




**Validation report form for renewal of CDM programme of activities period
(Version 02.0)**

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

BASIC INFORMATION

Title and UNFCCC reference number of the programme of activities (PoA)	Title: SKG Sangha Biodigester PoA UNFCCC ref. no: 9507
Number and duration of the next period	2 nd Crediting period. Duration: 28/01/2020 to 27/01/2027
Version number of the validation report	2.0Aa
Completion date of the validation report	03/04/2020
Version number of PoA-DD to which this report applies	Version 5.6 of 06/01/2020
Coordinating/managing entity (CME)	M/s SKG Sangha
Host Parties	India
Applied methodologies and standardized baselines	AMS-I.C. ver. 21 - Thermal energy production with or without electricity AMS-III.R. ver. 3 - Methane recovery in agricultural activities at household/small farm level AMS-I.E. ver. 10 - Switch from Non-Renewable Biomass for Thermal Applications by the User
Mandatory sectoral scopes	1 & 15
Conditional sectoral scopes, if applicable	NA
Estimated amount of annual average GHG emission reductions or GHG removals by sinks in the next programme of activities period	-
Name and UNFCCC reference number of the DOE	RINA Services S.p.A. (RINA) UNFCCC reference number: E-0037
Name, position and signature of the approver of the validation report	Laura Severino (Authorized officer signing for the DOE) Head of Certification Innovation & Sustainability Unit 

SECTION A. Executive summary

>> Purpose and general description and location:

The Programme of activities involves the implementation of biogas applications at individual households in rural India. The different sizes of the digesters included in the programme are between 2 to 15m³. The programme uses Deenbandu fixed model or other suitable model biodigester. In the absence of the project, the energy demand for cooking and heating at user point was met by firing firewood and kerosene. Also the cattle dung which is used as feedstock in bio-digester is left to decay anaerobically leading to methane emissions. Therefore, each digester replaces fire-wood/kerosene which otherwise would have been used for household thermal application (cooking/heating) and avoid anaerobic decay of cattle dung. The programme is managed by SKG Sangha (CME) in coordination with households part of the PoA and Project Implementing Partners (PIP) organizing the project activity and installing biodigesters.

The programme of activities are implemented in rural households throughout India.

Validation scope:

The objective of the Validation is to have an independent evaluation of a PoA with each generic component project activity (CPAs) and any CPA proposed to be included in the PoA by a designated operational entity against the requirements of the CDM as set out in decision 3/CMP.1, its annex and relevant decisions of the COP/MOP, on the basis of the Programme Design Document (POA-DD) and of the Component Project Activity Design Document (CPA-DD). In particular, the demonstration of additionality of the PoA as a whole, the eligibility criteria for inclusion of a CPA in the PoA, the baseline determination for each generic CPA, the monitoring plan for each generic CPA, the estimated emission reduction from any CPA proposed in the project and the programme's compliance with relevant UNFCCC requirements and host Party criteria are validated in order to confirm that the programme design, as documented, is sound and reasonable and meets the identified criteria. Validation is a requirement for all CDM PoA projects and is seen as necessary to provide assurance to stakeholders of the quality of the project and its intended generation of certified emission reductions (CERs).

The validation scope is to review the PoA-DD/CPA-DD against the UNFCCC criteria for CDM.

UNFCCC criteria for CDM refer to Article 12 of the Kyoto Protocol, the CDM modalities and procedures, the procedures for registration of programme of activity as a single CDM and the subsequent decisions by the CDM Executive Board.

Validation is not meant to provide any consultancy towards the project participants. However, stated requests for clarifications and/or corrective actions may have provided input for improvement of the project design.

Validation process:

Validation was conducted using RINA procedures in line with the requirements specified in the CDM M&P, the latest version of the CDM Validation and Verification Standard, and relevant decisions of the COP/MOP and the CDM EB and applying standard auditing techniques.

The validation consisted of the following three phases:

- Document review;
- Follow-up actions;
- The resolution of outstanding issues and the issuance of the final validation report.

Conclusion:

Foundation myclimate - The Climate Protection Partnership has commissioned RINA to carry out the validation (renewal of crediting period) of the PoA "SKG Sangha Biodigester PoA" in India, with regard to the relevant requirements for CDM activities.

This report summarizes the findings from the validation of the updated PoA-DD, performed on the basis of UNFCCC criteria for CDM, as well as criteria given by the CDM Validation and Verification Standard for PoA, CDM Project Cycle Procedure for PoA and CDM Project Standard for PoA and included an assessment of:

(a) The 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.

(b) 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.

In conclusion, it is RINA's opinion that the PoA meets all the relevant requirements for the renewal of the 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 DOE or outsourced entity)	Involvement in			
						Desk/document review	On-site inspection	Interview(s)	Validation findings
1.	Team Leader, Validator & Technical Expert (TA 1.1)	IR	Buragohain	Champok	RINA India	√	X	√	√
2.	Technical Expert (TA 15.1)	EI	Maso	Daria	Central Office	√	X	√	√

B.2. Technical reviewer and approver of the validation report for renewal of PoA period

No.	Role	Type of resource	Last name	First name	Affiliation (e.g. name of central or other office of DOE or outsourced entity)
1.	Technical reviewer	IR	Amalorpavanathan	Cyril Augustus A	RINA India
2.	Approver	IR	Severino	Laura	RINA HQ

SECTION C. Means of validation

C.1. Desk/document review

>> The PoA-DD version 5.5 of 19/12/2019 and version 5.6 of 06/01/2020 /01/, in particular the applicability of the methodology, the baseline determination, the monitoring plan were assessed as part of the validation. Appendix 3 lists the documentation that was reviewed during the validation.

C.2. On-site inspection

Duration of on-site inspection: N/A				
No.	Activity performed on-site	Site location	Date	Team member
1.	-	-	-	-

Site visit has not been performed for the validation of the renewal of crediting period, in accordance with CDM validation and verification standard for programmes of activities, version 02.0, paragraph 183 /08/, as the estimated emission reductions per CPA is limited upto 60,000 tCO₂e. Representatives from CME have been interviewed, publicly available authentic sources were reviewed for cross checking information necessary for validation of the PoA. Moreover, FAR 01 has been raised in order to have all technical data thoroughly checked, to confirm their consistency with presented information, during next first verification of the PoA.

C.3. Interviews

No.	Interviewee			Date	Subject	Team member
	Last name	First name	Affiliation			
1.	Kudaravalli	Kiran Kumar	SKG Sangha	24/12/2019	Status of the project activity and any modifications with respect to the registered PoA, The lifetime of the project activity; National and local policies and changes; Monitoring plan and changes	Champok Buragohain
3.	Leon	Paul	Foundation myclimate - The Climate Protection Partnership	24/12/2019	PoA-DD preparation, Applicability to the latest methodology; Emission Factors and their updates; Baseline of the project and its updates.	Champok Buragohain

C.4. Sampling approach

>> Not applicable.

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
Programme of activities			
Compliance with PoA-DD form			
Programme of activities period			
Coordinating/managing entity and the project participants			
Post-registration changes			
Generic component project activities			
Application and selection of methodologies and standardized baselines		1	
Validity of original baseline or its update			
Estimated emission reductions or net anthropogenic removals			
Validity of monitoring plan	1		
Eligibility criteria for inclusion of CPAs			
Others (please specify)- technical features of CPAs			1
Total	1	1	1

SECTION D. Validation findings**D.1. Programme of activities****D.1.1. Compliance with PoA-DD form**

Means of validation	The PoA-DD was cross-checked with the latest PoA-DD template available at UNFCCC and with the instructions for filling out.
Findings	NA

Conclusion	RINA confirms that the updated PoA-DD is in compliance with the latest version of the PoA-DD form (version 09.0) /16/ and the instructions therein for filling out the PoA-DD form. RINA also confirms that the CME has updated the relevant sections of the PoA-DD in accordance with the relevant requirements in the Project Standard for PoA. RINA further confirms that the information transferred to the updated version of the PoA-DD is materially the same as that in the registered PoA-DD.
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D.1.2. Programme of activities period

Means of validation	The PoA period is 7 years renewable. This is the second PoA period and its start date is 28/01/2020, which is day immediately after the expiration of current PoA period (i.e. 28/01/2013 to 27/01/2020).
Findings	NA
Conclusion	RINA confirms that the second PoA period for the PoA commences on the day after the expiration of the current PoA duration from 28/01/2020 which is as per paragraph 390 (v) of VVS for PoA version 02 /08/.

D.1.3. Coordinating/managing entity and the project participants

Means of validation	Cross checking the CME and project participants name from the list of project participants and CME of the PoA from the view page at UNFCCC website and latest MoC statement. RINA also reviewed the letter of approval (Ref. No.:4/10/2012-CCC) dated: 27/06/2012 issued from the DNA of India authorizing SKG Sangha as CME and letter of approval from NDA of Switzerland (dated 29/06/2012) authorizing Foundation myclimate-the climate protection partnership as project participant. The latest MoC dated: 25/01/2019 confirm the name of the project participant.
Findings	NA
Conclusion	RINA confirms that the CME and project participants of the PoA is listed in the updated PoA-DD and this information is consistent with the information provided in the latest MoC and hence meets paragraph 384 of VVS PoA version 02.

D.1.4. Post-registration changes

Type of post-registration changes (PRCs)	Confirmation (Y/N)	Validation report for PRCs	
		Version	Completion date
Corrections	N		
Inclusion of monitoring plan	N		
Permanent changes to the registered monitoring plan, or permanent deviation of monitoring from the applied methodologies, standardized baselines, or other methodological regulatory documents	N		
Changes to the programme design	N		
Addition of CPA inclusion template	N		
Changes specific to afforestation and reforestation activities	N		
Change of coordinating/managing entity	N		

D.2. Generic component project activities**D.2.1. Application and selection of methodologies and standardized baselines**

Means of validation	The CME has applied the methodology AMS-I.C version 21, AMS-III.R version 3 and AMS-I.E Version 10 /05/,/06/,/07/. The version of the methodologies are the latest version and currently valid for the submission of the PoA. The PoA meets the criteria defined in the methodologies as described below: Justification for AMS-I.C version 21:		
	Criteria	Means of verification	
	This methodology comprises	The project technology involves	

	renewable energy technologies that supply users i.e. residential, industrial or commercial facilities with thermal energy that displaces fossil fuel use. These units include technologies such as solar thermal water heaters and dryers, solar cookers, energy derived from renewable biomass and other technologies that provide thermal energy that displaces fossil fuel.	household biogas system (renewable) which replaces use of kerosene (fossil fuel). There is no change in the design of the program technology and hence meets the methodology requirement.
	Biomass-based cogeneration and trigeneration systems are included in this category.	The program involves household biogas system which generates biogas and generated biogas is used for cooking purposes. Hence, cogeneration is not within the project design scope.
	Emission reductions from a biomass cogeneration or trigeneration system can accrue from one of the following activities: (a) Electricity supply to a grid; (b) Electricity and/or thermal energy production for on-site consumption or for consumption by other facilities; (c) Combination of (a) and (b).	Not applicable for the project activity.
	Project activities that seek to retrofit or modify an existing facility for renewable energy generation are included in this category.	The project does not involve any retrofit or modify an existing facility for renewable energy generation. It involves replacement of existing inefficient cooking system with biogas based cooking system
	In the case of new facilities (Greenfield projects) and project activities involving capacity additions the relevant requirements related to determination of baseline scenario provided in the "General guidelines for SSC CDM methodologies" for Type-II and Type-III Greenfield/capacity expansion project activities also apply	The project activity involves replacement of existing inefficient cooking systems. Not relevant to the project.
	For co-fired systems, the total installed thermal energy generation capacity of the project equipment, when using both fossil and renewable fuel, shall not exceed 45 MW thermal.	There is no change in project design and capacity of each biogas system. Maximum installed electrical capacity of a 6m ³ biogas system is 0.832 kW or 2.496 kW _{thermal} . The number of units installed under a CPA shall be restricted to keep the CPA within 5MWe installed capacity. Therefore, each CPA will be within small-scale

		threshold.	
	<p>The following capacity limits apply for biomass cogeneration and trigeneration units:</p> <p>(a) If the emission reductions of the project activity are on account of thermal and electrical energy production, the total installed thermal and electrical energy generation capacity of the project equipment shall not exceed 45 MW thermal. For the purpose of calculating the capacity limit the conversion factor of 1:3 shall be used for converting electrical energy to thermal energy (i.e. for renewable energy project activities, the installed capacity of 15 MW(e) is equivalent to 45 MW thermal output of the equipment or the plant);</p> <p>(b) If the emission reductions of the project activity are solely on account of thermal energy production (i.e. no emission reductions accrue from the electricity component), the total installed thermal energy production capacity of the project equipment shall not exceed 45 MW thermal;</p> <p>(c) If the emission reductions of the project activity are solely on account of electrical energy production (i.e. no emission reductions accrue from the thermal energy component), the total installed electrical energy generation capacity of the project equipment shall not exceed 15 MW</p>	The program does not involve co-generation projects.	
	The capacity limits specified in paragraphs 7 to 9 above apply to both new facilities and retrofit projects. In the case of project activities that involve the addition of renewable energy units at an existing renewable energy facility, the total capacity of the units added by the project shall comply with capacity limits specified in the paragraphs 7 to 9, and shall be physically distinct ² from the existing units.	The project does not involve any retrofit or addition of renewable energy unit to existing renewable energy units. However, the maximum capacity within each CPA shall be restricted to 5MWe.	
	If solid biomass fuel (e.g. briquette) is used, it shall be demonstrated that it has been produced using solely renewable biomass and all project or leakage emissions associated with its production shall be taken into account in the emissions reduction calculation	No biomass fuel is proposed by the project.	
	Where the project participant is not the producer of the processed solid biomass fuel, the project participant and the producer are bound by a contract that shall enable the project	No biomass fuel is proposed by the project.	

	participant to monitor the source of the renewable biomass to account for any emissions associated with solid biomass fuel production. Such a contract shall also ensure that there is no double-counting of emission reductions.	
	If electricity and/or thermal energy produced by the project activity is delivered to a third party i.e. another facility or facilities within the project boundary, a contract between the supplier and consumer(s) of the energy will have to be entered into that ensures there is no double-counting of emission reductions	In the project activity the heat produced by the biogas units will not be delivered to another facility. It is used to fulfil cooking and heating needs of the household (generation point).
	If the project activity recovers and utilizes biogas for producing electricity and/or thermal energy and applies this methodology on a standalone basis i.e. without using a Type III component of a SSC methodology, any incremental emissions occurring due to the implementation of the project activity (e.g. physical leakage of the anaerobic digester, emissions due to inefficiency of the flaring), shall be taken into account either as project or leakage emissions as per relevant procedures in the tool "Emissions from solid waste disposal sites" and/or "Project emissions from flaring". In the event that the biomass fuel (solid/liquid/gas) is sourced from an existing CDM project, then the emissions associated with the production of the fuel shall be accounted with that project	The program uses AMS-III.R and AMS-I.E in combination of this methodology.
	If project equipment contains refrigerants, then the refrigerant used in the project case shall have no ozone depleting potential (ODP).	Not applicable for this programme.
	Charcoal based biomass energy generation project activities are eligible to apply the methodology only if the charcoal is produced from renewable biomass sources, provided: (a) Charcoal is produced in kilns equipped with methane recovery and destruction facility; or (b) If charcoal is produced in kilns not equipped with a methane recovery and destruction facility, methane emissions from the production of charcoal shall be considered. These emissions shall be calculated as per the procedures defined in the approved methodology "AMS-III.K: Avoidance of methane release from charcoal	The use of charcoal is not proposed by the program.

	production by shifting from traditional open-ended methods to mechanized charcoaling process". Alternatively, conservative emission factor values from peer reviewed literature or from a registered CDM project activity can be used, provided that it can be demonstrated that the parameters from these are comparable e.g. source of biomass, characteristics of biomass such as moisture, carbon content, type of kiln, operating conditions such as ambient temperature.	
	In cases where the project activity utilizes biomass, sourced from dedicated plantations, applicability conditions prescribed in the tool "Project emissions from cultivation of biomass" shall apply.	No biomass fuel is used in the project activity. The cattle dung which is a renewable source is used to generate biogas
	Justification for AMS-IE version 10:	
	Criteria	Means of verification
	This methodology comprises of activities to displace the use of non-renewable biomass by introducing renewable energy technologies. Examples of these technologies include, but are not limited to biogas stoves, bio-ethanol stoves, solar cookers, passive solar homes.	The project technology involves household biogas system (renewable) which replaces use of non-renewable biomass. There is no change in the design of the program technology and hence meets the methodology requirement.
	Project participants are able to show that non-renewable biomass has been used since 31 December 1989, using survey methods or referring to published literature, official reports or statistics.	As per survey report of implemented CPA and validation report /11/ it is evident that biomass has been used since 31 December 1989. The same is applicable for the second crediting period and hence condition is applicable.
	The methodology is applicable for technologies displacing use of non-renewable biomass by renewable energy	The project involves household biogas system which replaces non-renewable biomass (firewood). Therefore, the condition is applicable.
	Project participants or coordinating and managing entities shall describe in the PDD/PoA-DD how the double counting of emission reductions has been addressed (e.g. between end users, distributors and producers of stoves)	Each biodigester to be included in the program is assigned with a unique reference number and participating users enter into an agreement with CME. Further, a cross check at UNFCCC and GS database to be done to check if the CPA is already registered as a CDM or GS project. Therefore, procedures are in place to avoid double counting. The same was in place during the first crediting

		period.
	For project activities introducing bio-ethanol cookstoves, project participants or coordinating and managing entities shall demonstrate that the bioethanol cookstoves are designed, constructed and operated to the requirements (e.g. with regard to safety) of a relevant national or local standard or comparable literature. Latest guidelines issued by a relevant national authority or an international organisation may also be used.	No bio-ethanol cookstoves are part of the program.
	The CDM-PDD or CDM-PoA-DD/CPA-DD shall also explain how the proposed procedures prevent double counting of emission reductions, for example to avoid that project stove manufacturers, wholesale providers or others also claim credit for emission reductions from the project devices	All beneficiaries of a CPA will have to sign an agreement with the CME stating all required information about the carbon money and about the rights of carbon savings to be handed over to the CME.
	The project boundary is the physical, geographical site of the use of biomass or the renewable energy	The project boundary includes the biogas generation unit and the utilization area, i.e. the kitchen of the household.
	Justification for AMS-III.AR version 3:	
	Criteria	Means of verification
	<p>This project category comprises recovery and destruction of methane from manure and wastes from agricultural activities that would be decaying anaerobically emitting methane to the atmosphere in the absence of the project activity. Methane emissions are prevented by:</p> <p>(a) Installing methane recovery and combustion system to an existing source of methane emissions, or</p> <p>(b) Changing the management practice of a biogenic waste or raw material in order to achieve the controlled anaerobic digestion equipped with methane recovery and combustion system.</p>	<p>The project involves utilization of cattle manure in digester to recover biogas and use the same for cooking purposes replacing existing firewood/kerosene based cooking system. In the absence of the project, cattle dung is left to decay anaerobically in pits which lead to methane emissions. Therefore, the condition is met.</p>
The category is limited to measures at individual households or small	The project activity is implemented in individual households. Emission reductions from individual systems	

	<p>farms (e.g. installation of a domestic biogas digester). Methane recovery systems that achieve an annual emission reduction of less than or equal to five tonnes of CO₂e per system are included in this category. Systems with annual emission reduction higher than five tonnes of CO₂e are eligible under AMS-III.D "Methane recovery in animal manure management systems".</p>	<p>are limited to less than or equal to 5 tonnes of CO₂e per year. Therefore, the condition is justified.</p>
	<p>This project category is only applicable in combination with AMS-I.C "Thermal energy production with or without electricity" and/or AMS-I.I "Biogas/biomass thermal applications for households/small users" and/or AMS-I.E "Switch from non-renewable biomass for thermal applications by the user"</p>	<p>AMS-I.C and AMS-I.E are also applied along with this methodology. Hence, condition is justified.</p>
	<p>The project activity shall satisfy the following conditions:</p> <p>(a) The sludge must be handled aerobically. In case of soil application of the final sludge the proper conditions and procedures that ensure that there are no methane emissions must be ensured.</p> <p>(b) Measures shall be used (e.g. combusted or burnt in a biogas burner for cooking needs) to ensure that all the methane collected by the recovery system is destroyed.</p>	<p>The sludge from the biodigesters will be used as a fertiliser by spreading thinly and directly on the ground. Training for biogas system users will include training on the proper handling of sludge. The methane that builds up in the biodigester is destroyed on a daily basis by burning it in cookers for meeting household cooking needs and in some cases water heating needs. Therefore, the condition is met.</p>
	<p>Aggregated annual emission reductions of all systems included shall be less than or equal to 60 kt CO₂ equivalent.</p>	<p>Each CPA is limited to maximum emission reductions of 60,000 tCO₂ equivalent. Therefore, the condition is met.</p>
Findings	<p>CAR 01 was raised as explanation on installed capacity of digesters was not provided in the PoA-DD and density of kerosene was inconsistent in the PoA-DD. PP corrected the same in updated PoA-DD and hence CAR is closed.</p>	
Conclusion	<p>RINA hereby confirms that the selected baseline and monitoring methodologies have been previously approved by the CDM Executive Board, and is applicable to the Project, which complies with all the applicability conditions therein and the selected version is valid at the time of submission of the proposed PoA for renewal of crediting period. It is also confirmed that the methodology is correctly applied by comparing it with the actual text of the applicable version of the methodology and there is no deviation from the selected methodology.</p>	

D.2.2. Validity of original baseline or its update

Means of validation	In accordance of paragraph 287 of CDM project standard for PoA version 2, CME shall describe how to demonstrate the validity of the original baseline or how to
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	<p>update it for each of the corresponding CPAs in accordance with the provisions in paragraphs 288-291 of CDM project standard for PoA version 2.</p> <p>Accordingly, CME has specified that ‘validity of the original baseline’ shall be justified for each CPA as per paragraphs 288-291 of CDM project standard for PoA version 2.</p> <p>However, in accordance of paragraph 382 (a) of validation and verification standard for programmes of activities, version 02.0, DOE assessed the impact of new relevant and national and/or sectoral policies and circumstances on the PoA as below:</p> <p>The programme involves installation of household biogas digesters. In the host country (India), the Ministry of new and renewable energy promotes biogas plants in rural and semi urban areas by setting up of small size biogas plants of 1 to 25 Cubic Metre capacity with financial assistance /18/. However, installation of biogas plants is not mandatory by any law or any programme of the Government in India. Therefore, the national and/or sectoral policies and circumstances does not adversely impact the validity of original projected baseline for the PoA.</p> <p>The data and parameters determined ex-ante and not monitored during the PoA period is provided and justification is given below:</p> <p>Following data parameters are updated from registered PoA-DD:</p> <table><tr><th>Data/Parameter</th><th>Value in registered PoA-DD</th><th>Value in updated PoA-DD</th><th>Assessment</th></tr><tr><td>Emission factor for the substitution of non-renewable woody biomass by similar consumers (EF_{projected_fossilfuel}); tCO₂/TJ</td><td>81.6</td><td>64.4</td><td>The value is updated as per latest version of the methodology AMS-I.E version 10 /05/ and hence applicable for the PoA.</td></tr><tr><td>Global warming potential for methane (GWP_{CH4}); tCO₂ / tCH₄</td><td>21</td><td>25</td><td>The value is updated as per Decisions under UNFCCC and the Kyoto Protocol for second commitment period (from 1 January 2013) /12/</td></tr></table>	Data/Parameter	Value in registered PoA-DD	Value in updated PoA-DD	Assessment	Emission factor for the substitution of non-renewable woody biomass by similar consumers (EF _{projected_fossilfuel}); tCO ₂ /TJ	81.6	64.4	The value is updated as per latest version of the methodology AMS-I.E version 10 /05/ and hence applicable for the PoA.	Global warming potential for methane (GWP _{CH4}); tCO ₂ / tCH ₄	21	25	The value is updated as per Decisions under UNFCCC and the Kyoto Protocol for second commitment period (from 1 January 2013) /12/
Data/Parameter	Value in registered PoA-DD	Value in updated PoA-DD	Assessment										
Emission factor for the substitution of non-renewable woody biomass by similar consumers (EF _{projected_fossilfuel}); tCO ₂ /TJ	81.6	64.4	The value is updated as per latest version of the methodology AMS-I.E version 10 /05/ and hence applicable for the PoA.										
Global warming potential for methane (GWP _{CH4}); tCO ₂ / tCH ₄	21	25	The value is updated as per Decisions under UNFCCC and the Kyoto Protocol for second commitment period (from 1 January 2013) /12/										
Findings	N/A												
Conclusion	RINA concludes that the validity of original baseline is justified in the updated PoA-DD as per paragraph 287 of CDM project standard for PoA version 2.												

D.2.3. Estimated emission reductions or net anthropogenic removals

Means of validation	<p>The PoA-DD applies steps and equations to calculate project emissions, baseline emissions, leakage and emission reductions as per the requirements of the applied Methodologies (AMS-I.C version 21, AMS-I.E version 10 and AMS-III.R version 3). For the calculation of the GHG emission reductions the correct equations have been used reflecting the methodological choices.</p> <p>Following equations are used for the calculation of the emission reductions:</p> <p>The emission reduction is calculated as baseline emission deducted by project emission and leakage</p> <p>ER_y = BE_y – PE_y – LE_y, and</p> <p>BE_y = BE_{y,NRB} + BE_{y,kerosene} + BE_{y,manure}</p>
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where, $E_{y,t}$ is the total emission reductions by the project in year y ,
 BE_y is the baseline emissions of the project in year y ,
 PE_y is the project emissions due to the project activity, and
 LE_y is the leakage due to the project activity in year y :

The total baseline emissions for each household is given by- the baseline emissions from the use of non-renewable biomass, kerosene and the methane emissions from the anaerobic handling of animal manure:

Equation 1 – BE from NRB component as per AMS-I.E version 10.

$$BE_y = B_y \times f_{NRB,y} \times NCV_{biomass} \times EF_{projected\ fossil\ fuel}$$

Where:

BE_y	= Baseline emissions during the year y in t CO ₂ e
B_y	= Quantity of woody biomass that is substituted or displaced in 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 (f_{NRB})
$NCV_{biomass}$	= Net calorific value of the non-renewable woody biomass that is substituted (IPCC default for wood fuel, 0.0156 TJ/tonne)
$EF_{projected\ fossil\ fuel}$	Emission factor for the substitution of non-renewable woody biomass by similar consumers. Use a value of 64.4 t CO ₂ /TJ

Equations for the kerosene usage component as per AMS-I.C version 21:

$$BE_{y,kerosene} = FC_{kerosene} \times N \times \rho_{kerosene} \times NCV_{kerosene} \times EF_{CO_2,kerosene} \times 10^{-9}$$

Where,

$BE_{y,kerosene}$ baseline emissions from burning of kerosene for household cooking needs (t CO₂e/year)

$FC_{kerosene}$ annual amount of kerosene used for cooking in an average household (l/year)

N is the number of devices (biodigesters)

$\rho_{kerosene}$ is the density of kerosene (kg/l). Default value of 0.817 kg/liter is to be used.

$NCV_{kerosene}$ net calorific value of kerosene (TJ/Gg). Default value of 43.8 TJ/Gg to be used.

$EF_{CO_2,kerosene}$ is the emissions factor of kerosene (kg CO₂/TJ). Default value of 71,900 kg CO₂/TJ to be used.

Equations for BE from the manure component as per AMS-III.R version 3 is as below:

$$BE_{y,manure} = \sum(T) (EF_T \times N_T) \times N \times UF_b \times GWP_{CH_4} / 1000$$

Where,

$BE_{y,manure}$ is the baseline emissions from methane emissions from anaerobic decay of manure (Gg CH₄/year);

T is the species/category of livestock;

EF_T is the emissions factor for a defined livestock population (category), (kg CH₄ per animal per year);

and N_{LT} the number of head of livestock species/category T in an average household.

N is the number of units

UF_b is the correction factor suggested in the methodology. Default value of 0.94 to be used.

GWP_{CH_4} is the Global warming potential of Methane. Default value of 25 to be used.

The proposed project will involve N households and will avoid methane emissions which has to be converted into CO₂e with the Global potential warming for methane as per below equation:

$$EF_{(T)} = VS_{(LT)} * 365 * B_{o(LT)} * 0.67 \text{ kg/m}^3 * f_{\text{collected}} * (MCF_{\text{liquid}}/100 * MS\%_{\text{liquid}} + * MCF_{\text{liquid with crust}}/100 * MS_{\text{liquid with crust}} + MCF_{\text{solid}}/100 * MS\%_{\text{solid}} + MCF_{\text{dry}}/100 * MS\%_{\text{dry}})$$

Where,

$VS_{(LT)}$ – daily volatile solid excreted for livestock category T (kg dry matter per animal per day);

365 – basis for calculating annual VS production (days per year);

$B_{o(LT)}$ – maximum methane producing capacity for manure produced by livestock category (T/ m³ CH₄ per kg of VS excreted);

0.67 – conversion factor for converting m³ CH₄ to kg CH₄;

$f_{\text{collected}}$ – Animals kept in the shed (% of hours per day)

$MCF_{(S,k)}$ – methane conversion factors for each manure management system S by climate region k (%); and

$MS_{(T,S,k)}$ – fraction of livestock category T's manure handled using manure management system S in climate region k (dimensionless).

Finally the baseline emissions for one operating unit will be calculated according to the formula given in the methodology (AMS III D as suggested by AMS III R).

Annual baseline emissions for 1 operating unit:

$$BE_y = GWP_{CH_4} * D_{CH_4} * UF_b * \sum_{j,LT} MCF_j * B_{o,LT} * N_{LT,y} * VS_{LT,y} * MS\%_{BLj}$$

Where,

BE_y is the Baseline emissions in year “y” (tCO₂e)

GWP_{CH_4} is the global warming potential for methane. Default value of 25 to be applied.

D_{CH_4} is the density of methane fixed ex-ante to be 0.00067t/m³ as per applied methodology.

UF_b is the model correction factor to account for model uncertainties is fixed ex-ante to be 0.94 as per the applied methodology.

MCF_j is the annual methane conversion factor (MCF) for the baseline animal waste management.

$B_{o,LT}$ is the maximum methane producing potential of the volatile solid generated for animal type “LT” (m³ CH₄/kg dm).

VS_{LT} is the volatile solids for livestock “LT” entering the animal manure management system in year (on a dry matter weight basis, kg dm/animal/year).

Project emissions:

Project emissions from the physical leakage from the biogas units have been considered as per the default value provide in the AMS III R para.7, AMS III D para.21option (b) and methodological tool “Project and leakage emissions from anaerobic digesters”:

$$PE_{CH_4y} = Q_{CH_4,y} * EF_{CH_4,default} * GWP_{CH_4}$$

Where:

PE_{CH_4y} = Project emissions of methane from the anaerobic digester in year y

$Q_{CH_4,y}$ = Quantity of methane produced in the anaerobic digester in year y

$EF_{CH_4,default}$ = Default emission factor for the fraction of CH₄ produced that leaks from the anaerobic digester. Default value of 0.1 tCH₄ leaked / tCH₄ produced.

Q_{CH_4} is to be calculated as below:

$$Q_{CH4} = Q_{biogas,y} * f_{CH4,default} * \rho_{CH4}$$

Where,

$Q_{biogas,y}$ = Amount of biogas collected at the digester outlet in year y (Nm³ biogas)

$f_{CH4,default}$ = Default value for the fraction of methane in biogas (m³ CH₄/m³ biogas). Default 60% is considered.

ρ_{CH4} = Density of methane. Default value of 0.00067 is considered.

Project emissions from fuelwood consumption during non-operation of biogas units, if any are given by:

$$PE_{y,NRB} = B_{biomassproject,y} * f_{NRB,y} * NCV_{biomass} * EF_{projected_fossilfuel},$$

Where,

$B_{biomassproject,y}$ = Quantity of woody biomass that is used in Project Activity in 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 using survey methods.

$NCV_{biomass}$ = Net calorific value of the non-renewable woody biomass that is substituted (IPCC default for wood fuel, 0.015 TJ/tonne).

$EF_{projected_fossilfuel}$ = Emission factor for the substitution of non-renewable woody biomass by similar consumers. Default value of 64.4 tCO₂/TJ to be used.

Project emissions through consumption of kerosene due to use of traditional stove in case of nonoperation of bio-digester will be included in project emissions. Any form of kerosene consumption due to use of traditional stove will be monitored by yearly surveys and any use found in these surveys will be applied for all the project households. Following equation will be used:

$$PE_{kerosene} = F_{kerosene, project} * N * \rho_{kerosene} * NCV_{kerosene} * EF_{kerosene} * 10^{-9}$$

Where,

$F_{kerosene, project}$ is the Quantity of kerosene that is substituted or replaced in an average household.

$\rho_{kerosene}$ is the density of kerosene. Default value of 0.817 kg/liter to be used in the PoA.

$NCV_{kerosene}$ = Net calorific value of kerosene. Default value of 43.8 TJ/Gg to be used in the PoA.

$EF_{kerosene}$ is the emission factor for kerosene. Default value of 71,900 kg CO₂/TJ

Leakage Emissions:

Leakage relating to non-renewable biomass according to AMS I-E (version 10) Paragraph 31 will be assessed from ex-post surveys of users and areas from where biomass is sourced. Following leakage will be considered:

- 12) Use of non-renewable woody biomass saved under the project activity to justify the baseline of other CDM project activities.

If any CPA is designed in the area where any other CDM or PoA activity is going on the saving of wood of that project will be considered. The saved wood by any other project will be added to the available wood while calculating the NRB.

b) Increase in the use of non-renewable woody biomass outside the project boundary. Non-project households will be surveyed in the monitoring to know whether their wood usage has been increased compared to the baseline. If at all the survey shows a significant increase of " $B_{biomass non-project}$ " in comparison to " $Total B_{biomass,y}$ " due to the project activity, then the difference between " $Total B_{biomass,y}$ " and " $B_{biomass non-project}$ " will be considered for leakage calculation. In case it is shown that the fuelwood consumption of non-project households increased due to non-project related issues, such as i.e. reduction in fuelwood price, leakage will not be considered. Leakage due to increased use of fuelwood in non-project households will be calculated as follows:

	$LE_y = (B_{\text{biomass,non-project},y} - \text{Total } B_{\text{biomass},y}) * f_{\text{NRB},y} * NCV_{\text{biomass}} * EF_{\text{projected_fossilfuel}}$ <p>Where, LE_y = Project emissions due to leakage during the year y in tCO₂e $B_{\text{biomass,nonproject},y}$ = Quantity of woody biomass that is used during Project Activity in non-project household in tonnes $\text{Total } B_{\text{biomass},y}$ = Quantity of woody biomass that is used in Baseline in tonnes $f_{\text{NRB},y}$ = Fraction of woody biomass used in the absence of the project activity in year y that can be established as non-renewable biomass using survey methods NCV_{biomass} = Net calorific value of the non-renewable woody biomass that is substituted (IPCC default for wood fuel, 0.015 TJ/tonne) $EF_{\text{projected_fossilfuel}}$ = Emission factor for the substitution of non-renewable woody biomass by similar consumers. Use a value of 64.4 tCO₂/TJ</p> <p>Emission reductions shall be CPA specific as per above procedures and calculations.</p>
Findings	N/A
Conclusion	<p>RINA confirms, the PoA-DD correctly lists assumption and data used by the PP for estimating emission reduction including their references and sources. Source of data and assumptions are correctly quoted and interpreted in the PoA-DD.</p> <p>All values used in the PoA-DD are considered reasonable in the context of the proposed CDM PoA. The baseline methodology and corresponding tools have been correctly applied to calculate project, baseline and leakage emissions, and emission reductions.</p>

D.2.4. Validity of monitoring plan

Means of validation	The monitoring plan given in the updated PoA DD complies with the registered monitoring plan. The values of all ex-ante parameter and monitored parameters will be determined at the time of including CPAs. The assessment of these parameters is as follow:		
	Ex-ante Parameters:		
	Parameter	Value in updated PoA-DD	Assessment
	Quantity of kerosene that is substituted or replaced in average household per year (FC_{kerosene}); L/y	The value is defined based on a survey of a representative sample of households at CPA level.	The value will be determined at the time of CPA inclusion based on sample survey.
	Density of kerosene (ρ_{kerosene}); kg/l	0.817 kg/l	Value is as per publicly available source which was used during first crediting period /13/. Hence, accepted.
	Net calorific value of kerosene (NCV_{kerosene}); TJ/Gg	43.8 TJ/Gg	Default value as per IPCC is used which is unchanged from 1 st crediting period /14/. Hence accepted.
	Emissions factor from burning of kerosene in households ($EF_{\text{CO}_2,\text{kerosene}}$); kg CO_2/TJ	71,900 kg CO_2/TJ	Default value as per IPCC is used which is unchanged from 1 st crediting period /14/. Hence accepted.
	Quantity of biomass that is substituted or replaced in an average household (B_{biomass}); Tonnes	The value is defined based on a survey of a representative sample of households at CPA level.	The value will be determined at the time of CPA inclusion based on sample survey.
	Total quantity of biomass that is used in an	The value is defined based on a survey of a	The value will be determined at the time of

	average household (Total B_{biomass}); Tonnes	representative sample of households at CPA level.	CPA inclusion based on sample survey.
	Net Calorific Value of the non-renewable biomass that is substituted (NCV_{biomass}); TJ/Tonne	0.015 TJ/Tonne	The value is as per latest applied methodology AMS-I.E version 10 /05/ and hence accepted.
	Emission factor for the substitution of non-renewable woody biomass by similar consumers ($EF_{\text{projected_fossil fuel}}$); tCO_2/TJ	64.4 tCO_2/TJ	The value is as per latest applied methodology AMS-I.E version 10 /05/ and hence accepted.
	Fraction of biomass used in the absence of project activity that can be established as non-renewable biomass using survey methods (f_{NRB})	To be determined at CPA level following requirements of AMS-I.E version 10	To be determined at CPA level during inclusion following requirements of AMS-I.E version 10 /05/.
	Global warming potential for methane (GWP_{CH_4}); tCO_2/tCH_4	25	Value is as per decisions under UNFCCC and the Kyoto Protocol for second commitment period /05/.
	Number of heads per cattle species/category in an average household (N_{LT})	The value is defined based on a survey of a representative sample of households at CPA level.	The value will be determined at the time of CPA inclusion based on sample survey.
	Daily volatile solid excreted for livestock category T (VS_{LT}); kg (kilograms) dry matter / (head * day)	3.8 for dairy cow, 3.1 for buffalo, 1.4 for other cattle	Default value as per IPCC is used which is unchanged from 1 st crediting period /15/. Hence accepted.
	Maximum methane producing capacity for manure produced by livestock category T (Bo_{LT}); $m^3 CH_4/kg VS$ (cubic meters of CH_4 per kilogramme Volatile Solid)	0.13 for dairy cattle, 0.1 for buffalo and other cattle.	Default value as per IPCC is used which is unchanged from 1 st crediting period /15/. Hence accepted.
	Methane correction factor for cattle manure for each manure management system S by climate region k (MCF_{manure} (MCF_{liquid} , $MCF_{\text{liquid with crust}}$, MCF_{solid})); %	CPA specific value to be determined during CPA inclusion stage.	The value will be determined during CPA inclusion stage as per IPCC default value.
	Fraction of livestock category T's manure handled using manure management system S in climate region k (fraction of livestock manure handled using liquid/slurry manure management system, fraction of livestock manure handled using liquid/slurry with natural	CPA specific value to be determined during CPA inclusion stage.	CPA specific value to be determined during CPA inclusion stage.

	crust cover, fraction of livestock manure handled using solid storage manure management system and , fraction of livestock manure handled using dry storage manure management system); $MS\%_{\text{manure}}$ (MS_{liquid} , $MS_{\text{liquid with crust}}$, MS_{solid} and MS_{dry})		
	Ex-post parameters to be monitored:		
	Parameter	Monitoring plan	Assessment
	Number of systems (biogas units) operating ($N_{\text{operating}}$)	CPA specific value to be monitored based on yearly survey with clean statistical method for identifying the samples. Area specific supervisors are to be engaged to monitor the operational status of bio-digesters under the supervisors and maintain records for the same. A monthly record to be maintained.	The parameter will be monitored for CPA specific based on annual sample survey. The approach is consistent with methodology requirements.
	Amount of kerosene consumed by household after installation of biogas unit (FC_{kerosene}); liters	This parameter to be monitored CPA specific based on annual survey.	Annual survey based monitoring is to be followed for each CPA which to be done at Taluk level monitoring team.
	Consumption of fuel wood in households participating in the project activities ($B_{\text{biomass,project}}$); Tonnes	Biomass consumed after implementation of the project activity (determined during discussions and by weighing wood consumed on the day of the visit) to be monitored by SKG Sangha annually for each CPA.	Annual survey based monitoring is in consistent with methodology. Hence, accepted.
	Total quantity of biomass that is used in an average household not participating in the project activities ($B_{\text{biomass,non-project}}$); kg CO ₂ /TJ	Survey of 100 non-project households that use fuel wood. The surveys will be carried out once per year by the Taluk level monitoring team. Information will be sought on the quantity of biomass consumed (from discussions and by weighing wood consumed on the day of the visit). This information will be used to calculate $B_{\text{NRB_non_project}}$ (consumption of non-renewable biogas by	The number of sample shall ensure 90/10 confidence precision. In case, the 100 sample does not meet desired confidence precision, the number shall be enlarged to achieve 90/10 confidence precision /17/. This approach was also followed during first crediting period and hence accepted.

		households not participating in the project activities) by applying F_{NRB} of XX% to the monitoring parameter.	
	Annual average animal population in a household (number of heads of dairy cow, buffalo and other cattle). (N_{LT})	To be monitored at CPA level based on annual survey by taluk level monitoring team.	The monitoring procedure represent appropriate method for the parameter which shall be cross checked by project level team randomly.
	Annual hours of operation of an average system (hours of burner functioning) (H_{stove}); Hours	This parameter is not used in emission reduction calculations. However, PP shall check randomly 5% of users from each CPA to confirm whether biodigester produces enough gas to substitute previously use of non-renewable biomass and kerosene.	Since, this parameter is not directly used for emission reduction calculation, PP has considered the same on good will basis and method of monitoring is considered appropriate.
	Average amount of animal manure generated per household per year ($B_{manure,generated}$); Tonne	Sample surveys will be carried out once per year by the Taluk level monitoring team. The amount will be determined by during discussions with the beneficiaries.	Monitoring results shall be cross checked by project level team and by calculating amount of generated manure by multiplying heads of different types of cattle by typical amount of manure generated by these cattle types. The approach is similar to what followed during first crediting period.
	Average amount of animal manure fed into a biogas digester per year ($B_{manure,fed}$); Tonne	Survey of a representative sample (at least 5%) of beneficiaries. The surveys will be carried out once per year by the Taluk level monitoring team. The amount will be determined from discussions with the beneficiaries and by weighing manure fed into the biodigester at the day of the visit.	Monitoring results shall be cross checked by project level team. The approach is similar to what followed during first crediting period.
	Average hours of animals kept in shed/confinement ($H_{manure,collected}$); hours/day	The sample surveys will be carried out once per year by the Taluk level monitoring team. The hours will be determined by during discussions with the beneficiaries.	Monitoring results shall be cross checked by project level team and by calculating amount of generated manure by multiplying heads of different types of cattle by typical amount of manure generated by these cattle types. The

			approach is similar to what followed during first crediting period.
	Proper application of the sludge from the biogas unit.	Sample surveys will be carried out once per year by the Taluk level monitoring team. Application of the sludge will be determined from discussions with the beneficiaries on where, how and when the sludge is used.	Monitoring results shall be cross checked by project level team. Monitoring approach is same what followed during first crediting period.
	The monitoring plan is still same in consistent with the latest methodology and hence valid for the next crediting period. RINA is of the opinion that monitoring plan is feasible within the project design.		
Findings	CL 1 was raised to clarify monitoring procedure of some parameters to follow sampling standard requirements, which PP has clarified and hence CL is closed.		
Conclusion	RINA confirms that the monitoring plan included in the updated PoA-DD is valid as per the applied methodology and conforms the registered PoA-DD.		

D.2.5. Eligibility criteria for inclusion of CPAs

Means of validation	<p>The managing entity employs clear and unambiguous criteria for the inclusion of the CPA. The eligibility criteria's have been stated are in line with the applicability of the applied methodologies. Following has been included as eligibility criteria for CPAs to this PoA –</p> <ol style="list-style-type: none"> 1. Geographical boundary – The CPAs has to be implemented within geographical boundary of India 2. Double counting – CPA has not been implemented as a single CDM project activity or included in in another PoA. Unique reference number to be allocated to each bio-digester. 3. Technology – Each CPA involve biodigesters within the range of 2-15 m3 with a capacity of upto 6 m3 gas per day at household level in rural areas. 4. Baseline Scenario – Beneficiaries uses traditional cookstoves where firewood used is from non-renewable sources and animal waste management is based on anaerobic fermentation. 5. CPA Start date – Shall be later than PoA start date i.e. 14/02/2012 6. Compliance with applied methodology –The CPA shall meet all applicability criteria of applied methodology i.e AMS I.E, Version 10, AMS-I.C version 21 and AMS-III.R version 3. 7. Additionality- CPA shall meet auto-additional criteria as defined in Guidelines on the demonstration of additionality of small-scale project activities” Annex 27 EB 68 8. Local stakeholder consultations – A local stakeholder consultation shall be done at CPA level 9. Diversion of ODA – CPA implementation should not result in ODA diversion 10. Debundling check: The CPA is not a debundled component of a large-scale project activity in accordance with the approved version of the Methodological tool “Assessment of debundling for small-scale project activities v04”. 11. Carbon credit ownership – All households within the CPA transfer their right of CER ownership to the CME, SKG Sangha. 12. Target group – All beneficiaries are rural households without grid connection.
Findings	N/A
Conclusion	RINA confirms that the eligibility criteria are sufficiently objective and comprehensive to permit the assessment of the inclusion of CPAs in the PoA. The eligibility criteria will be checked at each CPA inclusion by the CME and shall be confirmed by the DOE to be fulfilled during CPA inclusion. The eligibility criterias are consistent with the first crediting period.

SECTION E. Internal quality control

>>The draft final validation report before being submitted to request for registration is subjected to an independent internal technical review to confirm that all validation activities had been completed according to the pertinent RINA instructions.

The technical review was performed by a technical reviewer(s) qualified in accordance with RINA's qualification scheme for CDM validation and verification.

SECTION F. Validation opinion

>> RINA has undertaken the validation for renewal of the second crediting period for the registered PoA, "SKG Sangha Biodigester PoA" (UNFCCC Ref 9507). The validation was performed on the basis of UNFCCC criteria for the Clean Development Mechanism, CDM Validation and Verification Standard for Programme of Activities (VVS-PoA) Version 02.0 and host country criteria.

The program of activity involves implementation of biogas applications at individual households in India. The different sizes of the digesters included in the programme are between 2 m³ to 15 m³. Each digester replaces fire-wood which otherwise would have been used for household thermal application (cooking/heating). Thereby, the PoA reduces GHG emissions from firing of fire-wood at household level and avoidance of methane emissions from open manure disposal.

To arrive at the final validation conclusions and opinion, RINA carried out review of project documents, assessment of compliance with and application of the approved baseline and monitoring methodologies as well as the approved methodological tools and interview with CME. Validation team confirms that project information remains materially same as in the registered PoA-DD.

The validation team is of the opinion that the PoA correctly applies the small scale methodology AMS-I.E Version 10, AMS-I.C version 21 and AMS-III.R version 3 and conforms to all the relevant UNFCCC requirements for the CDM as well as the host country's national requirements and that the monitoring arrangements described in the monitoring plan are feasible within the project design. Therefore, RINA requests the renewal of crediting period of "SKG Sangha Biodigester PoA" (UNFCCC Ref: 9507) to the CDM Executive Board.

Appendix 1. Abbreviations

Abbreviations	Full texts
BE	Baseline Emissions
CAR	Corrective Action Request
CDM	Clean Development Mechanism
CDM M&P	Modalities and Procedures CDM
CER(s)	Certified Emission Reduction(s)
CH ₄	Methane
CL	Clarification Request
CME	Coordinating and managing entity
CO ₂	Carbon dioxide
CO ₂ e	Carbon dioxide equivalent
CPA	Component project activity
CRT	Coordination and Technical Control Staff
DCI	Certification Division of RINA Services Spa
DNA	Designated National Authority
DOE	Designated Operational Entity
EB	Executive Board
EF	Emission Factor
EIA	Environmental Impact Assessment
ER	Emission Reductions
FAR	Forward Action Request
GHG(s)	Greenhouse gas(es)
GWP	Global Warming Potential
IPCC	Intergovernmental Panel on Climate Change
kW	Kilo Watt
LoA	Letter of Approval
MoC	Modalities of Communication
MoV	Means of Verification
MR	Monitoring Report
ODA	Official Development Assistance
PDD	Project Design Document
PE	Project Emission
PoA	Program of Activities
PP(s)	Project Participant(s)
Ref.	Document Reference
RINA	RINA Services Spa
SS(s)	Sectoral Scope(s)
TA(s)	Technical Area(s)
UNFCCC	United Nations Framework Convention on Climate Change
VVS	Validation and Verification Standard

Appendix 2. Competence of team members and technical reviewers



CERTIFICATO DI QUALIFICA QUALIFICATION CERTIFICATE

Si attesta che il sig./sig.ra:
We declare that Mr/Mrs/Ms:

Champok BURAGOHAIN

è qualificato come¹:
is qualified as:

CDM -TEC, -VAL, -VER, -TL
ITRP, REG-EXP²

per le seguenti aree tecniche:
for the following technical areas:

1.1, 1.2, 2.1, 13.1, 13.2

AREE TECNICHE TECHNICAL AREAS	DESCRIZIONE DELL'AREA TECNICA TECHNICAL AREA DESCRIPTION	SCOPO SETTORIALE SECTORAL SCOPE
1.1	Thermal energy generation	1
1.2	Renewables	1
2.1	Electricity distribution	2
13.1	Solid waste and wastewater	13
13.2	Manure	13

in accordo alle istruzioni della Unità Certification Innovation and Sustainability.
in accordance with the instructions of the Certification Innovation and Sustainability Unit.

REVISIONE REVISION	DATA DATE	MOTIVAZIONI PER LA REVISIONE REASON FOR THE REVISION
0	19-01-2011	-
13	10-10-2019	Update qualification as TEC in TA 1.1
14	15/11/2019	Update qualification with "Sampling and surveys for CDM PAs and PoAs"

Il Resp. CEINS
Head of CEINS

¹ Legend:

VAL: Validator
VER: Verifier
TEC: Technical Expert
TL: Team Leader
FIN-EXP: Financial Expert
DET: Determiner

CDM: Clean Development Mechanism
VCS: Verified Carbon Standard
GS: Gold Standard
SCS: SocialCarbon Standard
JI: Joint Implementation

² India, Nepal, Sri Lanka, Thailand, Indonesia, Vietnam.

RINA Services S.p.A. è accreditato da UNFCCC, quale Entità Operativa Designata (DOE), per condurre la Validazione e la Verifica di Progetti CDM, da VCSA per condurre la Validazione e la Verifica di Progetti VCS, da GS Foundation, per condurre la Validazione e la Verifica di Progetti GS, da Ecologica Institute per condurre la Validazione e la Verifica di rapporti SCS

RINA Services S.p.A. is accredited by the UNFCCC, as Designated Operational Entity (DOE), to carry out Validation and Verification of CDM Projects, by the VCSA, to carry out Validation and Verification of VCS Projects, by the GS Foundation, to carry out Validation and Verification of GS Projects and by the Ecologica Institute, to carry out Validation and Verification of SCS Reports

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CERTIFICATO DI QUALIFICA QUALIFICATION CERTIFICATE

Si attesta che il sig./sig.ra:

Amalorpavanathan Cyril AUGUSTUS AROKIASAMY

We declare that Mr/Mrs/Ms:

è qualificato come¹:
is qualified as:

CDM-TEC, CDM-VAL, CDM-VER, CDM-TL,
ITRP, REG-EXP²

per le seguenti aree tecniche:
for the following technical areas:

1.1, 1.2, 3.1, 5.1, 13.1

AREE TECNICHE TECHNICAL AREAS	DESCRIZIONE DELL'AREA TECNICA TECHNICAL AREA DESCRIPTION	SCOPO SETTORIALE SECTORAL SCOPE
1.1	Thermal energy generation	1
1.2	Renewables	1
3.1	Energy Demand	3
5.1	Chemical industry	5
13.1	Solid Waste and wastewater	13

in accordo alle istruzioni della Unità Certification Innovation and Sustainability.
in accordance with the instructions of the Certification Innovation and Sustainability Unit.

REVISIONE REVISION	DATA DATE	MOTIVAZIONI PER LA REVISIONE REASON FOR THE REVISION
0	30/06/2010	-
13	31/03/2017	Updated qualification as ITRP
14	20/09/2018	Update qualification as REG-EXP
15	15/11/2019	Update qualification with "Sampling and surveys for CDM PAs and PoAs"

Il Resp. CEINS
Head of CEINS

¹ Legend:

VAL: Validator
VER: Verifier
TEC: Technical Expert
TL: Team Leader
FIN-EXP: Financial Expert
DET: Determiner

CDM: Clean Development Mechanism
VCS: Verified Carbon Standard
GS: Gold Standard
SCS: Social/Carbon Standard
JI: Joint Implementation

² Ghana, Azerbaijan, China, Sri Lanka, Bangladesh, Nepal, Thailand, Indonesia, Singapore, Malaysia, Cambodia, Vietnam, Philippines, UAE and Iraq, Brazil, Japan.

RINA Services S.p.A. è accreditato da UNFCCC, quale Entità Operativa Designata (DOE), per condurre la Validazione e la Verifica di Progetti CDM, da VCSA per condurre la Validazione e la Verifica di Progetti VCS, da GS Foundation, per condurre la Validazione e la Verifica di Progetti GS, da Ecologica Institute per condurre la Validazione e la Verifica di rapporti SCS

RINA Services S.p.A. is accredited by the UNFCCC, as Designated Operational Entity (DOE), to carry out Validation and Verification of CDM Projects, by the VCSA, to carry out Validation and Verification of VCS Projects, by the GS Foundation, to carry out Validation and Verification of GS Projects and by the Ecologica Institute, to carry out Validation and Verification of SCS Reports

GHG_QUAL_CERT_EN_07_18

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CERTIFICATO DI QUALIFICA **QUALIFICATION CERTIFICATE**

Si attesta che il sig./sig.ra:
We declare that Mr/Mrs/Ms:

Daria MASO

è qualificato come¹:
is qualified as:

TEC

per le seguenti aree tecniche:
for the following technical areas:

14.1, 15.1

AREE TECNICHE TECHNICAL AREAS	DESCRIZIONE DELL'AREA TECNICA TECHNICAL AREA DESCRIPTION	SCOPO SETTORIALE SECTORAL SCOPE
14.1	Afforestation and reforestation	14
15.1	Agriculture	15

in accordo alle istruzioni dell'unità Certificazione, Innovazione e Sostenibilità.

in accordance with the instructions of the Certification, Innovation & Sustainability Unit.

REVISIONE REVISION	DATA DATE	MOTIVAZIONI PER LA REVISIONE REASON FOR THE REVISION
0	29/09/2017	First Issue
1	22/01/2020	Update qualification in TA 15.1

Il Resp. CEINS
Head of CEINS

¹ Legend:

VAL: Validator
VER: Verifier
TEC: Technical Expert
TL: Team Leader
FIN-EXP: Financial Expert
DET: Determiner

CDM: Clean Development Mechanism
VCS: Verified Carbon Standard
GS4GG: Gold Standard For Global Goals
SCS: SocialCarbon Standard
JI: Joint Implementation

RINA Services S.p.A. è accreditato da UNFCCC, quale Entità Operativa Designata (DOE), per condurre la Validazione e la Verifica di Progetti CDM, da VCSA per condurre la Validazione e la Verifica di Progetti VCS, da GS Foundation, per condurre la Validazione e la Verifica di Progetti GS, da Ecologica Institute per condurre la Validazione e la Verifica di rapporti SCS

RINA Services S.p.A. is accredited by the UNFCCC, as Designated Operational Entity (DOE), to carry out Validation and Verification of CDM Projects, by the VCSA, to carry out Validation and Verification of VCS Projects, by the GS Foundation, to carry out Validation and Verification of GS4GG Projects and by the Ecologica Institute, to carry out Validation and Verification of SCS Reports

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Appendix 3. Documents reviewed or referenced

No.	Author	Title	References to the document	Provider
1	Foundation myclimate	Updated PoA-DD for the PoA 'SKG Sangha Biodigester PoA' in India	Version 5.5 of 19/12/2019 and version 5.6 of 06/01/2020	CME
2	Foundation myclimate	Registered PoA DD for the PoA 'SKG Sangha Biodigester PoA' in India	Version 5.4 of 21/12/2012	CME
3	TUV Nord	Validation report for the PoA 'SKG Sangha Biodigester PoA' in India	Report no. 12/082-53603111-PoA dated 31/12/2012	CME
4	UNFCCC	UNFCCC viewpage: In English accessed on 22/01/2020 PoA 9507 : SKG Sangha Biodigester PoA	https://cdm.unfccc.int/ProgrammeOfActivities/poa_db/J9KD8PWLMZXABI6H3Y2U471F0NQ5ST/view	Others
5	UNFCCC	Small-scale methodology AMS-I.E 'Switch from non-renewable biomass for thermal applications by the user'	Version 10	Others
6	UNFCCC	Small-scale methodology AMS-I.C 'Thermal energy production with or without electricity'	Version 21	Others
7	UNFCCC	Small-scale methodology AMS-III.R 'Methane recovery in agricultural activities at household/small farm level'	Version 3	Others
8	UNFCCC	Validation and verification standard for PoA	Version 02 of 29/11/2018	Others
9	UNFCCC	CDM Project Standard for PoA	Version 02 of 29/11/2018	Others
10	UNFCCC	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- EB 66 Annex 47	Others
11	TUV Nord	CPA validation report 'SKG Sangha Biodigester PoA Gulbarga Biodigester Project CPA1'	Report No: 53603111-12/082- CPA 1 dated 31/12/2012	Others
12	CDM Executive Board	Standard for the application of the global warming potentials to clean development mechanism project activities and programme of activities for the second commitment period of the Kyoto Protocol	version 1, Annex 3 of EB 69 dated 13/09/2012	Others
13	Web Page	Density, mass gravity of liquids	https://www.simetric.co.uk/si_liquids.htm	Others
14	IPCC	IPCC Guidelines for National Greenhouse Gas Inventories, Volume 2, Chapter 1		Others
15	IPCC	Tables 10A-4 to 10A-6 in 2006 IPCC Guidelines for National Greenhouse Gas Inventories (Volume 4, Chapter 10)		Others
16	UNFCCC	Programme of activities design document form	Version 09 of 31/05/2019	Others
17	CDM Executive Board	Standard: Sampling and surveys for CDM project activities and programmes of activities	Version 08 of 28/11/2019	Others
18	Ministry of new and renewable energy, Govt.	New national biogas and organic manure programme	Website ' https://mnre.gov.in/bio-energy/schemes ' accessed on	Others

	of India		03/04/2020	
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Appendix 4. Clarification requests, corrective action requests and forward action requests

Table 1. CL from this validation

CL ID	01	Section no.	D.2.4	Date: 01/01/2020
Description of CL				
1) <i>Kindly clarify the basis on which 100 number of non-project households are considered for monitoring parameter $B_{biomass, non-project}$?</i> 2) <i>PP is requested to clarify whether survey means sample survey or 100% survey for parameter $FC_{kerosene}$, $B_{biomass, project}$, N_{LT}, $B_{manure, generated}$ and application of sludge.</i> 3) <i>Specify the purpose of the parameter $B_{manure, generated}$, $B_{manure, fed}$ and $H_{manure, collected}$</i>				
Project participant response				Date: 07/01/2020
1. As written in section I.7 Monitoring plan of the PoA-DD page 45 (and page 32 of generic VPA-DD) parameter " $B_{biomass, non-project}$ - Data for this variable will be collected by surveying 100 non-project households that use fuel wood In case it will be found that the chosen sample size for the parameter is too small to comply with 90/10 level of precision, it will be enlarged during the monitoring so that the 90/10 level of precision can be assured" and also in page 43 sample size section "Where there is no specific guidance in the applicable methodology, project proponents shall use 90/10 confidence/precision as the criteria for reliability of sampling efforts for small-scale project activities". The project proponent propose a size of 100 to comply with the level of precision rule following the Standard Sampling and surveys for CDM project activities and programme of activities" v07 and during the first four Monitoring Reports for CPA 1 the sample size of 100 has comply with the rule. Therefore the size of 100 has been already tested and complies with the standard requirements. Random survey of non-project households in the project area will be carried out. Households will be randomly selected. A pre-printed questionnaire will be used for filling the data collected. This will be carried out along with the monitoring survey of project households. 2. Survey means sample survey of the parameters mentioned. The word 'sample' has been added in each parameter identified in PoA-DD section I.7.1 and generic VPA-DD (section B.5.1) for clarification. 3. The purpose of parameter $B_{manure, generated}$, $B_{manure, fed}$ (calculation of leakage emissions) and $H_{manure, collected}$ (Calculation of baseline emissions) have been included in PoA-DD (section I.7.1) and generic VPA-DD (section B.5.1).				
Documentation provided by project participant				
PoA-DD				
DOE assessment				Date: 22/01/2020
Sample size calculation to follow 90/10 confidence precision in case pre-determined 100 sample does not meet the desired precision. Similarly other parameters are clarified as sample survey and necessary corrections are done in the updated PoA-DD. Hence, CL is closed.				

Table 2. CAR from this validation

CAR ID	01	Section no.	D.2.1	Date: 01/01/2020
Description of CAR				
1. Section I.2 of the PoA-DD mention 'The installed electrical capacity of this size of unit is 0.832 kW (see capacity calculation for 6m3 biogas unit below in this section) which corresponds to 2.496 kW thermal' under justification of AMS-I.C and 'Regarding the PoA maximum size (6m3 biogas generation per day) unit – it generates 71.28 MJ net energy per day (See Emission reduction excel sheet calculations' under justification of AMS-III.R. However, no details available in this regard. 2. Density of kerosene is taken as 0.817 kg/l in section I.6.2 whereas in section I.6.3 it is mentioned as 0.817 TJ/Gg.				
Project participant response				Date: 07/01/2020

1. A detail explanation has been included as footnote. Biogas plant with a capacity of 6 cubic meter biogas per day will generate 6 cubic meters of biogas per day. Methane content in the biogas is about 60% and will have the thermal energy capacity of 21.6 MJ per cubic meter (BT Nijaguna book mentioned in the PDD). One megajoule is equivalent of 0.28 Kwh (<http://www.kylesconverter.com/energy,-work,-and-heat/megajoules-to-kilowatt-hours>). 129.6 MJ is equal to 36.288 KWh. As the biogas is generated in a day (24 hours) the installed capacity of a 6 cubic meter unit is equal to 1.512 Kwh. The thermal efficiency of the biogas stove is 55% (BT Nijaguna book) and hence the net installed capacity of the 6 cubic meter gas generation per day unit is equal to 0.832 Kwh.
2. The correct unit for the density of kerosene is 0.817 kg/l. The same has been corrected in section I.6.2 and I.6.3 of the PoA-DD and also in generic CPA-DD section B.4.3.

Documentation provided by project participant

PoA-DD

Conversion of Kwh to MJ source(<http://www.kylesconverter.com/energy,-work,-and-heat/megajoules-to-kilowatt-hours>)**DOE assessment****Date:** 22/01/2020

Calculation of thermal capacity of a 6m3 biogas plant is elaborated and details are provided in the updated PoA-DD. Response is accepted and CAR is closed.

Table 3. FAR from this validation

FAR ID	01	Section no.	C.2	Date: 01/01/2019
Description of FAR				
As no site visit has been performed during the validation of the renewal of crediting period of the PoA and all validation of technical data of equipment has been done based on documents, pictures and interview, the verifier shall reconfirm the technical data.				
Project participant response				Date: 07/01/2020
Accepted.				
Documentation provided by project participant				
DOE assessment				Date: DD/MM/YYYY

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Document information

<i>Version</i>	<i>Date</i>	<i>Description</i>
02.0	31 May 2019	Revision to: <ul style="list-style-type: none">• Ensure consistency with version 02.0 of the “CDM validation and verification standard for programmes of activities” (CDM-EB93-A08-STAN) and version 02.0 of the “CDM project cycle procedure for programmes of activities” (CDM-EB93-A09-PROC);• Make editorial improvements.
01.0	29 December 2017	Initial publication.

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Document Type: Form
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