Sub-category i of forest areas and other wooded land areas

Determination of H

Parameter	Value	Assessment
HW	2.82 t/family/year	As per Kitchen performance test/11/ conducted by PP in the project region, the per capita fuel wood consumption is 2.82 t/family/ yr. Refer section D.3 for detailed assessment. Hence the value considered by PP is appropriate.
N	9,222,686	Number of households consuming wood fuel for thermal applications within the selected region (ie, Andhra Pradesh + Telangana) is calculated based on the number of population in this region, the average family size and percentage of households using fuel wood for cooking. <u>Population:</u> 91,355,932 is the total population of Andhra Pradesh & Telangana and is taken as per the Aadhar statistics/48/ as on 2020/2021. This is verified from the https://www.indiagrowing.com/. Out of 91,355,932 population, 60,761,631 is the rural population and remaining 30,594,301 is the urban population which is calculated based on the share of rural & urban population as per Census 2011 data. The data & calculation is verified and found to be correct.

		<u>Family size:</u> As the fuel wood consumption (HW_{region}) was estimated based on the family size of 4, the same is taken here. This is found to be appropriate and in line the official statistics of Andhra Pradesh ⁴ and Telangana⁵. <u>Percentage of HH using fuel wood for cooking:</u> As per National Family Health Survey (NFHS)/52/, average of 82.55% family from Andhra Pradesh & Telangana have LPG connections out of which 50% households uses LPG cooking. So effectively 58.37% of rural population still use fuel wood for cooking. From the NFHS survey, it is found that 96.05% of urban population uses LPG for cooking. Hence, effectively 3.95% of urban population still use fuel wood for cooking. The details are verified from National Family Health Survey (NFHS) report and Kumar et al., 2020 report. From the above data, PP calculated the N_{region} as 9,222,686. The calculation is checked and found to be correct.
CE	0	Data for commercial woody biomass consumption for energy applications is not available. Hence, PP consider the same as 0 as conservative option. This is found to be acceptable as it is conservative.
NE	18,637,088.22 tonne	As per the FAO 2019 report, the total round wood consumption for India during year 2019 is 352,856,168 cum or 278,756,373 (considering 0.79 tonne/m3 density). The FAO 2019 report is verified and found that the value provided for the year 2019 is correct. The round wood consumption for selected region (Andhra Pradesh & Telangana) is apportioned based on the population. The calculation is checked and found to be correct.
H	44,645,062 tonne	Calculated using the below formula $H=HW\times N+CE+NE$ The calculation is verified and found to be correct

Determination of RB

Parameter	Value	Assessment
MAI _{forest}	1.5 t/ha/yr	PP calculated MAI using the three different data explained below: 1. 2019 IPCC guidance and 2019/2011 FSI Report: The average MAI has been calculated from share of forest area for

⁴ <https://des.ap.gov.in/MainPage.do;jsessionid=F04A7521C972392935BCA351244DEF43>

⁵ <https://www.telangana.gov.in/about/state-profile>

			each type of forest and MAI of each type of forest. The Share of forest area has been calculated from the FSI 2011 report. As the share of are of each type of forest is not available in the latest FSI report these details are not available, PP has taken the same from 2011 report. This is verified and found to be correct. The MAI value for each type of forest is taken from IPCC Forestland, 2019 Refinement to the 2006 IPCC Guidelines. The values considered for calculation are cross verified with the IPCC Forestland, 2019 report and found to be correct. The average MAI value calculated to be 1.50 t/ha/yr. <u>2. 1995 data:</u> Calculated based on the growing stock taken from FSI 1995 report/50/ and Annual increment taken from Asia Pacific Forestry Sector Outlook Study-II Country Report/51/. Based on these data, the MAI is calculated to be 0.994 t/ha/yr <u>3. Kaul et al., 2010 report:</u> This is based on the report 'Phytomass carbon pool of trees and forests in India' by Meenakshi Kaul · G. M. J. Mohren · V. K. Dadhwa/23/ (page 9) which is again derived from Singh (2000) and FSI (1995a, b). As per this report the average increment of for the Andhra Pradesh forests is 0.763 t/ha/yr. The value is verified with the report and found to be correct PP compared all the three values calculated above and considered MAI value of 1.5 t/ha/yr for the fNRB calculation as this results to lower fNRB value and hence it is most conservative. This is found to be appropriate.
	F _{forest,i}	6,158,959ha	This is based on Forest Survey of India, 2019 report/22/ (Chapter 11.1, Page 4 for Andhra Pradesh & Chapter 11.26, Page 3. for Telangana). The total forest area in Andhra Pradesh + Telangana is provided in this report. The value is verified with the report and found to be correct
	P _{forest,i}	1,100,800ha	This is based on Forest Survey of India, 2019 report/22/ (Chapter 11.1, Page 3 for Andhra Pradesh & Chapter 11.26, Page 2 for Telangana). The total protected forest area in Andhra Pradesh + Telangana is provided in this report. The value is verified with the report and found to be correct
	MAI _{other,i}	3.02 t/ha/yr	This is calculated based on the FSI, 2020 report "Trees outside forest resources in India", Forest Survey of India, Ministry of Environment, Forest & Climate Change, Government of India. FSI Technical

		Information Series, Volume 2., No.1, 2020⁶. As per this report (page 19), the annual timber yield from Trees outside forest (TOF) of Andhra Pradesh is 3.14 mn cum/year and for Telangana is 2.12 mn cum/year. Considering the biomass density of 0.79 t/m³ and total extent of trees outside forest (TOF) area of 13,75,900 (as per FSI,2019), the MAI_{other} is calculated to be 3.02 t/ha/yr. Since the MAI_{others,i} is taken from government data, the value considered by PP is found to be appropriate.
F _{other,i}	13,75,900 ha	This is based on Forest Survey of India, 2019 report/22/ (Chapter 11.1, Page 3 for Andhra Pradesh & Chapter 11.26, Page 2. For Telangana). The total extent of trees outside forest (TOF) area in Andhra Pradesh + Telangana is provided in this report. The value is verified with the report and found to be correct
P _{other,i}	0 ha	In India, there is no protected area on TOF. Hence, PP considered this as zero. This is also found to be conservative and hence acceptable
RB	11,742,639 t/yr	Calculated as below: $RB = \sum (MAI_{forest,i} \times (F_{forest,i} - P_{forest})) + \sum (MAI_{other,i} \times (F_{other,i} - P_{other}))$ The calculation is checked and found to be correct.

Calculation of NRB

Parameter	Value	Assessment
NRB	32,902,423 t/yr	This is calculated as below: NRB = H-RB The calculation is checked and found to be correct.

Calculation of f_{NRB}

Parameter	Value	Assessment
f _{NRB}	0.737	This is calculated as below: $f_{NRB} = \frac{NRB}{NRB + RB}$ The calculation is checked and found to be correct.

EF_{projected fossil fuel}

The projected fossil fuel is now taken as per the applied methodology (AMS I.E, v11). As per the Table 2 of the methodology, the emission factor of projected fossil fuel for south Asia 64.4 t CO₂e/TJ and the same is considered in the PDD. Hence

⁶ <http://weblines.co.in/fsi-result/technical-information-series-vol2-no1-2020.pdf>

	Ok. All the above updated parameters takes into consideration the impact of: • All the new relevant mandatory national and/or sectoral policies on Renewable Energy Sector; and • Any changes in circumstances or conditions, for example, change in market characteristics, the availability of fuels for power generation or raw materials for developing new power generation capacity as well as the impact of electricity or fuel prices.
Findings	CL-01 & CAR-04 are raised and closed satisfactorily
Conclusion	Validity of the baseline has been correctly assessed and the parameters are updated as per the Methodological Tool “Assessment of the validity of the original/current baseline and update of the baseline at the renewal of the crediting period” Version 03.0.1 in the PDD submitted for the renewal of crediting period.

D.5. Contribution to SDGs

Means of validation	PP has provided the assessment of project contributions to UN's Sustainable Development Goals (SDGs) in the section B.6 of GS PDD. In PDD, PP claims the project contributes to the following sustainable development goals: • SDG 13: Climate Action • SDG 3: Good health and well-being • SDG 5: Gender Equality • SDG 7: Affordable and clean Energy • SDG 8: Decent work and economic growth • SDG 17: Partnerships for the Goals Validation team assessed the PPs claim on the contributions to the SDGs as below:	
	SDG 13- Climate action	The project avoids GHG emission from avoidance of non-renewable biomass. Hence, the project reduces GHG emission compare to baseline condition. Hence validation team confirms the project's contribution to SDG 13. The following parameters have been chosen as monitoring parameters for SDG13: • GHG emission reductions per year
	SDG 3 – Good health and well-being	In baseline the households in the project area uses less efficient conventional cook stove for cooking which lead to indoor air pollution. The indoor air pollution will lead to respiratory and eye problems especially for woman. The project will replace the conventional cooking stove using biogas stove which is a clean cooking technology which results in reduction indoor pollution. The project activity will reduce the number of deaths and illnesses from indoor air pollution by providing access to clean and renewable energy – biogas. The following parameters have been chosen as monitoring parameters for SDG3: • Reduction in indoor air pollution • Reduction in health issues due to better indoor air quality
	SDG 5 - Gender Equality	The project reduces hardship of women from collecting fuel wood and cooking on traditional stoves by providing free biogas systems for cooking. Women also save considerable time from fuel wood collections, cooking

		and cleaning utensils. The time saved is by the women is used for other income generation activities. Also the carbon revenue is shared with the women biogas users. Hence validation team confirms the project's contribution to SDG 5. The following parameters have been chosen as monitoring parameters for SDG5: Reduction in time for fuelwood collection and cooking due to ease of cooking on biogas
	SDG 7 – Affordable and clean energy	The project is implementation of biogas digesters in the rural households which is an affordable, reliable and sustainable form of energy for cooking. Hence validation team confirms the project contribution to SDG 7. The following parameters have been chosen as monitoring parameters for SDG7: - Number of biogas units constructed % of units operational
	SDG 8- Decent work and economic growth	The project generates new employment opportunities particularly for local people in monitoring & operation of the project. Hence validation team confirms the project's contribution to SDG 8. The following parameters have been chosen as monitoring parameters for SDG 8: Number of jobs created
	SDG 17 – Partnerships for the goals	The project receives carbon revenue for implementation, monitoring and repair and maintenance of biogas. After ERPA period, carbon revenue will be distributed to biogas users. Hence validation team confirms the project's contribution to SDG 17. The following parameter has been chosen as monitoring parameters for SDG17: Domestic/international carbon funding to construct and maintain biogas units.
Findings	No finding	
Conclusion	a) The validation team confirms the proposed project will results in contributions to the SDGs 13, 3, 5, 7, 8 & 17. b) Since the project contributes to more than three SDGs the validation team is in the opinion that the project is eligible under Gold standard as per GS4GG c) All the parameters chosen to monitor the SDGs are found to be appropriate.	

D.6. Assessment of SDG outcomes

Means of validation	For SDG outcome, PP followed the following approach:			
	SDG	Baseline Scenario	Project Scenario	Net Benefit
	SDG 3	Emissions in tCO ₂ emitted by using traditional cook stoves by 15,000 households	Emissions in tCO ₂ emitted by using biogas	Baseline Emissions – Project Emissions – Leakage as shown above

	SDG 5	i. Use of traditional cookstove causing indoor smoke and health hazards. ii. 0% of HHs having clear indoor air	i. Reduction in indoor air pollution (100% of HHs) ii. Reduction in health issues due to better indoor air quality	i. Project Scenario - % of households responding to reduction in air pollution ii. % of households responded to reduction in health issues.
	SDG 7	Women spent time and effort in fetching, processing and storing fuelwood for cooking and cooking on traditional stoves	i. Reduction in Hours for collection of woody biomass and cooking	i. (Hours spent in Baseline scenario – Project scenario)/Hrs spent in baseline scenario x 100%
	SDG 8	No Biogas Units	i. Number of biogas units constructed ii. Number of units operational	i. Number of biogas units constructed ii. % of units operational
	SDG 13	No project related jobs created	Project related temporary or permanent jobs created for men and women	Number of permanent and temporary jobs created due to the project activity with at least 50% women
	SDG 17	No funding in the baseline scenario	Domestic/international carbon funding to construct and maintain biogas units	Domestic/international carbon funding in Indian Rupees to construct and maintain biogas units
<u>SDG 13</u> The validation team checked whether the equations and parameters used to calculate GHG emission reductions or net anthropogenic GHG removals for project activity are in accordance with applied methodology. Validation team checked section B.6.2 & B.6.4 of the PDD to confirm whether all formulae to calculate baseline emissions, project emission and leakage have been applied in line with the underlying methodology. Baseline Emission: The baseline emission of the project activity is estimated in accordance with applied methodology AMS-I.E (Version 11) as follows:				

$$BE_y = B_y \times f_{NRB,y} \times NCV_{biomass} \times EF_{projected_fossil_fuel}$$

Parameter	Assessment
B_y - Quantity of woody biomass that is substituted or displaced in tonnes	The quantity of woody biomass substituted will be estimated based the option (a) given in the methodology as below: $B_y = N_{HH} \times (BC_{BL,HH,y} - BC_{PJ,HH,y})$ The parameter N_{HH} (Number of households in the project activity in year y) is fixed ex-ante. The number of households where the biodigesters proposed are 15,000 and hence the same value is considered for ex-ante calculation The parameter $BC_{BL,HH,y}$ (Average annual consumption of woody biomass per household before the start of the project activity, tonnes/household/year) is fixed ex-ante. , PP has conducted the Kitchen test in the non-project households in the project area. Please refer the assessment in section D.3 above. Hence, the value considered for this parameter (ie, 2.82 tonnes/hh/yr) is correct. The parameter $BC_{PJ,HH,y}$ (If it is found that pre-project devices were not completely displaced but continue to be used to some extent, average annual consumption of woody biomass per household in the pre-project devices during the project activity tonnes/household/year) is monitored ex-post. For the ex-ante estimation it is assumed as zero as it is assumed that the project will completely replace the NRB in the baseline stove. This is found to be acceptable. Hence, the B_y is estimated ex-ante as 42343.85 t/year is verified to be correct.
$f_{NRB,y}$ - Fraction of woody biomass used in the absence of the project activity in year y that can be established as non-renewable biomass	The value is fixed ex-ante. It is calculated from the FSI 2019- State of Forest Report/22/, Forest Survey of India, Ministry of Environment and Forests, Government of India, Please refer the assessment in the above section D.3. The calculated f_{NRB} value of 0.737 is verified to be correct.
$NCV_{biomass}$ - Net calorific value of the non-renewable woody biomass that is substituted	This is fixed ex-ante. PP considered IPCC default value of 0.0156 TJ/ton as given in methodology/6/ and hence acceptable
$EF_{projected_fossil_fuel}$ - Emission factor for the substitution of non-renewable woody biomass by similar consumers.	This is fixed ex-ante. The projected fossil fuel is taken as per the applied methodology (AMS I.E, v11). As per the Table 2 of the methodology, the emission factor of projected fossil fuel for south Asia 64.4 t CO₂e/TJ and the same is considered for the emission

	reduction calculation. Hence Ok.	
Based on the above values, the baseline emission is estimated as 31,325 tCO ₂ /year for the ex-ante calculation.		
Project emission:		
The project does not involve any cultivation of biomass. Hence, the project emission (PE _y) considered zero. Hence PE _y = 0 tCO ₂ e		
Leakage:		
As per Tool 16: Project and leakage emissions from biomass v4, there are two leakage emission applicable:		
LE _y = LE _{BC,y} + LE _{BR,y}		
Parameter	Assessment	
LE _{BC,y} - Leakage emissions due to shift of pre-project activities resulting from cultivation of biomass in a dedicated plantation, in year y	Not applicable as the project does not involve any cultivation of biomass	
LE _{BR,y} - Leakage emissions due to diversion of biomass residues from other applications, in year y	As per 39 of the applied methodology, Leakage emissions related to the non-renewable woody biomass saved by the project activity shall be assessed based on ex post surveys of users and the areas from which this woody biomass is sourced (using 90/30 precision for a selection of samples). Alternatively, B _y is multiplied by a net to gross adjustment factor of 0.95 to account for leakages, in which case surveys are not required. PP decided to use leakage adjustment factor. Hence, the leakage is 5% of the baseline emission which is estimated to be 1,568 tCO ₂ /year. The same is verified to be correct.	
Hence, the total leakage emission calculated to be 1,568 tCO ₂ /year.		
Emission reduction:		
As per the methodology emission reduction (ER _y) is calculated as below:		
ER _y = BE _y – PE _y - LE _y		
= 31,352 – 0 – 1,568= 29,784 tCO ₂ e/year		
PP has submitted the ex-ante emission reduction estimation in a excel sheet/2/. The excel sheet is clear, viewable, non-protected and the calculated values in the sheet are reproducible. Hence the ex-ante emission reduction calculated for this project is correct.		
The estimated ex-ante value for the SDGs are given below		
SDG	Parameter	Net Benefit
SDG 13	Reduction of CO ₂	29,784 tCO ₂ /year
SDG 3	i. Reduction in indoor air pollution (100% of HHs) i. Reduction in health issues due to better indoor air quality	i. 100% of surveyed households

			ii. 100% of surveyed households report reduction in health problems
	SDG 5	Reduction in time for fuelwood collection and cooking due to ease of cooking on biogas	50% reduction in time compared to baseline
	SDG 7	i. Number of biogas units constructed ii. Number of units operational	i. 15,000 units ii. 100% units operational
	SDG 8	Number of jobs created	At least 10 jobs created due to the project activity of which at least 50% are women
	SDG 17	Domestic/international carbon funding to construct and maintain biogas units	At least 50% carbon revenue for construction and maintenance of units
Findings	No finding		
Conclusion	The approach provided for estimation of SDG outcome provided in the PDD is verified and found to be appropriate for the project activity and selected indicator. For the estimation of SDG 13, validation team confirm that the algorithms and formulae proposed to calculate project emissions, baseline emissions, leakage and emission reductions in the PDD is in line with the requirements of the selected methodology AMS I.E, version 11. For ex-ante calculation, the assessment team confirms that • All assumptions and data used by the project participants are listed in the PDD, including their references and sources; • All documentation used by project participants as the basis for assumptions and source of data is correctly quoted and interpreted in the PDD; • All values used in the PDD are considered reasonable in the context of the project. • The applied formula and methods for calculating ER are in accordance with the applied methodology and • All calculations are complete and without any omissions. As per the GS4GG requirements, the emission reduction estimated in the PDD is in line the applied methodological requirement.		

D.7. Validity of monitoring plan

Means of validation	The sustainability monitoring plan in the revised GS PDD is compared with the GS4GG transition document and found that there is no change in the sustainability plan of the PDD and hence, the monitoring plan already followed by PP is still valid. As per the revised PDD the following parameters are to be monitored:		
	SDG	Monitoring Parameter	Assessment of monitoring plan
	SDG 3	i. Reduction in indoor air pollution (100% of HHs)	This will be determined once in two years though sample survey among the project beneficiaries. Minimum 30 sample will be considered. The monitoring plan is found to be appropriate for the selected parameter.
		i. Reduction in health issues due to better indoor air quality	This will be determined once in two years though sample survey among the project beneficiaries. Minimum 30 sample will be considered. The monitoring plan is found to be appropriate for the selected parameter.
	SDG 5	Reduction in time for fuelwood collection and cooking due to ease of cooking on biogas	This will be determined once in two years though sample survey among the project beneficiaries. Minimum 30 sample will be considered. The monitoring plan is found to

		be appropriate for the selected parameter.
SDG 7	i. Number of biogas units constructed	This will be monitored continuously through village level volunteers and this data is entered to the monitoring solution monthly once. The monitoring plan is found to be appropriate for the selected parameter and SDG.
	ii. Number of units operational	
SDG 13	GHG emission reduction	The detailed assessment provided below
SDG 17	Domestic/international carbon funding to construct and maintain biogas units	This will be monitored continuously and reported based on the bank transactions and audit statements. The monitoring plan is found to be appropriate for the selected parameter and SDG.

SDG 13 Monitoring plan:
Validation team checked whether existing monitoring plan followed during the 1st crediting period monitoring the plan is still valid for the 2nd crediting period or not. Validation team checked the monitoring plan provided in the revised PDD and compared with the monitoring plan provided in the PDD of 1st crediting period.

Validation team also checked whether the monitoring plan provided in the revised PDD is in consistent with requirements of the applied methodology (AMS I.E, version 11).

The information provided in the PDD has been found in compliance with the information evaluated during the site visit, while interviewing with the concerned people and the same was re-affirmed through the documentary evidence.

The monitoring plan described in the PDD is in compliance with the applied methodology. The assessment team has reviewed all the parameters in the monitoring plan against the requirements of the applied methodology and confirmed that monitoring parameters are applied in line with the requirement of the methodology and relevant in the context of the project. 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 PP. 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 PP will be able to implement the monitoring plan and the achieved emission reductions can be reported ex-post and verified.

The parameters that are fixed ex-ante are:

Parameter	Value	Source & Assessment
Rating Biogas - Thermal capacity of a digester	1.78	The thermal capacity digester is based on the technical specification of the biogas stove. The calculation is verified and found to be correct.
BC_{BLHH,y} - Average annual consumption of woody biomass per household before the start of the project activity	2.82	It is calculated determined through the following: 1. Kitchen Test conducted in the project area/17/ Please refer assessment Section D.3 above.

$f_{NRB,y}$ - Fraction of woody biomass saved by the project activity during year y that can be established as non-renewable biomass	0.737	Please refer assessment Section D.3 above.
$NCV_{biomass}$ - Net calorific value of the non-renewable woody biomass	0.0156	This is IPCC default value as per AMS I.E Methodology/5/. Hence OK.
$EF_{projected_fossil\ fuel}$ - Emission factor for the substitution of non-renewable woody biomass by similar consumers.	64.4	This is default value as per AMS I.E methodology/5/ for the South Asia. Hence appropriate.
Determination of Leakage	0.14 for household fuelwood use of 2.82 t/HH/Yr. Determined by net to gross adjustment factor of 0.95 to account for leakage	This is estimated based on the default value as per AMS I.E. Methodology/5/ for leakage. Hence appropriate.

The parameters that are to be monitored ex-post are:

Parameter	Monitoring Details
Date of commissioning of biogas units - Actual date of commissioning of the project device.	The construction processes were monitored on a day to day basis and database maintained from its initiation to completion dates for each of the biogas unit in first crediting period of the project activity. Thus the start date of each of the unit installed in fixed for each of the unit.
N_{HH} - Number of households in the project activity in year y	The construction processes were monitored on a day to day basis and database maintained from its initiation to completion dates for each of the biogas unit. Thus the start date of each of the unit installed in fixed for each of the unit. In case of replacement of any unit due to demolition will be recorded and the loss days accounted for. This could be for the same user or new users, in which case the baseline is the users were using fuel wood. A new end user agreement will be signed with them and recorded.
Number of biogas plants operating - Number of plants operating in year	In every village, the women Volunteer monitors the biogas units that are non-operational. The days other than that non-operational will determine the biogas units which are operational. For the monitoring period, the operational days of installed biogas units will be calculated by subtracting the non-usage days. The emission reduction will be estimated only for operational days
$BC_{PJ,HH,y}$ - Average annual	1. As and when biogas units are not

	consumption of woody biomass per household in the pre-project devices during the project activity, if it is found that pre-project devices were not completely displaced but continue to be used to some extent	functional, the beneficiaries report to the village level women volunteer, who in turn reports to the Case Worker of the project for the repair of the unit. A log book is maintained for the reason of non-function and days under repair. The data is entered into the monitoring solution for each of the unit. The appropriate fuelwood use for non-operational days of biogas units will be accounted. 2. For parallel use of pre-project devices, monitoring shall consist of estimation of a representative sample thereof, at least once every two years (biennial) at 95/10 confidence/precision. A statistically determined sample size will be sampled to determine the quantity of fuelwood used on pre project devices. A household level questionnaire survey will be conducted.
	Confirmation that non-renewable biomass has been substituted	A household level sample survey will be conducted biennially at 95/10 confidence/precision level to confirm that non-renewable biomass has been substituted.
	The monitoring plan content has been checked in the PDD and compared against the requirements of the monitoring methodology All means of implementing the monitoring plan are in line with the applied and monitoring methodology. The validation team has no doubts that the monitoring arrangements as it is already implemented during the first crediting period itself as described in the PDD. Sampling plan: As mentioned above, the following parameters will be determined using biennial sample survey: (i) Confirmation that non-renewable biomass has been substituted (ii) Average annual consumption of woody biomass per household in the pre-project devices during the project activity, used in parallel. (iii) SDG parameters: - Reduction in indoor air pollution - Reduction in health issues due to better indoor air quality - Reduction in time for fuelwood collection and cooking due to ease of cooking on biogas The PDD indicates a sampling plan as per the recommendation outlined in 'Guideline for Sampling and Surveys for CDM Project Activities and Programme of Activities, version 04'10/ (which also has normative reference to Sampling Standard, version 08) has been referred. Assessment team confirms that the sampling method (simple random sampling) is clearly described and is in line with the description of the population. The sampling plan transparently describes how the samples will be selected. PP also demonstrates how simple random sampling is suitable for the project. The PP also provided formula for sample size calculation and reliability requirements in line with the sampling guidelines. Hence, the sampling plan provided in the PDD is found to be appropriate and in line with the sampling guideline.	
Findings	CAR-03 is raised and closed satisfactorily.	
Conclusion	The sustainability monitoring plan is unambiguous & has clearly stated who will monitor each of the parameter & the monitoring frequency requirements. Validation	

	team checked monitoring procedure given for each parameter and found that the monitoring plan is feasible during the crediting period For SDG13, the validation team confirms that the monitoring plan based on the approved monitoring methodology is included in the PDD and is correctly applied to the project. 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. The validation team considers that monitoring arrangements described in the monitoring plan in line with the existing monitoring plan already implemented in the site. As per the GS4GG requirements, the monitoring requirements provided in the PDD is in line the applied methodological requirement
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D.8. Crediting period

Means of validation	The validation team checked whether the PP specified the Start date & duration of the 2nd crediting period which is in accordance with the applicable requirements in the VVS for PA and the PS for PA. The details provided in the PDD are: - Start date of crediting period: 31/05/2021 - Length of crediting period: 7 years The end date of the 1st crediting period is 30/05/2021 and the renewal of crediting period is submitted within 1 year from the end of 1st crediting period. Hence, considering the start date of 2nd crediting period for the project is appropriate. The length of the crediting period is as per the para 87(a) of PS for PA, v2 requirements As per GS4GG requirements, the GS CDM registered project shall mirror CDM crediting period. Hence, the crediting period considered in the project activity is appropriate. As per the GS4GG requirements, the request for renewal will be submitted to Gold Standard before the end of 1st crediting period.
Findings	No finding
Conclusion	The start date and the crediting period type & length have been validated and found to be in accordance with 'CDM project standard for project activities', version 2 and GS4GG Principles and Requirements, version 1.2

D.9. Gold Standard Requirement on Design Certification Renewal

Means of validation	<u>(a) Changes in the Project as related to the General Eligibility Criteria:</u> The Project is already transited to the GS4GG standard. No specific changes in the project related to general eligibility criteria is observed. The assessment of general eligibility criteria is provided in section D.2 above. <u>(b) Incorporation of any relevant updates to the Gold Standard Requirements</u> The project is already transited to the GS4GG standard. There is no any relevant updates to the Gold Standard Requirements has been included in the PDD. <u>(c) Re-definition of Baseline Scenario and any impact of change on the Eligibility Principles, Criteria and Requirements</u> The assessment of re-definition of Baseline scenario as per the UNFCCC requirement has been provided in the section D.4 above. Validation team checked the revised baseline and found that the revised baseline does not have impact on change on the Eligibility Principles, Criteria and Requirements. <u>(d) Any Gold Standard activity, product and methodology-specific Requirements</u> The project is already transited to the GS4GG standard. There is no change in Gold Standard activity or product requirement after the transition. However, the project uses the latest version of the methodology (ie, AMS I.E, v11) and in the GS PDD the emission reduction calculation and monitoring requirements are updated
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	as per the latest version of the methodology. The same is assessed in the section D.5 and D.6 above. <u>(e) Demonstration of Ongoing Financial Need</u> The ongoing financial Need is demonstrated in section B.5.2 of the GS PDD. The assessment of ongoing financial Need is provided in section D.2 above.
Findings	No finding
Conclusion	The revised GS PDD is in compliance with Gold Standard Design Certification Renewal requirements specified in section 5.1.47 of GS4GG Principles Requirements v1.2.

D.10. Assessment of safeguarding principles

Means of validation	PP has provided the assessment of safeguarding principles in the Appendix 1 of GS PDD. The detailed assessment of safeguarding principle is provided below:	
	Safeguarding principles	Assessment
	Human Rights	Validation team confirms that, the project will not breach the principles. It is also to be noted that India has signed the Universal Declaration of Human Rights (UDHR)/39/. PP also confirmed that the project is not complicity in human rights abuses, as the project does not force people to changes cultural habits, where company follow the labour laws and does not interfere with operation of Worship. Moreover, the project is implementation and operation of biogas system in rural households which will not affect the human rights in any way. Hence validation team concludes the project will not harm the human rights.
	Gender equality	The project is implementation and operation of biogas system in rural households and hence the project does not put the women at any risk to access or control of entitlement and benefits of the project activity. In fact the project enhances the women's access and entitlement of benefits as it reduces the exposure to the indoor air pollution thereby improving their health. Also it reduces workload of women from fuel wood collection, cooking and cleaning utensils compared to baseline condition. There is no way that the project can adversely affect men and women in marginalised or vulnerable communities (e.g., potential increased burden on women or social isolation of men). In fact, the project tends to decrease burden on women and won't result in social isolation of men. PP confirmed that project duly accounts the gender roles. The project in particular benefit the woman by reducing their work load from fuel wood collection, cooking and cleaning utensils and thereby saving time. PP also confirmed that the project shall make every effort to include the marginalised people in its design. PP also confirmed the project shall not deprive men from the families of minority groups or the landless people to take advantage of the capacity building activities that create entrepreneurial opportunities of women. As confirmed by PP, the project will not contribute to increase women's work load. In fact it will reducing women's work load

		from fuel wood collection, cooking and cleaning utensils and thereby saving time. Apart from the time saving due to the project activity, the PP also provides capacity building activities to improve entrepreneurial skills of women to utilize the saved time in productive manner. Hence, the project potentially reduce the discrimination against women based on gender, for instance, regarding their full participation in design and implementation or access to opportunities and benefits Also the project activity does not limit women's ability to use, develop and protect natural resources. The project activity will not expose women and girls to further risks or hazards. In fact, it will reduce the risk and hazards of indoor air pollution due to use of biogas system for cooking which is smokeless. The justification provided by PP is found to be appropriate for this project context. Hence, validation team concludes that there is no gender based discrimination in this project activity and also the project will not harm any women's right.
	Community Health, Safety and Working Conditions	The project involves installation and operation of biogas system for cooking and thereby avoids indoor air pollution compared to baseline condition. Also the biogas systems are much safer than the traditional wood stove and LPG stoves. Hence no risk of safety of users. Hence, validation team conclude that the project will not adversely affect the health of the workers and the community.
	Sites of Cultural and Historical Heritage	The biogas systems relatively very small area and that are installed at the premises of the rural households and hence the project has no relevant to Sites of Cultural and Historical Heritage sites. The Government of India is a party to UNESCO's "The States Parties to the Convention for the Safeguarding of the Intangible Cultural Heritage (2003)" /40/ which aims at protection of cultural heritage and safeguards any violation of the safeguarding principle Hence, validation team concludes that there is no risk on cultural heritage by the project activity.
	Forced Eviction and Displacement	The biogas systems relatively very small area and that are installed at the premises of the rural households and hence the project does not involve eviction and displacement. Also, India has ratified the ILO's Convention on Indigenous and Tribal Populations, 1957 (No.107) in 1958/41/ and also the Government of India, Ministry of Rural Development, Department of Land Resources, have formulated a National Rehabilitation and Resettlement Policy, 2011/42/ for acquisition of private property, leading to involuntary displacement of people, depriving them of their land, livelihood and shelter; restricting their access to traditional resource base, and uprooting them from their socio-cultural environment. Hence the validation team confirms the project does not require any physical or economic relocation of peoples.
	Land Tenure and Other Rights	The biogas systems relatively very small area and that are installed at the premises of the rural households and hence not relevant to any land use. Hence the validation team confirms

		the project not require any change in land tenure arrangements or other rights.
	Corruption	India has ratified the UN Convention against Corruption/43/ and also has it National Prevention of Corruption Act, 1988/44/. The biogas systems are given to the willing households. Hence the project will not complicit in corruption
	Labour Rights	Government of India ratified ILO convention 29 and 105 on elimination of forced and compulsory labour /45/. Also the project proponent is a NGO working in the areas of Community development. PP also confirms that the monitoring personals involved in the project are through voluntary interest of the staff and it will not be through forced or compulsory labour. The project activity provides short term employment to the trained masons and the employment model respects the local regulations. PP confirms they will not object labours in any kind in establishing and join labour organisations. Moreover, this an NGO and hence there is no labour organizations and working agreements of labourers involved The employment model executed by PP is legally appropriate and as per the current practices followed in the local. Signed contracts between Accion Fraterna and all workers are verified and found to be appropriate legally and current local practices. Child Labour (Prohibition & Regulation) Act /46/ of India prohibits employment of children in certain specified hazardous occupations and processes and regulates the working conditions in others. Also the project proponent is a NGO working in the area of Community development. PP also confirms that it will not employ any child labour. Also the installation of these units helps reduce the wood collection time for children, allowing them to regularly attend the school. PP confirmed that the workers are provided safety equipment's (helmets, boots, gloves etc.) during the construction work to avoid any accidents at the construction area. Also appropriate training are provided to the workers before starting of construction and during operation. Hence, validation team confirms the project does not adversely impact on the labours right in any way.
	Negative Economic Consequences	The cost of construction of biogas digesters is significant. But the digester operation does not require any cost except some small repairs and maintenance. The project will improve the economy of the beneficiary and there are no potential risks to the local economy. Hence, validation team confirms there are no negative economic consequences due to the implementation and operation of the project activity.
	Emissions	The project reduces CO ₂ emission from burning of non-renewable biomass. PP also claims GHG emission reduction under this project. Hence, the project reduces GHG emission over baseline scenario.
	Energy Supply	The project uses biogas as fuel for cooking which is produced from cattle dung which would have otherwise left to decay in the open pits. Hence, the project does not affect the availability and reliability of energy supply to other users. In fact, it increases the availability of energy supply to other users by

		reducing the use of non-renewable biomass.
	Impact on Natural Water Patterns/Flows	The project does not have any kind of impact on the natural water patterns/flows.
	Erosion and/or Water Body Instability	The project in installation of household underground bio digesters on the empty land near to the beneficiary household which is relatively very small area. Project does not directly or indirectly cause additional erosion and/or water body instability or disrupts the natural pattern of erosion.
	Landscape Modification and Soil	The project in installation of household underground bio digesters on the empty land near to the beneficiary household which is relatively very small area. Hence the project does not alter soil quality; rather it will improve soil quality by applying the slurry in the agricultural land.
	Vulnerability to Natural Disaster	The project in installation of household underground bio digesters on the empty land near to the beneficiary household which is relatively very small area this do not affect any natural phenomenon. Hence validation team conclude that the project activity does not lead to increased vulnerability to wind, earthquakes, subsidence, landslides, erosion, flooding, drought or other extreme climatic conditions.
	Genetic Resources	The project activity involved construction and monitoring of biogas plants for rural households and therefore, is not linked to any activity related to genetic resources.
	Release of pollutants	By avoiding the traditional cook stove based cooking the project activity avoids the release of pollutants. Hence, the indoor air pollution will be improved due to the project activity. Also foul smell of the cow-dung is also reduced due to avoidance of dung in the open pit. Hence validation team conclude that the project will not result in the release of pollutants to the environment; instead it will reduce the release of pollutants.
	Hazardous and Non-hazardous Waste	Project does not involve in hazardous material production, trade or release.
	Pesticides & Fertilisers	The project activity does not involve in application of pesticide and/or fertiliser.
	Harvesting of Forests	The project does not involve in harvesting of project.
	Food	The project is implementation of household bio digesters which does not result in change in quantity or nutritional quality of food available.
	Animal husbandry	The project is implementation of household bio digesters which does not linked to animal husbandry.
	High Conservation Value Areas and Critical Habitats	The project involves implementation of household size bio digester which will not result in any degradation of critical natural habitats. Rather the project will result in conservation of the same as it avoids forest degradation due to the avoidance of fuel wood collection from forest which will help in conservation of natural habitats. Hence validation team concludes that the project does not physically affect or alter largely intact or High Conservation Value (HCV) ecosystems, critical habitats, landscapes, key biodiversity areas or sites identified
	Endangered	The project in installation of household underground bio

	Species	digesters on the empty land near to the beneficiary household which is relatively very small area. Hence there is no considerable change in the ecosystem which may affect the Species in the project area. The project does not lead to the reduction or negative impact of any recognised Endangered, Vulnerable or Critically Endangered species. The Project also does not impact other areas where endangered species may be present through transboundary affects; rather it will positively impact due to the avoidance of fuel wood collection from forest which will help in conservation of natural habitats and endangered species.
	The validation approach didn't reveal any situation that could lead to the violation of safeguarding principles and VVB has confirmed that the project activity fulfil GS Safeguarding Principles Requirements, version 1.2 /35/	
Findings	No finding	
Conclusion	All supporting information & reference sources stated in the GS4GG PDD in order to support the assessment have been verified by the validation team & confirmed the assessment has been carried out based on accurate information. All of the Safeguarding Principles were evaluated and assessed as no risk. Hence no mitigation measure is proposed.	

D.11. Stakeholder consultation

Means of validation	This is the renewal of crediting period. Hence, the stakeholder consultation is not applicable. Stakeholder consultation was conducted during the registration of the project activity. The same has been validated during the registration of the project activity. As per the GS requirements, a continuous input and grievance mechanism is in place for the PDD. Validation team checked the grievance registers and discussed with the PP regarding the grievance reporting mechanisms. Validation team also interviewed the end users during the site visit and confirmed the end users are aware of the grievances mechanism in place. Validation team finds that the grievance mechanisms in place are adequate and the stakeholders are aware of the grievance mechanisms.
Findings	CAR-06 is raised and closed satisfactorily
Conclusion	The stakeholder requirements are validated during the registration of project activity. The Continuous input and grievance mechanism in place is found be adequate and in line with the GS requirements.

D.12. Post-registration changes

Type of post-registration changes (PRCs)	Confirmation (Y/N)	Validation report for PRCs	
		Version	Completion date
Temporary deviations from the registered monitoring plan, applied methodologies, standardized baselines or other methodological regulatory documents ⁸	N	NA	NA
Corrections	N	NA	NA
Change to the start date of the crediting period	N	NA	NA
Inclusion of a monitoring plan	N	NA	NA
Permanent changes to the registered monitoring plan, or	N	NA	NA

⁸ Other standards, methodologies, methodological tools and guidelines (to be) applied in accordance with the applied(selected) methodologies are collectively referred to as the other (applied) methodological regulatory documents).

permanent deviation of monitoring from the applied methodologies, standardized baselines, or other methodological regulatory documents			
Changes to the project design	N	NA	NA
Changes specific to afforestation and reforestation project activities	NA	NA	NA

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 and Gold Standard 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 VVB/Director.

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

SECTION F. Validation opinion

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4K Earth Science Private Limited has been contracted by “ACCION FRATERNA ECOLOGY CENTRE” to undertake validation of renewal of crediting period of the Gold Standard CDM registered project ‘Accion Fraterna Biogas CDM project for rural communities in Anantapur, Andhra Pradesh’ (UNFCCC Ref #3779 and GS Ref# GS980) in India for renewal of project activities period.

The validation was performed in accordance with the UNFCCC criteria for the Clean Development Mechanism, latest version of Validation and Verification Standard, latest version of GS4GG Principles & Requirements, and related Standards/Guidance and host country criteria, as well as criteria given to provide for consistent project operations, monitoring and reporting.

The assessment included:

- Any impact of new relevant national and/or sectoral policies and circumstances on the baseline taking into account relevant guidance from the Board with regard to renewal of the crediting period at the time of requesting renewal of crediting period;
- The correctness of the application of an approved baseline methodology for the determination of the continued validity of the baseline or its update, and the estimation of emission reductions for the applicable crediting period.
- Sustainability assessment as per GS4GG guidelines including stakeholder consultation, the Safeguard Assessment and SDG outcome assessment

In our opinion, the project meets all relevant UNFCCC, CDM & GS4GG criteria, and all relevant host country criteria.

The review of the final PDD and the subsequently performed follow-up interviews with representatives of the project participant has provided the validation team with sufficient evidence to determine the validity of the original baseline and/or its update of the project. The PDD correctly applies small scale methodology AMS-I.E. Version 11. It is demonstrated that the project baseline scenario is not changed and also all necessary parameters are updated correctly for the 2nd crediting period.

The monitoring plan provides for the monitoring of the SDG outcomes including project emission reductions. The monitoring arrangements described in the monitoring plan are feasible within the project design, and it is the validation team’s opinion that the project participates are able to implement the monitoring plan.

The ex-ante estimated SDG outcomes for the 2nd Crediting period are as below:

SDGs	Estimated SDG Impact
SDG 13	29,784 tCO ₂ /annum
SDG 3	100% reduction in indoor air pollution. 100% of surveyed households report reduction in health problems
SDG5	50% reduction in time in fuel wood collection and cooking
SDG 7	i. 15,000 number of biogas units constructed ii. 100% number of units operational
SDG 8	At least 10 jobs created due to the project activity of which at least 50% are women
SDG 17	At least 50% carbon revenue for construction and maintenance of units

In summary, it is validation team’s opinion that the GS CDM project ‘Accion Fraterna Biogas CDM project for rural communities in Anantapur, Andhra Pradesh’ (UNFCCC Ref #3779 and GS Ref# GS980) in India meets all relevant UNFCCC requirements for the renewal of crediting period. Hence 4KES requests the renewal of the crediting period of the project.

Appendix 1. Abbreviations

Abbreviations	Full texts
4KES	4K Earth Science Private Limited
AMS	Approved Methodology for Small-scale
BE	Baseline Emissions
CAR	Corrective Action Request
CDM	Clean Development Mechanism
CER	Certified Emission Reduction
CL	Clarification request
COP	Conference of Parties
DNA	Designated National Authority
DR	Document Review
EB	Executive Board
EF	Emission Factor
ERs	Emission Reductions
FAR	Forward Action Request
FCN	Fair Climate Network
FSI	Forest Survey of India
GHG	Greenhouse gas(es)
GS	Gold Standard
HCA	Host Country Approval
IPCC	Intergovernmental Panel on Climate Change
ISO	International Organization for Standardization
KP	Kyoto Protocol
LSC	Local Stakeholder Consultation
LE	Leakage Emissions
LoA	Letter of Approval/Authorization
MNRE	Ministry of New & Renewable Energy
MOP	Meeting of Parties
MoC	Modalities of Communication
MoV	Means of Verification
MP	Monitoring Plan
NCV	Net Calorific Value
NRB	Non-Renewable Biomass
ODA	Official Development Assistance
PA	Project Activity
PDD	Project Design Document
PE	Project Emissions
PP	Project Participant
PS	Project Standard
PCP	Project Cycle Procedure
QA/QC	Quality Assurance/Quality Control
RCP	Renewal of Crediting period
SDG	Sustainable Development Goal
SSC	Small Scale
T&C	Technical & Certification
UNFCCC	United Nations Framework Convention on Climate Change
VVB	Validation and verification body
VVS	Validation & Verification Standard

Appendix 2. Competence of team members and technical reviewers

<u>Certificate of Competence</u>						
Name	☒ Mr. ☐ Ms.	Narendra Kumar .R				
Qualification Procedure	Fulfils 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
<i>Appointed</i>	Yes	Yes	Yes	Yes	Yes	No
<i>Appointed Date</i>	27-04-2021					
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		
	Waste handling and disposal		13.1	Solid waste and wastewater		
	Waste handling and disposal		13.2	Manure		
Authorized to work as Local Expert for:						
<i>Country/Countries</i>	India					
Compliance check by: Anand S. R.						

<u>Certificate of Competence</u>						
Name	☒ Mr. ☐ Ms.	Anand S.R				
Qualification Procedure	Fulfils 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
<i>Appointed</i>	No	No	Yes	No	No	No
<i>Appointed Date</i>	29-07-2019					
Authorized to work as Technical Expert for:						
<i>Authorized Technical Area</i>						
Authorized to work as Local Expert for:						
<i>Country/Countries</i>	India					

<u>Certificate of Competence</u>						
Name	☒ Mr. ☐ Ms.	Ma Paa Puratchikkanal				
Qualification Procedure	Fulfils 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
<i>Appointed</i>	Yes	Yes	Yes	Yes	Yes	No
<i>Appointed Date</i>	27-04-2021					
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		
	Waste handling and disposal		13.2	Manure		
	Agriculture		15.1	Agriculture		
Authorized to work as Local Expert for:						
<i>Country/Countries</i>	India, Sri Lanka					
Compliance check by: Anand S. R.						

Appendix 3. Documents reviewed or referenced

No.	Author	Title	References to the document	Provider
1	Accion Fraterna	GS Project Design Document	Version 06, dated 09/05/2021	Accion Fraterna
	Accion Fraterna	GS Project Design Document	Version 07, dated 20/05/2021	Accion Fraterna
	Accion Fraterna	GS Project Design Document	Version 08, dated 14/12/2021	Accion Fraterna
2	Accion Fraterna	Revised ER Estimation sheet	Version 9	Accion Fraterna
	Accion Fraterna	Revised ER Estimation sheet	Version 10	Accion Fraterna
	Accion Fraterna	Revised ER Estimation sheet	Version 12	Accion Fraterna
3	Accion Fraterna	Registered CDM PDD (applicable for 1 st crediting period)	Version 8, dated 21/06/2017	Publicly available
4	Accion Fraterna	Registered CDM PDD (applicable for 2 nd crediting period)	Version 12, dated 05/10/2021	Publicly available
	4KES	CDM Validation report (applicable for 2 nd crediting period)	Version 3, Dated 06/10/2021	
5	UNFCCC	AMS.I.E – “Switch from non-renewable biomass for thermal applications by the user”	Version 11	Publicly available
6	IPCC	1. 1996 IPCC Guidelines for National Greenhouse Gas Inventories: work book 2. 2006 IPCC Guidelines for National Greenhouse Gas Inventories: work book	Web Link	Publicly available
7	UNFCCC	Kyoto Protocol (1997)	Web Link	Publicly available
8	UNFCCC	Project design document form	Version 11	Publicly available
9	UNFCCC	CDM Project Standard for project activities	Version 02	Publicly available
10	UNFCCC	Standard: Sampling and surveys for CDM project activities and programme of activities	Version 08	Publicly available
	UNFCCC	Guidelines for sampling and surveys for CDM project activities and programme of activities	Version 04	Publicly available
11	Gold Standard	Template: GS4GG project design Document (PDD),	Version 1.2	Publicly available
12	UNFCCC	Glossary “CDM terms”	Version 10	Publicly available
13	UNFCCC	TOOL11: Assessment of the validity of the original/current baseline and update of the baseline at the renewal of the crediting period	Version 3.0.1	Publicly available
14	UNFCCC	CDM project cycle procedure for project activities	Version 02	Publicly available
15	UNFCCC	Tool 16: Project and leakage emissions from biomass	Version 04	Publicly available
16	UNFCCC	Tool 30: Calculation of the fraction of non-renewable biomass	Version 02	Publicly available
17	Accion Fraterna	Kitchen Performance Test Documents: - KT mentoring sheets - Survey result summary excel sheet	-	Accion Fraterna
18	Accion Fraterna	Sample survey sheets	-	Accion Fraterna
19	Accion Fraterna	Project database	-	Accion Fraterna
20	Accion Fraterna	End user agreements	-	Accion Fraterna

21	Accion Fraterna	Online monitoring solution	-	Accion Fraterna
22	Forest Survey of India, MoEF & CC	State of Forest Report	Year 2019	Publicly available
23	Meenakshi Kaul · G. M. J. Mohren · V. K. Dadhwal	Research Paper: Phytomass carbon pool of trees and forests in India	-	Accion Fraterna
24	Centre for Science and Environment	Status Report: Wood is Good. But is India doing Enough to meet Its present and future needs?	-	Publicly available
25	Ratnam, J., Chengappa, S. K., Siddarth, J., Machado, Nandita Nataraj, Anand M. Osuri and Mahesh Sankaran.	<i>Functional Traits of Trees From Dry Deciduous Forests of Southern India Suggest Seasonal Drought and Fire Are Important Drivers. Frontiers in Ecology and Evolution. Brief Research Report, 2019, doi: 10.3389/fevo.2019.00008</i>	-	Publicly available
26	Directorate Of Census Operations	District Census Handbook- Anantapur https://cdn.s3waas.gov.in/s333e8075e9970de0cfea955afd4644bb2/uploads/2019/07/2019071836.pdf	-	Publicly available
27	Ministry of Statistics and Programme Implementation	NSS Report: Drinking water, sanitation, hygiene and housing condition in India,	76 th Round	Publicly available
28	Accion Fraterna	<i>Excel sheet for calculation of rotation period of dominant species in Andhra Pradesh</i>	-	Accion Fraterna
29	Accion Fraterna	<i>ERPA signed between Accion Fraterna & buyer</i>		Accion Fraterna
30	FAO	<i>Report: Forest Products</i> http://www.fao.org/3/i7304m/i7304m.pdf	Year 2005	Publicly available
	FAO	<i>Report: Forest Product</i> http://www.fao.org/3/cb3795m/cb3795m.pdf	Year 2011	Publicly available
31	Accion Fraterna	GS4GG Transition Document Annex	-	Accion Fraterna
32	Accion Fraterna	ODA declaration from PP	-	Accion Fraterna
33	Gold Standard	Gold standard Principles and Requirements,	Version 1.2	Publicly available
34	Gold Standard	GS4GG Stakeholder Consultation and Engagement Requirements	Version 1.2	Publicly available
35	Gold Standard	Safeguarding Principles & Requirements	Version 1.2	Publicly available
36	Gold Standard	Gender Equality Requirements & Guidelines,	Version 1.1	Publicly available
37	Gold Standard	Community Service Activity Requirements	Version 1.2	Publicly available
38	Gold Standard	COVID 2019 Interim Measures	Dated 24/07/2020 (updated 17/05/2021)	Publicly available
39	-	India's compliance with Universal Declaration of Human Rights (UDHR) http://www.archive.india.gov.in/spotlight/spotlight_archive.php?id=73	-	Publicly available
40	-	The States Parties to the Convention for the Safeguarding of the Intangible Cultural Heritage (2003)	-	Publicly available

		http://www.unesco.org/culture/ich/index.php?pg=00024		
41	-	ILO ratification by India http://www.ilo.org/indigenous/Activitiesbyregion/Asia/SouthAsia/India/lang--en/index.htm	-	Publically available
42	-	The Draft National Land Acquisition and Rehabilitation and Resettlement Bill, 2011, Ministry of Rural Development, Government of India, 2011. http://rural.nic.in/sites/downloads/policies/Final.pdf .	-	Publically available
43	-	UN Convention against Corruption-India Ratification http://www.persmin.gov.in/DOPT/EmployeesCorner/Acts_Rules/PCAct/pcact.pdf	-	Publically available
44	-	National Prevention of Corruption Act, 1988	-	Publically available
45	-	ILO convention for elimination of forced labour http://www.ilo.org/declaration/principles/eliminationofchildlabour/lang--en/index.htm	-	Publically available
46	-	Child Labour (Prohibition & Regulation) Act,	-	Publically available
47	-	UN Sustainable Development Goals http://www.undp.org/content/undp/en/home/sustainable-development-goals.html	-	Publically available
48	https://www.indiagrowing.com/	Andhra Pradesh & Telangana Population 2020/2021 https://www.indiagrowing.com/Telangana https://www.indiagrowing.com/Andhra_Pradesh	2020/2021	Publically available
49	PPAC, NFHS	https://www.thehindu.com/data/data-most-homes-have-lpg-connection-but-a-significant-share-dont-use-it/article34855341.ece		Publically available
50	FSI	https://fsi.nic.in/documents/sfr_1995_hindi.pdf ; Page 74	1995	Publically available
51	MOEF	Asia-Pacific Forestry Sector Outlook Study II- Country report http://moef.gov.in/wp-content/uploads/2019/06/Pacific.pdf		Publically available
52	International Institute for Population Sciences	National Family Health Survey – 5 http://rchiips.org/nfhs/NFHS-5_FCTS/FactSheet_AP.pdf	2019-20	Publically available
53	Accion Fraterna	fNRB calculation sheet	-	Accion Fraterna
54	FSI	Report: Trees outside forest resources in India	2020	Public

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

Table 1. CL from this validation

CL ID	01	Section no.	D.4	Date: 19/05/2021
Description of CL				
Regarding the fuelwood and timber consumption data for f_{NRB} calculation, it is noted that the table in the cited literature "Wood is Good, but is India doing enough to meet its present and future needs? A status report by CSE, 2017" is sourced from "India State of Forest Report, FSI, 2011". PP is requested to justify why the most recent available data are not used. Refer to the requirements in paragraph 10 of TOOL30, which states: "...In the case of ex ante calculation of f_{NRB}, the parameter f_{NRB} shall be estimated using the most recent historical year for which data is available....Where available, the same vintage of data should be used for all parameters applied in this tool to calculate f_{NRB}. Where data for one single vintage is not available for all parameters, different vintages may be used for parameters, as long as it can be justified (e.g. the use of different vintages leads to a conservative estimate of f_{NRB})." Also, it appears that the values of FSI 2011 cover the data of both Andhra Pradesh and Telangana states, the latter of which has been separated from Andhra Pradesh. On the other hand, the value of RB is derived from FSI 2019 where only the data of the new Andhra Pradesh (after separation) seems to be counted. Therefore, PP is requested to address inconsistent data coverage between H (estimate of consumption) and RB (growth).				
Project participant response				Date: 20/05/2021
<i>The latest data available at the state level is the CSE Report of 2017. But again the data used is from FSI, 2011. Hence based on national trend of Roundwood use, the value of 2011 is extrapolated to 2019. As there is a decreasing trend in Roundwood use, the H is also decreased for the calculations. This is a conservative approach.</i> <i>This is revised now to include both the states. For the calculations of RB and f_{NRB}, data of both the separated states Andhra Pradesh and Telangana is considered. This is done as the H value is available for the erstwhile Andhra Pradesh which included both states.</i> <i>With both the above corrections the f_{NRB} is revised from 0.91 to 0.86.</i>				
Documentation provided by project participant				

<i>Revised PDD and ER Calculations Sheet</i>	
DOE assessment	Date: 22/05/2021
As only the 2011 data available, PP now extrapolated the fuel wood consumption of 2019 based on the round wood consumption trend (which includes fuel wood and industrial wood consumption) which is derived from FAO data. The calculation is checked and found to be correct.	
Also the fuel wood consumption for Telangana and Andhra Pradesh is not available separately. Hence, the RB is also now calculated as total of Telangana and Andhra Pradesh. Hence, this is acceptable.	
CL is closed.	

Table 2. CAR from this validation

CAR ID	01	Section no.	D.1	Date: 19/05/2021
Description of CAR				
In Section A.1 of the PDD and summary sheet of the ER calculation sheet, the UNFCCC reference number of the project is incorrectly mentioned. Corrective action is requested.				
Project participant response				Date: 20/05/2021
<i>The UNFCCC reference number of the project is corrected to 3779.</i>				
Documentation provided by project participant				
<i>Revised PDD and ER Calculations Sheet</i>				
DOE assessment				Date: 22/05/2021
PP has corrected the UNFCCC reference number in PDD & ER sheet. CAR is closed.				

CAR ID	02	Section no.	D.3	Date: 19/05/2021
Description of CAR				
In section B.3 of the PDD, the gases included in the table and the justification provided are not appropriate: - Leakage emission is included in baseline scenario - In the project scenario, CH₄ & N₂O emission are included				
Corrective action is requested				
Project participant response				Date: 20/05/2021
<i>The table in section B.3. is revised. The leakage emission from baseline scenario is deleted. In the Project Scenario, leakage is included and CH₄ and N₂O emissions are excluded according to the methodology.</i>				
Documentation provided by project participant				
<i>Revised PDD</i>				
DOE assessment				Date: 22/05/2021
Appropriate corrections are done in the table in section B.3. The leakage emission from baseline scenario is deleted. In the Project Scenario, leakage is included and CH ₄ and N ₂ O emissions are excluded according to the methodology. CAR is closed				

CAR ID	03	Section no.	D.7	Date: 19/05/2021
Description of CAR				
The confidence/precision level for the parameter 'Confirmation that non-renewable biomass has been substituted' is inconsistently mentioned in the PDD. As per the parameter table in the section B.7.1, the confidence/precision requirement is 95/10 whereas, as per section B.7.2, the confidence/precision requirement is 90/10.				
Corrective action is requested.				
Project participant response				Date: 20/05/2021
<i>The confidence/precision requirement is 95/10 as the parameter is monitored once in 2 years. This is made consistent in the revised PDD. The confidence/precision requirement is corrected to 95/10 in section B.7.2</i>				
Documentation provided by project participant				
<i>Revised PDD</i>				
DOE assessment				Date: 22/05/2021
The applicable confidence and precision level is 95/10. PP corrected the confidence/precision level in section B.7.2. CAR is closed.				

CAR ID	04	Section no.	D.4	Date: 19/05/2021
Description of CAR				
PP shall submit the following documents:				
• Sample survey/KPT sheets • All documents/reports referenced in the MR				
Project participant response				Date: 20/05/2021
<i>The following documents are submitted:</i>				
- Sample survey/KPT sheets - Reports referenced in the MR				
Documentation provided by project participant				
Sample Surveys/KPT Sheets				
References				
DOE assessment				Date: 22/05/2021
PP has provided the requested documents for verification. CAR is closed.				

CAR ID	05	Section no.	D.2	Date: 19/05/2021
Description of CAR				
The ongoing financial need is not justified in the PDD which is a requirement as per the GS4GG rules & requirements during renewal of crediting period.				
Project participant response				Date: 20/05/2021
<i>The ongoing financial needs is included in the PDD in section B.5.2 as per the requirements of GS4G for the renewal of crediting period.</i>				
Documentation provided by project participant				
Revised PDD				
DOE assessment				Date: 22/05/2021
The ongoing financial need is justified section B.5.2 of the PDD as per the template requirement. CAR is closed				

Table 3. FAR from this validation

FAR ID	xx	Section no.		Date: DD/MM/YYYY
Description of FAR				
NA				
Project participant response				Date: DD/MM/YYYY
Documentation provided by project participant				
VVB assessment				Date: DD/MM/YYYY
