




Validation report form for post-registration changes for CDM programme of activities

(version 01.0)

Complete this form in accordance with the "Attachment: Instructions for filling out the validation report form for post-registration changes for CDM programme of activities" at the end of this form.

VALIDATION REPORT ON POST-REGISTRATION CHANGES (PRCs)

Title and reference number of the programme of activities (PoA)	SimGas Biogas Programme of Activities (ref no 7734)
Process track	<input type="checkbox"/> Prior approval <input checked="" type="checkbox"/> Issuance <input type="checkbox"/> Renewal of crediting period
Version number of the validation report on PoA PRCs	1. 10
Completion date of the validation report on PoA PRCs	31/06/2018 31/06/2018
Version number of PoA-DD and/or CPA-DD applicable to this validation report	PoA-DD Version 7.0 CPA-DD Version 7.0
Type(s) of PoA PRCs	<input checked="" type="checkbox"/> Temporary deviations from the registered monitoring plan, monitoring methodology or standardized baseline <input type="checkbox"/> Corrections <input type="checkbox"/> Changes to the start date of the crediting period <input type="checkbox"/> Inclusion of a monitoring plan to a registered PoA <input type="checkbox"/> Permanent changes from registered monitoring plan, monitoring methodology or standardized baseline <input type="checkbox"/> Types of changes specific to afforestation and reforestation activities <input type="checkbox"/> Changes to the programme design of a registered PoA <input type="checkbox"/> Changes to project design of generic component project activities or specific-case component project activities
Coordinating/managing entity (CME)	SimGas IP BV
Host Party(ies)	Kenya
Sectoral scope(s)	1 : Energy industries (renewable - / non-renewable sources) 15 : Agriculture
Selected methodology(ies)	<ul style="list-style-type: none"> - AMS-I.I. Version 4: Biogas/biomass thermal applications for households/small users - AMS-I.E. Version 4: Switch from non-renewable biomass for thermal applications by the user - AMS-III.R. Version 2: Methane recovery in agricultural activities at household/small farm level

Selected standardized baseline(s), where applicable	Not applicable
Name of DOE	EPIC Sustainability Services Private Limited (E-0062)
Name, position and signature of the approver of the validation report on PoA PRCs	 K. Sudheendra, Head Operations

SECTION A. Executive summary

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EPIC Sustainability Services Private Limited (EPIC) has been contracted by SimGas IP BV to undertake the initial periodic independent verification of the registered CDM programme of activity titled "SimGas Biogas Programme of Activities" (UNFCCC reference number: 7734). The objectives of this verification are to verify and certify emission reductions reported for project activity for the monitoring period of 20/01/2013 to 31/12/2015 (first and last day included); and to verify that the data reported are complete and transparent. During verification temporary deviation from the registered monitoring plan is identified. So, the verification scope also includes assessment of post registration change of the project monitoring plan.

This validation is an independent and objective review of the temporary deviation to the registered/validated monitoring plan in the PoA-DD^{/2/} and the CPA-DD^{/2/} for this monitoring period. The information in these documents is reviewed against the CDM Validation and Verification Standard (version 09) and Project Standard (version 09), Kyoto Protocol requirements and UNFCCC rules. The report is based on the assessment of the monitoring report, emission reduction spreadsheet, 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 objective of the CDM programme aims to install biogas systems with stoves in households/SMEs/communities typically using non-renewable biomass and fossil fuels as their main source of cooking fuel. The biogas systems will be fed with a feedstock of manure and/or organic waste, which will be anaerobically digested to produce biogas. The biogas produced will be used to replace the combustion of non-renewable biomass and fossil fuels, thereby reducing CO₂ emissions. The biogas systems that use manure as a feedstock can also reduce CH₄ emissions by diverting manure that would otherwise decompose without the capture and use of the methane. The Coordinating/Managing Entity of the SSC-PoA, SimGas IP BV, disseminate different types and sizes of biogas systems, depending on the needs and preferences of the user.

This report summarizes the findings of the validation of the temporary deviation to the registered monitoring plan. EPIC has employed a risk-based approach in the validation based on the recommendations in the Validation and Verification Standard, Version 9.0 (hereinafter referred to as VVS)^{/5/}, Project standard, Version 9.0 (hereinafter referred to as PS)^{/5/}, focusing on the temporary deviation to the monitoring plan. The validation is not meant to provide any consulting towards the client. However, the stated requests for clarifications and/or corrective actions may provide input for improvement of the monitoring plan and the project design.

Validation summary

The actual temporary deviation to the registered/validated monitoring plan in the PoA-DD^{/5/} and CPA-DD^{/5/} for the current monitoring period, and assessed by the validation team, meet the provisions described in the Appendix 1 of Project Standard (PS), version 9.0^{/1/}, hence it does not require prior approval by the Board. Therefore, the validation team reports the post registration changes along with issuance track.

SECTION B. Validation team, technical reviewer and approver

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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 review	On-site inspection	Interview(s)	Validation findings

CDM-PoA-PRCV-FORM

1.	Team Leader	IR	Anbazhagan	Prabu das	Central office, Bangalore	√	√	√	√
2.	Team Member	EI	Mwangi	Monica	Central office, Bangalore	√	√	√	√

B.2. Technical reviewer and approver of the validation report on PoA PRCs

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 Review team	IR	Vijayaraghavan	Radhamadhavan	Central office of EPIC, Bangalore
2.		ER	Seshan	Ranganathan	Central office of EPIC, Bangalore

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

>> The validation team has reviewed the registered PoA-DD^{/2/} version 4.1, Generic CPA-DD^{/2/} and the CPA-DD version 4.0^{/2/} and its corresponding validation report^{/3/}, revised PoA-DD^{/5/} version 7.0 and the revised CPA-DD version 7.0^{/5/}, monitoring report, Emission reduction spreadsheet, survey documents and additional background documents (listed in Appendix 3 of this report) submitted by the project participant. Based on the review, the validation team issued corrective action requests/ clarification requests, please refer to Appendix 4 of this report for the list of CAR/CLs and their closures.

C.2. On-site inspection

Duration of on-site inspection: 18/07/2016 to 21/07/2016				
No.	Activity performed on-site	Site location	Date	Team member
1.	<p>The verification team conducted visits to the project site between 18/07/2016 to 21/07/2016 to confirm the information and to resolve issues identified in the document review. An on-site assessment was conducted as a part of verification activity and involved:</p> <p>1) an assessment of the implementation and operation of the CDM programme of activity as per the PoA-DD and the CPA-DD's^{5/}</p> <p>2) a review of information flows for generating, aggregating and reporting of the monitoring parameters</p> <p>3) interviews with relevant personnel to confirm that the operational and data collection procedures are implemented in accordance with the Monitoring Plan</p> <p>4) a cross-check between information provided in the MR and data from other sources</p> <p>5) a check of the monitoring equipment including calibration performance, and observations of monitoring practices against the requirements of the PoA-DD and the applied methodology</p> <p>6) a review of calculations and assumptions made in determining the GHG data and ERs, and</p> <p>7) an identification of QA/QC procedures in place to prevent, or identify and correct, any errors or omissions in the reported monitoring parameters</p>	<p>SimGas office visit at Nairobi</p> <p>SimGas Kenya Ltd.</p> <p>P. O. Box 104699-00101</p> <p>Nairobi, Kenya</p> <p>Five Star Road, South C Estate, House No. 11</p>	18/07/2016 to 21/07/2016	Anbazhagan Prabud, Mwangi Monica

C.3. Interviews

No.	Interviewee			Date	Subject	Team member
	Last name	First name	Affiliation			
1.	Kynaston	Oliver	COO (Chief Operating Officer), SimGas	18/07/2016 to 21/07/2016	Performance of project activity -Project Implementation, Monitoring, Data management and reporting, QA/QC systems, logistics, interactions with Biogas digesters end users	Anbazhagan Prabud, Mwangi Monica
2.	Galt	Hilda	Senior Consultant, Climate Focus		Sampling, Internal quality, Documentation, MR, CER sheets, Sampling, Record keeping Customer complaints	Anbazhagan Prabud, Mwangi Monica
3.	Moses	Ogeto Gekara	SimGas, Country Manager,		Construction, Agreements, complaint management Repairs,	Anbazhagan Prabud, Mwangi Monica

			Kenya		User trainings, spares availability, interactions with the end users, scheduled inspections	
4.	Pan	Sabela	SimGas, Research and Development Officer		Sampling, survey, training to enumerators, Internal quality, Documentation, interactions with the end users	
5.	Tanui	Pauline	SimGas, Human Resources and Customer Care Manager, Kenya		Internal quality, Documentation, employee training, records keeping	
6.	Households (26)	Sampled and non-sampled house holds		18/07/2016 to 21/07/2016	Status of Biogas digester operation and its usage, operation and maintenance, and availability of trained personnel, down times, (if any), reasons for non-usage, cattle availability, household numbers, spares availability etc	Anbazhagan Prabu das, Mwangi Monica

C.4. Clarification requests, corrective action requests and forward action requests raised

Areas of validation findings	No. of CL	No. of CAR	No. of FAR
Compliance with PoA-DD and/or CPA-DD form(s)	-	-	-
Temporary deviations from the registered monitoring plan, monitoring methodology or standardized baseline	-	01	-
Corrections	-	-	-
Changes to the start date of the crediting period	-	-	-
Inclusion of a monitoring plan in a registered PoA	-	-	-
Permanent changes from registered monitoring plan, monitoring methodology or standardized baseline	-	-	-
Types of changes specific to afforestation and reforestation project activities	-	-	-
Changes to the programme design of a registered PoA	-	-	-
Changes to project design of generic component project activities or specific-case component project activities	-	-	-
Others (please specify)	-	-	-
Total	-	01	-

SECTION D. Validation findings

D.1. Compliance with PoA-DD and/or CPA-DD form(s)

Means of validation	Not applicable as the PRC only temporary deviation from registered Monitoring plan.
Findings	NA
Conclusion	NA

D.2. Temporary deviations from the registered monitoring plan, monitoring methodology or standardized baseline

Means of validation	For the current MR period, temporary deviation to the registered monitoring plan is observed with respect to carrying out of annual survey monitoring, and this temporary deviation is assessed as per Appendix 1 of PS Ver 9.0, Para 271 – 273 of PS Ver 9.0, 298 - 301 of VVS version 09
Findings	CAR 01 is raised
Conclusion	<p>Out of the total 276 digesters that are considered for the current MR period under CPA-1, 70 were installed in the year 2013, 158 were installed in 2014 and 48 were in 2015. The survey for this MR period was carried out once between 24/02/2016 to 15/03/2016 whereas the CPA-DD requires annual monitoring survey. This is reported as temporary deviation from the registered monitoring plan as per Para 271 – 273 of PS Ver 9.0. The nature, extent and duration of the deviation and its assessment is as follow:-</p> <ul style="list-style-type: none"> - Nature of deviation: Annual monitoring was not done during the first and second annual monitoring years for all those parameters that require annual monitoring as per the validated CPA-DD. - Extent of deviation: Annual monitoring was not done for the following four input parameters used in the emission reduction calculations under applied methodology AMS-III.R: <ul style="list-style-type: none"> o $n_{k,y}$ Operational rate of thermal applications installed o $N_{da,y}$ Number of days animal is alive on the farm; o $N_{p,y}$ Number of animals produced annually of type LT for year y; o $N_{LT,y}$ Average number of animals of type LT in year y (population) <p>All other monitored parameters that are inputs in the emission reduction calculations were monitored on an ongoing basis by the CME as and when the new customers are added to the programme, including:</p> <ul style="list-style-type: none"> o Number of biogas systems commissioned o Methane conversion factor for each manure management system j o Fraction of manure handled in the baseline animal manure management system j o Global Warming Potential of methane <p>Other monitored parameters in the project activity, not mentioned above, do not impact the calculation of emission reductions.</p> <ul style="list-style-type: none"> - Duration of deviation: The above four parameters, that has impact on the ER calculations, were not monitored during the first and second annual monitoring years. The results of the monitoring carried out in 2016 are applied for the year 2015, which is acceptable. - Proposed alternative: The CME has applied conservative values for the monitored parameters for the delay period as follows: <ul style="list-style-type: none"> o $n_{k,y}$ Operational Rate: An operational rate of 87.04<u>75.93</u>% was determined through the survey carried out in the year 2016. Application of this value for the entire MR period duration is a conservative approach since it is assumed that the operation rate of digesters is likely lower than in reality: a digester installed in the year 2013 that was not operational in 2016 is more likely to have been operational when it was newly installed in 2013. Since this is the lowest possible operational rate encountered over the three years (due to having the oldest digesters installed), applying 87.04<u>75.93</u>% across all the years is equivalent to assuming the operational rate is at “maximum capacity” for the duration of the period of missing data and is therefore accepted to be inline with the Para 3 of Appendix 1 of Project Standard, version 9.0 which says “If project participants or the coordinating/managing entity have temporarily not monitored parameters related to project GHG emissions or are unable to produce evidence related to such monitoring, prior approval by the Board is not required if project participants or the coordinating/managing entity estimate these parameters assuming that the source of the GHG emissions operated at maximum capacity for the full period of the missing data.” o $N_{da,y}$ Number of days animal is alive on the farm: ‘The number of days

an animal is alive on the farm' do not change significantly from one year to another. Hence, applying the monitored values of 343 days for cows, ~~and 336 for market swine~~ is reasonable. However, the values are reported as '0' for the years 2013 and 2014 for cows, and for market swine the sample size is below the 90/10 sample size requirement's so it is reported '0' for the entire MR period and this is in compliance with the Para 2 of Appendix 1 of Project Standard, version 9.0 which says "If project participants or the coordinating/managing entity have temporarily not monitored parameters related to baseline greenhouse gas (GHG) emissions or are unable to produce evidence related to such monitoring, prior approval by the Board is not required if project participants or the coordinating/managing entity report these parameters as zero".

- $N_{p,y}$ Number of animals produced annually of type LT for year: "The number of animals produced annually" do not change significantly from one year to another. Hence, applying the monitored values of ~~4.787.22~~ days for cows, ~~and 6.26 for market swine~~ is reasonable. However, the values are reported as '0' for the years 2013 and 2014 for cows, and for market swine the sample size is below the 90/10 sample size requirement's so it is reported '0' for the entire MR period -and this is in compliance with the Para 2 of Appendix 1 of Project Standard, version 9.0.
- $N_{LT,y}$ Average number of animals of type LT in year y (population): This value is derived from the above two quoted values(parameters), hence it is also reported at zero for the years 2013 and 2014 (and beyond for market swine).

Compliance of the survey results as per the requirement of the 90/10 confidence levels

Nature of deviation: The analysis to determine whether each parameter monitored met the 90/10 confidence level revealed that all monitored data meet the 90/10 confidence level, apart from the following parameters (a. *Operational rate of thermal application installed*, b. *Average annual hours of operation of a system*, c. *Average number of cows produced annually*, d. *Average number of pigs produced annually*) which are listed below.

Extent of deviation: For those parameters that were not able to meet the 90/10 confidence level, conservative discount factors following the Standard for Sampling & Surveys (v07) paragraph 17 (b) needed to be applied. Paragraph 17 (c) states that the option to apply a discount factor is permitted if 1) the survey is undertaken within the first two years of the crediting period and 2) when the attained confidence/precision from the actual samples is equal to or better than 90/15 for small-scale CDM project activities. Regarding the first requirement, a call with the UNFCCC Secretariat on 19 March 2018 confirmed that the first requirement is in place to ensure that Project Participants do not apply the discount factor repeatedly, and that in some occasions it happens that Project Participants must apply the discount factor. Further, the methodology AMS-I.E states that "In cases where survey results indicate that 90/10 precision... is not achieved, the lower bound of a 90 per cent... confidence interval of the parameter value may be chosen as an alternative to repeating the survey efforts to achieve the 90/10... precision" without any further time boundary stated. This is the first MR for the project activity. Regarding the second requirement, the attained confidence/precision from the actual samples is equal to or better than 90/15 for all parameters listed below.¹

Duration of deviation: 20/01/2013 to 31/12/2015 (both days inclusive)

Proposed alternative:

- Operational rate of thermal application installed. The achieved precision was 11.3%, 1.3% higher than the 10 % target. Therefore the emission reductions are discounted by no less than three times the percentage

¹ See file '20180330 Monitoring Results KE MP1 + ANALYSIS', sheet 'Analysis', columns M and N

	<p>precision points missed, inline with the Standard for Sampling & Surveys (V07), paragraph 17 (b) (i) (b). See the emission reduction calculation spreadsheet, sheet 'CDM CPA 1 Total ERs', rows 84 – 88. The operational rate applied in the ER calculations is 75.93%. For comparison and to demonstrate conservativeness, the more recent monitoring survey in the year 2017^{15/} (15 September – 20 October 2017) yielded a value of 86.57%.</p> <ul style="list-style-type: none"> - <u>Average annual hours of operation of a system.</u> The achieved precision was 12%, 2% higher than the 10% target. Therefore, the lower bound of the confidence interval was applied as per Standard for Sampling & Surveys (V07), para 17, (b) (i) (a), and AMS-I.E (V 04), paragraph 17. - <u>Average number of cows produced annually.</u> The achieved precision was 15%, 5% higher than the 10% target. Therefore, the lower bound of the confidence interval was applied as per Standard for Sampling & Surveys (V07), para 17, (b) (i) (a) to derive a value of 4.78 cows produced annually. This is a conservative approach. For comparison and to demonstrate conservativeness, a more recent monitoring survey in the year 2017^{15/} (15 September – 20 October 2017) yielded a value of 5.65 cows. - <u>Average number of pigs produced annually.</u> The survey revealed that only 3 customers owned pigs, with significant variation in the number owned (from 0- 300). It is prohibitively expensive to carry out additional monitoring in order to meet the 90/10 confidence level for this parameter due to the large sample size that would be needed. The Project Participant has therefore chosen to report this parameter as zero, in line with the Para 2 of Appendix 1 of Project Standard, version 9.0. - <u>% pig manure fed into the digester.</u> The survey revealed that only 3 customers owned pigs, with significant variation in the number owned (from 0- 300). It is prohibitively expensive to carry out additional monitoring in order to meet the 90/10 confidence level for this parameter due to the large sample size that would be needed. The Project Participant has therefore chosen to report this parameter as zero, in line with the Para 2 of Appendix 1 of Project Standard, version 9.0 <p>This temporary deviation from the registered monitoring plan and it's assessment is verified to be meeting the requirement of Para 2 and 3 of the Appendix 1 (Changes that do not require prior approval by the Executive Board of the clean development mechanism) of PS ver 9.0 and thus accepted by the verification team.</p>
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D.3. Corrections

Means of validation	NA
Findings	NA
Conclusion	NA

D.4. Changes to the start date of the crediting period

Means of validation	NA
Findings	NA
Conclusion	NA

D.5. Inclusion of a monitoring plan in a registered PoA

Means of validation	NA
Findings	NA
Conclusion	NA

D.6. Permanent changes from registered monitoring plan, monitoring methodology or standardized baseline

Means of validation	NA
Findings	NA
Conclusion	NA

D.7. Types of changes specific to afforestation and reforestation activities

Means of validation	NA
Findings	NA
Conclusion	NA

D.8. Changes to the programme design of a registered PoA

Means of validation	NA
Findings	NA
Conclusion	NA

D.9. Changes to project design of generic component project activities or specific-case component project activities

Means of validation	NA
Findings	NA
Conclusion	NA

SECTION E. Internal quality control

>> After the completion of assessment by the validation team all the relevant documentation is submitted to a qualified, Independent Technical reviewer as part of EPIC' internal quality control system. A Technical reviewer team is appointed to review the draft final validation report (Draft FVR). The comments made by the Technical reviewer team are taken into consideration and incorporated in the final FVR. The technical reviewer team assesses whether all the reporting requirements have been fulfilled and whether all the issues raised were closed satisfactorily by the validation team with justification. The technical review process can also raise issues in this regard which is resolved further by the validation team to the satisfaction of the technical reviewer. The technical reviewer team either accepts or rejects the report made by the validation team. The final report (after resolutions of all findings) is then submitted to the Head-operations for review and approval.

SECTION F. Validation opinion

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EPIC Sustainability Services Private Limited (EPIC) has been contracted by SimGas IP BV to undertake the initial periodic independent verification of the registered CDM programme of activity titled "SimGas Biogas Programme of Activities" (UNFCCC reference number: 7734). The objectives of this verification are to verify and certify emission reductions reported for project activity for the monitoring period of 20/01/2013 to 31/12/2015 (first and last day included). The scope of verification also includes the assessment of post registration change with respect to temporary deviation.

The PRC validation has been performed as described in the VVS, version 09.0, PS Version 9.0 and consists of the following steps: - Review of the MR - Desk review of the revised MR, and the relevant documents - Site visit & Interviews - Preparation of the PRC Validation Report.

Only a deviation from the registered monitoring plan is applied in the monitoring period. It is DOE's opinion that the revised documentation submitted is conforming to the requirements for Post Registration Changes as stipulated in the Clean Development Mechanism Validation and Verification Standard, Project Standard, version 09. The reported temporary deviation from the registered monitoring plan doesn't require PRC prior approval by the Executive Board of the clean development mechanism, and is suitable for approval under the issuance track as per the appendix -1 of CDM PS for project activities, version 09. EPIC further confirms that the deviation complies with the relevant requirements related to the temporary deviation from the registered monitoring plan and monitoring methodology

Appendix 1. Abbreviations

Abbreviations	Full texts
AMS	Approved Methodology Small Scale
CAR	Corrective Action Request
CDM	Clean Development Mechanism
CEF	Carbon Emission Factor
CER	Certified Emission Reductions
CO ₂	Carbon Dioxide
CO ₂ e	Carbon Dioxide Equivalent
CL	Clarification Request
DOE	Designated Operational Entity
ESSPL	EPIC Sustainability Services Private Limited
FAR	Forward Action Request
GHG	Greenhouse gases
MoV	Means of Verification
PCP	Project Cycle Procedure
PDD	Project Design Document
PP	Project Participant
PS	Project Standard
QA/QC	Quality Assurance/Quality Control
UNFCCC	United Nations Framework Convention on Climate Change
VVS	Validation and Verification Standard

Appendix 2. Competence of team members and technical reviewers

The following validation team has been assigned to carry out the verification of the project.

Name	Ms Monica Mwangi	Mr. A. Prabu Das	Mr. R. Vijayaraghavan	Mr. Seshan Renganathan
Role	Team Member	Auditor- team member	Technical Reviewer	Expert in TR team
Competence in relevant sectors	Sector 1	Sector 1, Sector 15	Sector 1 and Sector 13	Sector 1, Sector 15
Responsibility	Document review, Participation in site visit	Document review, DVR preparation, DVR resolution, FVR preparation	Technical review	Technical review

Mr. A Prabu Das, holds a M. Tech Degree in Energy Conservation and Management and B. Tech Degree in Petro-chemical Technology. He is a certified Energy Auditor by Bureau of Energy Efficiency (BEE), Government of India. He has around 8 years of work experience in Design of biomass Power plants, preparing Techno Economic Feasibility Reports (TEFR), carrying out energy audits, of which last six years have been in CDM consultancy and validation services. He has undergone extensive training on CDM validation and verification and is a qualified lead auditor

for Sectoral Scope 1 and 15 in accordance with procedures of EPIC Sustainability Services Pvt. Ltd. He is also an ISO 26000 lead auditor certified by Professional Evaluation and Certification Board (PECB).

Ms. Monica Mwangi, from Kenyan, holds a Bachelor of Business Science (BBS) in Financial Economics from Strathmore University and Bachelors in Community Resource Management from Kenyatta University. She has participated in surveys as freelancer expert providing technical solutions and general assistance for the construction of sustainable water, renewable energy and sanitation systems to be used in marginalized neighbourhoods in Africa for CDM projects. She has experience in Monitoring cooking experiments from marginalized households to determine fuel carbon emission factors and working with farming community in monitoring biogas projects and is qualified for Sector 1 and 13 in accordance with procedures of EPIC Sustainability Services Pvt. Ltd

Mr. R. Vijayaraghavan, holds BE in Mechanical Engineering, M. Tech in Energy Conservation and Management and MBA in Technology Management. He is certified as Energy Auditor by Bureau of Energy Efficiency (BEE), Government of India. He has 12 years of working experience in energy sector including 6 years as validator. He has successfully completed around hundred CDM, VCS/GS projects. He has been qualified as Lead Auditor for Sectoral Scope 1 and 13.

Mr. Seshan Ranganathan, holds a Bachelor's Degree in Chemical Engineering and has done diploma course in Management and completed the graduate ship course in Industrial Engineering and has an overall working experience of around thirty two years with twenty four years' experience in Chemical process industry (fertilizer & petrochemical manufacturing) covering production, technical services including energy audits and efficiency studies, waste heat -recovery, efficiency studies of boilers ,power plants, safety audits and pollution control activities including waste water treatment, project management, corporate planning, sales, logistics in fertilizer & petrochemical industry. With respect to the thermal power plant the job assignment included the monitoring of flue gas exit temperatures, excess air used efficiency of fuel additives, condition of boiler refractory, insulation of steam lines etc. The experience also includes 5 years in process design & engineering for chemical process industry. He is qualified validator, verifier and technical reviewer and has eight years' experience working with leading certification bodies. He is involved in the validation/verification of over 100 projects in various roles. He is a qualified expert under Technical Area TA 3.1, TA 1.1 and TA 15 in accordance with procedures of EPIC sustainability services Pvt. Ltd. He is also involved GS validation/verifications of various sectors and participated in webinars conducted by GS foundation time to time.

Appendix 3. Documents reviewed or referenced

No	Author	Title	References to the document	Provider
1	UNFCCC	Validation and Verification Standard version 9.0 https://cdm.unfccc.int/sunsetcms/storage/contents/stored-file-20150225165215954/accr_stan02.pdf Project Standard version 9.0 https://cdm.unfccc.int/sunsetcms/storage/contents/stored-file-20150225165159970/reg_stan01.pdf Project Cycle Procedure version 9.0 https://cdm.unfccc.int/sunsetcms/storage/contents/stored-file-20150226145113383/pc_proc01.pdf	1	Publicly available
2	CME	Registered PoA-DD, Generic CPA-DD, CPA-DD and its corresponding validation report http://cdm.unfccc.int/ProgrammeOfActivities/poa_db/BZVSOCK5G9WD	2	Publicly available

		EQF3A7TRMYJ2IPHU0N/view		
3	AENOR (DoE)	Validation report of Registered PoA-DD and CPA-DD http://cdm.unfccc.int/ProgrammeOfActivities/poa_db/BZVSOCK5G9WD EQF3A7TRMYJ2IPHU0N/view	3	Publicly available
4	EPIC (DoE)	Validation opinion on Revised PoA-DD, version 7.0 and revised CPA-DD, version 7.0	4	Publicly available
5	CME	Revised PoA-DD, version 7.0 and revised CPA-DD, version 7.0	5	CME
6	CME	MR, Version 3.43	6	CME
7	CME	ER sheet, Version 1.32	7	CME
8	UNFCCC	AMS-III.R. ver. 2 - Methane recovery in agricultural activities at household/small farm level AMS-I.E. ver. 4 - Switch from Non-Renewable Biomass for Thermal Applications by the User AMS-I.I. ver. 4 - Biogas/biomass thermal applications for households/small users	8	Publicly available
9	CME & owner of the digester	Commissioning Protocols prepared by SimGas at the time of commissioning the digesters	9	CME
10	CME	Annual Monitoring survey documents — Ke + ANALYSIS titled "20180330 Monitoring Results KE MP1 + ANALYSIS" conducted in 2016	10	CME
11	CME and owner of the digester	Sales Agreements copies signed between digester owners and SimGas	11	CME
12	World Bank	World Bank, <i>Climate Change Knowledge Portal</i> , Average Monthly Temperature for Kenya from 1990 – 2012 [online] Available from: http://sdwebx.worldbank.org/climateportal/index.cfm?page=country_historical_climate&ThisCCCode=KEN	12	CME
13	UNFCCC	Guidelines for sampling and surveys for CDM project activities and programme of activities (version 04.0)	13	Publicly available
14	CME	Ke - Central GesiShamba Database + ANALYSIS	14	CME
15	CME	Annual Monitoring survey documents conducted in the year 2017	15	CME
16	UNFCCC	Standard of Sampling and surveys for CDM project activities and programmes of activities (version 07.0)	16	Publicly available

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

Table 1. CL from this validation

CL ID	xx	Section no.	Date: DD/MM/YYYY
Description of CL			
<i>Not applicable</i>			
CME's response			Date: DD/MM/YYYY
<i>Not applicable</i>			
Documentation provided by CME			
<i>Not applicable</i>			
DOE assessment			Date: DD/MM/YYYY
<i>Not applicable</i>			

Table 2. CAR from this validation

CAR ID	01	Section no.	D.2	Date: 06/10/2017
Description of CAR				

CDM-PoA-PRCV-FORM

Non conduct of annual survey is clearly deviation from the registered Monitoring Plan for the current MR period, CME to explain how this is in accordance with the paragraph 271 - 273 of PS version 09	
CME's response	Date: 28/11/2017
The CME accepts non-monitoring annual as deviation from the registered monitoring plan and now report it as temporary deviation, and accordingly updated the sections E.1 of the MR and the ER sheet. Conservative estimate of ER is done, pls refer to revised MR ver 3.3 and ER sheet.	
Documentation provided by CME	
<i>Revised MR ver 3.3, and ER spreadsheet</i>	
DOE assessment	Date: 03/12/2017 30/03/2018

- Out of the total 276 digesters that are considered for the current MR period under CPA-1, 70 were installed in the year 2013, 158 were installed in 2014 and 48 were in 2015. The survey for this MR period was carried out once between 24/02/2016 to 15/03/2016 whereas the CPA-DD requires annual monitoring survey. This is reported as temporary deviation from the registered monitoring plan as per Para 271 – 273 of PS Ver 9.0. The nature, extent and duration of the deviation and its assessment is as follow:-
- **Nature of deviation:** Annual monitoring was not done during the first and second annual monitoring years for all those parameters that require annual monitoring as per the validated CPA-DD.
- **Extent of deviation:** Annual monitoring was not done for the following four input parameters used in the emission reduction calculations under applied methodology AMS-III.R:
 - $n_{k,y}$ Operational rate of thermal applications installed
 - $N_{da,y}$ Number of days animal is alive on the farm;
 - $N_{p,y}$ Number of animals produced annually of type LT for year y;
 - $N_{LT,y}$ Average number of animals of type LT in year y (population)

All other monitored parameters that are inputs in the emission reduction calculations were monitored on an ongoing basis by the CME as and when the new customers are added to the programme, including:

- Number of biogas systems commissioned
- Methane conversion factor for each manure management system j
- Fraction of manure handled in the baseline animal manure management system j
- Global Warming Potential of methane

Other monitored parameters in the project activity, not mentioned above, do not impact the calculation of emission reductions.

- **Duration of deviation:** The above four parameters, that has impact on the ER calculations, were not monitored during the first and second annual monitoring years. The results of the monitoring carried out in 2016 are applied for the year 2015, which is acceptable.
- **Proposed alternative:** The CME has applied conservative values for the monitored parameters for the delay period as follows:
 - $n_{k,y}$ Operational Rate: An operational rate of ~~75.93-87.04%~~ was determined through the survey carried out in the year 2016. Application of this value for the entire MR period duration is a conservative approach since it is assumed that the operation rate of digesters is likely lower than in reality: a digester installed in the year 2013 that was not operational in 2016 is more likely to have been operational when it was newly installed in 2013. Since this is the lowest possible operational rate encountered over the three years (due to having the oldest digesters installed), applying ~~75.93-87.04%~~ across all the years is equivalent to assuming the operational rate is at “**maximum capacity**” for the duration of the period of missing data and is therefore accepted to be inline with the Para 3 of Appendix 1 of Project Standard, version 9.0 which says “If project participants or the coordinating/managing entity have temporarily not monitored parameters related to project GHG emissions or are unable to produce evidence related to such monitoring, prior approval by the Board is not required if project participants or the coordinating/managing entity estimate these parameters assuming that the source of the GHG emissions operated at **maximum capacity** for the full period of the missing data.”
 - $N_{da,y}$ Number of days animal is alive on the farm: ‘The number of days an animal is alive on the farm’ do not change significantly from one year to another. Hence, applying the monitored values of 343 days for ~~cows,cows and 336 for market swine~~ is reasonable. However, the values are reported as ‘0’ for the years 2013 and 2014 for cows, and for market swine the sample size is below the 90/10 sample size requirement's so it is reported '0' for the entire MR period and this is in compliance with the Para 2 of Appendix 1 of Project Standard, version 9.0 which says “If project participants or the coordinating/managing entity have temporarily not monitored parameters related to baseline greenhouse gas (GHG) emissions or are unable to produce evidence related to such monitoring, prior approval by the Board is not required if project participants or the coordinating/managing entity report these parameters as zero”.
 - $N_{p,y}$ Number of animals produced annually of type LT for year: “The number of animals produced annually” do not change significantly from one year to another. Hence, applying the monitored values of 7.22 days for cows, ~~and 6.26 for market swine~~ is reasonable. However, the values are reported as ‘0’ for the years 2013 and 2014 for cows, and for market swine the sample size is below the 90/10 sample size requirement's so it is reported '0' for the entire MR period and this is in compliance with the Para 2 of Appendix 1 of Project Standard, version 9.0.
 - $N_{LT,y}$ Average number of animals of type LT in year y (population): This value is derived from the above two quoted values(parameters), hence it is also reported at zero for the years 2013 and 2014 (and beyond for market swine).

This temporary deviation from the registered monitoring plan and it's assessment is verified to be meeting the requirement of Para 2 and 3 of the Appendix 1 (do not require prior approval) of PS ver 9.0 and thus accepted by the verification team.

Table 3. FAR from this validation

FAR ID	xx	Section no.	Date: DD/MM/YYYY
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Description of FAR	
<i>Not applicable</i>	
CME's response	Date: DD/MM/YYYY
<i>Not applicable</i>	
Documentation provided by CME	
<i>Not applicable</i>	
DOE assessment	Date: DD/MM/YYYY
<i>Not applicable</i>	

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Document information

<i>Version</i>	<i>Date</i>	<i>Description</i>
01.0	5 June 2015	Initial publication.

Decision Class: Regulatory
 Document Type: Form
 Business Function: Registration
 Keywords: post-registration change, programme of activities, validation report