

CDM VALIDATION REPORT

VALIDATION OF THE PROJECT ACTIVITY:

**Empresa de Energía del Pacífico S.A.
E.S.P.**

CUCUANA HYDROELECTRIC POWER PLANT

AENOR REFERENCE: 2013/120/CDM/19

VERSION: 02

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Validation Report:	AENOR Reference n°:		Version of this report:		Date:	
	2013/120/CDM/19		02		17/12/2013	
PDD:	Title:		GSC publication date:		Comments received:	
	"Cucuana Hydroelectric Power Plant"		1. 2008/08/02 2. 2009/07/25		<input type="checkbox"/> Yes* <input checked="" type="checkbox"/> No	
Parties involved:	Host Party:		Other involved Parties:			
	Colombia		N/A			
Project Participant(s):	In host Party:		In other involved Parties:			
	Empresa de Energía del Pacífico S.A. E.S.P		N/A			
Size of the project activity:	<input type="checkbox"/> Small scale <input checked="" type="checkbox"/> Large scale					
Applied methodology/ies:	Title:		Code:		N° version Scope:	
	Consolidated methodology for grid-connected electricity generation from renewable sources		ACM0002		13.0.0 1	
Applied tools:	Title:		Version:			
	Tool to calculate the emission factor of an electricity system		version 03.0.0			
	Title:		Version:			
	Tool for the demonstration and assessment of additionality		version 07.0.0			
Emission reductions (ER):		GSC PDD:		Final PDD:		
<input checked="" type="checkbox"/> Annual average of the ER (tCO₂e) <input type="checkbox"/> Total ER (tCO₂e)		1. 78,177 2. 88,929		88,250		
Previous versions of this document:			Version:		Date:	
			1		17/05/2013	
			2			
			3			
			4			
Report prepared by:	Climate Change Unit. AENOR					

* The comments are detailed in Section 4 of this Validation Report

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ACM0002	Consolidated baseline methodology for grid-connected electricity generation from renewable sources. version 13.0.0
BM	Build Margin
CAR	Corrective Action Request
CL	Clarification Request
CCGT	Combined Cycle Gas Turbine
CDM	Clean Development Mechanism
CER	Certified Emission Reductions
DECISION 3/CMP.1	Modalities and Procedures for a Clean Development Mechanism as Defined in Article 12 of the Kyoto Protocol
DNA	Designated National Authority
EB	Executive Board of the CDM of the Kyoto Protocol
EIA	Environmental Impact Assessment
EPSA S.A. E.S.P.	Empresa de Energía del Pacífico S.A. E.S.P.
GHG	Greenhouse Gases
GWh _{EB}	Electrical Giga Watt Hour
GWh _{TB}	Thermal Giga Watt Hour
IPCC	Intergovernmental Panel on Climate Change
MP	Monitoring Plan
MWh	Mega Watt Hour
OM	Operating Margin
PDD	Project Design Document
XM	Market Experts (National Dispatch Centre)
SIN	National Interconnected System
UPME	Mining Energy Planning Unit
Tolima	Regional Corporation of Tolima
ODA	Official Development Aid
VVS	Validation and Verification Standard

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1 INTRODUCTION

This validation concerns a project implemented by Empresa de Energía del Pacífico S.A. E.S.P., in Colombia to reduce emissions of CO₂ by generating renewable energy coming from hydraulic resources. The objectives of the validation exercise are to confirm that the project meets the necessary CDM criteria, that the project follows the approved methodology, ACM0002 (version 13.0.0), and that the proposals presented by Empresa de Energía del Pacífico S.A. E.S.P. in the PDD will lead to a realistic determination of the emissions reductions.

The scope of the validation covers the additionality assessment (investment analysis, the environmental impact study and the stakeholder consultation. In addition it covers the baseline methodology, the calculation of the emission factor and the monitoring methodology to quantify the emissions reductions during the operational life of the project.

The project implies the construction of a hydroelectric power plant with a nominal water capacity of 55 MW (total installed capacity of 58.16 MW) in the Department of Tolima, municipality of Ronesvalles, in the Republic of Colombia. This plant will generate electric energy that would otherwise continue to be generated with fossil fuels power plants.

1.1 Objective

Empresa de Energía del Pacífico S.A. E.S.P. has commissioned AENOR to validate "**Cucuana Hydroelectric Power Plant**". The purpose of a validation is to have an independent third party assessment of the project design. In particular, the project's baseline, the monitoring plan (MP), and the project's compliance with relevant UNFCCC and host country criteria are validated in order to confirm that the project design as documented is sound and reasonable, and that it meets the stated requirements and identified criteria.

Validation is a requirement for all CDM projects and is considered as necessary to provide assurance of the quality of the project and its intended generation of certified emission reductions (CERs).

UNFCCC criteria refer to the Kyoto Protocol criteria and the CDM rules and modalities as agreed in the Bonn Agreement and the Marrakech Accords.

1.2 Scope

The scope of the validation is to assess all aspects of GHG reduction involved in the project, including the project design, the baseline, the determination of the emission factor of the grid and the procedures proposed for monitoring the emissions reductions in the future.

The following documents were reviewed as part of the scope of the activity:

- PDD, including baseline study and monitoring plan
- Approved Methodology: ACM0002 (version 7, 10, 13.0.0)
- Decision 3/CMP.1 and relevant decisions and guidelines from the EB
- Validation and Verification Standard (version 05.0).
- Tool to calculate the emission factor for an electricity system - version 03.0.0
- Tool for the demonstration and assessment of Additionality – version 07.0.0

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- Associated documentation (environmental requirements, investment analysis, etc.)

The validation scope is defined as an independent and objective review of the project design document, the project's baseline study and monitoring plan, and other relevant documents. The information in these documents is reviewed against Kyoto Protocol requirements, UNFCCC rules and associated interpretations. AENOR, based on the Instruction for Validation, Verification and Certification of CDM Project Activities (IE-DTC-039), and the Validation and Verification Standard, has used a risk-based approach in the validation, focusing on the identification of significant risks for project implementation and the generation of CERs.

The validation is not meant to provide any consultancy services to the Client. However, stated requests for clarifications and/or corrective actions may provide input for improvement of the PDD.

2 METHODOLOGY

The validation of the project started in August 2008. The validation was performed in the manner of an audit, where a desk review of PDD version 03.1 was first undertaken against the approved methodology and CDM, and other relevant criteria. The desk review was followed by a site visit to EPSA, Cortolima, and key stakeholders in Colombia.

In order to ensure transparency, a validation protocol was customized for the project according to Instruction IE-DCT-039. The protocol shows, in a transparent manner, criteria (requirements), means of verification and the results from validating the identified criteria. The validation protocol serves the following purposes:

- It organizes, provides details and clarifies the requirements a CDM project is expected to meet.
- It ensures a transparent validation process during which the validator will document how a particular requirement has been validated and the result of the validation.

The completed validation protocol is enclosed in Annex 1 to this report.

The sequence of the validation is given in the table below:

Topic	Date
Submission of PDD for global stakeholder consultation process	2008/08/02
	2009/07/25
On-site visit	2008/10/27 - 2008/10/30
Validation Protocol - Version 01	2008/11/07
Final Validation Report	2013/12/17

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2.1 Appointment of Team Members and Technical Reviewers

The list of involved personnel and the qualification status are summarized in the table below:

Name	Qualification	
	Position in the team	Technical areas
Elena Llorente Pérez	Chief Validator	TA 1.2
Mercedes García Madero	Validator	TA 1.2
Marcelino Pellitero	Validator	TA 1.2
Luis Javier Arribas	Technical Reviewer	TA 1.2
Jose Antonio Gesto	Technical Reviewer	TA 1.2

Technical areas (TA) mentioned above correspond to the following:

TA code	Technical area
TA 1.1	Thermal energy generation from fossil fuels and biomass including thermal electricity from solar (COMPLEX);
TA 1.2	Energy generation from renewable energy sources.
TA 2.1	Electricity distribution;
TA 2.2	Heat distribution
TA 3.1	Energy demand
TA 4.1	Cement sector (COMPLEX);
TA 4.2	Aluminum (COMPLEX);
TA 4.3	Iron and steel (COMPLEX);
TA 4.4	Refinery (COMPLEX)
TA 5.1	Chemical process industries (COMPLEX).
TA 6.1	Construction.
TA 7.1	Transport.
TA 8.1	Mining and mineral processes, excluding those included in TA 8.2 below;
TA 8.2	Oil and gas industry, coal mine methane recovery and use (COMPLEX).
TA 9.1	Metal production.
TA 10.1	Mining and mineral processes, excluding those included in TA 10.2 below;
TA 10.2	Oil and gas industry, coal mine methane recovery and use (COMPLEX).
TA 11.1	Chemical process industries (COMPLEX);
TA 11.2	GHG capture and destruction.
TA 12.1	Chemical process industries (COMPLEX).
TA 13.1	Waste handling and disposal;
TA 13.2	Animal waste management.

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TA 14.1	Forestry
TA 15.1	Agriculture
TA 15.2	Animal waste management.

2.2 Review of Documents

The project design document submitted by EPSA S.A. E.S.P was reviewed against the approved methodology and against CDM and other relevant criteria. Additional background documents related to the project design and baseline were also made available before and during the on-site visit in Colombia. These documents were also reviewed.

To address the corrective actions and clarification requests that arose from the desk review and on-site visit, Empresa de Energía del Pacífico S.A. E.S.P. revised the project design document several times and developed a final version which was submitted to the audit team.

The final validation findings are presented in this report related to the project as described in the final PDD.

The reviewed documents used during the entire validation process are detailed in chapter 7 of this report.

2.3 Follow-up Actions

AENOR conducted interviews with project developers in Colombia to confirm selected information and to resolve issues identified in the document review.

From 27 - 30 October 2008, representatives of EPSA S.A. E.S.P and main stakeholders were interviewed: the mayors of Roncesvalles and the representatives of the Environmental Authority were also interviewed.

The main topics of the interviews are summarized in table 1.

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Table 1: Interview topics

Interviewed organization/person/position	Interview topics
GAS NATURAL SDG, S.A. Spain <ul style="list-style-type: none"> - Ángel Lagares, Environment Director - Amado Gil, Carbon Management - Tomás Pedraza, Investment Development - German Medina, Investment Development SOCOIN <ul style="list-style-type: none"> - Antonio Sanz, Energy Efficiency Department - Estrella Ruiz, Energy Efficiency Department 	<ul style="list-style-type: none"> ✓ Project design ✓ Additionality assessment (investment and barrier analysis) ✓ Baseline determination: OM & BM (power plants, electricity production, start of operation, fuels, efficiencies, most recent data...) ✓ EIA approval and related conditions ✓ Monitoring of environmental impacts
EPSA S.A. ESP – Colombia <ul style="list-style-type: none"> - Pablo Rondeño, Cucuana Project Manager - Liliana Vidal, Director Social Labour - Albeiro Arias, Wholesale Market Manager - Carlos Quiceno, Environmental Director 	<ul style="list-style-type: none"> ✓ Construction and O&M of the Cucuana Hydroelectric Plant ✓ Social performances
RONCESVALLES – Colombia <ul style="list-style-type: none"> - Leyla Cubillas, Mayor of Roncesvalles 	<ul style="list-style-type: none"> ✓ Opinion about the project ✓ Knowledge of the environmental impacts ✓ Benefits for the community ✓ Land owners current socioeconomic situation ✓ Consultation with municipality's authorities, land owners and other stakeholders
CORPORACIÓN AUTÓNOMA REGIONAL DE TOLIMA (TOLIMA)- Colombia <ul style="list-style-type: none"> - Maria Ceila Cubillos Narvaez 	<ul style="list-style-type: none"> ✓ EIA approval and related conditions ✓ Monitoring of environmental impacts
XM – Medellín, Colombia <ul style="list-style-type: none"> - Silvia Elena Cossio Mesa, Operation Planning Manager 	<ul style="list-style-type: none"> ✓ Compliance with law applicable to electrical generation ✓ Operation of the Electricity Dispatch model

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Interviewed organization/person/position	Interview topics
DNA - Bogotá, Colombia - Sandra Garavito Rojas, Assessor of DNA Climate Change Group	<ul style="list-style-type: none"> ✓ Project's sustainable development contribution ✓ Consultation with municipality's authorities, land owners and other stakeholders ✓ DNA's opinion

Visits to the relevant organizations were carried out in Colombia, but a visit to the site of the project activity was not possible because the power plant is located in an isolated rural area that is vulnerable to guerrilla attacks.

2.4 Resolution of Clarification and Corrective Action Requests

The objective of this validation phase was to resolve the requests for corrective actions, clarifications and any other outstanding issues that needed to be clarified for AENOR's positive conclusion on the project design. The corrective action requests (CARs) and clarification requests (CLs) raised by AENOR were resolved during communications with project participants. To guarantee the transparency of the validation process, the concerns raised and responses given are summarized in chapter 6 below and documented in more detail in the validation protocol in Annex 1.

Since modifications to the project design were necessary to resolve AENOR's concerns, the Client decided to revise the documentation several times and finally resubmitted project design documentation. After reviewing the revised and resubmitted project documentation, AENOR issued this final validation report and opinion.

2.5 Internal Quality Control

Following the completion of the assessment process by the validation team, all documentation undergoes internal quality control through a technical review, before submission to the CDM-EB. The technical reviewer is a qualified member of AENOR, independent from the team that carried out the validation of the project activity. The technical reviewer or team appointed for the technical review is qualified in the technical area(s) and sectoral scope(s) of the project activity.

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3 VALIDATION FINDINGS

3.1 Approval

The project participant for Cucuana Hydroelectric Power Plant is Empresa de Energía del Pacífico S.A. E.S.P. (EPSA S.A. E.S.P) from the host country, Colombia.

Empresa de Energía del Pacífico S.A. E.S.P. (EPSA S.A. E.S.P) from the host Party Colombia meets all relevant participation requirements detailed below:

- Colombia has confirmed that is a Party of the Kyoto Protocol (30 November 2001).
- Colombia has confirmed its voluntary participation and the contribution of the project to the sustainable development through national approval of the project (dated 30 October 2009). The authenticity of the Letter of Approval was checked through interviews with the people in charge of the approval.

The validation did not reveal any information that indicates that the project can be seen as a diversion of ODA funding towards Colombia.

The project's contribution to the sustainable development of Colombia was confirmed by the DNA of the host country.

In the first PDD, which was submitted for global stakeholder consultation, there was other project participant, Unión Fenosa Generación S.A. This project participant has decided to voluntarily withdraw from the PDD.

The LoA does not refer to a specific version of the PDD or validation report. The corresponding references included in the LoA, PDD and validation report are consistent.

Approval requirements have been validated with the LoA, issued on 30 October 2009, a correction of the letter of approval¹, issued 22 October 2012, and an appeal of reversal for the correction letter of approval², issued on 20 December 2012.

AENOR ensures that the LoA have been issued by the respective Party designated national authority and does not doubt the authenticity of the letter of approval received from the PP. Hence AENOR confirms that the LoA is in compliance with paragraphs 39-42 of the VVS v.05.0.

3.2 Participation

As stated above, the project participant for Cucuana Hydroelectric Power Plant is Empresa de Energía del Pacífico S.A. E.S.P (EPSA E.S.P). from Colombia, the host country.

¹ Since Unión Fenosa Generación S.A. decided voluntarily not to continue as project participant of the project, the DNA issued a correction note in order to clarify that Empresa de Energía del Pacífico S.A. E.S.P. is the only approved project participant for this project activity.

² The correction letter had some mistakes regarding the names of the project participants; therefore the DNA issued an appeal of reversal for the correction letter in order to resolve the inconsistencies.

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The participation of Empresa de Energía del Pacífico S.A. E.S.P has been approved in the letter of approval, a correction of the approval letter and the appeal of reversal for the correction letter of approval.

In addition, the approval of participation has been issued by the relevant DNA.

AENOR's validation team states that the participation of the project participant has been issued by the relevant DNA. The Letter of Approval was issued by the Colombian DNA on October 30, 2009. Since the project participants were not correctly indicated in the Letter of Approval, a complementary letter was issued by the DNA on 22 October 2012, in order to clarify who are the authorized project participants, but also in this correction letter the project participants were not correctly written, therefore an appeal of reversal for the correction letter was carried out. These three letters were provided to the validation team. Furthermore, the authenticity of this evidence has been verified with the DNA representative.

The project participant has been listed in a consistent manner in the project documentation, and their participation in the project activity has been approved by a Party to the Kyoto Protocol. The project participant listed in tabular form in section A.4 of the PDD is consistent with the contact details provided in Appendix 1 of the PDD. AENOR confirms that no entity other than the approved as project participant is included in these sections of the final PDD.

3.3 Project Design Document

The **"Cucuana Hydroelectric Power Plant"** PDD has been prepared in accordance with latest template (version 04.1) and guidance from the CDM Executive Board.

The relevant changes in the final PDD respect to the PDD for GSC¹ are the following:

Issue	Information in PDD for GSC	Information in final PDD
Description of the project	The purpose of this project is to build a Hydroelectric Power Plant, with a total installed capacity of 55 MW, with the aim of making use of the capacity of the Cucuana river.	The description of the project activity now specifies that the generators installed capacity is 58.16MW and the nominal water capacity is 55MW.
Project participants	EPSA S.A. E.S.P. UNIÓN FENOSA GENERACIÓN, S.A.	Empresa de Energía del Pacífico S.A. E.S.P
ER	88,929	88,250
Additionality	Investment analysis and barrier analysis	Investment analysis
Starting date	01/01/2010	28/09/2010
Others	<p>The difference between the emission reductions values stated above is due to the fact that the formulae used for the ERs calculation in the first version of the PDD were not correct according to the applied methodology and tool. During the validation process, AENOR raised corresponding CARS and CLs in order to correct and clarify the inconsistencies found in the first version of the PDD.</p> <p>On the other hand, the PDD submitted for GSC was developed under VVM</p>	

¹ This data are from the PDD published in GSC on 25 July 2009.

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	requirements, but the information in the last PDD has been carried out under VVS requirements.
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The mentioned changes are explained in the different sections of this validation report.

3.4 Modalities of Communication

The MoC has been provided by the PP to the validation team. The corporate and personal identity of the project participant has been validated through the Registry Certificate of Empresa de Energía del Pacífico S.A. E.S.P. and the contract signed with the DOE.

The Validation Team confirms that the MoC statement complies with all relevant forms and requirements. Thus:

- The last version of the form "Modalities of Communication Statement" (F-CDM-MOC) has been used.
- The information required as per the F-CDM-MOC, including its annex 1, is correctly completed.
- The project participant's authorised signatories signing the F-CDM-MOC correspond to the project participant's authorised signatories included in F-CDM-MOC, annex 1.

3.5 Project Description

The "**Cucuana Hydroelectric Power Plant**" comprises a hydroelectric power plant located in the Cucuana River and San Marcos River. The purpose of this project is to build a Hydroelectric Power Plant, with a nominal water capacity of 55 MW (total installed capacity of 58.16 MW). The generation of renewable electricity partly displaces electricity generation based on fossil fuels supplied to the national interconnection grid of Colombia.

The project design engineering reflects good practice. As the plants will supply generated electricity to the grid, the project is eligible as a renewable energy project/renewable electricity generation for a grid.

The main technical characteristics are detailed below:

- Capacity of Cucuana distribution point (m3/s): 7.0
- Capacity of San Marcos distribution point (m3/s) 2.7
- Turbines design flow (m3/s) 9.7
- Elevation of Cucuana distribution point (metres above sea level): 2,170
- Elevation of San Marcos distribution point (metres above sea level): 2,179.5
- Length of the San Marcos tunnel (m): 1,076
- Length of the Cucuana tunnel (m): 1,698
- Length of the La Ensellada pipe (m): 137.7
- Length of the La Ensellada tunnel (m): 1,700.9
- Length of the load pipe (m): 1,596
- Maximum gross drop (m): 714
- Maximum net drop (m): 698
- Generators installed capacity (MW) 58.16
- Turbines installed capacity (MW): 58.14

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- Design Hydraulic capacity (MW)55
- Number of generators2
- Number and type of turbines: 4 turbines in tandem, Pelton

As established in the PDD, the project's contribution to sustainable development is not only related to electric generation from renewable resources and the subsequent reduction of pollutant emissions, but also to the social benefits that will be introduced in the area. The power plant will be located in an area with a low standard of living, and it contributes to regional development, consolidating the local and regional administrations in institutional terms. As checked during the on-site interviews, its operation will provide direct financing to the municipalities that are directly affected, allowing them to assume the development of their own projects, thus contributing directly to the improvement of the standard of living in the affected communities.

The project design has been checked, against the environmental license (Resolution number 2411) and the technical report of the generators and turbines of Cucuana by the validation team, because according to local regulation, the license is a unique document, and it shall include the technical approved description of the project.

Besides, it is expected to generate 252 GWh per year in accordance with the technical characteristics of the turbines.

All the characteristics included in the PDD were checked during the on-site visit and against the maps and the documentation submitted by EPSA S.A. E.S.P. The validation team requested to modify some of them because the project participant asked the competent authority for a clarification of the project activity which was not included in the first version of the PDD.

The last version of the PDD details the project design in a precise manner, in accordance with the accuracy and completeness principles required for the CDM process.

AENOR's validation team states that the description of the proposed CDM project activity as contained in the PDD sufficiently covers all relevant elements, is accurate, and that it provides the reader with a clear understanding of the nature of the proposed CDM project activity.

In conclusion, AENOR confirms that the project description, as included in the PDD, is sufficiently accurate and complete in order to comply with the requirements of the CDM.

3.6 Baseline Methodology

The PDD describes the baseline methodology, which is in conformance with the approved baseline methodology ACM0002 (version 13.0.0) for grid-connected electricity generation from renewable sources. The key conclusions about the correct application are summarized below.

The baseline emission factor (EFy) included in the final PDD has been determined with the ex post option for the OM and the ex ante option for the BM according to ACM0002 (version 13.0.0). The operational margin (OM) and the build margin (BM) have been calculated and combined to obtain the baseline emission factor.

The method selected to calculate the operating margin emission factor was the simple adjusted OM, called "option B" of the "Tool to calculate the emission factor of an electricity system", version 03.0.0. The simple adjusted OM provides a formula of the sources for calculating the emission factor, taking into account the hourly generation system and the percentage provided by the low-cost/must-run plants. The percentage of the mean generation during a period of five years for low-cost/must-run plants exceeds the 50% value, as is

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the case of the Colombian system. This issue was confirmed with NEON data (NEON is a software application owned by the electric market operator of Colombia).

The plants registered as CDM project activities were taken into account for the calculation of the operating margin emission factor, as established by the "Tool to calculate the emission factor of an electricity system". The procedure followed for the calculation of the operating margin was correctly described in the PDD and in Appendix 4 and was assessed by the validation team against the methodology and the tool. The chosen option was ex post approach for the operating margin emission factor, so it will be calculated once a year.

The plants used for the calculation of the build margin (BM) emission factor were the plants that have been built recently and that generated 20% of the system's energy during 2007. CDM project activities are not included according to the methodology. "Option 2" was chosen as the method in the build margin emission factor. Therefore, it shall be updated annually with an ex post approach.

The data from 2007 used are considered correct, since there are the most recent ones at the moment of the first PDD submitted for GSC.

The values of all plants in operation have been provided by the Associated Services Management, XM Compañía de Expertos en Mercados S.A. E.S.P., and they have been checked by the audit team against the XM web site, NEON.

AENOR requested official data related to the most recent additions to the Colombian electricity generation system and their net power generations from XM Compañía de Expertos en Mercados S.A. AENOR was registered with the software application NEON on the XM web page (<http://sv04.xm.com.co/neonweb/>) in order to be able to download all the official data. The NEON application is the property of XM.

The origin of data regarding the history of the power plants (XM mail sent by the consultant) was requested by the audit team and was also checked.

The formulae included in the spreadsheets were checked and they were in accordance with the methodology, using the same values and variables.

The following sources of data were taken into account:

- "Emission factors for Colombian fuels". UPME, FECOC and the Colombian Academy of Sciences. <http://www.upme.gov.co/sima/index.aspx>
- "Plan de expansión de referencia generación transmisión 2008 – 2022". UPME.
- 2006 IPCC "Guidelines for National Greenhouse Gas Inventories" Vol 2 Chapter 1. Table 1.2 Pag 1.18.

AENOR confirms that the baseline and monitoring methodology selected by the project participant comply with the methodologies previously approved by the CDM Executive Board, that the selected methodology is applicable to the project activity and that the PP has correctly applied the selected methodology.

3.6.1 Applicability of the Selected Methodology to the Project Activity

The selected methodology for **"Cucuana Hydroelectric Power Plant"** is ACM0002 version 13.0.0.

The selected baseline and monitoring methodology previously approved by the CDM Executive Board is applicable to the project activity, and the used version is valid.

The applicability of the selected methodology to the proposed CDM project activity has been assessed the following way:

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1. The project activity is the installation, capacity addition, retrofit or replacement of a power plant/unit of one of the following types: hydro power plant/unit (either with a run-of-river reservoir or an accumulation reservoir), wind power plant/unit, geothermal power plant/unit, solar power plant/unit, wave power plant/unit or tidal power plant/unit;

The proposed project activity involves the installation of a new power plant for renewable electricity generation that will be connected to the SIN. This condition has been checked against and the environmental impact assessment.

2. In the case of capacity additions, retrofits or replacements (except for capacity addition projects for which the electricity generation of the existing power plant(s) or unit (s) is not affected): the existing plant 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 or retrofit of the plant has been undertaken between the start of this minimum historical reference period and the implementation of the project activity.

No capacity additions, retrofits or replacements are implemented in the proposed project.

3. In case of hydro power plants: at least one of the following conditions must apply:

The project activity is implemented in an existing single or multiple reservoirs, with no change in the volume of any of reservoirs; or,

The project activity is implemented in an existing single or multiple reservoirs, where the volume of any of reservoirs is increased and the power density of each reservoir, as per the definitions given in the Project Emissions section, is greater than 4 W/m² after the implementation of the project activity; or

The project activity results in new single or multiple reservoirs and the power density of each reservoir, as per the definitions given in the Project Emissions section, is greater than 4 W/m².

The project activity results in a new single reservoir having power density more than 4W/m². This condition has been checked against and the environmental impact assessment.

4. The methodology is not applicable to the following:

-Project activities that involve switching from fossil fuels to renewable energy sources at the site of the project activity; in this case, the baseline may be the continued use of fossil fuels at the site;

-Biomass fired power plants;

-A hydro power plant that result in new single reservoir or in the increase in an existing single reservoir where the power density of the power plant is less than 4 W/m².

The project activity does not involve switching from fossil fuels to renewable energy sources, is not a biomass fired power plant and it is a hydropower plant with a power density more than 4 W/m².

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5. In the case of retrofits, 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, i.e., 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".

The validation team confirms that the project activity does not involve retrofits, replacements or capacity additions.

The project activity results in a new reservoir and the power density of the power plant, as per definitions given in the Project Emissions section, is greater than 4 W/m² as stated in the technical report.

AENOR confirms the applicability of the selected methodology to the **"Cucuana Hydroelectric Power Plant"**.

The project activity is not expected to result in emissions other than those allowed by the methodology, and there are no greenhouse gas emissions occurring within the proposed CDM project activity boundary as a result of the implementation of the proposed CDM project activity which are expected to contribute more than 1% of the overall expected average annual emissions reductions that are not addressed by the applied methodology.

3.6.2 Project Boundary

Regarding project boundary, the final PDD identifies the project boundary as the project power plant and the power plants physically connected to the National Interconnected System of Colombia, to which the project is connected.

In addition, all emission sources and gases related to the baseline scenario, project scenario, and leakage are clearly identified and described in a complete manner in section B.3 of the PDD. CO₂ is the main emission source and is included in the baseline scenario, but the gases CH₄ and N₂O are not included in the project boundary, in compliance with the methodology. In compliance with applicable methodology CO₂, and N₂O are not included in the project activity as an emission source.

AENOR validated the project boundary of the project during the on-site visit. The validation was also supported by the technical report of Cucuana and the environmental license.

The validation team states that the identified boundary and the selected sources and gases are justified for the project activity.

3.6.3 Baseline Identification

-

Regarding baseline identification, the project activity is the installation of a new grid-connected hydroelectric power plant. The baseline scenario in accordance with ACM0002 (version 13.0.0) is the electricity delivered to the grid by the project activity that would otherwise have 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 "Tool to calculate the emission factor for an electricity system".

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The PDD provides information about the Colombian electric sector and a forecast for installed power capacity to describe this baseline with more detail. These data have been validated by the validation team with the source of data of the grid XM Compañía de Expertos en Mercados S.A. (The official electric market of Colombia).

Thus AENOR deems the baseline determination is transparent and reasonable.

3.6.4 Calculation of GHG Emissions

The methodology for calculating emission reductions is transparently documented and it complies with existing good practice. Detailed below is the calculation of the emissions reduction stated in the last version of the PDD.

The validation of the emission reductions calculation was carried out in the following way:

According to the methodology ACM0002 (version 13.0.0) and the "Tool to calculate the emission factor for an electricity system" version 03.0.0 (hereinafter "Tool"), the emission reductions from the project activity were calculated following six steps:

Step 1. Identify the relevant electricity systems.

Cucuana's relevant electricity system is the Colombian National Interconnected System. This has been checked against the UPME website.

For the purpose of determining the OM emission factor, imports have been considered in the calculation. Taking into account the Tool, the emission factor is considered 0 tCO₂/MWh for imports from connected electricity systems in other host countries. Moreover, electricity exports are not subtracted from electricity generation data in baseline calculation.

Step 2. Choose whether to include off-grid power plants in the project electricity system (optional).

Option I: only grid power plants are included in the calculation.

Step 3. Select a method to determine the operating margin (OM).

For the calculation of the OM emission factor, the simple adjusted OM emission factor calculation method is selected.

It has been validated that the simple adjusted OM and ex post options have been chosen. The emission factor is determined for the year in which the project activity displaces grid electricity, requiring the emissions factor to be updated annually during monitoring.

Step 4. Calculate the operating margin emission factor according to the selected method.

It has been validated that the simple adjusted OM is calculated using option A, based on the net electricity generation and CO₂ emission factor of each power unit. EF_{grid,OM,y} is calculated as 0.4659 tCO₂e/MWh in the final PDD. This has been verified to be in compliance with the methodology, the Tool and relevant EB guidance.

Other data used in the OM and BM calculations, such as the EF_{EEL,m,y}, are calculated in tCO₂/GJ using the Tool's options A2 and A3. Option A2 of the Tool is used when the power units have the electricity

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generation and fuel type data available. Option A3 is used for the cogeneration plants since the only data available is the electricity generation. So, for the cogeneration plants, an emission factor of 0 tCO₂/MWh is assumed as a simple and conservative approach.

Formulas and factors used to calculate the operating margin and the build margin are properly described in the final PDD, and they are considered correct and transparent.

The sample group of power units used to calculate the build margin is defined as the set of power capacity additions in the electricity system that comprise 20% of the system capacity, instead of system generation that has been built more recently. This option comprises the larger annual generation.

Moreover, for the proposed project activity, option 1 of the applicable tool has been chosen.

Therefore, the build margin emission factor is calculated ex ante based on the most recent information available at the time of first GSC PDD submission to UNFCCC Website

Step 5. Calculate the build margin emission factor.

EF_{grid,BM,y} is calculated as **0.2345** tCO₂e/MWh in the final PDD. The formula used to obtain emissions data is:

$$\text{Build Margin} = \frac{\text{Net quantity of electricity generated and delivered to the grid (MWh)} \times \text{CO}_2 \text{ emission factor (tCO}_2\text{/MWh)}}{\text{Net quantity of electricity generated and delivered to the grid (MWh)}}$$

CO₂ emission factor of power unit is calculated using the Tool's option A2, so as to be in compliance with the formula:

$$\text{CO}_2 \text{ emission factor} = 3,6 \times \text{CO}_2 \text{ emission factor of fossil fuel type (t CO}_2\text{/GJ)} / \text{Net energy conversion efficiency of power unit (\%)}$$

As stated above, option A3 is used for cogeneration plants where the only data available is the electricity generation.

Step 6. Calculate the combined margin (CM) emissions factor.

According to the Tool the default weights OM = 0.5 and BM = 0.5 are adopted in the first crediting period of hydropower projects.

As per the baseline methodology ACM0002 and the Tool, the baseline emissions considered are the emission reductions E_R during the crediting period, which is the difference between baseline emissions and project emissions, as no leakage emissions are considered by the methodology.

These are:

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- Baseline emissions (BE_y in tCO₂) are equal to baseline emission factor (EF_{grid,CM,y} in tCO₂/MWh) times the net electricity supplied to the grid (EG_y in MWh).
- No project emissions and no leakage emissions have been considered for the proposed project activity according to the applicable methodology.
- Emission reductions: $ER_y = BE_y - PE_y = BE_y - EF_{grid,CM,y} \times EG_y$

With reference to the Tool, the simple adjusted OM emission factor (EF_{grid,OM,y}) is calculated as **0.4659** tCO₂e/MWh. Similarly, the build margin emission factor (EF_{grid,BM,y}) is calculated as **0.2345** tCO₂e/MWh.

Therefore the combined baseline emission factor is:

$$EF_{grid,CM,y} = 0.4659 \times 0.5 + 0.2345 \times 0.5 = 0.3502 \text{ (tCO}_2\text{e/MWh)}$$

The calculation of the emissions reduction stated in last version of the PDD is stated in detail below:

The sources of the data are XM (NEON system) and the UPME.

In this case EPSA uses two files including different spreadsheets designed to automate the process for the calculation of the emission factor.

The description of the validation activities of each spreadsheet is detailed as follows:

The first file, named "**Operating Margin_ Cucuana project activity**", includes four spreadsheets:

- **FE Power Station**: This spreadsheet includes the list of the power installations of the national electricity system. The spreadsheet also incorporates the heat rate, the fuel and the emission factor, according to vol 2 chapter 1 of the 2006 IPCC Guidelines, of all the installations included in the Colombian electricity system. The efficiency of the installations is also detailed in the spreadsheet. The source of data has been checked by the validation team.
- **Hourly Generation**: This spreadsheet includes the real hourly generation of the national system (KWh), information generated by NEON between 01 January 2007 and 31 December 2007. The validation team has assessed all the 2007 data and they were the same as the NEON information.
- **Lambda**: The lambda calculation has been developed according to the Tool. The load data is sorted from the highest to the lowest MW level in column D. The load curve in descending order has been plotted in the same spreadsheet and using the total generation of the low cost/must run power plants (calculated in another spreadsheet) the X, Y and Lambda have been correctly identified and calculated.
- **MO 2007**: This spreadsheet includes the generation (KWh) of all the agents of the Colombian national system and the emission factors of each agent in the system.

The second file, named, "**Build Margin_ Cucuana project activity**", includes the following six spreadsheets:

- **History**: This spreadsheet includes the installations of the national electricity system, their type of generation (thermal, cogeneration, hydro) and their opening and closing dates, if applicable. The source of the data was communication between the consultancy firm and XM, the market operator (these data were not available on the web page).
- **Calculation EFBM**: This spreadsheet includes the same information as the previous spreadsheet about the installations, incorporating the capacity and the energy generation during 2007. Using the emission factor of each power plant (described in a spreadsheet named, "Fuel"), the emissions of each power

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plant have been calculated. The power plants of the build margin are chosen according to the Tool as the set of power capacity additions that comprise 20% of the system and that has been built most recently.

- **Fuel**: This spreadsheet includes the same information as the "FE Power Station" spreadsheet in the **Operating Margin** calculation file: heat rate, emission factor and fuel of each plant of the Colombian national electricity system. All of the data were cross-checked with the first file and found to be in accordance.
- **Station Power Data**: This spreadsheet also includes the same information as the "MO_2007" spreadsheet in the **Operating Margin** calculation file. Twenty per cent of the total national generation is calculated in conformance with the Tool.
- **Summary EF BM**: This spreadsheet includes a summary of the installations in order to analyse the last installations built during 2007. These data were cross-checked with the NEON information.
- **FE**: The final spreadsheet of this file includes the baseline combined emission factor calculation.

The emission baseline factors, calculated in accordance with the ex post approach, are detailed as follows:

EF_{BM} =	0.2345	tCO ₂ /MWh
EF_{OM} =	0.4659	tCO ₂ /MWh
EF_y =	0.3502	tCO ₂ /MWh

The average annual emission reductions to be achieved by the project are **88,250** tCO₂/year.

As stated in section 3.6, in order to validate the data and results included in the PDD, information regarding the Colombian electrical system was checked by AENOR through the download of data by the NEON software application. Calculations have been reproduced by the validation team and the same results have been obtained, achieving the transparency, accuracy and consistency principles required for CDM projects.

In regard to item 94 of the VVS, AENOR confirms that:

1. All the assumptions and data used by the project participants are listed in the PDD, including their references and sources.
2. All documentation used is relevant for establishing the baseline scenario and correctly quoted and interpreted in the PDD.
3. Assumptions and data used in the identification of the baseline scenario are appropriately justified, supported by evidence, and can be deemed reasonable.
4. Relevant national and/or sectoral policies and circumstances are considered and listed in the PDD.
5. The approved baseline methodology has been correctly applied to identify the most reasonable baseline scenario, and the identified baseline scenario reasonably represents what would occur in the absence of the proposed CDM project activity.

3.7 Additionality

3.7.1 Starting Date of the Project Activity and CDM Prior Consideration

The starting date of Cucuana project activity is 28 September 2010 which is the earliest date at which either the implementation or construction or real action of a project activity begins.

The validation team has deemed as appropriate November 2007 as the date of the final investment decision and 28 September 2010 as the starting date of Cucuana project activity. The starting date of the project activity is, according to the current version of the CDM Glossary, the earliest date at which either the

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implementation or construction or real action of the project activity begins. This starting date corresponds to the purchase contract of Cucuana equipment COM-EP-112-2008, which was provided to the validation team.

Prior consideration of the CDM was validated according to the "Guidance on the demonstration and assessment of prior consideration of the CDM"; since the project starting date is after 02 August 2008 and the PDD was submitted for the first time to global stakeholder consultation on 02 August 2008, i.e. before the project starting date, the PP does not need to inform to the host Party DNA and UNFCCC. Thus project activity complies with the requirements.

A renewable crediting period of 21 years was selected. On 01 November 2014 the power plant is expected to start operation. This date was checked against the chronogram included in the technical report of the power plant.

Accordingly, the PP has provided AENOR with the timeline of the project activity and the evidence to support it. The main milestones of the project are shown below:

Date	Milestones	Evidence provided
November 2007	Union Fenosa/EPSA Strategic Plan (BIGGER) (investment decision date)	BIGGER approval
17/04/2008	Environmental Impact Assessment (EIA)	Ingetec SA
13/06/2008	Agreement with CDM consultant	Contract with SOCOIN
18/06/2008	Agreement with DOE	Contract with AENOR
July 2008	PDD submitted to DOE for validation	Email sent by PP to AENOR
02/8/2008	PDD published for GSC	UNFCCC webpage
06/07/2009	No Objection Letter	Colombian DNA
28/09/2010	Starting date of project activity	Purchase contract of Cucuana equipment
17/03/2011	Beginning of civil works	Chronogram

As demonstrated in the table above, the development of the **"Cucuana Hydroelectric Power Plant"** continued with real actions even when a merger and acquisition process between some companies involved in the project activity was being carried out.

All evidence provided to the validation team is credible and reliable, hence in the opinion of the AENOR validation team the CDM was seriously considered in the decision to implement the project activity.

3.7.2 Analysis of the Additionality

The additionality of Cucuana Hydroelectric Power Plant activity as required by ACM0002 version 13.0.0, is demonstrated by applying the "Tool for the demonstration and assessment of additionality" version 07.0.0.

Applying Step 1 of the tool, three alternative baseline scenarios to the project have been identified and discussed in the final PDD. These are:

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- Alternative 1: Continuation of the current situation: PP does not implement the project; hence the national grid consumers will continue using electricity from the National grid with a higher emission factor (Baseline scenario).
- Alternative 2: Execution of the project without its registration as CDM.
- Alternative 3: Construction of a 55 MW fuel-fired power plant in order to supply this electricity to the Interconnected System.

The alternatives presented in Step 1 are complete, realistic and credible and comply with the regulation in as per the Reference Expansion Plan of the Colombian Mining Energy Planning Unit (UPME). References are included in the PDD.

3.7.3 Investment analysis: parameters and calculation:

Concerning the step 2, the PP has finally chosen the investment analysis. As the project activity generates financial and economic benefits other than CDM related income through the sales of electricity and the proposed baseline scenario does not involve an investment, project participants have used an IRR benchmark analysis (Sub-step 2b – Option III) in order to demonstrate the additionality of the Project activity.

It has been demonstrated that the project IRR without any CDM revenues is estimated to be 10.85%. The Project IRR is lower than the benchmark IRR of 13.48% adopted by the Project participant. As per the Tool for the demonstration and assessment of additionality and the Guidelines on the assessment of investment analysis (paragraph 12), a relevant benchmark for a project IRR can be derived from estimates of the cost of financing and required return on capital (e.g. commercial lending rates and guarantees required for the country and the type of project activity concerned), based on bankers views and private equity investors/funds' required return on comparable projects. Furthermore the same post-tax benchmark has been used in the following registered CDM project in Colombia: “Project 5402: La Glorita Landfill Gas Project”.

The average August 2007 – October 2007 value, for the commercial lending rates available at the Central Bank of Colombia has been considered for the arriving at the benchmark of 13.48%. The IRR benchmark post-tax of 13.48% is validated to be suitable for the project activity by AENOR's validation team in compliance with paragraph 12, Annex 5 of the EB62 report and paragraph 121(a) of the VVS version 05.0. This benchmark value is conservatively chosen and does not reflect the inevitable risk premium of a novel hydropower project.

The project participant has assumed 3% as Colombian long term inflation and 1.74% as USA long term inflation which are consistent with the inflation rates provided in the inflation forecast of the central bank of Colombia and the average forecasted inflation rate for USA published by the IMF. This inflation rate based was applied in order to pass all values to nominal terms. This assumption is deemed appropriate, thus accepted by the validation team of AENOR.

The references have been verified and crosschecked by AENOR and are found to be appropriate hence accepted by the audit team. The IRR improves to 12.09% on considering CDM revenues.

The validation team verified that taxes and depreciation used in the investment analysis comply with the Colombian legal requirements i.e. 33% value of the corporate tax, tax deductions and depreciation method applied.

Following Annex 5 of EB62 “Guidelines on the Assessment of Investment Analysis”, it has been validated that the project IRR calculation reflects the expected operation of the underlying project activity (a technical lifetime of 50 years) and that the capital cost of the assets and their depreciation as an expense to the project were not treated both to constitute a double counting of this cost and that the cost of financing expenditures (i.e. loan repayments and interest) was not included in the calculation of project IRR.

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In the same way, it has been validated that the project IRR calculation are not limited to the proposed crediting period and as that the fair value of the project activity assets at the end of the assessment period is zero in accordance with local accounting regulations.

November 2007 has been considered as the date of final investment decision, as Cucuana Hydroelectric Power Plant was included by the Board in "Union Fenosa/EPSA Strategic Plan" (Plan BIGGER).

AENOR has verified and confirmed that the values used in the financial analysis are consistent with the value of the source and although, due to the acquisition negotiation between Union Fenosa and Gas Natural which supposed a delay in the implementation of the strategic plan (BIGGER), the period of time between the investment decision and the starting date of the project activity (35 months), it has been checked in the context of the project activity that the input values used in the investment analysis were conservative related to the existing values at the starting date of the Project (28/09/2010) and thus accepted by the validation team of AENOR. References are included in the PDD and IRR calculation spreadsheet.

The financial worksheets have been evidenced and verified to be correct. The assumptions used, the base documents and the financial calculations have also been verified.

In addition, during the assessment of this project, the reasonableness of the parameters used in the project IRR calculation were analyzed by comparison with similar projects signed as CDM project in the same area and public available data, as follows:

Total Investment

The investment cost has been quoted by EPSA internal document named "Estudio de Prefactibilidad y Diseño detallado del Proyecto Cucuana, Afluente del río Saldaña, Departamento del Tolima" (Feasibility Study and Detailed Design of Project Cucuana, Tributary of the Rio Saldaña, Department of Tolima) dated November 2007 which provided a quotation of 177,730 million COP (US\$ 79,379,210¹), corresponding to equipment, machinery, grid connection, substation, development and civil works for the project. This document constitutes the basis for the Board decision of including the Project activity in the Union Fenosa/EPSA Strategic Plan (BIGGER) (November 2007).

AENOR checked the credibility and plausibility of the input data by comparing the applied values with the average costs provided by several sources, inter alia, the report named "Development Plan for Non-Conventional Sources of Energy in Colombia of the Mining Energy Planning Unit (UPME)" dated in 2010, the World Energy Outlook 2008 of the International Energy Agency (IEA), similar projects proposed as CDM project in the same area (see table 2 below) and with Ministerio de Minas y Energía (Energy and Mines Ministry). The parameters have been cross-checked against third-party and publicly available sources.

Table 2: Comparison of investment costs per kW among hydropower projects in Colombia

Project	Capacity (MW)	Total investment US\$ 1,000	Investment per KW US\$
Project 3347 : Caruquia 9.76 MW Hydroelectric project	9.76	21,500	2,203
Project 3570 : Alto Tuluá Minor Hydroelectric Power Plant	20.00	53,346	2,667
Project 3599 : Bajo Tuluá Minor Hydroelectric Power Plant	20.00	53,442	2,672

¹ As per the exchange rate of 2,239 COP/US\$ used in the investment analysis

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Project	Capacity (MW)	Total investment US\$ 1,000	Investment per KW US\$
Project 4782 : Santiago 2.8 MW Hydroelectric Project	2.80	4,905	1,752
PCH Patico	14.50	22,500	1,552
Central Hidroeléctrica de Prado del Tolima	50.00	52,500	1,050
PCH Barroso	19.90	40,000	2,010
Cucuana Hydroelectric Power Plant¹	55.00	79,379	1,443

Source: <http://cdm.unfccc.int/Projects/registered.html>, UPME and Project Proponent

According to UPME, the capital cost of hydropower projects is site specific and can range from 1,400 US\$/KW to 2,200 US\$/KW being the most likely 1,800 US\$/KW.

The investment cost of Cucuana (1,443US\$/KW) was found to be within the range of values provided by UPME for similar hydropower plants in Colombia and lower than the average of 2,050 US\$/KW provided by the International Energy Agency for large scale hydro. Therefore, AENOR deemed the investment cost of the project activity as reasonable and appropriate.

In addition, PP has provided the up-to-date summary of costs of the project which shows current costs are being higher than those budgeted at the time of investment decision, among other reasons due to geological difficulties in the tunnel construction, not considered in the initial budget. According to the current valuation the cost of the project will rise to COP 210,594,881 (18.5% higher).

This situation confirms that the financial analysis done by the PP at the time of investment decision can be considered as conservative in the CDM/additionality context.

O&M costs

The annual O&M costs have been crosschecked with data from the Development Plan for Non-Conventional Sources of Energy in Colombia of the Mining Energy Planning Unit (UPME), International Energy Agency and the World Bank (Technical and Economic Assessment of Off-grid, Mini-grid and Grid Electrification Technologies 2007) and with similar projects proposed as CDM project in the same area (see table 3 below).

Table 3: Comparison of O&M costs per KWh among CDM hydropower projects in Colombia

Project	Capacity (MW)	Annual Generation (MWh)	Annual O&M Costs (US\$)	US\$/MWh
Project 3347 : Caruquia 9.76 MW Hydroelectric project	9.76	59,800	510,552	8.5

¹ The nominal capacity of the generating equipment is 58.16 MW but as stated in the PDD the effective capacity is 55 MW. For comparison purposes with other CDM registered projects, the effective capacity has been used which is conservative in the context of investment costs comparison.

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Project	Capacity (MW)	Annual Generation (MWh)	Annual O&M Costs (US\$)	US\$/MWh
Project 3570 : Alto Tuluá Minor Hydroelectric Power Plant	20.00	114,400	1,062,631	9.3
Project 3599 : Bajo Tuluá Minor Hydroelectric Power Plant	20.00	117,400	981,236	8.4
Project 4782 : Santiago 2.8 MW Hydroelectric Project	2.80	16,662	231,534	13.9
Cucuana Hydroelectric Power Plant	55.00	252,000	1,213,538	4.8

Source: <http://cdm.unfccc.int/Projects/registered.html> and Project Proponent

The applied average annual O&M costs of 4.8 US\$/MWh, were found to be lower than that of similar projects signed as CDM project in the same area and also lower than the average of 10 US\$/MWh provided by the World Bank and UPME, hence conservative in the CDM additionality context therefore accepted by the validation team of AENOR. Nevertheless, AENOR has validated that with a zero O&M costs, the benchmark is not crossed by the project activity.

Based on previous information, AENOR validation team considered that the Annual O&M cost used in the PDD was reasonable, valid and applicable at the time of the investment decision.

Annual Power Generation

The annual running hours of 4,582 falls within the range of the annual running hours for the similar projects, hence it can be considered suitable and therefore accepted by the validation team of AENOR.

Table 4: Comparison of the annual running hours among hydropower projects in Colombia

Project	Capacity (MW)	Annual operation hours	Load Factor (%)	Annual output MWh
Project 122 : Agua Fresca Multipurpose and environmental services project	7.49	8,451	96.48%	63,300
Project 275 : Santa Ana Hydroelectric Plant	13.43	3,500	39.95%	47,000
Project 1411 : La Cascada 2.3 MW Hydroelectric Project	2.30	6,239	71.22%	14,350
Project 2600: Amaime Minor Hydroelectric Power Plant	19.00	4,722	53.91%	85,000
Project 3347 : Caruquia 9.76 MW Hydroelectric project	9.70	6,165	70.38%	59,800
Project 3570 : Alto Tuluá Minor Hydroelectric Power Plant	20.00	5,720	65.30%	114,400
Project 3599 : Bajo Tuluá Minor Hydroelectric Power Plant	20.00	5,870	67.01%	117,400
Project 4782 : Santiago 2.8 MW Hydroelectric Project	2.80	5,951	67.93%	16,662

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Project	Capacity (MW)	Annual operation hours	Load Factor (%)	Annual output MWh
Cucuana Hydroelectric Power Plant	55.00	4,582	52.30%¹	252,000

Source: <http://cdm.unfccc.int/Projects/registered.html> and Project Proponent

Furthermore, electricity generation was determined by an independent third party, INGETEC, an international energy consultancy which specializes in sustainable energy technologies, including hydropower projects. Therefore, according to the "Guidelines for the reporting and validation of plant load factors" and due to above mentioned cross-checking, AENOR Validation Team considered that the annual grid-connected electricity generation is reasonable and appropriate.

Power tariff

The electricity tariff of 121.03 COP/KWh (54.06 US\$ /MWh) is an estimation of EPSA based on the historic prices of energy transactions available from official sources. The AENOR validation team consulted the statistic of spot prices in the bulk market in Colombia through the data bases of the SIEL (Sistema de Información Eléctrico Colombiano – Colombian Electric Information System), managed by the Mining and Energy Planning Unit of the Ministry of Energy (UPME), Republic of Colombia and the company XM (electricity market operator). AENOR validation team was able to check that the price used was 44% higher than year 2007 average market price of 83.8 COP/KWh and 37% higher than the 2008 average of 88.5 COP/KWh. For subsequent years a scenario of CPI escalation has been used based on the forecasts by the Central Bank of Colombia. The validation team of AENOR deems that the approach used by the PP in estimating the energy prices is adequate and the values used are correct and appropriate. Thus the tariff used is conservative in the CDM/additionality context and therefore accepted by the AENOR validation team.

AENOR validation team also examined the PDDs of small hydropower projects in Colombia and found the tariff used in the investment analysis of the final PDD to be the highest within the range of the tariffs for the existing small hydropower CDM projects (see table 5).

Table 5. Comparison of tariffs among CDM hydropower Projects in Colombia.

Project	Capacity (MW)	Tariff US\$ /MWh	Indexed
Project 1411 : La Cascada 2.3 MW Hydroelectric Project	2.30	49.35	Yes
Project 3347 : Caruquia 9.76 MW Hydroelectric project	9.76	48.55	No
Project 3570 : Alto Tuluá Minor Hydroelectric Power Plant	20.00	53.20	Yes
Project 3599 : Bajo Tuluá Minor Hydroelectric Power Plant	20.00	53.20	Yes
Project 4782 : Santiago 2.8 MW Hydroelectric Project	2.80	53.87	Yes
Cucuana Hydroelectric Power Plant	55.00	54.06	Yes

Source: <http://cdm.unfccc.int/Projects/registered.html> and Project Proponent

¹ In the case of using the nominal capacity of 58.16 MW the load factor decreases to 49.46% which also falls within the range of the annual running hours for similar projects in Colombia.

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In summary, the tariff used for IRR calculation was valid and applicable at the time of the investment decision and the concerns expressed by CDM-EB in paragraph 48 of EB49 report have been addressed, and the electricity tariff is confirmed through cross-checking the above mentioned evidences.

AENOR has verified and confirmed that the values used in the financial analysis are consistent with the value of the source and this information was available at the date of the final investment decision (November 2007) and was thus likely to be considered in the decision. References are included in the PDD.

ENFICC price and Reliability income

Historically, critical drought conditions are linked to El Niño events, such as those of 1991–1992 and 2002–2003 when severe energy rationing occurred when pool prices reached very high spot prices, forcing regulatory changes in the market. The Colombian electricity market includes a reliability payment for each resource based on its ability to generate energy during unusually dry periods, which is called firm energy. This firm energy is expected to meet user demand under critical conditions (when the wholesale market price is larger than the scarcity price). This is found in CREG Resolution 071 2006. In 2008, Colombia introduced an innovative and effective market in which auctions are held to commit enough firm energy to cover its needs. The firm energy market coordinates investment in new resources to assure that sufficient firm energy is available in dry periods. Currently the economic signal favors conventional thermal power plants. Thermal power plants powered with fossil fuels do not depend on the hydrologic conditions. Under any circumstance, these installations can participate in the dispatch system, provided that they have enough fuel for their operation and depending on their efficiency and price. Therefore, if the system has a price that is sufficiently high, the thermal power plant will be in operation selling the electricity generated.

The project developer estimated reliability income of 1,162,008 US\$ (on average), according to the Firm Energy price of USD 13.045 per MWh settled by CREG at the time of investment decision "CREG Resolution 071, 2006, art 82" indexed to USA CPI and the Firm Energy Calculation of 55.33 GWh for the proposed project as per Annex 3 of CREG Resolution 079, 2006.

AENOR has verified and confirmed that the values used in the financial analysis are consistent with the value of the source and the calculation procedures established by CREG, and that this information was available at the date of the final investment decision (November 2007) and was thus likely to be considered in the decision. The assumptions used, the base documents and the financial calculations have also been verified.

Reliability Charge price and Reliability Cost

In the same way, as per CREG Resolution 079, 2006, Annex 8, every generation plant has to collect through the energy sales the remuneration to the SIC (Superintendent of Industry and Commerce) according to the following formulae:

$$VR_{i,m} = CERE_m * G_{i,m}$$

Where:

$$VR_{i,m} = \text{Reliability cost}$$

$$CERE_m = \text{Real Equivalent Cost of Energy Reliability Charge}$$

$$G_{i,m} = \text{Real generation of the plant expressed in kWh}$$

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Since at the time of investment decision no auction for the reliability charge had taken place, the project developer estimated a reliability cost of 1,137,284 US\$ (on average) as per article 4 of the CREG Resolution 101, 2007 which establishes that for the transition period (from 2007 to 2009) the reliability cost should be calculated according to the Firm Energy price of USD 13.045 per MWh settled by CREG at the time of investment decision "CREG Resolution 071, 2006, page 13" indexed to USA CPI and the annual power generation.

AENOR has verified and confirmed that the values used in the financial analysis are consistent with the value of the source and this information was available at the date of the final investment decision (November 2007) and was thus likely to be considered in the decision. The assumptions used, the base documents and the financial calculations have also been verified.

In addition, AENOR has validated that with zero Reliability costs, the benchmark is not crossed by the project activity.

Regulatory costs

Regulatory costs and their indexation to Colombian CPI have been validated as follows:

The fee due to the water use of 20.93 COP/KWh has been crosschecked against article 45 of Act 99 of 1993 while the industry and commerce tax of 336 COP/kW was checked against Act 56 of 1993. Both values were found to be appropriate.

The tax on financial transactions of 0.4% has been crosschecked against Article 41 of the Law 1111 December 27 of 2006 while Commercial responsibility cost of 3 COP/KWh were crosschecked against CREG Resolution 60 of 1995. Both values were found to be correct

Finally, FAZNI cost of 1 COP/KWh have been crosschecked against Law 1099 November of 2006 and found to be appropriate. In addition, CND-ASIC-LAC regulatory costs of 96 million COP/year were crosschecked against CREG Resolution 110 of 2006, values and calculations were found to be correct.

Nevertheless, AENOR has validated that regulatory costs being zero, the benchmark is not crossed by the project activity.

3.7.4 Sensitivity Analysis

The final PDD includes a sensitivity analysis to demonstrate that the conclusion regarding the financial/economic attractiveness is robust to reasonable variations in the critical assumptions.

For this purpose, variations that would make the Project IRR reach the benchmark for the parameters of energy production, electricity price, ENFICC price, reliability charge price, total investment, O&M costs and Regulatory costs have been considered, since these variables constitute more than 20% of either total project costs or total project revenues.

The sensitivity analysis shows that without the income from CER sales the IRR of the proposed project is also lower than the benchmark, even when the possible variations of the main parameters are considered. It was confirmed that the conclusion obtained in the analysis mentioned above highly suggests that the project activity is unlikely to be financially attractive.

In addition, AENOR has validated that higher variations in the parameters that would make the project IRR reach the benchmark are not likely to occur due to the following facts:

- 41% increase in electricity generation. The annual electricity output is determined by a third party, INGETEC an engineering firm specialized in the energy sector, based on series hydrology data for

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42 years at Cucuana and San Marcos Rivers. The evidences and results of this study have been reviewed by the validation team, and in the opinion of AENOR it is unlikely that the electricity output can increase by 41% to make the project IRR reach the benchmark.

- 29% increase in electricity price. The electricity tariff was an estimation of EPSA based on the historic prices. As told before, the chosen tariff was cross-checked by AENOR, resulting to be 44% and 37% higher than year 2007 and 2008 average market price respectively. In addition, the tariff is indexed to CPI during the assessment period and most of the scenarios outlined by the UPME in the Expansion Plan Generation-Transmission 2008-2022, unless specific values (spikes of a month or two on a horizon of 24 years) never exceed the price indicated for Cucuana, thus it is unlikely that the electricity price could increase by 29% to make the project IRR reach the benchmark.
- 362% increase in the ENFICC price. As told before, the chosen price was settled based on the CREG Resolution 071, 2006, art 82 but also taking into account the US inflation rate. In addition, according to the historical data, ENFICC price is quite stable, e.g. price for 2013 is 13.998 per MWh which is the same that in 2012, thus it is unlikely that the reliability income could increase by 362% to make the project IRR reach the benchmark
- >100% decrease in reliability charge price. It means that even without reliability costs the project IRR does not reach the benchmark
- 29% decrease in the total investment costs. For the hydroelectric Project plant, the cost of the turbine purchase, engineering construction and related accessories constitute the main costs. Prices including those for the main equipments and raw materials have been increasing in recent years¹. In addition, PP has provided evidence of higher investment costs than those estimated at the time of investment decision. Therefore; it is unlikely that the total investment will decrease by 29%, such that the project IRR reaches the benchmark.
- >100% decrease in the total O&M costs. It means that even without O&M costs the project IRR does not reach the benchmark.
- >100% decrease in the total Regulatory costs. It means that even without Regulatory costs the project IRR does not reach the benchmark.

AENOR reviewed and confirmed all related documents. The assessments show clearly that investment is unlikely to be 29% lower, ENFICC price 362% higher, electricity price 29% higher and electricity generation 41% higher, while the required reliability charge price, O&M costs and Regulatory costs variation scenarios are unrealistic.

In summary, it is AENOR's opinion that the additionality of the project is sufficiently demonstrated based on the investment analysis and thus it is sufficiently demonstrated that the project is not a likely baseline scenario and those emission reductions are therefore additional.

3.7.5 Barrier Analysis

The barrier analysis has not been selected to demonstrate the additionality.

3.7.6 Common practice Analysis

According to the tool and following the Guidelines on common practice version 02.0, the common practice analysis is carried out.

¹The National Administrative Department of Statistics -DANE-
http://www.dane.gov.co/daneweb_V09/en/index.php?option=com_content&view=article&id=54&Itemid=76

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Step 1: The proposed project is of 55¹ MW effective capacity, thus the projects with $\pm 50\%$ design capacity of the proposed project activity (27.50-82.50 MW) are considered as of similar size.

Step 2: Colombia, the host country, is chosen as the applicable geographical area. This was assessed as appropriate by the validation team of AENOR.

Thus 3 criteria have been determined: a) with installed capacity 27.50-82.50 MW, b) located in Colombia and connected to the national interconnection grid; c) started commercial operation before the start date of the project.

Step 3: 18 plants have been correctly identified.

Step 4: According to XM data, there are 2 projects applying the same technology that the proposed project activity. Hence, N_{diff} is determined as 16.

Information used is carefully verified and the determination of N_{diff} is assessed as reasonable.

Step 5:

$$F = 1 - N_{diff}/N_{all} = 1 - 16/18 = 0.11$$

$$N_{all} - N_{diff} = 2.$$

Therefore as F is smaller than 0.2 and $N_{all} - N_{diff}$ is smaller than 3, the proposed project clearly cannot be taken as common practice in Colombia.

In summary, based on our local and sectoral expertise it is AENOR's opinion that the additionality of the project is sufficiently demonstrated based on the investment analysis, that the project is not a likely baseline scenario, and that those emission reductions are, therefore, additional.

3.8 Monitoring Plan

As stated above, the project uses the approved "Consolidated methodology for grid-connected electricity generation from renewable sources", ACM0002 (version 13.0.0).

As stated in the methodology ACM0002/version 13.0.0 and in the PDD, the main monitoring parameters are the following:

Quantity of net electricity generation supplied by the project plant to the grid in year y: This data shall be measured with two calibrated meters in accordance with XM standards, as the audit team checked during the on-site interview. The electricity generated by the project activity used in the emission reduction calculation should be measured by EPSA each hour through the commercial frontier located at Mirolindo sub-station. The data obtained will be recorded once a month on a spreadsheet. In addition, the data will also be provided by the NEON application, which will be downloaded annually and recorded on a different spreadsheet. EPSA will validate this official generation data against the data provided by their meters and it will be cross-checked with the monthly invoices. The following parameters shall be measured:

(i) The quantity of electricity supplied by the project plant/unit to the grid; and

(ii) The quantity of electricity delivered to the project plant/unit from the grid

These two parameters will be measured when the power plant is operating and also when the power plant has to stop operations.

¹ In the case of using the nominal capacity of 58.16 MW the range of comparison varies to 29.08-87.24 MW but the validation team of AENOR has checked that the result of the common practice analysis would be the same.

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1. During the on-site visit the validation team checked that the internal procedure of Cucuana has been developed in accordance with the Colombian electricity sector requirement.
2. Data required re-calculating the **operating margin emission factor**. These data will be obtained through the NEON web site (using a password) and incorporated into a spreadsheet. These data are described as following:

2.1. *Net electricity generated by power plant/unit m or k in year y or hour h*: This data is registered in the NEON Software Application as "Real Generation/Agents". This system will be accessed once a year to download data, which will be stored in an electronic spreadsheet.

2.2. *Average net energy conversion efficiency of power unit m in year y ($\eta_{m,y}$)* - obtained through following data:

- *Heat Rate (MBTU/MWh)*: This piece of data is provided directly by the Colombian electricity authorities in different formats. During the validation activities, this data was facilitated by the Colombian authorities and documented evidence was sent to the validation team.

2.3. *Emission factor of each plant (kgCO₂/kWh)*: Data will be calculated once a year in accordance with the type and characteristics of the fuel used to obtain energy, using IPCC default values at the lower limit of the uncertainty at a 95% confidence interval as provided in table 1.4 of chapter 1 of Vol. 2 (Energy) of the 2006 IPCC "Guidelines on National GHG Inventories" and the Colombian heat rates.

3. EF grid, OM,y, operating margin emission for the grid. It will be calculated ex post.
4. EFgrid,CM,y Combined margin CO2 emission factor for the grid: It will be calculated annually ex post as per the "Tool to calculate the emission factor for an electricity system" based on the latest information from CND.
5. CapPJ Installed capacity of the hydropower plant after the implementation of the project activity: This data is monitored yearly.
6. APJ Area of the reservoir measured in the surface of the water, after the implementation of the project activity, when the reservoir is full: This data is monitored yearly.

The revised monitoring plan was then established in accordance with the guidelines stated in the methodology ACM0002 and the relevant Tool. The Cucuana Hydroelectric Power Plant shall deliver its energy through the substation of Mirolindo. This shall be the commercial frontier with the national grid. The EPSA Department of Energy Control will be in charge of the supervision of the measurement of the equipment. This department has plenty of experience in the maintenance of electric meters as was demonstrated during the on-site visit to the EPSA head quarters. "

3.8.1 Compliance of the Monitoring Plan with the Approved Methodology

Cucuana Hydroelectric Power Plant complies with the methodology ACM0002 version 13.0.0, therefore, in the PDD the main monitoring parameter are the EGfacility,y, **Net Electricity (kWh) generated by the project's activity**, the data required re-calculating the **operating margin emission factor** and the installed capacity and the area of the single reservoir, as stated in section 3.8. of this report. The source of data to recalculate the OM are taken from the NEON system. The source of data for the quantity of net electricity generation supplied by the project to the grid are the electricity meters, with continuous monitoring and, at minimum, monthly recording, and the cross-check with records for sold electricity. The meter equipment will be calibrated periodically by the national authorities or at least every 3 years.

Therefore, AENOR confirms that the parameters required for the selected approved methodology have been stated in the monitoring plan of the PDD, that the monitoring plan contains all necessary parameters,

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clearly described, and that the means of monitoring described in the plan complies with the requirements of the methodology.

3.8.2 Implementation of the Monitoring Plan

The general operation of the monitoring parameters will be integrated into the quality system of Cucuana (ISO 9001 certificate assessed by the validation team), with an audit by a third party. The following procedures have been developed in order to facilitate the implementation of the monitoring plan:

- Procedure PR.GRH.07.002 "Procedure for the Development of Competencies". The different responsibilities regarding the calculation and monitoring of the emission reductions are included in this procedure.
- Procedure PR.PRO.03.001 "Procedure for Control of the Production Equipment". This procedure includes the calibration and verification (internal or external) of the meters. In accordance with the validation team's request, the procedure was referred to in section B.7 of the PDD in order to demonstrate the future control of the measurement equipment. The internal calibration is made by the EPSA calibration laboratory. The accreditation of this entity (Resolution 3972, 21 February 2003) was sent to the validation team in order to check the validity of the calibration certificates of the meters.
- Procedure PR.PRO.01.005 "Coordination Between the CSM Operation and the Power Plants". This procedure includes the control of the documentation related to electricity generation.

The monitoring plan provides the relevant data necessary to determine the baseline emissions in accordance with the methodology. So in accordance with ACM0002 (version 13.0.0) requirements, the MP provides information about frequency and responsibility for controlling and reporting during the crediting period.

After the review of evidence provided by the PPs, and of the interview and communications with all PPs, AENOR confirms that the monitoring arrangements described in the monitoring plan are feasible within the project design and that the means considered for the implementation, including data management, quality and assurance control procedures, are sufficient to ensure that the emission achieved resulting from the proposed CDM project activity can be reported ex post and verified.

Therefore, in the opinion of AENOR's validation team the PPs will be able to implement the monitoring plan.

3.9 Environmental Impacts

According to Colombian law (Decree 12/20 of 2005), proposals for electricity generation with water sources must undergo an environmental impact study which must be submitted to the corresponding authority. The law stipulates that plants with a nominal installed capacity between 10 and 100 MW (like Cucuana Hydroelectric Power Plant) have to communicate with the autonomous corporation, "*Corporación Autónoma Regional de Tolima*".

The environmental authorization for Cucuana Hydroelectric Power Plant was granted by Cortolima on 19 December 2008 (Resolution No. 2411) upon compliance with 21 terms and 12 conditions (under the fifth term). Both documents were cross-checked by the validation team during the on-site visit in a meeting with the "*Corporación Autónoma Regional de Tolima*" personnel.

The PDD is in line with the EIA approval. These requirements are described in the PDD (section D.2.) and they were checked by the audit team during the on-site visit, with the people in charge of the environmental licenses of the Cortolima.

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EPSA will give the 25% of the CERs income to the communities located in the Cucuana River Basin. This was also checked against the environmental license, the Cortolima personnel and the Colombian DNA.

We conclude that the PPs followed the requirements of the host country in regard to environmental impacts.

3.10 Comments by Local Stakeholders

According to environment law (Decree 12/20 2005), in order to guarantee the right to social participation and allow the involvement of the general public in the evaluation of the project, made the Cucuana project activity EIA available for public scrutiny in the newspaper and in posters. No negative feedback was received, and only one request for more information about the project was made.

During the on-site visit to the Roncesvalles Municipality in October 2008, some issues were verified:

- 13 Meetings were carried out to socialize the project activity.
- Local communities have been consulted and have demonstrated their support for the development of the Cucuana Hydroelectric Project by signing the corresponding minutes of the meetings. A sample of the signed minutes of the meetings was reviewed.
- EPSA has designated a local person in charge of providing information and receiving local complaints.

The mayor of Roncesvalles where the project will be implemented, was interviewed during the on-site visit to the Roncesvalles municipalities on 28 October 2008. She confirmed their support for the project and their knowledge about its benefits and environmental impacts. Landowners have participated in the development by leasing their lands to the project developer. The opinion and comments of the interview are summarized below:

- The overall opinion of the project was very positive.
- The project can be seen as an example of an agreement between the council and the private companies in the region because they need public services.
- They fear environmental damages, but EPSA has created vigilance committees with members of the communities in order to guarantee the fulfilment of the handling plan.
- The project will benefit the local communities through the services associated, and also because EPSA has offered employment at the construction site.
- The Cucuana project activity will respect the priority of the use of water; human consumption will be the main priority.
- The project activity will also provide support to restoration, conservation and protection programs of the territorial flora.
- Training activities in the tourism sector have been included in the budget.
- The promoter will give priority to local workers during the development, construction and operation of the project.

It is important to highlight that EPSA makes different kinds of voluntary donations (apart from the mandatory ones):

- Voluntary investment plan: EPSA will give an amount of money to electrification, infrastructure projects in education and environmental projects.
- CDM Benefits (voluntary): Additionally, EPSA will donate 25% of the revenue obtained from the sale of the Certificate Emission Reductions (CERs) to the affected communities.

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AENOR determines that the local stakeholders comments have been invited, a summary of the comments received, and that the project participants have taken due account of the comments received.

AENOR states that the local stakeholder consultation is adequate and accurate.

4 COMMENTS BY PARTIES, STAKEHOLDERS AND NGOS

According to Decision 3/CMP.1, the validator shall make the PDD publicly available and receive, within 30 days, comments on the validation requirements from parties, stakeholders and UNFCCC-accredited NGOs and make them publicly available, too.

AENOR published the first PDD, version 3.1, on the CDM website (<http://unfccc.cdm.int>) on 2 August 2008 and invited comments by Parties, stakeholders and non-governmental organizations. No comments were received during this period.

Additionally, AENOR published PDD, version 3.3, on the CDM website (<http://unfccc.cdm.int>) on 25 July 2009 and invited comments by Parties, stakeholders and non-governmental organizations. No comments were received during this period.

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5 VALIDATION OPINION

AENOR has performed the validation of the **Cucuana Hydroelectric Power Plant** in Colombia. The validation process was performed on the basis of all UNFCCC issues and criteria for CDM projects, the host country criteria and also on the criteria given to provide for consistent project operations, monitoring and reporting. The conclusions of this report show that the project, as it was described in the project documentation, is in line with all criteria applicable for the validation.

The validation consisted of the following three phases: i) a desk review of the project design, the baseline and the monitoring plans; ii) follow-up interviews with project stakeholders; iii) the resolution of outstanding issues and the issuance of the final validation report and opinion. In the course of the validation process, 15 corrective actions and two clarifications were raised; all have been successfully closed.

The project participant used the "Tool for demonstration and assessment of additionality" version 07.0.0, and the latest "Guidance on the demonstration and assessment of prior consideration of the CDM" to demonstrate the additionality of the project. In line with this tool, the PDD provides an investment analysis to determine that the project activity itself is not the baseline scenario. The "Tool to calculate the emission factor for an electricity system" version 03.0.0 was also applied to determine the emission factor of the Colombian grid.

The investment analysis demonstrates that the proposed project activity is not a likely baseline scenario. Emission reductions attributable to the project are hence additional to any that would occur in the absence of the project activity.

The review of the project design documentation and additional documents related to baseline and monitoring methodology, and the subsequent background investigation, follow-up interviews and review of comments by parties and stakeholder, have provided AENOR with sufficient evidence to validate the fulfilment of the stated criteria.

The conclusions can be summarised in detail as follows:

- The project is in line with all relevant host country criteria of Colombian DNA and with all relevant UNFCCC requirements for CDM. The LoA from Colombia is dated October 2009.
- The project additionality is sufficiently justified in the PDD.
- The monitoring plan is transparent and adequate.
- The calculation of project emission reductions has been carried out in a transparent and conservative manner, so that the total calculated emission reductions of 88,250 tCO₂e are most likely to be achieved within the renewable crediting period.

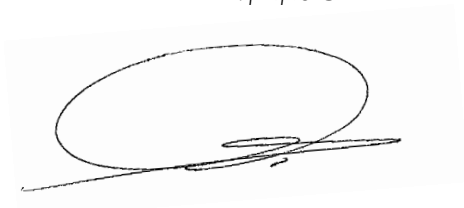
AENOR's opinion, the project correctly applies and meets the relevant UNFCCC requirements for the CDM and the relevant host country criteria.

The validation has been performed using a risk-based approach, as described above. The only purpose of this report is its use during the registration process as part of the CDM project cycle.

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17/12/2013

A large, stylized signature in black ink, consisting of a large loop followed by a horizontal stroke and a small flourish.

Luis Robles Olmos

Authorized Person

17/12/2013

A smaller, more compact signature in black ink, with several loops and a horizontal base.

Elena Llorente Pérez

Chief validator

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6 CORRECTIVE ACTION REQUESTS, CLARIFICATIONS AND FORWARD ACTION REQUESTS

FINDING	Nº 1		
Classification	CAR <input checked="" type="checkbox"/>	CL <input type="checkbox"/>	FAR <input type="checkbox"/>
Description of finding <i>Describe the finding in unambiguous style; address the context (e.g. section)</i>	The approval letter of the Colombian Designated National Authority has to be obtained		
PP RESPONSE #1	<i>This section shall be filled by the PP.</i>		
<i>It shall address the corrective action taken in details</i>	The letter has already started the issuance process according to the Colombian DNA procedures, in brief it will be delivered to the DOE.		
<i>It shall provide and indentified the evidences proposed (if applicable)</i>			
DOE Assessment #1 <i>The assessment shall encompass all open issues. In case of non-closure additional corrective action and DOE assessments (#2, #3, etc.) shall be added</i>	The letter of approval from Colombia has been provided and it is considered correct.		
PP RESPONSE #2	<i>This section shall be filled by the PP.</i>		
<i>Corrective action</i>			
<i>Evidences proposed</i>			
DOE Assessment #2			
Conclusion <i>Tick the appropriate checkbox</i>	CAR/CL CLOSED <input checked="" type="checkbox"/>	To be checked during the first periodic verification <input type="checkbox"/>	

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FINDING		Nº 2	
Classification	CAR <input checked="" type="checkbox"/>	CL <input type="checkbox"/>	FAR <input type="checkbox"/>
Description of finding <i>Describe the finding in unambiguous style; address the context (e.g. section)</i>	The approval letter of the Spain Designated National Authority has to be obtained.		
PP RESPONSE #1 <i>This section shall be filled by the PP.</i>			
<i>It shall address the corrective action taken in details</i>	The project participant from Spain has voluntary withdraw from the project activity.		
<i>It shall provide and indentified the evidences proposed (if applicable)</i>			
DOE Assessment #1 <i>The assessment shall encompass all open issues. In case of non-closure additional corrective action and DOE assessments (#2, #3, etc.) shall be added</i>	The letter of approval from Spain it is not needed since the project participant from Spain has been voluntary withdraw.		
PP RESPONSE #2 <i>This section shall be filled by the PP.</i>			
<i>Corrective action</i>			
<i>Evidences proposed</i>			
DOE Assessment #2			
Conclusion <i>Tick the appropriate checkbox</i>	CAR/CL CLOSED <input checked="" type="checkbox"/>	To be checked during the first periodic verification <input type="checkbox"/>	

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FINDING		Nº 3	
Classification	CAR <input checked="" type="checkbox"/>	CL <input type="checkbox"/>	FAR <input type="checkbox"/>
Description of finding <i>Describe the finding in unambiguous style; address the context (e.g. section)</i>	During the on site visit, some differences between the technical data included in the PDD and different presentations were detected. The inconsistencies detected shall be solved.		
PP RESPONSE #1 <i>It shall address the corrective action taken in details</i> <i>It shall provide and indentified the evidences proposed (if applicable)</i>	<i>This section shall be filled by the PP.</i> Changes have been applied for the emission reductions calculations, economic model and PDD.		
DOE Assessment #1 <i>The assessment shall encompass all open issues. In case of non-closure additional corrective action and DOE assessments (#2, #3, etc.) shall be added</i>	The equivalent annual operating hours have been updated. The installed capacity of the project activity does not coincide with the documentation provided.		
PP RESPONSE #2 <i>Corrective action</i> <i>Evidences proposed</i>	<i>This section shall be filled by the PP.</i> The plant load factor and the installed capacity have been updated in the PDD, in the emission reductions spreadsheet and in the economic model.		
DOE Assessment #2	The PDD has been corrected with the correct technical data.		
Conclusion <i>Tick the appropriate checkbox</i>	CAR/CL CLOSED <input checked="" type="checkbox"/>	To be checked during the first periodic verification <input type="checkbox"/>	

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FINDING	Nº 4		
Classification	CAR <input checked="" type="checkbox"/>	CL <input type="checkbox"/>	FAR <input type="checkbox"/>
Description of finding <i>Describe the finding in unambiguous style; address the context (e.g. section)</i>	The four different kinds of social contributions of the project developer shall be detailed in the PDD.		
PP RESPONSE #1 <i>This section shall be filled by the PP.</i>			
<i>It shall address the corrective action taken in details</i>	The social contributions of the project developer have been included in the PDD.		
<i>It shall provide and indentified the evidences proposed (if applicable)</i>			
DOE Assessment #1 <i>The assessment shall encompass all open issues. In case of non-closure additional corrective action and DOE assessments (#2, #3, etc.) shall be added</i>	The different social projects were described in the PDD.		
PP RESPONSE #2 <i>This section shall be filled by the PP.</i>			
<i>Corrective action</i>			
<i>Evidences proposed</i>			
DOE Assessment #2			
Conclusion <i>Tick the appropriate checkbox</i>	CAR/CL CLOSED <input checked="" type="checkbox"/>	To be checked during the first periodic verification <input type="checkbox"/>	

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FINDING	Nº 5		
Classification	CAR <input checked="" type="checkbox"/>	CL <input type="checkbox"/>	FAR <input type="checkbox"/>
Description of finding <i>Describe the finding in unambiguous style; address the context (e.g. section)</i>	The Environment License has to be obtained and submitted to the validation team.		
PP RESPONSE #1 <i>It shall address the corrective action taken in details</i> <i>It shall provide and indentified the evidences proposed (if applicable)</i>	<i>This section shall be filled by the PP.</i> The environmental license has been provided		
DOE Assessment #1 <i>The assessment shall encompass all open issues. In case of non-closure additional corrective action and DOE assessments (#2, #3, etc.) shall be added</i>	The environmental license was provided.		
PP RESPONSE #2 <i>Corrective action</i> <i>Evidences proposed</i>	<i>This section shall be filled by the PP.</i>		
DOE Assessment #2			
Conclusion <i>Tick the appropriate checkbox</i>	CAR/CL CLOSED <input checked="" type="checkbox"/>	To be checked during the first periodic verification <input type="checkbox"/>	

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FINDING	Nº 6		
Classification	CAR <input checked="" type="checkbox"/>	CL <input type="checkbox"/>	FAR <input type="checkbox"/>
Description of finding <i>Describe the finding in unambiguous style; address the context (e.g. section)</i>	The versions of the different tools shall be correctly referenced in the PDD.		
PP RESPONSE #1 <i>This section shall be filled by the PP.</i>			
<i>It shall address the corrective action taken in details</i>	The version of the methodology has been updated.		
<i>It shall provide and indentified the evidences proposed (if applicable)</i>			
DOE Assessment #1 <i>The assessment shall encompass all open issues. In case of non-closure additional corrective action and DOE assessments (#2, #3, etc.) shall be added</i>	The correct version of the tool has been stated in the PDD. However, the correct parameters in order to calculate the emission factor have not been established in the PDD.		
PP RESPONSE #2 <i>This section shall be filled by the PP.</i>			
<i>Corrective action</i>	The list of parameters from the methodology ACM0002 and the "Tool to calculate the emission factor for an electricity system" has been completed adding the following parameters $EG_{m,y}$, $EG_{k,y}$.		
<i>Evidences proposed</i>			
DOE Assessment #2	The correct parameters have been stated.		
Conclusion <i>Tick the appropriate checkbox</i>	CAR/CL CLOSED <input checked="" type="checkbox"/>	To be checked during the first periodic verification <input type="checkbox"/>	

VALIDATION REPORT

"Cucuana Hydroelectric power Plant"

FINDING	Nº 7		
Classification	CAR <input checked="" type="checkbox"/>	CL <input type="checkbox"/>	FAR <input type="checkbox"/>
Description of finding <i>Describe the finding in unambiguous style; address the context (e.g. section)</i>	<p>The start date of the project shall be in accordance with the last Glossary of terms: "the start date shall be considered to be the date on which the project participant has committed to expenditures related to the implementation or related to the construction of the project activity" Documented evidence of the starting date has to be provided.</p>		
PP RESPONSE #1 <hr/> <i>It shall address the corrective action taken in details</i> <hr/> <i>It shall provide and indentified the evidences proposed (if applicable)</i>	<p><i>This section shall be filled by the PP.</i></p> <p>Documented evidence of the starting date has been provided.</p>		
DOE Assessment #1 <i>The assessment shall encompass all open issues. In case of non-closure additional corrective action and DOE assessments (#2, #3, etc.) shall be added</i>	<p>The starting date is 28 September 2010. This date is the signature of the contract of the purchase of equipment. It is considered in accordance with the "Glossary of CDM terms".</p>		
PP RESPONSE #2 <hr/> <i>Corrective action</i> <hr/> <i>Evidences proposed</i>	<p><i>This section shall be filled by the PP.</i></p>		
DOE Assessment #2			
Conclusion <i>Tick the appropriate checkbox</i>	CAR/CL CLOSED <input checked="" type="checkbox"/>	To be checked during the first periodic verification <input type="checkbox"/>	

VALIDATION REPORT

"Cucuana Hydroelectric power Plant"

FINDING	Nº 8		
Classification	CAR <input checked="" type="checkbox"/>	CL <input type="checkbox"/>	FAR <input type="checkbox"/>
Description of finding <i>Describe the finding in unambiguous style; address the context (e.g. section)</i>	Project IRR has been identified as financial indicator. However, the PDD shall clarify if the indicator takes or not taxes into account. Besides, evidence about the choice of benchmark and its appropriateness for the underlying project activity has to be provided and addressed in the PDD.		
PP RESPONSE #1	<i>This section shall be filled by the PP.</i>		
<i>It shall address the corrective action taken in details</i>	The indicator selected is the "Post-tax project IRR" and the choice of the benchmark have been indicated in Section B.5 of the PDD.		
<i>It shall provide and indentified the evidences proposed (if applicable)</i>			
DOE Assessment #1 <i>The assessment shall encompass all open issues. In case of non-closure additional corrective action and DOE assessments (#2, #3, etc.) shall be added</i>	The financial indicator has been identified as Project IRR post-tax in the final PDD. The benchmark selected has been derived from the commercial lending rates which are considered appropriate as a benchmark for a Project IRR post-tax. Thus CAR is closed.		
PP RESPONSE #2	<i>This section shall be filled by the PP.</i>		
<i>Corrective action</i>			
<i>Evidences proposed</i>			
DOE Assessment #2			
Conclusion <i>Tick the appropriate checkbox</i>	CAR/CL CLOSED <input checked="" type="checkbox"/>	To be checked during the first periodic verification <input type="checkbox"/>	

VALIDATION REPORT

"Cucuana Hydroelectric power Plant"

FINDING		Nº 9	
Classification	CAR <input checked="" type="checkbox"/>	CL <input type="checkbox"/>	FAR <input type="checkbox"/>
Description of finding <i>Describe the finding in unambiguous style; address the context (e.g. section)</i>	Evidence about the appropriateness of the input values used in the investment analysis shall be provided i.e., investment cost, electricity tariffs, electricity generation, taxes, escalation of costs, operational lifetime, depreciation method, firm power, etc.		
PP RESPONSE #1 <i>It shall address the corrective action taken in details</i>	<i>This section shall be filled by the PP.</i>		
<i>It shall provide and indentified the evidences proposed (if applicable)</i>	Evidences had been provided and sources have been included in the excel spreadsheet and PDD <ul style="list-style-type: none"> • Project IRR Spreadsheet • Updated investment budget • Investment costs quotation • Reliability Payment Auction Result • Hydrologic Study 		
DOE Assessment #1 <i>The assessment shall encompass all open issues. In case of non-closure additional corrective action and DOE assessments (#2, #3, etc.) shall be added</i>	Appropriate and reliable evidence has been provided. Thus CAR is closed.		
PP RESPONSE #2 <i>Corrective action</i>	<i>This section shall be filled by the PP.</i>		
<i>Evidences proposed</i>			
DOE Assessment #2			
Conclusion <i>Tick the appropriate checkbox</i>	CAR/CL CLOSED <input checked="" type="checkbox"/>	To be checked during the first periodic verification <input type="checkbox"/>	

VALIDATION REPORT

"Cucuana Hydroelectric power Plant"

FINDING	Nº 10		
Classification	CAR <input checked="" type="checkbox"/>	CL <input type="checkbox"/>	FAR <input type="checkbox"/>
Description of finding <i>Describe the finding in unambiguous style; address the context (e.g. section)</i>	The barrier analysis shall be reinforced using official documentation and following the guidelines for objective demonstration and assessment of barriers. Documentation and evidence shall be submitted to the validation team.		
PP RESPONSE #1 <i>It shall address the corrective action taken in details</i> <i>It shall provide and indentified the evidences proposed (if applicable)</i>	<i>This section shall be filled by the PP.</i> Removed barriers analysis		
DOE Assessment #1 <i>The assessment shall encompass all open issues. In case of non-closure additional corrective action and DOE assessments (#2, #3, etc.) shall be added</i>	Barrier analysis has been removed from the final PDD, thus CAR is closed.		
PP RESPONSE #2 <i>Corrective action</i> <i>Evidences proposed</i>	<i>This section shall be filled by the PP.</i> 		
DOE Assessment #2			
Conclusion <i>Tick the appropriate checkbox</i>	CAR/CL CLOSED <input checked="" type="checkbox"/>	To be checked during the first periodic verification <input type="checkbox"/>	

VALIDATION REPORT

"Cucuana Hydroelectric power Plant"

FINDING	Nº 11		
Classification	CAR <input checked="" type="checkbox"/>	CL <input type="checkbox"/>	FAR <input type="checkbox"/>
Description of finding <i>Describe the finding in unambiguous style; address the context (e.g. section)</i>	Evidence about XM data on existing hydraulic power plants shall be provided.		
PP RESPONSE #1 <i>This section shall be filled by the PP.</i>	<i>This section shall be filled by the PP.</i>		
<i>It shall address the corrective action taken in details</i>	The common practice section of the PDD has been updated following the new version 07.0.0 of the "Tool for the demonstration and assessment of additionality" and evidence and sources provided.		
<i>It shall provide and indentified the evidences proposed (if applicable)</i>			
DOE Assessment #1 <i>The assessment shall encompass all open issues. In case of non-closure additional corrective action and DOE assessments (#2, #3, etc.) shall be added</i>	A common practice analysis has been correctly addressed following the steps of the Tool for the demonstration and assessment of additionality version 07.0.0 in the final PDD and reliable evidence has been provided. Thus CAR is closed.		
PP RESPONSE #2 <i>This section shall be filled by the PP.</i>	<i>This section shall be filled by the PP.</i>		
<i>Corrective action</i>			
<i>Evidences proposed</i>			
DOE Assessment #2			
Conclusion <i>Tick the appropriate checkbox</i>	CAR/CL CLOSED <input checked="" type="checkbox"/>	To be checked during the first periodic verification <input type="checkbox"/>	

VALIDATION REPORT

"Cucuana Hydroelectric power Plant"

FINDING	Nº 12		
Classification	CAR <input checked="" type="checkbox"/>	CL <input type="checkbox"/>	FAR <input type="checkbox"/>
Description of finding <i>Describe the finding in unambiguous style; address the context (e.g. section)</i>	The spreadsheets used for the emission reduction calculation shall be provided to the validation team.		
PP RESPONSE #1 <i>This section shall be filled by the PP.</i>			
<i>It shall address the corrective action taken in details</i>	The spreadsheet for the calculation of the emission reductions is provided to the DOE.		
<i>It shall provide and indentified the evidences proposed (if applicable)</i>			
DOE Assessment #1 <i>The assessment shall encompass all open issues. In case of non-closure additional corrective action and DOE assessments (#2, #3, etc.) shall be added</i>	The spreadsheet for calculation has been provided, the following issues should be improved: <ul style="list-style-type: none"> - Lambda should be calculated in accordance with the tool to calculate the emission factor for an electricity system, the area under the curve should be calculated in order to determine the number of hours for which low cost sources are on the margin in year. - The net quantity of electricity generated and delivered to the grid should used in order to calculate the emission factor of the grid, not the gross electricity generation (Scada). 		
PP RESPONSE #2 <i>This section shall be filled by the PP.</i>			
<i>Corrective action</i>	The requested changes are applied to the emissions reduction spreadsheet.		
<i>Evidences proposed</i>			
DOE Assessment #2	The spreadsheet for the calculation of emission reduction has been provided and it is considered correct.		
Conclusion <i>Tick the appropriate checkbox</i>	CAR/CL CLOSED <input checked="" type="checkbox"/>	To be checked during the first periodic verification <input type="checkbox"/>	

VALIDATION REPORT

"Cucuana Hydroelectric power Plant"

FINDING	Nº 13		
Classification	CAR <input checked="" type="checkbox"/>	CL <input type="checkbox"/>	FAR <input type="checkbox"/>
Description of finding <i>Describe the finding in unambiguous style; address the context (e.g. section)</i>	The parameters used to calculate the emission factor of the grid shall be included in the Monitoring Plan Section.		
PP RESPONSE #1 <i>This section shall be filled by the PP.</i>	<i>This section shall be filled by the PP.</i>		
<i>It shall address the corrective action taken in details</i>	The parameters to recalculate the OM and BM have been stated.		
<i>It shall provide and indentified the evidences proposed (if applicable)</i>			
DOE Assessment #1 <i>The assessment shall encompass all open issues. In case of non-closure additional corrective action and DOE assessments (#2, #3, etc.) shall be added</i>	The BM has been fixed ex ante; therefore the PDD needs to be modified.		
PP RESPONSE #2 <i>This section shall be filled by the PP.</i>	<i>This section shall be filled by the PP.</i>		
<i>Corrective action</i>			
<i>Evidences proposed</i>			
DOE Assessment #2	The correct parameters have been stated in the monitoring plan.		
Conclusion <i>Tick the appropriate checkbox</i>	CAR/CL CLOSED <input checked="" type="checkbox"/>	To be checked during the first periodic verification <input type="checkbox"/>	

VALIDATION REPORT

"Cucuana Hydroelectric power Plant"

FINDING	Nº 14		
Classification	CAR <input checked="" type="checkbox"/>	CL <input type="checkbox"/>	FAR <input type="checkbox"/>
Description of finding <i>Describe the finding in unambiguous style; address the context (e.g. section)</i>	The procedures developed in order to describe the authority and the activities involved in the emission reduction calculation shall be referenced in the PDD.		
PP RESPONSE #1 <i>It shall address the corrective action taken in details</i> <i>It shall provide and indentified the evidences proposed (if applicable)</i>	<i>This section shall be filled by the PP.</i> The procedure developed has been included in the PDD.		
DOE Assessment #1 <i>The assessment shall encompass all open issues. In case of non-closure additional corrective action and DOE assessments (#2, #3, etc.) shall be added</i>	PDD has been completed the procedures, but documentation evidence shall be provided.		
PP RESPONSE #2 <i>Corrective action</i> <i>Evidences proposed</i>	<i>This section shall be filled by the PP.</i>		
DOE Assessment #2	The correct procedure has been stated in the PDD.		
Conclusion <i>Tick the appropriate checkbox</i>	CAR/CL CLOSED <input checked="" type="checkbox"/>	To be checked during the first periodic verification <input type="checkbox"/>	

VALIDATION REPORT

"Cucuana Hydroelectric power Plant"

FINDING		Nº 15	
Classification	CAR <input checked="" type="checkbox"/>	CL <input type="checkbox"/>	FAR <input type="checkbox"/>
Description of finding <i>Describe the finding in unambiguous style; address the context (e.g. section)</i>	The Stakeholder Section of the PDD shall be re edited in a more specific way, reinforced and the mistakes have to be solved.		
PP RESPONSE #1	This section shall be filled by the PP.		
<i>It shall address the corrective action taken in details</i>	The answer to this CAR has been added in the section E.3 of the PDD. The comments received in the stakeholders consultation sessions have been overall positives and the doubts presented answered during these sessions.		
<i>It shall provide and indentified the evidences proposed (if applicable)</i>			
DOE Assessment #1 <i>The assessment shall encompass all open issues. In case of non-closure additional corrective action and DOE assessments (#2, #3, etc.) shall be added</i>	The stakeholder section has been correctly modified.		
PP RESPONSE #2	This section shall be filled by the PP.		
<i>Corrective action</i>			
<i>Evidences proposed</i>			
DOE Assessment #2			
Conclusion <i>Tick the appropriate checkbox</i>	CAR/CL CLOSED <input checked="" type="checkbox"/>	To be checked during the first periodic verification <input type="checkbox"/>	

VALIDATION REPORT

"Cucuana Hydroelectric power Plant"

FINDING	Nº 1		
Classification	CAR <input type="checkbox"/>	CL <input checked="" type="checkbox"/>	FAR <input type="checkbox"/>
Description of finding <i>Describe the finding in unambiguous style; address the context (e.g. section)</i>	The last chronogram has to be submitted to the validation team.		
PP RESPONSE #1	<i>This section shall be filled by the PP.</i>		
<i>It shall address the corrective action taken in details</i>	The dates mentioned in the chronograph have been updated accordingly.		
<i>It shall provide and indentified the evidences proposed (if applicable)</i>			
DOE Assessment #1 <i>The assessment shall encompass all open issues. In case of non-closure additional corrective action and DOE assessments (#2, #3, etc.) shall be added</i>	A chronogram/timeline of the project activities shall be provided. In order to know when it is expected to start the construction of the Wind Farm.		
PP RESPONSE #2	<i>This section shall be filled by the PP.</i>		
<i>Corrective action</i>	An updated chronogram has been delivered to the DOE.		
<i>Evidences proposed</i>	Chronogram of implementation of the project activity.		
DOE Assessment #2	The chronogram has been provided and the timeline is in accordance with the PDD.		
Conclusion <i>Tick the appropriate checkbox</i>	CAR/CL CLOSED <input checked="" type="checkbox"/>	To be checked during the first periodic verification <input type="checkbox"/>	

VALIDATION REPORT

"Cucuana Hydroelectric power Plant"

FINDING	Nº 2		
Classification	CAR <input type="checkbox"/>	CL <input checked="" type="checkbox"/>	FAR <input type="checkbox"/>
Description of finding <i>Describe the finding in unambiguous style; address the context (e.g. section)</i>	Section D of the PDD shall be more specific according to the EIA submitted for the Cucuana project activity.		
PP RESPONSE #1 <i>It shall address the corrective action taken in details</i> <i>It shall provide and indentified the evidences proposed (if applicable)</i>	<i>This section shall be filled by the PP.</i> The environmental section of Cucuana project activity has been reinforced.		
DOE Assessment #1 <i>The assessment shall encompass all open issues. In case of non-closure additional corrective action and DOE assessments (#2, #3, etc.) shall be added</i>	The environmental analysis has been sufficiently described in the PDD.		
PP RESPONSE #2 <i>Corrective action</i> <i>Evidences proposed</i>	<i>This section shall be filled by the PP.</i>		
DOE Assessment #2			
Conclusion <i>Tick the appropriate checkbox</i>	CAR/CL CLOSED <input checked="" type="checkbox"/>	To be checked during the first periodic verification <input type="checkbox"/>	

VALIDATION REPORT

"Cucuana Hydroelectric power Plant"

7 REFERENCES

Ref	Document Name	Author/Competent Authority
1	PDD Cucuana Hydroelectric Power Plant version 3.1.	EPSA E.S.P.
2	PDD Cucuana Hydroelectric Power Plant version 3.3.	EPSA E.S.P.
3	PDD Cucuana Hydroelectric Power Plant version 4	EPSA E.S.P.
4	ACM0002 (version 7) – Consolidated methodology for grid-connected electricity generation from renewable sources	CDM - EXECUTIVE BOARD
5	ACM0002 (version 10) – Consolidated methodology for grid-connected electricity generation from renewable sources	CDM - EXECUTIVE BOARD
5	ACM0002 (version 13.0.0) – Consolidated methodology for grid-connected electricity generation from renewable sources	CDM - EXECUTIVE BOARD
6	Tool to calculate the emission factor for an electricity system - version 01.1	CDM - EXECUTIVE BOARD
7	Tool to calculate the emission factor for an electricity system - version 02.	CDM - EXECUTIVE BOARD
8	Tool to calculate the emission factor for an electricity system - version 03.0.0	CDM - EXECUTIVE BOARD
9	Tool for the demonstration and assessment of Additionality – version 07.0.0	CDM - EXECUTIVE BOARD
10	2006 IPCC Guidelines for National Greenhouse Gas Inventories	PANEL INTERGUBERNAMENTAL PARA EL CAMBIO CLIMÁTICO
11	Host country Letter of Approval Correction of the letter of approval Appeal of reversal for the correction letter of approval	MINISTERIO DE AMBIENTE, VIVIENDA Y DESARROLLO TERRITORIAL (Colombian DNA)
12	Environmental License 2411	CORPORACIÓN AUTÓNOMA REGIONAL DEL TOLIMA(environment competent authority)
13	Methodology for the energy production calculation	SOCOIN (consultant company)
14	Environmental management plan	EMPRESA DE ENERGÍA DEL PACIFICO, EPSA S.A. E.S.P.
15	Hydroelectric power plant map PL-TUL-EIA	EMPRESA DE ENERGÍA DEL PACIFICO, EPSA S.A. E.S.P.
16	Contract for the purchase of the Cucuana equipment EP-CO 433-2010	EMPRESA DE ENERGÍA DEL PACIFICO, EPSA S.A. E.S.P.
17	Cucuana technical report	EMPRESA DE ENERGÍA DEL PACIFICO, EPSA S.A. E.S.P.
18	ISO 9001 certificate (Icontec)	EMPRESA DE ENERGÍA DEL PACIFICO, EPSA S.A. E.S.P.
19	Procedure PR.GRH.07.002 "Procedure for the Develop of Competencies".	EMPRESA DE ENERGÍA DEL PACIFICO, EPSA S.A. E.S.P.

VALIDATION REPORT

"Cucuana Hydroelectric power Plant"

Ref	Document Name	Author/Competent Authority
20	Procedure PR.PRO.03.001 "Procedure for Control of the Production Equipment"	EMPRESA DE ENERGÍA DEL PACIFICO, EPSA S.A. E.S.P.
21	Chronogram of Cucuana Hydroelectric Project	EMPRESA DE ENERGÍA DEL PACIFICO, EPSA S.A
22	Minutes of the public meetings with the communities	EMPRESA DE ENERGÍA DEL PACIFICO, EPSA S.A
23	Agreement with the communities format	EMPRESA DE ENERGÍA DEL PACIFICO, EPSA S.A
24	Validation and Verification Standard, version 05.0	CDM - EXECUTIVE BOARD
25	Glossary of the CDM terms	CDM - EXECUTIVE BOARD
26	Guidance on the demonstration and assessment of prior consideration of the CDM	CDM - EXECUTIVE BOARD
27	Law N° 1111 :Tax law	DIAN (COLOMBIAN TAX AND CUSTOMS AUTHORITY)
28	Decree 3019 :Depreciation periods	REPUBLIC OF COLOMBIA
29	Guidelines on the assessment of investment analysis version 05	CDM - EXECUTIVE BOARD
30	Investment costs quotation	"ESTUDIO DE PREFACTIBILIDAD Y DISEÑO DETALLADO DEL PROYECTO CUCUANA" ("Technical and financial basis for Cucuana hydropower plant, prefeasibility phase"
31	Commercial Lending rates	CENTRAL BANK OF COLOMBIA
32	Development plan for Non-Conventional Sources of Energy in Colombia	MINISTERIO DE MINAS Y ENERGÍA. UNIDAD DE PLANEACIÓN MINERO ENERGÉTICA
33	Technical and Economic Assessment of Off-grid, Mini-grid and Grid Electrification Technologies	WORLD BANK
34	World Energy Outlook	IEA
35	Project 5402: La Glorita Landfill Gas Project	CDM - EXECUTIVE BOARD
36	Project 3347 : Caruquia 9.76 MW Hydroelectric Project	CDM - EXECUTIVE BOARD
37	Project 0122 : Agua Fresca Multipurpose and environmental services project	CDM - EXECUTIVE BOARD
38	Project 0275 : Santa Ana Hydroelectric Plant	CDM - EXECUTIVE BOARD
39	Project 1411 : La Cascada 2.3 MW Hydroelectric Project	CDM - EXECUTIVE BOARD
40	Project 2600. Amaime Minor Hydroelectric Power Plant	CDM - EXECUTIVE BOARD
41	Project 3570 : Alto Tuluá Minor Hydroelectric Power Plant	CDM - EXECUTIVE BOARD
42	Project 3599 : Bajo Tuluá Minor Hydroelectric Power Plant	CDM - EXECUTIVE BOARD
43	Project 4782 : Santiago 2.8 MW Hydroelectric Project	CDM - EXECUTIVE BOARD
44	Colombia target inflation rate	CENTRAL BANK OF COLOMBIA
45	USA long term inflation forecast	INTERNATIONAL MONETARY FUND
46	Energy Production Estimate Report	INGETEC
47	Guidelines for the reporting and validation of plant load factors v.1.	CDM - EXECUTIVE BOARD

VALIDATION REPORT

"Cucuana Hydroelectric power Plant"

Ref	Document Name	Author/Competent Authority
48	Electricity prices	SIEL (COLOMBIAN ELECTRIC INFORMATION SYSTEM)
49	Price Indexes in Colombia	NATIONAL ADMINISTRATIVE DEPARTMENT OF STATISTICS (DANE)
50	Updated investment budget	EMPRESA DE ENERGÍA DEL PACIFICO, EPSA S.A
51	Guidelines for objective demonstration and assessment of barriers-version 01	CDM - EXECUTIVE BOARD
52	Resolution 071 of 2006: Firm Energy for the Reliability Charge	COMISIÓN DE REGULACIÓN DE ENERGÍA Y GAS (CREG)
53	Resolution 079 of 2006: Procedure for Firm Energy Calculation and Reliability Cost	COMISIÓN DE REGULACIÓN DE ENERGÍA Y GAS (CREG)
54	FAZNI. Law 1099	REPUBLIC OF COLOMBIA
55	CND-ASIC-LAC. Resolution nº 81	COMISIÓN DE REGULACIÓN DE ENERGÍA Y GAS (CREG)
56	CND-ASIC-LAC. Resolution nº 48	COMISIÓN DE REGULACIÓN DE ENERGÍA Y GAS (CREG)
57	Law Nº 56: Industry and Commerce tax	REPUBLIC OF COLOMBIA
58	Law Nº 99: Water fee	REPUBLIC OF COLOMBIA
59	Reliability Payment Auction Result	SUPERINTENDENCIA DE SERVICIOS PÚBLICOS
60	Project IRR Spreadsheet	EMPRESA DE ENERGÍA DEL PACIFICO, EPSA S.A
61	Report of Operation and Administration System Market	XM (Colombian Electricity Market Operator)

ANNEX 1: CDM VALIDATION PROTOCOL

VALIDATION PROTOCOL

PROJECT: "CUCUANA HYDROELECTRIC POWER PLANT"

PROJECT PARTICIPANT:

EMPRESA DE ENERGÍA DEL PACÍFICO S.A. E.S.P

CHECKLIST TOPIC / QUESTION	MoV/Ref. *	COMMENTS	Draft Conclusion	Final Conclusion
A. GENERAL DESCRIPTION OF PROJECT ACTIVITY				
A.1. Approval				
A.1.1 Have all the Parties involved in the project activity provided a written Letter of Approval of the project activity?	DR	<p>The parties involved have not provided a letter of approval yet.</p> <p>CAR 1- The approval letter of the Colombian Designated National Authority has to be obtained</p> <p>The letter of approval from Colombia has been provided and it is considered correct.</p> <p>CAR 1 is resolved.</p> <p>CAR 2- The approval letter of the Spain Designated National Authority has to be obtained.</p> <p>The letter of approval from Spain it is not needed since the project participant from Spain has been voluntary withdrawn.</p> <p>CAR 2 is resolved.</p>	CAR 1 CAR 2	OK
A.1.2 Do the Letters of Approval confirm that: <ul style="list-style-type: none"> The Party is a Party to the Kyoto Protocol The participation is voluntary The CDM project activity contribute to the sustainable development (host Party) The title of the project activity is precise and coincides with the title included in the PDD? 	DR	<p>Letter of Approval confirms that:</p> <ul style="list-style-type: none"> The Party is a Party to the Kyoto Protocol The participation is voluntary The CDM project activity contributes to the sustainable development (host Party) The title of the project activity is precise and coincides with the title included in the PDD 	CAR 1 CAR 2	OK

A.1.3 Has the Letter of Approval be obtained from the project participants or directly from the DNA? In case that it has been obtained from the project participant, how has been assessed its authenticity?	DR	the Letter of Approval be obtained from the project participant	CAR 1 CAR 2	OK
A.1.4. If either LoA contains additional specification or conditions of the project activity, then has the request for registration been based on the documents specified in the LoA?	DR	The LoA does not have specific versions.	N/A	OK
A.1.5. If the LoA references a specific version of the Validation Report or PDD and this version cannot be submitted, then has either of the following been submitted? a) a statement indicating final LoA has not been received, or b) an updated Validation Report/ PDD		The LoA does not have specific versions.	N/A	OK
A.2. Project participants				
A.2.1. Is the form of required for the indication of project participants correctly applied in the PDD?	DR	The project participant is Empresa de Energía del Pacífico S.A., E.S.P.. The form of the project participant	OK	OK
A.2.2. Is the participation of all project participants approved by a Party to the Kyoto Protocol?	DR	The letter of approval approves the participation of the project participant.	CAR 1 CAR 2	OK
A.2.3. Is all information on participants / Parties provided in consistency with details provided by further chapters of the PDD (in particular appendix 1)?	DR	The details of Appendix 1 are in accordance with the other sections of the PDD.	OK	OK
A.2.4. Are any other project participants approved but not	DR	The project participant is listed in the PDD.	CAR 1 CAR 2	OK

listed in the PDD?				
A.3. Project Design Document				
A.3.1. Does the used project title clearly enable to identify the unique CDM project activity? Is it consistent in all section of the PDD and in all documents?	DR	Yes. The title of the project activity is consistent with the sections of the PDD and the documents.	OK	OK
A.3.2. Is there any indication concerning the version number and the date of the version? (<i>Note: PDDs older than 6 months are not acceptable</i>)	DR	The version number and the date of the version are correct.	OK	OK
A.3.3. Is this consistent with the time line of the project's history?	DR	<p>CL 1 - The last chronogram has to be submitted to the validation team.</p> <p>The updated chronograph has been provided and it is consistent with the timeline of the project activity.</p> <p>CL 1 is resolved.</p>	CL 1	OK
A.3.4. Is the PDD prepared in accordance with the latest template and requirements from the CDM Executive Board?	DR	The latest template has been used.	OK	OK
A.3.5. Has the PDD been published for Global Stakeholder Consultation (GSC) in UNFCCC website?	DR	The PDD was published for global stakeholder consultation two times.	OK	OK
A.3.6. Have there been any comments during the GSC process?	DR	No comments have been received during the GSC.	OK	OK
A.3.7. Have them correctly addressed by the validation team?	DR	This section is not applicable.	N/A	N/A
A.4. Description of the project activity				
The PDD (section A.2) shall contain a clear description of the				

project activity that provides the reader with a clear understanding of the precise nature of the project activity.				
<p>A.4.1. Is the description delivering a transparent overview of the project activities?</p> <p>Is the description of the proposed CDM project activity as contained in the PDD sufficiently covers all relevant elements, is accurate and that it provides the reader with a clear understanding of the nature of the proposed CDM project activity?</p>	DR	<p>Yes. As it is established in the PDD, the Cucuana hydroelectric Project is located in the middle section of the river's basin, between points 2,195 and 1,500 meters above sea level.</p> <p>The water intake point is located on the right margin on the oriental slope of the central Mountain Range, in the Roncesvalles Municipality, department of Tolima. The power plant obtains water at 2,195 meters above sea level from the Cucuana river.</p> <p>As it is established in the Section A.2 of the PDD, the hydroelectric project consists in four Pelton Turbines with a design Hydraulic capacity of 55 MW.</p> <p>CAR 3- During the on site visit, some differences between the technical data included in the PDD and different presentations were detected. The inconsistencies detected shall be solved.</p> <p>The correct documentation was provided and coincides with the PDD.</p> <p>CAR 3 is resolved.</p> <p>During the on-site visit, the Major of the Municipality of Roncesvalles was interviewed in order to confirm the social and economic benefits the project will bring (local employment, additional incomes) to the local community.</p> <p>During the on site visit, the validation team assessed the four different kinds of social contributions of the project developer.</p>	<p>CAR 3</p> <p>CAR 4</p>	OK

		CAR 4 - The four different kinds of social contributions of the project developer shall be detailed in the PDD. The different social projects were described in the PDD. CAR 4 is resolved.		
A.4.2. What proofs are available demonstrating that the project description is in compliance with the actual situation or planning?	DR	CAR 5 – The Environment License has to be obtained and submitted to the validation team. The environmental license was provided. CAR 5 is resolved.	CAR 5	OK
A.4.3. Is the information provided by these proofs consistent with the information provided by the PDD?	DR	The information provided is consistent with the information provided in the PDD.	CAR 3	OK
A.4.4. Has the validation team conducted a physical site inspection to confirm the description of the PDD? If not, justify.	DR	Yes. The validation team has carried out an on site visit on 27-30 October 2008.	OK	OK
A.4.5. If the proposed CDM project activity involves the alteration of an existing installation or process, does the project description clearly state the differences resulting from the project activity compared to the pre-project situation?	DR	Yes. The project activity is a Greenfield.	OK	OK

A.4.6. In the case of greenfield project activity, is the project design described sufficiently by means of specifications, drawings and manuals?	DR	The project activity it is a Greenfield.	CAR 3	OK
A.4.7. Does the PDD explain how the proposed project activity reduces greenhouse gas emissions (i.e. what type of technology is being employed, what measures are undertaken as part of the project activity, etc);	DR	Yes. The emission reductions result due to the displacement of the grid based power. As it is established in the Section A.2 of the PDD, the hydroelectric project consists in four Pelton Turbines with a capacity of 58.14MW.	OK	OK
A.5. Technical description of the project activity The PDD (section A.4) shall contain a clear description of the project activity that provides the reader a clear understanding of the technical aspects of its implementation.				
<i>A.5.1. Location of the project activity</i>				
A.5.1.1. Does the information provided on the location of the project activity allow for a clear identification of the site(s)? Are the latitude and longitude on the site indicated (decimal points)?	DR	Yes. The project activity is in the Roncesvalles Municipality, department of Tolima, Colombia.	OK	OK
A.5.1.2. How is it ensured and/or demonstrated that the project proponents can implement the project at this site (ownership, licenses, contracts etc.)?	DR	The license for the construction, maintenance, generation and energy sale has been provided, as well as, the environmental license.	OK	OK
<i>A.5.2. Category of the project activity</i>				

A.5.2.1. Does the project qualify as a small scale CDM project activity as defined in paragraph 6 (c) of decision 3/CMP.1 on the modalities and procedures for the CDM?	DR	No, the project activity it is not a small scale.	N/A	N/A
A.5.2.2. To which category(ies) does the project activity belonging to? Is this category correctly identified and indicated?	DR	The project activity is of sectoral scope 1: Energy Industries.	OK	OK
A.5.2.3. Does proposed project activity confirm to one of the project categories defined for small scale CDM project activities?	DR	The project activity it is not a small scale project activity.	N/A	OK
A.5.2.4. In the case of a small scale project activity, is it justified that it is not a debundled component of a larger project activity?	DR	The project activity it is not a small scale project activity.	N/A	OK
A.5.2.5. In case of small scale project activities, is the estimate of emissions reductions increasing during the crediting period? In affirmative case, have project participants demonstrated in the CDM-SSC-PDD that the project activity characteristics are defined in a way that precludes project activities to go beyond the limits for SSC Project activities (as stipulated in paragraph 3 of the General Guidelines to SSC CDM methodologies)?		The project activity it is not a small scale project activity.	N/A	OK

<i>A.5.3. Technology to be employed by the project activity</i>				
A.5.3.1. Does the description of the technology to be applied provide sufficient and transparent input/information to evaluate its impact on the greenhouse gas balance? And, is the explanation how the project will reduce greenhouse gas emission transparent and suitable?	DR	The description of the technology to be applied provides sufficient and transparent input/information to evaluate its impact on the greenhouse gas balance.	CAR 3	OK
A.5.3.2. Does the project require extensive initial training and maintenance efforts in order to be carried out as scheduled during the project period? If so, does the project make provisions for meeting training and maintenance needs?	DR	The project activity does not require extensive initial training and maintenance efforts	N/A	N/A
A.5.3.3. Is a schedule available for the implementation of the project and are there any risks for delays? Is the schedule consistent with the starting date of the crediting period?	DR	A schedule is available for the implementation of the project and there are no risks for delay.	CL 1	OK
<i>A.5.4. Estimated amount of emission reductions over the chosen crediting period</i>				
A.5.4.1. Is the form required for the indication of projected emission reductions correctly applied?	DR	The form of the projected emission reduction is correctly applied, and is consistent with the starting date of the crediting period.	OK	OK
A.5.4.2. Are the figures provided consistent with other data presented in the PDD?	DR	The figures are consistent with other data presented in the PDD.	OK	OK

<i>A.5.5. Public funding of the project activity</i>				
A.5.5.1. In case of public funding from Annex I Parties is it confirmed that such funding does not result in a diversion of official development assistance?	DR	No public funding is required for the project activity.	OK	OK
A.5.5.2. Is all information provided consistent with the details given in remaining chapters of the PDD (in particular appendix 2)	DR	The information provided in appendix 2 is consistent in the PDD.	OK	OK
B. BASELINE AND MONITORING METHODOLOGY				
B.1. Title and reference of the approved baseline and monitoring methodology				
B.1.1. Are reference number, version number, and title of the approved baseline and monitoring methodology clearly indicated?	DR	Yes. The methodology applied is the consolidated baseline methodology for grid-connected electricity generation from renewable sources version 13.0.0. CAR 6 – The versions of the different tools shall be correctly referenced in the PDD. The correct version of the tool has been stated in the PDD. CAR 6 is resolved.	CAR 6	OK
B.1.2. Is the applied version the most recent one and / or is this version still applicable?	DR	Yes. The applied version is the most recent one.	CAR 6	OK

B.1.3. Does the PDD refer to the corresponding tools with their latest approved versions?	DR	Yes. The PDD refers to the tool to calculate the emission factor for an electricity system version 03.0.0.	OK	OK
B.1.4. Have any sources of greenhouse gas emissions been identified by the DOE ,within the project boundary following project implementation, which are expected to contribute more than 1% of the overall expected average annual emissions reductions, and which are not addressed by the applied methodology?	DR	Within the project boundary there are not greenhouse gas emissions which are expected to contribute more than 1% of the overall expected average annual emissions reductions.	OK	OK
B.2. Applicability of the selected methodology to the project activity				
B.2.1. Are the chosen tools considered applicable in accordance with the design of the project and the provisions of the applied methodology?	DR	Yes. The tools applied are correctly described in the PDD.	OK	OK
B.2.2. Is the choice of the methodology correctly justified by the PDD and is the project in conformance with all applicability criteria of the applied methodology?	DR	The choice of the methodology has been correctly justified by the PDD and is the project in conformance with all applicability criteria of the applied methodology.	CAR 6	OK
B.2.3 Has been applied the specific guidance provided by the CDM Executive Board in respect to the approved methodology?	DR	There is not a specific guidance in respect to the approved methodology.	N/A	OK
Fill in the required amount of sub checklists for applicability criteria as given by the methodology applied and comment				OK

at least every line answered with “No”												
B.2.4. Criterion 1 – This methodology is applicable to grid-connected renewable power generation project activities that (a) install a new power plant at a site where no renewable power plant was operated prior to the implementation of the project activity (greenfield plant); (b) involve a capacity addition; (c) involve a retrofit of (an) existing plant(s); or (d) involve a replacement of (an) existing plant(s).	DR	<table><tr><th>Applicability checklist</th><th>Yes/No</th></tr><tr><td>Criterion discussed in the PDD?</td><td>Yes</td></tr><tr><td>Evidence provided?</td><td>Yes</td></tr><tr><td>Compliance verified?</td><td>Yes</td></tr></table>	Applicability checklist	Yes/No	Criterion discussed in the PDD?	Yes	Evidence provided?	Yes	Compliance verified?	Yes	CAR 6	OK
Applicability checklist	Yes/No											
Criterion discussed in the PDD?	Yes											
Evidence provided?	Yes											
Compliance verified?	Yes											
B.2.5. Criterion 2 – The project activity is the installation, capacity addition, retrofit or replacement of a power plant/unit of one of the following types: hydro power plant/unit (either with a run-of-river reservoir or an accumulation reservoir), wind power plant/unit, geothermal power plant/unit, solar power plant/unit, wave power plant/unit or tidal power plant/unit;	DR	<table><tr><th>Applicability checklist</th><th>Yes/No</th></tr><tr><td>Criterion discussed in the PDD?</td><td>Yes</td></tr><tr><td>Evidence provided?</td><td>Yes</td></tr><tr><td>Compliance verified?</td><td>Yes</td></tr></table>	Applicability checklist	Yes/No	Criterion discussed in the PDD?	Yes	Evidence provided?	Yes	Compliance verified?	Yes	CAR 6	OK
Applicability checklist	Yes/No											
Criterion discussed in the PDD?	Yes											
Evidence provided?	Yes											
Compliance verified?	Yes											
B.2.9. Was there a request for clarification, revision or deviation made for the adopted methodology in relation to the proposed project activity? If so, were the correct procedures provided by the CDM EB followed?	DR	There has been no request for clarification for the methodology in relation to the proposed project activity.	N/A	OK								

B.3. Description of the Project Boundary				
B.3.1 Are all the sources and gases included in the project boundary of the project activity (baseline scenario, project scenario and leakage) in accordance with the applied methodology?	DR	The sources and gases are correctly included.	OK	OK
B.3.2. Are the inclusion or exclusion of the sources of gases correctly justified?	DR	The correct sources of gases have been correctly included in the PDD.	OK	OK
B.3.3. Do the spatial and technological boundaries as verified on-site comply with the discussion provided by the PDD?	DR	Yes. The spatial boundaries are in accordance with the provided in the PDD.	OK	OK
B.3.4. In case of grid connected electricity projects, is the relevant grid correctly identified in accordance with EB guidance and the underlying methodology?	DR	The correct relevant grid has been identified, the SIN, the national grid of the country.	OK	OK
B.4. Description of the baseline scenario identification				
B.4.1. Is the baseline scenario clearly described?	DR	The baseline scenario has been described in accordance with the methodology ACM0002.	OK	OK
B.4.2. Have there been other alternative scenarios considered? Is it justified the selected scenario as the most likely one?	DR	The correct alternative scenarios have been selected.	OK	OK

B.4.3. Does the PDD follow the steps to determine the baseline scenario required by the methodology?	DR	The correct steps have been provided.	OK	OK
B.4.4. Has the baseline scenario been determined using conservative assumptions where possible?	DR	The correct baseline scenario has been determined.	OK	OK
B.4.5. Does the baseline scenario sufficiently take into account relevant national and/or sectoral policies? (<i>Note: refer Annex 3 EB 22</i>). Are they listed in the PDD?	DR	The baseline scenario has taken into account the relevant national and sectoral policies.	OK	OK
B.4.6 If alternatives are excluded: a.- Is sufficient evidence/ justification provided to support every exclusion of alternatives? Is it reasonable? b.- Is it shown that at least one credible and feasible alternative does not face a barrier? Is this reasonable?	DR	N/A	N/A	OK
B.4.7 Is the baseline scenario determination compatible with the available data and are all literature and sources clearly referenced?	DR	The correct baseline scenario has been determined.	OK	OK
B.5. Description of how the anthropogenic emissions of GHG by sources are reduced below those that would have occurred in the absence of the registered CDM project activity (assessment and demonstration of additionality):				

B.5.1 Is the start date defined in accordance with the "Glossary of CDM terms"? What evidence is provided to verify that this was the official start date? Is this considered reliable and reasonable?	DR	<p>CAR 7 – The start date of the project shall be in accordance with the last Glossary of terms: "the start date shall be considered to be the date on which the project participant has committed to expenditures related to the implementation or related to the construction of the project activity" Documented evidence of the starting date has to be provided.</p> <p>The starting date is 28 September 2010. This date is the signature of the contract of the purchase of It is considered in accordance with the "Glossary of CDM terms".</p> <p>CAR 7 is resolved.</p>	CAR 7	OK
B.5.2 Is it a new project activity (start date on or after August 2008) or an existing project?	DR	It is a new project activity (After August 2008).	OK	OK
<p>B.5.3 For a new project which does not require a new methodology and has not published its PDD for stakeholder comments prior to the start date, then:</p> <p>a. Have the project proponents informed the DNA and/or UNFCCC secretariat in writing? How has this notification been verified? (i.e. confirmation from the DNA or UNFCCC)</p> <p>b. Was the notification made within 6 months of the project activity start date?</p> <p>c. Does the letter/ notification indicate the precise geographic location and provide a brief description of the</p>	DR	<p>The project activity was published for global stakeholder consultation on 02 August 2008, prior to the start date.</p> <p>Therefore, the PP does not need to inform to the host Party DNA and UNFCCC. Thus project activity complies with the requirements.</p>	CAR 7	OK

proposed project?				
d. Have the project proponents informed the DNA and/ or UNFCCC secretariat of the progress of the project activity every subsequent two years after the initial notification?				
<p>B.5.4 For an existing project which has a start date prior to the publication of the PDD for global stakeholder comments, has the project proponent provided the following:</p> <p>a. Evidence of awareness of the CDM prior to the project activity start date and that the benefits of the CDM were a decisive factor in the decision to proceed with the project? (e.g. Board minutes, notes etc) Is this sufficient?</p> <p>b. Reliable evidence that demonstrates real actions were taken to secure CDM status in parallel with the project's implementation? (e.g. contracts with consultants for CDM/PDD/methodology services, ERPAs, correspondence with CER buyers, DOEs, DNAs or the UNFCCC). Is this sufficient?</p>	DR	The PDD was published for global stakeholder prior the start date and it is a new project.	CAR 7	OK
B.5.5. Is the project additionality assessed according to the applicable methodology? Detail the Tool used to demonstrate the Additionality of the project activity.	DR	Yes, the additionality has been assessed according to the latest version of the "Tool for the demonstration and assessment of additionality".	OK	OK
B.5.6. In the case of a small scale project activity, is the	DR	Not applicable. The project is a large scale project.	N/A	N/A

additionality justified according to the applicable CDM requirements specific for small scale project activities?				
B.5.7 Have realistic and credible alternatives been identified providing comparable outputs or services?	DR	Yes, realistic and credible alternatives have been identified.	OK	OK
B.5.8. Is the project activity without CDM included in these alternatives?	DR	Yes, it is included.	OK	OK
B.5.9. Is a discussion provided for all identified alternatives concerning the compliance with applicable laws and regulations?	DR	Yes, it is provided.	OK	OK
B.5.10. In case of using a FSR as a basis of the decision, is this analysis made in accordance with the EB Guidance?	DR	Not applicable. The project activity does not use a FSR as a basis of the decision.	N/A	N/A
B.5.11. In case the PDD argues that specific laws are not enforced in the country or region: Is evidence available concerning that statement?	DR	Not applicable since there is no reference to not enforced laws.	OK	OK
B.5.12. In case of applying step 2 / investment analysis of the additionality tool: Is the analysis method identified appropriately?	DR	Yes, the analysis method has been identified appropriately.	OK	OK
B.5.13. In case of Option I (simple cost analysis): Is it demonstrated that the activity produces no economic	DR	Not applicable since Option I is not considered in the analysis.	N/A	N/A

benefits other than CDM income?				
a. Are the assumptions for all alternatives compared consistent (including discount rates if applicable)?				
B.5.14. In case of Option II (investment comparison analysis): Is the most suitable financial indicator clearly identified (IRR, NPV, cost benefit ratio, or (levelized) unit cost)?	DR	Not applicable since Option II is not considered in the analysis.	N/A	N/A
a. Are the assumptions for all alternatives compared consistent (including discount rates if applicable)?				
B.5.15. In case of Option III (benchmark analysis): Is the most suitable financial indicator clearly identified (IRR, NPV, cost benefit ratio, or (levelized) unit cost)?	DR	CAR 8- Project IRR has been identified as financial indicator. However, the PDD shall clarify if the indicator takes or not taxes into account. Besides, evidence about the choice of benchmark and its appropriateness for the underlying project activity has to be provided and addressed in the PDD.	CAR 8	OK
a. If an IRR indicator is used, is the choice of benchmark appropriate to the type of IRR calculated? (The financial indicator has been identified as Project IRR post-tax in the final PDD. The benchmark selected has been derived from the commercial lending rates which are considered appropriate as a benchmark for a Project IRR post-tax.		
b. Is the choice of benchmark or discount rate justified with supporting evidence for its appropriateness?		Thus CAR 8 is closed.		
B.5.16 If risk premiums are applied in the development of the benchmark, are they reasonable and justified?	DR	Yes, they are reasonable and appropriate.	CAR 8	OK
B.5.17 Do the project participants justify the period of assessment in the context of the underlying project activity?	DR	Yes, the period of assessment is justified.	CAR 8	OK

B.5.18 Is the period of assessment appropriate?	DR	Yes, the period of assessment is appropriate	CAR 8	OK
B.5.19 Is any residual value of the project activity assets included in the analysis? Are residual value calculations reasonable and justified and consistent with local accounting rules or international best practice?	DR	Residual value is considered zero in the analysis which is consistent with local accounting rules.	CAR 8	OK
B.5.20 Are depreciation and other non-cash items related to the project activity deducted from net profits used for calculating the financial indicator (e.g. IRR, NPV)?	DR	Yes, they have been deducted in estimating gross profits but they have been added back for the purpose of calculating the Project IRR post-tax	CAR 8	OK
B.5.21 Is the treatment of taxation consistent with the chosen benchmark? (i.e. taxation should only be treated as an expense in the IRR/NPV calculation if the chosen benchmark is intended for post-tax calculations?)	DR	Yes, it is consistent.	CAR 8	OK
B.5.22 Recommended project: If the implementation of the project ceased and then recommenced due to consideration of the CDM, then: a. Are input values valid and applicable at the time of making the decision to recommence the project? b. Are capital costs incurred prior to the revised project activity start date input as the recoverable value of the assets (limited to the potential reuse/ resale of tangible	DR	Not applicable. The project activity is not a recommended project.	N/A	N/A

assets)? c. How has the fair market value of the capital expenditures been calculated and validated? (e.g. by chartered specialists). Is this fair market value reasonable and justified? d.- Is the book value as well as the expectation of the potential profit or loss included in the fair value calculation?				
B.5.23 Has the project participant supplied unprotected and traceable spreadsheet versions of all investment analysis?	DR	Yes, unprotected and traceable spreadsheets have been provided.	CAR 8	OK
B.5.24 From the investment analysis provided, is it possible to reproduce the results?	DR	Yes, it is possible.	OK	OK
B.5.25 Costs of financing expenditures (i.e. loan repayments and interest) should only be included in the cashflow as costs if an equity IRR is used, not if a project IRR is used. Are interest payments taken into account in the calculation of tax, if the benchmark is for after-tax comparison?	DR	Not applicable. The project proponent uses Project IRR.	N/A	N/A
B.5.26 If an Equity IRR has been used, is the debt portion of the investment cost included as a cash outflow? (i.e. as well as interest costs and principle repayments – double counting)	DR	Not applicable. The project proponent uses Project IRR.	N/A	N/A

B.5.27 Sensitivity analysis: a. Are all variable and critical costs and revenues in the analysis included in the sensitivity analysis? b. Is the assessed range of variations reasonable in light of the reliability of the estimated input values and the likely range? c. Is the sensitivity analysis possible to reproduce?	DR	All critical costs and revenues are included in the sensitivity analysis. The assessed range of variation is reasonable and the sensitivity analysis is possible to reproduce.	OK	OK
B.5.28 Are input values used in all the investment analysis valid and applicable at the time of the investment decision taken by the project participant? Is the time of investment decision appropriately justified by evidences?	DR	CAR 9- Evidence about the appropriateness of the input values used in the investment analysis shall be provided i.e., investment cost, electricity tariffs, electricity generation, taxes, escalation of costs, operational lifetime, depreciation method, firm power, etc. Appropriate and reliable evidence has been provided. Thus CAR 9 is closed. Yes, they are valid and applicable. The investment decision is appropriately justified.	CAR 9	OK
B.5.29 Does the PDD present the investment analysis in a transparent manner and provide all the relevant assumptions (preferably in the CDM-PDD form, or in separate annexes to the CDM-PDD)	DR	Yes, the investment analysis is presented in a transparent manner.	CAR 9	OK
B.5.30 Have the listed input values been consistently applied in all calculations?	DR	Yes, they have been consistently applied.	CAR 9	OK
B.5.31 Are all references made in the investment analysis	DR	Yes, they are correctly referenced/ sourced and they have been	CAR 9	OK

correctly referenced/ sourced? Have these sources been verified?		verified. .		
B.5.32 Have financial calculations been verified by: assessing all parameters and assumptions against the available evidence and expertise; crosschecking the parameters against 3rd party or publicly available sources; reviewing feasibility reports, public announcements and annual financial reports; assessing the correctness of computations and the sensitivity analysis?	DR	Yes, all the parameters and assumptions have been verified against available evidence and 3rd or public available sources	CAR 9	OK
B.5.33 Have values from a feasibility study report (FSR) approved by national authorities been used? If so: a. Has the FSR been the basis of the decision to proceed with the investment in the project? How has this been verified? b. Are the values used in the PDD and associated annexes valid and consistent with the FSR? c. At the time of the investment decision, are the input values from the FSR valid and applicable (based on specific local and sectoral expertise and knowledge)?	DR	Not applicable. The project activity does not use a FSR as a basis of the decision.	N/A	N/A
B.5.34. In case of applying step 3 (barrier analysis) of the additionality tool: Is a complete list of barriers developed	DR	CAR 10- The barrier analysis shall be reinforced using official documentation and following the guidelines for objective demonstration and assessment of barriers. Documentation and	CAR 10	N/A

that prevent the different alternatives to occur?		evidence shall be submitted to the validation team. The PP has removed the barriers analysis from the final PDD Thus CAR 10 is closed. Not applicable since barrier analysis has not been applied.		
B.5.35. Do any such identified barriers have a clear and direct impact on the financial returns of the project activity? (these are not barriers and should be assessed in the investment analysis)	DR	Not applicable since barrier analysis has not been applied.	CAR 10	N/A
B.5.36 Are the identified barriers real and substantiated by independent sources of data such as relevant national legislation, surveys of local conditions and national or international statistics?	DR	Not applicable since barrier analysis has not been applied.	CAR 10	N/A
B.5.37. Is it clearly explained how approval of the project in the CDM would enable the proposed project activity to surmount the barrier? Is the rationale reasonable and justified with evidence?	DR	Not applicable since barrier analysis has not been applied.	CAR 10	N/A
B.5.38. Does the review of relevant background information on the nature of the company(ies) and entity(ies) involved in the financing and implementation of the project sufficiently justify that the barriers related to the lack of access to capital, technologies and skilled labour are real?	DR	Not applicable, since barrier analysis has not been applied.	CAR 10	N/A

B.5.39 Has common practice analysis been undertaken?	DR	Yes, it has been undertaken.	OK	OK
B.5.40 Is the geographical and temporal scope of the common practice analysis appropriate for the assessment related to the project activity's technology or industry type?	DR	Yes, the geographical and temporal scope of the analysis is appropriate.	OK	OK
B.5.41 Have all comparable projects been included in the common practice analysis If some projects have been excluded as non comparable, is the exclusion reasonable and justified?	DR	<p>CAR 11.- Evidence about XM data on existing hydraulic power plants shall be provided.</p> <p>A common practice analysis has been correctly addressed following the steps of the Tool for the demonstration and assessment of additionality version 07.0.0 in the final PDD and reliable evidence has been provided. Thus CAR is closed.</p> <p>Thus CAR 11 is closed</p> <p>Yes, all comparable projects have been included in the common practice analysis</p>	CAR 11	OK
B.5.42 Have similar and operational projects other than CDM project activities been undertaken in the region?	DR	No other projects than CDM project activities have been undertaken in the region.	CAR 11	OK
B.5.43 Are these widely observed and commonly carried out? If so: a. How have the essential distinctions with the proposed CDM project activity been assessed? b. Are such distinctions justified with sufficient evidence? c. If inaccessibility of data is the reason why some projects	DR	No they are not commonly carried out.	CAR 11	OK

have not been included in the analysis, is justification of this claim provided?				
B.5.44 Overall, is the proposed CDM project activity considered common practice?	DR	No, the project activity cannot be considered common practice.	CAR 11	OK
B.5.45. Is it demonstrated/justified that the project activity is not a likely baseline scenario?	DR	Yes, it is demonstrated.	CAR 8, CAR 9, CAR 10 and CAR 11	OK
B.6. Emissions reductions				
<i>B.6.1. Explanation of methodological choices</i>				
B.6.1.1. Is it explained how the procedures provided in the methodology are applied by the proposed project activity?	DR	The correct methodology procedures are applied by the project activity.	OK	OK
B.6.1.2. Is every selection of options offered by the methodology correctly justified and is this justification in line with the situation verified on-site?	DR	The correct selection for leakage, project emissions and baseline emissions it is made.	OK	OK
B.6.1.3. Are the formulae required for the determination of emissions reductions correctly presented and used? (<i>Open excel, trazability of data, etc</i>)	DR	The baseline emission factor (EFy) has been calculated according to the steps stated in ACM0002 and complemented according to the "Tool to calculate the emission factor for an electric system". The Operational Margin (OM) and the Build Margin (BM) have been calculated and combined to obtain the Baseline Emission factor.	CAR 12	OK

		<p>According to the description included in the PDD, the methods selected to calculate are following described:</p> <ul style="list-style-type: none"> • <i>Operating margin</i>: Simple Adjusted, the Option 2 of the "Tool to calculate the emission factor for an electricity system" • <i>Building Margin</i>: Option 2, ex-post calculation of the emission factor for the first crediting period and ex ante during the second and third periods. <p>CAR 12 - The spreadsheets used for the emission reduction calculation shall be provided to the validation team.</p> <p>The spreadsheet for the calculation of emission reduction has been provided and it is considered correct.</p> <p>CAR 12 is resolved.</p>		
B.6.1.4 Are all the data and assumptions listed in the PDD and are appropriate and calculations result in a conservative estimate of emission reductions?	DR	The appropriate data have been listed in the PDD.	CAR 12	OK
<i>B.6.2. Data and parameters that are available at validation</i>				
B.6.2.1. Is the list of parameters presented in chapter B.6.2 considered to be complete with regard to the requirements of the applied methodology? Is all the information required for each parameter included?	DR	The correct parameters have been completed in the PDD.	CAR 12	OK
B.6.2.2. Are all the data derived from official data sources or replicable records and have been correctly quoted?	DR	The data are from an official source, the National Dispatch Center.	OK	OK

<p>B.6.2.3. For each parameter:</p> <p>a. Title in line with Methodology?</p> <p>b. Data unit correctly expressed?</p> <p>c. Appropriate description?</p> <p>d. Source clearly referenced? (and appropriate?)</p> <p>e. Correct value provided?</p> <p>f. Has this value been verified?</p> <p>g. Choice of data correctly justified?</p> <p>h. Measurement method correctly described?</p>	DR	The correct parameters have been stated in the PDD in accordance with the methodology applied.	CAR 12	OK
<p>B.6.2.4. Will the data and parameters result in a conservative estimate of emissions reductions?</p>	DR	The data and parameters result in a conservative estimate of emissions reductions.	CAR 12	OK
<p><i>B.6.3 Calculation of GHG Emission Reductions – Baseline Emissions</i></p> <p><i>It is assessed whether the baseline emissions are stated according to the methodology and whether the argumentation for the choice of default factors and values – where applicable – is justified.</i></p>				
<p>B.6.3.1 Are the calculations documented according to the approved methodology and in a complete and transparent</p>	DR	The calculation of the emission reductions are in accordance with the approved consolidated baseline and monitoring methodology ACM0002.	OK	OK

manner?				
B.6.3.2. Have conservative assumptions been used when calculating the baseline emissions?	DR	Conservative assumptions have been used for the calculation of baseline emissions.	CAR 12	OK
B.6.3.3 Are uncertainties in the baseline emission estimates properly addressed?	DR	There are not uncertainties in the calculation of the baseline emission.	N/A	N/A
B.6.3.4. Is additional background information on baseline data provided in Appendix 4 of the PDD? Is this information consistent with data presented by other sections of the PDD?	DR	Additional information has been included in Appendix 4.	OK	OK
B.6.4 Calculation of GHG Emission Reductions – Project Emissions <i>It is assessed whether the project emissions are stated according to the methodology and whether the argumentation for the choice of default factors and values – where applicable – is justified.</i>				
B.6.4.1 Are the calculations documented according to the approved methodology and in a complete and transparent manner?	DR	This project activity does not have project emissions since the power density is higher than 4 W/m ² .	N/A	N/A
B.6.4.2. Have conservative assumptions been used when calculating the project emissions?	DR	This project activity does not have project emissions	N/A	N/A
B.6.4.3 Are uncertainties in the project emission estimates	DR	This project activity does not have project emissions	N/A	N/A

properly addressed?				
<p><i>B.6.5. Calculation of GHG Emission Reductions – Leakage</i></p> <p><i>It is assessed whether leakage emissions are stated according to the methodology and whether the argumentation for the choice of default factors and values – where applicable – is justified.</i></p>				
B.6.5.1 Are the leakage calculations documented according to the approved methodology and in a complete and transparent manner?	DR	This project activity does not have Leakage.	N/A	N/A
B.6.5.2. Have conservative assumptions been used when calculating the leakage emissions?	DR	This project activity does not have Leakage.	N/A	N/A
B.6.5.3. Are uncertainties in the leakage emission estimates properly addressed?	DR	This project activity does not have Leakage.	N/A	N/A
<p><i>B.6.6. Ex-ante calculation of emission reductions</i></p>				
B.6.6.1. Are the GHG calculations documented in a complete and transparent manner? Are all the calculations correct?	DR	The GHG calculations are documented in a complete and transparent manner	OK	OK
B.6.6.2. Is the data provided in this section consistent with data as presented in other chapters of the PDD?	DR	The data provided in the PDD is consistent with data as presented in the spreadsheet calculation.	CAR 12	OK

<i>B.6.7. Summary of the ex-ante estimation of emission reductions</i>				
B.6.7.1. Will the project result in fewer GHG emissions than the baseline scenario?	DR	The project activity results in fewer GHG emissions.	OK	OK
B.6.7.2. Are the emissions reductions projected in line with the envisioned time schedule for the project' implementation and the indicated crediting period?	DR	The emission reductions are in line with the time schedule provided.	OK	OK
B.7. Application of the monitoring methodology and description of the monitoring plan				
<i>B.7.1. Description of the monitoring plan</i>				
B.7.1.1 Is the monitoring plan documented according to the approved methodology and relevant tools and in a complete and transparent manner?	DR	<p>The monitoring plan it is in accordance with the tool to calculate the emission factor for an electricity system and the methodology ACM0002.</p> <p>CAR 13 - the parameters used to calculate the emission factor of the grid shall be included in the Monitoring Plan Section.</p> <p>The correct parameters have been stated in the monitoring plan.</p> <p>CAR 13 is resolved.</p>	CAR 13	OK
B.7.1.2. Does the monitoring methodology provide a consistent approach in the context of all parameters to be monitored and further information provided in the PDD?	DR	<p>According to the methodology and the PDD, the relevant data necessary for determining baseline emissions are:</p> <ul style="list-style-type: none"> Electricity generated by the project (kWh) measured hourly 	OK	OK

		<p>and download manually and annually from NEON System.</p> <ul style="list-style-type: none"> Data required to the re-calculation of the operating margin emission factor. <p>The provisions included in the PDD in order to monitor the relevant data are in accordance with the ACM0002.</p>		
B.7.1.3. Does the monitoring plan provide a clear description of the organization structure involved in monitoring activities and their responsibilities?	DR	<p>The project manager is responsible for the implementation and update of all data and parameters monitored, ensuring that the emission reduction calculations obtained are realistic and based on evidence.</p> <p>EPSA will develop, own and operate the Cucuana project activity. It is the holder of the project-specific contracts and required permits.</p> <p>EPSA has developed different procedures in order to manage the emission reduction calculation.</p> <p>CAR 14 - The procedures developed in order to describe the authority and the activities involved in the emission reduction calculation shall be referenced in the PDD.</p> <p>The correct procedure has been stated in the PDD.</p> <p>CAR 14 is resolved.</p>	CAR 14	OK
B.7.1.4. If applicable: Does Appendix 5 provide useful information enabling a better understanding of the envisioned monitoring provisions?	DR	Appendix 5 provides useful information and is in accordance with section B.7	OK	OK
B.7.1.5. Is the registration, monitoring, measurement and reporting procedure defined?	DR	Yes. A measuring system must be approved; double check it is made by sales invoice and the Technical department of EPSA will check and authorize the monitoring data.	OK	OK

<i>B.7.2 Compliance of the monitoring plan with the approved methodology</i>				
B.7.2.1 Is the list of parameters considered to be complete with regard to the requirements of the applied methodology? Are all of them clearly described in the monitoring plan and in accordance with the methodology and tools?	DR	Yes. The parameters that will be monitored in order to calculate the emission reduction calculation are stated in accordance with the methodology.	OK	OK
B.7.2.2. Does the monitoring plan provide for the collection and archiving of all relevant data necessary for estimation or measuring the emission reductions within the project boundary during the crediting period?	DR	Yes. The data will be archived in electronic way and the data will be kept during the crediting period and two years later.	OK	OK
B.7.2.3. For each parameter, is the: a. Title in line with methodology? b. Data unit correctly expressed? c. Parameter appropriately described? d. Source clearly referenced? e. Correct value provided for the purpose of PDD estimations? f. Has this value been verified? g. Measurement methods correctly described and in line	DR	The correct parameter has been stated for the monitoring of the emission reductions.	CAR 13	OK

with the methodology/tools?				
h. Correct reference to standards (i.e. for calibration and maintenance)?				
i. Indication of accuracy provided?				
j. QA/QC procedures described?				
k. QA/QC procedures appropriate?				
<i>B.7.3 Implementation of the Monitoring Plan</i>				
B.7.3.1 Do the means of monitoring of each of the parameters included in the plan complies with the requirements of the methodology?	DR	The monitoring parameters included in the plan comply with the requirements of the methodology.	OK	OK
B.7.3.2. Is the measurement equipment described and deemed appropriate?	DR	The measurement equipment has been correctly described in the PDD.	CAR 13	OK
B.7.3.3. Are procedures identified for maintenance of monitoring equipment and installations? Are provisions regarding the calibration intervals included in the monitoring plan?	DR	Procedures have been identified for maintenance of monitoring equipment and installations.	CAR 13	OK
B.7.3.4. Is the measurement accuracy addressed and deemed appropriate? Are procedures in place on how to deal with erroneous measurements or lack of data?	DR	The measurement accuracy has been correctly addressed in the monitoring plan.	CAR 13	OK

B.7.3.5. Is the monitoring Plan sufficient to ensure the verification of a proper implementation of the monitoring plan?	DR	The monitoring Plan is sufficient to ensure the verification of a proper implementation of the monitoring plan.	CAR 13	OK
B.8. Date of completion of the application of the baseline study and monitoring methodology and the name of the responsible person(s)/entity(ies)				
B.8.1. Is there any indication of a date when the baseline and monitoring was determined?	DR	There is no indication on a date, since the new guideline to complete the PDD does not require it.	N/A	N/A
B.8.2. Is this consistent with the time line of the PDD history?	DR	Yes. It is consistent with the project history.	OK	OK
B.8.3. Is the information on the person(s)/entity(ies) responsible for the application of the baseline and monitoring methodology provided consistent with the actual situation?	DR I	Yes. The entity responsible is SOCOIN.	OK	OK
B.8.4. Is information provided whether this person / entity is also considered a project participant? <i>(Guidelines for Completing the Project Design Document (CDM-PDD) and the Proposed New Baseline and Monitoring Methodologies (CDM-NM)</i>	DR	Yes. The person responsible is project participant.	OK	OK

C. DURATION OF THE PROJECT ACTIVITY / CREDITING PERIOD				
C.1. Duration of the project activity				
C.1.1. Are the project's starting date and operational lifetime clearly defined and reasonable?	DR	The starting date is 28 September 2010. This date is the signature of the contract of the purchase of turbines. It is considered in accordance with the "Glossary of CDM terms". The operational lifetime of the project is 50 years.	CAR 7	OK
C.2. Choice of the crediting period and related information				
C.2.1. Is the assumed crediting period clearly defined and reasonable (renewable crediting period of max 7 years with potential for 2 renewals or fixed crediting period of max. 10 years)? And, is the starting date of the crediting period corrected considered?	DR	The crediting period is a renewable period. The starting date of the crediting period is 01/11/2014.	OK	OK
D. ENVIRONMENTAL IMPACTS				
D.1. Documentation on the analysis of the environmental impacts, including transboundary impacts				
D.1.1. Has the analysis of the environmental impacts of the project activity been sufficiently described in the PDD?	DR	In Section D of the PDD, the Environmental Impact Assessment Study has been correctly summarized. The Audit Team has checked the summary with the environmental impact assessment study, and they have interviewed the Environment Authority in Ibagué, the Cortolima (<i>Corporación Autónoma Regional del Tolima</i>).	CL 2	OK

		CL 2- Section D of the PDD shall be more specific according to the EIA submitted for the Cucuana project activity. The environmental analysis has been sufficiently described in the PDD. CL 2 is resolved.		
D.1.2. Are there any Host Party requirements for an Environmental Impact Assessment (EIA), and if yes, has an EIA been approved?	DR	Yes. An EIA has been carried out for the construction of the project activity.	OK	OK
D.1.3. Will the project create any adverse environmental effects? Has any environmental impact identified as significant?	DR	Environmental impacts have not been identified with adverse environmental effects.	OK	OK
D.1.4. Are transboundary environmental impacts identified in the analysis?	DR	Transboundary environmental impacts have not been identified.	N/A	N/A
D.1.5. Does the project comply with any other environmental legislation in the host country?	DR	The project activity complies with the environmental legislation in the host country.	OK	OK
D.2. If environmental impacts are considered significant by the project participants or the host Party, please provide conclusions and all references to support documentation of an environmental impact assessment undertaken in accordance with the procedures as required by the host Party.				
D.2.1. Have the identified environmental impacts been	DR	There are not significant impacts identified in the project activity.	OK	OK

addressed in the PDD sufficiently?				
E. STAKEHOLDERS' COMMENTS				
E.1. Brief description how comments by local stakeholders have been invited and compiled				
E.1.1. Have relevant local stakeholders been consulted prior to the publication of the PDD? Is the exact date of the consultation process included in the PDD?	DR	<p>Different stakeholder consultation meetings were carried out.</p> <p>During the on-site visit in October 2008, some issues were verified:</p> <ul style="list-style-type: none"> ○ EPSA is going to make four different kinds of donation. Two of them are mandatory by the national regulation (1190/2006 and 6/33), but the other two are voluntary. This issue has to be explained in the PDD. - During the opening meeting held in Cali on 27th October, the Director of the RSE Department made a presentation about the social activities and the high investment in this kind of work. - Because of the social company politic, EPSA is currently involved in many social activities, and during all the phases of Cucuana Hydroelectric Project they will continue with them. 1.145 families have been benefited by the company, and the number will be increased. <p>During the on site visit, the validation team noted that Cortolima was not in the meeting as it is established in the PDD. This issue shall be solved in the PDD.</p> <p>On the other hand, the stakeholder section of the PDD is not specific for the Cucuana project.</p> <p>CAR 15 –The Stakeholder Section of the PDD shall be re edited in a</p>	CAR 15	OK

		<p>more specific way, reinforced and the mistakes have to be solved.</p> <p>The stakeholder section has been correctly.</p> <p>CAR 15 is resolved.</p>		
E.1.2. Have appropriate media been used to invite comments by local stakeholders?	DR	The media uses to invite the stakeholders were by official letters and by the newspaper. The different communities that attended are stated in the PDD and were checked by the validation team with the minute.	CAR 15	OK
E.1.3. If a stakeholder consultation process is required by regulations/laws in the host country, has the stakeholder consultation process been carried out in accordance with such regulations/laws?	DR	During the EIA a stakeholder process was carried out in accordance with the national law.	OK	OK
E.1.4. Is the undertaken stakeholder process that was carried out described in a complete and transparent manner?	DR	The stakeholder process has been carried out described in a complete and transparent manner.	CAR 15	OK
E.2. Summary of the comments received				
E.2.1. Is a summary of the stakeholder comments received provided?	DR	Yes. A summary of the comments received have been provided.	OK	OK
E.3. Report on how due account was taken of any comments received				

E.3.1. Has due account been taken of any stakeholder comments received?	DR	<p>The PPD describes different actions to be implemented based on the feedback received from the environmental authorities.</p> <p>The requirements of the EIA approval are included in the Management Plan and shall be audited during the verification stage.</p> <p>The company Energía del Pacífico, EPSA is committed to different interventions, based on the projects identified and prioritized in the meetings held with the communities and their representatives. All of them shall be audited during the verification stage.</p>	CAR 14	OK
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*MoV/Ref: Means of Validation and references of background documents.

VALIDATION REPORT

Project: "Cucuana Hydroelectric Power Plant"

ANNEX 2: CERTIFICATES OF QUALIFICATION

CERTIFICATE OF QUALIFICATION

Subject: Validation and Technical Review Team for Project: "Cucuana Hydroelectric Power Plant"

Madrid, 17th December 2013

Hereby I confirm the following records of qualification, according with AENOR internal instruction "Validation, Verification and Certification of Clean Development Mechanism (CDM) project activities" IE-DTC-039, and in relation with the validation process of the above mentioned project activity:

Name: **Elena Llorente Pérez**

CDM Chief Validator: Yes

CDM Validator: Yes

CDM Chief Verifier: N/A

CDM Verifier: N/A

External Technical Expert: Yes

Technical areas related with the project activity:

TA 1.2 Energy generation from renewable energy sources



José Luis TEJERA OLIVER
CDM Operational Director

CERTIFICATE OF QUALIFICATION

Subject: Validation and Technical Review Team for Project: "Cucuana Hydroelectric Power Plant"

Madrid, 17th December 2013

Hereby I confirm the following records of qualification, according with AENOR internal instruction "Validation, Verification and Certification of Clean Development Mechanism (CDM) project activities" IE-DTC-039, and in relation with the validation process of the above mentioned project activity:

Name: **Mercedes Garcia Madero**

CDM Chief Validator: Yes

CDM Validator: Yes

CDM Chief Verifier: N/A

CDM Verifier: N/A

External Technical Expert: Yes

Technical areas related with the project activity:

TA 1.2 Energy generation from renewable energy sources



José Luis TEJERA OLIVER
CDM Operational Director

CERTIFICATE OF QUALIFICATION

Subject: Validation and Technical Review Team for Project: "Cucuana Hydroelectric Power Plant"

Madrid, 17th December 2013

Hereby I confirm the following records of qualification, according with AENOR internal instruction "Validation, Verification and Certification of Clean Development Mechanism (CDM) project activities" IE-DTC-039, and in relation with the validation process of the above mentioned project activity:

Name: **Marcelino Pellitero**

CDM Chief Validator: Yes

CDM Validator: Yes

CDM Chief Verifier: N/A

CDM Verifier: N/A

External Technical Expert: Yes

Technical areas related with the project activity:

TA 1.2 Energy generation from renewable energy sources



José Luis TEJERA OLIVER
CDM Operational Director

CERTIFICATE OF QUALIFICATION

Subject: Validation and Technical Review Team for Project: "Cucuana Hydroelectric Power Plant"

Madrid, 17th December 2013

Hereby I confirm the following records of qualification, according with AENOR internal instruction "Validation, Verification and Certification of Clean Development Mechanism (CDM) project activities" IE-DTC-039, and in relation with the validation process of the above mentioned project activity:

Name: **Luis Javier Arribas**

CDM Chief Validator: Yes

CDM Validator: Yes

CDM Chief Verifier: N/A

CDM Verifier: N/A

External Technical Expert: Yes

Technical areas related with the project activity:

TA 1.2 Energy generation from renewable energy sources



José Luis TEJERA OLIVER
CDM Operational Director

CERTIFICATE OF QUALIFICATION

Subject: Validation and Technical Review Team for Project: "Cucuana Hydroelectric Power Plant"

Madrid, 17th December 2013

Hereby I confirm the following records of qualification, according with AENOR internal instruction "Validation, Verification and Certification of Clean Development Mechanism (CDM) project activities" IE-DTC-039, and in relation with the validation process of the above mentioned project activity:

Name: **Jose Antonio Gesto**

CDM Chief Validator: Yes

CDM Validator: Yes

CDM Chief Verifier: N/A

CDM Verifier: N/A

External Technical Expert: Yes

Technical areas related with the project activity:

TA 1.2 Energy generation from renewable energy sources



José Luis TEJERA OLIVER
CDM Operational Director