



**Verification and certification report form 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	Suba and Usaquen hydroelectric CDM umbrella project 9798
Scale of the project activity	<input type="checkbox"/> Large-scale <input checked="" type="checkbox"/> Small-scale
Version number of the verification and certification report	03.0
Completion date of the verification and certification report	19/05/2020
Monitoring period number and duration of this monitoring period	Second monitoring period 01/01/2016 – 31/12/2018
Version number of the monitoring report to which this report applies	03
Crediting period of the project activity corresponding to this monitoring period	Renewable 04/06/2014 – 03/06/2021 Seven Years
Project participants	Empresa de Acueducto y Alcantarillado de Bogotá E.S.P- EAAB
Host Party	Colombia
Applied methodologies and standardized baselines	Applied small-scale methodology AMS-I.D Grid connected renewable electricity generation, version 17.0
Mandatory sectoral scopes	1- Energy industries (renewable - / non-renewable sources)
Conditional sectoral scopes, if applicable	N/A
Estimated amount of GHG emission reductions or GHG removals for this monitoring duration in the registered PDD	31,272 tCO ₂ e
Certified amount of GHG emission reductions or GHG removals for this monitoring period	21,468 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 verification and certification report	 Juan Sebastian Salazar Technical Director

SECTION A. Executive summary

ICONTEC performed the 2nd periodic verification of the registered CDM project Suba and Usaquen hydroelectric CDM umbrella project¹ in Colombia on the basis of UNFCCC criteria contained in Article 12 of the Kyoto Protocol and CDM modalities and procedures according to the Marrakech Agreement, the criteria of the CDM Executive Board and the host country, as well as the operational and technical monitoring criteria specific to this type of project.

The proposed project activity under this verification process is based on methodology AMS-I.D: Grid connected renewable electricity generation, version 17.0. The project involves the installation of two small run-of-river hydroelectric plants (Suba and Usaquen), which take advantage of the water flow supply system of Bogotá. The project activity has a total effective capacity of 3.77 MW (rated capacity of turbine-generator system). The energy produced by this project activity will be delivered to the Colombian electrical grid.

The verification process consisted of the following three phases:

- I. Desk review of the monitoring documentation, registered PDD, validation report and if apply, previous verification reports and relevant information (e.g. IPCC reports).
- II. On-site visit and follow up interviews with project stakeholders
- III. Resolution of outstanding issues and the issuance of the final verification and certification report.

The review of the monitoring documentation, registered PDD, validation report, relevant information and interviews during the on-site visit allowed ICONTEC to collect enough evidence to completely assess the verification criteria and determinate that the project has been implemented as planned and as it has been described in the registered PDD version 04.0. Emission reductions were correctly calculated based on the PDD and the monitoring equipment with an impact on the claimed emission reductions work reliably. The monitoring system is in place and has been calibrated appropriately. ICONTEC can confirm that the GHG emission reductions are calculated without material misstatements.

SECTION B. Verification team, technical reviewer and approver

B.1. Verification 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 review	On-site inspection	Interview(s)	Verification findings
1.	Team Leader and Technical Expert in Sectoral Scope 1.2	IR	Ramirez	Francy	Employee	✓	✓	✓	✓

¹ The audit team confirmed that monitoring periods have been consecutive. Likewise, the audit team confirmed that monitoring reports have been published on the UNFCCC CDM website in a consecutive manner

B.2. Technical reviewer and approver of the verification and certification report

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	IR	Santos	Diana	Employee
2.	Technical Expert Reviewer in Sectoral Scope 1.2	ER	Gomez	Fernando	Freelance
3.	Approver	IR	Salazar	Juan Sebastian	Employee

SECTION C. Application of materiality**C.1. Consideration of materiality in planning the verification**

No.	Risk that could lead to material errors, omissions or misstatements	Assessment of the risk		Response to the risk in the verification plan and/or sampling plan
		Risk level	Justification	
1.	Human error in the quantification of emissions	Low	The monitoring data is exported directly from XM Web page, so there is low potential risk of errors/errors, omissions or misstatements.	To cross check 100% of electricity generation stated in Excel ER spreadsheet with the information available in XM Web page.
2.	Undue reliance on a designed information system, which may lead to Omissions and misstatements in data transfer from raw data into digital Excel ER spreadsheet	Low	Ineffective quality control of data transfer due to unclear QA/QC procedure.	Check Quality Management procedures and instructives. PP may demonstrate how to transfer data and how this is crosschecked. Conduct interviews with related personnel whether procedure is actually conducted but not adequately described.
3.	Calibration delays on monitoring equipment	Low	The last calibration activities to electric meters installed at the delivery point to Colombian electrical grid were performed on January 2017 (Usaquen) and January 2017 (Suba). In accordance with Colombian electrical measurement code /5/, these meter shall be calibrate every four years	In the audit plan was included the review of all the calibration certificates (100%).
4.	Missing data due to failure of measurement equipment	Low	The monitoring plan defines emergency procedures in case a meter fails. Besides back-up meters are either installed or available onsite for fast exchange.	Check if related meters are installed as per monitoring plan. Check if emergency procedure is known across related personnel via interviews. Check back-up meters on correct calibration.
5.	Possibility of post-registration changes	Medium	Inasmuch as this is the second verification process after the registration of the project activity, maybe the	In the audit plan was included a tour by the facilities of both hydroelectric power plants

			implementation of the project activity could vary from the original project design described in the registered PDD	
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In order to assess possible material misstatements it was established a threshold based on the provisions stated in the VVS/UN2/ paragraph 326 (e), 5 per cent of the emission reductions, for this project activity:

$$7,156^2 \text{ tCO}_2\text{e} \times 5\% = 358 \text{ tCO}_2\text{e}$$

C.2. Consideration of materiality in conducting the verification

A risk assessment was undertaken by the verification team by means of onsite physical inspection, and document review. The audit team checked the 100% of the possible material misstatements, hence, no sampling plan was required in the monitoring plan. The verification team is able to confirm that all material misstatements were properly conducted and the required corrections were performed by the PP on the version 02 of the MR.

SECTION D. Means of verification

D.1. Desk/document review

The verification of the project documentation provided by the project proponent is based upon both quantitative and qualitative information on emission reductions. Quantitative information comprises the reported numbers in the monitoring report submitted. Qualitative information comprises information on internal management controls, calculation procedures, and procedures for transfer of data, frequency of emission reports, and review and internal audit of calculations.

Main documents reviewed during the desk review stage:

- Registered PDD version 04.0, dated on April 25th/2014 /2/
- Previous validation report issued by ICONTEC, dated on May 19th/2014 /3/
- Previous verification report for first monitoring period (04/06/2014 – 31/12/2015) issued by ICONTEC, dated on May 12th/2017 /23/
- Monitoring report as submitted to UNFCCC, version 01, dated on August 30th/2019 /1/
- Emission reduction calculation file (Emission_reductions_CDM_Suba-Usaquen_2016-2019.xlsx) /4/

In addition to the monitoring documentation provided by the project proponent, ICONTEC reviewed:

- Methodology AMS-I.D: Grid connected renewable electricity generation, version 17.0 /UN1/
- CDM validation and verification standard for project activities, version 02.0 /UN2/
- CDM project standard for project activities, version 02.0 /UN3/
- CDM project cycle procedure for project activities, version 02.0 /UN4/
- Guideline on the application of materiality in verifications, version 02.0 /UN5/
- Monitoring report form for CDM project activity, version 07.0 /UN6/

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

² This is the value of estimated emission reduction per year (21,468 tCO₂e ÷ 3 years)

D.2. On-site inspection

Duration of on-site inspection: 30/10/2019 to 31/10/2019				
No.	Activity performed on-site	Site location	Date	Team member
1.	Tour by the project's facility	Project sites located in Suba and Usaquen in Bogota, Colombia	30/10/2019	Francy Ramírez
2.	Visit to the interconnection Point (Usaquen substation and Morato Substation)			
3.	Verification of the monitoring system in place			
4.	Verification of compliance of the project implementation with the registered project design document			
5.	Verification of operational and maintenance activities			
6.	Description of the nature of the project, its implementation and its operation	EAAB's office located in Carrera 33 – Calle 17 in Bogota	31/12/2019	
7.	Compliance of the monitoring report with the monitoring report form			
8.	Compliance of the project implementation and operation with the registered PDD			
9.	Possible post-registration changes			
10.	Compliance of the registered monitoring plan with the methodologies including applicable tools and standardized baselines			
11.	Compliance of monitoring activities with the registered monitoring plan			
12.	Compliance with the calibration frequency requirements for measuring instruments			
13.	Assessment of data and calculation of emission reductions			

D.3. Interviews

No.	Interviewee			Date	Subject	Team member
	Last name	First name	Affiliation			
1.	Sanchez	Juan Carlos	Specialized professional EAAB	30/10/2019 to 31/10/2019	<ul style="list-style-type: none"> • Description of the nature of the project, its implementation and its operation • Compliance of the monitoring report with the monitoring report form • Compliance of the project implementation and operation with the registered PDD • Possible post-registration changes • Compliance of the registered monitoring plan with the methodologies including applicable tools and standardized baselines • Compliance of monitoring activities with the registered monitoring plan • Compliance with the calibration frequency requirements for measuring instruments • Assessment of data and calculation of emission reductions • Tour by the project's facility • Visit to the interconnection Point (Sogamoso substation) • Verification of the monitoring system in place • Verification of compliance of the project implementation with the registered project design document • Verification of operational and maintenance activities 	Francy Ramírez
2.	Forero	Natasha	Environmental Professional EAAB			
3.	Lopez	Jose	Specialized professional EAAB			
4.	Navarro	Ivone	Control Centre Chief EAAB			
5.	Lizarazo	Guillermo	Central Network Director EAAB			
6.	Ramirez	Daniel	Electro-mechanic EAAB			
7.	Cruz	Martha	Specialized professional EAAB			
8.	Pacheco	Andrea	CDM Technical Consultant EBT			

D.4. Sampling approach

ICONTEC checked the 100% of project's information hence, no sampling approach was required.

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

Areas of verification findings	No. of CL	No. of CAR	No. of FAR
Compliance of the monitoring report with the monitoring report form	CL 1	-	-

Compliance of the project implementation and operation with the registered PDD	-	-	-
Post-registration changes	-	-	-
Compliance of the registered monitoring plan with the methodologies including applicable tools and standardized baselines	-	-	-
Compliance of monitoring activities with the registered monitoring plan	-	-	-
Compliance with the calibration frequency requirements for measuring instruments	-	CAR 2	-
Assessment of data and calculation of emission reductions or net removals	-	CAR 1	-
Assessment of reported sustainable development co-benefits	-	-	-
Global stakeholder consultation	-	-	-
Others (please specify)	-	-	-
Total	1	2	0

SECTION E. Verification findings

E.1. Compliance of the monitoring report with the monitoring report form

Means of verification	<p>Monitoring report version 01 was submitted to the verification team by the project participants on September 10th/2019. ICONTEC has made this report publicly available on September 12th/2019, prior to the start of the verification activities. No comments were received.</p> <p>During desk review, previous to the onsite visit, the audit team contrasted the Instructions for filling out the monitoring report form with the document made /UN7/, mistakes and clarifications were identified and corrections was requested.</p>
Findings	CL 1. More details about this finding in Appendix 4.
Conclusion	<p>ICONTEC verified through documental review that the latest version of the MR form for the 2nd monitoring period was applied.</p> <p>It can be confirmed that the monitoring report is complete, transparent and in accordance with the revised PDD, relevant CDM requirements and applicable monitoring report from. ICONTEC confirms that the MR version 03 is free of material misstatements.</p>

E.2. Remaining forward action requests from validation and/or previous verifications

There are no remaining forward action requests from previous verification process.

E.3. Compliance of the project implementation and operation with the registered project design document

Means of verification	<p>At the time of the desk review, the audit team assessed the implementation of the project reported on MR version 01, against the one established on the registered PDD. No inconsistencies were found.</p> <p>During the onsite visit, the implementation status and monitoring plan reported on MR/1/ were compared with the onsite evidence, physical inspection and interviews. No inconsistencies were found.</p> <p>The status of implementation, progress and operation's starting date for each phase are shown on the next table:</p>
Implementation Status	
Phase/Site	<p>Start of operation:</p> <p>Two hydroelectric run-of river power generation projects with a total effective capacity of 3.77 MW (rated capacity of turbine-generator system)</p>

	Status of Implementation	Operation started	Operation Started
	Progress	There was no delay or interruptions in the implementation	
	Operation	Both power plants began delivery of electrical energy to the Colombian electrical grid on April 15 th /2013 as the audit team verified by means of documental review of The Webpage of Colombian Electrical Wholesale market administrator (XM) ³	
	Comments	The project activity is already implemented and it is currently operating as it was described in the registered PDD/2/.	
	Likewise the audit team reviewed the periodic maintenance activities for the equipment involved in the project activity which covers the entire monitoring period /6/→/11/. These maintenance activities ensure a proper operation of the project activity.		
	The audit team verified the electricity generation data with 0 MWh of generation ⁴ in the spreadsheet with ERs calculation /4/ with the electricity generation reported in the information service about the Colombian Wholesale Power Market operated by XM. The information provided by the PP is coherent, traceable and reliable with other information sources.		
Findings	No finding was raised regarding to this issue		
Conclusion	The audit team can confirm that: <ul style="list-style-type: none"> • The implementation of the project is consistent with the information provided in the registered PDD (Physical features such as technology project equipment, monitoring and metering equipment) • The project is operated as per the registered PDD. • Information provided in the MR is in accordance with that stated in the registered PDD. 		

E.4. Post-registration changes

E.4.1. Temporary deviations from the registered monitoring plan, applied methodologies, standardized baselines or other methodological regulatory documents⁵

No temporary deviations have been approved by the CDM Executive Board for this monitoring period or will be submitted with the request for issuance.

E.4.2. Corrections

No corrections have been approved by the CDM Executive Board. Moreover there are no corrections to project information or parameters fixed at validation, as it was described in the registered PDD made by the project participant during the current monitoring period.

E.4.3. Changes to the start date of the crediting period

No change to the start date of the crediting period has been approved by the CDM Executive Board. Moreover the project participant did not change the start date of the crediting period during the current monitoring period.

E.4.4. Inclusion of a monitoring plan

³ <http://paratec.xm.com.co/paratec/SitePages/generacion.aspx?q=capacidad>

⁴ The most of the events with 0 MWh corresponds to overhauls, maintenance activities (predictive or corrective)

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).

No inclusion of a monitoring plan has been approved by the CDM Executive Board. Moreover there is no inclusion of a monitoring plan to the registered project activity during this monitoring period.

E.4.5. Permanent changes from registered monitoring plan, or permanent deviation of monitoring from the applied methodologies, standardized baselines or other methodological regulatory documents

No permanent change from registered monitoring plan, nor permanent deviation of monitoring from the applied methodologies other methodological regulatory documents has been approved by the CDM Executive Board. Moreover, there are no permanent changes from the registered monitoring plan and/or methodology identified during the current monitoring period.

E.4.6. Changes to the project design

No permanent change from registered monitoring plan has been approved by the CDM Executive Board. Moreover, there are no proposed or actual changes to the project design of the registered CDM project activity reported or identified during the current monitoring period.

E.4.7. Changes specific to afforestation and reforestation project activities

This kind of changes does not apply to this project.

E.5. Compliance of the registered monitoring plan with applied methodologies, applied standardized baselines, and other applied methodological regulatory documents

Means of verification	During the desk review phase, it was checked the monitoring plan against the monitoring methodology AMS-I.D, version 17.0./UN1/ ICONTEC declares that the registered monitoring plan is in accordance with the approved methodology AMS-I.D, version 17 and the registered PDD version 04.0 /2/
Findings	There is no finding regarding to this issue
Conclusion	According to the registered PDD /2/, the CDM project activity Suba and Usaquen hydroelectric CDM umbrella project was monitored following the guidelines of the approved monitoring methodology AMS-I.D: Grid connected renewable electricity generation, version 17.0

E.6. Compliance of monitoring activities with the registered monitoring plan

E.6.1. Data and parameters fixed ex ante or at renewal of crediting period

Means of verification	The monitoring parameters related to the GHG emission reductions in the project activity have been implemented in accordance with the monitoring plan contained in the registered PDD /2/.										
	The following table describes the parameters that were determined ex-ante and not monitored during the monitoring period:										
	<div>Parameters Determined Ex-Ante in the Registered PDD</div> <table><tr><th>Parameter</th><th>Description</th><th>Value</th><th>Source</th></tr><tr><td>EF_{grid,y}</td><td>Combined margin CO₂ emission factor in year y.</td><td>0.38115 tCO₂e/kWh</td><td>This value was calculated once at the request of registration of the project activity as it was established in the registered PDD /2/</td></tr></table>				Parameter	Description	Value	Source	EF _{grid,y}	Combined margin CO ₂ emission factor in year y.	0.38115 tCO ₂ e/kWh
Parameter	Description	Value	Source								
EF _{grid,y}	Combined margin CO ₂ emission factor in year y.	0.38115 tCO ₂ e/kWh	This value was calculated once at the request of registration of the project activity as it was established in the registered PDD /2/								

	In section B.6.2 of the registered PDD, titled: “ <i>Data and parameters fixed ex ante</i> ”, it is listed the parameters, and its values, used to calculate the emission factor (ex-ante) for national electrical interconnected grid of Colombia at validation time and then used for emission reductions estimation at that time. The calculation of the Colombian electrical grid emission factor and proper use of these parameters it was already assessed at validation time.
Findings	There is no finding regarding to this issue
Conclusion	ICONTEC can determine that the data sources and assumptions are appropriate and calculations are correctly used on the PDD version 04.0 and result in a conservative estimate of the emission reductions on the spreadsheet 120520 CDM-Suba and Usaquen Emission reductions_Calculation-V3.xlsx /4/.

E.6.2. Data and parameters monitored

Means of verification	The monitoring parameter related to the GHG emission reductions in the project activity has been implemented in accordance with the monitoring plan contained in the registered PDD /2/.			
	The following table includes the parameter monitored and describes how ICONTEC verified the fulfillment of this parameter with the registered monitoring plan, including the information flow and the values as reported in the MR/1/.			
	Monitored Parameters			
	Monitored Parameter	EG _{facility,y} (EG _{BL,y})		
	Description	Net electricity generated and supplied to the grid by the project activity in the year <i>y</i>		
	Value	56,348.327 MWh		
		Year	Suba (MWh)	Usaquen (MWh)
		2016	11,555.637	6,780.117
		2017	12,266.239	8,442.770
		2018	8,382.830	8,920.734
		Total	32,204.706	24,143.621
	Means of Verification	Source of Data and Frequency:		
		Hourly transmission of the information to XM is done by EMGESA via Internet using the digital and coded mechanisms defined for all the agents of the Wholesale Power Market. The databases for recording the operations of the Colombian market are managed by XM. It is worth to mention that EMGESA does the transmission of information based on the data transmitted by the measurement systems located in Morato (Suba) and Usaquen Electrical Substations, respectively.		
		These substations are owned by CODENSA, the local distributor and grid operator. ICONTEC verified that the connection point of the transmission line from both hydroelectric power plants to its respective substation, which, in fact, are the commercial frontiers registered by the project responsible in the National Dispatch Center – CND.		
		For this parameter the PP used the information recorded by CND. This data is publicly available, and ICONTEC verified by documental review that the information used for this parameter and hence utilized in the emissions reduction calculation are credible and reliable.		
		Used Equipment:		
		Two power meters installed in the commercial frontier (Suba and Usaquen Electrical Substations, respectively) by power plant (Four power meters in total). These have identical Schneider Electric features ⁶ ,		

⁶ Schneider Electric Meters:
Model: POWERLOGIC ION8650

Voltage: 57-277 V

Current: 2.5A

Class: 0.2S

	<p>with an accuracy of 0.2 IEC. Since these four power meters are installed in the commercial frontier, they fulfill the requirement stated in Regulation CREG 038 /5/ article 8 therefore, they record the net electricity generation delivered to the Colombian electrical grid by a power plant (electricity generated and delivered to the grid minus electricity consumed from the grid by a power plant).</p> <p>Data Cross Checking:</p> <p>In order to verify the data provided by the PP in the spreadsheet used for emission reduction calculations, ICONTEC reviewed the electricity generation reported in the information service of the Colombian Wholesale Power Market operated by XM⁷. After this review the audit team concluded that information provided by PP is reliable, coherent, consistent and traceable with secondary sources of information.</p> <p>Consistency Between the QA/QC Defined in the Methodology:</p> <p>In table 1 of the applied methodology /UN1/ it was stated as the performance of calibration activities for the measurement equipment. As it will explained in the Section E.7 of this verification report.</p> <p>Consistency Between the QA/QC Established by the Project Participants in the PDD:</p> <p>In section B.7.1 of the registered PDD, the PP listed procedures for power plant operation and for power plant maintenance. During the onsite visit, it was verified the execution of all those procedures guaranteeing proper functioning of both hydroelectric power plants.</p> <p>ICONTEC could verify that according to the monitoring plan approved in the PDD and the methodology AMS.I-D, version 17.0, the data from electricity generation from the project activity can be checked and it is available in the XM information platform, on the other hand, this monitoring plan is in accordance with the rules established by Colombian Electrical Authorities /5/.</p> <p>Application of Default Values:</p> <p>Not applicable</p>
Findings	No finding was raised on this issue.
Conclusion	<p>ICONTEC could verify the completeness and integrity of the data used by the project proponents for the emission reductions calculations. During the verification, ICONTEC was able to verify that the parameter is properly measured according to the monitoring plan and the registered PDD, and that the information is consistent with the secondary information sources used to verify the information.</p> <p>ICONTEC can conclude that the data aggregation is appropriate to comply with the methodology and it is in accordance with the registered PDD.</p> <p>In conclusion the process of data management, transfer, storage and reporting was carried out in compliance with the monitoring plan, the registered PDD /2/ and the methodology AMS.I-D version 17/UN1/ .</p> <p>ICONTEC can thus conclude that:</p> <p>The monitoring has been carried out in accordance with the monitoring plan contained in the registered PDD.</p> <p>All parameters stated in the monitoring plan of the registered PDD have been correctly and sufficiently monitored and listed. The monitored data for required parameters have been verified by ICONTEC and have been found complete, reliable and consistent.</p>

⁷ Available at <http://informacioninteligente10.xm.com.co/oferta/Paginas/HistoricoOferta.aspx>

E.6.3. Implementation of sampling plan

Means of verification	The PP did not apply a sampling approach for the determination of data and parameters monitored.
Findings	There is no finding regarding to this issue
Conclusion	No sampling approach was applied by the PP in order to determine the monitored parameters.

E.7. Compliance with the calibration frequency requirements for measuring instruments

Means of verification	<p>The following table includes the current monitoring equipment for the parameter $EG_{\text{facility},y}$ ($EG_{\text{BL},y}$) above mentioned and the information on equipment identification and calibration records. ICONTEC verified that there was not a delay in the calibration activities during the monitoring period under assessment for all four electric measurement equipment.</p>	
	Monitoring Equipment	
	Parameter	<p>$EG_{\text{facility},y}$ ($EG_{\text{BL},y}$)</p> <p>Net electricity generated and supplied to the grid by the project activity in the year y</p>
	Calibration Frequency	<p>In accordance with the monitoring plan in the registered PDD (Section B.7.1): At least once every two years.</p> <p>Although it exists calibration frequency defined for electricity meters on the monitoring plan/2/; there is a mandatory document in force since March 2014 for every commercial frontier (delivery point to electrical Colombian grid): Resolution 038 issued by CREG/5/. In this regulatory framework, the calibration frequency for the measurement equipment for electricity generated by power plants, like Suba and Usaquen hydroelectric power plants, which delivers to Colombian electrical grid, is four years. In order to clarify how the project activity met the requirement of this mandatory document, the audit team raised CAR 2.</p> <p>In accordance with the provisions stated in the methodological tool for Baseline, project and/or leakage emissions from electricity consumption and monitoring of electricity generation, version 03.0, Section 7.2, Data / Parameter table 12, page 23 /UN7/:</p> <p><i>"The project participants do not need to apply for post registration changes in the following situations and the change shall be described in the subsequent monitoring report and verification report: ...</i></p> <p><i>(c) Changing the calibration frequency of meter within the range stipulated in the national standards or requirements set by the meter supplier or requirements set by the grid operators."</i></p> <p>Hence, the calibration activities performed for the measurement equipment related to the quantity of electricity generated and supplied by Suba and Usaquen hydroelectric power plants to the</p>

			Colombian electrical grid not only follow the Colombian regulatory framework but it is not against the CDM requirements.		
	Equipment		Calibration Records	Date of Calibration	
	Suba hydroelectric project	Schneider Electric power meter with an accuracy of 0.2 IEC.	Calibration Certificate N° CAM-IM-1205-019533. Dated on May 22 nd /2012 /14/	22/05/2012	
		Serial number of Main measurement equipment: MW-1203A089-01	Calibration Certificate N° ME-1701-20379. Dated on January 30 th /2017 /12/	29/01/2017	
		Schneider Electric power meter with an accuracy of 0.2 IEC.	Calibration Certificate N° CAM-IM-1205-019470. Dated on May 19 th /2012 /15/	19/05/2012	
		Serial number of Back up measurement equipment: MW-1203A090-01	Calibration Certificate N° ME-1701-20378. Dated on January 30 th /2017 /13/	29/01/2017	
	Usaquen hydroelectric project	Schneider Electric power meter with an accuracy of 0.2 IEC.	Calibration Certificate N° CAM-IM-1205-019469. Dated on May 18 th /2012 /16/	18/05/2012	
		Serial number of Main measurement equipment: MW-1203A086-01	Calibration Certificate N° CAM-IM-1501-016399. Dated on January 30 th /2015 /18/	26/01/2015	
		Schneider Electric power meter with an accuracy of 0.2 IEC	Calibration Certificate N° CAM-IM-1205-019047. Dated on May 17 th /2012 /17/	17/05/2012	
		Serial number of Back up measurement equipment: MW-1203A087-01	Calibration Certificate N° CAM-IM-1501-016399. Dated on January 30 th /2015 /19/	26/01/2015	
	In order to verify if the calibration activities were carried out by an accredited institution, ICONTEC search in the public available information in the Web page of the Colombian National Accreditation Body ⁸ . By means of documental review,				

⁸ <https://onac.org.co/directorio-de-acreditados>

	<p>ICONTEC concluded that the calibration activities for all four electrical measurement equipment were carried out by an accredited institution: Veritest Ltda /20//21/ and CAM Colombia Multiservicios S.A.S /2/.</p> <p>For the measurement equipments which record the energy generated by Suba hyedroelectric power plant, the calibration activities have a delay. Once the PP gets the outcomes of the delayed calibration activities, the ERs calculation /4/ was adjusted in accordance with paragraph 366 (a) of the VVS /UN2/. Since all errors detected are smaller than the maximum permissible error (0.2%), the maximum permissible error was applied to the measured values taken during the period between the scheduled date of calibration (May 21st/2016) and the actual date of calibration (January 29th/2017). However the PP applied the maximum permissible error during 2016 and the entire month of January/2017 (See 120520 CDM-Suba and Usaquen Emission reductions_Calculation-V3.xlsx /4/, Sheet : "ER CALCULATION-V2" Cells: D8 to D20)</p>
Findings	CAR 2. More details about this finding on Appendix 4
Conclusion	ICONTEC concluded that the detected calibration delays were penalized in accordance with the established guidelines in the latest version of VVS /UN2/ and PS /UN3/.

E.8. Assessment of data and calculation of emission reductions or net removals

E.8.1. Calculation of baseline GHG emissions or baseline net GHG removals by sinks

Means of verification	<p>In accordance with AMS I.D, version 17 /UN1/, the baseline is the kWh produced by project activity (Suba & Usaquen Hydroelectric Plant) multiplied by the emission factor of the national interconnected grid of Colombia.</p> <p>It is worth to drawn attention, that a discount was carried out by PP in the electricity delivered by the project activity to Colombian interconnected electrical grid, since there was a delay in the calibration activities, (See section E.7 on this report)</p> $BE_y = EG_{BL,y} \times EF_{CO_2,grid,y}$ <p>For Suba hydroelectric power plant :</p> $BE_y = 32,181,564 \text{ kWh} \times 0.38115 \text{ kgCO}_2\text{e/kWh}$ $BE_y = 12,266 \text{ tCO}_2\text{e}$ <p>For Usaquen hydroelectric power plant :</p> $BE_y = 24,143,621 \text{ kWh} \times 0.38115 \text{ kgCO}_2\text{e/kWh}$ $BE_y = 9,202 \text{ tCO}_2\text{e}$
Findings	CAR 1. Details about this finding on Appendix 4.
Conclusion	ICONTEC concludes that baseline emission reductions have been correctly calculated without material misstatements.

E.8.2. Calculation of project GHG emissions or actual net anthropogenic GHG removals by sinks

Means of verification	In accordance to the applied methodology AMS.1-D, version 17/UN1/ paragraph 20, emissions by sources of GHG due to the project activity are zero.
Findings	N/A
Conclusion	N/A

E.8.3. Calculation of leakage GHG emissions

Means of verification	Given that, Leakages are to be considered only when transferring existing renewable energy technology from another activity and this project activity is not transferring existing renewable energy technology from another activity, leakages are considered as zero.
Findings	N/A
Conclusion	N/A

E.8.4. Summary calculation of GHG emission reductions or net anthropogenic GHG removals by sinks

Means of verification	In accordance with the applied methodology /UN1/ and the description provided in section E.8.1, E.8.2 and E.8.3: $ER_y = BE_y$ $ER_y = 21,468 \text{ tCO}_2e$
Findings	No finding was raised on this issued.
Conclusion	The data used for determination of the emission reductions are available and have been monitored in accordance with the registered monitoring plan and methodology AMS.1-D version 17. Likewise a complete set of data for the specified monitoring period was available. The data used for the calculation of ERs in this monitoring period were verified and they were found consistent with those reported in the registered PDD. The appropriate methods and formulae for calculating baseline emissions, project emissions and leakage were followed in accordance with the approved PDD and applied methodology. The assumptions, emission factors and default values applied in the MR version 03 and the calculations were correctly justified.

E.8.5. Comparison of actual GHG emission reductions or net anthropogenic GHG removals by sinks with estimates in registered PDD

Means of verification	ICONTEC verified that the emission reductions achieved during the 2 nd monitoring period (21,468 tCO ₂ e) are lower than the ex-ante value (31,272 tCO ₂ e) of emission reductions in the approved PDD.
Findings	No findings were raised for this section.
Conclusion	During the verification ICONTEC confirm that there was not increase of emission reductions compared with the emissions reductions registered on the PDD.

E.8.6. Remarks on difference from estimated value in registered PDD

Means of verification	During the verification ICONTEC confirm that there was not increase of emission reductions compared with the emissions reductions approved on the PDD, as it was explained in Section E.8.5. above
Findings	No finding was raised regarding to this issue
Conclusion	During the verification ICONTEC confirm that there was not increase of emission reductions compared with the emissions reductions registered on the PDD.

E.8.7. Actual GHG emission reductions or net anthropogenic GHG removals by sinks during the first commitment period and the period from 1 January 2013 onwards

Means of verification	Following the statements in the applied methodology and previously explained in section E.8.4 on this report, the emissions reduction belongs to the period from January 1 st /2013 onwards: $ER_y = BE_y$ $ER_y = 21,468 \text{ tCO}_2e$
Findings	No finding was raised regarding to this issue
Conclusion	ICONTEC deems that the current ERs have been correctly reported for the period from 1 January 2013 onwards.

E.9. Assessment of reported sustainable development co-benefits

Means of verification	The project activity have not monitored sustainable development co-benefits.
Findings	No finding was raised on this issue.
Conclusion	Since there is not monitored sustainable development co-benefits of the project activity, it is no necessary to assess this issue by DOE.

E.10. Global stakeholder consultation

Means of verification	The MR version 01 /1/ submitted by EAAB was made publicly available on the UNFCCC website from September 12 th /2019, during the time specified in the Project Cycle Procedure/UN5/ paragraph 186 and 187. Parties, stakeholders and NGOs were invited to provide comments through the website. No comments were received either during the public consultation nor at the moment of submission of this report for issuance of certified emissions.
Findings	No finding was raised on this issue.
Conclusion	Since there was no comments in comments in the global stakeholder consultation, it is no necessary to assess the actions taken regarding any comment.

SECTION F. Internal quality control

This report includes the verification findings that underwent a technical review before being submitted to UNFCCC.

The technical review and the quality control process was performed by an internal technical reviewer team in accordance with the ICONTEC's internal procedures for carrying out validation, verification and certification audits of CDM project activities. After this step the submission for requesting for issuance has been conducted.

The technical reviewers are qualified in accordance with the ICONTEC's professional qualification scheme for CDM validation and verification.

SECTION G. Verification opinion

ICONTEC was engaged by Empresa de Acueducto y Alcantarillado de Bogotá (EAAB – ESP) to verify the greenhouse gas (GHG) emission reductions reported by the CDM project Suba and Usaquen hydroelectric CDM umbrella project, registration number 9798, owned by PP for the period 01/01/2016 to 31/12/2018, equating to 21,468 tCO₂e.

The verification was performed based on the requirements set by the CDM and relevant guidance provided by CMP and the CDM Executive Board. ICONTEC considers that the project's GHG emissions and resulting GHG emissions reductions reported in the monitoring report version 03 dated on 12/05/2020, are fairly stated.

ICONTEC confirms that the project is implemented as described in the validated and registered PDD. Installed equipment essential for generating emission reductions are running reliably and calibrated appropriately. The monitoring system is in place and the project is generating GHG emission reductions as a CDM project.

Empresa de Acueducto y Alcantarillado de Bogotá (EAAB – ESP) is responsible for the preparation of the GHG emissions data and the reported GHG emissions reductions on the basis set out within the project's monitoring and verification plan.

Empresa de Acueducto y Alcantarillado de Bogotá (EAAB – ESP) is responsible for developing and keeping records and reporting procedures in accordance with the monitoring plan.

ICONTEC received the information and asked for explanations deemed necessary to provide enough evidence about the amount of GHG emissions and the calculation of the GHG emission reductions.

The verification consisted of the three following phases: i) desk review of the PDD, the MR and the monitoring plan ii) follow-up interviews with project stakeholders; iii) resolution of outstanding issues and the issuance of the final verification report and opinion.

It is ICONTEC's responsibility to set an independent GHG verification opinion on the GHG emissions from the project and approved a baseline for the monitoring period.

ICONTEC utilizes a risk-based approach that draws on an understanding of the risks associated with reporting GHG emissions data and the controls in place to mitigate them. ICONTEC's examination process includes test-based assessments of all evidence relevant to the amounts and disclosures of a project's GHG emissions and the calculations of such reductions for the reporting period.

ICONTEC can confirm that the GHG emissions reductions are calculated without material misstatements.

ICONTEC's opinion applies to the project's GHG emissions and the resulting GHG emission reductions reported and related to the validated and registered baseline, as well as the monitoring plan and its associated documents. ICONTEC confirms the following statements:

CDM project: Suba and Usaquen CDM umbrella project

Reporting period: 01/01/2016 to 31/12/2018

Baseline emissions: 21,468 tCO₂e

Project emissions: 0 tCO₂e

Leakage: 0 tCO₂e

Emission Reductions: 21,468 tCO₂e

SECTION H. Certification statement

ICONTEC has been engaged by Empresa de Acueducto y Alcantarillado de Bogotá (EAAB – ESP) to examine the greenhouse gas (GHG) emission reductions reported from Suba and Usaquen CDM umbrella project for the corresponding period, equating to 21,468 tonnes of CO₂ equivalent.

We consider that the project's GHG emissions and resulting GHG emissions reductions reported in the Monitoring Report version 03 (12/05/2019) are fairly stated. Monitoring Report first version was publicly available on September 12th/2019.

The owner of Suba and Usaquen CDM umbrella project is responsible for the preparation of the GHG emission data and the reported GHG emission reductions on the basis set out within the project's Monitoring and Verification Plan.

The owner of Suba and Usaquen CDM umbrella project is responsible for developing and keeping records and reporting procedures in accordance with the Monitoring Plan.

ICONTEC is responsible to set an independent GHG verification opinion on the GHG emissions from the Project activity and approved baseline for the same period.

For this verification audit ICONTEC was provided the information and asked for explanations we deemed necessary to provide enough evidence that the amount of GHG emission and the calculation of the GHG emission reductions, based on the Monitoring Report, are fairly stated for the reporting period.

Our verification approach was based on the Kyoto Protocol requirements, Marrakech Agreement, as well as those defined by the CDM Executive Board.

ICONTEC's approach is risk-based, drawing on an understanding of the risks associated with reporting GHG emissions data and the controls in place to mitigate them. Our examination includes review and assessment, of the evidence related to the project's GHG emission and calculations for this reporting period.

ICONTEC is able to certify that the emission reductions from the Suba and Usaquen CDM umbrella project during the 2nd verification period from January 1st/2016 to December 31st/2018 equals to 21,468 tonnes of CO₂ equivalent.

Appendix 1. Abbreviations

Abbreviations	Full texts
CAR	Corrective Action Request
CDM	Clean Development Mechanism
CERs	Certified emission reductions
CL	Clarification Request
CND	Colombian National Dispatch Center (Centro Nacional de Despacho)
CO ₂ e	Carbon dioxide equivalent
CREG	Colombian Regulatory Commission for energy and gas (Comisión de Regulación de Energía y Gas)
DNA	Designated National Authority
DOE	Designated Operational Entity
EBT	Environmental Business Technology
EAAB	Bogota aqueduct and sewerage company (Empresa de Acueducto y Alcantarillado de Bogota)
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
ISA	Electrical Interconnection (Interconexión Eléctrica S.A. E.S.P.)
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
UNFCCC	United Nations Framework Convention for Climate Change
VVS	CDM Validation and Verification Standard
XM	Abbreviation for "Market Experts". XM is a company of the ISA Group that provides integral services. www.xm.com.co

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).

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:

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

Diana Santos**Lead technical reviewer**

MAIN PROFESSIONAL EDUCATION

Specialization on Climate Change and Kyoto Protocol OEA 2011-ILC, Latin American, 2011.

Post degree on International cooperation for development Pavia University. Italy - San Buenaventura University, Cartagena, Colombia, 2007.

Clean Production specialization, Los Andes University, Bogotá, Colombia, 2003.

Industrial Engineer, Los Andes University, Bogotá, Colombia, 2002.

ADDITIONAL STUDIES

Lead Auditor Carbon Footprint. ICONTEC. Jun 2012.

Lead Auditor Clean Development Mechanisms. UNFCCC- ICONTEC. Jan 2012

Lead auditor Sello Ambiental Colombiano, Sostenibilidad Turística. ICONTEC.Feb 2011

Quality Management Systems Diploma, ISO 9001, and 14001. ICONTEC. Apr 2010.

Sustainable development indicators. World Bank, CEPAL – United Nations, Los Andes University, Bogotá, Colombia. Jun 2007.

Seminary Development Projects for Latin America. Hilfswerk der Evangelischen Kirchen der Schweiz –HEKZ- Basilea, SUIZA. Apr 2005.

PROFESSIONAL EXPERIENCE

- ICONTEC (October 2008 – Actual)

Sustainable Development. Ensure efficiency and quality when providing climate change services by meeting policies, standards and procedures defined by ICONTEC and the accreditation bodies. Ensure the fulfillment of the UNFCCC accreditation and other schemes requirements in relation to the performance of professionals providing services, non-conforming product and training plans design and implementation focused on professionals' skills improvement, technical criteria unification, and added value increase in the audit process. Coordination of projects to design and develop new services; Research and analysis of new business opportunities, and analysis of the market projections through participation in activities that permit knowing and analyzing the market conditions and their characteristics. Direction of Inter-institute Relations and Special Projects, 2008-2009 my initial work was focused on the Centro American Custom Integration project. I supported the research and development of a unified quality system for the region

- ECLAC –Economic Commission for Latin America and the Caribbean– United Nations Organization – UNO (Mar 2007 - July 2007)

Project: Política social y reducción de la pobreza; Optimizando el gasto social. My functions were as practicum collaborating on the formulation and management of the project, participate on the link enforcement with the UNICEF initiative of public investment for children; support on the management of the project Efectos y Costos de la Desnutrición Infantil en Colombia, currently in process, made in association with the Programa Mundial de Alimentos PMA, lead by CEPAL; y also support other projects for sustainable Development and environment.

- Büro Nosotras – Basilea, Suiza (Sep 2005- Aug 2006)

Project development assistant and Administrative assistant. Nosotras is a NGO supported for the Swiss government to promote integration projects of Latin-American immigrant families in the Swiss society, My function in this organization consisted on the formulation, management and implementation of projects that promote the integration, education projects for women as a vulnerable member of the society, I also did some management work for this organization and social work planning, support on the area of language teaching.

- ODES. Organización para el Desempeño Empresarial Sostenible (Jan 2005- Aug 2005)

Professional on the development and implementation of PGIRS with the Tolima government and the Environmental authority. My duties were the coordination of productive and commercialize projects that were integrated as important elements of the productive chain of solid remainders management service, focused on link and benefit of the vulnerable population that work on recycling in 39 places in Tolima, Colombia.

- CIGRAF – Colciencias (Jan 2005- Apr 2005)

Professional on the development, presentation and execution planning of the project “Competencias Laborales de la Industria Gráfica” for the whole nation.

- Artico Software (Aug 2004- Jan 2005)

Commercial Manager, in charge of market lines and customer care; communication between company and customers; work plan projections.

- Corporación Somos Más (Jul 2004- Nov 2004)

Formulation Project Assessor. Specifically for the project www.somosmas.org - This Project shows the civil organization work for more than 1.200 organizations, this Project was made in association with the Bogota Major office, United Nations Volunteer Program, Los Andes University and important local NGO's.

- Industrial Engineering Department, Los Andes University. (2003)

Research group leader. Responsibilities: Coordination of a research group about the viability of a transportation enterprise as an alternative solution to the problematic of the population working with the animal-driven vehicles and recycling in Bogotá city. Achievement: Exposition of the formulated solution to the Bogotá's Major Antanas Mockus Sivickas.

- Bogotá Council. (2002)

Debate assessor of the councilor David Luna. Responsibilities: Exposition of the social problematic related with the population working with animal-driven vehicles and formulation of solution alternatives.

EXPERIENCE IN CDM ACTIVITIES**Lead Auditor and Specialist:**

- Verification of Carbon Footprint –Pacific Rubiales
- Verification of Carbon Footprint –Biorganicos S.A.S.
- Verification of Carbon Footprint –Colcafé S.A.S.
- Verification of Carbon Footprint –Compañía De Galletas Noel S.A.S.
- Verification of Carbon Footprint –Europharma
- Verification of Carbon Footprint – Empresa De Acueducto Y Alcantarillado De Bogotá EAAB
- Verification of Carbon Footprint –Tropical Coffee Company S.A.S.- Colcafé
- Verification of Carbon Footprint –Celsia S.A E.S.P.
- Verification of Carbon Footprint –Supercerdo Paisa S.A.S.
- Verification of Carbon Footprint –Profafor S.A
- Verification of Carbon Footprint –Industrias Japan
- Verification of Carbon Footprint –Coltanques
- Verification of Carbon Footprint – Ladrillera La Clay
- Verification of Carbon Footprint – Red De Salud Ladera
- Verification of Carbon Footprint – Univesidad Autonoma De Cali
- Verification of Carbon Footprint – Reii
- Verification of Carbon Footprint – Eternil
- Verification of Carbon Footprint – Isagen
- Verification of Carbon Footprint – Pacific Rubiales
- Verification of Carbon Footprint –Proalco
- Verification of Carbon Footprint – Corpbanca
- Verification of Carbon Footprint –Industrias Japan
- Verification of Carbon Footprint –Profafor
- Verification of Carbon Footprint – Colombia de Extrusión SAS
- Verification of Carbon Footprint – Freskaleche SAS
- Verification of Carbon Footprint – Instituto del corazón Bucaramanga SA
- Verification of Carbon Footprint – Zona Franca Santander SA.
- Verification of Carbon Footprint – Compañía de Galletas Pozuelo DCR, S.A.
- Verification of Santa Ana Hydroelectric Plant
- Verification of La Venta II
- Verification of Proyecto Forestal Co2cero
- Verification of La Venta II

Technical reviewer

- Verification of Energy Efficiency and Partial Fuel Switch at Ladrillera Alcarraza
- Verification of Co-composting of EFB and POME project
- Verification of A joint venture project of cogeneration of electricity and hot water using natural gas and biogas produced from on-site wastewater biodigesters
- Verification of Reduction of energy consumption during the production of hydraulic lime for the construction industry through the addition of non-calcined mineral components and additives
- Verification of Fertinal Nitrous Oxide Abatement Project
- Verification of GEA Small Hydropower (SHP) Run-of-the-River CDM Project Bundle
- Verification of Agua Fresca Multipurpose and Environmental Services
- Verification of Methane recovery and effective use of power generation project Norte III-B Landfill
- Verification of CELSIA
- Validation of N2O Abatement at Austin Bacis Mexico Nitric Acid Plant
- Validation of Project LRT system in tunis
- Validation of Doña Teresa Small Hydro Power Plant
- Validation of San Nicolas CDM Reforestation Project
- Validation of Providencia I: 1.8MW Small Hydro Power Generation Plant
- Validation of Providencia III: 9.11MW Small Hydro Power Generation Plant
- Validation Gold Standard: Consorcio Eólico Amayo, S.A.

- Validation VCS: Grouped Project for Commercial Forest Plantations initiatives in the department of Vichada.

Fernando Gomez

Technical Expert reviewer in Sectoral Scope 1.2

Financial Specialist. EAFIT University. Colombia, 1984.

Master of Power Systems. Instituto Tecnológico de Monterrey. Mexico, 1970.

Electrical Engineer. National University of Colombia Bogotá. 1967.

PROFESSIONAL EXPERIENCE

- ENVISERVICES SAS. (2014)

Technical and Energy Advisory in registering hydro power generation projects into the UPME (Mining and Energy Planning Unit) catalog of projects for long term Colombian national expansion plan.

- PERSONAL CONTRACT for BID (Interamerican Development Bank). (2014)

As an Expert in Energy Economics to review the study “Vulnerabilidad al Cambio Climático de los sistemas de producción hidroeléctrica en Centroamérica y sus opciones de adaptación” (Vulnerability of the Central American hydroelectric systems to the Climate Change and adaptation options), commissioned by OLADE (Latin America Energy Organization) to the Incam Group.

- ICONTEC (from 2006 to present)

Specialist Scope 1. CDM Activities (Attached)

- GESTION Y AUDITORIAS ESPECIALIZADAS - GAE LTDA. Technical and Economic Advisory (November 2004 – May 2005)

Technical and Economic Advisory to Superintendencia de Servicios Públicos Domiciliarios (Superintendent of Public Services) in integral auditing to EPM (Medellín Public Services Utility) management of energy and gas services.

- ECONOMETRÍA S.S. - Technical Advisory (October 2002 - March 2003)

Technical Advisory to Unidad de Planeación Minero Energética to incorporate international electrical interconnections into the Colombian electrical planning carried by UPME, (including use of SUPEROLADE, MPODE, NEPLAN and REAL models).

- ECOENERGIA S.S. ESP - Founding Member and Manager

Management of private projects of generation, distribution and commercialization of power.

- UNIDAD DE PLANEACIÓN MINERO ENERGÉTICA – UPME (October 1996 - October 1997)

Elaboration of Catalog of Generation Projects for National Energy Plan.

- AUDITORES ENERGÉTICOS - AENE LTDA (October 1994 - March 1995)

Advisory to the company in the application of the new regulatory scheme of Colombian electrical sector to private and public entrepreneurial management through the following studies:

- CORELCA: Determination of marginal costs and development of innovative rate structures for power generation companies and big industrial customers, October 1994 - March 1995.
- CORELCA: Development and application of rate models to prepare proposal on power sale in the wholesale market, July 1995 - September 1995.
- Empresa de energía de Cundinamarca - EEC: Advisory in convoking and long-term power contracting, July 1995 - September 1995.
- Instituto Nacional de Ciencias Nucleares y Energías Alternativas - INEA: Development of tutorial model for financial assessment of energy projects in the industry, April 1995 - September 1995.
- Consorcio Nacional de Energía CNE : Consortium Management. Elaboration of studies on power commercialization in Colombia and competitive strategies. Interpretation and application of the Code of Commerce, Code of Networks and other power regulatory standards - commercial activity in Colombia, October 1995 - March 1996.
- EMPRESA DE ENERGIA DE BOGOTÁ – EEB (1978 – 1994)

Positions:

- Chief of the Department of generation planning, interconnection and sub-transmission, 1978 - 1979.
- Chief of Electric Planning Division, 1979 - 1986.
- Assistant for Technical Sub-management, 1986 - 1987
- Chief of Special Projects Division, 1987
- Chief of expansion and Development Division, 1987 - 1994
- Management Advisor, 1994
- INTERCONEXIÓN ELÉCTRICA S.A - ISA (1976 – 1978)

Engineer Specialist in electric planning Research and development of models for planning and operation of electric systems.

National Coordinator of Colombian electric system planning in the project "Study of Electric Power Sector (Estudio del Sector de Energía Eléctrica), ESEE" winner of the National Award of Engineering.

Technical Expert

- Validation of Thuan Nhlen Phong Wind Farm
- Validation of Phuong Mai 3 Wind Power Project
- Validation of Fossil Fuel replacement by Biomass in the Brick Manufacturing Industry (Group 1)
- Validation of CTR Rosario Landfill Gas Project
- Validation of SHP Itaguacu CDM Project (JUN 1146), Brazil
- Validation of Palmaceite Wastewater Treatment and Biogas Utilization Project
- Validation of Agua Fresca Multipurpose and Environmental Services
- Validation of CTR Feira de Santana Landfill Gas Project
- Validation of SHP Morro Azul CDM Project (JUN 1164)
- Validation of Biogas recovery and heat generation from Palm Oil Mill Effluent (POME), Coopeagropal.
- Validation of EPM Grouped Natural Gas Project
- Validation of Caruquia 9.76 MW hydroelectric project

- Validation of Cervecería Hondureña Methane Capture Project
- Validation of El Bote Small Hydroelectric Plant project
- Validation of Guanaquitas 9.74 MW hydroelectric project
- Validation of Rio Amoyá Run-of-River Hydro Project
- Validation of Fuel Switching through change of furnaces at Imusa S.A.
- Validation of Installation of a high-pressure/high-efficiency bagasse boiler to cogenerate heat and power
- Validation of Macano Small Hydro Power Plant
- Validation of Cueva Maria Hydroelectric Expansion Project
- Validation of La Vegona Hydroelectric project
- Validation of Chamelecón 280 Hydroelectric project
- Validation of Pardos Small Hydro Plant and LOGICarbon CDM Project
- Validation of Cambará and Embaúba SHPs and LOGICarbon CDM Project
- Validation of Bonyic hydroelectric project
- Validation of Tunjita Diversion Hydroelectric Project
- Validation of METALDOM Fossil fuel switch from reheat furnace.
- Validation of Providencia Sugar Mill Cogeneration Project
- Validation of Toachi – Pilaton Hydroelectric Project
- Validation of El Toqui wind power project
- Validation of Paramonga Bagasse Boiler Project
- Validation of Ferreira Gomes Hydro Power Plant Cdm Project Activity
- Validation of Providencia I: 1.8MW Small Hydro Power Generation Plant
- Validation of Providencia III: 9.11MW Small Hydro Power Generation Plant
- Validation of Marañon Hydroelectric Project
- Validation of Ventana, Suba and Usaquén Hydroelectric CDM Bundled
- Validation of EMGEA Small Hydropower (SHP) Run-of-the-River CDM Project Bundle
- Validation of Inversiones Hondurenas Cogeneration Project
- Validation of Panuco Bagasse Cogeneration Project
- Validation of Pequi and Sucupira SHPs and LOGICarbon CDM Project
- Validation of Santa Rita Hydroelectric Plant
- Validation of Tres Valles Cogeneration Project
- Validation of La Calera Biodigesters Project
- Verification of Agua Fresca Multipurpose and Environmental Services
- Verification of La Cascada 2.3 MW Hydroelectric Project
- Verification of La Venta II
- Verification of RIMA Fuel Switch in Bocaiúva
- Verification of Agua Fresca Multipurpose and Environmental Services
- Verification of Biogas Project, Olmeca III, Tecun Uman
- Verification of Jepirachi Wind Power Project
- Verification of A joint venture project of cogeneration of electricity and hot water using natural gas and biogas produced from on-site wastewater biodigesters
- Verification of Santa Ana Hydroelectric Plant
- Verification of Los Algarrobos hydroelectric project
- Verification of La Joya Hidroelectric project
- Verification of Bio energy in General Deheza –Electric power generation from peanut hull and sunflower husk-
- Verification of Agua Fresca Multipurpose and Environmental Services
- Verification of La Joya Hidroelectric project
- Verification of Biogas energy plant from palm oil mill effluent
- Verification of Incauca S. A. Fuel Switch from Coal to Green Harvest Residues CDM Project
- Verification of Cervecería Hondureña Methane Capture Project
- Verification of Inversiones Hondurenas Cogeneration Project
- Verification of La Venta II

Appendix 3. Documents reviewed or referenced

No.	Author	Title	References to the document	Provider
/1/	EAAB	Monitoring Report for second monitoring period (01/01/2016 – 31/12/2018) of Suba and Usaquen CDM umbrella project	Version 01 , dated on August 30 th /2019 Version 02, dated on December 17 th /2019 Version 03, dated on May 12 th /2020	PP
/2/	EAAB	Approved project design document (PDD)	Version 04.0, dated on April 25 th /2014	Other
/3/	ICONTEC	Previous validation report for registration purposes	Report No: CDMVAL-057-04, dated on May 19 th /2014	Other
/4/	EAAB	Spreadsheet used for emissions reductions calculations	Files: Version 1: Emission_reductions_CDM_Suba-Usaquen_2016-2019.xlsx Version 2: 241119 CDM-Suba and Usaquen Emission reductions_Calculation-V2.xlsx Version 3: 171219 CDM-Suba and Usaquen Emission reductions_Calculation-V2.xlsx Version 4: 120520 CDM-Suba and Usaquen Emission reductions_Calculation-V3.xlsx	PP
/5/	CREG	Resolution 038	Issued on 2014 https://www.google.com/url?client=internal-uds-cse&cx=016208785558189889602:knydcv-kjdi&q=http://apolo.creg.gov.co/Publicac.nsf/1c09d18d2d5ffb5b05256eee00709c02/0131f0642192a5a205257cd800728c5e%3FOpenDocument&sa=U&ved=2ahUKEwjBzOnPx8nkAhWPfMAKHsVC3oQFjAAegQIAhAC&usg=AOvVaw0IPah08TJftZBJ9APzZ6v	Other
/6/	EAAB	2016 power generation technical report of Suba Hydroelectric power plant	Dated on April 2017	PP
/7/		2016 power generation technical report of Usaquen Hydroelectric power plant	Dated on April 2017	PP

/8/		2017 power generation technical report of Suba Hydroelectric power plant	Dated on April 2018	PP
/9/		2017 power generation technical report of Usaquen Hydroelectric power plant	Dated on April 2018	PP
/10/		2018 power generation technical report of Suba Hydroelectric power plant	Dated on May 2019	PP
/11/		2018 power generation technical report of Usaquen Hydroelectric power plant	Dated on May 2019	PP
/12/	Vertitest Ltda	Calibration certificate ME-1701-20379. Calibration activity performed on January 29 th /2017 for electric measurement equipment MW-1203A089-01	Issued on January 30 th /2017	PP
/13/		Calibration certificate ME-1701-20378. Calibration activity performed on January 29 th /2015 for electric measurement equipment MW-1203A090-01	Issued on January 30 th /2017	PP
/14/		Calibration certificate CAM-IM-1205-019533 Calibration activity performed on May 22 nd /2012 for electric measurement equipment MW-1203A089-01	Issued on May 22 nd /2012	PP
/15/		Calibration certificate CAM-IM-1205-019470 Calibration activity performed on May 19 th /2012 for electric measurement equipment MW-1203A090-01	Issued on May 19 th /2012	PP
/16/		Calibration certificate CAM-IM-1205-019469 Calibration activity performed on May 18 th /2012 for electric measurement equipment MW-1203A086-01	Issued on May 18 th /2012	PP
/17/	CAM Colombia Multiservicios S.A.S	Calibration certificate CAM-IM-1205-019047 Calibration activity performed on May 17 th /2012 for electric measurement equipment MW-1203A087-01	Issued on May 17 th /2012	PP
/18/		Calibration certificate CAM-IM-1501-016399 Calibration activity performed on January 26 th /2015 for electric measurement equipment MW-1203A086-01	Issued on January 30 th /2015	PP
/19/		Calibration certificate CAM-IM-1501-016399 Calibration activity performed on January 26 th /2015 for electric measurement equipment MW-1203A087-01	Issued on January 30 th /2015	PP
/20/	ONAC	Accreditation Certificate: 10-LAC-032	Available in:	Other

		Grant date: June 17 th /2011 Renovation date: June 17 th /2019 Last modification date: May 29 th /2019 Due date: June 16 th /2024	https://onac.org.co/certificados/10-LAC-032.pdf	
/21/	ONAC	Accreditation Certificate: 10-LAB-032 Grant date: June 17 th /2011 Renovation date: June 17 th /2019 Last modification date: June 13 th /2019 Due date: June 16 th /2024	Available in: https://onac.org.co/certificados/10-LAB-032.pdf	Other
/22/	ONAC	Accreditation Certificate: 11-LAC-055 Grant date: August 6 th /2012 Renovation date: August 5 th /2015 Last modification date: February 22 nd /2019 Due date: August 5 th /2020	Available in: http://onac.org.co/certificados/11-LAC-055.pdf	Other
/23/	ICONTEC	Previous verification report for first monitoring period (04/06/2014 – 31/12/2015) of Suba and Usaquen CDM umbrella project	Version 02.0, dated on May 12 th /2017	Other
/UN1/	UNFCCC	Methodology AMS-I.D: Renewable electricity generation for a grid, version 17.0		Other
/UN2/	UNFCCC	CDM validation and verification standard for project activities, version 02.0.		Other
/UN3/	UNFCCC	CDM project standard for project activities, version 02.0.		Other
/UN4/	UNFCCC	CDM project cycle procedure for project activities, version 02.0		Other
/UN5/	UNFCCC	Guideline on the application of materiality in verifications, version 02.0.		Other
/UN6/	UNFCCC	Monitoring report form for CDM project activity, version 07.0.		Other
/UN7/	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. Remaining FAR from validation and/or previous verifications

FAR ID	xx	Section no.	E.2	Date: DD/MM/YYYY
Description of FAR				
Project participant response				Date: DD/MM/YYYY
Documentation provided by project participant				
DOE assessment				Date: DD/MM/YYYY

Table 2. CL from this verification

CL ID	1	Section no.	E.1	Date: 31/10/2019
Description of CL				
<i>Section E.1 of MR version 1 have to follow the instruction for completing the MR form, providing sample calculations for all formulae used to calculate baseline GHG emissions</i>				
<i>Monitoring report form for CDM project activity. Attachment. Instructions for completing this form. Chapter 2, Section E.1</i>				
Project participant response				Date: 21/11/2019
<i>On section E1 of the Monitoring Report version 02, information of the baseline has been updated in order to include a sample of the formulae used to calculate the baseline emissions (a table has been included).</i>				
Documentation provided by project participant				
<i>Monitoring Report version 02 is attached to this document.</i>				
DOE assessment				Date: 28/11/2019
In the updated version of MR (version 02), the section E.1 follow the instruction for completing the MR form, providing sample calculations for all formulae used to calculate baseline GHG emissions.				
Audit team conclusion				
Closed				

Table 3. CAR from this verification

CAR ID	1	Section no.	E.8.1	Date: 31/10/2019
Description of CAR				
<i>The Quantity of net electricity generation supplied by the Usaquen hydroelectric power plant to the grid in September 2017 is not consistent with the electricity measured by the electricity meters in the delivery point</i>				
<i>Approved Small scale methodology AMS-I.D, version 17.0, Section 6.1, Data / Parameter table 2 Registered PDD version 04.0, section B.7.1</i>				
Project participant response				Date: 22/11/2019
<i>On sections C and D of the Monitoring Report version 02, data for Usaquen power plant has been corrected in order to be consistent with electricity reported to the National Interconnected System administrator XM.</i>				
Documentation provided by project participant				
<i>Monitoring Report version 02 and Emission Reduction calculation spreadsheet version 02 are attached to this document.</i>				
DOE assessment				Date: 28/11/2019

The PP has updated the MR (version 02) and its annexes with the aim to correct the quantity of net electricity generation supplied by the Usaquen hydroelectric power plant to the grid in September 2017, in accordance with the electricity measured by the electricity meters in the delivery point.

Audit team conclusion
Closed

CAR ID	2	Section no.	E.7	Date: 31/10/2019
Description of CAR				
<p><i>In accordance with the calibration frequency (at least once every two years) defined at registration time for the electricity meter which records the electricity generated and supplied to the grid by the project activity (Registered PDD, Section B.7.1. "QA/QC procedures"). It was identified that no calibration activity has been implemented for measurement equipment which record the electricity generation of Usaquen hydroelectric power plant.</i></p> <p><i>CDM validation and verification standard for project activities, version 02.0, paragraph 365 Registered PDD version 04.0, section B.7.1 "QA/QC procedures"</i></p>				
Project participant response				Date: 24/11/2019
<p><i>On section D.2 of the Monitoring Report version 02, a note clarifying the situation regarding calibration frequency of power meters every 4 years as has been stated by the regulation (Measurement Code .- Resolution 038 2014) and not every 2 years as was defined in the PDD. The added note to the MR corresponds to: "According with the provisions of the Measurement Code (Resolution CREG 038 of 2014), the calibration of power meters can be made each 4 years, being this the period recommended to this type of installation. In addition, in the tool to determine the "Baseline, project and/or leakage emissions from electricity consumption and monitoring of electricity generation" – Version 3.0, it has been established for monitoring of the electricity generated, that calibration frequency of the power meters can be changed if fits within the range stipulated in the national standards or requirements set by the grid operators (in our case is the consideration of 4 years recommended by regulation instead of the 2 years established in the PDD); this change do not need to be reflected in a post registration change".</i></p> <p><i>In addition, all data measured during the non-calibrated period has been adjusted applying the maximum error permissible as the case for Suba power plant during the period 01/01/2016 to 28/01/2017. A note on section D.2 has been included to clarify this; The added note to the MR corresponds to: "Data measured with equipment during non-calibrated period (01/01/2016 to 28/01/2017), thus for the emissions reduction calculation the maximum error permissible has been applied (please see section E.1)". This condition has been adjusted in the MR and the spreadsheet.</i></p>				
Documentation provided by project participant				
<i>Monitoring Report version 02 is attached to this document.</i>				
DOE assessment				Date: 15/01/2020

The audit team reviewed the Colombian electrical measurement code (Resolution 038 issued by CREG in 2014), in fact, the calibration frequency for the measurement equipment for electricity generated by power plants, like Suba and Usaquen hydroelectric power plants, which delivers to Colombian electrical grid, is four years.

On the other hand, in accordance with the provisions stated in the methodological tool for Baseline, project and/or leakage emissions from electricity consumption and monitoring of electricity generation, version 03.0, Section 7.2, Data / Parameter table 12, page 23:

“The project participants do not need to apply for post registration changes in the following situations and the change shall be described in the subsequent monitoring report and verification report: ...

(c) Changing the calibration frequency of meter within the range stipulated in the national standards or requirements set by the meter supplier or requirements set by the grid operators.”

Hence, the calibration activities performed for the measurement equipment related to the quantity of electricity generated and supplied by Suba and Usaquen hydroelectric power plants to the Colombian electrical grid not only follow the Colombian regulatory framework but it is not against the CDM requirements.

Likewise, the audit assessed that PP applied the maximum permissible error of the instrument to the measured values taken during the period between the scheduled date of calibration (May 21st/2016) and the actual date of calibration (January 29th/2017), since the results of the delayed calibration showed that the equipments error is smaller than the maximum permissible error (this only applied for the measurement equipment which measured the energy generation for Suba Hydroelectric power plant)

Audit team conclusion
Closed

Table 4. FAR from this verification

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

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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); Make structural and editorial improvements.
02.1	11 January 2018	Editorial revision to correct the numbering of appendices in the instructions.
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.

<i>Version</i>	<i>Date</i>	<i>Description</i>
Decision Class: Regulatory Document Type: Form Business Function: Issuance Keywords: project activities, verifying and certifying		