

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	5436
Project Name	Catanduva Landfill Gas Project
Review Type	Registration
Program(s)	VCS
Verification Period	NA
Project Proponent	UniCarbo Energia e Biogás Ltda.
Methodology	ACM0001, Flaring or use of Landfill Gas v19.0
VVB	LGAI Technological Center, S.A. (Applus+ Certification)
Assessment Criteria	VCS Standard, v4.7,
Date of First Issue	11 Sept 2025
Review Conclusion	Approved
Date of Final Issue	26 NoV 2025

FINDINGS

1. Assessment of 1% MSW Growth Assumption (from 2025 onwards)		
<u>Issue</u> PP assumes a 1% annual increase in MSW disposal from 2025 onwards for ex-ante emission reduction estimates. While the PD and VVB responses restate ACM0001 requirements for the <i>Management of SWDS</i> parameter, the validation report does not demonstrate how the VVB confirmed that: 1. The landfill's original design and remaining capacity can accommodate the projected growth; 2. Municipal waste supply contracts or planning documents support the assumption of increased volumes; 3. Environmental and operational permits (e.g., CETESB license) allow acceptance of the projected waste; 4. Historical disposal data were reviewed to check that the 1% fixed growth is a realistic representation of likely trends (noting that actual intakes fluctuate year to year); 5. Landfill management practices have not changed in ways that could increase methane generation, or if changes occurred, that these were justified by technical or regulatory specifications as required by ACM0001 (Data/Parameter Table 8 and monitoring provisions). <u>Action Required</u> The VVB must provide documented evidence of its validation of the 1% MSW growth assumption and <i>Management of SWDS</i>, including: 1. Confirmation that the landfill design capacity and	Round 1 <u>VVB Response</u> 1. In accordance with the latest operational license for the CGR Catanduva landfill (license/permit no. 14009984, issued by CETESB (environmental agency for the State of São Paulo) on 24/08/2022 and valid until 24/08/2027), the landfill is currently authorized to receive up to 1,000 tons/day of MSW. While the landfill is currently receiving about 650 tons/day, the estimated annual increase of 1% in the amount of MSW to be disposed at the landfill will not exceed the landfill's MSW disposal capacity. As argued by the representatives of the project proponent, the 1% annual increase in the amount of MSW disposed at the landfill was included in the ER calculations to account for populational growth. 2. As confirmed by the Applus+ Certification's validation team, the agreements between the municipalities and CGR Centro de Gerenciamento de Resíduos Ltda. (operator of the CGR Catanduva landfill) only establish a maximum amount of MSW to be disposed at the landfill yearly. If MSW from a municipality exceeds this maximum amount (as established in the agreement) in a given year, then the agreement must be revised. The Applus+ Certification's validation team has confirmed that the 1% annual increase in the amount of MSW disposed at the landfill (included to account for populational growth) will not exceed the combined maximum amount of MSW to be disposed at the landfill as established in the current agreements between the municipalities and CGR Centro de Gerenciamento de Resíduos Ltda.	Closed

	remaining capacity were reviewed and are sufficient 1for the projected growth. 2. Verification of municipal waste contracts/agreements or planning data that support the inflow projection. 3. Review of environmental and operational permits (e.g., CETESB) to confirm regulatory acceptance of projected volumes. 4. Assessment of historical MSW intake data to determine whether the 1% fixed growth assumption is reasonable.Considering the annual increase from 2013 till the project start date 5. Confirmation that landfill management practices have not changed since project start in ways that would increase methane generation, or justification of any changes by reference to technical/regulatory specifications. <u>Program Rule(s)</u> Data/Parameter Table 8, ACM0001,Flaring or use of Landfill Gas v19.0	3. In accordance with the latest operational license for the CGR Catanduva landfill (license/permit no. 14009984, issued by CETESB (environmental agency for the State of São Paulo) on 24/08/2022 and valid until 24/08/2027), the landfill is currently authorized to receive up to 1,000 tons/day of MSW. While the landfill is currently receiving about 650 tons/day, the estimated annual increase of 1% in the amount of MSW to be disposed at the landfill will not exceed the landfill's MSW disposal capacity. 4. While it is common practice in Brazil for municipalities to review or even cancel agreements for MSW disposal with landfill operators (by selecting a new landfill in the region), it is impossible to accurately estimate the amounts of MSW which will be disposed in a landfill in future years. The 1% annual increase is only intended to account for populational growth, by assuming that the landfill will remain receiving the same amount of MSW which it is currently receiving. 5. The Applus+ Certification's validation team has confirmed, during conducted interviews with representatives of the project operator, that so far, no MSW management practices were implemented at the CGR Catanduva landfill that would increase methane generation. Please note that, in accordance with ACM0001 (version 19.0) and the VCS PD, evidence will be required (during each future verification assessments for the project activity) to demonstrate that no practice aiming to increase methane generation in the landfill occurs after the implementation of the proposed VCS project activity (as a monitoring requirement for the parameter "Management of SWDS", which is to be monitored yearly). <u>Verra Response</u>	
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		The VVB has provided sufficient evidence to support the validation of the 1% annual MSW growth assumption and the application of the “Management of SWDS” parameter under ACM0001. The VVB reviewed the landfill’s operational license issued by CETESB, confirming that the facility is authorized to receive up to 1,000 tons/day of MSW and that the projected 1% annual increase remains well within this permitted capacity. The VVB also verified that existing municipal waste agreements establish maximum disposal quantities that would not be exceeded under the projected growth scenario. Historical disposal volumes and the inherent variability of municipal waste flows were considered, with the 1% growth rate justified as a conservative assumption to reflect population growth rather than precise forecasting. The VVB further confirmed through interviews with the project operator that no changes in waste management practices have occurred since project start that would increase methane generation, consistent with ACM0001 monitoring requirements. These assessments have been integrated into the revised Validation Report. No further action is required.	
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2. Stakeholder Engagement and Consultation			
Issue		Round 1	Closed
		VVB Response	
As per the section 2.2.1 of the PD, PP only states that no changes in stakeholder diversity are expected over time and that the project is not expected to cause negative impacts. This does not meet the template requirements, as the PD does not; (i) describe the social, economic, and cultural diversity of stakeholder groups, their		Section 2.1.1 of the VCS PD was revised by including further details about social, economic, and cultural diversity of the identified stakeholder groups. The Applus+ Certification’s validation team has also assessed a spreadsheet with information about the stakeholders who attended the previously conducted local stakeholder consultation meeting, which also confirms the	

	differences, interactions, and changes over time; or (ii) describe the location of stakeholders, including IPs, LCs, customary rights holders, and potentially impacted communities outside the project boundary. <u>Action Required</u> The VVB must ensure that the PD is revised to: 1. Provide a description of stakeholder diversity, including social, economic, and cultural characteristics, differences, interactions, and any changes over time. 2. Clearly identify the location of stakeholders, including IPs, LCs, customary rights holders, and any external communities predicted to be impacted. <u>Program Rule(s)</u> Section 3.18.2 of the VCS Standard v4.7 Section 2.2.1; VCS Project Description Template, v4.4	information included in the revised VCS PD regarding stakeholder diversity. Applus+ Certification's assessment of the revisions included in the VCS PD were included in Section 3.2.1.1 of the Validation Report. Regarding IPs, as appropriately outlined in Section 2.3.3 of the VCS PD and assessed by the Applus+ Certification's validation team in Section 3.2.3.3 of the Validation Report, there are no sites of cultural heritage in the area of influence of this landfill site. <u>Verra Response</u> The VVB has ensured that the PD was revised to include appropriate detail on stakeholder diversity, covering social, economic, and cultural characteristics, as required by the VCS PD template. The VVB reviewed supporting documentation, including the stakeholder consultation attendance records, and confirmed that the information presented accurately reflects the diversity and characteristics of the stakeholder groups. The PD was also updated to address the presence or absence of Indigenous Peoples, local communities, customary rights holders, and cultural heritage sites, with the VVB confirming that no such groups or sites are located within the project's area of influence. No further action is required.	
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3.	Timing of Stakeholder Consultation		
	<u>Issue</u> The VCS standard v4.7 (Section 3.18.2) requires that project proponents conduct stakeholder consultations before implementing project activities. The project start date is reported as 01 June 2023, while the stakeholder consultation is reported as occurring on 21 May 2024. This indicates the	<u>Round 1</u> <u>VVB Response</u> As confirmed by the Applus+ Certification's validation team, the following disclaimer is included in Appendix 3 of the VCS Standard version 4.7 (DOCUMENT HISTORY AND EFFECTIVE DATES):	Closed

	consultation was conducted after implementation had already begun, which would not meet the requirement. <u>Action Required</u> The VVB shall describe how it checked compliance with Section 3.18.2 of the VCS Standard (v4.7) concerning the timing of the stakeholder consultation and provide its assessment in the validation report. <u>Program Rule(s)</u> Section 3.18.2 of the VCS Standard v4.7	<i>“Clarified safeguard and stakeholder engagement requirements related to ecosystem health, property rights, human rights, and risks to stakeholders and the environment. Clarified that project proponents reporting on SDGs must also report on contributions to the host country’s SDG reporting. Effective for all project requests submitted on or after 1 March 2024.</i> <i>Except for:</i> • <i>Section 3.19.27 (3) which does not apply to project with a start date prior to 1 March 2024, pending further consultation.</i> • Section 3.18.2 which does not apply to projects with a start date prior to 1 October 2023.” While the project start date is defined as 01-June-2023, this requirement from Section 3.18.2 of the VCS Standard is thus not applicable. <u>Verra Response</u> The VVB has demonstrated that Section 3.18.2 of the VCS Standard v4.7 is not applicable to this project. Appendix 3 of the VCS Standard clarifies that the requirement for stakeholder consultations to occur prior to project implementation does not apply to projects with a start date before 1 October 2023. As the project start date is 01 June 2023, the timing provisions under Section 3.18.2 are not required for this project. No further action is required.	
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4.	Incomplete project boundary representation in diagram and monitoring plan		
	<u>Issue</u> The project boundary diagram does not include OP_{j,h}	Round 1 <u>VVB Response</u>	Closed

	(operation hours) for the open flare, although ACM0001 requires monitoring of methane destruction devices. In addition, the diagram shows monitoring arrangements for captive power plants, but the PD (page 14) states that no captive power plant will be on site. <u>Action Required</u> The VVB shall confirm and provide evidence that the project boundary is correctly represented, including: 1. Incorporation of $OP_{j,h}$ monitoring for the open flare in the diagram and monitoring plan. 2. Clarification regarding captive power plants, ensuring alignment between the VCS PD narrative and the project boundary schematic. <u>Program Rule(s)</u> Section 3.3; VCS Project Description Template, v4.4 Section 5.1; ACM0001, Flaring or use of Landfill Gas v19.0	The diagram in Section 3.3 of the VCS PD was revised by including the parameter $OP_{j,h}$ for the open flare. Moreover, the table for the monitoring parameter $OP_{j,h}$ in Section 5.3 of the VCS PD was also revised by indicating that the open flare is also an equipment that consumes LFG. Finally, reference to “captive power plant” was removed from the diagram in Section 3.3 of the VCS PD. As argued by the representatives of the project proponent and confirmed by the Applus+ Certification’s validation team, the electricity meter previously indicated in the diagram as “captive power plant electricity power meter” is actually the electricity meter that measures electricity generated by the project’s electricity generation infrastructure (which does not represent a captive power plant). The Validation Report was also revised accordingly. <u>Verra Response</u> The VVB has updated the project boundary diagram and monitoring plan to clearly incorporate the parameter $OP_{j,h}$ for the open flare, ensuring alignment with ACM0001 requirements for monitoring methane destruction devices. References to a “captive power plant” were removed from the diagram, and the VVB clarified that the previously labeled meter corresponds to electricity generation infrastructure associated with the project, not a captive power plant. The Validation Report was revised to reflect these corrections. No further action is required.	
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5.	MCF _{default} Value Justification		
	<u>Issue</u> The PP has applied MCF = 1 as per the CDM Tool 4 Emissions from solid waste disposal sites Version 08.1, assuming the landfill is a managed anaerobic SWDS. However, the PD does	Round 1	Closed
		<u>VVB Response</u> The table for the ex-ante parameter MCF _{default} in Section 5.1 of the VCS PD was revised by including complementary information	

	not provide details or justification on how the landfill meets the required conditions (controlled waste placement, compaction, cover material/levelling, and no water table above the bottom of the SWDS). It is unclear how the VVB has cross-checked and confirmed that these conditions are satisfied to justify the application of MCF = 1. <u>Action Required</u> The VVB shall ensure that the PP provides clear evidence in the PD demonstrating that the landfill qualifies as a managed anaerobic SWDS as per the CDM Tool. The VVB must also identify and reference the specific documents, site inspection records, or technical studies reviewed to confirm the validity of applying MCF = 1. <u>Program Rule(s)</u> (Data / Parameter table 5), CDM Tool 4: Emissions from solid waste disposal sites Version 08.1	regarding the MSW management practices at the CGR Catanduva landfill, in order to further justify the application of the default value of 1.0 for the parameter MCF_{default}, Section 3.3.8 of the Validation Report was also revised accordingly. <u>Verra Response</u> The VVB has revised the PD to include clear justification for applying MCF = 1, supported by official evidence from the São Paulo environmental agency (CETESB). The CETESB Landfill Quality Index (IQR) assessment for the CGR Catanduva landfill demonstrates that the site applies all required management practices for classification as a managed anaerobic SWDS, including controlled waste placement, compaction, cover material application, fire control, and absence of scavengers. The VVB reviewed this technical analysis, which also evaluates cell isolation, leachate management, groundwater monitoring, soil waterproofing, and other operational criteria. The Validation Report was updated accordingly to document the evidence reviewed. Based on this information, the justification for using MCF = 1.0 is adequately supported and reviewed by VVB. No further action is required.	
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6.	Data & Parameters		
	<u>Issue</u> 1. In Section 5.1 of the PD, the parameter SPECflare is not included, as per CDM TOOL06 (“Project emissions from flaring,” v04.0, Data/Parameter table 2) requires that manufacturer’s flare operating specifications (temperature, flow rate/heat flux, and maintenance schedule) be documented. Since the flare has already been installed at the CGR Catanduva landfill, these specifications should be available and included in the PD. 2. Section 3.4 of the PD confirms that the project proponent has applied the simplified procedures under ACM0001	Round 1 <u>VVB Response</u> 1. As confirmed by the Applus+ Certification’s validation team, the following disclaimer is included in the table for the parameter SPECflare in the CDM methodological tool “Project emissions from flaring”: <i>“Only applicable in case of enclosed flares”</i> While the flare installed as part of the project activity is an open flare, the ex-ante parameter SPECflare is thus not applicable.	Closed

(v19.0, section 5.3.1) for baseline identification and demonstration of additionality. Under this approach, tariff and CAPEX/OPEX parameters are not required (ACM0001, Data/Parameter Table 17). However, Sections 5.2 and 5.3 of the PD includes these parameters. 3. Section 5.2 of the PD does not include the parameter $p_{reg,y}$ (Fraction of LFG that is required to be flared due to a requirement in year y), which ACM0001 (v19.0) explicitly requires to be monitored. 4. Section 5.2 of PD describes that T_t and P_t may not be monitored when LFG flow meters automatically convert flows to normalized units. However, as per TOOL08 (v3.0), Data/Parameter tables 14 & 15, both T_t (temperature) and P_t (pressure) require continuous monitoring with periodic calibration (unless parameters are already converted to normal conditions and no applicability condition requires otherwise, e.g., $T < 60^{\circ}\text{C}$).	2. The monitoring parameters “Tariff of electricity exported” and “CAPEX/OPEX” were removed from the monitoring plan of the VCS PD. References to these parameters were also removed from the Validation Report. 3. As confirmed by the Applus+ Certification’s validation team, in accordance with ACM0001 (version 19.0), the parameter $p_{reg,y}$ is only applicable for Case 2 of the determination of the parameter $F_{CH4,BL,y}$, where it is identified that a requirement to destroy methane existed in the baseline scenario. While the project activity falls under Case 3, this parameter is thus not applicable for the project activity. Details about the determination of the parameter $F_{CH4,BL,y}$ and the identification of the Case applicable for the project activity are appropriately included in Section 4.1 of the VCS PD, and related Applus+ Certification’s assessment is presented in Section 3.3.6 of the Validation Report. 4. The disclaimers stating that the monitoring parameters T_t and P_t may not be required were removed from the VCS PD. The Validation Report was also revised accordingly.	
<u>Action Required</u> 1. The VVB shall ensure that $SPEC_{flare}$ is included in the PD with manufacturer’s operating specifications (flow rate, temperature, maintenance schedule) as required by TOOL06. 2. The VVB must ensure that, since the simplified approach has been applied, the PD is revised to remove tariff and CAPEX/OPEX parameters from the monitoring plan 3. The VVB must ensure that $p_{reg,y}$ is included in the PD monitoring plan in accordance with ACM0001 requirements. 4. VVB shall ensure that PP revise monitoring plan to ensure compliance with TOOL08 requirements for T_t and P_t, including continuous measurement and calibration, or provide clear justification under the exceptions allowed in the tool.	<u>Verra Response</u> The VVB has addressed all required corrective actions as follows; 1. It confirmed by VVB that the parameter $SPEC_{flare}$ is not applicable because the project utilizes an open flare, consistent with the applicability conditions in TOOL06. 2. Tariff and CAPEX/OPEX parameters were removed from the monitoring plan, reflecting the project’s use of the simplified ACM0001 approach. 3. The VVB also clarified that the parameter $p_{reg,y}$ does not apply to the project, as the activity falls under Case 3 of ACM0001 for determining $F_{CH4,BL,y}$, and this is now properly reflected in the PD and Validation Report.	

<u>Program Rule(s)</u> TOOL06: Project emissions from flaring, V4.0 TOOL08: Tool to determine the mass flow of a greenhouse gas in a gaseous stream ACM0001, Flaring or use of Landfill Gas v19.0	4. Ok, finding is closed No further action is required.	
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7. Appropriateness of LFG Capture Efficiency Value (η_{PJ})		
<u>Issue</u> ACM0001 (v19, Table 6) requires the efficiency of the LFG capture system (η_{PJ}) to be taken from the technical specifications of the system to be installed, or, if not available, to apply the default value of 50%. The Project Proponent applied a value of 0.928 (92.8%), citing a US technical paper (“Measuring landfill gas collection efficiency using surface methane concentration,” Huitric & Kong, Los Angeles County, 2006) that reports high efficiencies for well-managed US landfills. The VVB accepted this value as “reasonable” but did not demonstrate review of manufacturer specifications for the CGR Catanduva system or justify deviation from the 50% default. <u>Action Required</u> The VVB shall describe how it checked compliance of the η_{PJ} parameter with ACM0001 (v19, Table 6), including: 1. Whether any technical specifications of the installed LFG capture system at CGR Catanduva were obtained and reviewed; 2. On what basis the literature value of 92.8% from a US study was deemed applicable to the Brazilian landfill; 3. The VVB’s conclusion on whether the applied η_{PJ} value is compliant with ACM0001, and its assessment included in the validation report. 4. Clarification on why literature was used as the source, when the methodology explicitly states that the	Round 1	Closed
	<u>VVB Response</u> In order to address this issue, the project proponent has decided to apply the default value (50%) from ACM0001 (version 19.0) to the parameter η_{PJ}. As a result, ex-ante estimations of baseline emissions and emission reductions to be achieved by the VCS project activity during its 1st crediting period under the VCS were significantly reduced (with values being appropriately revised in both the ER calculation sheet and the VCS PD). The Validation Report was also revised accordingly.	
	<u>Verra Response</u> Project Proponent has replaced the previously efficiency of the LFG capture system (η_{PJ}) value with the ACM0001 (v19) default value of 50%. No further action is required.	

parameter must be derived from the technical specifications of the installed equipment or the 50% default value. 5. The VVB shall update the VR accordingly <u>Program Rule(s)</u> Data / Parameter table 6, ACM0001, Flaring or use of Landfill Gas v19.0		
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8. Clarity of Calibration Procedures			
	<u>Issue</u> The monitoring plan describes calibration of all monitoring devices to be performed periodically by an accredited calibration laboratory, at a frequency “as per instrument specifications and/or manufacturer’s recommendations.” Monitoring instruments will also be subject to maintenance/testing in line with national or international standards, and “spare instruments may be kept.” ACM0001 and the VCS Standard (v4.7) require that QA/QC procedures, including calibration, be clearly defined ex-ante to allow for validation of adequacy and ensure consistent application during monitoring. The current description does not provide a specific calibration interval, and the language regarding spares is not sufficiently precise <u>Action Required</u> The VVB shall explain how it assessed the adequacy of the proposed calibration procedures specifically: 1. What calibration frequency was validated as appropriate for the LFG flow meters at CGR Catanduva landfill; 2. Whether manufacturer specifications or applicable standards were obtained and reviewed; 3. Whether the monitoring plan needs to be updated to	Round 1 <u>VVB Response</u> The VCS PD was revised by including the recommended calibration frequencies for all applicable monitoring instruments included in the monitoring plan of the VCS PD. The Applus+ Certification’s validation team has assessed the Specification sheet for the instruments (as provided by the representatives of the project proponent) and confirmed that the information included in the VCS PD is correct.	
		<u>Verra Response</u> The VVB has revised the VCS Project Description to include clearly defined calibration frequencies for all relevant monitoring instruments, in line with manufacturer specifications. The VVB reviewed the specification sheets provided by the project proponent and confirmed that the calibration intervals reflected in the updated monitoring plan are accurate and appropriate. No further action is required.	
		Closed	

	clearly specify the calibration interval and confirm use of spare instruments. The VVB shall provide its assessment in the Validation Report <u>Program Rule(s)</u> Section 2.2, VCS standard v4.7		
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