

PROJECT REVIEW REPORT

This project review report includes findings raised during Verra's review of the project specified below. The VVB must address the findings before the project request can be considered for approval by Verra. The project review report will be made publicly available on the Verra Registry. Confidential information may be provided in separate attachments.

Project ID	2457
Project Name	BYZ Global Energy Biogas Plant
Review Type	Verification
Program(s)	VCS Program
Project Proponent	BYZ GLOBAL ENERJİ VE GÜBRE ÜRETİMİ TİCARET SANAYİ ANONİM ŞİRKETİ and CS CLIMATE SOLUTIONS DANIŞMANLIK ANONİM ŞİRKETİ
Methodology	AMS-III.D, "Methane recovery in animal manure management systems", version 21.0 AMS-I.D, "Grid connected renewable electricity generation version", version 18.0
VVB	TÜV SÜD South Asia Private Limited
Assessment Criteria	VCS Standard, v4.3
Date of First Issue	24 January 2023
Date of Second Issue	19 April 2023
Date of Third Issue	19 June 2023
Review Conclusion	Approve
Date of Final Issue	15 September 2023

FINDINGS

#	Finding Description	VVB Response	Status
1	Further assessment of farms included in the project boundary <u>Issue</u> The monitoring and verification reports do not clearly indicate if the 21 farms included in the project during the monitoring period are the same farms included at the validation stage. <u>Action Required</u> 1. The VVB must ensure that the project proponent clearly identifies the farms which were included at the validation stage of the project activity and indicate if new farms have been included or not during the monitoring period. 2. The VVB must clearly indicate which were the farms included at the validation stage and if new farms have been added during the monitoring period. Further, if new farms have been added, the VVB must verify that they comply with the AMS-III.D, version 21 applicability requirements, related to the baseline conditions, retention time and depth. <u>Program Rule(s)</u> VCS Monitoring Report Template v.4.1 VCS Verification Report Template v.4.1	Round 1 <u>VVB Response</u> 1. PP has further elaborated and revised the Section 1.7 of VCS MR, clarifying the farms included at the validation stage and the manure supplier farms at the current monitoring period. In addition, PP briefly outlined which farms were removed and which were added during the current monitoring period. Furthermore, in Appendix 3, Table 8 of VCS MR, PP has declared the lagoon depths and the retention periods for each of the manure supplier farms. Same has been updated and assessed in the section 2.4 of the VR. 2. VVB has clearly indicated the farms that were included at the validation stage and new farms added during the monitoring period. VVB also verified the compliance of the farms in question with AMS-III.D v.21 by both performing site visits to each of the farms and checking the monitoring surveys. Section 2.4 of the VR is updated <u>Verra Response</u> The documents were updated to include a description of the new farms added and excluded during the current monitoring period.	Closed

		<u>Issue:</u> The project was registered as a non-grouped project, however, the project included further farms during the current verification. Further, 16 farms were excluded from the monitoring report during the present monitoring period. <u>Action required:</u> The VVB must ensure that if there are changes in the project description, these should be adequately addressed through a project description deviation. <u>Requirement:</u> VCS Standard v4.4, section 3.6.5: “Inclusion of further project activity instances subsequent to initial validation of a non-grouped project is not permitted (see Sections 3.6.10 – 3.6.17 for information on grouped projects).” VCS Standard v4.4 section 3.20: “Projects may deviate from the validated project description in certain cases in order to accommodate changing circumstances post-validation. Such deviations must be described and assessed by a validation/verification body during the next project verification.” Standard v4.4, section 3.5.6: “Grouped projects, AFOLU projects, and other projects with a risk of a reversal or loss event shall not have gaps between monitoring periods.” The finding remains open. Round 2 <u>VVB Response</u> As registered VCD-PD v5 dated 02/12/2021 states that the project will be sourcing cattle and chicken manure from the neighbouring animal farms in Kocasinan district, animal farms that satisfy the eligibility condition of the applied Methodology AMS-III.D v21 is	
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		suitable to include in the project without a need for project description deviation. The VVB confirms, based on regional expertise, animal farms in this region are mandated by “The Regulation on Livestock Farms in Turkey” to be managed under confined conditions and utilize concrete foundation lagoons as AWMS. Since animal farms in the project region are operated for commercial production, these farms are inspected by Ministry of Agriculture to ensure that the regulation is followed properly, which demonstrates the common practice and baseline condition of animal farms in the region. Furthermore, the eligibility of each farm included in the project boundary was assessed through site visits to each of the farms included in the monitoring report and review of monitoring surveys. <u>Verra Response</u> The VVB states that the eligibility of the farms included during the current verification period was assessed during the site visit. <u>Issue Raised:</u> The VCS Standard v4.4, states that a project description deviations are permitted at verification, however, the deviations shall be described and assessed by the validation/verification body. Further, the validation/verification body shall assess whether the deviation impacts the applicability of the methodology, additionality, or the appropriateness of the baseline scenario. However, the project description changed the animal farms included in the project boundary, and this was not reflected as a deviation from the project description document. <u>Action required:</u> The VVB must ensure that if there are changes in the project description, these should be adequately addressed through a project description deviation. Further, the VVB must ensure that	
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		the project description deviation complies with the VCS Standard requirements. The finding remains open. <u>VVB Response</u> The project deviation related to the changes in the animal manure supplying farms during the current monitoring period with respect to the list of manure supplier farms declared in time of validation has been provided by PP in line with VCS Standard 4.4 in Section 3.2.2 of VCS MR. The VVB has ensured that the project deviation regarding the change of the animal manure supplying farms has been provided in line with the VCS Standard requirements in Section 3.2.2 of VCS MR. VVB has also updated the verification report, accordingly. Also, a FAR has been raised to ensure that any changes in farms included in the project activity at the time of registration are assessed during every subsequent verification Verra Review: The PD deviation was included in line with the VCS Standard requirements, and the VVB checked that the deviation had no impact on the baseline scenario, additionality or applicability of the methodology. The finding is closed.	
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2	Inconsistent grid emission factor used		
	<u>Issue</u> The project description determines the combined margin grid emission factor of 0.5403tCO₂/MWh in Section 5.1 (data and parameters available at validation) and defines the BM as per Option 1 (ex-ante, in page 50). However, the monitoring report calculates both OM and BM ex-post. <u>Action Required</u> 1. The VVB must ensure that the project proponent calculates the combined margin grid emission factor as per the options selected in the registered PD and as per the requirements in the applicable TOOL07, v.07.0. 2. The VVB must ensure that the combined margin grid emission factor is calculated as per the applicable TOOL07, v.07.0 and registered PD and update the verification report as needed. <u>Program Rule(s)</u> VCS Monitoring Report Template v.4.1 VCS Verification Report Template v.4.1	Round 1 <u>VVB Response</u> 1. PP has revised Sections 4.1 and 5.1 of VCS MR in accordance with the registered VCS PD and the requirements of the applicable TOOL07 v07.0. Accordingly, PP has revised the baseline and project emissions calculations along with the emission reduction calculations in the ER spreadsheet. VVB has ensured that PP has clearly indicated which option has been selected for the calculation of the OM emission factor as per para. 42 of the TOOL07, v.07.0. PP has updated the value based on the registered ex-ante value. VVB has updated the section 4.1 of the VR and assessment on value taken of emission factor has been added. 2. VVB has reviewed the PD and sourced document, from where the value has been taken., VVB has validated that PP has used the ex-ante value published by the official source in time of validation. VVB has revised Verification Report, accordingly. <u>Verra Response</u> The documents were revised to ensure that the combined margin emission factor is calculated consistently and based on the decisions stated in the project description. The finding is closed.	Closed

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3 Missing information on the measurement of biogas flow sent to the flare			
	<u>Issue</u> The monitoring report does not indicate how, in case of emergency, the biogas sent to the flare is measured. Please note that as per the information provided in page 34 of the verification report, there is only one flow meter installed at the combined outlet line of the anaerobic digesters. Further, the monitoring report page 91 states that FE is considered as 100%, however as per para. 33 of AMS-III.D, v.21.0 this value can be applied in cases where the amount of methane that is combusted for energy and that is flared is separately monitored. <u>Action item</u> 1. The VVB must ensure that the project proponent clearly indicates how the biogas sent to the flare is measured in case the emergency flare is used. 2. The VVB must verify this information, including how it has verified that no biogas has been sent to the flare during the verification period, and update the verification report as needed. <u>Program Rule(s)</u> VCS Monitoring Report Template v.4.1, Sections 4.2 and 5.4	Round 1 <u>VVB Response</u> 1. PP has revised Section 4.2 and Section 5.3 of VCS MR to clearly indicate how biogas sent to the flare is measured in case the emergency flare is used. The measuring system is based on the use of valves for the control of gas flow. Since gas engine and flare are not designed to be operated simultaneously, gas flow is redirected to flare instead of gas engine in case of any emergency which allows for the measurement of flared biogas through the flow meter installed on the main gas line. Consequently, the amount of methane that is combusted for energy and that is flared is separately monitored. Considering FE as 100% is, thus, appropriate. PP has accordingly revised Figure 4 in Section 3.1 to clearly demonstrate the control of flared biogas. Through site inspections and interviews, VVB has checked and verified that the demonstrated measurement method for flow rate of flared biogas, is suitable for the project activity. 2. VVB has verified that the flow rate of flared biogas, if any, is monitored through the flowmeter connected to the SCADA system whose data is recorded to the operational logbooks. Furthermore, any operation on the valves that are separating flare and gas engine lines are recorded to the operational logbooks. By checking the operational	Closed

VCS Verification Report Template v.4.1, Section 4.4 AMS-III.D, v.21.0, para. 33	logbook records as well as SCADA records, VVB has verified that no biogas has been sent to flare during the current monitoring period. Verification report has been updated accordingly.	
	<u>Verra Response</u> The revised documents clarify that when the flare is in use, the biogas is monitored using the same flowmeter as when the biogas is sent to the generators, however, the use of the valves is recorded in the SCADA system. <u>Issue:</u> The VVB states that considering the flare efficiency as 100% is appropriate, however, this is not aligned with the methodology. <u>Action required:</u> The VVB must ensure that the project proponent correctly describes the flare efficiency. The methodology allows applying a 100% destruction efficiency only for the biogas burned in the generators (that is, the destruction efficiency of the generators), not for the biogas burned in the flare. The VVB must ensure that the documents are updated to reflect the requirements of the methodology. <u>Requirement:</u> Paragraph 33 of AMS-III.D ver.21: “Project activities where a portion of the biogas is destroyed through flaring and the other portion is used for energy may consider applying the flare efficiency to the portion of the biogas used for energy, if separate measurements of the respective flows are not performed. When the amount of methane that is combusted for energy and that is flared is separately monitored, or when only the biogas flow to the flare is monitored and the biogas used for energy is	

		calculated based on electricity generation, a destruction efficiency of 100% can be used for the amount that is combusted for energy.” The finding remains open. <u>VVB Response</u> Within the project activity, recovered biogas is combusted for electricity production, and not used for flaring. The flaring equipment is merely installed for safety reasons in the case of emergency. Thus, within the project activity there is not a scenario “where a portion of the biogas is destroyed through flaring and the other portion is used for energy”. Recovered biogas is either entirely used for electricity generation or entirely flared in a case of emergency allowing separate monitoring of flared/utilized biogas through the same flow meter. According to the operation scenario of the SCADA system. The valve before the gas engine is simultaneously closed while the valve before the flare is opened. Thus, it is not possible to supply biogas to both equipment at the same time. Both the use of valves and flow meter activity is recorded to the SCADA system which was confirmed during the inspections. Evidently, as confirmed during the verification process, the flare was not used during the monitoring period which means that the recovered biogas was only sent to the gas engines. Furthermore, the destruction of biogas through the gas engine was verified and reported in the verification report. Consequently, as per Paragraph 22 of AMS-III.D., stating “If the recovered biogas is combusted for electrical/thermal energy production or for other gainful use, the methane destruction efficiency can be considered as 100%.”, VVB confirms that applying a 100% destruction efficiency is in line with the applied Methodology.	
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		<u>Verra response:</u> The VVB states that the biogas is either used in the generators or destroyed in the flare, which is accepted. <u>Issue:</u> The revised monitoring report, page 79, under parameter FE representing the “Flare efficiency in the year y” states a value monitored of 100%, which is not aligned with the requirements. <u>Action required:</u> The VVB must ensure that the parameter stated for the efficiency of the flare, even if it was applied during the current monitoring period, is adjusted according to the requirements. The finding remains open. <u>VVB Response</u> The efficiency of the flare has been adjusted in line with the requirements of the applied methodology. Besides, PP has provided further explanations regarding the parameter of FE used in MD_y calculations in Section 4.2 and 5.4 of VCS MR, respectively. The VVB has checked and confirmed that the relevant details added by PP in Section 4.2 and 5.4 of VCS MR has been provided in line with the applied methodology of AMS-III.D. The VVB ensures that the FE parameter has been adjusted as per the requirements. VVB has revised the verification report, accordingly. Verra response: The efficiency was adjusted in line with the applied methodology of AMS-III.D. The finding is closed.	
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4 Further information on the measurement of the fraction of methane in the biogas			
	<u>Issue</u> The monitoring report states that for the measurement of the quantity of methane produced in the anaerobic digester in year y (QCH_{4,y}) the methane content is measured with a Gas Analyzer AwiFLEX Cool+ (page 62) while in page 72 it also states that a default value of 60% is selected as per AMS-III.D. However, the project description page 67 requires the methane content to be monitored. <u>Action Required</u> 1. The VVB must request the project proponent to clearly indicate how the methane content in the biogas is measured and provide the monitored results in Section 4.2 of the monitoring report. 2. The VVB must verify that the methane content is measured as per the registered PD and applicable methodology, that the monitoring report includes the measured values and update the verification report as needed. <u>Program Rule(s)</u> VCS Monitoring Report Template, v.4.1, Section 4.2 VCS Verification Report Template, v.4.1, Sections 4.2	Round 1 <u>VVB Response</u> 1. PP has corrected the inadvertent mistake of using default value for the quantity of methane in Section 4.2 of VCS MR and ER spreadsheet by replacing it with the measured annual average methane quantity. The PP has also provided further information on the measurement procedure in Section 4.2 of VCS MR. VVB has cross verified the logbook records and measurement method during the audit and same has been assessed in the section 4.1 of the VR. 2. VVB has checked the revised VCS MR sections as well as ER spreadsheet and confirms that methane content is measured as per the registered PD and applicable methodology, and that the monitoring report includes the measured values (Q_{biogas,y} and w_{CH_{4,y}}). The Verification Report has been updated accordingly. <u>Verra Response</u> The revised documents were updated with the monitored value of the methane content in the biogas, and the default value was removed. All calculations were updated accordingly. The finding is closed.	Closed

5	Further information on monitored parameters BG _{burnt,y} and QCH _{4,y} and calculation of MDy		
	<u>Issue</u> As per the spreadsheet submitted, the parameters BG_{Burnt,y} (TAG ER-file3) and QCH_{4,y} (TAGS AMS-III.D. P_{Ey} cells B31) are typed values. Further information is required on how they have been calculated. Finally, MDy (TAG ER-file4) has been calculated considering a default value of 0.6 for the methane content while as per the project description this parameter is to be monitored. <u>Action Required</u> 1. The VVB must ensure that the project proponent: (a) clearly indicates how BG_{burnt} and QCH₄ have been calculated in the spreadsheet submitted and; (b) calculates MDy as per the registered project description. 2. The VVB must verify this information and update the verification report as needed. 3. The VVB is required to cross-check the values reported of methane captured and destroyed (parameter MD) each year in relation to the amount of electricity generated and the energy efficiency of the generator. <u>Program Rule(s)</u> AMS.III-D, v.21.0, para. 27	Round 1 <u>VVB Response</u> 1. (a) PP has provided the BG_{burnt} data from operational logbook records. Since this is a monitored value, no calculation was involved in its determination. The BG_{burnt} parameter is monitored through the flow meter installed on the main gas line. On the other hand, PP has revised Section 5.2 of VCS MR and related tabs of ER spreadsheet to clearly demonstrate how Q_{CH_{4,y}} parameter was calculated during the current monitoring period. (b) PP has also updated the ER spreadsheet to demonstrate MDy calculations using monitored methane content as per the registered VCS PD. 2. VVB has checked the provided calculations as well as supporting documents such as operational logbook records and verified that PP has followed the calculation procedures of applied Methodology AMS-III.D and Methodological Tool to determine the mass flow of a greenhouse gas in a gaseous stream v03.0. Monitoring of BG_{burnt} is performed according to applied methodology AMS-III.D. Calculations for the Q_{CH₄} is in line with the applied tool. 3. VVB has cross-checked the values reported of methane captured and destroyed (parameter MDy) each year in relation to the amount of electricity generated and the energy efficiency of the generator, and verified that the reported values are consistent with the generated electricity. <u>Verra Response</u> The VVB clarified that the value of BG_{burnt} is monitored based on the flowmeter installed in the main gas line.	Closed

		<u>Issue:</u> However, it is not clear: 1) How the VVB verified the use of the biogas burned in the generators, as per the requirements of the methodology AMS-III.D ver. 13, para 22 2) How the VVB cross-checked the information on the biogas burned in the generators based on the electricity production and the efficiency of the generators. <u>Action required:</u> 1) The VVB must ensure that the calculations performed to cross-check the use of the biogas in the generators are clearly included in the revised verification report, in order to allow a third party to replicate the calculations. <u>Program Rule:</u> AMS-III.D ver. 13, para 22: “This use of the recovered biogas shall be included in the project boundary and its output shall be monitored in order to ensure that the recovered biogas is actually destroyed, even if the emission reductions from this component are not claimed”. The finding remains open. <u>VVB Response</u> 1) The VVB has revised the verification report to include cross-check details for the amount of biogas destroyed. <u>Verra Review:</u> In the revised verification report, the VVB states that it cross-checked the parameter MD in relation to the amount of electricity generated. However, the VVB also states that part of the electricity was used for internal consumption, and this was	
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		not used for cross-checking the amount of biogas destroyed. Also, calculations were not clearly included in the revised verification report. Action required: 1) The VVB shall ensure that it cross-checks the information on the biogas burned in the generators based on the total electricity production and the efficiency of the generators. 2) VVB shall ensure that all calculations are clearly explained in the revised verification report, in order to ensure a third party can replicate the calculations. 3) The VVB is required to provide the efficiency of the generators applied for the cross-checking calculations, and explain why it considers that it is a reasonable value, 4) The VVB shall explain any discrepancies with the values achieved when cross-checking the values. The finding remains open. <u>VVB Response:</u> 1) PP has included the relevant explanation in the monitoring report. The VVB has cross-checked the relevant information provided by PP and has also revised the verification report, accordingly. 2) PP has added a tab to ER spreadsheet that clearly indicates the relationship between biogas generation and associated electricity generation. The VVB has ensured that the relevant calculations have been replicated by a third party. VVB has also updated the verification report, accordingly. 3) VVB has provided the efficiency of the biogas engines and	
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		explained the assumptions in detail in the monitoring period. 4) VVB has crosschecked the values and found it appropriate. Verra Review: The PP provided a cross-check calculation between the methane destroyed in the generators and the electricity generated. Further, the VVB verified that the ratio between the total amount of captured methane and the electricity generated is 552 m3 of biogas for every 1 MWh of electricity, which is within the range as per the technical specifications (gas consumption range of the gas engine which is between 531- 577 Nm3 /MWh as per specifications). The finding is closed.	
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6 Further clarification on the level of assurance of the audit			
	<u>Issue</u> The site visit was conducted on 7-9 March 2022 while the monitoring period is from 30 July 2019 to 31 July 2022. Clarification is required on how the level of assurance of the audit has been achieved given that the site visit was performed before the end of the monitoring period. <u>Action Required</u> 1) The VVB is required to explain how it could verify all the required parameters on site, given that the site visit was performed before the end of the monitoring period. <u>Program Rule(s)</u>	Round 1 <u>VVB Response</u> For a reasonable level of assurance, Section 3.3.1.1 of the VCS Validation and Verification Manual v.3.2 classifies the types of evidence in order of decreasing reliability as physical, documentary and testimonial. Accordingly, VVB conducted a site visit from 7-9 March 2022 and visited the central treatment plant and animal farms. There was no sampling involved to verify the animal farms and VVB has visited 100% of farms which supplied manure to the central treatment plant. Hence, VVB has assured a reasonable level of assurance.	Closed

	VCS Verification Report Template v.4.1, Section 2	During on-site verification VVB has cross verified the provided data on the monitoring parameters, application of methodologies, appropriateness of monitoring plan, and the qualification of animal farms. VVB has assured that a monitoring plan is in place as per the registered PD. In addition, for the entire monitoring period, VVB has cross-checked all the monitoring parameters supplied by the PP with the electronic records, operational logbooks and monitoring surveys. The additional four months' data has been cross verified by the electronics records submitted by the PP. PP has opted for the yearly monitoring and the monitoring survey has been conducted in January 2022, hence, the results are valid for a year. Hence, VVB concluded to have obtained a proper level of assurance for the current monitoring period. <u>Verra Response</u> The VVB explained how the verification was performed without compromising the accuracy of the review, even when the site visit was done before the end of the monitoring period. The finding is closed.	
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