



**Validation report form for post-registration changes for  
CDM project activities  
(Version 03.0)**

**BASIC INFORMATION**

<b>Title and UNFCCC reference number of the project activity</b>	CTR Rosario Landfill Gas Project UNFCCC Ref. Number 8242
<b>Process track</b>	<input type="checkbox"/> Prior approval <input checked="" type="checkbox"/> Issuance <input type="checkbox"/> Renewal of crediting period
<b>Version number of the validation report</b>	1.0
<b>Completion date of the validation report</b>	29/06/2021
<b>Type(s) of PRCs</b>	<input checked="" type="checkbox"/> Temporary deviations from the registered monitoring plan, applied methodologies, standardized baselines or other methodological regulatory documents <sup>1</sup> <input type="checkbox"/> Corrections <input type="checkbox"/> Changes to the start date of the crediting period <input type="checkbox"/> Inclusion of a monitoring plan <input type="checkbox"/> Permanent changes to the registered monitoring plan, or permanent deviation of monitoring from the applied methodologies, standardized baselines or other methodological regulatory documents <input type="checkbox"/> Changes to the project design <input type="checkbox"/> Changes specific to afforestation and reforestation project activities
<b>Version number of PDD to which this report applies</b>	8
<b>Project participants</b>	Vital Engenharia Ambiental S.A.
<b>Host Party</b>	Brazil
<b>Applied methodologies and standardized baselines</b>	ACM0001: Flaring or use of landfill gas, version 19.0
<b>Mandatory sectoral scopes</b>	Sectoral Scope: 13 - Waste handling and disposal
<b>Conditional sectoral scopes, if applicable</b>	Sectoral Scope: 1 - Energy industries (renewable - / non-renewable sources)
<b>Name and UNFCCC reference number of the DOE</b>	Name: KBS Certification Services Pvt. Ltd. UNFCCC reference number: E-0051

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

**Name, position and signature of the approver of the validation report**



Kaushal Goyal  
Managing Director  
KBS Certification Services Pvt. Ltd.

**SECTION A. Executive summary****Description of project:**

The “CTR Rosario Landfill Gas Project” was implemented with the objective to capture, flare and generate electricity with the landfill gas generated at the Central de Tratamento de Resíduos Rosario (hereinafter referred to as CTR Rosario) landfill, at Rosario Municipality (in the state of Maranhão), in order to avoid emissions of methane to the atmosphere produced by the anaerobic decomposition of the dumped waste from Rosario Municipality and to avoid emissions of CO<sub>2</sub> by the electricity supplied to the local grid.

The project consists of LFG capture and flaring, reducing uncontrolled release to atmosphere and generation of electricity from LFG. Part of the electricity will be used for self-consumption and the other part will be exported to the grid.

The flare system was commissioned on 23/07/2019 and the group generators were commissioned on 26/08/2019 (group generator 1) and 17/01/2020 (group generator 2). The group generators 1 and 2 started commercial operation on 26/08/2019 and 31/03/2020, respectively. During the period between the start of the 1st Crediting Period until open flare commissioning date, the plant has not operational, once the Project Participant could not find the sufficient commercial conditions to implement the plant.

The GHG emission reductions were calculated on the basis of the approved methodology ACM0001 – Flaring or use of landfill gas, version 19.0 of 14/06/2019 and the monitoring plan included in the revised registered Project Design Document, version 8 of 29/04/2020.

The project was validated by ICONTEC (validation report version 1.0 issued on 09/07/2012) and it was registered on 24/05/2013 under the CDM registration reference No. 8242. The post registration changes described in the PDD version 8 of 29/04/2020 was validated by Earthood Services Private Limited. (validation opinion version 1.0 of 29/04/2020).

**Validation process**

This report summarizes the findings from the validation of a PRC, performed on the basis of UNFCCC criteria for CDM, as well as criteria given by the CDM Validation and Verification Standard for project activities, CDM Project Cycle Procedure for project activities and CDM Project Standard for project activities. The Validation Opinion is not meant to provide any consultancy towards the project participants. However, stated requests for clarifications and/or corrective actions may have provided input for improvement of the monitoring.

**Conclusion**

Vital Engenharia Ambiental S.A. has commissioned KBS to perform the validation of the PRC of the project “CTR Rosario Landfill Gas Project”. In conclusion, it is KBS's opinion that the PRC meet all the relevant requirements established in the CDM Project Standard.

Hence, KBS requests that the PRC for the project activity “CTR Rosario Landfill Gas Project” in Brazil may be considered by the Board.

**SECTION B. Validation team, technical reviewer and approver****B.1. Validation team member**

No.	Role	Type of resource	Last name	First name	Affiliation (e.g. name of central or other office of DOE or outsourced entity)	Involvement in			
						Desk/document review	On-site inspection	Interviews	Validation findings
1.	Team Leader/Technical Expert (TA 13.1)	EI	Leiroz	Andrea	Central Office	✓	-	✓	✓

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

No.	Role	Type of resource	Last name	First name	Affiliation (e.g. name of central or other office of DOE or outsourced entity)
1.	Technical reviewer	IR	Kandari	Sanjay	Central Office
2.	Manager Technical & Certification	IR	Chaudhari	Tushar	Central Office
3.	Authorizer	IR	Goyal	Kaushal	Central Office

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

A desk review is undertaken, involving but not limited to,

- A review of the data and information presented to verify their completeness;
- A review of the PDD;
- A review of the monitoring plan and monitoring methodology, paying particular attention to the frequency of measurements, the quality of metering equipment including calibration requirements, and the quality assurance and quality control procedures;
- An evaluation of data management and the quality assurance and quality control system in the context of their influence on the generation and reporting of emission reductions.

The list of documents reviewed is included in the section 'Appendix 3' of this report.

**C.2. On-site inspection**

Duration of on-site inspection: DD/MM/YYYY to DD/MM/YYYY				
No.	Activity performed on-site	Site location	Date	Team member
4.				

As result of the COVID-19 pandemic, taking into account the rules of relevant national and local authorities (local to the DOE offices as well as to locality of the site visits), World Health Organization (WHO) recommendations, policies of the DOE and other relevant travel restrictions and guidance (for example, a requirement to self-isolate upon return from specific countries), a DOE may postpone site visits for onsite inspections required by the "Validation and Verification Standard for project activities" version 02.0 /10/.

If the site visits cannot be postponed, a proper justification should be provided by the DOE why the site visits cannot be postponed, including the demonstration of a significant impact of delaying the site visits on the DOE, or project participants or coordinating/ managing entity (e.g. commitment/ timeline as per the validation or verification contract, CER delivery commitment by project participants) reliance on applicable force majeure provisions in the validation or verification contracts, if needed.

For this project, PP has made commitment/timeline as per the verification contract /36/ PP is one of the winners of the Fourth Pilot Auction Facility and according to the eligibility criteria, the emission reductions must have been issued until 30/11/2021 /47/. Hence, the DOE has skipped the on-site visit /37/. However, as per the CDM EB, the DOE may use other standard auditing techniques for validation or verification as referred to in sections 9.1.3 of the VVS-PA /10/.

Validation team has used the following alternative means for its assessment and to justify that they are sufficient for the purpose of validation. Along with desk review, audit team has conducted remote audit interview as follows:

- A complete desk review of the registered PDD /6/, submitted MR (initial and final versions) /1/ /2/, as well as applicable country legal requirement and supportive evidences have been checked by the Validation Team.
- Validation team has performed a remote site inspection via videoconference (Skype) with PP in order to check implementation, project boundary, current situation, evaluation of data management, QA/QC system, monitoring and metering equipment, monitoring procedures, calibration etc. Interview questions were filled as per Verification team interview checklist and also videos were captured.
- Cross-checks between information provided by interviews, under the scope of all information and references provided in MR and supporting documents.
- Cross-checked evaluation, for information received from interviews, under the scope of all information and references provided in MR and supporting documents.

Details of interviewees, topics covered and additional information presented in the below section "C.3 – Interviews".

Validation team has also checked the site visit requirements mentioned in the VVS for PA version 02.0 /10/.

### C.3. Interviews

No.	Interviewee			Date	Subject	Team member
	Last name	First name	Affiliation			
1.	Martins	Jefferson	Director - Titara	15/04/2021	Project implementation, management, operation and monitoring.	Andrea Leiroz
2.	Ribeiro	Caio	Operational manager - Titara			
3.	Carvalho	Andrea	Environment al Analyst - Titara			
4.	Garcia	João	Unit Director – Equipment - ENC		Project monitoring.	
5.	Louzeiro	Jadson	Operator - ENC Energy		Project operation.	
6.	Frizzo	Amanda	New Projects Analyst - ENC Energy		Project implementation, management, operation and monitoring. CERs calculation and data analysis. Temporary deviation.	
7.	Veiga	Ana Paula	Consultor - BENG			
8.	Sprovieri	João	Consultor - BENG			

### C.4. Sampling approach

No sampling approach is used during verification.

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

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

**SECTION D. Validation findings****D.1. Compliance with PDD form**

<b>Means of validation</b>	N/A
<b>Findings</b>	N/A
<b>Conclusion</b>	N/A

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

<b>Means of validation</b>	<p>For the entire monitoring period from 03/03/2020 to 31/12/2020, the supervisory system was not operational due to supervisory system software errors causing the lack of registration of the main data and project participant was not able to demonstrate the monitored data.</p> <p>For the entire monitoring period mentioned above, the landfill gas suction and electricity generation systems operated normally, what can be clearly demonstrated by the exported electricity meter data, which has registered all the electricity exported to the grid. For this reason, a temporary deviation from the monitoring plan is being requested for the entire monitoring period while the plant operated normally but no data was registered by the supervisory system, and emission reductions will be claimed according to a conservative estimative based on the electricity exported using landfill gas.</p> <p>As proposed by PP, the estimative of methane volume into power plant will be based on the electricity exported to the grid instead of electricity generated by the power plant, which is greater as it includes the electricity for self-consumption by the plant equipment. The methane fed to the engines will be calculated as follows:</p> $F_{CH_4,EL} = \frac{EC_{BL} \times (Conversion\ rate\ MWh\ to\ TJ)}{(NCV_{CH_4}) \times El_{eff}}$ <p>Where:</p> <p><math>F_{CH_4,EL,y}</math> – Amount of methane in the LFG which is used for electricity generation (tCH<sub>4</sub>);</p> <p><math>EC_{BL}</math> – Net amount of electricity generated using LFG and exported to the grid during the monitoring period applying deviation (MWh);</p> <p>Conversion rate MWh to TJ – Unit conversion rate from MWh to TJ (0.0036 TJ/MWh);</p> <p><math>NCV_{CH_4}</math> – Net calorific value of methane at reference conditions (0.0504 TJ/tCH<sub>4</sub>) according to ex-ante PDD;</p> <p><math>El_{eff}</math> – Efficiency of engine, assuming a 100% plant load factor as a conservative approach (39.10%).</p> <p>Then, the emission reductions will be normally calculated according to the methodologies and tools defined in the registered PDD and the section E of the MR.</p> <p>During the remote audit, KBS verified in the deviation spreadsheet /5/ that the calculation is correctly applied and considered conservative. First of all, PP calculated the methane in the LFG for electricity generation (<math>F_{CH_4,EL,y}</math>) and methane volume in the LFG for electricity generation. After that, the baseline and project emissions were calculated.</p> <p>The net amount of electricity generated using LFG and exported to the grid during the monitoring period applying deviation was measured by electricity meters and data was verified against the electricity data reports provided by PP /54/. The value applied for the net calorific value of methane at reference conditions is as per registered PDD /6/. The value of 39.10% of efficiency of engine was used, assuming a 100% plant load factor as a conservative approach. This value of the efficiency of the engine was according to group generator data sheet (information</p>
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	<p>provided in the monthly CERs spreadsheet /4/), in order to lower the calculated methane volume in the LFG for electricity generation. Moreover, the verification team compared this value with efficiency percentages of the engine, as per its technical description. At 75% of load factor, the efficiency goes to 37.7% and at 50% load factor, the efficiency is 35.0%. Thus, it can be concluded that the applied value is conservative. Refer to the deviation spreadsheet /5/.</p> <p>KBS verified the deviation spreadsheet /5/ and confirmed that the formulae applied to estimate the amount of methane in the LFG for electricity generation, as well as to calculate the amount of methane volume in the LFG for electricity generation was assessed and is considered correct by the validation team. The parameters applied are conservative and/or taken from reliable literature and/or official source. In addition, during the remote audit, KBS confirmed that there are two LFG flow lines installed in the plant: one line to the group generators and the other line to the flare. However, it was verified that all the methane was combusted to generate electricity and no flaring is applied. In addition, KBS verified in the CERs spreadsheets that the calculation is correctly applied and considered conservative.</p> <p>KBS verified the conservativeness of the proposed measurement method comparing the net amount of electricity generated using LFG and exported to the grid measured by the electricity meter and the estimated values for the months with deviation. It is noted that the values determined applying the deviation are lower than the values estimated in the registered PDD.</p> <p>Thus, it is possible to confirm that the method proposed for the calculation of the methane volume into power plant is conservative since there is no increase of the emission reductions for the period when compared to the values estimated in the PDD.</p> <table><tr><td></td><td>Yearly average based on annual estimation of registered PDD</td><td>Monitoring period (03/03/2020 to 31/12/2020)</td></tr><tr><td>Net amount of electricity generated using LFG and exported to the grid</td><td>19,645 MWh</td><td>10,911 MWh</td></tr><tr><td>Emission reductions</td><td>86,109 tCO<sub>2</sub>e</td><td>38,665 tCO<sub>2</sub>e</td></tr></table> <p>KBS verified that PP has correctly followed the procedure described in the paragraph 231 of CDM Project Standard for Project Activities. The temporary deviation is described in the MR version 3 of 28/06/2021.</p>		Yearly average based on annual estimation of registered PDD	Monitoring period (03/03/2020 to 31/12/2020)	Net amount of electricity generated using LFG and exported to the grid	19,645 MWh	10,911 MWh	Emission reductions	86,109 tCO <sub>2</sub> e	38,665 tCO <sub>2</sub> e
	Yearly average based on annual estimation of registered PDD	Monitoring period (03/03/2020 to 31/12/2020)								
Net amount of electricity generated using LFG and exported to the grid	19,645 MWh	10,911 MWh								
Emission reductions	86,109 tCO <sub>2</sub> e	38,665 tCO <sub>2</sub> e								
Findings	CL 01 was raised and successfully closed. The findings are discussed in Appendix 04 of the validation report.									
Conclusion	The temporary deviation applied by PP are in accordance with CDM project standard for project activities, version 02.0, para 231 and Appendix para (b) /11/.									

### D.3. Corrections

<b>Means of validation</b>	N/A
<b>Findings</b>	N/A
<b>Conclusion</b>	N/A

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

<b>Means of validation</b>	N/A
<b>Findings</b>	N/A
<b>Conclusion</b>	N/A

### D.5. Inclusion of a monitoring plan

<b>Means of validation</b>	N/A
<b>Findings</b>	N/A
<b>Conclusion</b>	N/A

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

<b>Means of validation</b>	N/A
<b>Findings</b>	N/A
<b>Conclusion</b>	N/A

**D.7. Changes to the project design**

<b>Means of validation</b>	N/A
<b>Findings</b>	N/A
<b>Conclusion</b>	N/A

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

<b>Means of validation</b>	N/A
<b>Findings</b>	N/A
<b>Conclusion</b>	N/A

**SECTION E. Internal quality control**

The draft validation report prepared by team leader is reviewed by an independent technical reviewer (having competence of relevant technical area himself/herself or through an independent technical area expert) to confirm the internal procedures established by KBS are duly followed and the validation report/opinion is reached in an objective manner and complies with the applicable CDM requirements.

The independent technical reviewer may approve or reject the draft validation report. The findings may be identified even at this stage, which needs to be satisfactorily resolved, before the request for PRC is submitted to UNFCCC. The final decision is taken by the Manager Technical and Certification. The technical reviewer and Manager (Technical & Certification) can be same person.

The final decision is authorized by Managing Director, KBS once the report is approved by the Manager (Technical & Certification).

**SECTION F. Validation opinion**

KBS Certification Services Pvt. Ltd. has been contracted by Vital Engenharia Ambiental S.A. to undertake independent validation of the post registration changes of the CDM project activity "CTR Rosario Landfill Gas Project" and UNFCCC Reference Number 8242 to ensure that the post registration changes meet all relevant requirements to the UNFCCC for CDM project activities including CDM Validation and Verification Standard for project activities.

Validation methodology and process:

The validation has been performed as described in the VVS, version 02.0, and consists of the following steps:

- Review of the PDD, version 8 dated 29/04/2020;
- Desk review of the revised MR, and the relevant documents;
- Remote audit Interviews;
- Preparation of the Validation Report.

It is DOE's opinion that the post registration changes, as outlined in the monitoring report version 3 of 28/06/2021 submitted is conforming to the requirements for Post Registration Changes as stipulated in the Clean Development Mechanism Validation and Verification Standard and thus DOE is recommending the approval of the post registration changes.

## Appendix 1. Abbreviations

Abbreviations	Full texts
BE	Baseline Emissions
BM	Build Margin
CAR	Corrective Action Request
CDM	Clean Development Mechanism
CDM EB	CDM Executive Board
CER(s)	Certified Emission Reduction(s)
CH <sub>4</sub>	Methane
CL	Clarification Request
CO <sub>2</sub>	Carbon Dioxide
CO <sub>2</sub> e	Carbon Dioxide Equivalent
DNA	Designated national Authority
DOE	Designated Operational Entity
EF	Emission Factor
EPE	Energy Research Company of the Ministry of Mines and Energy - Brazil
ER	Emission Reductions
FAR	Forward Action Request
GHG(s)	Greenhouse Gas(es)
GWP	Global Warming Potential
IPCC	Intergovernmental Panel on Climate Change
LFG	Landfill Gas
MR	Monitoring Report
OM	Operating Margin
ONS	National Grid Operator (from Portuguese Operador Nacional do Sistema)
PDD	Project Design Document
PE	Project Emissions
PP	Project Participant
QA/QC	Quality Assurance/Quality Control
SEMA	Secretary of State for Environmental and Natural Resources (from Portuguese Secretaria de Estado do Meio Ambiente e Recursos Naturais)
tCO <sub>2</sub> e	Tonnes of Carbon Dioxide Equivalent
UNFCCC	United Nations Framework Convention on Climate Change
VVS	Validation and Verification Standard

## Appendix 2. Competence of team members and technical reviewers

Personnel Name:		Andrea Leiroz	
Qualified to work as:			
Team Leader	<input checked="" type="checkbox"/>	Technical Expert	<input checked="" type="checkbox"/>
Validator/Verifier	<input checked="" type="checkbox"/>	Financial Expert	<input type="checkbox"/>
Technical Reviewer	<input type="checkbox"/>	Local Expert (Brazil)	<input checked="" type="checkbox"/>
Area(s) of Technical Expertise			
Sectoral Scope	Technical Area		
Energy industries (renewable/non-renewable sources)	TA 1.1: Thermal energy generation from fossil fuels and biomass including thermal electricity from solar		
	TA 1.2: Energy generation from renewable energy sources		

Waste handling and disposal	TA 13.1. Solid waste and wastewater TA 13.2. Manure
Approved by (Manager C & T)	Sanjay Kandari
Approval date:	17/12/2018

Personnel Name:		Sanjay Kandari	
Qualified to work as:			
Team Leader	<input checked="" type="checkbox"/>	Technical Expert	<input checked="" type="checkbox"/>
Validator/Verifier	<input checked="" type="checkbox"/>	Financial Expert	<input checked="" type="checkbox"/>
Technical Reviewer	<input checked="" type="checkbox"/>	Local Expert (India)	<input checked="" type="checkbox"/>
Area(s) of Technical Expertise			
Sectoral Scope		Technical Area	
Energy Industries (renewable/non-renewable sources)	TA 1.1: Thermal energy generation from fossil fuels and biomass including thermal electricity from solar		
Energy industries (renewable/non-renewable sources)	TA 1.2: Energy generation from renewable energy sources		
Energy demand	TA 3.1. Energy Demand		
Waste Handling and Disposal	TA 13.1 Waste Handling and Disposal TA 13.2 Manure		
Approved by (Manager C & T)	Akhilesh Joshi		
Approval date:	11/12/2015		

### Appendix 3. Documents reviewed or referenced

No.	Author	Title	References to the document	Provider
/1/	Vital Engenharia Ambiental S.A.	Monitoring report.	Version 1 of 17/03/2021	Project participant
/2/	Vital Engenharia Ambiental S.A.	Final Monitoring Report	Version 3 of 28/06/2021	Project participant
/3/	Vital Engenharia Ambiental S.A.	ER calculation sheet corresponding to MR version 1.	Corresponding to MR version 1	Project participant
/4/	Vital Engenharia Ambiental S.A.	Final ER calculation sheet corresponding to Final MR.	Corresponding to MR version 3	Project participant
/5/	Vital Engenharia Ambiental S.A.	Deviation spreadsheet.	Version 1 Version 2	Project participant
/6/	Vital Engenharia Ambiental S.A.	Registered PDD.	Version 8 of 29/04/2020	UNFCCC website
/7/	ICONTEC	Validation report.	Version 1.0 of 09/07/2012	UNFCCC website
/8/	Earthhood Services Private Limited	Validation report on PRC	Version 1.0 of 29/04/2020	Project participant
/9/	KBS Certification	Verification report from 2 <sup>nd</sup> monitoring period (01/09/2019 to 02/03/2020).	Under development.	UNFCCC website
/10/	CDM Executive Board	Clean Development Mechanism Validation and Verification Standard for project activities.	Version 02.0 of 29/11/2018	UNFCCC website
/11/	CDM Executive	Clean Development Mechanism	Version 02.0 of	UNFCCC

	Board	Project Standard for project activities.	29/11/2018	website
/12/	CDM Executive Board	Clean Development Mechanism Project Cycle Procedure for project activities.	Version 02.0 of 29/11/2018	UNFCCC website
/13/	CDM Executive Board	Large-scale Consolidated Methodology ACM0001: Flaring or use of landfill gas.	Version 19.0 of 14/06/2019	UNFCCC website
/14/	CDM Executive Board	TOOL02: Methodological tool: Combined tool to identify the baseline scenario and demonstrate additionality.	Version 07.0 of 22/09/2017	UNFCCC website
/15/	CDM Executive Board	TOOL03: Methodological tool: Tool to calculate project or leakage CO <sub>2</sub> emissions from fossil fuel combustion.	Version 03.0 of 22/09/2017	UNFCCC website
/16/	CDM Executive Board	TOOL04: Methodological tool: Emissions from solid waste disposal sites.	Version 08.0 of 04/05/2017	UNFCCC website
/17/	CDM Executive Board	TOOL05: Methodological tool: Baseline, project and/or leakage emissions from electricity consumption and monitoring of electricity generation.	Version 03.0 of 22/09/2017	UNFCCC website
/18/	CDM Executive Board	TOOL06: Methodological tool: Project emissions from flaring.	Version 03.0 of 28/03/2019	UNFCCC website
/19/	CDM Executive Board	TOOL07: Methodological tool: Tool to calculate the emission factor for an electricity system.	Version 07.0 of 31/08/2018	UNFCCC website
/20/	CDM Executive Board	TOOL08: Methodological tool: Tool to determine the mass flow of a greenhouse gas in a gaseous stream.	Version 03.0 of 27/11/2015	UNFCCC website
/21/	CDM Executive Board	TOOL09: Methodological tool: Determining the baseline efficiency of thermal or electric energy generation systems.	Version 02.0 of 27/11/2015	UNFCCC website
/22/	CDM Executive Board	TOOL10: Methodological tool: Tool to determine the remaining lifetime of equipment.	Version 01 of 16/10/2009	UNFCCC website
/23/	CDM Executive Board	TOOL12: Methodological tool: Project and leakage emissions from transportation of freight.	Version 01.1.0 of 23/11/2012	UNFCCC website
/24/	CDM Executive Board	TOOL32: Methodological tool: Positive lists of technologies.	Version 02.0 of 28/11/2019	UNFCCC website
/25/	CDM Executive Board	Guideline: Application of materiality in verifications.	Version 2 of 20/02/2015	UNFCCC website
/26/	CDM Executive Board	Standard for application of the global warming potentials to clean development mechanism project activities and programmes of activities for the second commitment period of the Kyoto protocol.	Version 01.0, EB69, annex 3	UNFCCC website
/27/	Intergovernmental Panel on Climate Change (IPCC)	Fourth Assessment Report: Climate Change 2007. Available at: <a href="https://www.ipcc.ch/site/assets/uploads/2018/02/ar4-wg1-chapter2-1.pdf">https://www.ipcc.ch/site/assets/uploads/2018/02/ar4-wg1-chapter2-1.pdf</a> .	Assessed on 17/12/2020	Web link
/28/	Interministerial Commission in Global Climate Change (DNA of Brazil)	Carbon Emission Factor for the National Grid. Available at: <a href="https://www.mctic.gov.br/mctic/opencms/ciencia/SEPED/clima/textogeral/missao_despacho.html">https://www.mctic.gov.br/mctic/opencms/ciencia/SEPED/clima/textogeral/missao_despacho.html</a> .	Assessed on 14/04/2021	Web link
/29/	Energy Research	National Energy Balance 2020	05/2020	Project

	Company of the Ministry of Mines and Energy - Brazil (EPE)	(database of 2019). Available at: <a href="https://www.epe.gov.br/sites-pt/publicacoes-dados-abertos/publicacoes/PublicacoesArquivos/publicacao-479/topico-521/Relatório%20S%C3%ADntese%20BEN%202020-ab%202019_Final.pdf">https://www.epe.gov.br/sites-pt/publicacoes-dados-abertos/publicacoes/PublicacoesArquivos/publicacao-479/topico-521/Relatório%20S%C3%ADntese%20BEN%202020-ab%202019_Final.pdf</a> .		participant
/30/	Landis Gyr	Electricity meter calibration certificate. • Serial number 3304-0070821-1; Serial number 3306-000226-1.	14/06/2018 19/07/2019	Project participant
/31/	Endress Hauser	• Data sheet of flow meter model Prosonic Flow 200: Endress-Hauser_Proline_Prosonic_Flow_200_9B2B_EN.pdf.	-	Project participant
/32/	Endress Hauser	Manufacture's specifications for temperature meter: TR10 TI00256TEN_0219.pdf.	-	Project participant
/33/	MRU	Manufacture's specifications: • Manual of gas analyser SWG 100BIO-Ex: EN_BROCHURE_SWG100bioW x.pdf.	-	Project participant
/34/	Landis Gyr	• Technical description of electricity meter: LandisGyr_E750(1).pdf.	-	Project participant
/35/	Equatorial Energia	Electricity invoices.	03/2020 – 12/2020	Project participant
/36/	KBS Certification Services Pvt.	Verification contract between KBS Certification Services Pvt. and Vital Engenharia Ambiental S.A..	10/03/2021	KBS Certification Services Pvt.
/37/	CDM Executive Board	CDM Executive Board agrees to relax mandatory site visits by DOEs for a period of three months (23 March to 23 June 2020) because of COVID-19. The Executive Board of the Clean Development Mechanism (CDM) agreed on 23 June 2020 to, on an exceptional basis, considering the COVID-19 pandemic, to extend the period in which CDM Designated Operational Entities (DOEs) may apply alternative measures of validation/verification to mandatory on-site inspections until 31 December 2020. The Executive Board of the Clean Development Mechanism (CDM), as its 108 <sup>th</sup> meeting, agreed to further extend the period in which DOEs may apply alternative measures of validation/verification to mandatory on-site inspections until 30 June 2021.	23/03/2020 23/06/2020 14/12/2020	Publicly available
/38/	Secretary of State for Environmental and Natural Resources (SEMA)	Environmental licenses: No. 1015106/2020 valid until 06/04/2022.	10/02/2020	Project participant

/39/	CTR Rosario	Log diaries with information about incidents that occurred during the monitoring period.	03/2020 – 12/2020	Project participant
/40/	Endress Hauser	Manufacture's specifications of the pressure meter: CEREBAR_PMC11-PMC21-PMP21-Datasheet.pdf.	-	Project participant
/41/	Titara Central de Gerenciamento Ambiental	Declaration provided by PP regarding to the management of SWDS.	14/04/2021	Project participant
/42/	Secretary of State for Environmental and Natural Resources (SEMA)	Environmental license for the energy plant No. 1139110/2019 valid until 08/11/2023.	08/11/2019	Project participant
/43/	GE Jenbacher	Commissioning date of the group generators. Group generator 1 – serial number #1362594; Group generator 1 – serial number #1362606.	26/08/2019 17/01/2020	
/44/	ENC Energy	Commissioning report of the flare.	23/07/2019	Project participant
/45/	Equatorial Energia	Commercial operation: electricity invoices. Group generator 1 – serial number #1362594; Group generator 1 – serial number #1362606.	Issued date of the invoice. 28/08/2019 31/03/2019	Project participant
/46/	ONS	Grid Procedures: Module 12. Procedure for energy meter class: Sub-module 12.2 v2019.08. Available at: <a href="http://www.ons.org.br/%2FProcedimentosDeRede%2FM%C3%B3dulo%2012%2FSubm%C3%B3dulo%2012.2%2FSubm%C3%B3dulo%2012.2%202019.08.pdf">http://www.ons.org.br/%2FProcedimentosDeRede%2FM%C3%B3dulo%2012%2FSubm%C3%B3dulo%2012.2%2FSubm%C3%B3dulo%2012.2%202019.08.pdf</a> . Procedure for calibration: Sub-module 12.3 v2016.12. Available at: <a href="http://www.ons.org.br/%2FProcedimentosDeRede%2FM%C3%B3dulo%2012%2FSubm%C3%B3dulo%2012.3%2FSubm%C3%B3dulo%2012.3%202016.12.pdf">http://www.ons.org.br/%2FProcedimentosDeRede%2FM%C3%B3dulo%2012%2FSubm%C3%B3dulo%2012.3%2FSubm%C3%B3dulo%2012.3%202016.12.pdf</a> .	04/09/2019       16/12/2016	Publicly available
/47/	World Bank Group	Fourth Pilot Auction Facility: Vital Engenharia Ambiental S.A. is one of the winners and the maturity date is 30/11/2021. <a href="https://www.pilotauctionfacility.org/content/results">https://www.pilotauctionfacility.org/content/results</a> . <a href="https://www.pilotauctionfacility.org/content/fourth-auction-eligibility-criteria">https://www.pilotauctionfacility.org/content/fourth-auction-eligibility-criteria</a> .	03/03/2020	Publicly available
/48/	Endress Hauser	Flow meter calibration certificate. • Serial number N4120602000 (flare); Serial number N4066002000 (GGs).	24/04/2018 12/04/2018	Project participant
/49/	MRU	Gas analyser # 080902 calibration certificate No. 3-WAGNER3/CHK/028846.	23/05/2018	Project participant
/50/	Endress Hauser	Pressure meter # N405A80116A calibration certificate	26/04/2018	Project participant
/51/	Endress Hauser	Manufacture's specifications for calibration:	07/06/2021	Project participant

		Flow meter, temperature meter and pressure meter: 2 years (declaration from manufacturer - Frequencia Endress Hauser.pdf).		
/52/	MRU	Manufacture's specifications for calibration: Gas analyser: 1 year (declaration from manufacturer - Frequencia MRU.pdf).	07/06/2021	Project participant
/53/	Endress Hauser	Temperature meter # R1043823180 calibration certificate.	22/01/2020	Project participant
/54/	Vital Engenharia Ambiental S.A.	Data of net electricity generated by the project activity downloaded from the electricity meters.	03/03/2020 – 31/12/2020	Project participant

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

**Table 1. CLs from this validation**

No CL raised from this verification.

<b>CL ID</b>	01	<b>Section no.</b>	D.2	<b>Date:</b> 22/04/2021
<b>Description of CL</b>				
Section B.2.1 of MR - PP is requested to clarify the period where the deviation is applied.				
<b>Project participant response</b>				<b>Date:</b> 14/05/2021
Deviation period have been correctly stated in B.2.1.				
<b>Documentation provided by project participant</b>				
Revised MR/ER spreadsheet				
<b>DOE assessment</b>				<b>Date:</b> 14/05/2021
The MR was revised and it clearly described that the deviation is applied for the entire monitoring period. This CL is closed.				

**Table 2. CARs from this validation**

<b>CAR ID</b>	01	<b>Section no.</b>		<b>Date:</b> DD/MM/YYYY
<b>Description of CAR</b>				
<b>Project participant response</b>				<b>Date:</b> DD/MM/YYYY
<b>Documentation provided by project participant</b>				
<b>DOE assessment</b>				<b>Date:</b> DD/MM/YYYY

**Table 3. FARs from this validation**

No FAR raised from this verification.

<b>FAR ID</b>	xx	<b>Section no.</b>		<b>Date:</b> DD/MM/YYYY
<b>Description of FAR</b>				
<b>Project participant response</b>				<b>Date:</b> DD/MM/YYYY
<b>Documentation provided by project participant</b>				

DOE assessment	Date: DD/MM/YYYY

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**Document information**

<i>Version</i>	<i>Date</i>	<i>Description</i>
03.0	31 May 2019	Revision to: <ul style="list-style-type: none"><li>• Ensure consistency with version 02.0 of the “CDM validation and verification standard for project activities” (CDM-EB93-A05-STAN);</li><li>• Make editorial improvements.</li></ul>
02.0	31 October 2017	Revision to align with the requirements in the “CDM validation and verification standard for project activities” (version 01.0).
01.0	23 March 2015	Initial publication.
Decision Class: Regulatory Document Type: Form Business Function: Registration Keywords: post-registration change, project activities, validation report		