Validation report form for post-registration changes for CDM project activities

(Version 03.0)

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

BASIC INFORMATION	
Title and UNFCCC reference number of the project activity	IOT Mabagas Limited power plant, Pudhuchatram UNFCCC Reference Number:8288
Process track	☐ Prior approval ☒ Issuance ☐ Renewal of crediting period
Version number of the validation report	Version 4.0
Completion date of the validation report	13/03/2020
Type(s) of PRCs	☒ Temporary deviations from the registered monitoring plan, applied methodologies, standardized baselines or other methodological regulatory documents[1] ☒ Corrections ☐ Changes to the start date of the crediting period ☐ Inclusion of a monitoring plan ☒ Permanent changes to the registered monitoring plan, or permanent deviation of monitoring from the applied methodologies, standardized baselines or other methodological regulatory documents ☐ Changes to the project design ☐ Changes specific to afforestation and reforestation project activities
Version number of PDD to which this report applies	5.5
Project participants	IOT Mabagas Limited (IML) Carbonbay GmbH & Co. KG
Host Party	India
Applied methodologies and standardized baselines	AMS-III.AO. Version 1.0 - Methane recovery through controlled anaerobic digestion AMS-I.D. Version 17 - Grid connected renewable electricity generation
Mandatory sectoral scopes	1 : Energy industries (renewable - / non-renewable sources) 13 : Waste handling and disposal
Conditional sectoral scopes, if applicable	N/A

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

Name and UNFCCC reference number of the DOE	E-0066: Earthood Services Private Limited
Name, position and signature of the approver of the validation report	 Ashok Kumar Gautam Director

SECTION A. Executive summary

Brief summary of PA (purpose, general description and location)

The PA under PRC deals with building and operating anaerobic digestion plant. The plant produces biogas with which 2.4 MW of renewable electricity is generated as a part of the proposed greenfield project activity.

In the pre-project scenario, poultry litter was generated at the poultry farms in Namakkal district. The litter was collected for up to a period of six months after which it is sent to a nearby drying yard or dumping area where it was allowed to further degrade. Such storage conditions and piling up creates anaerobic conditions, leading to methane emissions into the atmosphere due to anaerobic decomposition of the poultry litter.

The project activity basically aims at procuring both the poultry litter and other wastes (cow dung and agri wastes) from the nearby poultry farms and sites respectively in the district. All these wastes were then used to produce biogas with the help of bio-methanation process in order to recover methane from the litter. The biogas was then used for generation of electricity which was supplied to the state electricity board via a dedicated 22 kV transmission line feeder to the nearby substation. Thus, the PA helps in reducing the GHG emissions by avoiding the release of methane directly into the atmosphere and then generating electricity from the biogas generated from the poultry litter and organic wastes.

Scope of validation

Earthood Services Private Limited (ESPL) is contracted by Project participants (IOT Mabagas Limited (IML) and Carbonbay GmbH & Co. KG) to perform the validation for post-registration changes for a temporary deviation, correction and change to registered monitoring plan proposed by the PP. Project participant has identified a scope of post-registration change due to difficulty in maintaining the already registered values. This validation is an independent and objective review of the post registration changes proposed in revised specific case PDDs against latest CDM Validation and Verification Standard (VVS) for PA version 2.0, Project Standard (PS) for PA version 2.0, Project Cycle Procedures (PCP) for PA version 2.0 and other related requirements, as appropriate.

Validation process

The validation process is undertaken by validation team that involved the desk review of proposed changes as submitted by Project Participants, undertaking site visit, interview or interactions with the representative of Project participants, reporting and closure of findings, as appropriate and preparing a draft validation report complying with the CDM requirements. The validation report prepared by validation team is reviewed by an independent Technical Review team.

The final validation report that is accepted by Technical Reviewer is then approved on behalf of Earthood Services Private Limited and processed further as per CDM procedures.

Conclusion

The description in the revised PDD meet all relevant UNFCCC requirements for the CDM and correctly applies the selected baseline and monitoring methodology.

This report is the assessment opinion for all the changes that are proposed in PA. All above changes were found to fall under the conditions listed in Appendix: Indicative list of post registration changes that may be suitable for approval under the issuance track, of the PS for PA therefore is being submitted as request for PRC along with the issuance request.

SECTION B. Validation team, technical reviewer and approver

B.1. Validation team member

No.	Role	Type of resource	Last name	First name	Affiliation (e.g. name of central or other office of DOE or outsourced entity)	Involvement in			
						Desk/document review	On-site inspection	Interviews	Validation findings
1.	Team Leader	IR	Singh	Kaviraj	Central Office	Y	Y	Y	Y
2.	Verifier	IR	Gupta	Anshika	Central Office	Y	N	N	Y
3.	Local Expert	IR	Gupta	Anshika	Central Office	Y	N	N	Y
4.	Technical Expert (1.1 & 13.1)	IR	Singh	Kaviraj	Central Office	Y	Y	Y	Y
5.	Methodology Expert	IR	Singh	Kaviraj	Central Office	Y	Y	Y	Y

B.2. Technical reviewer and approver of the validation report on 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 reviewer	IR	Garg	Shreya	Central Office
2.	SS expert to TR	IR	Gautam	Ashok	Central Office
3.	Approver	IR	Gautam	Ashok	Central Office

SECTION C. Means of validation

C.1. Desk/document review

The list of all documents/evidences reviewed for the purpose of this PRC validation is included under Appendix 3 of this report.

C.2. On-site inspection

Duration of on-site inspection: 17/08/2018				
No.	**Activity performed on-site**	**Site location**	**Date**	**Team member**
1.	Validation of corrections proposed	Village - SF. Nos.52/1, 52/2, 53/1A and 53/2A Thattayangarpatti	17/08/2018	Kaviraj Singh
2.	Validation of Permanent changes to monitoring plan proposed	Pudhuchatram, Namakkal, Tamil Nadu, India	17/08/2018	Kaviraj Singh
3.	Validation of temporary deviations proposed	Village - SF. Nos.52/1, 52/2, 53/1A and 53/2A Thattayangarpatti	17/08/2018	Kaviraj Singh

C.3. Interviews

No.	Interviewee			Date	Subject	Team member
	Last name	First name	Affiliation			
1.	Purushottam	Ravishankar	IOT	17/08/2018	Project implementation, monitoring plan	Kaviraj Singh
2.	Chinnusamy	Sivakumar	IOT	17/08/2018	Monitoring plan, sampling, recording and reporting of data, emission reduction calculation	Kaviraj Singh

C.4. Sampling approach

Not Applicable

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

Areas of validation findings	No. of CL	No. of CAR	No. of FAR
Compliance with PDD form	-	-	-
Temporary deviations from the registered monitoring plan, applied methodologies, standardized baselines or other methodological regulatory documents	CL#04	CAR#01 CAR#05	-
Corrections	-	CAR#03	-
Changes to the start date of the crediting period	-	-	-
Inclusion of a monitoring plan	-	-	-
Permanent changes to the registered monitoring plan, or permanent deviation of monitoring from the applied methodologies, standardized baselines or other methodological regulatory documents	-	CAR#01	-
Changes to the project design	-	-	-
Changes specific to afforestation and reforestation project activities	-	-	-
Others (please specify)	-	CAR#02	-
Total	01	04	-

SECTION D. Validation findings

D.1. Compliance with PDD form

Means of validation	The validation team reviewed the revised PDD/2/ provided to them by the PP as a part of proposed PRCs and compared it with the valid templates or forms available for PDD/3/ and found it was updated using the latest available template. The validation team also reviewed the registered PDD/1/ and found that the information transferred in the revised PDD/2/ is materially same except the changes highlighted/discussed/validated under Section D.2., D.3 and D.6 of this report.
Findings	None
Conclusion	The validation team confirms that the proposed post registration changes as included in the revised PDD/2/ were presented by using the valid version of PDD forms/3/ and were in compliance with the instructions contained therein. The PP has used the latest version of PDD form/3/ and the validation team confirms that the information transferred in this process is consistent.

D.2. Temporary deviations from the registered monitoring plan, applied methodologies, standardized baselines or other methodological regulatory documents

Means of validation	
Document	Revised PDD/2/ and MR/11/
Proposed Changes	Due to failure of hardware and software from PLC/SCADA system, the PP has been unable to monitor

		the parameter ID.23./w_{CH4} (methane %), ID. 24./$FV_{RG,h,}$ ID.25./$BG_{combusted,y}$ and ID.26./$BG_{flared,y}$ between the following periods in 01/05/2016-18/08/2016 15/12/2016-20/04/2017
	Assessment	The period not monitored has been highlighted yellow in the worksheet titled "ID 23,24,25,26,29 PE_Flare 2017" and "ID 23,24,25,26,29 PE_Flare 2016" of the ER sheet/12/. **<u>Calculation of ERs through first method:</u>** PP has applied a value '0' for the parameter ID23 during the deviation period which is most conservative approach. It should also be noted that the parameter-ID23 was monitored only to meet the requirement of the applied methodology/9/ and for the second calculation method. It is not used in the ER calculation/12/, thus the application 0 for deviation period was accepted by the validation team. The values of the parameter ID. 24./FVRG,h, ID.25./BGcombusted,y and ID.26./BGflared,y were also not recorded as per the set frequency. The parameters ID. 24./FVRG,h, ID.25./BGcombusted,y and ID.26./BGflared,y are directly used in calculation of $PE_{flaring,y}$ and $PE_{phy,Leakage,y.}$ as can be seen the work sheet titled 'PE-IIIAO' , column G and column H in the ER sheet/12/. The baseline emissions are calculated based on the amount of poultry waste used. This is the first calculation method and the second method is described below. Thus, these parameters contribute only to project emissions and not baseline emissions. Though the parameters were not monitored, the plant was still working. Thus, the project emissions occurred during the period of no monitoring cannot be ignored. The period for which temporary deviation has been sought, the PP has proposed to apply the maximum values of flow rate ever monitored since the start of the crediting period, as an alternative approach. The maximum values of flow rate monitored between the period 01/08/2015 to 31/08/2017(i.e. current monitoring period) were as following: 1120 m^3/hr for flow rate of gas sent to flame and 1175.95m^3/hr for flow rate of gas sent to CHP as checked from column C and D of the worksheets - "ID 23,24,25,26,29 PE_Flare 2015" , "ID 23,24,25,26,29 PE_Flare 2016" and "ID 23,24,25,26,29 PE_Flare 2017", ER sheet/12/ and ER sheet of the previous monitoring period/16/. The period not monitored is: 01/05/2016-18/08/2016[2] 15/12/2016-20/04/2017 The period with delay in calibration is:

[2] The exact period is 01 August 2016 12:10 and 12 August 2016 11:10 to 18 August 2016 11:30 am, but for the ease of calculation the deviation has been sought for the entire period between 01/05/2016 to 18/08/2016

30/10/2016-16/01/2017(for the flow meters HAO 3CE02000)
30/10/2016-16/07/2017(for both the flow meters HAO 3CF02000)

PP has also applied the error factor to maximum values identified (1.8% to 1120 m^3/hr for flow rate of gas sent to flame and 1.0% to 1175.95m^3/hr for flow rate of gas sent to CHP) as per the results of next calibration certificate. The next calibration certificates/17,18/ were checked to confirm that the meters are rending the values within the permissible limit and applied error factor is correct and justified.

The final value obtained after applying the error factor to identified maximum values are 1140.16 m^3/hr for flow rate of gas sent to flame and 1187.71 m^3/hr for flow rate of gas sent to CHP. These values are consistently applied in the ER sheet/12/ for the period when no monitoring was done.

The highest obtained values have not been achieved during actual monitoring. Thus, applying these highest values throughout the period not monitored was found conservative as compared to period when the monitoring is done. It is can be clearly seen in the work sheet titled 'PE-IIIAO' , column G and column H in the ER sheet/12/, that the values for not monitored period are unrealistically higher as compared to the other months when regular monitoring has been done.

Thus, the PP has applied a conservative approach to account for the project emission from flaring and physical leakage for this period.

Calculation of ERs through the second calculation method:

The applied methodology prescribes a second method to calculate the total ERs achieved by the project.
and formula is as following:

$MDy = (BG_{flared,y} * w_{CH4,y} * D_{CH4} * FE * GWP_{CH4}) + (BG_{combusted,y} * w_{CH4,y} * D_{CH4} * GWP_{CH4})$

In this second method the parameter ID. 24./$FV_{RG,h}$, ID.25./$BG_{combusted,y}$ and ID.26./$BG_{flared,y}$ and ID.23./w_{CH4} (methane %) are directly contributing to increase of baseline emission . As per the registered PDD page, the lowest ERs obtained from the two method prescribed shall be used to claim the final ERs during the monitoring period.

Thus, the PP has proposed to apply following approaches in the calculation method:

1. 0 value is applied ID.23./w_{CH4} (methane %) for period with no monitoring
   (Please see worksheet "ID 23,24,25,26,29 PE_Flare 2016", column E and "ID 23,24,25,26,29 PE_Flare 2017", column E, ER sheet/12/).

		2. 0 value is applied ID.25./$BG_{combusted,y}$ for period with no monitoring (Please see worksheet 'ID_R_QC', column K, ER sheet/12/). 3. 0 value is applied ID.26./$BG_{flared,y}$ for period with no monitoring (Please see worksheet 'ID_R_QC', column K, ER sheet/12/). 4. 0 value for flame efficiency for entire monitoring period, (Please see worksheet 'MD_y', column K36-38, ER sheet/12/). 5. The error factor has been deducted from the parameter methane content (W_{CH4} ID 23) during the non-calibration period from 24/09/2015 to 21/07/2016. Applying these values reduced the total ERs achieved through the second calculation method drastically. However, the total ERs were still higher than the first calculation method. Thus, PP has used first method to claim emission reduction during the current monitoring period. However, for transparency both the methods are clearly depicted and compared in the ER sheet, worksheet named 'ER', cell O24.
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	In accordance with para 282 of the VVS for PA/7/, the validation team confirms that PP has followed the conservative approaches as described above. PP has assured that the deviation in the monitoring is only applicable for the current monitoring period i.e. from 01/05/2016-18/08/2016 and 15/12/2016-20/04/2017 and will conform to the stated registered monitoring plan from the next Monitoring period onwards. Since, the proposed alternative monitoring arrangement were found to be conservative, the PRC does not need prior approval l in-accordance to appendix 1(b) of PS for PA and is being submitted along with the issuance request	
Findings	CAR#01, CAR#05 and CL#04 were raised and resolved.	
Conclusion	The DOE confirms that • The deviation applies for the monitoring period from 01/05/2016-18/08/2016 and 15/12/2016-20/04/2017 (as per para 285 of CDM VVS PA V2 /7/). • The deviation does fall under provision (b) of Appendix 1 of PS and hence is submitted for approval by CDM EB along with the issuance track (as per para 284 of CDM VVS PA V2 /7/) • There will be no over-estimation of emission reductions due to deviation as the assumptions and formulae are applied in a conservative manner. The deviation complies with the relevant requirements related to the temporary deviation from the registered monitoring plan as prescribed in the PS for PA/6/ and VVS for PA/7/.	

D.3. Corrections

Means of validation	Following corrections have been proposed to the PDD/1/: 1. **The value of the parameter ID. 13./ EF_{CO2},transport is calculated through following formula:** $EF_{CO2,transport} = (NCV_{Diesel} \times \rho_{Diesel} \times EF_{CO2,diesel,y}) / F_{diesel,avg}$ / liter x 1/1000

All the inputs in the formula above are also listed parameters of the registered PDD.
$NCV_{Diesel:}$ This is ID11 parameter fixed ex-ante with a value of 43.3GJ/T
ρ_{Diesel} This is ID12 parameter fixed ex-ante with a value of 0.83 t/m3
$EF_{CO2,diesel,y}$ This is ID10 parameter fixed ex-ante with a value of 74.8 tCO2/TJ
$F_{diesel,av}$ This is parameter determined contracts obtained from logistics company which has value of 8.25km/l

Registered PDD	Revised PDD
For the calculation of value of ID 13, $EF_{CO2\ transport}$, the formula written above is applied. In the registered PDD, the value of NCV $_{diesel}$ applied was 42	In the revised PDD, the value of NCV diesel is 43.3GJ/T. This has bee done as the ID 11 listed under section B.6.2. of the regsitered PDD provides 43.3 GJ/T as the value of NCVdiesel.
For the calculation of value of ID 13, EFCO2 transport, the formula written above is applied. The value of F_{diesel} applied was 8km/litre	In the revised PDD/2/, the value of Fdiesel applied is 8.25km/litre. This has been done because the sourced of the input(Substrate transport quotation)/19/ referred on page 56 of the registered PDD/1/.
was mentioned as 0.326 under section of the PDD/1/. The value of the parameter was mentioned as 0.336 on page 56 of the PDD/1/. The value is now consistently reported throughout the revised PDD/2/.	Revised PDD consistently mentions 0.326 under section B.6.2. and section B.6.3. of the revised PDD/2/.

The applied value of the parameter was 0.326 in the registered PDD/1/ (page 56) which is same as in the revised PDD/2/. The change does not impact the total estimated ERs/1,2/. The change has been proposed only to correct typographical error in the PDD/1/. Since this parameter was fixed ex-ante at the time of registration, any change to it qualifies as correction as per para 232 of PS for PA/6/

2. **Correcting the ID number of parameters under section B.7.3. of the PDD/2/:**

The section numbers of the following parameters have been updated:

a. w_{CH4} (ID.23)

b. $BG_{combusted,y}$ (ID.25)

c. $BG_{flared,y}$ (ID.26)

d. T_{flare} (ID.29)

The ID numbers were checked and found to be same under section B.7.1. of the registered PDD/1/. The numbers have just been corrected under section B.7.3. of the revised PDD/2/. The change is done mere to make the ID numbers consistent with the number mentioned under section B.7.1 of the revised PDD/2/. Any change to the project information fixed at the time of registration is classified as correction as per para 232 of PS for PA version 2.0/6/.

3. **Updating the contact details of the project proponent:**

	The address and the phone of the project proponent- Carbonbay GmbH & Co. KG have been updated in the revised PDD under Appendix 1/2/. The details were checked with the office website of the organization/20/ and were found to be correct. Any change to the project information is classified as correction as per para 232 of PS for PA version 2.0/6/. The changes do not impact the final ERs or the design of the project, thus have been proposed along with the issuance request as per Appendix 2: Indicative list of post-registration changes that may be suitable for approval under the issuance track of PS for PA version 2.0/6/.
Findings	CAR#03 was raised and resolved.
Conclusion	The DOE confirms following: 1) There is no change in the value ex-ante parameters. 2) The corrected information is an accurate reflection of actual information and is in accordance with registered PDD and applied methodology. The assessment of the changes in given above. All the changes were found to comply with requirements of VVS for PA version 2.0./7/ and PS for PA version 2.0/6/.

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

Means of validation	NA
Findings	NA
Conclusion	NA

D.6. Permanent changes to the registered monitoring plan, or permanent deviation of monitoring from the applied methodologies, standardized baselines or other methodological regulatory documents

Means of validation	

Document	Revised PDD/2/
Proposed Changes	Changes in the calibration frequency, of ID.19./EGBL,y (Net electricity supplied by the project activity to the grid) and ID. 20./ECPJ,y(Net electricity imported from the grid in case the Power units are not operating), has been changed to once in five years (proposed) from once in three years (existing).
Assessment	It is observed that the calibration of the meter is not under the control of Tamilnadu Generation and Distribution Corporation Ltd. (state distribution company) and PP has no control on calibration of energy meters. Following the Power Purchase Agreement /8/ signed between state grid company and PP, the calibration of the energy meter will be conducted as per the regulations issued by Central Electricity Authority (CEA) of India. The CEA prescribes the calibration of meters once in five years and therefore the state grid company (TGDC) will get the calibration of meter done only after 5 years of previous calibration/15/. Therefore, PP has opted to revise the same in the registered PDD/1/. It is also to be noted here that calibration of meter is not in control of PP and he has to follow the frequency and procedures set by the state grid distribution company (TGDC). This change in frequency does not impact the applicability of the applied methodologies/9,10/ or the other applied methodological regulatory documents, or the accuracy and completeness of the monitoring. The change was found to comply with para 238 and 239 of the PS for PA version 2.0/6/. The change does not have an impact on the design of the PA thus was found to be suitable for approval under issuance track as per PS for PA, page 65/6/.

Findings	CAR#01 was raised and resolved.
Conclusion	The changes requested by the PP have been corroborated with the central electricity authority guidelines. The monitoring plan in the revised PDD/2/ is according to the applied methodology/9,10/ and VVS for PA/7/.

D.7. Changes to the project design

Means of validation	NA
Findings	NA
Conclusion	NA

D.8. Changes specific to afforestation and reforestation project activities

Means of validation	NA
Findings	NA
Conclusion	NA

SECTION E. Internal quality control

The draft validation report prepared by validation team is reviewed by an independent technical review team (one or more members) to confirm if the internal procedures established and implemented by Earthood Services Private Limited were duly complied with and whether such opinion/conclusion were reached in an objective manner that complies with the applicable CDM rules/requirements. The technical review team is

collectively required to possess the technical expertise of all the technical area/sectoral scopes the project activity falls into. All team members of technical review team were independent of the validation team.

During the technical review process, additional findings may be identified or the closed-out findings may be opened, which needs to be satisfactorily resolved by validation team before the validation report/opinion is finalized. The independent technical reviewer may either approve the report as such or reject/return the same in such case providing the comments/findings/issues that needs to be resolved by the validation team.

The decision taken by the Technical Reviewer is final and is authorized by the Managing Director on behalf of Earthood Services Private Limited.

SECTION F. Validation opinion

Earthood Services Private Limited (Earthood) has performed the validation of the post registration changes of the PA 8288: IOT Mabagas Limited power plant, Pudhuchatram–- India by IOT Mabagas Limited (IML) and Carbonbay GmbH & Co. KG.

The DOE has applied all the objectives, approaches and means of validation as per applicable version of VVS for PA while validating the post-registration changes. Earthood issues a positive opinion to the proposed PRC since the changes/modifications fulfils the requirements of relevant CDM rules and requirements. Thus, Earthood would like to submit a request for approval of the changes under issuance approval track in accordance with CDM project cycle procedure for project activity, version 02.

The PP has used updated version of PDD for preparing the new document. Earthood, after a thorough review, confirms that the information transferred to the new form is materially the same as that contained in registered PDD.

The validation was performed on the basis of rules and requirements defined by UNFCCC for the CDM project activities. The review of the registered PDD, revised specific PDD, supporting documentation and subsequent follow-up actions, have provided Earthood with sufficient evidence to determine the fulfilment of stated criteria.

Appendix 1. Abbreviations

Abbreviations	Full texts
AS	Accreditation Standard
CAR	Corrective Action Request
CDM	Clean Development Mechanism
CDM PCP	Clean Development Mechanism Project Cycle Procedure
CDM PS	Clean Development Mechanism Project Standard
CDM VVS	Clean Development Mechanism Validation and Verification Standard
CEA	Central electricity authority
CER	Certified Emission Reduction(s)
CL	Clarification Request
CPCB	Central Pollution Control Board
DOE	Designated Operational Entity
DNA	Designated National Authority
EB	Executive Board
Earthood	Earthood Services Private Limited
FAR	Forward Action Request
GHG	Greenhouse Gas(es)
GOI	Government Of India
IR	Internal Resource
IPCC	Intergovernmental Panel on Climate Change
MOEF	Ministry of Environment and Forests
MR	Monitoring Report
MW	Mega Watt
NABL	National Accreditation Board for Testing and Calibration Laboratories
PDD	Project Design Document
PP	Project Participants
PPA	Power Purchase Agreement
QA/QC	Quality Assurance / Quality Control
tCO_2e	tonnes of Carbon dioxide equivalent
UNFCCC	United Nations Framework Convention on Climate Change
VCR	Verification and Certification Report

Appendix 2. Competence of team members and technical reviewers

Name	Kaviraj Singh		
Country	India		
Education	Ph.D. (Environmental Engineering), IIT Delhi Masters (Energy & Environmental), DAVV Indore		
Experience	15 Years +		
Field	Climate Change & Environment		
Approved Roles			
Team Leader	YES		
Validator	YES		
Verifier	YES		
Methodology Expert	AMS-I.D., AMS-II.D., ACM0006, AMS-I.A., AMS-I.C., AMS-II.B., AMS-III.H, ACM0002, ACM0001, AM0080		
Local expert	YES (India)		
Financial Expert	YES		
Technical Reviewer	YES		
TA Expert	YES (TA 1.1, TA 1.2, TA 13.1, 13.2)		
Reviewed by	Abhishek Mahawar	**Date**	01/03/2018
Approved by	Ashok Gautam	**Date**	01/03/2018

Name	Ashok Gautam		
Country	India		
Education	M. Sc. (Environmental Sciences) M. Tech. (Energy & Environmental Management)		
Experience	16 Years +		
Field	Energy, Climate Change & Environment		
Approved Roles			
Team Leader	YES		
Validator	YES		
Verifier	YES		
Methodology Expert	AMS-I.D., AMS-I.A., AMS-I.C., AMS-I.E, AMS-II.D., AMS-II.G., AMS-III.E., AMS-III.H., AMS-III.Q, AMS-III.Z., AMS-III.AV., AM0029, AM0025, AM0056, ACM0001, ACM0002, ACM0004, ACM0012, ACM0006, AM0018, ACM0009, AM0034, AMS.I.B		
Local expert	YES (India)		
Financial Expert	YES		
Technical Reviewer	YES		
TA Expert	YES (TA 1.1, TA 1.2, TA 3.1, TA 13.1)		
Reviewed by	Shreya Garg	**Date**	25/01/2019
Approved by	Anshika Gupta	**Date**	25/01/2019

Name	Shreya Garg		
Country	India		
Education	M.Sc. (Climate Science & Policy), TERI University		
Experience	6 Years +		
Field	Climate Change		
Approved Roles			
Team Leader	YES		
Validator	YES		
Verifier	YES		
Methodology Expert	AMS.I.A., AMS.I.C., AMS.I.D., AMS.I.F., AMS.II.D., AMS.II.G., AMS.II.J., AMS.III.AV., ACM0002, ACM0012		
Local expert	YES (India)		
Financial Expert	NO		
Technical Reviewer	YES		
TA Expert	YES (TA 1.2, TA 3.1)		
Reviewed by	Abhishek Mahawar	**Date**	01/03/2018
Approved by	Ashok Gautam	**Date**	01/03/2018

Name	Anshika Gupta		
Country	India		
Education	M.Sc. (Climate Science & Policy), TERI University		
Experience	4 Years +		
Field	Climate Change		
Approved Roles			
Team Leader	YES		
Validator	YES		
Verifier	YES		
Methodology Expert	AMS-I.A., AMS-II.G., ACM0002, AMS-III.A.V.		
Local expert	YES (India)		
Financial Expert	NO		
Technical Reviewer	YES		
TA Expert	Yes (TA 1.2, TA 3.1)		
Reviewed by	Shreya Garg	**Date**	12/03/2019
Approved by	Kaviraj Singh	**Date**	12/03/2019

Appendix 3. Documents reviewed or referenced

No.	Author	Title	References to the document	Provider
1.	Carbonbay	Registered PDD	Version 5.2	Other
2.	Carbonbay	Revised PDD	Version 5.5	Other
3.	UNFCCC	CDM-PDD-FORM	Version 10.1	Other
4.	IPCC	2006 IPCC Guidelines for National Green House Gas inventory	2006	Other
5.	UNFCCC	PCP for PA	Version 2.0	Other
6.	UNFCCC	PS for PA	Version 2.0	Other
7.	UNFCCC	VVS for PA	Version 2.0	Other
8.	IOT	Power Purchase Agreement	Version 1.0	PP
9.	UNFCCC	AMS-III.AO. - Methane recovery through controlled anaerobic digestion	Version 1.0	Other
10.	UNFCCC	AMS-I.D. - Grid connected renewable electricity generation	Version 17	Other
11	Carbonbay	MR for MP 02 (Final)	Version 6.0, Dated 13/03/2020	PP
12	Carbonbay	ER sheet for MP-2	Corresponding to MR	PP
13	ESPL	VCR for MP 02	Version 4.0, Dated 13/03/2020	Other
14	Carbonbay	Monthly reports for Biogas combusted and Biogas flared	For entire 2nd monitoring period	PP
15	CEA	Installation and operation of meter (regulation)	26th Nov 2014	Other
16	PP	ER sheet -MP1	-	Other
17	Arrow instruments	Calibration certificate- HAO 3CE02000	08/02/2018	PP
18	Arrow instruments	Calibration certificate- HAO 3CF02000	20/06/2018	PP
19	PP	Substrate transport quotation	-	PP
20	PP	https://www.carbonbay.com/en/	-	Other

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

Table 1. CLs from this validation

CL ID	04	Section no.	D.3.	Date : 02/09/2019
Description of CL				
The value for EFCO2,transport, 0.326 kgCO2/km, is consistently reported throughout the revised PDD. However, the revised PDD indicates that 0.326 kgCO2/km is outcome of the equation of NCVDiesel x ρDiesel x EFCO2,diesel,y)/ Fdiesel,avg / litre x 1/1000 = (43.3*0.83*74.8)/8.25/1000 = 0.326 while the registered PDD (p 61) and the revised PDD (P 51) also define EFCO2 = 0.336 kgCO2/km based on the equation of (43.3*0.83*74.8)/8/1000 = 0.336. Therefore, the PP is required to provide further information on how is considers this correction as per the paragraph 288(a) as the input values for the calculation of the emission factor is consistently represented across the PDD.				
Project participant response				**Date : 03/12/2019**

The update to 0.326 is done. This led to the consequence that Fdiesel,avg had to be changed in several formulas to 8.25 instead of 8.00. However, there was a reference made to "SD_28 (Substrate Transport Quotation)"
Documentation provided by project participant
DOE assessment **Date : 09/12/2019**
The PP has proposed correction to the parameter which has been validated in detail in the PRC validation opinion. By updating the value of NCVdiesel and average fuel consumption, the total value of EFCO2, transport remains same thus no revised ER sheet for ex-ante calculation was required. The number was erroneously written as 0.336 instead of 0.326 which has also been updated. Please see section D.3. of this report for detailed assessment. Thus, the CAR stands closed.

Table 2. CARs from this validation

CAR ID	01	**Section no.**	D.2. and D.6.	**Date :** 17/08/2018
Description of CAR				
The following meter was not found in calibration; 1. The energy meter (SN TNE59496) which is being used for monitoring EGBL(Net electricity supplied by the project activity to the grid) was calibrated on 30/08/2012 doesn't cover the complete monitoring period (01/08/2015 to 31/08/2017) because PDD requires meters to be calibrated once in three years. 2. There was a delay observed in calibration of methane analyser and provided calibration records doesn't cover the entire monitoring period. The calibration was conducted on 25/09/2012 which is valid till 24/09/2015. The next calibration was due on 24/09/2015 but was conducted on 21/07/2016 and valid for next three years. A gap in calibration of methane analyser was observed from 24/09/2015 to 21/07/2016. 3. There was a gap observed in the calibration of thermocouples installed on the flare. These thermocouples was not found in calibration from the period starting from 05/06/2015 to 31/12/2015 & 01/01/2017 to 17/01/2017				
Project participant response				Date : 10/09/2018
1. According to the PPA (section 4.1& 4.6), the meter is supposed to be tested/calibrated as per central electricity authority (CEA) regulation. Please follow page 232 para 18 for the regulation from CEA http://www.cbip.org/MIR/1%20DATA/CEA%201.pdf and it require the meter to be calibrated once in five years which means the calibration was due in August 2017. 2. This parameter is not being used for calculation of CERs therefore it does not affect the final calculations. 3. Attached are the calibration certificates, the calibration was done on 5-Jun 2014 and then again on 17 Jan 2017.				
Documentation provided by project participant				
Calibration certificates PPA				
DOE assessment				**Date:** 03/12/2018
1. The PPA has been checked and found that the calibration frequency is once in five years. However, the registered/revised PDD dated 03/11/2012,page-65 mentions that The measuring equipment used for monitoring data is calibrated as per manufacturers specifications, but at least once in three years as per § 17.c of the general guidelines to SSC CDM methodologies (version 17). PP is requested to clarify the same. 2. The purpose of the data as per registered PDD and MR is determination of Emission reduction. Further, as per registered PDD page-67 "The measuring equipment used for monitoring data is calibrated as per manufacturers specifications, but at least once in three years as per § 17.c of the general guidelines to SSC CDM methodologies (version 17)". PP is requested to clarify the same. 3. The calibration certificate dated 06/06/2014 expires on 04/06/2015, Calibration certificate dated 31/12/2015 expires on 31/12/2016, calibration certificate dated 17/01/2017 expires on 17/01/2018. Thus, there is a gap from 05/06/2015 to 30/12/2015 and 01/01/2017 to 17/01/2017. As per registered PDD, the calibration frequency is three years, however the calibration certificates mentions that the calibration is valid until one year. Please justify. CAR#01 is open.				
Project participant response				**Date :** 11/02/2019

1. The measuring equipment used for monitoring data is calibrated as per manufacturers' specifications, but at least once in five years as per section 4.1& 4.6 of the PPA. This has now been clarified in sections B.2.5., D.2. and Annex 1.
2. An error margin of +0.7% has been determined during calibration and was applied to periods without calibration
3. An error margin of -2,2 °C has been determined during calibration and was applied to periods without calibration. Further, calibration frequency was changed to 1-year calibration frequency as set forth in the calibration certificates.

Documentation provided by project participant

DOE assessment	**Date:** 18/02/2019

1. PP has provided details for delay in calibration and also considered this under PRC and the calibration frequency is proposed to be once in five year in line with PPA. However, PP has not applied the delay calibration factor for this monitoring period for the calculation of Emission reductions. The issue remains open.
2. PP has applied delay calibration factor for the parameter for which delay is observed. The assessment team has checked the ER sheet and found it correct. Hence, the issue is considered to be accepted and closed.
3. PP has applied error factor for delay in calibration for this monitoring period which is found in line with the requirements. PP has further considered this under PRC and the calibration frequency is revised. Hence, the issue is considered to be closed.
4. There is a temporary deviation mentioned in section B.2.1 of the MR. However, PP has not provided the details of alternative arrangements and applied values in line with para 231 of CDM-PS for PA version 2.0.
5. PP has discussed correction in section B.2.2 of MR. PP is requested to clarify how the change in value of fixed parameters is applicable for correction in line with footnote 24 of CDM-PS for PA version 2.0.
6. PP is requested to list all PRCs considered during this verification under appendix-7 of the PDD.

CAR#01 is open.

Project participant response	**Date**: 21/03/2019

1.The calibration is valid only until 29 August of 2017. However, since energy readings for billing purpose have taken place on 27th August the entire period of the Monitoring Period, which has been used to claim for CERs, has been covered with a calibrated energy meter.
4. To account for paragraph 231 of the project standard a value of "0" is being applied to the emission reduction sheet. This fix is mentioned in section D.2. and Annex 1 of the Monitoring Report.
5. The correction has been mentioned erroneously and was deleted from the MR.
7. The temporary deviation has now been mentioned in Annex 7.

Documentation provided by project participant

DOE assessment	**Date:** 08/04/2019

1. PP has considered the calibration frequency under post registration changes and the calibration frequency is updated to once in five years in line with the PPA. The assessment team has checked the documents and is found correct. Since the calibration frequency is not under the PP and PP has to follow the frequency in line with the PPA, hence the assessment team considered this correct and accepted. Thus, the calibration frequency is in line with the revised PDD.
4. PP has applied a value '0' during the period for temporary deviation. The assessment team has found this conservative and hence accepted and closed out.
5. There is no correction applied by the PP during this Monitoring period and the erroneous para has been removed in revised MR. The assessment team has checked the revised MR and found it correct.
7. PP has also mentioned all post registration changes in appendix-7 of the revised PDD. The assessment team found it in line with the requirement with the PDD template.

CAR#01 is closed.

CAR ID	#02	**Section no.**	NA	**Date :** 17/04/2019
Description of CAR				

1. Para 30 of PS for PoA version 2.0, states “The project participants shall determine whether the actual or proposed changes are temporary deviations referred to in section 8.2 of PS for PoA, or permanent changes referred to in section 8.3 of PS for PoA, and whether they require approval by the Board. However, Under Appendix 7 of the revised PDD, the categorization of changes was found missing.

Project participant response	**Date :** 26/04/2019
1 The categorization was added.	
Documentation provided by project participant	
-	
DOE assessment	**Date:** 30/04/2019

1. The categorization has now been added under Appendix 7 of the PoA DD. The categorization was found to be in line with the PS for PoA version 2.0. The changes are assessed in detail in the PRC report.

Thus, the CAR stands closed.

CAR ID	**03**	**Section no.**	**D.2.**	**Date : 02/09/2019**

Description of CAR

The PP was unable to monitor the values of the parameter ID. 24./FVRG,h, ID.25./BGcombusted,y and ID.26./BGflared,y were also not recorded as per the set frequency. As an alternative approach, These maximum values have been applied for the period between Jan2017-April2017 and May 2016-August 2016, i.e. the period for which deviation has been sought.
The highest value identified and applied is 716m3/hr for flow rate of gas sent to flame is the maximum values of flow rate monitored during this monitoring period and application of this value was found to be highly conservative. However, there were much higher values such as 1,120 m3/hr reported/verified in the 1st monitoring period (01 Jan 2013 - 31 Jul 2015). Therefore, the PP is required to provide further information on how it has applied the most conservative values approach.

Project participant response	**Date : 03/12/2019**

The ER sheet has been to use the maximum reported value for calculating the emission reduction calculations. For the period that overlaps with delay in calibration, error factor has also been applied to the cell. To avoid confusion all the cells with no monitored values have error factor applied to it irrespective of the fact whether it falls under the period of calibration or not. Thus, the maximum values applied are 1140.16 m3/hr and 1187.71 m3/hr.

Accordingly, the MR has been revised.

Documentation provided by project participant	
DOE assessment	**Date : 09/12/2019**

The PP has now applied maximum value ever measured by the meters. The maximum value has been identified taking note of the pervious monitoring period also. The used approach is conservative and consistently applied in the ER sheet for the missing data. PP has applied both highest values of ID24,25,26 and also the error factor for no calibration of meter which is conservative.

However, some cells with no monitoring values are still empty and the maximum value has not applied there. For eg: 12/08/2016-18/08/2016. PP shall apply the maximum reported values consistently in all cells of the ER sheet.

CAR OPEN

Project participant response	**Date: 15/12/2019**
The ER-sheet was revised filling the empty cells for ID24,25,26 values that were empty.	
Documentation provided by the CME	
8288 ER Sheet_WB	

DOE assessment	Date: 16/01/2020
The revised ER sheet with the highest value of ID24,25,26, applied for the period where the monitoring has been missed, was provided by the PP. The approach leads to reduction in the total ERs. The approach was found to be correctly and consistently applied across the ER sheet. Thus, the CAR stands closed.	

CAR ID	05	Section no.	D.2.	Date : 12/03/2020
Description of CAR				
As per tool to determine project emissions from flaring gases containing methane, if temperature of the exhaust gas of the flare is less than 500 C for any particular hour, it shall be assumed that during that hour the flare efficiency is zero." However, "ID 23,24,25,26,29 PE_Flare 2016" and "ID 23,24,25,26,29 PE_Flare 2017" of "8288 ER sheet" show that flare efficiency of 50% were applied where there were no reported temperature values, i.e. "-", in the column G (ID29 Thermocouples).				
Project participant response				**Date :** 13/03/2020
ER sheet has been revised				
Documentation provided by project participant				
Revised ER sheet Revised MR version 6.0				
DOE assessment				**Date:** 13/03/2020
The ER sheet, worksheet titled "ID 23,24,25,26,29 PE_Flare 2016" and "ID 23,24,25,26,29 PE_Flare 2017" were checked. For all cells the temperature was not monitored (under column G), the flare efficiency has been considered 0(under column H). This has increased the total project emissions, Thus reduced the total number of ERs. Thus, the CAR is closed.				

Table 3. FARs from this validation

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

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Document information

Version	*Date*	*Description*
03.0	31 May 2019	Revision to: • Ensure consistency with version 02.0 of the "CDM validation and verification standard for project activities" (CDM-EB93-A05-STAN); • Make editorial improvements.

Version	*Date*	*Description*
02.0	31 October 2017	Revision to align with the requirements in the “CDM validation and verification standard for project activities” (version 01.0).
01.0	23 March 2015	Initial publication.

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