
 Validation report form for post-registration changes for CDM project activities (Version 03.0)	
Complete this form in accordance with the instructions attached at the end of this form.	
BASIC INFORMATION	
Title and UNFCCC reference number of the project activity	CTR Candeias Landfill Gas Project reference number 3958
Process track	<input checked="" type="checkbox"/> Prior approval <input type="checkbox"/> Issuance <input type="checkbox"/> Renewal of crediting period
Version number of the validation report	1.0Aa
Completion date of the validation report	18/12/2020
Type(s) of PRCs	<input type="checkbox"/> Temporary deviations from the registered monitoring plan, applied methodologies, standardized baselines or other methodological regulatory documents ¹ <input checked="" 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 checked="" type="checkbox"/> Changes to the project design <input type="checkbox"/> Changes specific to afforestation and reforestation project activities
Version number of PDD to which this report applies	23
Project participants	Brazil: Haztec Tecnologia e Planejamento Ambiental S.A.;
Host Party	Brazil
Applied methodologies and standardized baselines	ACM0001 "Flaring or use of landfill gas" version 19 of 14/06/2019
Mandatory sectoral scopes	13 - Waste handling and disposal
Conditional sectoral scopes, if applicable	1 - Energy industries (renewable - / non-renewable sources)
Name and UNFCCC reference number of the DOE	RINA Services S.p.A. (RINA), UNFCCC reference number of the DOE E-0037
Name, position and signature of the approver of the validation report	Laura Severino (Authorized officer signing for the DOE) Head of Certification Innovation & Sustainability Unit 

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).

SECTION A. Executive summary

>> Purpose and general description

The objective of the CTR Candeias Landfill Gas Project is to capture and burn the landfill gas (LFG) generated by the decay of organic waste from the CTR Candeias Sanitary landfill located in the municipality of Jaboatão dos Guararapes, in the Recife Metropolitan Area. The project also intends to generate electricity from the combustion of LFG and sale it to the national electricity grid and thus reduce CO₂ emissions by displacing electricity generated from fossil fuels.

The project activity was validated by ERM Certification and Verification Services (validation report dated 30/08/2011) and it was registered on 29/09/2011 under the CDM registration reference N° 3958.

In the beginning, PP submitted the post-registration change combined with the request for renewal of crediting period. However, the project received an incomplete requesting PP to not include this PRC in the request for renewal of crediting period. The crediting period was renewed on 03/07/2020. Thus, a validation opinion on the changes to the project design presented in the revised PDD version 23 of 16/12/2020 is submitted.

Validation process

Validation was conducted using RINA procedures in line with the requirements specified in the CDM M&P, the latest version of the CDM Validation and Verification Standard, and relevant decisions of the COP/MOP and the CDM EB and applying standard auditing techniques.

The verification consisted of the following three phases:

- Desk review;
 - On-site assessment:
 - The resolution of outstanding issues and the issuance of the final validation report
- Validation 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

It is RINA's opinion, the changes, as outlined in the revised PDD version 23 of 16/12/2020, from the project activity as described in the registered PDD ensure that the level of accuracy and completeness in the monitoring and verification process is not reduced as a result of the revision; the revisions are in accordance with the applied monitoring methodology and the changes to the project activity comply with the requirements established in the CDM Project Standard.

Hence RINA requests that the validation opinion on changes from the project activity as described in the revised PDD for the project activity "CTR Candeias Landfill Gas Project" in Brazil may be considered by the Board

The following points were raised in the Clarification Request received on 07/12/2020. The responses are provided below. The PDD (version 23 of 16/12/2020) and the validation opinion were updated accordingly.

The DOE is requested to address the information related to the validation of additionality as below:

- a) The DOE is requested to submit the revised additionality calculation spreadsheets including the revised financial analysis spreadsheets and updated cash flow as referred in the VR reference number 33 and the revised common practice analysis as referred in the VR reference number 46;
- b) The validation report does not include information how DOE crosschecked the each changed parameter against third-party or publicly available source in accordance with the VVS-PA paragraph 99(b) to be read in conjunction with paragraph 303;
- c) The revised PDD (v22) page 6 states 20 number of group generators with installed capacity 28.52 MW in 2023, whereas the page 19 states 9 units x 1.426 MW with total 28.520 MW.

RINA response:

- a) The documents requested were included in the submission package sent to UNFCCC secretariat.

- b) Additionality changed parameters have been crosschecked as below:

- O&M LFG system costs: presented in spreadsheet "O&M LFG Costs Rev1.xlsx", line 16. The value 0.03 BRL/m³ of LFG used in the project activity was crosschecked against O&M LFG costs from the registered CDM Project: 5947 CTL Landfill Gas Project (<https://cdm.unfccc.int/PRCContainer/DB/prcp656332989/view>) which presented a similar value of 0.04 BRL/m³ of LFG.

- Energy price: presented in sheet "Electricity price", in spreadsheet "Candeias - Updated Cash Flow 2020 08 03 FES.xls".
The value of 170.00 BRL/MWh used in the project activity was crosschecked against all energy auctions held by the Brazilian government between 2020 and 2019.

Electricity Price	Held on	Source: Electricity Trading Chamber – CCEE https://www.ccee.org.br/
142.00 BRL/MWh	04/12/2020	https://www.ccee.org.br/portal/faces/oquefazemos_me_nu_lateral/leiloes?_adf.ctrl-state=iltz9wnwa_79&_afLoop=18277324846021
171.52 BRL/MWh	09/12/2019	
158.37 BRL/MWh	09/12/2019	
176.09 BRL/MWh	18/10/2019	
151.15 BRL/MWh	28/06/2019	

Thus, the value used in the project activity is conservative and close to the auction results.

- Investment on Electricity generation plant: presented in spreadsheet "2020 12 14 - Capex Electricity plant.xlsx".
The value of 433,451.12 EUR/MW installed used in the project activity was cross checked against Electricity generation plant CapEx from the registered CDM Project 3464 : Exploitation of the biogas from Controlled Landfill in Solid Waste Management Central – CTRIS / BR.040 (<https://cdm.unfccc.int/Projects/DB/SGS-UKL1267696608.78/view>) which in its financial analysis spreadsheet "Appendix 4 - Ref. 18b - Financial Analysis Spreadsheet (version 3).xls", sheet "Input", cell P17, defined a CapEx in electricity generation of 530,817.78 EUR/MW installed.
Thus, the value used in the project activity is conservative and close to the cross reference presented.
- O&M electricity costs: presented in spreadsheet "2020 12 17 - O&M Electricity Cost.xlsx".
The value of 101.40 BRL/MWh used in the project activity was cross checked against O&M electricity costs from Article: "Analysis of the theoretical potential of biogas energy generation in the Varginha/MG sanitary landfill" (ISSN: 2237 9290) from Natural Resources Journal which presents in page 8 for O&M electricity costs, the value of 114.75 BRL/MWh.
Thus, the value used in the project activity is conservative and close to the cross reference presented.
- Extraordinary maintenance cost for gas engines: Overhaul LFG Engine presented in spreadsheet "2020 12 17 - Overhaul LFG Engine.xlsx".
The used values in the project activity were:
 - 29.7% of ratio of Overhaul/New Group generator;
 - 60,000 hours/overhaul.

The values were cross checked against Overhaul LFG Engine from the registered CDM Project 8751: Proactiva CGA Iperó Landfill Gas to Energy Project which in its financial analysis spreadsheet "Ipero_model_v4.1_11dec2012.xls", Sheet "Parameters", cell B76, B77 and B82 present LFG Engine cost, Overhaul LFG Engine and Hours/overhaul, respectively.
The used values in the CDM Project 8751 were:

 - 33.3% of ratio of Overhaul/New Group generator;
 - 60,000 hours/overhaul.

Thus, the value used in the project activity is conservative and close to the cross reference presented.

c) The information has been corrected in Section B.5., Sub-step3b, of the revised PDD, stating: "2023-2030: 20 units X 1.426 MW, total 28.520 MW".

SECTION B. Validation team, technical reviewer and approver

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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	Interview(s)	Validation findings
1.	Team Leader/ validator Technical Expert	IR	Carvalho	Thaís	RINA Brazil	x	x	x	x
2.	financial expert (PRC)	EI	Rocha	Mayra	RINA Brazil				x
3.	Team Leader/ validator Technical Expert (from 01/03/2020 onwards)	EI	Leiroz	Andrea	RINA Brazil	x			x

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	Principe Branco Saettoni	Geisa	RINA Brazil
2.	Approver	IR	Severino	Laura	RINA HQ

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

>> The revised PDD, version 23 of 16/12/2020 /02/, in particular the applicability of the methodology, the baseline determination, the emission reduction calculations provided in the form of a spreadsheet "PRC - Candeias 2nd CP CER Spreadsheet v9 2020 08 03 JAS" version 9 of 03/08/2020 /10/, and supporting documents listed below are used for validation assessment.

The Appendix 3 lists the documentation that was reviewed during the validation.

C.2. On-site inspection

Duration of on-site inspection: 30/08/2018				
No.	Activity performed on-site	Site location	Date	Team member
1.	<ul style="list-style-type: none"> - Implementation and operation of the proposed project activity; - interviewed key personnel of the plant to confirm the operational and data collection procedures; QA QC procedures - Ex-ante parameters, baseline, project and leakage emissions calculation. - Monitoring Plan 	CTR Candeias landfill	30/08/2018	Thais Carvalho
2.	<ul style="list-style-type: none"> - RINA assessed the Project activity design and implementation (changes). - Assessment of choice and applicability of the baseline methodology, project boundary and emissions sources included in the project boundary. - Additionality. (parameters modified) 	CTR Candeias landfill	30/08/2018	Thais Carvalho

In the beginning, PP submitted the post-registration change combined with the request for renewal of crediting period. Thus, the on-site visit was done with the renewal of the crediting period of the project activity. However, the project received an incomplete requesting PP to not include this PRC in the request for renewal of crediting period. The crediting period was renewed on 03/07/2020. Thus, a validation opinion on the changes to the project design presented in the revised PDD version 23 of 16/12/2020 is submitted. No new on-site inspection was done for this project.

C.3. Interviews

No.	Interviewee			Date	Subject	Team member
	Last name	First name	Affiliation			
1.	Sprovieri	João	BENG	30/08/2018	Consultant: PDD CERs calculation Methodology applicability Monitoring, QA/QC procedures	Thaís Carvalho
2.	Santos	Camila	Ecopesa Ambiental/ Haztec	30/08/2018	Engineer auxiliary: project and landfill data, operation	Thaís Carvalho
3.	Zorzi	Fábio	Ecopesa Ambiental/ Haztec	30/08/2018	manager: project and landfill data, operation, project chances	Thaís Carvalho
4.	Feitosa	Vitor	Ecopesa Ambiental/ Haztec	30/08/2018	Waste weight	Thaís Carvalho
5.	Nogueira	Rafaela	ASJA	30/08/2018	Environmental analyst: equipment's installed, equipments operation, maintenance, monitoring, QA/QC procedures	Thaís Carvalho
6.	Santos	Carlos	ASJA	30/08/2018	Project manager: equipment's installed, equipments operation, maintenance, monitoring, QA/QC procedures	Thaís Carvalho

C.4. Sampling approach

>>N/A

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	-	-	-
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)	-	-	-
Total	-	-	-

SECTION D. Validation findings

D.1. Compliance with PDD form

Means of validation	PDD applies the applicable CDM- PDD-FORM: Project design document form version 11.0 /07/. RINA confirms that the information transferred to the later valid version of the PDD form is materially the same as that in the registered PDD /01/.
Findings	N/A
Conclusion	Validation team confirms that final PDD is completed using the valid version of the applicable ACM0001 version 19 /06/.

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

Means of validation	N/A
Findings	N/A
Conclusion	N/A

D.3. Corrections

Means of validation	The corrections in the project activity are related to the following: <ul style="list-style-type: none"> • Typo mistake correction in the first and last days of the crediting period. The PDD dated 03/04/2020 /01/ submitted for the renewal of the crediting period mentioned the first and the last days of the crediting period as 29/10/2018 and 28/10/2025, respectively. However, the correct dates are 29/09/2018 and 28/09/2025. RINA verified that the dates were correctly updated in tables presented in sections B.6.3., B.6.4 and also in table presented for the parameters "$EC_{PJ1,y} = EG_{EC1,y}$" and "$EC_{PJ2,y} = EG_{EC2,y}$" in section B.7.1 of the PDD. The mistake was made during the renewal of the crediting period process and should be amended in order to be in line with 2nd crediting period dates presented in the project activity on UNFCCC's website.
Findings	N/A
Conclusion	RINA verified the correction presented in the revised PDD is in accordance with project information in the UNFCCC web site.

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

Means of validation	N/A
Findings	N/A
Conclusion	N/A

D.5. Inclusion of a monitoring plan

Means of validation	N/A
Findings	N/A
Conclusion	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

Means of validation	N/A
Findings	N/A
Conclusion	N/A

D.7. Changes to the project design

Means of validation	<p>The changes in the project activity are related to the following:</p> <ul style="list-style-type: none"> • The installed capacity and number of generators and consequently the total installed capacity of the power plant; • LFG collection efficiency; • Plant load factor; • Cash flow considering the amendments of key parameters. <p>The PDD dated 03/04/2020 /01/ submitted for the renewal of the crediting period specifies a total installed capacity of 4.245 MW (3 generators of 1.415 MW each one), however the actual total installed capacity of the project activity is 28.52 MW comprising 20 generators of 1.426 MW each one as confirmed in the contract/agreement between ASJA and Ecopesa /42/.</p> <p>PP clarified that the investments into the electricity generators were not under the PP's control, since the entity responsible for exploration, electricity generation and commercialization is the consortium agreement between ASJA and Ecopesa /42/ which is not a Project Participant in " CTR Candeias Landfill Gas Project ", which ASJA is a leading consortium party and one of the biggest world player in landfill electricity generation sector. For the project estimative energy, was provided by the electricity plant owner /38/. The Load Factor reference 95% was calculated based on data provided by the project owner, where: Load Factor (%) = Electricity generated in the plant (MWh) / Installed capacity (MW) / 8760, in accordance with Project Standard, paragraph 73 modality: (a) The appropriate values, or the values calculated based on the methods, specified in the applied methodologies, the applied standardized baselines and the other applied methodological regulatory documents. Also, there is a change to project design regarding LFG collection efficiency amended from 40 % to 85% in accordance with <i>USEPA 1996 Handbook EPA-LFG.pdf - Box 3.6 page 3-15/24/</i>. PP clarified in appendix 7 of the revised PDD that the investments into the collection system were not under the PP's control /42/ .</p> <p>The change in the total installed capacity represents an increase of 671.85% regarding the installed capacity stated in the registered PDD /01/. The change in the installed capacity result in a increase in estimated annual electricity generation from 28,798 MWh to 237,343 MWh as well as a consequential increase in the estimated baseline emission associated with electricity generation from 32,003 tCO₂ (registered PDD) to 209,125 tCO₂ (revised PDD).</p> <p>Furthermore, the increase in the LFG collection efficiency results in an increase in the baseline emissions of methane from the SWDS from 1,490,885 tCO₂ (registered PDD) to 3,168,131 tCO₂ (revised PDD).</p> <p>As a consequence, the estimated emission reductions increase of 16,3% from 1,522,882 tCO₂ (registered PDD) to 3,377,256 tCO₂ (revised PDD).</p> <p>These changes have been included in the revised PDD and in the revised emission reduction calculation spreadsheet provided by project participant and assessed as acceptable by RINA.</p> <p>The applied consolidated methodology was ACM0001 "Flaring or use of landfill gas" – /09/ (version version 19 of 14/06/2019). The changes in the project activity described above have no impact on the applicability and application of applied methodology. Sections B.1, B.2 and B.3 that refers to applicability and project boundary were not updated in the revised PDD. Section B.4 regarding baseline scenario was not impacted by the changes in the design.</p> <p>Regarding additionality (section B.5), the project additionality was originally demonstrated by applying an investment analysis following the tool "Combined tool to identify the baseline scenario and demonstrate additionality". Due to the the changes described above, the additionality of the project activity was reassessed.</p> <p>Investment analysis</p> <p>A Project IRR benchmark analysis was undertaken by comparing the project IRR with the more conservative opportunity cost in the Brazilian economy – SELIC Basic</p>
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Interest Rate set by the Banco Central do Brasil (Central Bank of Brazil) validated by the time of validation as 10.25% /01/.

In the registered PDD, the Internal Rate of Return (IRR) of 5.20% was compared to the benchmark at that time was 10.25%. Therefore, it was demonstrated that the project implementation was not economic or financially attractive when analysing the alternative scenario.

The following changes from the registered PDD were considered for the PRC financial analysis: Permanent Changes in the cashflow /33/ considering amendments of key parameters:

- Change to the project design regarding to electricity generation plant installed capacity increase, change in the installed capacity of the power plant from 4.245 MW in 2012 to 8.490 MW in 2017, in the registered PDD to 28.520 MW in the revised PDD. The electricity generation was amended for the period 2012 to 2018 equal to 0 MWh/year, for 2019 it will be 118,672 MWh/year; for 2020 it will be 142,406 MWh/year; for 2021 it will be 189,875 MWh/year; for 2022 it will be 213,609 MWh/year and from 2023 to 2030 will be 237,343 MWh/year and it was verified by the evidence provided by the electricity plant owner /38/.
- Energy price was amended from 148.39 R\$/MWh to 170.00 R\$/MWh according to the evidence verified by RINA: 199.18 - PV - Haztec Tecnologia e Planejamento Ambiental.pdf /39/. The value applied was cross checked against all energy auctions held by the Brazilian government between 2020 and 2019 /52/. RINA was able to confirm that the value applied is conservative.
- Exchange rate used for the investment analysis: from 1.80 R\$/US\$ and 2.2 R\$/Euro to 3.97 BRL/EUR; verified in the evidence "BCB Conversao EUR BRL 26 02 2018.pdf" /40/
- O&M electricity costs were amended based on O&M - HAZTEC - O&M power costs (O&M fixed price and O&M variable price values against the e-mail received from a third party company) /56/ verified by RINA as:

R\$/year	Year
0	2012-2018
12,167,172	2019
15,194,934	2020
21,062,405	2021
24,718,696	2022
28,661,402	2023
29,951,165	2024
31,298,968	2025
32,707,421	2026
34,179,255	2027
35,717,322	2028
37,324,601	2029
39,004,208	2030

RINA has cross checked the value of 101.40 BRL/MWh used in the project activity /10/ /58/ against O&M electricity costs from Article: "Analysis of the theoretical potential of biogas energy generation in the Varginha/MG sanitary landfill" (ISSN: 2237 9290) from Natural Resources Journal /59/ which presents in page 8 for O&M electricity costs, the value of 114.75 BRL/MWh.

Thus, RINA confirmed that the value used in the project activity is conservative and close to the cross reference presented.

- Extraordinary maintenance cost for gas engines: from 1,785,097 R\$/year(2019) to 0 R\$/year(2019) and 9,832,771 R\$/year(2026), 2,055,049 R\$/year(2027), 4,110,098 R\$/year(2028), 2,055,049 R\$/year(2029), 2,055,049 R\$/year(2030) based on O&M – HAZTEC – O&M power costs /57/ verified by RINA. As per e-mail received from GE Energy Jenbacher /57/, RINA was able to confirm the overhaul price per engine used in the investment alanylis. The values were cross checked against Overhaul LFG Engine from the registered CDM Project 8751: Proactiva CGA Iperó Landfill Gas to Energy Project which in its financial analysis spreadsheet "Ipero_model_v4.1_11dec2012.xls", Sheet "Parameters ", cell B76, B77 and B82 present LFG Engine cost, Overhaul LFG Engine and Hours/overhall, respectively /60/. Thus, RINA confirmed that the value used in the project activity is conservative and close to the cross reference presented.
- O&M LFG system costs: sum from 2010 to 2030 of R\$ 11,613,098 to sum from 2010 to 2030 to R\$ 74,452,575 based on O&M – HAZTEC – O&M power costs /38/ verified by RINA. [The value 0.03 BRL/m³ of LFG used in the project activity was crosschecked against O&M LFG costs from the registered CDM Project: 5947 "CTL Landfill Gas Project" which presented a similar value of 0.04 BRL/m³ of LFG in its financial analysis spreadsheet "CTL Cash Flow PRC v9 2019 10 02 – Updated All FES.xlsx" /53/.](#)
- Investment on Electricity generation plant: from R\$ 14,299,218 (2011) and R\$ 17,819,427 (2016) to R\$ 25,879,796 (2019), R\$ 4,869,867 (2020), R\$ 9,739,733 (2021), R\$ 4,869,867 (2022) and R\$ 4,869,867 (2023) based on GE ENERGY JENBACHER – HAZTEC – Proposta Comercial.pdf /47/. RINA has cross checked the [value of 433,451.12 EUR/MW installed presented in the spreadsheet "2020 12 14 – Capex Electricity plant" /54/](#) against the electricity generation plant CapEx from the registered CDM Project 3464: Exploitation of the biogas from Controlled Landfill in Solid Waste Management Central – CTRS / BR.040 /55/, which in its financial analysis spreadsheet "Appendix 4 – Ref. 18b – Financial Analysis Spreadsheet (version 3).xls.", sheet "Input", cell P17, defined a CapEx in electricity generation of 530,817.78 EUR/MW

installed. RINA considered the value used in the project activity conservative and close to the cross reference presented.

According to paragraph 243 of the CDM Project Standard of the Project Activity (v.2), if changes affect additionality of the project activity, the demonstration of the impacts of the changes on the additionality shall be based on all original input data:

“(a) If investment analysis was used, the project participants shall only modify the key parameters in the original spreadsheet calculations affected by the proposed or actual changes to the project activity”

The project participants revised the project cash flow in order to demonstrate that the project is still additional following paragraph 243 of the standard above.

Therefore, this change resulted in an increase in project investment and operational costs. Therefore, this change negatively impact the project attractiveness.

Revisions mentioned above resulted in **1.42%** project IRR, which is below the benchmark 10.25%, demonstrating that the project continues to be unattractive to investor.

Sensitivity analysis

The sensitivity analysis was performed varying the electricity tariff (revenues), the capital expenses (CapEx) and operational and maintenance costs (O&M) for the alternative scenarios 1 and 4. All parameters ranging from -10% to +10%, as presented below:

Item	Variation	IRR - scenario 1	IRR - scenario 4
	%	(%)	(%)
CapEx	-10%	2.74%	10.25%
	10%	0.19%	10.25%
Revenues	-10%	-12.53%	10.25%
	10%	7.99%	10.25%
O&M	-10%	7.26%	10.25%
	10%	-9.19%	10.25%
Base Case	0.0%	1.42%	10.25%

As presented above, the project IRRs in scenario 1 are always less than benchmark (10.25%) in all sensitivity analyses.

Based on the 2nd investment decision:

Breakeven point

Project proponents varied the three identified parameters (CapEx, Revenues and O&M) until each of them reached the benchmark (i.e. IRR = benchmark) to ensure the additionality of this project activity. The results are presented below for alternative scenario 1:

Parameter	Breakeven point
	Alternative Scenario 1
Capex variation until reach the benchmark (%)	-53.20%
Revenue until the benchmark (%)	14.74%
O&M variation until the benchmark (%)	-16.91%

Capital Expenditures (CapEx) – To reach the benchmark, CAPEX should be reduced in the **scenario alternative 1** in 53.20%. This result is not possible. Consequently, this scenario is unrealistic.

Revenues – Revenues should be increased in the **scenario alternative 1** in 14.74%. This scenario is extremely unlikely to happen in the future based on the average electricity auction price results was 140.29 BRL/MWh verified in the historical auction data from Brazilian Electricity Regulatory Agency (ANEEL) for new energy generation projects in Brazil from 2005 to 2016 /48/ which is lower than 170 BRL/MWh of the electricity price of the project activity. Therefore, this scenario is unrealistic.

O&M – Also, to reach the benchmark, the O&M should be reduced in the scenario alternative 1 in 16.91%. RINA considers such a decrease unlikely to happen given that these costs are likely to increase in line with inflation. RINA has verified the rate of inflation in Brazil (4.5% according to official data from the Central Bank /49/) to confirm that it is unlikely that annual running costs will decrease to the extent where the IRR reaches the benchmark.

Outcome of Step 3

The alternative scenarios of the project activity is presented below according to the best IRR (financial indicator), taking into account the results of the sensitivity analyses.

Alternatives	Results
Scenario 4	Best scenario
Scenario 1	Worst scenario

Based on the sensitivity analysis the most financially attractive alternative is scenario 4.

Therefore, it seems reasonable to conclude that the alternative scenario 1 is unlikely to be the most financially attractive scenario.

Common practice analysis

RINA verified that the common practice analysis was updated, considering the new installed capacity of the power plant (28.52 MW). The result demonstrate, that the project activity is still not a common practice in Brazil /46/

Sections B.6.1 and B.6.3 that refers to explanation of methodological choices and ex-ante calculation of emission reductions were correctly updated in the revised PDD.

Emission reductions are directly monitored and calculated *ex-post*, using the approach indicated in the methodology ACM0001 “Flaring or use of landfill gas” version 19 of 14/06/2019.

- All assumptions and data used by the project participants are listed in the PDD and/or supporting documents, including their references and sources;
- All documentation used by the project participants as the basis for assumptions and source of data is correctly quoted and interpreted in the PDD;
- All values used in the PDD are considered reasonable in the context of the proposed CDM project activity;
- The baseline methodology has been applied correctly to calculate project emissions, baseline emissions, leakage and emission reductions;

All estimates of the baseline, project and leakage emissions can be replicated using the data and parameter values provided in the PDD.

Findings	N/A
Conclusion	RINA checked and verified complementary data and related information used to assess and explain the change made in the project activity and the impact of such

	<p>change in the project's implementation, emission reductions, additionality and applicability and application of baseline methodology.</p> <p>The revised PDD and the calculations provided in the revised spreadsheet clearly and transparently identify the change from the project activity as described in the registered project design document. The change made in the revised PDD is related to the actual installed capacity of the power plant, plant load factor and LFG collection efficiency.</p> <p>The justification and assumptions made in the calculations considering the actual values are considered reasonable and acceptable.</p> <p>The changes in the project activity do not affect negatively the project activity operation however it affects the amount of emission reductions expected by the project activity. The changes do neither impact adversely the additionality of the project nor the applicability/application of ACM0001 "Flaring or use of landfill gas" (version 19 of 14/06/2019).</p> <p>Hence, it is RINA's opinion that the changes do <u>not</u> raise any concerns with regard to i) additionality, ii) the scale of the CDM project activity and/or iii) the applicability and application of baseline methodology.</p>
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D.8. Changes specific to afforestation and reforestation project activities

Means of validation	N/A
Findings	N/A
Conclusion	N/A

SECTION E. Internal quality control

>> The draft final validation opinion before being submitted to the client were subjected to an independent internal technical review to confirm that all validation activities had been completed according to the pertinent RINA instructions.

The technical review was performed by a technical reviewer(s) qualified in accordance with RINA's qualification scheme for CDM validation and verification

SECTION F. Validation opinion

>> RINA Services Spa (RINA) has performed a validation of post registration changes for the project activity "CTR Candeias Landfill Gas Project" in Brazil, CDM Registration Reference N° 3958. The validation has s based on the information made available to us.

RINA has performed this validation on the basis of the following documents:

- CDM Executive Board: CDM project cycle procedure for project activities, version 2.0 of 29/11/2018;
- CDM Executive Board: CDM project standard for project activities, version 2.0 of 29/11/2018
- CDM Executive Board: CDM validation and verification standard for project activities, version 2.0 of 29/11/2018
- Approved baseline and monitoring methodology ACM0001 "Flaring or use of landfill gas" version 19 of 14/06/2019 (updated due to the renewal crediting period).

It is RINA's opinion, the changes in the project design, as outlined in the revised PDD version 23 of 16/12/2020, from the project activity as described in the registered PDD ensure that the level of accuracy and completeness in the monitoring and verification process is not reduces as a result of the revision; the revisions are in accordance with the applied monitoring methodology and the changes to the project activity comply with the requirements established in the CDM Project Standard. RINA re-assessed the additionality of the project to confirm that the project remains additional. There was no impact in the scale of the project activity and the applicability of the methodology and tools were reassessed in the renewal crediting period in accordance with the updated versions. Therefore it is RINA's opinion that the post registration change would not adversely affect the conclusions of the validation report of the registered PDD.

Hence RINA requests that the post registration changes from the project activity as described in the registered PDD for the project activity "CTR Candeias Landfill Gas Project" in Brazil may be considered by the Board

Appendix 1. Abbreviations

Abbreviations	Full texts
BE	Baseline Emissions
CAR	Corrective Action Request
CDM	Clean Development Mechanism
CDM M&P	Modalities and Procedures CDM
CER(s)	Certified Emission Reduction(s)
CH ₄	Methane
CL	Clarification Request
CO ₂	Carbon dioxide
CO ₂ e	Carbon dioxide equivalent
CRT	Coordination and Technical Control Staff
DCI	Certification Division of RINA Services Spa
DNA	Designated National Authority
DOE	Designated Operational Entity
EB	Executive Board
ER	Emission Reductions
FAR	Forward Action Request
GHG(s)	Greenhouse gas(es)
GWP	Global Warming Potential
IPCC	Intergovernmental Panel on Climate Change
LoA	Letter of Approval
MoV	Means of Verification
MR	Monitoring Report
NGO	Non-governmental Organization
ODA	Official Development Assistance
PDD	Project Design Document
PE	Project Emission
PP(s)	Project Participant(s)
Ref.	Document Reference
RINA	RINA Services S.p.A.
SS(s)	Sectoral Scope(s)
TA(s)	Technical Area(s)
UNFCCC	United Nations Framework Convention on Climate Change
VVS	Validation and Verification Standard

Appendix 2. Competence of team members and technical reviewers



CERTIFICATO DI QUALIFICA QUALIFICATION CERTIFICATE

Si attesta che il sig./sig.ra:
We declare that Mr/Mrs/Ms:

Thais DE LIMA CARVALHO

è qualificato come¹:
is qualified as:

CDM -TEC, -VAL, -VER, -TL
ITRP, REG-EXP²

per le seguenti aree tecniche:
for the following technical areas:

1.1, 1.2, 2.1, 13.1

AREE TECNICHE TECHNICAL AREAS	DESCRIZIONE DELL'AREA TECNICA TECHNICAL AREA DESCRIPTION	SCOPO SETTORIALE SECTORAL SCOPE
1.1	Thermal energy generation	1
1.2	Renewables	1
2.1	Electricity distribution	2
13.1	Solid waste and wastewater	13

in accordo alle istruzioni della Divisione Certificazione.
in accordance with the instructions of the Certification Division.

REVISIONE REVISION	DATA DATE	MOTIVAZIONI PER LA REVISIONE REASON FOR THE REVISION
0	19-08-2009	-
13	31-03-2017	Added qualification as ITRP
14	20-07-2018	Added qualification as REG-EXP

Il Resp. CCPLS
Head of CCPLS

¹ Legend:

VAL: Validator
VER: Verifier
TEC: Technical Expert
TL: Team Leader
FIN-EXP: Financial Expert
DET: Determiner

CDM: Clean Development Mechanism
VCS: Verified Carbon Standard
GS: Gold Standard
SCS: Social/Carbon Standard
JI: Joint Implementation

² Argentina, Mexico, Panama, Colombia, Dominican Republic, Honduras, Ecuador, Chile, Cape Verde

RINA Services S.p.A. è accreditato da UNFCCC, quale Entità Operativa Designata (DOE), per condurre la Validazione e la Verifica di Progetti CDM, da VCSA per condurre la Validazione e la Verifica di Progetti VCS, da GS Foundation, per condurre la Validazione e la Verifica di Progetti GS, da Ecologica Institute per condurre la Validazione e la Verifica di rapporti SCS

RINA Services S.p.A. is accredited by the UNFCCC, as Designated Operational Entity (DOE), to carry out Validation and Verification of CDM Projects, by the VCSA, to carry out Validation and Verification of VCS Projects, by the GS Foundation, to carry out Validation and Verification of GS Projects and by the Ecologica Institute, to carry out Validation and Verification of SCS Reports



CERTIFICATO DI QUALIFICA
QUALIFICATION CERTIFICATE

Si attesta che il sig./sig.ra:
We declare that Mr/Mrs/Ms:

Mayra Rocha

è qualificato come¹:
is qualified as:

CDM-FIN EXP, CDM-TEC

per le seguenti aree tecniche:
for the following technical areas:

1.2

AREE TECNICHE TECHNICAL AREAS	DESCRIZIONE DELL'AREA TECNICA TECHNICAL AREA DESCRIPTION	SCOPO SETTORIALE SECTORAL SCOPE
1.2	Renewable Energy	1

in accordo alle istruzioni della Divisione Certificazione.
in accordance with the instructions of the Certification Division.

REVISIONE REVISION	DATA DATE	MOTIVAZIONI PER LA REVISIONE REASON FOR THE REVISION
0	05-08-2015	First issue

Il Resp. QPT
Head of QPT

Roma Severino

¹ Legend:

VAL: Validator
VER: Verifier
TEC: Technical Expert
TL: Team Leader
FIN-EXP: Financial Expert
DET: Determiner

CDM: Clean Development Mechanism
VCS: Verified Carbon Standard
GS: Gold Standard
SCS: SocialCarbon Standard
JI: Joint Implementation

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RINA Services S.p.A. is accredited by the UNFCCC, as Designated Operational Entity (DOE), to carry out Validation and Verification of CDM Projects, by the VCSA, to carry out Validation and Verification of VCS Projects, by the GS Foundation, to carry out Validation and Verification of GS Projects and by the Ecologica Institute, to carry out Validation and Verification of SCS Reports



CERTIFICATO DI QUALIFICA QUALIFICATION CERTIFICATE

Si attesta che il sig./sig.ra:
We declare that Mr/Mrs/Ms:

TEIXEIRA LEIROZ ANDREA

è qualificato come¹:
is qualified as:

TL, VAL, VER and TEC

per le seguenti aree tecniche:
for the following technical areas:

1.1, 1.2, 5.1, 13.1, 13.2

AREE TECNICHE TECHNICAL AREAS	DESCRIZIONE DELL'AREA TECNICA TECHNICAL AREA DESCRIPTION	SCOPO SETTORIALE SECTORAL SCOPE
1.1	Thermal Energy Generation	1
1.2	Renewables	1
5.1	Chemical industry	5
13.1	Solid waste and wastewater	13
13.2	Manure	13

in accordo alle istruzioni della Unità Certification Innovation and Sustainability.
in accordance with the instructions of the Certification Innovation and Sustainability Unit.

REVISIONE REVISION	DATA DATE	MOTIVAZIONI PER LA REVISIONE REASON FOR THE REVISION
0	17/09/2019	First Issue
1	15/11/2019	Update qualification with "Sampling and surveys for CDM PAs and PoAs"

Il Resp. CEINS
Head of CEINS

¹ Legend:

VAL: Validator
VER: Verifier
TEC: Technical Expert
TL: Team Leader
FIN-EXP: Financial Expert
DET: Determiner

CDM: Clean Development Mechanism
VCS: Verified Carbon Standard
GS4GG: Gold Standard For Global Goals
SCS: SocialCarbon Standard
JI: Joint Implementation

RINA Services S.p.A. è accreditato da UNFCCC, quale Entità Operativa Designata (DOE), per condurre la Validazione e la Verifica di Progetti CDM, da VCSA per condurre la Validazione e la Verifica di Progetti VCS, da GS Foundation, per condurre la Validazione e la Verifica di Progetti GS, da Ecologica Institute per condurre la Validazione e la Verifica di rapporti SCS

RINA Services S.p.A. is accredited by the UNFCCC, as Designated Operational Entity (DOE), to carry out Validation and Verification of CDM Projects, by the VCSA, to carry out Validation and Verification of VCS Projects, by the GS Foundation, to carry out Validation and Verification of GS4GG Projects and by the Ecologica Institute, to carry out Validation and Verification of SCS Reports

GHG_QUAL_CERT_EN(07-2018)

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CERTIFICATO DI QUALIFICA QUALIFICATION CERTIFICATE

Si attesta che il sig./sig.ra:

Geisa Maria Principe BRANCO SAETTONI

We declare that Mr/Mrs/Ms:

è qualificato come¹:
is qualified as:

CDM-TEC, VAL, VER, TL, ITRP, REG-EXP²

per le seguenti aree tecniche:
for the following technical areas:

1.1, 1.2, 13.1

AREE TECNICHE TECHNICAL AREAS	DESCRIZIONE DELL'AREA TECNICA TECHNICAL AREA DESCRIPTION	SCOPO SETTORIALE SECTORAL SCOPE
1.1	Thermal Energy generation	1
1.2	Energy generation from renewable energy sources	1
13.1	Waste Handling and Disposal	13

in accordo alle istruzioni della Unità Certification Innovation and Sustainability.
in accordance with the instructions of the Certification Innovation and Sustainability Unit.

REVISIONE REVISION	DATA DATE	MOTIVAZIONI PER LA REVISIONE REASON FOR THE REVISION
0	27-08-2009	-
10	31-03-2017	Added qualification as ITRP
11	07/12/2018	Added qualification as REG-EXP
12	15/11/2019	Update qualification with "Sampling and surveys for CDM PAs and PoAs"

Il Resp. CEINS
Head of CEINS

¹ Legend:

VAL: Validator
VER: Verifier
TEC: Technical Expert
TL: Team Leader
FIN-EXP: Financial Expert
DET: Determiner

CDM: Clean Development Mechanism
VCS: Verified Carbon Standard
GS: Gold Standard
SCS: SocialCarbon Standard
JI: Joint Implementation

² Argentina, Perú, Colombia, Mexico, Honduras, Panama, Dominican Republic, Guatemala

RINA Services S.p.A. è accreditato da UNFCCC, quale Entità Operativa Designata (DOE), per condurre la Validazione e la Verifica di Progetti CDM, da VCSA per condurre la Validazione e la Verifica di Progetti VCS, da GS Foundation, per condurre la Validazione e la Verifica di Progetti GS, da Ecologica Institute per condurre la Validazione e la Verifica di rapporti SCS

RINA Services S.p.A. is accredited by the UNFCCC, as Designated Operational Entity (DOE), to carry out Validation and Verification of CDM Projects, by the VCSA, to carry out Validation and Verification of VCS Projects, by the GS Foundation, to carry out Validation and Verification of GS Projects and by the Ecologica Institute, to carry out Validation and Verification of SCS Reports

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Appendix 3. Documents reviewed or referenced

No	Author	Title	References to the document	Provider
1	Haztec Tecnologia e Planejamento Ambiental S.A.	CDM-PDD for the second crediting period for the project activity “CTR Candeias Landfill Gas Project” in Brazil.	Version 21 of 03/04/2020	Project participant
2	Haztec Tecnologia e Planejamento Ambiental S.A.	CDM-PDD “CTR Candeias Landfill Gas Project”.	Version 22 of 21/08/2020 Version 23 of 16/12/2020	Project participant
3	CDM Executive Board	CDM project cycle procedure for project activities	version 2.0 of 29/11/2018	Others
4	CDM Executive Board	CDM project standard for project activities	version 2.0 of 29/11/2018	Others
5	CDM Executive Board	CDM validation and verification standard for project activities	version 2.0 of 29/11/2018	Others
6	CDM Executive Board	CDM Executive Board: Baseline and monitoring methodology ACM0001 “Flaring or use of landfill gas”	version 19 of 14/06/2019	Others
7	CDM Executive Board	CDM-PDD-FORM: Project design document form, including its Attachment: Instructions for completing this form	Version 11 of 31/05/2019	Others
8	CDM Executive Board	CDM Executive Board: “Assessment of the validity of the original/current baseline and update of the baseline at the renewal of the crediting period”	version 03.0.1 of 02/03/2012	Others
9	CDM Executive Board	CDM Executive Board: Baseline and monitoring methodology ACM0001 “Consolidated baseline and monitoring methodology for landfill gas project activities”	Version 11 of 28/05/2009	Others
10	Haztec Tecnologia e Planejamento Ambiental S.A.	CERs spreadsheet “PRC - Candeias 2nd CP CER Spreadsheet v9 2020 08 03 JAS.xls”.	Version 9 of 03/08/2020	Project participant
11	MCTI-Brazilian DNA	Resolution number 8, that defines the grid for CDM project	26/05/2017	Others
12	CDM Executive Board	Emissions from solid waste disposal sites	version 08.0 of 04/05/2017	Others
13	IPCC	Fourth Assessment Report: Climate Change 2007, available in English at http://www.ipcc.ch/publications_and_data/ar4/wg1/en/ch2s2-10-2.html	Assessed on 27/08/2018	Others

14	CDM Executive Board	Project emissions from flaring	version 03.0 dated 28/03/2019	Other
15	CDM Executive Board	Tool to determine the mass flow of a greenhouse gas in a gaseous stream	Version 03.0 of 27/11/2015	Other
16	CDM Executive Board	Determining the baseline efficiency of thermal or electric energy generation systems	Version 02.0 of 27/11/2015	Others
17	CDM Executive Board	Tool to determine the remaining lifetime of equipment	version 01 of 16/10/2009	Others
18	CDM Executive Board	Tool to calculate project or leakage CO2 emissions from fossil fuel combustion	Version 03.0 of 22/09/2017	Others
19	CDM Executive Board	Combined tool to identify the baseline scenario and demonstrate additionality	Version 07.0 of 22/09/2017	Others
20	CDM Executive Board	Baseline, project and/or leakage emissions from electricity consumption and monitoring of electricity generation.	Version 03 of 22/09/2017	Others
21	CDM Executive Board	Project and leakage emissions from transportation of freight	version 1.1.0, dated 23/11/2012	Others
22	CDM Executive Board	Tool to calculate the emission factor for an electricity system	Version 07.0 of 31/08/2018	Others
23	INMET	Data for the temperature and precipitation (Estação - 82900.xlsx)	Accessed on 30/08/2018	Others
24	USEPA	USEPA: A Landfill Gas-to-Energy Project Development Handbook (Collection efficiency 0.85 - USEPA 1996 Handbook EPA-LFG.pdf)	1996	Others
25	Brazilian Government	Law number 12.305: "Política Nacional de Resíduos sólidos" (National Solid Waste Policy)	02/08/2010	Other
26	ECOPESA/Haztec	Historical data of the waste received in CTR Candeias landfill	-	PP
27	International Bank for Reconstruction and Development, as Trustee the coordinating/managing entity of the Spanish Carbon Fund (SCF)	Mail sent to UNFCCC with the intention to renew the crediting period "email UNFCCC revalidacao Candeias.pdf"	26/03/2018	PP
28	International Bank for Reconstruction and Development, as Trustee the coordinating/managing entity of the	CDM-RENN-FORM for the renewal crediting period of the project CTR Candeias Landfill Gas Project	26/03/2018	PP

	Spanish Carbon Fund (SCF)			
29	MCTI (Brazilian DNA)	Brazilian Resolution # 8 of 28/05/2008 defines the Brazilian Interconnected grid for CDM project, available at	Accessed on 24/10/2017	Other
30	CPRH	Operational license for the biogas plant and future energy generation number 05.17.10.003624-7 (RLO UTB 05.17.10.003624_7_59_VALIDA ATÉ 27.10.2019.pdf)	Dated 27/10/2017 valid until 27/10/2019	PP
31	MCTI (Brazilian DNA)	Emission factor for the grid, available in Portuguese at http://www.mctic.gov.br/mctic/opencms/ciencia/SEPED/clima/textogeral/emissao_despacho.html	Accessed on 10/09/2018	Others
32	ITEP-Instituto de Tecnologia de Pernambuco	Study from the composition of waste in the CTR Candeias (Gravimetria CTR Candeias Nov-2015 highlighted.pdf)	Nov/2015	PP
33	Haztec Tecnologia e Planejamento Ambiental S.A. and BENG	Revised financial analysis spreadsheet : Candeias - Cash Flow 2018 03 22 FES.xls Candeias - Original Cash Flow.xls Candeias - Updated Cash Flow 2020 08 03 FES.xls	22/03/2018 (original – registration) 03/08/2020	PP
34	ERM Certification and Verification Services	Validation report for the project activity “CTR Candeias Landfill Gas Project”	30/08/2011	PP
35	IPEA	Research report: Waste Diagnosis Urban Solids available at: http://www.ipea.gov.br/agencia/images/stories/PDFs/relatoriopesquisa/121009_relatorio_residuos_solidos_urbanos.pdf	Accessed on 15/02/2019	Others
36	Brazilian Government	Law number 12.305: “Política Nacional de Resíduos sólidos” (National Solid Waste Policy)	02/08/2010	Other
37	Biotechnogas	Letter with main technical data about a specific model of enclosed flare Biotechnogas- flare model BTG 2500 HT (181015 - Enclosed flare info 2500.pdf)	15/10/2018	PP
38	Haztec Tecnologia e Planejamento Ambiental S.A. and ASJA	Candeias - O_M LFG Costs Rev1.xlsx	-	PP
39	Haztec Tecnologia e Planejamento Ambiental	199.18 - PV - Haztec Tecnologia e Planejamento Ambiental.pdf	13/11/2018	PP

	S.A. and ASJA			
40	Banco Central do Brasil	BCB Conversao EUR BRL 26 02 2018.pdf	26/02/2018	Other
41	World Bank database	Brazilian historycal data for TDL	accessed on 20/04/2018	PP
42	ASJA Pernambuco Serviços Ambientais Ltda e ECOPESA Serviços Ambientais	Consortium agreement between ASJA and Ecopesa (Asja Instrumento de Constituição de Consórcio.pdf// Asja - Acordo de Consorciadas - Ecopesa 2019 11 08)	14/01/2019	PP
43	ANEEL	Dispatch 2,046 Authorization to ASJA for commercial operation of UG1 to UG8 from 26/07/2019 (11,408 kW) (JAB_Despacho de Operação Comercial.pdf)	25/07/2019	PP
44	Secretaria Executiva de Meio Ambiente e Gestão Urbana- SEMAG	Operational license to ASJA n 048/2018 valid until 06/04/2021,	05/04/2019	
45	INNIO	Form of Equipment Acceptance Report -Generator number A18F258635 (Acceptance Report Design No X465 .pdf) - Generator number A18G279103 (Acceptance Report Design No X466 .pdf) - Generator number A18G279092 (Acceptance Report Design No X468 .pdf) - Generator number A18E206859 (Acceptance Report Design No X470 .pdf) - Generator number A18F2277773 (Acceptance Report Design No X471 .pdf) - Generator number A18E227542 (Acceptance Report Design No X472 .pdf) - Generator number A18F269006 (Acceptance Report Design No X473 .pdf) - Generator number A18F269007 (Acceptance Report Design No X474 .pdf)	-08/08/2019 -30/07/2019 -30/07/2019 -08/08/2019 -08/08/2019 -08/08/2019 -08/08/2019 -22/08/2019 -30/07/2019	PP
46	BENG	Common Practice analysis (Candeias Pratica Comum 2020 08 03 JAS.xlsx)	03/08/2020	PP
47	GE ENERGY JENBACHER	Comercial proposal from GE energy Jenbacher for 03 x 1, 415 kW - 4,2 MW. Benco Energia. GE Energy Jenbacher – Haztec – Proposta comercial.pdf	25/06/2010	Other
48	ANEEL	historical auction data from Brazilian Electricity Regulatory Agency (ANEEL) available at: https://www.aneel.gov.br/resultados-de-leiloes Average electricity auction price results up to 2016.xlsx	Accessed on 14/10/2019	Other
49	Brazilian Central Bank	Historic inflation rates - BCB (Brazilian Central Bank)	Accessed on 14/10/2019	Other

50	CDM Executive Board	Positive lists of technologies.	Version 01.0	Other
51	World Bank	World Bank Database (15.775% for 2014 is the most recent data. It was adopted 16%). Source: https://data.worldbank.org/indicator/EG.ELC.LOS.S.ZS?end=2014&locations=BR&start=1971&view=chart		Other
52	CCEE Electricity Trading Chamber	Electricity Trading Chamber – energy auctions: https://www.ccee.org.br/portal/faces/oquefazemos_menu_lateral/leiloes?_afdf.ctrl-state=iltz9wnwa_79&_afdfLoop=18277324846021	-	Other
53	CDM Executive Board	CDM Project: 5947 CTL Landfill Gas Project. Available at: https://cdm.unfccc.int/PRCContainer/DB/prcp656332989/view	-	Other
54	Haztec Tecnologia e Planejamento Ambiental S.A. and ASJA	2020 12 14 – Capex Electricity plant.xlsx	14/12/2020	PP
55	CDM Executive Board	CDM Project 3464 : Exploitation of the biogas from Controlled Landfill in Solid Waste Management Central – CTRS / BR.040. Available at: https://cdm.unfccc.int/Projects/DB/SGS-UKL1267696608.78/view	-	Other
56	ENC ENERGY	Email received from ENC ENERGY: Evidences – O&M power costs.pdf.	26/06/2019	PP
57	GE ENERGY JENBACHER	Email received from GE Energy Jenbacher: Overhaul Motores JMS 420.pdf	30/09/2010	PP
58	Haztec Tecnologia e Planejamento Ambiental S.A. and ASJA	2020 12 17 - O&M Electricity Cost.xlsx	17/12/2020	PP
59	Natural Resources Journal	Analysis of the theoretical potential of biogas energy generation in the Varginha/MG sanitary landfill" (ISSN: 2237 9290).	11/2016 – 10/2017 Volume 7 number 1	Other
60	CDM Executive Board	CDM Project 8751: Proactiva CGA Iperó Landfill Gas to Energy Project. Available at: https://cdm.unfccc.int/Projects/DB/LRQA%20Ltd1355408694.95/view	-	Other

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

Table 1. CLs from this validation

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

Table 2. CARs from this validation

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

Table 3. FARs from this validation

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

- - - - -

Document information

<i>Version</i>	<i>Date</i>	<i>Description</i>
03.0	31 May 2019	Revision to: <ul style="list-style-type: none">• Ensure consistency with version 02.0 of the “CDM validation and verification standard for project activities” (CDM-EB93-A05-STAN);• Make editorial improvements.
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		