




**Validation report form for renewal of crediting period 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	LaGeo, S. A. de C. V., Berlin Geothermal Project, Phase Two 0297
Number and duration of the next crediting period	Third Crediting period (01/01/2021 – 31/12/2027)
Version number of the validation report	02.0
Completion date of the validation report	20/12/2021
Version number of PDD to which this report applies	23
Project participants	LaGeo, S. A de C.V.
Host Party	El Salvador
Applied methodologies and standardized baselines	Approved consolidated methodology ACM0002, Grid-connected electricity generation from renewable sources, version 20.0
Mandatory sectoral scopes	1 : Energy industries (renewable - / non-renewable sources)
Conditional sectoral scopes, if applicable	N/A
Estimated amount of annual average GHG emission reductions or GHG removals by sinks in the next crediting period	139,962 tCO ₂ e
Name and UNFCCC reference number of the DOE	Colombian Institute for Technical Standards and Certification (ICONTEC) E-0024
Name, position and signature of the approver of the validation report	Signature  Juan Sebastián Salazar Technical Director

SECTION A. Executive summary

ICONTEC has performed the assessment for the renewal of crediting period of LaGeo, S. A. de C. V., Berlin Geothermal Project, Phase Two in El Salvador on the basis of UNFCCC criteria for the CDM, as well as criteria given to provide for consistent project operations, monitoring and reporting. UNFCCC criteria refer to Article 12 of the Kyoto Protocol, the CDM modalities and procedures and the subsequent decisions by the CDM Executive Board. This renewal of crediting period report summarizes the findings of this exercise.

The proposed project activity under the renewal process is based on the approved consolidated methodology ACM0002, Grid-connected electricity generation from renewable sources, version 20.0. The project involves an extension of the Berlin Geothermal Power Plant through the drilling of additional geothermal wells which take advantage of Berlin Geothermal Field. The extension of geothermal power plant is located in the municipalities of Berlín and Alegría, in Department of Usulután in El Salvador. The project activity (named by the PP as Unit 3) has an installed capacity of 44 MW ((maximum gross output to the generator). The energy produced by this project activity is delivered to Salvadorian electrical grid.

The renewal of crediting period process consisted of the following three phases: i) a desk review of the revised project design documents, ii) onsite inspection and follow up interviews with project stakeholders and iii) the resolution of outstanding issues and the issuance of the final renewal of crediting period report and opinion. (See Appendix 4 on this report)

The total emission reductions from the project are estimated to be on average 139,962 tCO₂e per year for the third crediting period.

In summary, it is ICONTEC's opinion that LaGeo, S. A. de C. V., Berlin Geothermal Project, Phase Two, as described in the version 23 of the revised project design document, meets all relevant UNFCCC requirements for the CDM and all relevant host country criteria and correctly applies the baseline and monitoring methodology ACM0002, version 20.0. Hence, ICONTEC requests the renewal of crediting period of the project as CDM project activity.

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	Interview(s)	Validation findings
1.	Team Leader and Technical Expert in Sectoral Scope 1.2	EI	Ramirez	Francy	Freelance	✓	✓	✓	✓

B.2. Technical reviewer and approver of the validation report for RCP

No.	Role	Type of resource	Last name	First name	Affiliation (e.g. name of central or other office of DOE or outsourced entity)
1.	Lead Technical Reviewer and Technical Expert Reviewer in Sectoral Scope 1.2	EI	Aubad	Ana Isabel	Feelance
2.	Approver	IR	Salazar	Juan Sebastian	Employee

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

The reviewing of the project documentation provided by the project proponent is based upon both quantitative and qualitative information on estimated emission reductions. Quantitative information comprises the reported numbers in the revised PDD submitted. Qualitative information comprises information about description of the project activity and the equipment related, and monitoring procedures.

Main documents reviewed during the desk review stage, provided by the project proponent, are:

- Approved PDD version 21, for the second crediting period, dated on January 28th/2014/1/
- Revised PDD version 8, dated on April 12th/2021/2/
- Spreadsheet used for the calculation of estimated ERs for the third crediting period /3/
- Spreadsheet used for the calculation of emission factor of Salvadorian interconnected electrical grid /4/
- Validation report for renewal of crediting period (second crediting period) written by ICONTEC, dated on January/2014 /5/

In addition to the revised PDD documentation provided by the project proponent, ICONTEC utilized:

- Approved consolidates methodology ACM0002, Grid-connected electricity generation from renewable sources, version 20.0/UN1/
- CDM validation and verification standard for project activities, version 03.0/UN2/
- CDM project standard for project activities, version 03.0/UN3/
- CDM project cycle procedure for project activities, version 03.0/UN4/
- Tool to calculate the emission factor for an electricity system, version 07.0.0/UN5/
- Methodological Tool for 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/UN6/
- Project Design Document form, version 12.0/UN7/

A compilation of the documents related to the validation activities have been compiled under Appendix 3.

C.2. On-site inspection

Duration of on-site inspection: 16/11/2021 to 18/11/2021				
No.	Activity performed on-site	Site location	Date	Team member
1.	Tour by the project's facility	Project's site located in Berlín and Alegría, in Departament of Usulután, El Salvador	16/11/2021	Francy Ramírez
2.	Compliance of the project implementation with the approved project design document			
3.	Interviews with personnel in charge of			

	operational and maintenance activities			
4.	Visit to the interconnection Point of the project activity.			
5.	Compliance of monitoring activities with the approved monitoring plan			
6.	Compliance of the revised PDD with the PDD form			
7.	Application and selection of methodologies and standardized baselines			
8.	Validity of original baseline or its update			
9.	Crediting period			
10.	Project participants			
11.	Assessment of estimated emission reductions or net anthropogenic removals			
12.	Validity of monitoring plan			

LaGeo's offices
located in Santa Tecla,
El Salvador

18/11/2021

C.3. Interviews

No.	Interviewee			Date	Subject	Team member
	Last name	First name	Affiliation			
1.	Aguirre	Luis	Engineering Manager LaGeo	16/11/2021	<ul style="list-style-type: none">• Tour by the project's facility.• Compliance of the project implementation with the approved project design document.• Interviews with personnel in charge of operational and maintenance activities• Visit to the interconnection Point of the project activity.• Compliance of monitoring activities with the approved monitoring plan	Francy Ramírez
2.	Fuentes	Juan	Coordinator of operations LaGeo			
3.	Navarro	Denis	Alternative Energy Investment LaGeo			
4.	de Estrada	Martha	Commercial Manager LaGeo	18/11/2021	<ul style="list-style-type: none">• Compliance of the revised PDD with the PDD form.• Application and selection of methodologies and standardized baselines.• Validity of original baseline or its update.• Crediting period.• Project participants.• Assessment of estimated emission reductions or net anthropogenic removals.• Validity of monitoring plan	
5.	Alvarado	John	Commercial Analyst LaGeo			

C.4. Sampling approach

No sampling approach was used during the validation.

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

Area of validation findings	No. of CL	No. of CAR	No. of FAR
Compliance with PDD form	CL 1	-	-
Application and selection of methodologies and	-	-	-

standardized baselines			
Validity of original baseline or its update	-	CAR 1	-
Estimated emission reductions or net anthropogenic removals	-	CAR 2 CAR 3 CAR 4	-
Validity of monitoring plan	-	-	-
Crediting period	-	-	-
Project participants	-	-	-
Post-registration changes	-	-	-
Others (please specify) In accordance with the provisions stated in paragraph 7 (c) of meeting report of CDM Executive Board 108 th meeting	-	-	1
Total	1	4	1

SECTION D. Validation findings

D.1. Compliance with PDD form

Means of validation	The audit team checked the latest approved PDD form /UN7/ and the contents written by the PP in that form, besides the PDD approved for the second crediting period, in order to assess if the project participants have updated the relevant sections of the PDD in accordance with relevant requirements in the Project standard for the request of the crediting period renewal.
Findings	CL 1. More details about this finding on Appendix 4.
Conclusion	The audit team deems that all information transferred to the latest valid version of the PDD form is materially the same as that in the approved PDD for the second crediting period. Likewise, the audit team confirms that the PDD Version 23 /2/ is in compliance with the relevant valid version of project design document form /UN7/ and instructions therein for filling out PDD.

D.2. Application and selection of methodologies and standardized baselines

Means of validation	<p>The project activity has been registered with the approved methodology, ACM0002, version 4. For the second crediting period the version 14 of the applied methodology was used. Since version 14 of ACM0002 is no longer valid, the PDD for the renewal crediting period has been revised in line with the approved methodology ACM0002 version 20.0 /UN1/, which is the latest version of the applied methodology at the time of submitting the revised PDD and is currently valid.</p> <p>The applicability criteria of this methodology, was verified by ICONTEC, as follows:</p> <table border="1"> <thead> <tr> <th>Applicability Condition</th><th>Means of Validation</th></tr> </thead> <tbody> <tr> <td> <p>This methodology is applicable to grid-connected renewable energy power generation project activities that:</p> <p>(a) Install a Greenfield power plant;</p> <p>(b) Involve a capacity addition to (an) existing plant(s);</p> <p>(c) Involve a retrofit of (an) existing operating plants/units;</p> <p>(d) Involve a rehabilitation of (an) existing plant(s)/unit(s); or</p> <p>(e) Involve a replacement of (an) existing plant(s)/unit(s).</p> </td><td> <p>Berlin Geothermal Project, Phase Two consists of an extension of the Berlin Geothermal Power Plant through the drilling of additional geothermal wells which take advantage of Berlin Geothermal Field. ICONTEC verified this statement by means of:</p> <ul style="list-style-type: none"> - On site visit - Documental review of: <ul style="list-style-type: none"> ▪ Validation report for renewal of second crediting period purpose /5/. ▪ Validation report for registration purpose/6/. </td></tr> </tbody> </table>	Applicability Condition	Means of Validation	<p>This methodology is applicable to grid-connected renewable energy power generation project activities that:</p> <p>(a) Install a Greenfield power plant;</p> <p>(b) Involve a capacity addition to (an) existing plant(s);</p> <p>(c) Involve a retrofit of (an) existing operating plants/units;</p> <p>(d) Involve a rehabilitation of (an) existing plant(s)/unit(s); or</p> <p>(e) Involve a replacement of (an) existing plant(s)/unit(s).</p>	<p>Berlin Geothermal Project, Phase Two consists of an extension of the Berlin Geothermal Power Plant through the drilling of additional geothermal wells which take advantage of Berlin Geothermal Field. ICONTEC verified this statement by means of:</p> <ul style="list-style-type: none"> - On site visit - Documental review of: <ul style="list-style-type: none"> ▪ Validation report for renewal of second crediting period purpose /5/. ▪ Validation report for registration purpose/6/.
Applicability Condition	Means of Validation				
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	<p>The methodology is applicable under the following conditions:</p> <p>(a) The project activity may include renewable energy power plant/unit of one of the following types: hydro power plant/unit with or without reservoir, wind power plant/unit, geothermal power plant/unit, solar power plant/unit, wave power plant/unit or tidal power plant/unit;</p> <p>(b) In the case of capacity additions, retrofits, rehabilitations or replacements (except for wind, solar, wave or tidal power capacity addition projects the existing plant/unit started commercial operation prior to the start of a minimum historical reference period of five years, used for the calculation of baseline emissions and defined in the baseline emission section, and no capacity expansion, retrofit, or rehabilitation of the plant/unit has been undertaken between the start of this minimum historical reference period and the implementation of the project activity.</p>	<p>As it was mentioned above, Berlin Geothermal Project, Phase Two consists of an extension of the Berlin Geothermal Power Plant through the drilling of additional geothermal wells which take advantage of Berlin Geothermal Field. ICONTEC verified this statement by means of:</p> <ul style="list-style-type: none"> - On site visit - Documental review of: <ul style="list-style-type: none"> ▪ Validation report for renewal of second crediting period purpose /5/. ▪ Validation report for registration purpose /6/.
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	<p>In case of hydro power plants one of the following conditions must apply:</p> <p>(a) The project activity is implemented in existing single or multiple reservoirs, with no change in the volume of any of the reservoirs; or</p> <p>(b) The project activity is implemented in existing single or multiple reservoirs, where the volume of the reservoir(s) is increased and the power density calculated using equation (8), is greater than 4 W/m²; or</p> <p>(c) The project activity results in new single or multiple reservoirs and the power density, calculated using equation (3), is greater than 4 W/m²; or</p> <p>(d) The project activity is an integrated hydro power project involving multiple reservoirs, where the power density for any of the reservoirs, calculated using equation (3), is lower than or equal to 4 W/m², all of the following conditions shall apply:</p> <p>(i) The power density calculated using the total installed capacity of the integrated project, as per equation (4), is greater than 4 W/m²;</p> <p>(ii) Water flow between reservoirs is not used by any other hydropower unit which is not a part of the project activity;</p>	<p>As it was mention before, the project activity is geothermal unit as a capacity addition to an existing power plant. Hence this condition is not applicable to this project activity.</p>
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	<p>In the case of integrated hydro power projects, project proponent shall:</p> <p>(a) Demonstrate that water flow from upstream power plants/units spill directly to the downstream reservoir and that collectively constitute to the generation capacity of the integrated hydro power project; or</p> <p>(b) Provide an analysis of the water balance covering the water fed to power units, with all possible combinations of reservoirs and without the construction of reservoirs. The purpose of water balance is to demonstrate the requirement of specific combination of reservoirs constructed under CDM project activity for the optimization of power output. This demonstration has to be carried out in the specific scenario of water availability in different seasons to optimize the water flow at the inlet of power units. Therefore this water balance will take into account seasonal flows from river, tributaries (if any), and rainfall for minimum five years prior to implementation of CDM project activity.</p>	<p>As it was mention before, the project activity is geothermal unit as a capacity addition to an existing power plant. Hence this condition is not applicable to this project activity.</p>
	<p>The methodology is not applicable to:</p> <p>(a) Project activities that involve switching from fossil fuels to renewable energy sources at the site of the project activity, since in this case the baseline may be the continued use of fossil fuels at the site;</p> <p>(b) Biomass fired power plants.</p>	<p>As it was mention before, the project activity is geothermal unit as a capacity addition to an existing power plant.</p>
	<p>In the case of retrofits, rehabilitations, replacements, or capacity additions, this methodology is only applicable if the most plausible baseline scenario, as a result of the identification of baseline scenario, is "the continuation of the current situation, that is to use the power generation equipment that was already in use prior to the implementation of the project activity and undertaking business as usual maintenance".</p>	<p>By means of the onsite visit and the interviews performed, the audit team concluded that if Unit 3 of the Berlin Geothermal Power Plant does not operate, the remaining units (1 and 2) have the ability to generate electrical energy and deliver it to the Salvadorian electrical interconnected grid, since LaGeo has maintenance practices with the aim to assure the proper operation of three units involved in Berlin Geothermal Power Plant.</p>

	<p>In addition, the applicability conditions included in the tools referred to below apply.</p> <p>The applicability conditions of this project activity regarding to the tool to calculate the emission factor for an electricity system /UN5/ and the Tool for Assessment of the validity of the original/current baseline and update of the baseline at the renewal of the crediting period /UN6/ will be discussed in Sections D.3, D.4 and D.5 of this report.</p>
	<p>The paragraph 281 of PS /UN3/ states: "The project participants are not required to reassess the additionality of the project activity and update the section relating to additionality", hence this report does not contain an assessment regarding to this issue.</p>
Findings	No finding was raised on this issue.
Conclusion	The validation team confirms that the Project meets all the applicability conditions and is in line with all the requirements and stipulations mentioned in the applied methodology /UN1/.

D.3. Validity of original baseline or its update

Means of validation	<p>The baseline determination has been developed using methodology ACM0002, Version 20.0 /UN1/ and Tool for the 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/UN6/</p> <p>According to the tool /UN6/ the PP applied correctly the following steps:</p> <p>Step 1: Assess the validity of the current baseline for the next crediting period</p> <p>Step 1.1: Assess compliance of the current baseline with relevant mandatory national and/or sectoral policies</p> <p>There are no significant changes in the relevant national and/or sectoral policies since the date of registration, which impacts the baseline scenario/7//8/. Although the national policies encourage the development of renewable energy/9/, however using renewable energy resources for power generation is not mandatory. Power generation by fossil fuel based plants has a relevant role in Salvadorian power supply/10/. Likewise, the audit team review the Salvadorian regulatory framework¹ with the aim to verify the description provided by the PP in the revised PDD /2/. As conclusion current baseline still complies with all relevant Salvadorian policies.</p> <p>Step 1.2: Assess the impact of circumstances</p> <p>As it was described above, the circumstances at moment of request the renewal of crediting period are the same at the moment of validation; since the existing scenario is that the Salvadorian electrical interconnected electrical grid provides the same electricity service as the proposed project /6/, where the power generation by fossil fuels still has a relevant share in the Salvadorian electrical interconnected grid even with the efforts made by the Salvadorian Government to encourage the investment in electrical generation by the use of renewable energies². PP assessed the impact of circumstances existing at the time of requesting renewal of the crediting period on the current baseline emissions, in which the baseline emission factor has been updated based on the latest available public data. (See development of Step 2.2 on this report)</p> <p>Step 1.3: Assess whether the continuation of use of current baseline equipment(s) or an investment is the most likely scenario for the crediting</p>
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¹ <https://www.ut.com.sv/reglamento>

² http://www.oas.org/juridico/spanish/mesicic3_slv_energia.pdf

period for which renewal is requested.

In absence of the project activity, equivalent amount of electricity would have been generated by other power plants connected to Salvadorian electrical grid, even Unit 1 and Unit 2 of Berlin Geothermal power plant.

The baseline equipments, related with the baseline scenario defined in the applied methodology, would be those equipment related with the electricity delivered to the grid, even Unit 1 and Unit 2 of Berlin Geothermal power plant.

Therefore, the baseline scenario involves the current baseline equipments (current power plants connected to the Salvadorian electrical interconnected grid) and the addition of new generation sources, as it has been done since the moment of project registration.

Step 1.4: Assessment of the validity of the data and parameters

The data and parameters used for the baseline calculations follow provisions of the Tool to calculate the emission factor for an electricity system /UN5/.

For the operating margin emission factor (EF_{OM}), it was considered that there are new power plants operating in the Salvadorian electrical grid since the registration with the existing power plants /4/. The baseline emissions of the project activity were updated, considering the Tool to calculate the emission factor for an electricity system /UN5/, data available in the Salvadorian administrator of the wholesale electric market (UT)³ and the emissions factor from IPCC for the calculation of grid emission factor (please refer to Step 2.2 below).

Step 2: Update the current baseline and the data and parameters**Step 2.1: Update the current baseline**

As per the applied methodology, ACM0002, version 20.0 /UN1/, the baseline emission is the electricity delivered to the grid by the project activity that would have otherwise been generated by the operation of grid-connected power plants and by the addition of new generation sources, as reflected in the combined margin (CM) calculations described in the Methodological Tool to calculate the emission factor for an electricity system /UN5/. In accordance with applied methodology /UN1/ and applicable Tool /UN5/ an electricity baseline emission factor has been calculated as a combined margin emission coefficient, consisting of the combination of a simple adjusted operating margin (OM) emission coefficient and a build margin (BM) emission coefficient.

Step 2.2: Update the data and parameters

The simple adjusted OM was chosen by the PP to calculate the operating margin emission factor, using 2018, 2019 and 2020 data vintage for the estimation of emissions reductions, in accordance with the parameters stated in the following equation:

$$EF_{grid,OM-adj,y} = (1 - \lambda_y) \times \frac{\sum_m EG_{m,y} \times EF_{EL,m,y}}{\sum_m EG_{m,y}} + \lambda_y \times \frac{\sum_k EG_{k,y} \times EF_{EL,k,y}}{\sum_k EG_{k,y}}$$

This emission factor is fixed during the crediting period. It will not require monitoring during the third crediting period.

Calculations of OM emission factor were made as illustrated in the spreadsheets used for Salvadorian electrical grid emission factor calculation /4/, which is according to the tool's specifications/UN5/. The audit team validated the values comparing the ones presented for the PP in the mentioned spreadsheet/4/, against the values downloaded from UT during the interviews. After the comparison, the audit team deemed reliable and appropriate the values used. The OM emission

³ <https://www.cnd.com.pa/index.php/informes/categoria/informe-historicos-cnd>

	<p>factor calculated was 0.610 tCO₂e/MWh, hence ICONTEC deemed the obtained value as reliable and credible.</p> <p>For BM emission factor (step 5) option 1 (ex-ante) was chosen for the second crediting period. In accordance with paragraph 72 (a) of the Tool to calculate the emission factor for an electricity system: <i>“For the third crediting period, the build margin emission factor calculated for the second crediting period should be used”</i>. That is it the build margin emission factor for third crediting period is 0.522 tCO₂e, and this emission factor does not require monitoring during third crediting period.</p> <p>The grid emission factor for the project activity has been calculated to be 0.544 tCO₂e/MWh, considering a weighted of $W_{OM} = 0.25$ and $W_{BM} = 0.75$, as stipulated for renewable crediting period in the “Tool to calculate the emission factor for an electricity system” /UN5/.</p>
Findings	CAR 1. More details about this finding on Appendix 4.
Conclusion	The audit team confirms the validity of updated baseline in the updated PDD/2/ in accordance with the applicable validation requirements related to the renewal of crediting period/UN6/ in the VVS /UN2/.

D.4. Estimated emission reductions or net anthropogenic removals

Means of validation	<p>According to equation 17 of the methodology ACM002, version 20/UN1/, emission reductions shall be calculated as follows:</p> $ER_y = BE_y - PE_y - L_y$ <p>For this type of project activity, according to Methodology $L_y = 0$ (ACM0002, version 20 section 5.6).</p> <p>The baseline emissions are the product of electrical energy baseline $EG_{BL,y}$ expressed in MWh of energy produced by the renewable generating unit multiplied by the grid emission factor.</p> $ER_y = BE_y = EG_{PJ,y} \times EF_{grid,CM,y}$ <p>For ex-ante estimation of baseline emissions, the electric energy baseline $EG_{PJ,y}$ was established as a total of electrical energy produced by the project activity (Unit 3) at renewal of second crediting period and registration time (314,720 MWh per year) /1//5//6/. The audit team deemed the value used for parameter $EG_{PJ,y}$ as credible, reliable and traceable.</p> <p>The Grid emission factor was calculated, as it was explained in Section D.3 on this report ($EF_{grid,y} = 0.544$ tCO₂e/MWh), this emission factor is fixed during the third crediting period.</p> <p>So the baseline emissions are:</p> $BE_y = 314,720 \text{ MWh} \times 0.5400 \text{ tCO}_2/\text{MWh} = 171,207 \text{ tCO}_2\text{e/year.}$ <p>The project emissions for geothermal project activities are due to fossil fuel consumption and the operation of dry, flash steam or binary geothermal power plants.</p> <p>In accordance with onsite inspection, the audit team can confirm that there is no fossil fuel consumption for electricity generation, and the Unit 3 of Berlin Geothermal Project is not a binary geothermal power plant, hence the project emission for this project activity are determined as follows:</p> $PE_y = PE_{GP,y} = PE_{dry \text{ or flash steam},y} = (W_{steam,CO_2,y} + W_{steam,CH_4,y} \times GWP_{CH_4}) \times M_{steam,y}$ <p>For the estimation of project emissions per year, the PP has presented for the third crediting period the values already verified and certified for the fourth monitoring period of the second crediting period – Year 2017. The audit team considered this</p>
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	<p>value as conservative regarding to the value of project emissions used for registration purposes and for previous renewal of crediting period. Hence, the project emissions are:</p> $PE_y = (1.30 \times 10^{-2} \text{tCO}_2/\text{t steam} + (2.83 \times 10^{-7} \text{tCH}_4/\text{t steam} \times 21 \text{ tCO}_2/\text{tCH}_4)) \times 2,397,198 \text{ t steam}$ $PE_y = 31,245 \text{ tCO}_2\text{e}$ <p>Hence, the emissions reduction per year for this project activity are:</p> $ER_y = BE_y - PE_y$ $ER_y = 171,207 \text{ tCO}_2\text{e} - 31,245 \text{ tCO}_2\text{e}$ $ER_y = 139,962 \text{ tCO}_2\text{e}$
Findings	CAR 2, CAR 3 and CAR 4. More details about these findings on Appendix 4
Conclusion	<p>Based on the information reviewed, the audit team confirmed that in the revised PDD/2/, the sources used were correctly quoted and interpreted, the calculation processes are complete and replicable, and the calculation outcomes are reasonable and accurate.</p> <p>The audit team also confirms that:</p> <ul style="list-style-type: none"> • All assumptions and data used by the project participants are listed in the revised PDD and its annexes, including their references and sources; • All documentation used by project participants as the basis for assumptions and source of data is correctly quoted and interpreted in the revised PDD and its annexes; • All values used in the revised PDD and its annexes are considered reasonable in the context of the proposed CDM project activity; • The baseline methodology /UN1/ and applicable tools/UN5/ have been correctly applied to calculate baseline emissions, project emissions, leakage and emission reductions; • All estimates of the baseline emissions can be replicated using the data and parameter values provided in the PDD and its annexes.

D.5. Validity of monitoring plan

Means of validation	<p>Monitoring plan presented on revised PDD complies with requirements of approved methodology ACM0002 (version 20.0) /UN1/. Monitoring of GHG emission reductions is based on the electricity generation by the project activity, which is transparently presented in section B.7 of the revised PDD, version 23 /2/.</p> <p>ICONTEC verified through interviews with relevant personnel that the project is equipped with an extensive monitoring system for electrical energy generation in accordance with the Salvadorian regulatory framework/11/. Training provided to the operational staff with respect to the monitoring plan has been established to maintain installed equipment and technology performance, as well as to ensure the measurement's accuracy of data reported.</p> <p>Audit team checked all parameters presented at the monitoring plan of the latest version of the revised PDD /2/, against methodology /UN1/ and applied tools /UN5/ requirements. No deviations to the project activity were found.</p>
Findings	No finding was raised on this issue.
Conclusion	With the above information, ICONTEC confirmed that the monitoring plan established by the PP, is feasible and that the PP has the ability and sufficient means of implementation to ensure that the emission reductions expected as a result of the project activity, are reported and verified. It is according with provisions of VVS/UN2/ and PS /UN3/.

D.6. Crediting period

Means of validation	The type of crediting period for this project activity is renewable three times by 7 years. The first crediting period of the project activity was 01/01/2007 – 31/12/2013, and the second crediting period of the project activity was 01/01/2014 –
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	<p>31/12/2020.</p> <p>In accordance with the provisions stated in paragraph 280 of CDM project cycle procedure for project activities /UN4/, it is expected to submit through the dedicated interface on the UNFCCC CDM website, a request for renewal of crediting period of LaGeo, S. A. de C. V., Berlin Geothermal Project, Phase Two together with the new version of the PDD and this validation report before December 31st/2021 (no later than one year after the expiry of the crediting period).</p> <p>Therefore, the third crediting period commences on the day immediately after the expiration of the second crediting period (January 1st 2021).</p>
Findings	No findings were raised on this issue
Conclusion	The validation team confirms that the description of the third crediting period in the revised PDD complies with applicable requirements established by the CDM Executive Board.

D.7. Project participants

Means of validation	Audit team checked whether the names of the project participants included in the revised PDD /2/ were consistent with the names of the project participants in the UNFCCC Website ⁴ by means of desk review.
Findings	No finding was raised on this issue
Conclusion	The audit team concluded that the names of project participants in the revised PDD /2/ were consistent with the names of the project participants in the UNFCCC Website ⁴ .

D.8. Post-registration changes

Type of post-registration changes (PRCs)	Confirmation (Y/N)	Validation report for PRCs	
		Version	Completion date
Temporary deviations from the registered monitoring plan, applied methodologies, standardized baselines or other methodological regulatory documents ⁵	N		
Corrections	N		
Change to the start date of the crediting period	N		
Inclusion of a monitoring plan	N		
Permanent changes to the registered monitoring plan, or permanent deviation of monitoring from the applied methodologies, standardized baselines, or other methodological regulatory documents	N		
Changes to the project design	N		
Changes specific to afforestation and reforestation project activities	N/A		

SECTION E. Internal quality control

This report includes the validation findings that underwent a technical review before being submitted to the project participants.

The technical review and the quality control of the process was performed by an internal technical reviewer in accordance with ICONTEC internal procedures for carrying out validation, verification and certification audits of CDM project activities. The technical reviewers are qualified in accordance with the professional qualification scheme for CDM validation and verification activities established by ICONTEC.

⁴ <https://cdm.unfccc.int/Projects/DB/DNV-CUK1141464500.33/view?cp=1>

⁵ 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 F. Validation opinion

ICONTEC has performed the validation to renew crediting period of LaGeo, S. A. de C. V., Berlin Geothermal Project, Phase Two, in El Salvador. The assessment of renewal of crediting period was performed on the basis of UNFCCC criteria for the Clean Development Mechanism and host country criteria, as well as criteria given to provide for consistent project operations, monitoring and reporting.

The review of the revised Project Design Documentation and the subsequent follow-up interviews has provided ICONTEC with sufficient evidence to determine the fulfilment of the stated criteria.

The project correctly applies the Approved Consolidated Methodology ACM0002: Grid-connected electricity generation from renewable sources, version 20.0.

The project involves an extension of the Berlin Geothermal Power Plant through the drilling of additional geothermal wells which take advantage of Berlín Geothermal Field. The extension of geothermal power plant is located in the municipalities of Berlín and Alegría, in Department of Usulután in El Salvador. The project activity (named by the PP as Unit 3) has an installed capacity of 44 MW ((maximum gross output to the generator). The energy produced by this project activity is delivered to Salvadorian electrical grid.

The total emission reductions from the project are estimated to be on the average of 139,962 tCO₂e per year over the selected 7 year – third crediting period. The emission reductions' forecast has been checked and it is deemed likely that the stated amount is achieved because the underlying assumptions do not change.

In summary, it is ICONTEC's opinion that LaGeo, S. A. de C. V., Berlin Geothermal Project, Phase Two, in El Salvador, as described in the revised PDD version 23, meets all relevant UNFCCC requirements for the CDM and all relevant host country criteria and correctly applies the approved consolidated methodology ACM0002: Grid-connected electricity generation from renewable sources, version 20.0. ICONTEC thus, requests the renewal of the crediting period of the project as a CDM project activity.

Appendix 1. Abbreviations

Abbreviations	Full texts
CAR	Corrective Action Request
CDM	Clean Development Mechanism
CERs	Certified emission reductions
CL	Clarification Request
CO ₂ e	Carbon dioxide equivalent
DNA	Designated National Authority
DOE	Designated Operational Entity
ERs	Emission Reductions
GHG	Greenhouse Gases
ICONTEC	Colombian Institute of Technical Standards and Certification (Instituto Colombiano de Normas Técnicas y Certificación)
IPCC	Intergovernmental Panel on Climate Change
MoC	Modalities of Communication
MR	Monitoring Report
PCP	CDM Project Cycle Procedure
PDD	Project Design Document
PP	Project Participant
PRC	Post Registration Change
PS	CDM Project Standard for project activities
UNFCCC	United Nations Framework Convention for Climate Change
UT	Salvadorian Transactions Unit ⁶ (Unidad de Transacciones)
VVS	CDM Validation and Verification Standard for project activities

Appendix 2. Competence of team members and technical reviewers

Francy Ramírez

Lead auditor and Technical Expert in Sectoral Scope 1.2

Education:

Electrical Engineer. Universidad Los Andes, 2001

Post grade:

Assessment of Social Projects. Universidad Los Andes, 2005

Environmental Management. Universidad Los Andes, 2016

University of Oxford. Course: Applying Knowledge Management, Principle and Practices (December 1st/ 2009).

University of Oxford. Course: Successful Change Management for Engineers, Scientists and Staff in Hi-tech Companies (December 2nd 2009).

University of Oxford. Course: Essentials of Project Management for Engineers, Scientists and Staff in Hi-tech Companies (December 3rd 2009).

⁶ Salvadorian Transactions Unit is a organization dedicated to operate the transmission system and managing the wholesale electricity market.

University of Oxford. Course: Advanced Project Management for Engineers, Scientists and Staff in Hi-tech Companies (December 4th 2009).
Climate Change, Trade and Standardization - in a development perspective". Stockholm, Sweden(23 and 25 November 2009)
ISO global workshop on Greenhouse Gas Schemes Addressing Climate Change – How ISO Standards Help, Stockholm, Sweden. (20 and 21st November 2009)
Conference on Climate Change – Deforestation and Standardization. Bali, Indonesia (31st May and 1st June 2010)

Professional Background:

FENOGE - Fund for non-conventional energy and efficient energy management (October 2020 – August 2021)

Technical Specialist for IDB Credit 3747/TC-CO

Provide advice and provide technical assistance to the Coordinating Unit of the Credit in the planning, execution, monitoring and control of the Program. Issue technical concepts, formulate the necessary technical guidelines and orientations to carry out the contracts, activities, projects, actions and improvements that are required for the adequate implementation and fulfilment of the goals and indicators of the Program. Prepare the necessary studies and structure the strategies for the adequate execution of the Program, from the technical point of view and oriented to the fulfilment of the investment and impact indicators in the reduction of energy consumption and reduction of GHG emissions in the Archipelago of San Andrés, Providencia and Santa Catalina. Technically support the structuring and elaboration of the documents required in the framework of the contracting according to its modality in the aspects that are within its competence. Suggest the measures and technical updates that may arise for the documents that are an integral part of the Program.

ICONTEC (2010 – 2020 as employee. Since October 2020 as external individual)

Professional of Validation and Verification

Plan, coordinate, execute and guarantee compliance with the evaluation program for projects that reduce the emission of greenhouse gases in different schemes (CDM, VCS, Gold Standard), catalogued in the sectors of renewable energy generation and manufacturing industries (energy efficiency) and transportation projects. Provide training to internal and external company personnel. To elaborate technical norms concerning the subjects of the area, specifically in carbon footprint quantification. Develop special projects assigned on energy efficiency issues. Carry out audits in the energy sector under the Colombian Environmental Seal, GHG Protocol and ISO 14064-1.

ICONTEC (2005 - 2010)

Professional of Standardization

Planning, coordinate, implement and ensure compliance with the program of national standardization in technical committees among which are electrical installations, electrical power quality, electrical transformers, substations and equipment for medium and high voltage, lighting, appliances and electrical accessories, protection against lightning strikes and electrical equipment. Develop technical standards. Develop and manage special projects assigned. Participate in programs of regional and international standardization.

CODENSA (2002 - 2005)

Inspections and electrical works coordinator

Supervise field work and download the results in the central information system, evaluate the inspections performed, reconciled with contractors, addressing the results of inspections to different areas of the company, charging inspections and electrical work to clients of the firm, coordination and support group field sales engineers, technical training for technical staff, administrative support to department business processes and lost control, maintenance of the database for internal management inspections. Project Leader for the Optimization of Technical Processes and Regional Trade in Cundinamarca.

CDM Experience

Lead Auditor

- Validation of Guanaquitas 9.74 MW hydroelectric project, Colombia
- Validation of Fuel Switching through change of furnaces at Imusa S.A., Colombia
- Validation of Installation of a high-pressure/high-efficiency bagasse boiler to cogenerate heat and power, Argentina
- Validation of Cueva Maria Hydroelectric Expansion Project, Guatemala
- Validation of Paysandú Clean Energy, Uruguay
- Validation of La Vegona Hydroelectric project, Honduras
- Validation of Chamelecón 280 Hydroelectric project, Honduras
- Validation of Pardos SHPs and LOGICarbon CDM Project, Brazil
- Validation of Pequi and Sucupira SHPs and LOGICarbon CDM Project, Brazil
- Validation of Cambará and Embaúba SHPs and LOGICarbon CDM Project, Brazil
- Validation of Bonyic hydroelectric project, Panamá
- Validation of METALDOM Fossil fuel switch from reheat furnace, República Dominicana
- Validation of Toachi – Pilaton Hydroelectric Project, Ecuador
- Validation of EMGEA Small Hydropower (SHP) Run-of-the-River CDM Project Bundle, Colombia
- Validation of Energy efficiency at Malvinas Gas Plant, Perú
- Validation of Marañon Hydroelectric Project, Perú
- Validation of Santa Rita Hydroelectric Plant, Guatemala
- Validation of Ventana, Suba and Usaquén Hydroelectric CDM Bundled, Colombia
- Verification of Los Algarrobos hydroelectric project, Panamá
- Verification of Bio energy in General Deheza –Electric power generation from peanut hull and sunflower husk-, Argentina
- Validation of Taurichuco Hydropower Project, Perú
- Validation of Aguafresca Multipurpose and Environmental Service Project, Colombia
- Verification of Agua Fresca Multipurpose and Environmental Service Project, Colombia
- Verification of La Joya Hidroelectric project, Costa Rica
- Verification of Amaime Minor Hydroelectric Power Plant, Colombia

Specialist:

- Validation of Rio Bonito and Baitaca SHPs and LOGICarbon CDM Project, Brazil
- Validation VCS of Pequi and Sucupira SHPs and LOGICarbon CDM Project, Brazil
- Verification of three crediting periods of La Vuelta and la Herradura hydroelectric project, Colombia

CDM Technical Reviewer:

- Validation of improving energy efficiency in a new Gas Plant in Gibraltar - Colombia
- Validation of Tres Valles Cogeneration Project, Honduras
- Validation of Tunjita Diversion Hydroelectric Project, Colombia
- Validation of Ferreira Gomes Hydro Power Plant CDM Project, Brazil
- Verification of two crediting periods of La Venta II, México
- Verification of two crediting periods of La Joya Hidroelectric Project, Costa Rica
- Verification of Bio energy in General Deheza –Electric power generation from peanut hull and sunflower husk-, Argentina
- Verification of Tres Valles Cogeneration Project, Honduras
- Verification of Agua Fresca Multipurpose and Environmental Services, Colombia
- Verification of La Venta II, México
- Verification of two crediting periods of Fertinal Nitrous Oxide Abatement Project, México
- Verification of Co-composting of EFB and POME project, Guatemala
- Verification of Biogas Project, Olmeca III, Tecun Uman, Guatemala
- Verification of Jepirachi Wind Power Project, Colombia
- Verification of Biogas energy plant from palm oil mill effluent, Guatemala
- Verification of Santa Ana Hydroelectric Project, Colombia
- Validation of SHP Morro Azul CDM Project (JUN1164), Colombia

- Verification of Biogas Project, Olmeca III, Tecun Uman, Guatemala

Specialist Technical Reviewer

- Validation of Biogas project, Olmeca I, Santa Rosa, Guatemala
- Validation of CGR Catanduva Landfill Gas Project, Brazil
- Validation of Macaubas Landfill Gas Project, Brazil

Ana Isabel Aubad

Lead Technical Reviewer and Technical Expert Reviewer in Sectoral Scope 1.2

Main professional education:

- International Master (MSc.) “Material and Energy Flow Management”. Universidad Trier, Germany. Area of study in depth: “Use of solid waste for energy generation”. Master's thesis with the biogas company Kompogas. 2005
- “ISO 14000 and ISO 9000 Quality Auditor”. Universidad de Antioquia in association with Bureau Veritas, Medellin, Colombia. 1999
- “Environmental Engineer”. Escuela de Ingeniería de Antioquia, Envigado, Colombia. 1998
- Internship - November 2009: company specialized in design, construction and operation of biogas plants: Chfour Biogas Inc. Ontario, Canada.
- Internship- September 2008: company specialized in design, construction and operation of biogas plants: Agraferm Ag-Luxemburgo.
- Internship- April-May 2007: companies specialized in design, construction and operation of biogas plants (Agraferm, Biogasnord, Ökobit). Germany.
- Practical training – November 2004: “Local Administration of the Environment, Agenda 21 and sustainable development (2 phase)”. Life Academy, San José, Costa Rica.
- Practical training – April-May 2002: “Local Administration of the Environment, Agenda 21 and sustainable development (1 phase)”. Life Academy, Karstad, Sweden.
- Internship – July- August 1999: “Practical training on Environmental Management Systems and Cleaner Production”. Federal Swiss Institute for Research and Materials Testing (EMPA). St.Gallen, Switzerland.

Professional experience:

ISA Group (2018-Present)
Environmental Specialist

Responsibilities:

- Guaranteeing environmental and social compliance in energy projects and assets in operation at the Southern Cone level.
- Identifying and implementing good environmental and social practices based on internal and external references in the region.
- Defining environmental guidelines for the ISA group.
- Consolidating and analyzing environmental and social information for the Dow Jones Sustainability Index, Green Bonds, International Bonds, CDP, and Global Reporting Initiative.

ICONTEC (2006-Present)

Sustainability Professional for Service Provision

- Verifying and validating projects of: Voluntary climate change markets such as VCS, Gold Standard, verification of GHG inventories, verification of carbon footprints, verification of standardized baselines, stamps and sustainability reports, and life cycle assessment.
- Designing and creating programs based on ISO 9000/14000 standards and sustainability.
- Auditing schemes of ISO 9000/14000 standards and Chilean Technical Standards in public and private companies.

G.P.R. S.A. (2006 - 2011)

Project Manager

Co-creator of the environmental engineering company (spin-off) G.P.R.

- Formulating and implementing sustainability, climate change and technological innovation projects applied to energy recovery and the reuse of solid waste.

ISAGEN (2000-2006)

Environmental Analyst

- Designing and implementing EIA and EMP for the construction and operation of hydroelectric and thermal plants.
- Ensuring the environmental legal compliance of the company.
- Designing and monitoring compliance with the company's environmental policies, standards, and procedures (with emphasis on climate change and sustainability of the energy sector).

National Center for Cleaner Production and Environmental Technologies (1999 - 2000)

Environmental Engineer

- Training and advising companies for the implementation of strategies for sustainability, climate change, cleaner production, eco-balances, energy efficiency, alternative energies, and comprehensive solid waste management.

EXPERIENCE IN CLIMATE CHANGE ACTIVITIES

Technical Reviewer:

- Validation of the Second Crediting Period for Providencia I: 1.8MW Small Hydro Power Generation Plant.
- Verification of three periods for "Agua Fresca Multipurpose and Environmental Services Project"
- Validation of "Fuel Switching through change of furnaces at Imusa S.A."
- Validation of "Pirgua Landfill Gas Recovery and Flaring"
- Validation of "Installation of a high-pressure/high-efficiency bagasse boiler to cogenerate heat and power"
- Validation of "Methane Gas Capture and Fuel Switching at Compañía Argentina de Levaduras S.A.I.C. Plant Project"
- Validation of "Cueva Maria Hydroelectric Expansion Project"
- Validation of "Montenegro Landfill Gas Recovery and Flaring"
- Validation of "La Vegona Hydroelectric project"
- Validation of "Chamalecón 280 Hydroelectric project"
- Validation of "Metaldom Fossil fuel switch from reheat furnace"
- Verification of five periods for "Doña Juana Landfill gas-to-energy project"
- Verification of "La Vuelta and la Herradura hydroelectric project"
- Validation "Pardos Small Hydro Plant and LOGICarbon CDM Project"
- Validation "Pequi and Sucupira SHPs and LOGICarbon CDM Project"
- Validation "Cambará and Embaúba SHPs and LOGICarbon CDM Project"
- Validation "Rio Bonito and Baitaca SHPs and LOGICarbon CDM Project"
- Verification of "Landfill Gas to Energy Facility at the Nejapa Landfill Site, El Salvador"
- Verification of "Co-composting of EFB and POME project"
- Verification of "Biogas Project, Olmeca III, Tecun Uman"
- Verification of "Los Algarrobos hydroelectric project"
- Verification of "La Venta II Project2"

- Valitation of “Toachi – Pilaton Hydroelectric Project”
- Validation “EMGEA Small Hydropower (SHP) Run-of-the-River CDM Project Bundle”
- Validation “Marañon Hydroelectric Project” • Verification “Los Algarrobos hydroelectric project”
- Verification “Bio energy in General Deheza –Electric power generation from peanut hull and sunflower husk-“
- Verification of VCS Scheme “Fuel-Switching Project from Fossil Fuels to Biomass in La Providencia, Arcor”
- Verification “BRASCARBON Methane Recovery Project BCA-BRA-02, Brazil”
- Verification “BRASCARBON Methane Recovery Project BCA-BRA-03, Brazil”
- Validation and Verification VCS “BRASCARBON Methane Recovery Project BCA-BRA-02, Brazil”
- Validation and Verification VCS “BRASCARBON Methane Recovery Project BCA-BRA-03, Brazil”
- Validation of “CTR Teresina landfill gas project”
- Validation of “CTR Maceio landfill gas project”
- Validation of “Santa Rita Hydroelectric Plant”
- Validation “Biogas Recovery And Heat Generation From Palm Oil Mill Effluent (Pome), Coopeagropal”
- Verification CDM “BK Energia Itacoatiara Project”
- Verification Gold Standard “BK Energia Itacoatiara Project”
- Validation Gold Standard “Cururos Wind Power Project-Chile” (Sustainability expert)
- Validation “Nuevo Mondoñedo Landfill Gas Recovery, Flaring and Energy Production”
- PRC and validation (new credit period) for: “BRASCARBON Methane Recovery Project
- BCA-BRA-05, Brazil” and “BRASCARBON Methane Recovery Project BCA-BRA-08, Brazil”
- Verification of the 5th period and 1st period of the new credit period: Ciudad Juarez Landfill Gas to Energy Project
- Verification “DOÑA JUANA LANDFILL GAS-TO-ENERGY PROJECT” (Several periods)
- Post Registration Change BRASCARBON Methane Recovery Project BCA-BRA-08
- Post Registration Change BRASCARBON Methane Recovery Project BCA-BRA-05
- Renewal of Crediting Period BRASCARBON Methane Recovery Project BCA-BRA-08
- Renewal of Crediting Period BRASCARBON Methane Recovery Project BCA-BRA-05
- Verification BRASCARBON Methane Recovery Project BCA-BRA-14
- Verification BRASCARBON Methane Recovery Project BCA-BRA-13
- Verification Ciudad Juarez
- Verification BRASCARBON Methane Recovery Project BCA-BRA-04A, Brazil.
- Verification BRASCARBON Methane Recovery Project BCA-BRA-09, Brazil
- Verification BRASCARBON Methane Recovery Project BCA-BRA-15, Brazil
- Verification BRASCARBON Methane Recovery Project BCA-BRA-14
- Verification BRASCARBON Methane Recovery Project BCA-BRA-13
- Verification DOÑA JUANA LANDFILL GAS-TO-ENERGY PROJECT

Specialist (onsite visit) and Auditor:

- Verification of two periods “Biogas energy plant from palm oil mill effluent”
- Validation “Los Angeles Landfill Gas Flaring Project”
- Verification of two periods “Doña Juana Landfill gas-to-energy project”
- Verification “Landfill Gas to Energy Facility at the Nejapa Landfill Site, El Salvador”
- Verification “La Joya hydroelectric project” • Verification “Hydroelectric Santa Ana”
- Verification “Biogas Project, Olmeca III, Tecún Uman”
- Displacement of the electricity of the national electric grid by the auto-generation of renewable energy in the Cañaveralejo Wastewater Treatment Plant in Cali, Colombia

Lead Auditor:

- Verification “BRASCARBON Methane Recovery Project BCA-BRA-05, Brazil”

- Verification “BRASCARBON Methane Recovery Project BCA-BRA-07, Brazil”
- Verification “BRASCARBON Methane Recovery Project BCA-BRA-08, Brazil”
- Verification “BRASCARBON Methane Recovery Project BCA-BRA-04, Brazil”
- Verification “BRASCARBON Methane Recovery Project BCA-BRA-09, Brazil”
- Verification “BRASCARBON Methane Recovery Project BCA-BRA-15, Brazil”
- Verification “BRASCARBON Methane Recovery Project BCA-BRA-13, Brazil”, three verifications
- Verification “BRASCARBON Methane Recovery Project BCA-BRA-14, Brazil”, three verifications
- Validation “Biogas Project, Olmeca I, Santa Rosa”
- Verification “Co-composting of EFB and POME project”
- Validation “CTR Rosario Landfill Gas Project”
- Validation “CTR Feira de Santana Landfill Gas Project”
- Validation “SHP Itaguaçu CDM project (JUN 1146), Brazil”
- Verification “Doña Juana Landfill gas-to-energy project”, two periods
- Verification of two periods for “Biogas Project, Olmeca III, Tecún Uman”
- Verification “Methane recovery and effective use of power generation project Norte III-B Landfill”
- Introduction of the recovery and combustion of Methane in the existing sludge treatment system of the Cañaveralejo Wastewater Treatment Plant in Cali, Colombia (Post registration change PDD and three Verifications)
- Assessment Report for CDM proposed standardized baseline: “Standardized baseline for the sector of brick production in Colombia”. Client: Climate Change Division of the Ministry of Environment and Sustainable Development of Colombia.
- Post Registration Changes (PRC) for PDDs “BRASCARBON Methane Recovery Project BCA-BRA-04A, Brazil”, BRASCARBON Methane Recovery Project BCA-BRA-13, Brazil” and BRASCARBON Methane Recovery Project BCA-BRA-14, Brazil”
- Verification and Post Registration Change Ciudad Juarez Landfill Gas to Energy Project

Lead auditor in voluntary schemes:

- Validation and verification of VCS “BRASCARBON Methane Recovery Project BCA-BRA05, Brazil”
- Validation and verification of VCS “BRASCARBON Methane Recovery Project BCA-BRA07, Brazil”
- Validation and verification of VCS “BRASCARBON Methane Recovery Project BCA-BRA08, Brazil”
- Verification VCS of “Montañitas hydroelectric project”

Appendix 3. Documents reviewed or referenced

No.	Author	Title	References to the document	Provider
/1/	LaGeo, S. A de C.V.	Approved Project Design Document (PDD) for the second crediting period LaGeo, S. A. de C. V., Berlin Geothermal Project, Phase Two	Version 21 dated on January 28 th /2014	PP
/2/	LaGeo, S. A de C.V.	Revised Project Design Document (PDD) for the third crediting period LaGeo, S. A. de C. V., Berlin Geothermal Project, Phase Two	<ul style="list-style-type: none"> • Version 01 dated on November 5th/2021. • Version 22 dated on November 5th/2021. 	PP

No.	Author	Title	References to the document	Provider
			<ul style="list-style-type: none"> Version 23 dated on December 7th/2021. 	
/3/	LaGeo, S. A de C.V.	Spreadsheet used for the calculations of estimated ERs for the third crediting period of LaGeo, S. A. de C. V., Berlin Geothermal Project, Phase Two.	Files: <ul style="list-style-type: none"> Emissions_reductions_calculation_2021_v01.xlsx Emissions_reductions_calculation_2021_v02.xlsx Emissions_reductions 	PP
/4/	LaGeo, S. A de C.V.	Spreadsheet used for the calculation of emission factor of Salvadorian interconnected electrical grid.	Files: <ul style="list-style-type: none"> REN_EF_calculation__2021v1.xlsx REN_EF_calculation__2021_v2.xlsx REN_EF_calculation__2021_v4.xlsx 	Other
/5/	ICONTEC	Validation report for renewal of crediting period of LaGeo, S. A. de C. V., Berlin Geothermal Project, Phase Two.	Report N°. CDMRE-13-001-02, dated on January/2014	Other
/6/	DNV Certification, International Climate Change Services	Validation report for registration purpose of LaGeo, S. A. de C. V., Berlin Geothermal Project, Phase Two.	Report No: 2005-1447, revision 01. Dated on March 3 rd /2006	Other
/7/	Salvadorian Congress	Decree N° 843 General Electricity Law	Issued on October 21 st /1996	Other
/8/	Salvadorian Congress	Regulation of General Electricity Law	Issued on January 22 nd /2008	Other
/9/	Salvadorian Congress	Law on tax incentives for the promotion of renewable energies in electricity generation.	Issued on January 22 nd /2008	Other
/10/	UT	2020 Statistical Bulletin	Published on January 22 nd /2021	Other
/11/	UT	Regulation of Transmission System Operation and Wholesale Market Based on Production Costs	Issued on July 1 st /2011	Other
/UN1/	UNFCCC	Approved consolidated methodology ACM0002 Grid-connected electricity generation from renewable sources, version 20.0		Other
/UN2/	UNFCCC	CDM validation and verification standard for project activities, version 03.0		Other
/UN3/	UNFCCC	CDM project standard for project activities, version 03.0		Other
/UN4/	UNFCCC	CDM project cycle procedure for project activities, version 03.0		Other
/UN5/	UNFCCC	Tool to calculate the emission factor for an electricity system, version 07.0.0		Other
/UN6/	UNFCCC	Methodological Tool for 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		Other
/UN7/	UNFCCC	Project Design Document		Other

No.	Author	Title	References to the document	Provider
		form, version 12.0		
/UN8/	UNFCCC	Methodological tool for Baseline, project and/or leakage emissions from electricity consumption and monitoring of electricity generation, version 03.0		Other

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

Table 1. CL from this validation

CL ID	1	Section no.	D.1	Date: 19/11/2021
Description of CL				
<p>The PP does not follow the instructions for completing the PDD form on these sections:</p> <ul style="list-style-type: none"> On the front page: PDD version and applied methodology. Figure 2 has texts in Spanish. On section B.1: the listed methodological tools are incomplete. On section B.3: the table in the form to describe emissions sources and GHGs included in the project boundary was altered. It was not possible to trace the web link reference in Figure 4. <p>CDM project standard for project activities, version 03.0, paragraph 280 CDM validation and verification standard for project activities, version 03.0, paragraph 402 and 403. Project design document form, version 12.0. Attachment. Instructions for completing this form.</p>				
Project participant response				Date: 03/12/2021
New version of the PDD has been provided to the validation team. Updated version addresses the mistakes stated in this CL				
Documentation provided by project participant				
Updated version PDD version 22				
DOE assessment				Date: 07/12/2021
<p>The lead auditor reviewed the version 22 of PDD and:</p> <ul style="list-style-type: none"> The date of version 22 of PDD, which responses findings during the desk review and onsite visit, has a date before those events. The figure 2 still has texts in Spanish. On section B.1, the listed methodological tools are complete. However it is repeated the Methodological tool Baseline, project and/or leakage emissions from electricity consumption and monitoring of electricity generation Version 03.0. In table on Section B.3, it is included as project emissions: "CO₂ emissions from combustion of fossil fuels for electricity generation in solar thermal power plants and geothermal power plants" however in the spreadsheet used for emissions reduction calculation It is not included the calculations for those project emissions. 				
Project participant response				Date: 08/12/2021
Open issues have been amended.				
Documentation provided by project participant				
New version of the PDD is submitted for EOD assesment				
DOE assessment				Date: 09/12/2021
In the updated version of PDD (dated December 7 th /2021) the correction requested by the lead auditor were made.				
<p>Audit team conclusion: Closed.</p>				

Table 2. CAR from this validation

CAR ID	1	Section no.	D.3	Date: 19/11/2021
Description of CAR				
<p>The description provided for the assessment of the continuation of use of current baseline equipment(s)(Step1.3) in the revised PDD is not coherent with the baseline stated in the applied methodology.</p> <p>CDM project standard for project activities, version 03.0, paragraph 283. CDM validation and verification standard for project activities, version 03.0, paragraph 404. Methodological Tool for the 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. Step 1.3. Approved consolidated methodology ACM0002, version 20.0, paragraph 23.</p>				
Project participant response				Date: 03/12/2021
Description of the baseline has been corrected in line with paragraph 23 of the methodology and other relevant requirements-				
Documentation provided by project participant				
Updated version PDD version 22				
DOE assessment				Date: 07/12/2021
<p>In the updated version 22 of PDD, the PP has described the baseline in accordance with the applied methodology.</p> <p>Audit team conclusion: Closed</p>				

CAR ID	2	Section no.	D.4	Date: 19/11/2021
Description of CAR				
<p>It was not possible to trace the values used for electricity generated by the power plants connected to the electrical interconnected grid of El Salvador in the spreadsheet sent to the document review before the onsite inspection, against the UT values reviewed during the interviews.</p> <p>Methodological tool to calculate the emission factor for an electricity system, version 07.0, paragraph 17</p>				
Project participant response				Date: 03/12/2021
Data and sources have been provided to the validation team				
Documentation provided by project participant				
Information to track the calculation is provided (INyecctions, Hourly generation, etc)				
DOE assessment				Date: 07/12/2021
<p>The lead auditor reviewed the updated spreadsheet used for the calculation of emission factor of Salvadorian electrical interconnected system, and the figures for the electrical generation of power plant connected was traced to UT figures reviewed in the onsite visit interviews.</p> <p>Audit team conclusion: Closed</p>				

CAR ID	3	Section no.	D.4	Date: 19/11/2021
Description of CAR				
<p>For the build margin emission factor to be used during the third crediting period, the PP does not follow the provisions stated in the Methodological tool to calculate the emission factor for an electricity system.</p> <p>Methodological tool to calculate the emission factor for an electricity system, version 07.0, paragraph 72 (a).</p>				
Project participant response				Date: 03/12/2021
Build margin has been applied as option 1-a of the tool.				
Documentation provided by project participant				
Updated version of the PDD version 22				
DOE assessment				Date: 07/12/2021

<p>The lead auditor reviewed the updated spreadsheet used for the calculation of emission factor of Salvadorian electrical interconnected system, and it was used the value for the build margin emission factor in accordance with the provisions <i>stated in the Methodological tool to calculate the emission factor for an electricity system.</i></p> <p>Audit team conclusion: Closed</p>
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CAR ID	4	Section no.	D.4	Date: 19/11/2021
Description of CAR				
<p><i>It was not possible to trace the values used for the project emissions presented in the spreadsheet with emission reductions calculations forecast for the third crediting period.</i></p> <p><i>Approved consolidated methodology ACM0002, version 20.0. Section 5.4.2.</i></p>				
Project participant response				Date: 03/12/2021
<p><i>The values are the same used in previous crediting period.</i></p>				
Documentation provided by project participant				
DOE assessment				Date: 07/12/2021
<p>The answer provided by the PP to CAR 4 does not response the query by the lead auditor.</p>				
Project participant response				Date: 08/12/2021
<p>Value ex ante for some of the parameters (EG_{historical}; σ_{historical}; DATE_{BaselineRetrofit}) applied for the third crediting period, are the same used in first and second crediting period. From our point of view, these parameters refers to a pre-project situation. As per PDD version 21 (second crediting period), EG_{historical} (Average historical energy of the existing units) applied for this period, is calculated using years 2002;2003;2004;2005;2006 (which corresponds to the previous years of the first crediting period), therefore the value applied (440,843) and the Standard deviation, σ_{historical} (12.904) in the second crediting period are the same values used for the registration of the PDD.</p>				
Documentation provided by project participant				
DOE assessment				Date: 09/12/2021
<p>The PP has provided the answer for the baseline emissions parameters (EG_{historical}; σ_{historical}; DATE_{BaselineRetrofit}). However, the lead auditor is asking about the figures, and how to trace the values used for the project emissions presented in the spreadsheet with emission reductions calculations forecast for the third crediting period. Please refer to the applied methodology, section 5.4.2.</p>				
Project participant response				Date: 13/12/2021
<p>Values for the calculation of ex ante project emissions have been updated in line with request from lead auditor. In this case, the figures included in the PDD are those stated in the latest verified Monitoring Report for the project activity (year 2017)</p>				
Documentation provided by project participant				
<p>Appudated version of the PDD (v04) and updated version of the emissions reduction calculation spreadsheet (v04)</p>				
DOE assessment				Date: 13/12/2021
<p>The PP has used the values used to calculate the project emissions for the lastest CERs issued for the project activity (fourth monitoring period of the second crediting period – Year 2017), The audit team considered this value as conservative regarding to the value of project emissions used for registration purposes and for previous renewal of crediting period.</p> <p>Audit team conclusion: Closed</p>				

Table 3. FAR from this validation

FAR ID	1	Section no.	N/A	Date: 12/11/2021
Description of FAR				
<p><i>In accordance with the provisions stated in paragraph 7 (c) of meeting report of CDM Executive Board 108th meeting, it is requested to PP</i></p> <p><i>(i) Apply any global warming potential values that may be adopted by the CMP for that period in their monitoring reports for any emission reductions achieved on or after 1 January 2021; and</i></p> <p><i>(ii) Update their project or programme design documents in accordance with any requirements of the CMP guidance.</i></p>				
Project participant response				Date: 03/12/2021
<p>Global warming potential of methane valid for the third commitment period applied in line with EB 108 meeting report, paragraphs 7–8.. 21 tCO₂e/tCH₄</p>				
Documentation provided by project participant				
Updated version of the PDD version 22				
DOE assessment				Date: 07/12/2021
<p>The instruction provided by the CDM Executive board in its 108th meeting shall be followed by the project activity for the third crediting period.</p> <p>Audit team conclusion: Open</p>				

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Document information

Version	Date	Description
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) and version 02.0 of the “CDM project cycle procedure for project activities” (CDM-EB93-A06-PROC); Make editorial improvements.
02.0	31 October 2017	Revision to align with the requirements of the “CDM validation and verification standard for project activities” (version 01.0).
01.0	23 March 2015	Initial publication.

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