Verification and certification report form for Gold Standard project activities

BASIC INFORMATION	
Title and GS4GG reference number of the project activity	İzmir Ödemiş Biogas Power Plant GS Reference number: GS7527
Scale of the project activity	Large-scale
Version number of the verification and certification report	8
Completion date of the verification and certification report	27/11/2024
Monitoring period number and duration of this monitoring period	The 1st monitoring period from 01/01/2020 to 31/12/2022 (first and last days included)
Version number of the monitoring report to which this report applies	Version 10 (Dated: 21/11/2024)
Crediting period of the project activity corresponding to this monitoring period	01/01/2020 to 31/12/2024
Project representative(s)	Bio Solutions ARF Yenilenebilir Enerji Üretim Anonim Şirketi
Host Party	Turkey
Applied methodologies and standardized baselines	AM0073 "Approved baseline and monitoring methodology – GHG emission reductions through multi-site manure collection and treatment in a central plant", Version 01
Mandatory sectoral scopes	13 (Waste handling and disposal)
Conditional sectoral scopes, if applicable	NA
Estimated amount of GHG emission reductions or GHG removals for this monitoring duration in the registered PDD	668,247 tCO2e
Certified amount of GHG emission reductions or GHG removals for this monitoring period	536,703 tCO2e
SDG Impacts:	1. SDG 7: Affordable and Clean Energy (7.1, 7.2) 2. SDG 8: Decent work and Economic Growth (8.2, 8.5) 3. SDG 13: Climate Action (13.2)
Name of the VVB	Carbon Check (India) Private Limited
Name, position and signature of the approver of the verification and certification report	Priya Suman Priya Suman, Compliance Officer

SECTION A. Executive summary

The Project Participant has appointed the VVB, Carbon Check (India) Private Ltd. (CCIPL) to perform an independent verification of the GS Project activity, "İzmir Ödemiş Biogas Power Plant". The purpose of the proposed project activity is biogas-to-energy project that will generate renewable energy by capturing biogas from animal manure -via anaerobic digestion- and utilizing it to produce thermal and electric energy through biogas systems. The project enables reduction of GHG incurred from existing system of cattle manure generated at farms, which is left to decay at and around farms in anaerobic conditions.

The project is located in İzmir province, in Turkey. The first monitoring period is 01/01/2020 to 31/12/2022. During the first monitoring period, the project has achieved 536,703 tCO_2e GHG emission reduction. The purpose of the verification is to review the monitoring results and verify that monitoring methodology was implemented in accordance with the monitoring plan and monitoring data, used to confirm the reductions in anthropogenic emissions by sources are sufficient, definitive, and presented in a concise and transparent manner. Monitoring plan, monitoring report and project compliance with relevant GS, UNFCCC and host party criteria are particularly verified to confirm that the project has been implemented in accordance with previously registered design and conservative assumptions, as documented.

This report summarises the findings of the verification of the project, performed on the basis of paragraph 62 of the CDM Modalities & Procedures and GS4GG requirements, as well as criteria given to provide for consistent project operations, monitoring and reporting and the subsequent decisions by the CDM Executive Board and Gold Standard. Verification is required for all registered GS project activities intending to confirm their achieved emission reductions and proceed with request for issuance of VERs. This report contains the findings and resolutions from the verification and a certification statement for the certified emission reductions.

Verification methodology and process

The Verification team confirms the contractual relationship signed on 08/08/2023 between the Carbon Check (India) Private Ltd. (hereafter the "VVB") and the project participant - ARF Yenilenebilir Enerji Üretim Anonim Şirketi /B09/. The team assigned to the verification meets the Carbon Check (India) Private Ltd's internal procedures including the UNFCCC requirements for the team composition and competence. CCIPL has conducted a thorough contract review as per UNFCCC and Carbon Check's procedures and requirements.
The verification has been performed as per the requirements described in the Gold Standard for the Global Goals Principles & Requirements (version 1.2); and CDM VVS for project activities (version 03.0) and constitutes the review and completion of the following steps:

- Review of the registered PDD (version 07; Dated: 30/09/2022) /02/, including the monitoring plan and the corresponding validation report.
    - Review of revised PDD (version 08; Dated: 19/11/2024, subject to design change approval)
- Desk review of the MR /01/, emission reduction spreadsheet /03/
- Review of the applied monitoring methodology AM0073 – "GHG emission reductions through multi-site manure collection and treatment in a central plant", Version 1.0 /B01/;
- Review of any CMP and EB decisions, clarifications and guidance and the Gold Standard Secretariat;
- On-site assessment (22/08/2023 to 25/08/2023)
- Resolution of CARs and CLs raised during verification
- Issuance of Verification Report

The verification of the emission reductions reported for the project activity 'İzmir Ödemiş Biogas Power Plant', GS Registration Reference No. 7527 for the monitoring period 01/01/2020 to 31/12/2022, with regard to the relevant GS requirements and principles for project activities. In Carbon Check's opinion, the project activity was correctly implemented according to selected monitoring methodology monitoring plan and the registered PDD /02/. The monitoring data allowed for the verification of the amount of achieved GHG emission reductions. Through document review, on-site interview, the verification team confirms that the project has resulted 536,703 tCO_2e emission reductions during this 1st monitoring period. The GHG emission reductions and non-GHG parameters were correctly calculated/monitored based on the approved monitoring methodology "AM0073 – "GHG emission reductions through multi-site manure collection and treatment in a central plant", Version 1.0 /B01/ and the monitoring plan contained in the registered PDD (version 07; Dated: 30/09/2022) /02/.

SECTION B. Verification team, technical reviewer and approver

B.1. Verification team member

No.	Role	Type of resource	Last name	First name	Affiliation	Involvement in			
					(e.g., name of central or other office of DOE or outsourced entity)	Document review	On-site inspection	Interviews	Findings
1.	Team Leader/Technical Expert	IR	Agarwalla	Sanjay Kumar	CCIPL	X	X	X	X
2	Trainee Assessor	IR	Nadkarni	Tanvi	CCIPL	X	X	X	X
3	Trainee Assessor	IR	Kadam	Campal	CCIPL	X			X
4	Local Expert	ER	Erduran	Muhammet Ali	CCIPL		X	X	

B.2. Technical reviewer and approver of the verification and certification report

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	C	Indumathi	CCIPL
2	Approver	IR	Suman	Priya	CCIPL

SECTION C. Application of materiality

The threshold of materiality was evaluated based on § 9.6.3 of "Validation and Verification Standard" Version 1.0 dated 06/03/2023. It was concluded that the materiality threshold applicable to the project activity based on actual emission reductions achieved is 0.5% of 536,703 tCO2e which is 2,683.52 tCO_2e.

C.1. Consideration of materiality in planning the verification

No.	Risk that could lead to material errors, omissions, or misstatements	Assessment of the risk		Response to the risk in the verification plan and/or sampling plan
		Risk level	Justification	
1.	Human Error: Recording and reporting of the information in the ER spreadsheet.	Medium	All the ER spreadsheet input data of the stoves, including sales database, determination of parameter for efficiency testing including data calculation are recorded and reported manually. This includes all the parameters to be monitored ex-post as per the PDD.	The risk was mitigated by reviewing the training of the personnel involved in the data capture, calculation and by following the monitoring responsibilities. The training records were reviewed during the on-site visit interviews.
2.	Information System:	Medium	The data is recorded in the spreadsheet based on the	The identified risk was mitigated by reviewing the

	Use of spreadsheets without adequate controls related to data changes/updates, version tracking, traceability, security		raw data collected during the field visits. The access to the spreadsheets for calculation of ERs, monitoring and sales database and baseline stove efficiency testing, and other quality test records.	management of access to the records. It was confirmed through interviews whether the raw data is collected by the field personnel and then transmitted and stored electronically to the PPs office. The data quality control was checked.
3.	Competence of personnel involved in conducting standardized tests viz., monitoring survey, usage survey, and other quality test etc.	Medium	Interview of the personnel involved and check the training records/ accreditation certificates involved in conducting such tests.	The risk was mitigated by reviewing the training records of the personnel involved in conducting such tests and by following the monitoring responsibilities. For institutions involved in conducting such tests, their accreditation certificates were checked to establish their competency. The training records and certificates were reviewed during the onsite interviews.

C.2. Consideration of materiality in conducting the verification

Based on the above, activities in which risks were assessed were:

1. Monitoring system including the data input procedure (including relevant personnel and applicable template forms used)
2. ER sheet (application of data)
3. Data flow
4. Data control procedures

In conducting the verification, VVB took cognizance of §09 of the "Validation and Verification Standard" Version 1.0 dated 06/03/2023. Data flow was checked through comparison of data in hand-written forms, electronic database, and ER sheet /03/. The competence of the personnel involved in recording of data and calculation of the emission reductions data has been checked by the verification team by means of on-site visit interviews.

The risks identified can be mitigated through cross check with all sets of documents. The verification team performed the following checks in order to mitigate the effects of the above-identified sources of error:

Mitigation of Human error risks: The verification team mitigated the risk by checking the training records of the personnel and assessing their competencies, skills, monitoring / testing procedure followed, etc. during the on-site visit interviews. Further, data was crosschecked with the ER calculation spreadsheet /03/ and the raw data.

Mitigation due to error in Information system: Verification team by conducting interviews with the personnel responsible for such activities mitigated the risk due to error in information system. It was confirmed through interviews that the raw data is recorded by an automated system and also collected by the field personnel and farm owners which is then transmitted and stored electronically at PP's office. The data quality control is maintained by the PP.

Accuracy of the measuring equipment: Verification team has conducted document review of calibration records applicable to the measuring equipment. In particular the calibration record of flowmeters and electricity meters were checked to ensure accuracy if the monitored data.

In conducting the verification, VVB took cognizance of In conducting the verification, VVB took cognizance of §09 of the "Validation and Verification Standard" Version 1.0 dated 06/03/2023 and based on the input of data from different sources checked through sampling of records during on-site visit interviews.

Based on the assessment carried out, CCIPL confirms with a reasonable level of assurance that the claimed emission reductions are free from material errors, omissions or misstatements.

SECTION D. Means of verification

D.1. Desk/document review

The verification was performed primarily based on the review of the Monitoring report /1/ and the supporting documentation. This process included review of data and information presented to verify their completeness and review of the monitoring plan and monitoring methodology /B01/. Documents reviewed or referenced during the verification are listed in Appendix 3 of this report.

D.2. On-site inspection

The verification team has carried out on-site inspection and interviews in order to assess the information included in the monitoring report and monitoring measurement procedures adopted during the monitoring period. During the desk review, the relevant monitoring records were checked. Validation report was also used to cross check consistency of information.

Through the review of validation reports, comparing the relevant evidence and interview with the PP's representatives, CCIPL has confirmed that the project is implemented in line with the registered GS PDD during the monitoring period. There is no change of the project design, operation, and monitoring plan.
On-site inspection and interviews were performed by verification team in order to assess the following:

On-site inspection and interviews: 22/08/2023 to 25/08/2023				
No.	**Activities performed on-site**	**Site location**	**Date**	**Team member**
1.	Opening Meeting and brief project description by the PP; discussion on implementation status of the project activity.	Central treatment plant	22/08/2023	Sanjay Kumar Agarwalla, Tanvi Nadkarni and Muhammet Ali Erduran
2.	Compliance of Monitoring plan with the applied methodology and registered monitoring plan; project implementation and operation as per the GS PDD.	Central treatment plant	22/08/2023 to 25/08/2023	Sanjay Kumar Agarwalla, Tanvi Nadkarni and Muhammet Ali Erduran
3.	Discussion on the monitoring parameters, review of QA/QC process including interview / competency assessment (abilities, qualifications, training, calibrations etc.) of persons responsible for conducting the monitoring; Review of monitored data, discussion on Monitoring report and ER calculation spread sheets. Reassessment of baseline scenario and additionality.	Central treatment plant	22/08/2023 to 25/08/2023	Sanjay Kumar Agarwalla, Tanvi Nadkarni and Muhammet Ali Erduran
4.	Physical site visit (Central treatment plant)	Central treatment plant	22/08/2023	Sanjay Kumar Agarwalla, Tanvi Nadkarni and Muhammet Ali Erduran
5.	Physical site visit to farms involved in the project as per section III of the applied methodology AM0073 v 01	Farms	22/08/20234 to 25/08/2023	Sanjay Kumar Agarwalla, Tanvi Nadkarni and Muhammet Ali Erduran
6.	Discussion on OSV findings and Closing meeting.	Central treatment plant	25/08/2023	Sanjay Kumar Agarwalla, Tanvi Nadkarni and Muhammet Ali Erduran

Interviews

No.	Interviewee			Date	Subject	Team member
	Last name	First name	Affiliation			
1.	Onaran	Ilayda	BioSolutions	22/08/2023 – 25/08/2023	• Project Design • Project Implementation status • Plant operations • Project start date and Project Location • Baseline Scenario • Monitoring and reporting documentation • Qualification and Training • Quality Assurance – Management and operating system • Social and Environmental Impacts • Roles and responsibility • Compliance with relevant laws	Sanjay Kumar Agarwalla, Tanvi Nadkarni and Muhammet Ali Erduran
1.	Baysun	Serim	BioSolutions	22/08/2023 – 25/08/2023	• Project Design • Project Implementation status • Plant operations • Project start date and Project Location • Baseline Scenario • Monitoring and reporting documentation • Qualification and Training • Quality Assurance – Management and operating system • Social and Environmental Impacts • Roles and responsibility • Compliance with relevant laws	Sanjay Kumar Agarwalla, Tanvi Nadkarni and Muhammet Ali Erduran

2.	Gencer	Batin	Plant operations head - ARF	22/08/2023 – 25/08/2023	• Project Design • Project Implementation status • Plant operations • Project start date and Project Location • Baseline Scenario • Monitoring and reporting documentation • Qualification and Training • Quality Assurance – Management and operating system • Social and Environmental Impacts • Roles and responsibility • Compliance with relevant laws	Sanjay Kumar Agarwalla, Tanvi Nadkarni and Muhammet Ali Erduran
3.	Harmankaya	Seil	In charge for electricity operations of the plant -ARF	22/08/2023	• Project Design • Project Implementation status • Plant operations • Project start date and Project Location • Baseline Scenario • Monitoring and reporting documentation • Qualification and Training • Quality Assurance – Management and operating system • Social and Environmental Impacts • Roles and responsibility • Compliance with relevant laws	Sanjay Kumar Agarwalla, Tanvi Nadkarni and Muhammet Ali Erduran
4.	Murat	Yesiltar	In charge for biogas operations of the plant - ARF	22/08/2023	• Project Design • Project Implementation status • Plant operations • Project start date and Project Location	Sanjay Kumar Agarwalla, Tanvi Nadkarni and Muhammet Ali Erduran

					• Baseline Scenario • Monitoring and reporting documentation • Qualification and Training • Quality Assurance – Management and operating system • Social and Environmental Impacts • Roles and responsibility • Compliance with relevant laws	
5.	Oncel	Murat	Laboratory in charge -ARF	22/08/2023	• Project Design • Project Implementation status • Plant operations • Project start date and Project Location • Baseline Scenario • Monitoring and reporting documentation • Qualification and Training • Quality Assurance – Management and operating system • Social and Environmental Impacts • Roles and responsibility • Compliance with relevant laws	Sanjay Kumar Agarwalla, Tanvi Nadkarni and Muhammet Ali Erduran
6.	Sezgin	Zafer	ARF	22/08/2023	• Project Design • Project Implementation status • Plant operations • Project start date and Project Location • Baseline Scenario • Monitoring and reporting documentation • Qualification and Training • Quality Assurance –	Sanjay Kumar Agarwalla, Tanvi Nadkarni and Muhammet Ali Erduran

					Management and operating system • Social and Environmental Impacts • Roles and responsibility • Compliance with relevant laws	
7.	Dinlenmez	Deniz	ARF	22/08/2023	• Project Design • Project Implementation status • Plant operations • Project start date and Project Location • Baseline Scenario • Monitoring and reporting documentation • Qualification and Training • Quality Assurance – Management and operating system • Social and Environmental Impacts • Roles and responsibility • Compliance with relevant laws	Sanjay Kumar Agarwalla, Tanvi Nadkarni and Muhammet Ali Erduran
6.	Can	Mustafa	Village Mukhtar	22/08/2023	Local Stakeholder consultation Grievance redressal mechanism	Sanjay Kumar Agarwalla, Tanvi Nadkarni and Muhammet Ali Erduran

For the project activity, "İzmir Ödemiş Biogas Power Plant" during the 1st monitoring period manure generated at 123 farms is collected. PP has ordinated the farms where baseline emissions would occur as per their emissions. Out of the 123 farms 123 farms are categorized as 'Upper rank' which are individually responsible for an amount of baseline emissions equal to, or higher than, 900 tCO_2e.

As per the requirements stated in the methodology AM0073 v01.0, on-site interviews were conducted at all 123 farms to assess the methodology applicability conditions as per the requirements state in the applied methodology AM0073. VVB was able to complete interviews with 123 farms in 4 days (22nd August to 25th August 2023) as most of the farms were in cluster and close to each other. The distances of the farms from the central treatment plant is reported in the MR which was found to be consistent during site visit.

The key personnel interviewed, and the key topics of interview are summarized in the table below:

Sl no.	Date	Farm name	Topics
1	22/08/2023	Abdullah öztürk çiftliği	• Baseline scenario. • Conditions under which livestock is managed. • Treatment of animal residue. • Lagoon depth. • Retention time of baseline anaerobic treatment system. • Supply chain to AWMS. • Declaration that CERs will not be claimed by the farm. • Discharge or end use of the treated residue in baseline. • Type and number of animals in the farm
2	22/08/2023	Adaş emlak	
3	22/08/2023	Adem çakir - hasan çakir	
4	22/08/2023	Adem uğur çiftliği	
5	22/08/2023	Ahmet yağci	
6	22/08/2023	Ahmet hamdi saygin	
7	22/08/2023	Alfemo	
8	22/08/2023	Ali balci	
9	22/08/2023	Ali kurbanci	
10	22/08/2023	Alper erkin	
11	22/08/2023	Anil zeybek	
12	22/08/2023	Arif uzbasan çiftliği	
13	22/08/2023	Arif ülteciel çiftliği	
14	22/08/2023	Arif yurdaşan	
15	23/08/2023	Armutlu çiftliği	
16	23/08/2023	Arnavut hüzeyin	
17	23/08/2023	Aykanlar çiftliği	
18	23/08/2023	Aytekin karadağ	

20	23/08/2023	Baltaci mehmet	
21	23/08/2023	Bariş burgazlioğlu	
22	23/08/2023	Beytullah uçar çiftliği	
23	23/08/2023	Bülent irak	
24	23/08/2023	Cafer hakanoğlu çiftliği	
25	23/08/2023	Can-hakki zülan çiftliği	
26	23/08/2023	Cargil çiftliği	
27	23/08/2023	Coşkun demir	
28	23/08/2023	Çelikkaleli	
29	23/08/2023	Celep hüsnü	
30	23/08/2023	Cesur erdoğan	
31	23/08/2023	Çiçekçi nazmi	
32	23/08/2023	Damizlik birliği	
33	23/08/2023	Değirmenci çiftliği	
34	23/08/2023	Demircioğlu	
35	23/08/2023	Deniz okuroğlu çiftliği	
36	23/08/2023	Doktor riza kargin çiftliği	
37	23/08/2023	Durmaz çiftliği	
38	23/08/2023	Ekber aydemir	

40	23/08/2023	Elektrikçi sami çiftliği	
41	23/08/2023	Emin karaoğlan	
42	23/08/2023	Emin sari çiftliği	
44	23/08/2023	Eray yilmaz laz çiftliği	
45	23/08/2023	Ercan tekeli	
46	23/08/2023	Ergün çakir	
47	23/08/2023	Erkoç çiftliği	
48	23/08/2023	Ersoy ediz	
50	23/08/2023	Eskici çiftliği	
51	24/08/2023	Fahrettin dadal çiftliği	
52	24/08/2023	Faruk erdinç	
54	24/08/2023	Fatih-hasan kirlier	
55	24/08/2023	Galerici asil çiftliği	
57	24/08/2023	Gökhan özen çiftliği	
58	24/08/2023	Gülcüoğlu çiftliği	
59	24/08/2023	Güral ulusoy çiftliği	
60	24/08/2023	Hakan dönmez çiftliği	
61	24/08/2023	Hakan-ibrahim güreşmen	
62	24/08/2023	Halit büyükkutlu	

63	24/08/2023	Hasan palaska çiftliği	
64	24/08/2023	Hasan-hüseyin çakir	
65	24/08/2023	Hüseyin-nazmi gökçen tarim	
66	24/08/2023	Hüseyin dereli	
67	24/08/2023	Hüseyin kurt	
68	24/08/2023	Hüseyin meydan çiftliği	
69	24/08/2023	Hüseyin özgüroğlu	
72	24/08/2023	Hüsnü boyacioğlu çiftliği	
73	24/08/2023	Hüsnü kulluk	
74	24/08/2023	İbrahim sevgi çiftliği	
76	24/08/2023	İrfan akça çiftliği	
77	24/08/2023	İrfan soğuksu çiftliği	
78	24/08/2023	İsmail harman çiftliği	
80	24/08/2023	Kadir zeybek çiftliği	
81	24/08/2023	Kepceci aydin devecioğlu çiftliği	
82	24/08/2023	Koray eriş	
83	24/08/2023	Korkmaz cam çiftliği	
84	24/08/2023	Köroğlu çiftliği	

85	24/08/2023	Kürşat dikici çiftliği	
86	24/08/2023	Levent okan	
88	24/08/2023	Mehmet cingirt çiftliği	
90	24/08/2023	Mehmet barut nizamoğlu	
91	24/08/2023	Mehmet çakir çiftliği	
92	24/08/2023	Mehmet elmali çiftliği	
93	24/08/2023	Mehmet karaca	
95	25/08/2023	Mehmet nihat karci çiftliği	
96	25/08/2023	Mehmet özer	
97	25/08/2023	Mehmet özilhan	
98	25/08/2023	Mert mehmet atik hayvan çiftliği	
99	25/08/2023	Mesut purmaz	
100	25/08/2023	Muharrem-münir uyandiran çiftliği	
103	25/08/2023	Mustafa kaya çiftliği	
105	25/08/2023	Mustafa sert ikizler galeri çiftliği	
106	25/08/2023	Mustafa tüyene	
107	25/08/2023	Mustafa uysal konyali çiftliği	
108	25/08/2023	Muzaffer-mustafa softa çiftliği	

109	25/08/2023	Nalbantçi feridun çiftliği	
110	25/08/2023	Nayman tarim	
111	25/08/2023	Necip kuyucu çiftliği	
112	25/08/2023	Niyazi sayan çiftliği	
113	25/08/2023	Nuri seçeroğlu	
114	25/08/2023	Osman yazan doyranli çiftliği	
115	25/08/2023	Ömer demirci çiftliği	
116	25/08/2023	Orhan kemal akkuş çiftliği	
117	25/08/2023	Orhan yünlüoğlu	
119	25/08/2023	Özhan özen çiftliği	
120	25/08/2023	Prokons çiftliği	
121	25/08/2023	Rifat eriş çiftliği	
122	25/08/2023	Rifat yerdelen çiftliği	
123	25/08/2023	Süleyman gacar	

D.4. Sampling approach

Project proponent has decided to use all data from animal farms instead of using sampling method. Therefore, all data has been taken into account while monitoring parameters calculated.

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

The VVB has raised 09 Clarifications and 03 Corrective Action Requests which have been resolved and successfully closed. No FAR has been raised. Please refer to Appendix 4 for further details.

SECTION E. Verification findings

E.1. Compliance of the monitoring report with the monitoring report form

Means of verification	Comparing the monitoring report /01/ with the monitoring report form provided by GS
Findings	-
Conclusion	CCIPL confirms that the monitoring report version 10, dated 21/11/2024 /01/ is prepared using GS monitoring report template version 1.1 of 14/10/2020 which is the latest and valid template and completed with relevant information as per the template requirement.

E.2. Remaining forward action requests from validation and/or previous verifications

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GS had raised a FAR during design review which stated that *"VVB is required to check for double counting at verification stage by reviewing all relevant registries that could hold RECs from the project. The list of registries examined shall be reported in the verification report."* This has been addressed by the VVB in this report. Please refer to section E.3.

E.3. Compliance of the project implementation and operation with the registered project design document

Means of verification	The proposed project activity is a biogas-to-energy project that will generate renewable energy by capturing biogas from cattle manure -via anaerobic digestion- and utilising it to produce thermal and electric energy. The Manure generated by approximately over 36,327 cattle living at around 123 neighbouring farms is collected daily through special sewage trucks. The proposed project activity has a total number of five biogas engines installed at the biogas power plant. Four engines are with the net capacity of 1.067 MWe each. While 1 engine is with net capacity 0.621 MWe. Accordingly, the biogas system installed has been designed with a total power of 4.868 MWe. The proposed project activity will consist in a collection system of the manure generated from the dairy and other cattle, and an ulterior process in the anaerobic digesting plant. The manure will be treated through the following processes: a) homogenization of the manure, b) pasteurization in order to eliminate pathogens that could affect the biodigester operation and c) anaerobic digestion. This was effectively confirmed by CCIPL during the site visit through direct supervision of the installations. The baseline scenario of the proposed project activity, as a Greenfield power plant, is that the electricity delivered by the Project to the National Grid of the Republic of Turkey. In the absence of the proposed project activity, the same amount of electricity is required to be supplied via either the current power plants or by increasing the number of thermal power plants, thus increasing GHG emissions. In addition, Before the project activity, cattle manure generated at the farms were left to decay in anaerobic conditions. Hence, greenhouse gases generated from animal manure were released directly into atmosphere. Hence, the greenhouse gas identified in the PDD is Carbon dioxide (CO_2) and Methane (CH_4) which is duly validated by the VVB during validation. The commercial operation of the project activity had been commissioned on 26/10/2018 /08/ which was verified vide commissioning certificates indicating the start date of commercial operation. As per the GHG Emissions Reductions & Seq. Product Requirements V.2 para 10.2.1 start date of the crediting period is the start date of the project operation or

two years prior to the date of Project Design certification, whichever is later. The project was design certified on 30/12/2021. Accordingly, the crediting period start date is 01/01/2020. Kindly refer appendix 05 of this report for details of design change assessment.

Location of the central treatment plant and the farms were verified through Google Maps (https://www.google.com/maps) and found consistent with the data provided in the registered PDD.

The technical specifications of the project activity equipment's have been physically checked during the site visit and are found to be consistent with the mentioned under section B.1 of MR.

The status of the project activity is verified through the online system during site visit available at site office, indicating the real-time generation data and hence it is confirmed that the project is fully functioning.

The project activity is designed to treat the cattle manure (anaerobic digestion) & capture the biogas to generate electricity and heat in a cogeneration unit. Waste heat from gas engine is utilized mainly for heating anaerobic fermenters and emission reductions associated with heat generation and usage are not claimed. The generated electricity is supplied to the national grid and is also used for auxiliary/internal consumption required for the plant to function. This has been verified by on-site inspection, checking the related documentations, and interviews with the project implementer.
The project is expected to reduce of GHG in the atmosphere through avoiding emissions from controlled anaerobic digestion treatment by capturing biogas & generate electricity. The estimated emission reduction from the project is 1,244,314 tCO2e per year during the 5-year crediting period from 01/01/2020 to 31/12/2024.

Thus, the project generates GHG emission reductions and produces financial, social, and environmental benefits. The project has resulted in the local sustainable development as described in table 1 of MR.

Therefore, it was confirmed that the sectoral scope is Scope 13 Waste handling and disposal as per the UNFCCC Standard "Applicability of sectoral scopes version 01.0".

The project is applicable to the applied CDM Methodologies AM0073 – "GHG emission reductions through multi-site manure collection and treatment in a central plant", Version 1.0" /B01/.

In conclusion, it is verified that the summary description of the project in MR is in line with the PD template requirements and all the information has been provided and verified as correct.

The project developer has implemented the grievance mechanism in line with the registered PDD, this is confirmed through the interviewing the village mukhtar and by reviewing a copy of grievance register submitted. The project implementation, with reference to PDD, was checked during the site visit and confirmed the following:

- The monitoring system including the measurement of parameters, data collection and archiving was also implemented and operated inline to the PDD.
- The emission reduction was achieved in compliance with applied methodology and registered PDD.
- The project contributes to the sustainable development which includes, but not limited to, enhancement of local economy, creating employment and many other benefits to the village population.

Double counting of carbon credits:

	a. The project activity is not registered under any other emissions trading program or any other mechanism that includes GHG allowance trading. Following registries have been assessed: https://www.climateactionreserve.org/ https://registry.goldstandard.org/projects?q=&page=1 https://iceland.itmoregistry.net/Public/Project https://biocarbonregistry.com/en/projects/ https://projects.globalcarboncouncil.com/pages/submitted_projects https://registry.verra.org/app/search/VCS/All%20Projects b. The project activity has not sought or received any renewable energy certificates during this monitoring period. This is verified through the list of registered projects published at the official website. c. The project is not registered under the international REC Mechanism e.g. I-REC Device Registry and the same is confirmed through the I-REC web site (https://v-1.evident.app/Public/ReportDevices/). The assessment team can confirm that there is no double counting of credits anticipated in the current monitoring period. The PP has also provided a declaration for no double counting and the same has been verified by the VVB. The outage record/Excel Sheets for this monitoring period was verified from Invoices/Logbooks shared by PP and found ok.
Findings	CL 02 and CAR 01 were raised and closed successfully. Please refer to Appendix 4 for further details.
Conclusion	The emission reductions achieved during the current monitoring period (01/01/2020 – 31/12/2022) are 536,703 tCO_2e, that is within the estimated quantity of 668,247 tCO_2e for the monitoring period, in the registered PDD. The verification team confirms actual operation of the project and implementation in compliance with §09 of the "Validation and Verification Standard" Version 1.0 dated 06/03/2023 and GS4GG requirements.

E.4. Post-registration changes

E.4.1. Temporary deviations from the registered monitoring plan, applied methodologies, standardized baselines or other methodological regulatory documents[1]

>>
N/A

E.4.2. Corrections

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As per section 8.1.1 of the Design change requirements version 1.1, following is indicative list of changes suitable to be submitted under issuance track :
a. Any corrections to project information13 of a certified project activity that do not affect the design of the project activity;

b. Changes to the monitoring of a certified project activity that have no material impact on the applicability of the applied methodologies, other standard documents, or the accuracy and completeness of the monitoring;

[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).

c. Changes to the project design of a certified project activity that do not adversely impact any of the following:
i. The applicability and application of the applied methodologies and the other standard documents with which the project activity has been certified;
ii. The additionality of the project activity;
iii. The scale of the project activity;
iv. Safeguarding and sustainable development impact;

d. Changes to the project design to use the positive list for demonstrating additionality.

Taking cognizance of indicative list above, VVB has assessed if the changes proposed by PD to the PDD can be submitted under issuance track. PD has proposed following changes :

1. Unit conversion error made in PD for while determining the value for parameter VSLT,y is corrected. PD has used a more conservative conversion factor to convert the wet basis value to dry basis. The initial conversion factor led to significant overestimation of estimated baseline emissions and consequently the emission reductions. Post rectification of error, the estimated annual average emission reductions have reduced from 1,190,971 to 213,927. This design change can be submitted under issuance track as per VVB's assessment as follows :
    - This correction does not affect design of the project activity. The actual value estimation process is unchanged with only the unit conversion factor being corrected leading to more conservative final value.
    - The correction does not affect applicability of methodology. While the methodology prescribes procedures to determine the value of parameter VSLT,y, it does not prescribe a preferred conversion factor. Further, the correction increases the accuracy of ER calculations.
    - The correction does not affect applicability of the methodology. It does not affect additionality as the parameters applied to assess additionality remain unchanged. The change in ERs does not affect scale of the project as estimated annual average ERs are still higher that 60k tCO2e thus classifying the project as large scale. The correction does not impact the safeguarding and sustainable development impact.

2. Error in application for conversion used to Calculate Project Emissions from Road Transportation has been corrected.
   As per the registered PDD, PD had applied a constant 10^{-7} in the equation to calculate project emissions. However, the resulting value in tonnes was erroneous. In the revised equation, PD has applied the constant 10^{-9} which accurately provides the value in tonnes. This design change can be submitted under issuance track as per VVB's assessment as follows :
    - This correction does not affect design of the project activity. The actual value estimation process is unchanged with only the unit conversion factor being corrected leading to more conservative final value.
    - The correction does not affect applicability of methodology but rather increases the accuracy of ER calculations.
    - The correction does not affect applicability of the methodology. It does not affect additionality as the parameters applied to assess additionality remain unchanged. The change in ERs does not affect scale of the project as estimated annual average ERs are still higher that 60k tCO2e thus classifying the project as large scale. The correction does not impact the safeguarding and sustainable development impact.

3. PD has now chosen to determine VSLT,y based on option (4) of the applied methodology. As per AM0073 version 1.0, there are 5 methods to determine VSLT,y and these are in order of preference.

   Originally, PD had chosen the 5th option that involves direct measurement of volatile solid. However, during the course of first verification PD has decided to change the method as default IPCC values can be applied as per option 4th which is also a preferred method over option 5th.
    - This correction does not affect design of the project activity. This change would be in line with methodology since IPCC default values are preferred over direct measurement. The IPCC values also lead to a more conservative calculation. The project activity used to monitor VS in past and will continue to monitor it since project owner wishes to do a quality check on the manure received from farms. However, now instead of monitored values of VS, default values will be used in ER calculations as explicitly specified by PD while addressing comment #8 below and no monitored values of VS will be used in ER calculation. PD has

also demonstrated how VS is measured on site. However, this does not impact project design with regards to ER calculation as the monitored value is not used in ER calculations. Only the default value is used.

- The change does not affect applicability of methodology but rather is in line with methodology and increases the accuracy of ER calculations.
- The correction does not affect applicability of the methodology. It does not affect additionality as the parameters applied to assess additionality remain unchanged. The change in ERs does not affect scale of the project as estimated annual average ERs are still higher that 60k tCO2e thus classifying the project as large scale. The correction does not impact the safeguarding and sustainable development impact.

In addition to the three changes above, minor corrections are made the PDD for additional clarity as follows:

1. The parameter 'T' (Monthly average ambient temperature at the livestock farms included in the project boundary) was not included in the registered PDD. The parameter is an important monitoring parameter as the methodology only accounts for emissions if the outside ambient temperature is above 5^0C. This error is corrected during the first verification and PD has included the parameter as monitoring parameter.

2. MS%BL,j is an ex-ante parameter as per the methodology. However, it was not included in the registered PDD. The parameter was always utilized in the original ER calculations as per the requirement. However, it was not described in PDD as such. This was verified through cross-checking of originally submitted ER sheet during validation. PD has corrected this error and included the ex-ante parameter.

3. Typo error while describing the SDG parameter 13 is corrected.

4. According to 'Errata and Clarifications to AM0073' publication by VERRA, CDM TOOL 14 and 2019 Refinement to the 2006 IPCC Guidelines for National GHG Inventories can be used for defining LFAD parameter. Therefore, LFAD parameter has been corrected as the digesters with steel or lined concrete or fiberglass digesters and a gas holding system (egg shaped digesters) and monolithic construction will have a value of 0.028 as per the IPCC (2006), Flesch et al. (2011) and Kurup (2003).

VVB has assessed the above changes and confirms that these are eligible to be submitted under issuance track.

E.4.3. Changes to the start date of the crediting period

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The start date of the crediting period as per the registered PDD was 26/10/2018. However, the project has been design certified on 30/12/2021.

As per the GHG Emissions Reductions & Seq. Product Requirements V.2 para 10.2.1 start date of the crediting period is the start date of the project operation or two years prior to the date of Project Design certification, whichever is later.

Accordingly, in line with the GHG Emissions Reductions & Seq. Product Requirements V.2 crediting start date is changed as 01/01/2020 to 31/12/2024 (first and last days included).

PD has requested this design change in prior approval track. VVB has assessed the revised PDD version 08 dated 19/11/2024 /25/ and provided an assessment for the change to the crediting period in a separate validation report as the design change is to be requested under prior approval track.

E.4.4. Inclusion of a monitoring plan

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N/A

E.4.5. Permanent changes from registered monitoring plan, or permanent deviation of monitoring from the applied methodologies, standardized baselines or other methodological regulatory documents

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N/A

E.4.6. Changes to the project design

>>
N/A

E.4.7. Changes specific to afforestation and reforestation project activities

>>
N/A

E.5. Compliance of the registered monitoring plan with applied methodologies, applied standardized baselines, and other applied methodological regulatory documents

Means of verification	During this monitoring period, the validated and registered monitoring plan was found to be in accordance with the applied methodology /02/, /12/.
Findings	-
Conclusion	The verification team has checked the actual monitoring plan against the registered monitoring plan and monitoring methodology and applicable tools. Furthermore, the verification team has checked the monitoring system by means of comparison with the information given in the monitoring plan and monitoring methodology. The monitoring plan is completely in accordance with the approved methodology /B01/ applied by the registered PDD/02/.

E.6. Compliance of monitoring activities with the registered monitoring plan

E.6.1. Data and parameters fixed ex ante or at renewal of crediting period

Means of verification

The following ex-ante parameters are considered in the calculation of the emission reductions:

Parameters	VVB Assessment
$EF_{grid,CM,y}$ - Emission factor for the Turkish National Grid.	This value is fixed ex-ante based on published data from the Ministry of the Energy and Natural Resources in Turkey & found consistent with the PDD. **Value** – 0.5706 tCO_2/MWh
D_{CH4} - Density of methane at normal (at room temperature 20°C and 1 atm pressure) conditions.	PP has applied the value prescribed in the applied methodology /B01/ for this parameter & found consistent with the registered PDD. **Value** – 0.00067 t/m^3
GWP_{CH4} - Global Warming Potential of CH4	PP has applied IPCC (AR4/5) value which has been cross verified by the assessment team. **Value** – Till 01/01/2021 – 25 After 01/01/2021 – 28
$n_{flare,m}$ – Flare efficiency	The value is applied in accordance with CDM TOOL 06 /B02/. In accordance with paragraph 21 of TOOL 06, the default value for flare efficiency is 90%. However, the flare installed on-site is an enclosed

	flare that is defined as low height flare. This is also confirmed by reviewing the technical specifications of the flare /21/. Therefore, in accordance with paragraph 23 of TOOL 06, flare efficiency is adjusted, as a conservative approach, by subtracting 10 percentile points. **Value** – 80%
MCF_j - Annual methane conversion factor (MCF) for the baseline animal manure management system j	The value applied in accordance with 2006 IPCC Guidelines for National Greenhouse Gas Inventories (IPCC 2006), Volume 4, Chapter 10, Table 10.A-4, page 10.77. **Value** – 0.76
$B_{0,LT}$ - Maximum methane producing potential of the volatile solid generated for animal type 'LT'.	PP has sourced the value from IPCC 2006, Volume 4, Chapter 10, Table 10.A-4, page 10.77. **Value –** Dairy Cattle: 0.24 m^3CH4/kg-dm; Non-Dairy Cattle: 0.17 m^3CH4/kg-dm
$TDL_{j,y}$ - Average technical transmission and distribution losses for providing electricity to source j in year y	The value is calculated from the data Provided by Turkish Electricity Transmission Corporation (TEİAŞ) in accordance with Methodological Tool: Baseline, project and/or leakage emissions from electricity consumption and monitoring of electricity generation, Version 3.0 /B02/. This is found to be consistent with the registered PDD. **Value** – 0.11
LF_{AD} - Default Methane leakage from anaerobic digesters/reactor.	According to the applied methodology /B01/, the default value is 0.15. However, PP has applied a lower value, the source of which has been checked by the verification team and is found to be appropriate. The value is taken in accordance with TOOL 14 /B02/ for concrete digesters. **Value**- 0.028
$EF_{CO2,f}$ - CO2 emission factor of the fossil fuel type f used in transportation vehicles.	PP has used IPCC 2006 value as a source of document, which has been cross verified by the assessment team & found consistent with the registered PDD. **Value**- 74,800 (tCO_2e/TJ)

	$NCV_{,f}$ - Net calorific value of fuel type f in TJ per volume or mass units.	PP has used IPCC 2006 value as a source of document, which has been cross verified by the assessment team & found consistent with the registered PDD. **Value** – 43.3
	$MS\%Bl,j$ - Fraction of manure handled in system j in the baseline	Baseline survey /10/ conducted by the PP has been verified. Manure management system is uncovered anaerobic lagoon in the baseline survey farms. **Value** – 100%
	$SPEC_{flare}$ - Manufacturer's flare specifications for temperature, flow rate and maintenance schedule	Manufacturer's specification have been checked by the VVB. The values stated are in line with the specifications. **Value –** Max Capacity: 2,300 Nm3/h Operating Temperature: 800-1200°C Maintenance Schedule: Depending on the maintenance, periodical controls should be done every 6 months for partial equipment changes or every 2 years for flame holder changes.
Findings	CL02 was raised and closed successfully. Please refer to Appendix 4 for further details.	
Conclusion	CCIPL is able to confirm that the data and parameters fixed ex-ante have been implemented in full compliance with the registered monitoring plan.	

E.6.2. Data and parameters monitored

Data / Parameter:	$EG_{d,y}$	
Data unit:	MWh/yr	
Description:	Quantity of net electricity generation supplied by the project plant/unit to the grid in year y.	
Source of data used:	Electricity meter / Bill generated	
Value	**Year**	**Net Electricity Generation (MWh)**
	2020	13,303.14
	2021	18,769.352
	2022	17,011.02
	Total	49,083.512

Means of verification/Comments:	As per the registered monitoring plan, following the Turkish legislation titled 'The Measurement and Measuring Instrument Regulations,[1]' the meters are calibrated and tested periodically (every 10 years) by the designated authority and the same has been considered for this MP and confirmed by cross-checking the calibration records. The details of the calibration of electricity meters are given below:

Serial no.	Calibration date	Accuracy
21010329	26/10/2018	0.5S
21010254	26/10/2018	0.5S

Cross-check	The reported data has been cross-checked with ER Sheet /03/, meter readings and sales receipts /17/ and found to be consistent.

Data / Parameter:	Quality of employment
Data unit:	Number of trainings for employees
Description:	Without the Project, local people have no such opportunities to work in safe and healthy environment like in the project; or no chance to be trained on the technology and the monitoring of the plant operation, and the emergency and safety procedures.
Source of data used:	Training records for all employees from Human Resource Department.
Value	

Year	Number of Trainings
2020	32
2021	20
2022	11

Means of verification/Comments:	A number of training courses are conducted by the PP for all employees every year and/or once required to improve their knowledge and performance. The parameter is monitored to check project's contribution towards SDG 8. VVB has verified the same during site visit & crosschecked the training records provided by the PP for the same & found consistent.
Cross-check	The recorded data has been cross-checked with the training records /22/ and is found to be consistent.

Data / Parameter:	Quantitative employment and income generation
Data unit:	Number of recruited staff and their social security records
Description:	Ensuring that the staff receives their full salaries on time
Source of data used:	Salary slips to be provided by the Project Owner
Value	

Year	Employee Number
2020	31
2021	27
2022	29

Means of verification/Comments:	The parameter is monitored annually to check the project's contribution towards SDG 8. VVB has verified during site visit & crosschecked the supporting evidence (Appointment Letters/Salary Slip) for the same & found consistent.

[1] https://www.mevzuat.gov.tr/anasayfa/MevzuatFihristDetayIframe?MevzuatTur=7&MevzuatNo=6381&MevzuatTertip=5#:~:text=Naklimetre%20ve%20hububat%20muayene%20aletlerinin,ve%20Ayar%20Te%C5%9Fkilat%C4%B1%20taraf%C4%B1ndan%20yap%C4%B1l%C4%B1r (Accessed on 30/01/2023)

Cross-check	The reported data has been cross-checked with the salary slips /23/ and is found to be consistent.

Data / Parameter:	Tonnes of greenhouse gas emissions avoided or removed
Data unit:	tCO_2eq/yr
Description:	Emission reductions achieved due to project activity
Source of data used:	ER Sheet
Value	

Year	Emission Reduction (tCO2e/year)
2020	229,323
2021	251,677
2022	252,738

Means of verification/Comments:	The parameter is monitored to check project's contribution towards SDG 13. The parameter in the PDD was addressed "Air Quality related to capturing and utilizing GHGs from animal manure", which has now been corrected in the MR.
Cross-check	The reported data has been cross-checked with the ER sheet /03/ and is found to be consistent.

Data / Parameter:	VSLT,y
Data unit:	kg-dm/animal/day
Description:	Volatile solid excretion rate per day on a dry-matter basis for a defined livestock population
Source of data used:	2006 IPCC Guidelines for National Greenhouse Gas Inventories (IPCC 2006), Annex 10A.2 from Table 10A-4 and Table 10A-5 Eastern Europe values.
Value	

YEARLY	UNIT	DAIRY	CATTLE
$VSLT_{2020}$	kg-VS-dm/animal/yr	1,642.50	949
$VSLT_{2021}$	kg-VS-dm/animal/yr	1,642.50	949
$VSLT_{2022}$	kg-VS-dm/animal/yr	1,642.50	949

VSdefault,Dairy Cattle =4.5 kg-dm/animal/day

VSdefault,Other Cattle=2.6 kg-dm/animal/day

Means of verification/Comments:	As described in IPCC Sixth Assessment report under Chapter 13 Turkey is regarded under Southern Europe Region. Also project location is just 150 kms away from the Greece Border. So as per 2006 IPCC Guidelines for National Greenhouse Gas Inventories (IPCC 2006), Annex 10A.2 from Table 10A-4 and Table 10A-5 Eastern Europe values are used which is more conservative compared to the direct measurements. VSdefault,Dairy Cattle =4.5 kg-dm/animal/day VSdefault,Other Cattle=2.6 kg-dm/animal/day
Cross-check	The reported data is cross-checked with lab log book records /15/ and ER sheet /03/ and is found to be consistent.

\	$W_{manure,LT}$
Data unit:	kg/animal/day
Description:	Average manure weight excreted by a defined population at the project site in kg/animal/day
Source of data used:	Animal manure is received daily from animal farms involved in the project activity. The animal manure, collected from the farms, and supplied to the biogas plant, is weighed for each farm by the weighbridge installed at the entrance of the facility, and the daily amounts and animal type of manure are recorded through the weighbridge operational logbook. Number of animals from different farms and different animal types are recorded separately.
Value	

Monitoring Period	Wmanure,cattle (Wmanure /day/head dry basis (kg))	Wmanure,dairy (Wmanure /day/head dry basis (kg))
01/01/2020 - 31/12/2020	3.18	8.03
01/01/2021 - 31/12/2021	3.03	7.80
01/01/2022 - 31/12/2022	3.36	8.20

Means of verification/Comments:	Wmanure,LT on wet basis will be calculated as follows ; $Wmanure,LT = Wweighbridge,y \times 1000 \div NLT,y \div ndy$ Where; Wmanure,LT= Average manure weight excreted by a defined population at the project site, in a wet basis(kg/day) Wweighbridge,y= Weighbridge data related to the specific farm, in a wet basis (ton/y) 1000 = Conversion of ton to kg NLT,y= Average annual livestock population at the manure supplying farm ndy= Number of days central plant is operational in the year y. Wmanure on wet basis will be converted to Wmanure dry basis by using below formula as described in "CORRECTION AND CLARIFICATION TO AM0073 GHG EMISSION REDUCTIONS THROUGH MULTI-SITE MANURE COLLECTION AND TREATMENT IN A CENTRAL PLANT V1.0" published by Verra on 15-January-2024. Wmanure,LT [Dry] = Wmanure,LT [Wet] * TS TS= Total Solids (Moisture Content or the Total Solids (%TS) in the wet manure is determined in laboratory also as part of the determination of the VSmanure, LT in the project case. Lab results for %TS value is used for calculation of Wmanure in dry basis) Dry matter values (TS% wb) for other cattle and for dairy is as follows TSdairy,2020%=37.89% TSdairy,2021%=36.14% TSdairy,2022%=37.29% TScattle,2020%=18.26% TScattle,2021%=17.73% TScattle,2022%=18.69%
Cross-check	The reported data is cross-checked with the literature and the ER sheet /03/ and is found to be consistent.

Data / Parameter:	FE
Data unit:	%
Description:	The flare efficiency

Source of data used:	Project developer records
Value	

Year	Flare Efficiency (%)
2020	80
2021	80
2022	80

Means of verification/Comments:	PP has conservatively considered the flare efficiency to be 80%. The PP has determined the flare efficiency based on CDM Tool 06: Project emission from flaring version 4.0 and monitored the flare efficiency through the SCADA-connected flame detection system. The enclosed flare is installed, and according to the applied tool, the flare efficiency for the enclosed flare system has two options. The PP has chosen to determine the flare efficiency according to Option A: Default value that is 90%. However, For enclosed flares that are defined as low height flares, the flare efficiency shall be adjusted, as a conservative approach, by subtracting 10 percentile points. Therefore, PP has chosen to apply a default value of 80% for low height enclosed flare efficiency in accordance with section 6.2.2.1 of TOOL 06. Also, logbook records have been checked and VVB confirmed that flaring biogas amount mentioned is correct.
Cross-check	The reported data has been cross-checked with the flare specifications /21/, operational records for the monitoring period /21/ and ER sheet /03/ and is found to be consistent.

Data / Parameter:	N_p
Data unit:	Numbers
Description:	Number of animals produced annually of type LT for the year y
Source of data used:	Project developer records
Value	

Year	Type of Animal	Number of Animals
2020	Dairy Cattle	37,066
	Non-dairy Cattle	1,619
2021	Dairy Cattle	36,075
	Non-dairy Cattle	1,822
2022	Dairy Cattle	34,625
	Non-dairy Cattle	1,406

Means of verification/Comments:	The data is obtained from the annual monitoring surveys conducted by the PP and is reported monthly and aggregated annually. The monitoring survey results can be cross-checked with the farm owner's records. The farm owners keep track of each animal that they have at their farm. Each animal has their ear tags stating their names, ages, weights, vaccinations etc.
Cross-check	The reported data is cross-checked with the ER sheet /03/ and the monitoring surveys conducted by the PP and is found to be consistent. The farmers records are maintained in an online system which can be accessed by the farm owner. These records were also checked during the site visit.

Data / Parameter:	N_{da}
Data unit:	Numbers

Description:	Number of days animal is alive in the farm in the year y
Source of data used:	Project developer records
Value	

Year	Type of Animals	Days
2020	Dairy Cattle	365
	Non-dairy Cattle	270
2021	Dairy Cattle	365
	Non-dairy Cattle	270
2022	Dairy Cattle	365
	Non-dairy Cattle	270

Means of verification/Comments:	The PP has monitored the number of days animals are alive in the farm in the year (Nda) based on the annual monitoring surveys that was conducted by the PPs with the animal farm owners. By interviewing with the animal farm owners and assessing the annual monitoring surveys during the site visits, the verification team confirms that the average annual number of animals is appropriately monitored. The monitoring survey results can be cross-checked with the farm owner's records. The farm owners keep track of each animal that they have at their farm. Each animal has their ear tags stating their names, ages, weights, vaccinations etc.
Cross-check	The reported data is cross-checked with the ER sheet /03/ and the monitoring surveys conducted by the PP and is found to be consistent. The farmers records are maintained in an online system which can be accessed by the farm owner. These records were also checked during site visit.

Data / Parameter:	MS%j
Data unit:	Fraction
Description:	Fraction of manure handled in system j in project activity
Source of data used:	Project proponent
Value	

Year	MS%
2020	55%
2021	55%
2022	54.6%

Means of verification/Comments:	The parameter is monitored annually for the calculation of baseline emissions. The PP has monitored the fraction of manure handled based on the logbook records on the weighbridge. By checking the logbook records of the weighbridge, the verification team confirmed that the amount of waste entered the plant from each supplier farm. Furthermore, the manure supply agreements signify that the manure supplier farms are obligated to furnish the entirety of animal waste generated at the farms to the project activity. The PP has applied an approach to cross-check the values by applying equation below: Wweighbridge = MS% * Np,LT * Wmanure,LT Where; Wweighbridge= weighbridge data related to the specific farm (ton/day) MS%= Fraction of manure handled in AWMS Wmanure,LT= Average manure weight excreted by a defined population at the project site Np,LT= Number of animals produced annually of type LT for the year y The verification team has found the applied approach and equation reasonable
Cross-check	The reported data is cross-checked with the ER sheet /03/, weighbridge data, and the monitoring surveys conducted by the PP and is found to be consistent.

Data / Parameter:	v_f
Data unit:	m^3
Description:	Biogas flow
Source of data used:	Daily operation record
Value	

Year	Total Biogas Flow (m^3)	Biogas Flow to the Gas Engine (m^3)	Biogas Flow to the Flare (m^3)
2020	40,078,459	39,389,620	688,838
2021	38,738.614	38,354,223	384,390
2022	42,816.733	42,315,233	501,499

Means of verification/Comments:	The volumetric flow rate of the captured biogas is measured with flow meters installed at the project site. The parameter of biogas flow from the anaerobic digester system is measured by the flow meters installed at the outlet of the Anaerobic Digesters (ADs). By interviewing with the site manager(s) and the SCADA operators, assessing calibration and maintenance records for the monitoring instruments, checking the SCADA records of the flow meters, the verification team confirmed that the readings of the flow meters are continuously monitored and hourly recorded to SCADA. Also, biogas flow rate was manually recorded by SCADA operators in the operational logbook.
Cross-check	The reported data is cross-checked with the ER sheet /03/ and is found to be consistent.

Data / Parameter:	$\sum_i (N_{vehicles,i,y} \times Dist_{i,y} \times FC_{i,f})$
Data unit:	Liters
Description:	Average consumptions of fuel type f in volume per year from manure road transportation

Source of data used:	Truck diesel oil bills
Value	

Year	Average Consumption (lt)
2020	83,027
2021	86,365
2022	104,131

Means of verification/Comments:	VVB confirmed that the amount of diesel is monitored annually based on daily records maintained by the project staff for the calculation of project and leakage emissions. Diesel oil bills are inclusive of inclusive of all the trucks used for transportation of manure and treated manure. The verification team interviewed the site manager and the PP during the site visits and found this approach reliable and realistic.
Cross-check	The reported data was cross-checked with the ER sheet /03/ and diesel oil bills /19/ for the monitoring period and is found to be consistent.

Data / Parameter:	n_{dy}
Data unit:	Numbers
Description:	Number of days the central treatment plant was operational in year y
Source of data used:	Project developer records
Value	

Year	n_{dy} (numbers)
2020	365
2021	365
2022	365

Means of verification/Comments:	As per the registered PDD, the parameter is monitored annually. During the site visits, the verification team interviewed the site manager and checked the logbook records. The verification team confirmed the n_{dy} value is taken for the current monitoring period is correct.
Cross-check	The reported data was cross-checked with the ER sheet /03/ and logbook records and is found to be consistent.

Data / Parameter:	$EC_{PJ,j,y}$
Data unit:	MWh/yr
Description:	Quantity of electricity consumed by the project electricity consumption source j in year y
Source of data used:	Project developer records

Value	

Year	Electricity from biogas captured (MWh)	Electricity supplied the national grid (MWh)	Electricity consumed by the project activity (MWh)
2020	16,725.963	13,303.140	3,422.809
2021	21,488.186	18,769.352	2,718.834
2022	19,840.527	17,011.020	2,829.507

Means of verification/Comments:	The parameter is continuously measured and recorded monthly by electricity meters installed at the project. In accordance with the local standard (Measurement and Measuring Instruments Inspection regulation), the meter is calibrated every 10 years. By interviewing with the site manager(s), assessing calibration and maintenance records for the monitoring instruments, and checking the records on electricity meters cross-verified with the electricity bills issued to the national grid, the verification team confirmed that the electricity meters were continuously recorded, and the value taken is correct.
Cross-check	The reported data was cross-checked with the ER sheet /03/ and meter readings /18/ and is found to be consistent.

Data / Parameter:	$FV_{RG,h}$
Data unit:	$m^{3/}h$
Description:	Volumetric flow rate of the captured biogas in dry basis at normal conditions in hour h
Source of data used:	Log book records
Value	

Year	Captured biogas (m^3/h)
2020	4,575.166
2021	4,422.216
2022	4,887.754

Means of verification/Comments:	The volumetric flow rate of the captured biogas is measured with flow meter installed at the project site. The parameter of biogas flow rate from the anaerobic digester system is measured by the flow meter installed at the outlet of the Anaerobic Digesters (ADs). By interviewing with the site manager(s) and the SCADA operators, assessing calibration and maintenance records for the monitoring instruments, checking the SCADA records of the flow meter, the verification team confirmed that the readings of the flow meter is continuously monitored and hourly recorded to SCADA. Also, biogas flow rate was manually recorded by SCADA operators in the operational logbook. In accordance with the local standard (Measurement and Measuring Instruments Inspection regulation), the flowmeters are calibrated every 10 years.
Cross-check	The reported data was cross-checked with the ER sheet /03/ and log book records and is found to be consistent.

Data / Parameter:	$f_{vCH4,RG,H}$

Data unit:	fraction
Description:	Volumetric fraction of methane in the captured biogas on dry basis in hour h
Source of data used:	Log book records
Value	

Year	Volumetric fraction of methane (%)
2020	62.65
2021	61.70
2022	63.80

Means of verification/Comments:	The parameter of volumetric fraction of methane in captured biogas is continuously measured by gas analyser installed on gas line. By interviewing with the site manager(s) and the SCADA operators, assessing calibration and maintenance records for the monitoring instrument, checking the SCADA records of the gas analyser during site visits, the verification team confirmed that the reading of the gas analyser is continuously monitored and hourly recorded to SCADA and was aggregated yearly. Also, the volumetric fraction of methane is recorded to operational logbook by site manager. The verification team confirmed that the monitoring of this parameter is in compliance with the applied methodology.
Cross-check	The reported data was cross-checked with the ER sheet /03/ and log book records and is found to be consistent.

Data / Parameter:	T
Data unit:	°C
Description:	Monthly average ambient temperature at the livestock farms included in the project boundary
Source of data used:	Turkish General Directorate of Meteorology

Value	Year	Month	Average Ambient Temperature (ºC)
	2020-2022	January	8.8
		February	9.6
		March	11.6
		April	15.9
		May	20.8
		June	25.4
		July	27.9
		August	27.7
		September	23.8
		October	18.9
		November	14.3
		December	10.6
	Yearly Average		17.9
Means of verification/Comments:	The values are sourced from Turkish General Directorate of Meteorology[1] which are found appropriate. The annual average temperature is higher than 5 degrees Celsius and therefore complies to the applicability condition of the applied methodology. Therefore, all the months are included in the calculations of emission reductions.		
Cross-check	The reported data was cross-checked with the ER sheet /03/ and is found to be consistent.		

Data / Parameter:	$V_{CH4,RG,m}$	
Data unit:	m3 gas/m3 dry gas	
Description:	Volumetric fraction of component CH4 in the residual gas on a dry basis in the minute m	
Source of data used:	Measurements by project operator using a continuous gas analyzer (values are recorded with the same frequency as the flow).	
Value	**Year**	$V_{CH4,RG,m}$ **(%)**
	2020	62.65
	2021	61.70
	2022	63.80

[1] https://www.mgm.gov.tr/veridegerlendirme/il-ve-ilceler-istatistik.aspx?k=A&m=IZMIR

Means of verification/Comments:	The parameter 'Volumetric fraction of component CH4 in the residual gas on a dry basis in the minute m' is continuously measured by continuous gas analyser installed on gas line. By interviewing with the site manager(s) and the SCADA operators, assessing calibration and maintenance records for the monitoring instrument, checking the SCADA records of the gas analyser during site visits, the verification team confirmed that the reading of the gas analyser is continuously monitored and hourly recorded to SCADA and was aggregated yearly. Also, the volumetric fraction of methane is recorded to operational logbook by site manager. The verification team confirmed that the monitoring of this parameter is in compliance with the applied methodology.
Cross-check	The reported data was cross-checked with the ER sheet /03/ and log book records and is found to be consistent.

Data / Parameter:	$V_{RG,m}$
Data unit:	m3
Description:	Volumetric flow of the residual gas on a dry basis at reference conditions in the. minute m
Source of data used:	Measurements by project participants using a flow meter.
Value	

Year	$V_{RG,m}$ (m^3)
2020	688,838.96
2021	384,390.51
2022	501,499.13

Means of verification/Comments:	The parameter 'Volumetric flow of the residual gas on a dry basis at reference conditions in the. minute m' is continuously measured by continuous gas analyser installed on gas line. By interviewing with the site manager(s) and the SCADA operators, assessing calibration and maintenance records for the monitoring instrument, checking the SCADA records of the gas analyser during site visits, the verification team confirmed that the reading of the gas analyser is continuously monitored and hourly recorded to SCADA and was aggregated yearly. Also, the volumetric fraction of methane is recorded to operational logbook by site manager. The verification team confirmed that the monitoring of this parameter is in compliance with the applied methodology.
Cross-check	The reported data was cross-checked with the ER sheet /03/ and log book records and is found to be consistent.

Data / Parameter:	$Flame_m$
Data unit:	Flame on
Description:	Flame detection of flare in the minute m
Source of data used:	Booster System

Value	**Year**	**Flame On Duration (h)**
	2020	424
	2021	285
	2022	357
Means of verification/Comments:	The parameter '*Flame$_m$*' is continuously measured using a fixed installation optical flame detector. By interviewing the site manager(s) and the SCADA operators, assessing calibration and maintenance records for the monitoring instrument, checking the SCADA records during site visits, the verification team confirmed that the reading is continuously monitored. Detection of flame is recorded as a minute that the flame was on, otherwise recorded as a minute that the flame was off.	
Cross-check	The reported data was cross-checked with the ER sheet /03/ and log book records and is found to be consistent.	

E.6.3. Implementation of sampling plan

Project proponent has decided to use all data from animal farms instead of using sampling method. Therefore, all data has been taken into account while monitoring parameters calculated.

E.7. Compliance with the calibration frequency requirements for measuring instruments

Means of verification	Document Review, Interviews
Findings	-
Conclusion	The verification team confirms that all the monitoring equipment have been installed in the project activity as per the registered monitoring plan. In summary, the verification team is able to verify that the accuracy of the monitoring equipment was set according to the registered monitoring plan and relevant standards. Furthermore, the verification team confirms all calibration procedures were carried at the frequency as specified by the methodology, monitoring plan of the registered PDD /02/ and aligned with the manufacturer specifications. Therefore, the accuracy of the monitoring equipment is assured. VVB has cross checked the calibration records /20/ during the document review and confirms that the calibration requirements are followed.

E.8. Assessment of data and calculation of emission reductions or net removals

E.8.1. Calculation of baseline GHG emissions or baseline net GHG removals by sinks

Means of verification	Baseline emissions are estimated as the sum of the amount of methane and nitrogen oxide emissions and electricity / heat emissions in the baseline scenario. $$BE_y = BE_{AW,CH_4,y} + BE_{AW,N_2O,y} + BE_{elec/heat,y}$$ Where, BE_y = total baseline emissions in year y, in tCO_2e/year $BE_{AW,CH4,y}$ = baseline methane emissions attributable to animal waste

treatment in year y, in tCO_2e/year.

$BE_{AW,N2O,y}$ = baseline N2O emissions attributable to animal waste treatment in year y, in tCO_2e/year.

$BE_{elec/heat}$ = baseline CO_2 emissions from electricity and/or heat generated/consumed in the baseline, in tCO_2e/year

The calculation of the baseline emissions has been documented in the excel sheet /03/ provided by the project participant which have been verified by CCIPL.

The total emissions have been obtained by the project participant considering 100% of the baseline manure is treated in uncovered anaerobic lagoons and 0% with active deep bedding mixing as this is the most conservative scenario. These percentages are aligned with what has been observed by CCIPL during the site visit.

Baseline Emissions during Monitoring period

VVB has cross verified all the below equations & parameters in line with registered PDD /02/ & Methodology /B01/ during this monitoring period.

<table>
<tr><th>Baseline Emissions Equations</th><th>Value</th></tr>
<tr><td>Baseline CH_4 emissions ($BE_{CH4,y}$)
$$BE_{CH4,y} = GWP_{CH4} * D_{CH4} * \sum_{j,LT}(MCF_j * B_{0,LT} * N_{LT} * VS_{LT,y} * MS\%_{Bl,j})$$</td><td>555,931 tCO_2e</td></tr>
<tr><td>$VS_{LT,y}$ (Volatile solid excretion per animal per day)

Default IPCC values as per option (4) of the methodology.</td><td><table>
<tr><td>VSLT2020</td><td>kg-VS-dm/animal/yr</td><td>1,642.50</td><td>949</td></tr>
<tr><td>VSLT2021</td><td>kg-VS-dm/animal/yr</td><td>1,642.50</td><td>949</td></tr>
<tr><td>VSLT2022</td><td>kg-VS-dm/animal/yr</td><td>1,642.50</td><td>949</td></tr>
</table></td></tr>
<tr><td>Annual average number of animals of type LT (N_{LT})
$$N_{LT} = N_{da,LT} * \left(\frac{N_{p,LT}}{365}\right)$$</td><td><table>
<tr><th>Year</th><th>Dairy Cattle</th><th>Other Cattle</th></tr>
<tr><td>2020</td><td>37,066</td><td>1,197</td></tr>
<tr><td>2021</td><td>36,075</td><td>1,347</td></tr>
<tr><td>2022</td><td>34,625</td><td>1,040</td></tr>
</table></td></tr>
<tr><td>Maximum methane producing potential($B_{0,LT}$)</td><td>0.24 m^3 CH_4/kg dm for dairy cattle and 0.18 m^3 CH_4/kg dm for other cattle.</td></tr>
<tr><td>Baseline N_2O emissions ($BE_{N2O,y}$)</td><td>0</td></tr>
<tr><td>Baseline CO_2 emission from electricity and/or heat used in the baseline</td><td>$EG_{BL,y}$ i.e., amount of electricity that would be consumed in the absence of the project activity for operating all AWMs facilities would be 0 as there is no electricity consumption or generation in the baseline.</td></tr>
</table>

$BE_{\frac{elec}{heat},y} = EG_{Bl,y} \times CEF_{Bl,elec,y} + EG_{d,y} \times CEF_{grid} + HG_{Bl,y} \times CEF_{Bl,therm,y}$	$HG_{BL,y}$ i.e., Quantity of thermal energy that would be consumed in year y in the absence of the project activity using fossil fuel for operating all AWMSs would be 0 as there is no thermal energy consumption or generation in the baseline. The product of amount of electricity generated utilizing the biogas collected during project activity and exported to the grid and grid emission factor in the project scenario during the monitoring period amounts to 28,007 tCO_2e. The grid emission factor is based on the 2020 published data by Ministry of Energy and Natural resources of Turkey has calculated combined margin, the value for which is 0.5706 tCO_2e/MWh.

The parameters which are a part of the equations stated above are assessed in sections E.6.1 and E.6.2 of this report.

According to applied methodology, AM0073, if the calculated CH_4 emissions from the baseline are higher than the measured CH_4 generated in the anaerobic digester in the project situation (this is calculated as the product of biogas flow at the digester outlet and methane fraction in the biogas), then the latter shall be used to calculate the emissions reduction for claiming certified emissions reductions. The measured CH4 during this monitoring period is as follows:

Measured Methane Emission from Baseline			
Year	**$Q_{biogas,y}$ (Nm^3)**	**f_{CH4} (Nm^3 CH_4/Nm^3 biogas)**	**BE**
2020	40,078,459	62.65%	
2021	38,738,614	61.70%	
2022	42,816,733	63.80%	

Total actual methane captured from anaerobic digesters is higher than calculated CH_4 emissions for the monitoring period. Accordingly, PP has considered calculated **BE_{CH4}** value to determine the total baseline emissions. On this basis, the baseline emission values are demonstrated below for the monitoring period and are considered for emission reduction calculations.

Period	BE_{CH4}(tCO_2e)	$BE_{elec/heat,,y}$(tCO_2e)	BE_y(tCO_2e)
2020	177,289	7,591	184,880
2021	193,333	10,710	204,043
2022	185,309	9,706	195,015
Total	**555,931**	**28,007**	**583,938**

BEy of the 1st monitoring period are 583,938 tCO_2e.

Findings	CL 07 was raised and closed successfully. Please refer to Appendix 4 for further details.
Conclusion	CCIPL confirms that baseline emissions have been appropriately calculated and are consistent with on-site assessment, the applied methodology and registered PDD /02/, /03/.

E.8.2. Calculation of project GHG emissions or actual net anthropogenic GHG removals by sinks

Means of verification	

Project Emissions: -

According to the applicable methodology AM0073, project emissions are calculated according to the following formula:

$$PE_y = PE_{AD,y} + PE_{Aer,y} + PE_{Comp,y} + PE_{N_2O,y} + PE_{PL,y} + PE_{flare,y} + PE_{elec/heat,y} + PE_{CO_2,Trans,y} + PE_{storage,y}$$

Where,

PEy	=	Project emissions (tCO_2e/yr)
$PE_{AD,y}$	=	Leakage from treatment stage that captures methane (tCO_2e/yr)
$PE_{Aer,y}$	=	Methane emissions from the aerobic treatment stage (tCO_2e/yr)
$PE_{Comp,y}$	=	Total project emissions due to composting (tCO_2e/yr)
$PE_{N2O,y}$	=	Nitrous oxide emission from project treatment system (tCO_2e/yr)
$PE_{PL,y}$	=	Physical leakage of emissions from biogas network to flare the captured methane or supply to the facility where it is used for heat and/or electricity generation (tCO_2e/yr)
$PE_{flare,y}$	=	Project emissions from flaring of the residual gas stream (tCO_2e/yr)
$PE_{elec/heat}$	=	Project emissions from use of heat and/or electricity in the project case (tCO_2e/yr)
$PE_{CO2,Trans,y}$	=	Project emissions from manure road transportation (tCO_2e/yr)
$PE_{storage,y}$	=	Project emissions from manure storage (tCO_2e/yr)

Since the proposed project activity does not consist of aerobic AWMS treatment, $PE_{Aer,y}$ shall be accounted as "0". In addition, for the proposed project does not involve composting, $PE_{Comp,y}$ shall also be accounted as "0". Moreover, since the manure is not stored in outdoor open storage tanks more than 24 hours, $PE_{storage,y}$ shall be accounted as "0" too.

VVB has cross verified all the below equations & parameters in line with registered PDD & Methodology during this monitoring period.

Project Emissions Equations	Value
Leakage from AWMS systems that capture's methane in tCO_2e $$PE_{AD,y} = GWP_{CH4} \times \rho_{CH4,n} \times \frac{LF_{AD}}{(1 - LF_{AD})} \times \sum_{h=1}^{8760} (FV_{RG,h} \times fv_{CH4,RG,h})$$	39,794.66 tCO_2e
N_2O emissions from the central treatment plant	0

Physical Leakage from distribution network of the captured methane in (PE_{PL})	0
Project emissions from heat use and electricity use ($PE_{elec/heat}$) $$PE_{\frac{elec}{heat}y} = PE_{elec,y} + \sum_{j} PE_{heat,j,,y}$$	0
Project emissions from road transportation ($PE_{CO2,Trans,y}$) $$PE_{CO_2,Trans,y} = \{\sum_{i}(N_{vehicles,i,y} \times Dist_{i,y} \times FC_{i,f}) \times [\sum_{f} NCV_f \times EF_{CO_2,f}]\}$$	739.63 tCO_2e
Project emissions from flaring $$PE_{flare,y} = GWP_{CH4} \times \sum_{m=1}^{525600} F_{CH4,RG,m} \times (1 - \eta_{flare,m}) \times 10^{-3}$$	1,018.07
Project emissions from electricity consumption in year y (tCO_2/yr) $$PE_{EC,y} = \sum_{j} EC_{PJ,j,y} \times EF_{EF,j,y} \times (1 + TDL_{j,y})$$	5,383.29.02 tCO_2e

The parameters which are a part of the equations stated above are assessed in sections E.6.1 and E.6.2 of this report.

The project emission component values are demonstrated below:

Period	$PE_{AD,y}$ (tCO_2e)	$PE_{CO2,trans,y}$ (tCO_2e)	$PE_{EC,y}$ (tCO_2e)	$PE_{flare,y}$ (tCO_2e)	PE_y (tCO_2e)
2020	12,115.43	224.51	2,167.89	416.24	14,924
2021	12,916.77	233.54	1,722.02	256.20	15,129
2022	14,762.46	281.58	1,792.11	345.63	17,182
Total	**39,794.66**	**739.63**	**5,682.02**	**1,018.07**	**47,235**

Total SDG 13 baseline impact (Project emissions excluding Leakage from treatment stage that captures methane and excluding Physical leakage of emissions from biogas network to flare the captured methane or supply to the facility where it is used for heat and/or electricity generation which is "0") of the 1st monitoring period was 47,235 tCO_2e.

The calculation of the project emissions has been verified by CCIPL and added documented in the excel sheet provided by the project participant. In the case of the project activity there are methane emissions, nitrogen oxide emissions, and carbon dioxide emissions from electricity consumption and from manure road transportation. Therefore, the total project emissions amount to 47,235 tCO_2e during this monitoring period.

Findings	CL 08 and CL 09 were raised and closed successfully. Please refer to Appendix 4 for further details.
Conclusion	CCIPL confirms that project emissions have been appropriately calculated and are consistent with on-site assessment, the applied methodology and registered PDD /02/

E.8.3. Calculation of leakage GHG emissions

Means of verification	According to methodology AM0073, leakage covers the emissions from land application of treated residues, outside the project boundary. These emissions are estimated as net of those released under project activity and those released in the baseline scenario. Net leakage of N_2O and CH_4 are only considered if they are positive. CO_2 emissions due to the road transportation of sludge or treated effluent outside the project boundary are also considered as leakage. Under both the project activity and the baseline, the treated manure is spread as fertilizer in agricultural fields. However, under the project activity a part of the manure is transformed into biogas under anaerobic conditions. Therefore, the amount of manure used as a fertilizer under the project activity will be lower than in the baseline with the correspondent GHG emissions reductions, including the emissions from transportation of the fertilizer by road. Also, this project considers the road transportation within the project boundary and therefore, leakage emission from road transportation is considered as zero. Therefore, as the leakage emissions to be considered in the emission reduction calculation are the net of those released under the project activity and those released under the baseline scenario, no leakage has been considered. It is CCIPL's opinion that this approach is acceptable.
Findings	-
Conclusion	CCIPL confirms that leakage emissions are not applicable to the project activity in accordance with the applied methodology.

E.8.4. Summary calculation of GHG emission reductions or net anthropogenic GHG removals by sinks

Means of verification	Document Review, Interview
Findings	-
Conclusion	The emission reductions are calculated in accordance with the following equation: $ER_y = BE_y - PE_y - LE_y$ Where, ER_y is the total emission reductions of the project activity during the year y in tCO_2e; BE_y is the baseline emissions for the project activity during the year y in tCO_2e; PE_y is the emissions for the project activity during the year y in tCO_2e; LE_y is the leakage emissions for the project activity during the year y in tCO_2e.

Year	BE_y (tCO_2e)	PE_y (tCO_2e)	ER_y (tCO_2e)
2020	184,880	14,924	169,956
2021	204,043	15,128	188,915
2022	195,015	17,181	177,834
Total	**583,938**	**47,235**	**536,703**

The data presented in the monitoring report /01/ and emission reduction sheet /03/ were assessed by reviewing in detail project documentation, collection of monitored

	data, observation of established monitoring and reporting practices and assessment of the reliability of monitoring equipment. Sufficient evidence was presented by the PP which is detailed in Appendix 3 of this report and verified by CCIPL team.

E.8.5. Comparison of actual GHG emission reductions or net anthropogenic GHG removals by sinks with estimates in registered PDD

Means of verification	Document Review, Interview
Findings	-
Conclusion	The ex-ante estimate value of the emission reductions for the monitoring period as per the registered PDD /02/ is 668,247 tCO_2e and the actual emission reductions achieved for the monitoring period is 536,703 tCO_{2e}. The emission reduction calculations provided in the spreadsheet /03/ have been verified to be correct and in line with the registered PDD /02/

E.8.6. Remarks on difference from estimated value in registered PDD

Means of verification	Document Review, Interview
Findings	N/A
Conclusion	The ex-ante estimate value of the emission reductions for the monitoring period as per the registered PDD /02/ is 668,247 tCO_2e and the actual emission reductions achieved for the monitoring period is 536,703 tCO_2e. For SDG 13, since actual emission reduction is lower than the estimated value and hence it is acceptable to the verification team. The monitoring report /01/ provides a reason for the decrease in the actual emission reduction and the same was confirmed by the verification team by interviewing the representatives of PP and by reviewing the actual implementation status of the project. For other SDG parameters, PP has provided justification in the Monitoring report, and an assessment of the same is provided below: • SDG 7: The actual value is lower than the estimated value, which is deemed appropriate and thus acceptable to the VVB. • SDG 8: The actual value exceeds the estimated value, which is deemed appropriate and thus acceptable to the VVB.

E.9. Assessment of reported sustainable development co-benefits

<table>
<tr><td>Means of verification</td><td>
<table>
<tr><th>Relevant SDG</th><th>Source of Data</th><th>Estimated value in the PDD</th><th>Reported value for the monitoring period</th></tr>
<tr><td>SDG 7</td><td>Meter records and sales receipts /17/ /18/</td><td>93,345 MWh of electricity generation by capturing biogas</td><td>49,083.512 MWh of electricity generation by capturing biogas</td></tr>
<tr><td>SDG 8</td><td>Employment records, salary slips and training records /22/ /23/</td><td>20 jobs for local people created

10 trainings</td><td>31, 27, and 29 jobs for local people created respectively for years 2020, 2021, and 2022

63 trainings

Average monthly salary – 1,950-6,680 TL TL</td></tr>
<tr><td>SDG 13</td><td>-</td><td>668,247 tCO_2e</td><td>536,703 tCO_2e</td></tr>
</table>

The reported SDG benefits are monitored in accordance with the monitoring plan in the registered PDD which is confirmed by the VVB by document reviews and during site visit as well. In the baseline there was no electricity generation, and no employment was generated. Therefore, it can be confirmed that the project activity generates net benefit as demonstrated in the table above.

Continuous grievance mechanism: As verified during on on-site audit, no grievance was recorded. PP do have an effective maintenance/service mechanism in place to resolve any issues by the stakeholders. As part of this a grievance register is maintained at the village mukhtar’s office who was interviewed during on-site visit.
</td></tr>
<tr><td>Findings</td><td>-</td></tr>
<tr><td>Conclusion</td><td>The parameters have been monitored appropriately, in accordance with the registered monitoring plan (as per measurement methods and procedures to be applied) and applied methodology. The monitoring results were recorded consistently as per the approved frequency in the monitoring plan.</td></tr>
</table>

SECTION F. Internal quality control

The final verification report passed a technical review before being submitted to the client for submission to SustainCERT. A technical reviewer qualified in accordance with CCIPL’s qualification scheme for CDM validation and verification performed the technical review.

SECTION G. Verification opinion

CCIPL has performed first verification of the emission reductions reported for the project activity “İzmir Ödemiş Biogas Power Plant” having GS Reference No. 7527 for the period 01/01/2020 to 31/12/2022, with regard to the relevant GS4GG principles and requirements. The project participants are responsible for the collection of data in accordance with the monitoring plan and the reporting emission reductions from the project.

Verification methodology and process:

The team assigned to the verification meets the CCIPL's internal procedures including the UNFCCC requirements for the team composition and competence.
The verification team has conducted thorough review as per GS4GG, UNFCCC and CCIPL's procedures and requirements. The verification has been performed as per the requirements described in the GS4GG requirements and constitutes the review and completion of the following steps:

- Reviewing the registered PDD (version 7; dated 30/09/2022) /02/;
- Review of revised PDD (version 08; Dated: 19/11/2024, subject to design change approval)
- Receipt of the MR /01/;
- Desk review of the MR /01/ and other relevant documents;
- Review of the applied monitoring methodology (AM0073, version 01) /B01/;
- Review of any CMP and EB decisions, clarifications and guidance;
- On-site assessment (22/08/2023 – 25/08/2023);
- Resolution of CARs and CLs raised during verification;
- Issuance of Verification Report

The project activity was correctly implemented according to the selected monitoring methodology and registered PDD /02/. Through document review and on-site visit assessment, the verification team confirms that the project activity has resulted in 536,703 tCO_2e emission reductions during the monitoring period.

The verified amount of emission reductions is stated below as per each vintage covered under the current monitoring period.

Year	Emission Reductions (Amount) in this monitoring period	
	Duration	Emission reduction (tCO_2e)
2020	01/01/2020-31/12/2020	169,956
2021	01/01/2021-31/12/2021	188,915
2022	01/01/2022-31/12/2022	177,834
Total	-	**536,703**

CCIPL therefore pleased to issue a positive verification opinion expressed in the attached Certification statement.

SECTION H. Certification statement

It is CCIPL's opinion that the GHG emission reductions stated in the monitoring report, version 10 dated 21/11/2024 for project activity, "İzmir Ödemiş Biogas Power Plant" for period 01/01/2020 to 30/11/2022 (Inclusive of both the dates) are fairly stated /01/. The GHG emission reductions were calculated correctly based on the approved monitoring methodology, AM0073 – "GHG emission reductions through multi-site manure collection and treatment in a central plant", Version 1.0 /B01/ Hence, CCIPL able to certify that the emission reductions from the project during the monitoring period 01/01/2020 to 31/12/2022 (Inclusive of both the dates) amount to 536,703 tCO_2e.

Appendix 1. Abbreviations

Abbreviations	Full texts
BE	Baseline Emissions
CAR	Corrective Action Request
CCIPL	Carbon Check (India) Pvt. Ltd.
CDM	Clean Development Mechanism
CH_4	Methane
CL	Clarification Request
CO_2	Carbon dioxide
CO_2e	Carbon dioxide equivalent
DOE	Designated Operational Entity
EB	Executive Board
EIA	Environmental Impact Assessment
ER	Emission Reductions
ER	External Resources
FAR	Forward Action Request
GHG(s)	Greenhouse gas(es)
GS4GG	Gold Standard for Global Goals
GWP	Global Warming Potential
IPCC	Intergovernmental Panel on Climate Change
LDC	Least Developed Country
LoA	Letter of Approval
LSC	Local Stakeholder Consultation
MoV	Means of Verification
MP	Monitoring Plan
MR	Monitoring Report
PDD	Project Design Document
PE	Project Emission
PP(s)	Project Participant(s)
Ref.	Document Reference
SD	Sustainability Development
SDG	Sustainable Development Goals
SMP	Sustainability Monitoring Plan
SS(s)	Sectoral Scope(s)
UNFCCC	United Nations Framework Convention on Climate Change
VER	Voluntary Emission Reduction
VVB	Validation and Verification Body
VVS	Validation and verification standard

Appendix 2. Competence of team members and technical reviewers

Carbon CHECK

Carbon Check (India) Private Limited

Certificate of Competency

Mr. Sanjay Kumar Agarwalla

has been qualified as per CCIPL's internal qualification procedures in accordance with the requirements of CDM AS (V7.0), ISO/IEC14065:2020, ISO/IEC 17029:2019 and other applicable GHG programs:

for the following functions and requirements:

☒ Validator	☒ Verifier	☒ Team Leader	☒ Technical Expert
☒ Technical Reviewer	☐ Health Expert	☐ Gender Expert	☐ Plastic Waste Expert
☐ CCB Expert	☐ Legal Expert	☒ Financial Expert	☐ Environmental, Health and Safety financial matters
☒ SDG+	☒ Social no-harm(S+)	☒ Environment no-harm(E+)	
☒ Local Expert for India and Bangladesh			

in the following Technical Areas:

☒ TA 1.1	☒ TA 1.2	☒ TA 2.1	☒ TA 3.1	☒ TA 4.1
☐ TA 4. n	☒ TA 5.1	☒ TA 5.2	☒ TA 7.1	☐ TA 8.1
☒ TA 9.1	☒ TA 9.2	☒ TA 10.1	☒ TA 13.1	☒ TA 13.2
☐ TA 14.1	☐ TA 15.1	☒ TA 16.1		

Issue Date

05th December 2023

Expiry Date

31st December 2024

Priya Suman

Ms. Priya Suman
Compliance Officer

Revision History of the document:

Revision	Summary of changes
2022[1]	Annual revision
Jan 2023	Annual revision and template change
Dec 2023	Change in the template due to revision in TA and function

CCIPL_FM 7.9 Certificate of Competency_V4.0_112023

[1] Please refer to previous version of FM 7.9 for the revision history

Carbon Check (India) Private Limited

Certificate of Competency

Mr. Muhammet Ali ERDURAN

has been qualified as per CCIPL's internal qualification procedures in accordance with the requirements of CDM AS (V7.0), ISO/IEC14065:2020, ISO/IEC 17029:2019 and other applicable GHG programs:

for the following functions and requirements:

☐ Validator	☐ Verifier	☐ Team Leader	☐ Technical Expert
☐ Technical Reviewer	☐ Health Expert	☐ Gender Expert	☐ Plastic Waste Expert
☐ CCB Expert	☐ Legal Expert	☐ Financial Expert	☐ Environmental, Health and Safety financial matters
☐ SDG+	☐ Social no-harm(S+)	☐ Environment no-harm(E+)	
☒ Local Expert for Turkey			

in the following Technical Areas:

☐ TA 1.1	☐ TA 1.2	☐ TA 2.1	☐ TA 3.1	☐ TA 4.1
☐ TA 4. n	☐ TA 5.1	☐ TA 5.2	☐ TA 7.1	☐ TA 8.1
☐ TA 9.1	☐ TA 9.2	☐ TA 10.1	☐ TA 13.1	☐ TA 13.2
☐ TA 14.1	☐ TA 15.1	☐ TA 16.1		

Issue Date	Expiry Date
1st December 2023	31st December 2024

Priya Suman

Ms. Priya Suman
Compliance Officer

Sanjay Agarwalla

Mr. Sanjay Kumar Agarwalla
Technical Director

Revision History of the document:

Revision date	Summary of changes
May 2023	Initial Adoption
Dec 2023	Template changes to include additional functions and TA

CCIPL_FM 7.9 Certificate of Competency_V4.0_112023

[1] Please refer to previous version of FM 7.9 for the revision history

Carbon CHECK

Carbon Check (India) Private Limited

Certificate of Competency

Ms. Indumathi C

has been qualified as per CCIPL's internal qualification procedures in accordance with the requirements of CDM AS (V7.0), ISO/IEC14065:2020, ISO/IEC 17029:2019 and other applicable GHG programs:

for the following functions and requirements:

☒ Validator	☒ Verifier	☒ Team Leader	☒ Technical Expert
☒ Technical Reviewer	☐ Health Expert	☐ Gender Expert	☒ Plastic Waste Expert
☐ CCB Expert	☐ Legal Expert	☒ Financial Expert	☐ Environmental, Health and Safety financial matters
☒ SDG+	☒ Social no-harm(S+)	☒ Environment no-harm(E+)	
☒ Local Expert for India and Sri Lanka			

in the following Technical Areas:

☒ TA 1.1	☒ TA 1.2	☐ TA 2.1	☒ TA 3.1	☐ TA 4.1
☐ TA 4. n	☐ TA 5.1	☐ TA 5.2	☐ TA 7.1	☐ TA 8.1
☐ TA 9.1	☐ TA 9.2	☐ TA 10.1	☒ TA 13.1	☒ TA 13.2
☐ TA 14.1	☐ TA 15.1	☐ TA 16.1		

Issue Date

5th December 2023

Expiry Date

31st December 2024

Priya Suman

Ms. Priya Suman
Compliance Officer

Sanjay Agarwalla

Mr. Sanjay Kumar Agarwalla
Technical Director

Revision History of the document:

Revision date	Summary of changes
2022[1]	Annual revision
Jan 2023	Annual revision
Dec 2023	Change in the template due to revision in TA and function

CCIPL_FM 7.9 Certificate of Competency_V4.0_112023

[1] Please refer to previous version of FM 7.9 for the revision history

Appendix 3. Documents reviewed or referenced

No.	Author	Title	References to the document	Provider
/01/.	Biosolutions	Monitoring Report	Version 03, dated 31/07/2023; Version 05, dated 13/09/2023 Version 06, dated 26/10/2023 Version 07, dated 11/06/2024 Version 08, dated 05/08/2024 Version 09, dated 24/09/2024 Version 10, dated 21/11/2024	PP
/02/.	Biosolutions	Registered GS PDD	Version 07, dated 30/09/2022	PP
/03/.	Biosolutions	Ex-post emission reduction calculation spreadsheet	--	PP
/04/.	Biosolutions	Ex-ante emission reductions calculation sheet	-	PP
/05/.	Biosolutions	Evidence for the project location (GPS coordiantes – KML file)	-	
/06/.	Almer Proje Ministry of Environment and Urbanization	EIA report issued by Almer Proje and approved by the Ministry of Environment and Urbanization	Report dated 06/04/2017 Approval Dated 11/05/2017	PP
/07/.	Energy Market Regulatory Authority PP	Electricity generation license issued by the Energy Market Regulatory Authority (EMRA)	Dated 20/09/2018	PP
/08/.	Ministry of Energy and Natural Resources	Commissioning certificates of the gas engines installed under project activity	Gas Engine 1 – dated 26/10/2018 Gas Engines 2, 3, 4, and 5 – dated 08/12/2018	PP

/09/.	Biosolutions	Project implementation timeline (evidence for the key project milestones)	-	PP
/10/.	ARF Ministry of Agriculture and Rural Affairs	Credible evidence for the baseline scenario in line with the applied methodology: - Baseline surveys - ESTABLISHMENT, WORKING, SUPERVISION OF LIVESTOCK ENTERPRISES REGULATION ON PROCEDURES AND PRINCIPLES	Dated 09/08/2006	PP
/11/.	PP	Evidence for on-going communication with local stakeholders: Grievance register maintained at Mukhtar's office	-	PP
/12/.	PP	Declaration by parties other than the central treatment plant managing entity stating that they will not claim CERs claim CERs from the improved animal waste treatment practices	-	PP
/13/.	PP	Manure collection agreement signed with each farm owner	-	PP
/14/.	Ministry of Energy and Natural resources of Turkey	Credible evidence for the calculation of Operating, Build and Combined margin in line with CDM TOOL 07: Türkiye NATIONAL ELECTRICAL NETWORK EMISSION FACTOR INFORMATION FORM, 2019		PP
/15/.	ARF	Lab logbook records as evidence for the determination of volatile solid excretion rate per day on dry matter basis,	-	PP
/16/.	ARF	Animal counting records	-	PP
/17/.	ARF	Invoices corresponding to the quantity of electricity supplied by the project during the monitoring period from 01/01/2020 till 31/12/2022	Monthly invoices for the years 2020, 2021, and 2022	PP
/18/.	ARF	Evidence for the electricity generation for this monitoring period: Meter Readings	-	PP
/19/	BİOTRANSPORT LOJİSTİK TARIM SANAYİ VE TİCARET ANONİM ŞİRKETİ	Diesel Oil Bills for the monitoring period from 01/01/2020 to 31/12/2022	-	PP

/20/	Various	Calibration records for the following: - Electricity main-meter - Electricity backup meter - Flowmeter 1 - Flowmeter 2 - Gas analyzer - Portable gas analyzer - Lab equipment - Weighbridge	-	PP
/21/	Aris Enerji ARF	Flare operational records for the monitoring period along with its technical specifications	Dated 08/03/2022	PP
/22/	ARF	Training manuals, records and certificates of personnel involved with the project activity	-	PP
/23/	ARF	Employment records for the monitoring period	-	PP
/24/	ARF	Single line diagram of the central treatment plant	-	PP
/25/	ARF	Revised PDD version 08, dated 19/11/2024 (Subject to design change approval)	-	PP
/B01/	UNFCCC	Approved baseline and monitoring methodology AM0073 "GHG emission reductions through multi-site manure collection and treatment in a central plant"	Version 01	Publicly Available
/B02/	UNFCCC	TOOL 05: Baseline, project and/or leakage emissions from electricity consumption and monitoring of electricity generation TOOL O6: Project emissions from flaring TOOL 07: Tool to calculate the emission factor for an electricity system TOOL 14: Project and leakage emissions from anaerobic digesters	Version 3.0 Version 04.0 Version 07.0 Version 2	Publicly Available
/B03/	UNFCCC	CDM validation and verification standard	Version 03	Publicly Available
/B04/	UNFCCC	Guideline: Application of materiality in verifications	Version 02	Publicly Available

/B05/	Gold Standard	Gold Standard for the Global Goals Principles & Requirements Gold Standard for the Global Goals Principles & Requirements Gold Standard for the Global Goals CS Activity Requirements	Version 1.2 of October 2019	Publicly Available
/B06/	TUV SUD	Validation report for the project "Izmir Odemis Biogas Power Plant"	Version 5.0, dated 07/11/2021	PP
/B07/	Gold Standard	Site Visit and Remote Audit Requirements and Procedures	Version 2.0, dated 30/05/2023	Publicly Available
/B08/	Gold Standard	Renewable Energy Activity Requirements	Version 1.4, dated 16/08/2021	Publicly Available
/B09/	CCIPL	Contract between Carbon Check (India) Private Limited and ARF Yenilenebilir Enerji Üretim Anonim Şirketi	Dated 08/08/2023	CCIPL

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

Table 1. CLs from this verification

CL ID	01	**Section no.**	-	**Date:** 31/08/2023
Description of CL				
On the cover page of the MR, it is stated that version 06 of the PDD is applicable. However, on the project's SustainCERT platform, version 07 of the PDD is listed under design review documents. Clarification is requested.				
PP response				**Date:** 01/09/2023
As it is mentioned in SustainCERT platform, version 07 of the PDD is the last version of PDD. It was a typing error on the cover page of the MR. Latest PDD (version 07) has been shared as evidence.				
Documentation provided by PP				
VVB assessment				**Date:** 06/09/2023
PP has revised the cover page of the MR to indicate applicability of version 07 of the PDD which is deemed acceptable. Therefore, this CL is closed.				

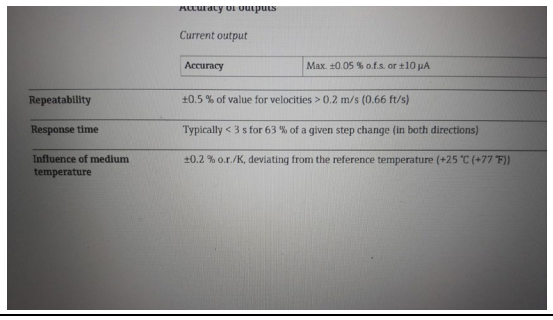
CL ID	02	**Section no.**	E.3, E.6.2	**Date:** 31/08/2023
Description of CL				
In section D.2 of the MR, for Data/parameter table for $W_{manure,LT}$, PP has stated unit as 'kg'. PP needs to correct the unit and check the units of data/parameters throughout the MR. Additionally, the parameter $W_{manure,LT}$, was included under data and parameters fixed ex-ante in the PDD. Therefore, PP is requested to clarify why is it included under monitoring parameters in section D.2 of the MR.				
PP response				**Date:** 01/09/2023
Unit of $W_{manure,LT}$ has corrected as kg/animal/day in section D.2. $W_{manure,LT}$ is taken from literature review to be conservative for emission reduction calculations. The parameter will be monitored by conducting literature review annually. Therefore, $W_{manure,LT}$ is included under section D.2.				
Documentation provided by PP				
VVB assessment				**Date:** 06/09/2023
The unit for $W_{manure,LT}$ has been corrected to kg/animal/day. Additionally, PP has also clarified why $W_{manure,LT}$ is included under monitoring parameters in section D.2 of the MR as it will be monitored by conducting literature review annually. This is deemed acceptable to the verification team and therefore, this CL is closed.				

CL ID	03	**Section no.**	E.6.2	**Date:** 31/08/2023
Description of CL				
The make and model of the weigh scale and dry air sterilizer listed in section D.2 of the MR for parameter VS differ from those observed on site.				

PP response	**Date:** 01/09/2023
The make and model of the weigh scale and dry air sterilizer are corrected in section D.2. of the MR.	
Documentation provided by PP	
VVB assessment	**Date:** 06/09/2023
PP has revised section D.2 of the MR to indicate the correct make and model of the weigh scale and dry air sterilizer for parameter VS, which is deemed acceptable to the verification team. Therefore, this CL is closed.	

CL ID	04	**Section no.**	-	**Date:** 31/08/2023
Description of CL				
With respect to table 6 of the MR, the verification team has made following observations: (a) The serial numbers for Flow meter 1, Electricity meter 1, Electricity meter 2 and Gas analyzer do not match with the serial numbers of these meters on-site. (b) The type of gas analyzer installed at site is different from the one indicated in the MR.				
PP response				**Date:** 01/09/2023
a. The reason of serial numbers does not match with meters installed on the site is that product codes have been written previously instead of serial numbers. The serial numbers for flowmeter 1, electricity meter 1, electricity meter 2 and gas analyzer have been corrected. b. There are two types of gas analyzer in the project site: one is portable and one is installed. Two of them are mentioned in the MR.				
Documentation provided by PP				
VVB assessment				**Date:** 06/09/2023
a. PP has revised table 6 of the MR to indicate the correct serial numbers for Flow meter 1, Electricity meter 1, Electricity meter 2 and Gas analyzer. Therefore, this part of the CL is closed. b. There were 2 gas analyzers on-site one of which is installed, and one is portable. The details of both have been provided in table 6 of the MR which match with the details observed on-site. Therefore, this part of the CL is closed.				

CL ID	05	**Section no.**	E.6.2	**Date:** 31/08/2023
Description of CL				
PP has chosen to apply a default value of 80% for low height enclosed flare efficiency in accordance with section 6.2.2.1 of TOOL 06. In line with this, PP needs to demonstrate flare operation during the monitoring period by providing evidence for the following 2 conditions: - The temperature of the flare ($T_{EG.m}$) and the flow rate of the residual gas to the flare ($F_{RG,m}$) is within the manufacturer's operating specification for the flare ($SPEC_{flare}$) in the minute m - The flame is detected in the minute m ($Flame_m$).				
PP response				**Date:** 01/09/2023
The flow rate of the residual gas to the flare is measured every three seconds. Technical details of flowmeter have been shared below.				



Accuracy of outputs

Current output

Accuracy	Max. ±0.05 % o.f.s. or ±10 µA

Repeatability	±0.5 % of value for velocities > 0.2 m/s (0.66 ft/s)
Response time	Typically < 3 s for 63 % of a given step change (in both directions)
Influence of medium temperature	±0.2 % o.r./K, deviating from the reference temperature (+25 °C (+77 °F))

Flare specifications have been shared below. Manufacturer spesifications for the temperature of the flare ($T_{EG,m}$) and the flow rate of the residual gas to the flare ($F_{RG,m}$) can be seen below. Temperature of the flare should be between 800 to 1200 ^{O}C and the flow rate of the residual gas to the flare should not exceed 2300 Nm^3/h.

BİYOGAZ YAKMA BACASI SPESİFİKASYONLARI	
Kapasite	2300 Nm3/h
Tip	Ground Flare
Malzeme	AISI 304 Paslanmaz Çelik
Yanma odası ölçüleri	Çap: 1700 mm, boy: 6.000 mm
Flare ölçüleri	Toplam boy 7.500 mm.
Refrakter	100 mm seramik elyaf
Yanma sıcaklığı	800-1200 C
Min yanma basıncı	20 mbar
Min methane oranı	35%
Gözetleme camı	3" gözetleme camı
Gaz bağlantısı	DN 200 PN 10

PP uses ORDEL 0-1200C N type thermocouple[1] to measure the temperature of flare. This mineral-insulated thermocouple produced according to DIN 43710 standard which states that the thermocouple enables 0.15s response time for temperature measuring.

Mineral-Insulated Thermocouples According to DIN 43710 and DIN EN 60584

- **For temperatures between -200 to +1200 °C**
- **Flexible sheath cable with vibration-resistant measuring insert**
- **Protection tube diameter as of 0.5 mm**
- **Quick response time**
- **Application-specific insertion length**

Due to their specific features, mineral-insulated thermocouples are used in chemical plants, power plants, pipelines, engine building, and test rigs. Inside the flexible and thin-walled sheathed cable, the thermowires are embedded in compressed and fire-resistant magnesium oxide.

The good thermal transfer between the sheath and the thermocouple enables short response times ($t_{0.5}$ as of 0.15 s) and excellent measuring accuracy. The vibration-resistant construction guarantees a long operating life. The smallest bending radius is 5 times the outer diameter. With a diameter of 0.5 to 2.0 mm, the minimum insertion length (EL) is ≥ 50 mm; with a diameter of 3.0 to 6.0 mm the EL is ≥ 100 mm.

The thermocouples are designed to be insulated from the sheath as standard. The measuring insert is equipped with thermocouples (elements) according to DIN EN 60584 and/or DIN 43710. Versions with two thermocouples are also possible.

Test pressure: check for leaks at the measuring point at 40 bar (helium).

Leakage resistance: thermocouple against sheath at room temperature and lengths < 1 m 200 MΩ, with lengths ≥ 1 m 200 MΩ × m.

Both flow rate of the residual gas and the temperature of the flare records have been shared with VVB. It can be seen that records for both parameters are coherent with flare specifications.
Therefore, PP has chosen to apply a default value of 80% for low height enclosed flare efficiency in accordance with section 6.2.2.1 of TOOL 06.

Documentation provided by PP

VVB assessment	**Date:** 06/09/2023

PP has demonstrated flare operation during the monitoring period by providing required evidence in accordance with TOOL 06. This is deemed acceptable to the verification team and therefore, this CL is closed.

CL ID	06	**Section no.**	E.6.2	**Date:** 31/08/2023

[1] https://www.ordel.com.tr/upload/MINERAL-IZOLELIITERMOKUPLLAR-.pdf

Description of CL	
In section D.3 of the MR, for parameter VS (%) PP has not provided data for 'other cattle'. PP needs to state the entire data monitored for the parameter and follow this throughout the MR for all parameters.	
PP response	**Date:** 01/09/2023
In section D.3. pf the MR, parameter VS has been given for both dairy and non-dairy cattle separately for each year.	
Documentation provided by PP	
VVB assessment	**Date:** 06/09/2023
PP has revised section D.3 of the MR, for parameter VS (%), to provide data for 'other cattle' separately for each year in the monitoring period. Therefore, this CL is closed.	

CL ID	07	Section no.	E.8.1	Date: 31/08/2023
Description of CL				
In section E.2 of the MR, PP has calculated the final value of Baseline emissions for this monitoring period as 2,021,284 tCO_2e. However, the verification team has noted that the value is calculated excluding 'Baseline CO_2 emission from electricity and/or heat used ($BE_{\frac{elec}{heat},y}$) PP needs to clarify why the baseline CO_2 emissions due to electricity use were not included in final BE value.				
PP response				**Date:** 01/09/2023
Baseline CO_2 emissions due to electricity use are included in final BE value as it can be seen in ER calculation sheet. In MR document, $BE_{elec/heat}$ was forgotten to be added in final BE value. Final BE value has been updated in section E.2. The final value of Baseline emissions for this monitoring period has calculated as 2,049,290 tCO2e.				
Documentation provided by PP				
VVB assessment				**Date:** 06/09/2023
PP has revised section E.2 of the MR to include baseline CO_2 emissions due to electricity use in final BE value which is deemed acceptable to the verification team. Therefore, this CL is closed.				

CL ID	08	Section no.	E.8.2	Date: 31/08/2023
Description of CL				
In section E.2 of the MR, sub section (III) 'Physical Leakage from distribution network of the captured methane in (PE_{PL}), PP needs to report on the value of Physical leakage from distribution network during this monitoring period. If the value for parameter is reported as 'zero', PP needs to demonstrate through calculation by stating the values monitored on flowmeter installed after the anaerobic digester and the flowmeter before the gas engine, boiler, and flare.				
PP response				**Date:** 01/09/2023

In the project site, gas generated in anaerobic digesters are carried by stainless and sealed pipes. The gas is either goes to gas engine or to the flare. PP declares that gas engine and flare do not work at the same time. PP shows the calculation of monitored values of generated and burned gas in the system as shown below.

Year	Total Biogas Flow (m^3)	Total Biogas to the Gas Engine (m^3)	Total Biogas to the Flare (m^3)
2020	40,078,459.40	39,389,620.44	688,838.96
2021	38,738,614	38,354,223.49	384,390.51
2022	42,816,733	42,315,233.87	501,499.13

Since there is no difference between the total biogas flow and the sum of biogas flow to the GE and flare, physical leakage from distribution network of the captured methane is taken as zero.

Documentation provided by PP

VVB assessment **Date:** 06/09/2023

PP has demonstrated how the physical leakage from distribution network of the captured methane is zero for the project activity, which is deemed acceptable to the verification team. Therefore, this CL is closed.

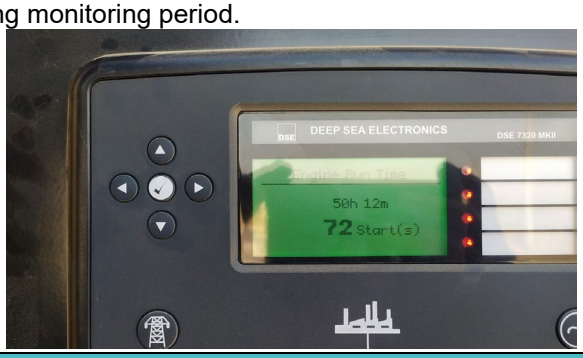
CL ID	09	**Section no.**	E.8.2	**Date:** 31/08/2023

Description of CL

During the on-site visit a DG set was observed by the verification team. Therefore, PP is requested to demonstrate project emissions from fossil fuel combustion due to the use of backup diesel generator during the monitoring period in accordance with TOOL 03, along with supporting evidence.

PP response **Date:** 01/09/2023

PP has declared that project activity did not use diesel generator during the monitoring period. PP has mentioned that they have started to use diesel generator since 2023. PP has started to monitor diesel generator usage and engine has worked 50 hours 12 min until now. PP will include project emissions from diesel generator for upcoming monitoring period.



Documentation provided by PP

VVB assessment **Date:** 06/09/2023

PP has clarified that there was no usage of diesel generator during the monitoring period along with supporting evidence. This is deemed acceptable to the verification team and therefore, this CL is closed.

Table 2. CARs from this Verification

CAR ID	01	**Section no.**	E.3	**Date:** 31/08/2023

Description of CAR

In section A.1 of the MR, PP states that, *"The proposed project activity has total number of four biogas engines installed at the biogas power plant, with the net capacity of 1.20 MWe/h each. Accordingly, the biogas system installed has been designed with a total power of 4.8 MWe/h."* However, during the on-site inspection, it was found that there are five gas engines installed in the plant. Four of the gas engines are of capacity 1.067 MWe each, while one gas engine is of 0.621 MWe. This could also be confirmed with the electricity generation license for the project issued by EPDK on 20/09/2018. Therefore, PP needs to clarify regarding this discrepancy and clearly indicate the installed capacity of the plant.
PP response **Date:** 01/09/2023
The project activity had planned to implement 4 biogas engines with power of 1.2 MWe each. However, due to supplier's stock lack, planned capacity has been achieved by other engines. At the moment, the project activity has total number of five biogas engines installed at the biogas power plant, with the net capacity of 0.600x1 MWe and 1.067x4 MWe. Accordingly, the biogas system installed has been designed with a total power of 4.868 MWe. Typing error has been corrected on MR and commissioning report for all five engines have been shared with VVB.
Documentation provided by PP
VVB assessment **Date:** 06/09/2023
PP has clarified the reason for the aforementioned discrepancy and revised the MR to clearly indicate the number and installed capacity of the gas engines along with supporting evidence. This is deemed acceptable to the verification team and therefore, this CAR is closed.

CAR ID	02	**Section no.**	E.3, E.6.2	**Date:** 31/08/2023
Description of CAR				
In section C of the MR, it is stated that $FV_{RG,h}$ is continuously measured by the biogas flow meters (1 meter installed at the outlet of the anaerobic digestion, 1 meter installed at the inlet of the power generator and 1 meter installed in inlet of flare). But table 6 of the MR indicates presence of 2 flowmeters, 1 at the outlet of anaerobic digestion and 1 at the inlet of generator. However, during the on-site visit VVB observed that two flow meters are installed at the outlet of anaerobic digestion for the total gas produced which is either used for electricity generation or flaring, not both simultaneously. Accordingly, PP needs to revise the relevant sections of the MR.				
PP response				**Date:** 01/09/2023
In the project site, there are two flowmeters installed at the outlet of the anaerobic digester, before desulphurization unit. PP monitors generated gas amount at digesters and burned gas amount either in gas engine or flare. In the project site, gas engine and flare do not work at the same time. Therefore, PP can monitor the amount of gas whether it is flared or burned in gas engine easily.				
Documentation provided by PP				
VVB assessment				**Date:** 06/09/2023
PP has revised the relevant sections of the MR to indicate the presence of two flowmeters at the outlet of the anaerobic digester before the desulphurization unit. This is deemed acceptable to the verification team and therefore, this CAR is closed.				

CAR ID	03	**Section no.**	Technical Review	**Date:** 11/09/2023
Description of CAR				

Following findings were raised during the technical review process:

a. In section B.1 of the MR, PP needs clarify the purpose / use of the heat produced during the process and clarify whether ERs are claimed w.r.t heat generation and usage.
b. In section B.1 of the MR, PP is requested to provide technical details of the digesters and other technical systems and should also clarify whether the project has been implemented in line with sec A.3 of PDD with same technical components.
c. In section D.2 of the MR, the parameter with heading "*Tonnes of greenhouse gas emissions avoided or removed*" differs from PDD. Additionally, the monitoring parameters T, $W_{manure\ LT}$, $MS_{\%j}$ and Vf were not indicated in PDD. Therefore, clarification is requested.
d. In section D.3 of the MR, PP is requested to add all the parameters mentioned under section D.2 of the MR.
e. In section E.2 of the MR, PP needs to represent the total value of "*Electricity supplied to the national grid"* correctly.
f. In section E.4 of the MR, the baseline and project estimate for "emission reductions" are indicated as baseline and project emissions for the monitoring period. PP is requested to rectify the same to represent the net benefit correctly.

PP response	**Date:** 11/09/2023

a) Waste heat from gas engines is utilized mainly for heating anaerobic fermenters. The generated electricity is not only supplied to the national grid but is also used as auxiliary/internal consumption required for the plant to function. Untreated animal manure is an important source of methane which is of the most potent Greenhouse Gases (GHGs). The project activity avoids methane emission through the methane capture and utilization processes. Furthermore, the project reduces CO2 emissions from fossil fuel-based electricity generation by supplying biogas-based electricity to the national grid. Emission reductions are not claimed for heat generation and usage.
b) All Technical Information related to digesters and other technical equipment is added in the MR.
c) Monitoring of the parameter MS%j is required by the methodology so MS%j is added to the parameters that has to be monitored.
The methodology is applicable where the outside temperature is higher than 5°C so in order to check the methodology applicability Outside Temperature (T) has been added to the parameters that have to be monitored.
Wmanure,Lt parameter should be monitored as required by the methodology so the parameter have been moved from Ex-Ante values to the parameters that has to be monitored.
Parameter under SDG 13 in the PDD has been mentioned as "Air Quality related to capturing and utilising GHGs from animal manure" and corrected to "Tonnes of greenhouse gas emissions avoided or removed" in order to avoid misunderstanding in this MR.
d) All missing parameters have been added under D.3
e) The value has been presented correctly now in the MR.
f) Emission reductions have been rectified in Section E.4

Documentation provided by PP

VVB assessment	**Date:** 13/09/2023

a. Section B.1 of the MR has been revised to clarify the purpose / use of the heat produced during the process and whether ERs are claimed w.r.t heat generation and usage. Therefore, this part of the CAR is closed.
b. Section B.1 of the MR has been revised to provide technical details of the digesters and other technical systems and it can be confirmed that the project has been implemented in line with sec A.3 of PDD with the same technical components. Therefore, this part of the CAR is closed.
c. The title for the SDG 13 monitoring parameter has been changed from "Air Quality related to capturing and utilising GHGs from animal manure" to ""Tonnes of greenhouse gas emissions avoided or removed" which aligns with the project contribution of resulting emission reductions.
The monitoring parameters T, $W_{manure\ LT}$, $MS_{\%j}$ and Vf were not indicated in PDD. However, according to the applied methodology, these parameters are required to be monitored and therefore are included in section D.2 of the MR. This is deemed acceptable to the verification team and therefore, this part of the CAR is closed.
d. PP has revised section D.3 of the MR to add all the parameters mentioned under section D.2. Therefore, this part of the CAR is closed.
e. PP has revised section E.2 of the MR to represent the total value of "Electricity supplied to the national grid" correctly. Therefore, this part of the CAR is closed.
f. PP has revised section E.4 of the MR to represent the net benefit for "emission reductions" correctly and therefore, this part of the CAR is closed.

Table 3. FARs from this verification

FAR ID	xx	**Section no.**		**Date:** DD/MM/YYYY
Description of FAR				
PP response				**Date:** DD/MM/YYYY
Documentation provided by PP				
VVB assessment				**Date:** DD/MM/YYYY