VALIDATION OF EL BOTE SMALL HYDROELECTRIC PLANT PROJECT

ASOCIACIÓN DE TRABAJADORES DE DESARROLLO RURAL - BENJAMIN LINDER
ATDER-BL
(NICARAGUA)

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CDMVAL-002-07

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Summary:

ICONTEC has performed the validation of the project: “El Bote small hydroelectric plant” in Nicaragua on the basis of UNFCCC criteria for the CDM, as well as criteria given to provide for consistent project operations, monitoring and reporting. UNFCCC criteria refer to Article 12 of the Kyoto Protocol, the CDM modalities and procedures and the subsequent decisions by the CDM Executive Board. This validation report summarizes the findings of the validation.

“El Bote small hydroelectric plant” project is located in the municipality of El Cuá, 1 km north of El Bote village, Department of Jinotega, in northern Nicaragua. The small dam has been constructed in a section of the El Bote river just above a set of falls at approximately 615 m above sea level. From this point the river falls 120 m in elevation over a horizontal distance of 350 m to the powerhouse. The proposed project activity under validation process is Type I: Renewable Energy Projects. Category D: Renewable electricity generation for a grid. AMS-I.D, version 14, Sectoral scope 01, “Renewable energy technologies that supply electricity to a grid fall into category I.D.”.

The validation consisted of the following three phases: i) a desk review of the project design documents, ii) follow up interviews with the owner of the project and stakeholders and iii) the resolution of outstanding issues and the issuance of the final validation report and opinion. As a part of the validation and before the desk review phase, the PDD of the project activity was made publicly available in UNFCCC webpage.

In summary, it is ICONTEC’s opinion that the project “El Bote small Hydroelectric plant”, as described in the version 11 of the project design document, meets all relevant UNFCCC requirements for CDM and all relevant host country criteria, and correctly applies the baseline and monitoring methodology. Hence, ICONTEC requests the registration of the project as CDM project activity.

Report No.:	Subject Group:
CDMVAL-002-07	Scope 1
Report title: Validation of El Bote small hydroelectric plant project	

Indexing terms:
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This report should not be read without reference to the annexed Validation Protocol.

Abbreviations

ATDER-BL	ASSOCIATION OF RURAL DEVELOPMENT WORKERS-BENJAMIN LINDER (ASOCIACIÓN DE TRABAJADORES DE DESARROLLO RURAL – BENJAMÍN LINDER)
AL	Lead Auditor
BM	Build Margin
CAR	Corrective Action Request
CDM	Clean Development Mechanism
CM	Combined Margin
CERs	Certified emission reductions
CLA	Clarification Request
MARENA	Ministry of Environment and Natural Recourses of Nicaragua (Ministerio del Ambiente y los Recursos Naturales de Nicaragua)
CO_2	Carbon Dioxide
CO_2eq	Carbon dioxide equivalent
DNA	Designated National Authority
DOE	Designated Operational Entity
DR	Document Review
EIA	Environmental Impact Assessment
FAR	Forward Action Request
GHG	Greenhouse Gases
I	Interview
ICONTEC	Colombian Institute of technical standards and certification (Instituto Colombiano de Normas Técnicas y Certificación)
IPCC	Intergovernmental Panel on Climate Change
MoV	Means of verification
MP	Monitoring Plan
OM	Operating Margin
PDD	Project Design Document
UNFCCC	United Nations Framework Convention for Climate Change
INE	Nicaraguan Institute of Energy (Instituto Nicaragüense de Energía)

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1. INTRODUCTION

The “Asociación de Trabajadores de Desarrollo Rural – Benjamín Linder” (ATDER-BL) have commissioned ICONTEC to perform the validation of its CDM project: “El Bote small hydroelectric plant” (hereafter called “the project”).

This report summarizes the findings of the validation of the project, which was performed on the basis of UNFCCC criteria for small scale CDM projects, as well as criteria given to provide for consistent project operations, monitoring and reporting.

According to the specific CDM documentation of the project, it consists in the construction of a run of river hydroelectric plant to generate electricity for delivering to the El Cuá and San José de Bocay municipalities. The excess power will be also sold to the national grid.

Without implementation of the project, the electrification of the Cuá Bocay area, similar to other rural areas of Nicaragua, would be based on extension of local grids with electricity supplied from the national grid, consuming the mix of fuels (predominantly petroleum) that are utilized in the power plants of the national grid. The supply of electricity to the local communities will avoid the combustion of the fossil fuels, stimulate growth of the local economy and also it will serve as a focus for watershed conservation efforts.

The infrastructure of the El Bote hydroelectric plant has already been built, the projected yearly average generation is 5.8 Gigawatts hours (GWh). The project expects to displace 53,998 tonnes of carbon dioxide equivalent (tonnes CO2eq) in 7 years renewable to 14 years of crediting period. The CERs are calculated on the basis of recent years of the national grid generation mix, since the project displaces electricity from the national grid.

1.1 OBJECTIVE

According to CDM Modalities and Procedures (Decision 17/CP7) the purpose of a validation is to have an independent third party to assess the project design. In particular, the project's baseline, monitoring plan, and the project’s compliance with relevant UNFCCC and host Party’s criteria that are validated in order to confirm that the project design, as documented, is sound and reasonable and meets the identified criteria. Validation is a requirement for all CDM projects and is seen as necessary to provide assurance to stakeholders of the quality of the project and the intended generation of certified emission reductions (CERs).

1.2 SCOPE

The validation scope involves the independent and objective revision to determine that the project design meets the following criteria:

- the UNFCCC criteria: The Kyoto Protocol Article 12 criteria, the modalities and procedures for CDM (Marrakech Accords) and the relevant decisions by the CDM Executive Board, and

- Host Party criteria: National CDM requirements, including sustainable development priorities, and potential specific requirements contained in, for example, the preliminary approval by the Designated National Authority or project agreements between the involved parties.

ICONTEC based on its ethics code and internal procedures for carrying out validation, verification and certification audits of CDM project activities (which, in turn, are based on the Validation and Verification Manual of EB-UNFCCC) focused on the identification of significant risks for CER generation, and verification of the mitigation.

The validation does not mean to provide any consulting to the project participants. However, stated requests for clarifications and/or corrective actions may have provided input for improvement of the project design.

1.3 GHG PROJECT DESCRIPTION

Project Parties	:	Asociación de Trabajadores de Desarrollo Rural - Benjamín Linder (ATDERBL)
Title of project activity	:	"El Bote small hydroelectric plant"
Project Entity	:	ASOCIACIÓN DE TRABAJADORES DE DESARROLLO RURAL – BENJAMÍN LINDER - ATDER – BL Del Hotel Bermudez 75 v. sur Matagalpa, Nicaragua Phone: 505-2772-2030 Fax: 505-2772-5423 atder@ibw.com.ni
Location of the project activity	:	Municipality of El Cuá Department of Jinotega Nicaragua. Coordinates: Longitud 85°33'24" East and Latitude 13°23'36" North.
Methodology	:	AMS-I-D ver.14 Renewable Energy Projects. Category D: Renewable electricity generation for a grid.
Project's crediting period	:	7 years (renewable)
Estimated amount of emission reductions over the chosen crediting period:		26,999 tonnes CO_2-equivalent

The “El Bote Small hydroelectric plant” project involves the construction of a dam in a section of the El Bote river just above a set of falls at approximately 615 m above sea level. From this point the river falls 120 m in elevation over a horizontal distance of 350 m to the powerhouse.

The objective of the project is to generate hydroelectricity for sale to the local communities of El Cuá and San José de Bocay municipalities. The excess power will be sold to the national grid.

The “El Bote Small hydroelectric plant” project was designed and built by ATDER-BL, a non-governmental organization (NGO), which also designed and built small isolated hydroelectric plants in San José de Bocay and La Pita de Carmen, in the same area. The infrastructure of the El Bote plant has already been built and it will permit to extend the electrical service to more users in the rural area. The beneficiaries of El Bote project and other nearby rural communities voluntarily contributed the unskilled manual labor to the construction of the civil works of El Bote hydroelectric plant. The ATDER-BL organization and the beneficiaries continue now to develop and expand the project to reach more rural communities and farms in the local impact area that request and require electrification.

As mentioned in clause 1.1, without the implementation of the project, the electrification of the Cuá Bocay area would be based on extension of local grids with electricity supplied from the national grid, consuming the mix of fuels (predominantly petroleum) that are utilized in the power plants of the national grid.

2. VALIDATION METHODOLOGY

The validation consists of the following three phases after to make publicly available the PDD:

i) A desk review of the project design documents
ii) Follow up interviews with the owner of project and stakeholders
iii) The resolution of outstanding issues and the issuance of the final validation report and opinion.

As mentioned in clause 1.2 of this report ICONTEC based on its ethics code and internal procedures, carries out validation audits of CDM project activities (which, in turn, are based on the Validation and Verification Manual of the CDM EB of UNFCCC) focused on the identification of significant risks for CER generation, and verification of the mitigation.

These internal procedures define the validation protocol which consists of three tables. The different columns in these tables are described in Figure 1 “Validation protocol tables”.

The validation protocol resulting from the assessment of “El Bote small hydroelectric plant” is enclosed in Annex A of this report.

Findings established during the validation can be deemed as:

- a non-fulfillment of validation protocol criteria, or
- an identified risk to the fulfillment of the project objectives

The findings could take the form of a Corrective Action Request (CAR) or a Clarification Request (CLA) or Forward Action Request (FAR).

FIGURE 1. VALIDATION PROTOCOL TABLES

Validation Protocol Table 1: Mandatory Requirements for CDM Project Activities			
Requirement	Reference	Conclusion	Cross reference
The requirements that the project shall meet.	It gives reference to the legislation or agreement where the requirement is set.	This is either: - Acceptable based on evidence provided (OK), - a Corrective Action Request (CAR) for risk or non-compliance with stated requirements, or - a Request for Clarification (CL) where further clarifications are needed. - a Forward Action request when risk or non-compliance may be in the follow crediting period time.	Used to refer to the relevant checklist questions in Table 2 to show how the specific requirement is validated. This is to ensure a Transparent validation process.

Validation Protocol Table 2: Requirement checklist				
Checklist Question	Reference	Means of verification (MoV)	Comment	Final Conclusion
The various requirements in Table 1 are linked to the checklist questions that the project should meet. The checklist is organized in seven different sections. Each section is then further sub-divided. The lowest level constitutes a checklist question.	It gives reference to documents where the answer to the checklist question or item is found.	Explains how conformance with the checklist question is investigated. Examples of means of verification are Document Review (DR) or Interview (I). N/A means not applicable.	The section is used to elaborate and discuss the checklist question and / or the conformance to the question. It is further used to explain the conclusions reached.	This is either: - Acceptable based on evidence provided (OK), - a Corrective Action Request (CAR) for risk or non-compliance with stated requirements, or - a Request for Clarification (CL) where further clarifications are needed. - a Forward Action request when risk or non-compliance may be in the follow crediting period time

Validation Protocol Table 3: Resolution of Corrective Action, Forward Action and Request for Clarification			
Report Clarifications and Corrective Action Requests	Ref. to checklist question in table 2	Summary of project owner response	Validation conclusion
If the conclusions from the Validation are either a Corrective Action or Forward Action Request or a Clarification Request; these should be listed in this section.	Reference to the checklist question number in Table 2 where the Corrective Action Request, FAR or Clarification Request is explained.	The responses given by the project participants during the communications with the Validation team should be summarized in this section.	This section should summarize the validation team's responses and final conclusions. The conclusions should also be included in Table 2, under "Final Conclusion".

2.1 REVIEW OF DOCUMENTS

The PDD submitted by ATDER-BL and the additional background documents related to the project design and baseline were assessed during the validation. Several versions of PDD were successively submitted by the project participant along the process, reacting to clarifications and the corrective and forwards actions request for the DOE.

Main documents reviewed were:

- Funds origin certificates (no official development aid) from the Energy and Mines Ministry of Nicaragua and the Rural Development Institute of Nicaragua
- Financial projections of the project (Additionality assessment)
- Baseline calculation data
- Maintenance and calibration records and procedures for monitoring equipment (frontier electricity meter)
- Quality assurance procedures
- Analysis of the related environmental impacts
- Letter approving the project issued by the Designated National Authority
- Letter confirming the voluntary participation of the parties
- Records on the early identification of the project as CDM
- Comments of the interested parties received up to date and how these has been treated
- Records on the meeting to inform local stakeholders about the project activity
- Electrical statistics of the electric sector of Nicaragua published by INE
- Information on electrical generation companies and the electrical interconnected grid in Nicaragua published by INE
- Legal decree that support the national emission factor for the electric sector (INE)
- Single line diagram of the distribution grids for the project area

2.2 FOLLOW UP INTERVIEWS

ICONTEC performed interviews with project stakeholders to confirm the selected information and to resolve issues identified during the desk review. The main topics of the interview are summarized in Table 1.

Table 1. Follow up Interview

DATE	PLACE	INTERVIEW DELEGATE	ORGANIZATION	INTERVIEW TOPICS
2009 01 29	ATDER-BL OFFICES - MATAGALPA	Jorge Ayala Aleyda Morales Environmental Advisor and administrative support	ATDER-BL	Further clarification on: - Establishment of baseline, monitoring plan, emission reduction calculation. - Consistency on Baseline calculation data. - Rationale of the additionally of the project. - Comments of the interested parties received up to date and how these have been treated. - Environmental aspects of the project - Social benefits of the project.
2009 01 29	Ministry of Environment and Natural Resources of Nicaragua (MARENA). Managua, Nicaragua	Bernardo Torres Director (E) ONDL - Marena Manuel Madrid Professional ONDL - Marena	Nicaraguan DNA	Issues related to: - No objection letter to the project - Process of National Approval (register) of the project (Contribution to Sustainable Development) and voluntary participation of the parties.
2009 01 30	El Cuá - Municipality	Elsa Benavides El Cuá Councilor Gloria Rivera Community Leader Simón Hernández Community member Melitonio Gutierrez Community member Candida Treminio Community member	Community Members	Further clarification on: - Environmental aspects of the project - Social Benefits of the project - Expectations on other benefits of the project (example: improvements in economical conditions, new opportunities of employ)
2009 01 30	El Cuá - Municipality Project Facilities	Rebeca Leaf ATDER-BL Director Félix Rosales Technical Advisor Miguel Suarez and Donaldo Cordero Hydro Plant Operators	ATDER-BL	Further clarification on : - Project design engineering facilities. - Technical and Operational issues of the plant - Establishment and applicability of the monitoring plan. - Responsibility, authority and procedures for monitoring, measuring and reporting data. - Training needs - Calibration of measurement equipment. - Social benefits of the project. - Operation procedures.

2.3 RESOLUTION OF CLARIFICATION AND CORRECTIVE ACTION REQUESTS

Corrective action and clarification requests raised by ICONTEC, presented to the project participants in the preliminary validation report of 2009 01 30 (version 0) were resolved through communication and meetings between ICONTEC and ATDER-BL. To guarantee the transparency of the validation process, the concerns raised and the response provided by the project participants are documented in more detail in the validation protocol in Annex A (Table 3).

Modifications to the project design document were necessary to resolve ICONTEC´s concerns. As a result the final PDD version 11 of May 15, 2010, was issued.

2.4 INTERNAL QUALITY CONTROL

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

The technical review and the quality control of the process were performed by the internal assessment in accordance with ICONTEC internal procedures for carrying out validation audits of CDM project activities. The internal Technical reviewers are qualified in accordance with ICONTEC qualification scheme for CDM validation and verification activities.

2.5 VALIDATION TEAM

The validation Team consists of the following members:

ROLE/QUALIFICATION	LAST NAME	FIRST NAME	COUNTRY
Lead Auditor	Gracia	Juan Alberto	Colombia
Expert	Gómez	Fernando	Colombia
Expert	Pedraza	Eder	Colombia

The validation team is qualified in accordance with ICONTEC qualification scheme for CDM validation and verification services.

3 VALIDATION FINDINGS

3.1 OVERVIEW

The findings of the validation are stated in the following sections. The validation criteria (requirements), the means of verification and the results from validating the identified criteria are documented in more detail in the validation protocol in Annex A (Table 1, 2 and 3).

3.2 PARTICIPATION REQUIREMENTS

The project activity is proposed by ATDER-BL which is also the project participant. The host country is Nicaragua.

Nicaragua meets all participation requirements, and the Designated National Authority of Nicaragua (MARENA) has approved the project with a letter of approval dated September 5, 2008 and has provided confirmation that the project contributes to the country in the search of sustainable development. An update letter of approval was requested to the Nicaragua DNA (MARENA) in order to change the name of the project for the “El Bote Small Hydroelectric plant” in the August 28, 2009.

3.3 PROJECT DESIGN

The project is designed as “run of the river”. The purpose of the dam/weir (less than 3 m in height) is primarily to obtain sufficient depth of water to ensure that water can enter into and fill the pipeline and excess water can flow over the weir and continue along the natural course of the river. The live capacity of the head pond with flash boards is 5,500 m^3, and the volume of dead storage is estimated to accommodate one year of sediment. A low level outlet through the base of the weir with dimensions of 80 cm by 80 cm permits the draining of the reservoir and assists with the cleaning and maintenance of the reservoir, weir and intake structure. A sluice gate controls the opening and closing of the low level outlet and it is operated by hand wheel from the crest of the weir. The small amount of live storage capacity of the head pond allows some flow regulation of the river which during the dry season can provide an increase in available water to meet the daily peak demand of the local market. The head pond has a surface area of 1,350 m^2 (approximately 30 m wide x 45 m long).

The pipeline is 385 m in length and is constructed of 24” and 30” diameter PVC and steel pipe. The majority of the pipeline is buried except for first section at the weir intake, a section in the middle that is on bedrock, and a final 36 m long section that is very steep to the powerhouse. PVC was chosen as a pipeline material due to its low cost, low friction factor, easiness of assembly, it is corrosion free and because of its relative lightness. The three sections of the pipeline that could not be buried in a ditch due to irregular and rocky terrain are constructed of steel pipe. The steel pipe has an epoxy liner and several exterior coats of specialized paint to prevent interior and exterior corrosion. The pipeline permits a design flow of 1.05 m^3/s resulting in a water velocity between 2.2 m/s to 3.8 m/s. The total hydraulic losses through the intake, the trash rack, and the pipeline are calculated as 6.7 m, with a net head for the project of 112.7 m, at design flow.

The soil above the buried pipeline is 0.5 m in depth and has been planted with Vetiver grass to prevent soil erosion. Four air/vacuum valves have been installed to prevent accumulation of air or the creation of vacuums in the pipeline. Reinforced concrete anchors were built at points of deflection and at the reduction in the pipeline to prevent movement by hydraulic forces that are created at these locations. A manually operated 4” diameter gate valve has been provided on a “T” to the bottom section of the pipeline, immediately before the powerhouse pipe bifurcation to permit the cleaning of any sediment that may accumulate in the pipeline.

The electro-mechanical equipment installed in the El Bote powerhouse consists of two sets of turbine/generator. Each 470 kW turbine/generator set consists of:

- A Pelton horizontal shaft turbine with two nozzles, with deflectors for each nozzle
- A shut-off butterfly valve

- A dresser coupler with bolt harness between butterfly valve and turbine to permit assembly, disassembly and repair of the turbine

- Direct-drive coupler between turbine and generator

- A synchronous generator with flywheel, 514.33 rpm, 480 V, 60 kVA

- Hydraulically actuated turbine injectors to regulate water flow and meet electrical demand when operating in island mode, and to regulate flow based on the level of water in the reservoir while connected to the national grid

- Control panel for start-up, shut-down, regulation, synchronization, surge, lightning and other electrical protection

When operating at design flow and at design load the efficiency of the turbine and generator is 79.4 % and 95.9 % respectively.

The electro-mechanical equipment in the El Bote powerhouse has the capacity for isolated operation (island mode) and also operation while connected to and synchronized with the national grid (intertie mode).

The situation of the project activity at February of 2010 is as follows: power measuring equipment and the current and power transformers were installed in December 2009. Does not have an audit of the national authority is the National Center for Load Dispatch (Centro Nacional de Despacho de Carga de Nicaragua) to this SIMEC (Commercial Measurement System).

3.4 BASELINE DETERMINATION

According to the description above, the type and category of the project activity is defined as follows:

- Type I: Renewable Energy Project
- Category D: Renewable electricity generation for a grid

The baseline and monitoring methodology chosen is AMS-I.D, “Grid-connected renewable electricity generation” version 14. As was verified by ICONTEC (via desk review, investigation of additional sources, follow up interviews and with on site visit), the project complies with the eligibility criteria of the methodology because:

- The project comprises a renewable energy generation unit (hydro) that supply electricity and displace electricity from an electricity distribution system that would have been supplied by some fossil fuel fired generating unit (mainly petroleum).

- The capacity of the entire unit does not exceed the limit of 15 MW.

- The project does not involve combined heat and power (co-generation) systems

- This project does not involve the addition of renewable energy generation units at an existing renewable power generation facility.

- Prior to the implementation of the project activity, no power was generated at the project site (i.e. the project plant does not substitute or amend any existing power generation at the project site);

- The geographic and system boundaries for the relevant electricity grid had been clearly identified and information on the characteristics of the grid is available.

In accordance with the methodology, the baseline is the kWh produced by the renewable generating unit multiplied by an emission coefficient (measured in $KgCO_2/KWh$), calculated in a transparent and conservative manner as a Combined Margin (CM), consisting of the combination of Operating Margin (OM) and Build Margin (BM), (option a) of the methodology) according to the procedures prescribed in the 'Tool to calculate the emission factor for an electricity system'.

Then, the baseline emissions ***BEy*** (tonnes CO_2/year) are given by:

$$BEy = EGy \; X \; EF_{grid,CM,y}$$

Where:

EGy = Annual electricity supplied by the project activity to the grid (MWh/year)
$EF_{grid,CM,y}$ = Combined Margin CO_2 emission factor of the grid (tonnes CO_2/MWh)

As was verified by ICONTEC this choice (option a) of the methodology) was made based on dispatch characteristics of National Interconnected System of Nicaragua as follows is explained:

The baseline calculation chosen was deemed to be superior on its compliance with the Marrakech Accords ("MA")'s baseline definition, than the weighted average emissions of the current generation mix for two reasons:

a) The project is more likely to mitigate fossil fuel-based electricity generation than hydro electricity generation given the NIS dispatch characteristics; this operational fact of the NIS, would have been completely ignored if the weighted average emissions (in $KgCO_2/KWh$) of the current generation mix had been considered the project's baseline. However, it is taken into account (with a weight of 50%) in the baseline chosen as the approximate operating margin excludes renewable energy sources (low-cost / must-run resources constitute less than 50% of total grid generation), and

b) The build margin is a more dynamic component for the baseline than the weighted average emissions (in $KgCO_2/KWh$) of the current generation mix, since the build margin focuses on the emission from the most recently-built plants. At the same time, the build margin is also conservative as it is based on weighted average emissions (in $KgCO_2/KWh$) of a generation mix that does not exclude any type of electricity generation technology. In summary, it was deemed that this 50%-50% combination of both margins (approximate operating margin and build margin) explained better what would happen in the absence of the project activity than the weighted average emissions (in $KgCO_2/KWh$) of the current generation mix.

As was mentioned the combined margin emission factors of the grid are calculated using the "Tool to calculate the emission factor for an electricity system" (version 1.1). The tool permits the

estimation of the OM, BM and/or CM for the purpose of calculating baseline emissions for a project activity that substitute's electricity from the grid.

According to the tool, and in order to determine the Combined Emission factor of the grid, the Project responsible applied the following six steps of the Tool, as was verified by ICONTEC:

STEP 1. Identify the relevant electric power system.
STEP 2. Select an operating margin (OM) method.
STEP 3. Calculate the operating margin emission factor according to the selected method.
STEP 4. Identify the cohort of power units to be included in the build margin (BM).
STEP 5. Calculate the build margin emission factor.
STEP 6. Calculate the combined margin (CM) emissions factor.

In relation to the application of the steps, the DOE`s identified the following:

- Step 1, the owner of the project defined that the relevant Project Electricity System is the entire national grid of Nicaragua. In this framework it was identified that the extension of local grids with electricity supplied by the national grid (consuming a mix of fuels) is the project scenario alternative. Since this is the traditional solution adopted in other rural areas of Nicaragua, it is correct to assume that this situation is consistent with current laws and regulations (See CLA 1).

- Step 2, the owner of the project selected option A of the Tool, Simple Operation Margin Method, which is properly justified, because of the low-cost/must run resources constitute less than 50% of total grid generation in average of the five most recent years, as demonstrated in the annexes of PDD, where official information on generation in Nicaragua by type of combustible is showed. The results are summarized in main text of the PDD.

- Step 3, Option A (Simple OM calculations) is selected to calculate Operating Margin, based on the full availability of the necessary data, which is considered consistent taking into account that this is the preferred option for the Methodology.

Nevertheless, sources of heat content and fuel CO_2 emission factor of fuels data, used for calculations, were required to be specified (See CLA 2).

In relation to the calculation of the operating margin component of the grid emission factor ICONTEC identify that the calculation was not made conform to the following specification of the tool: "The simple OM emission factor is calculated as the generation-weighted average CO2 emissions per unit…" (See CAR 6).

In Step 4, the DOE required clarification about the option adopted to conform the sample group of power units to calculate the Build Margin. (See CAR 7 and CLA 2).

Also, selection of Option 1 of vintage of data to calculate the Build Margin was required to be justified. (See CAR 7).

Finally, in Step 5, it was necessary to require a correction to the application of formula to calculate Build Margin component of the grid emission factor, regarding the correct application of the data vintage criterion. (See CAR 7).

3.5 ADDITIONALITY

The DOE carefully assessed and verified the reliability and creditability of all data, rationales, assumptions, justifications and documentation provided by project participants to support the demonstration of additionality, as described ahead, where can be seen that some CAR's were raised to justify additionality demonstrations

According to the request made by the Executive Board include an additional analysis of financial assessment for El Bote project and the requirements of the VVM (ver. 1.1) following is an explanation:

In Section B.5 of the PDD, PPs initially describe projects scenarios alternatives, then explain why the activity project proposed is not economically feasible, and finally refer to a financial analysis of the project, with and without the CDM benefits to demonstrate that the project is not financially feasible without the incomes from the sale of CERS.

In order to validate this approach, the DOE followed the guidelines of the Methodological Tool "Tool for the demonstration and assessment of Additionality" EB39 Annex 10, as follow:

Step1. Identification of alternatives to the project activity consistent with current laws and regulations:

The scenarios alternatives considered were: (1) extension of electric lines from the national grid, and (2) build the El Bote small hydro plant. Since the extension of local grid, as the project scenario alternative, is the traditional solution adopted in other rural areas of Nicaragua, the DOE deems that it is correct to assume that this alternative is consistent with current laws and regulations.

Step 2. Investment analysis

PPs included an explanation about demonstrate and assess the Project additionality by Investment Analysis, using benchmark approach, as described in the Annex 5 of the PDD (Version May 15th 2010).

Firstly, the DOE agrees that, taking into account the rationales presented in the first part of the Annex, the alternative to construction of El Bote project is supplying electricity from the national grid, without direct investment from the proponents (ATDER-BL). On these bases, according to the *"Tool for the demonstration and assessment of additionality"*, benchmark analysis (Option III), using IRR as financial indicator, is the option to be used in the investment analysis of the step 2 of the tool, as PPS do. IRR is a suitable financial indicator, used generally to analyze energy investment projects, like this one.

As required by the VVM, ICONTEC carefully assessed and verified the reliability and creditability of all data, rationales, assumptions, justifications and documentation provided by project participants to support the demonstration of additionality, as described ahead, where it can be seen that some CAR's were raised to justify additionality demonstrations

Specifically, by CAR 3, explanations about the criteria to assess the following parameters used in the financial analysis were requested to the PPs:

- Net annual generation output

- Average consumption

- Annual growth rate projected

- Sales in the local grid

- Sales in the national grid

- Market prices of CERs

Project owner responses and Validation appraisal are in the Validation protocol, Table 3, of this Report, where explanations were considered adequate by the DOE, and the CAR was closed.

As required by the VVM, ICONTEC verified the benchmark used to compare the IRR of the Project. The PPs assumed the discount rate of 12% as benchmark. Given that discount rate reflexes the Equity capital cost for this type of proponents, (NGO without profit aim), the DOE deems that it is suitable to take 12% as a benchmark rate for this project.

As required by the VVM, the following main parameters and assumptions used in calculating the IRR were verified by the DOE, based on supporting documents attached:

Investment costs:

Main items on investment costs used in financial analysis, as showed in Annex 5 of PDD, were verified as follow:

- Civil works: Values of civil works registered by the Registry of Properties of the province of Jinotega, Nicaragua. The evidence analyzed is the Notarized Public Document (Escritura pública) No. 1.518, august 27th, 2008.

- Generating equipment, control and protection equipment, and substation equipment: Values of these main investment components verified by the assessment firm TECNITASA (Técnicos de Tasación de Centro América S.A). The evidence analyzed is the *"Expediente No. 00-505-0092-04/019-0000"*, in which turbines and generators, electric control systems, hydraulic equipment, transformers and switchgear equipment costs are certified by this Firm, from suppliers invoices.

From the knowledge and experience of the DOE, items included are appropriate and values assigned are representative of this type of project.

O&M costs:

Project Operation and Maintenance Costs were assigned by means of a detailed projection of costs, including usual items for the operation of this type of plant.

From the knowledge and experience of the DOE, items included are appropriate and values assigned are representative of this type of project.

As Costs of Debt are concerned, the loan contract with FNI (Financiera Nicaraguense de Inversiones) was verified for DOE, which shows the debt amount of US$1,210,000 at 5.5% annual interest, and also the loan signed for additional mortgage of $ 91,465.00 for a total loan amount of US$ 1,301,465 as indicated in the project Financial Projection.

Electricity tariff:

Evidences of electricity tariffs used in Financial Projection were obtained by sampling invoices: Electricity sold by El Bote to the national grid (distributor DISNORTE), shows sale price of US$ 68/MWh as indicated in the Financial Projection; Electricity bills to local customers, shows average tariff of US$ 200/MWh as indicated in the Financial Projection. (The exchange rate of the local currency, Nicaraguan Córdobas - C$, to the US dollar varies daily and in the latter half of 2009 was approximately C$ 20.70 = US$ 1.00

The electricity output and the PLF:

Electricity output was estimated using the RETScreen software (Canadian Ministry of Natural Resources), as indicate in the Attachment 4.4. This software calculates the energy available by integrating under the flow duration curve, taking into account the stated efficiencies of the equipment, and the friction losses in the pipeline. Site hydrological characteristics and geographical parameters used in the model are as described in the PDD. With these data the model drives output gross production of 5.841 MWh/year. Gross electricity output used in the finance analysis is 5.800 MWh/year, and net projected annual electricity sold is 4.640 MWh/year (20% losses), values deemed conservative by the DOE.

Final IRR results

Two financial scenarios were analyzed: with and without incomes from CREs. Considering sales of carbon certificates, the IRR is 12.6% (NPV = US$39,351), a little beat greater than the benchmark. By the other hand, not considering sales of carbon certificates, the IRR is 7.9 (NPV = -US$242,577), less than the benchmark rate.

Sensitivity analysis

Sensitivity analysis on Investments costs, A&M costs and Energy prices in the national market were made by the DOE in order to establish the reliance of the Project IRR results on variations in these main parameters and to appreciate the significance of the CDM incomes on the Project additionality.

From these analyses it can be seen that, without CERs, should be necessary savings of, at least, 26% in investment costs or 22% in A&M costs for reaching IRR equal to the benchmark rate.

In respect to tariffs, should be necessary at least 22% of increase, with flat investment and O&M costs, to reach a fair situation.

Taking account the limited experience of PPS with this technology, Investment and O&M costs increases should be expected, such that high savings are considered very improbable. On the contrary, with 10% of over costs, tariffs should have to increase something like 40% to reach benchmark rate. Oil prices increases would have to be extremely high to force such high tariffs rates.

DOE Conclusions

Based on the certitude allowed for the analysis and verifications executed, the DOE confirms that financial analysis demonstrate that the activity project is additional.

3.5.1 CDM Prior considerations

In response to the CAR 8 of DOE, a fully demonstration of early consideration of CDM was given by project participant as described in paragraph A.4.6 of the last version of PDD. The El Bote small hydroelectric project was identified as an MDL project by the sponsor (ATDER-BL) and by the National Office of the Clean Development Mechanism (ONDL) of the Nicaraguan Ministry of Environment and Natural Resources (MARENA) as early as the year 1999, when ATDER-BL initiated the design of the small hydroelectric plant.

Besides that, the following additional documentation, chronologically arranged, was verified by DOE:

February 11, 2001: e-mail from ATDER-BL to Wiwili Project: Announcement of approval by Finland government of proposal of baseline and PDD studies for hydroelectric projects in Cuá-Bocay.

March 5, 2001: e-mail from ATDER-BL to CNE, submitting preliminary calculations of CER's.

March 12, 2001: Communication from Cuá-Bocay municipality to Instituto Nicaraguense de Electricidad. The municipality agree ATDR-BL obtain the concession for electricity services in the zone.

October 26, 2001: e-mail announcing official endorsement letter for the Finland government and PDD elaboration TOR's.

November 7, 2001: e-mail from Department for International Development Cooperation, Finland government to ATDER-BL submitting the Terms of Reference for preparation of the Project Design Document (PDD) of the Cua-Bocay hydroelectric project.

November 7, 2001: e-mail from ATDER-BL inviting to the capacitating event on "GEF/FMAM" funds and carbon by PNUD.

May 10, 2004: ECO SECURITIES: UNITED NATIONS DEVELOPMENT PROGRAMME – LEARNING BY DOING CDM CAPACITY BUILDING INICIATIVE Completion Document for the El Bote-Bocay-La Pita Pilot Project in Nicaragua

November 25, 2004: El Cuá municipality endorsements financing procurement actions by ATDER-BL to build electricity services supply from El Bote hydroelectric project.

December 1, 2004: El Cedro, Cuá Municipality ask to ATDER-BL inclusion of this population in the electrification program from the El Bote Hydroelectric project.

December 10, 2007: El Cuá municipality endorsements actions by ATDER-BL looking for CDM achievement to El Bote Hydroelectric project.

3.6 MONITORING PLAN

The electricity supplied to the grid and to the local consumers directly, if any, will be monitored by meters installed in the substation to measure the energy generated. Meters should be installed, maintained and calibrated according to equipment manufacturer instructions and be in line with national standards.

The total energy delivered to the grid will also be tracked by the Nicaraguan Energy Institute (INE, the Nicaragua National Regulator), which keeps an official record.

Production records will be crosschecked with the record of sales to the grid plus local sales bills, if any.

The electricity supplied to the grid will be monitored by special meters installed in the substation to measure the energy generated. There will be an operator responsible for the measurement of the energy generated by the plant. The measurement and recording of energy generated will be double checked by the head plant operator.

The data collected as part of the monitoring plan will be electronically archived and kept for 2 years after the end of the last crediting period. Measurements will be made with calibrated equipment according to accepted standards.

3.7 CALCULATION OF GHG EMISSIONS

3.7.1 EMISSION REDUCTIONS DETERMINATION

Emission reductions in year *y* ***ERy*** (tonnes CO_2eq/year) are calculated as follows:

$$ERy = BEy - PEy - LEy$$

Where:

BEy = Baseline emissions in year *y* (tonnes CO_2eq/year)
PEy = Project emissions in year *y* (tonnes CO_2eq/year)
LEy = Leakage in year *y* (tonnes CO_2eq/year)

As demonstrated in the PDD, in this case Project Emissions (PEy) and Leakage (LEy) are zero, so the emission reductions in year *y* ***ERy*** (tonnes CO_2eq/year) results to be:

$$ERy = BEy = EGy \ X \ EF_{grid,CM,y}$$

The combined margin emission factor of the grid is calculated using the "Tool to calculate the emission factor for an electricity system" (version 01.1).

The combined margin emission factor $\boldsymbol{EF_{grid,CM,y}}$ (tCO2e/MWh) is determined as follows:

$EF_{grid,CM,y} = wOM \ X \ EF_{grid,OM,y} + wBM \ X \ EF_{grid,BM,y}$ where wOM =50% and wBM = 50%.

As described in Section B.6.1, the grid emission factor is calculated *ex-ante* according to the "Tool to calculate the emission factor for an electricity system", as a combined margin emission factor, consisting of the combination of the operating margin and the build margin factors.

ICONTEC verified that the analysis of the Project Base Line gives a relationship of 0.665 ton CO2 / MWh for substitution of electricity generated by the Nicaraguan national grid. 100% of the energy generated by the El Bote hydroelectric plant displaces electricity that would otherwise be generated by the Nicaraguan national grid.

This value of 0.665 ton CO2 / MWh is based on "analysis of 6 years of national generation statistics taking into account the types of fuels utilized" (see PDD Version 11) and is calculated step by step in the PDD (see PDD Version 11).

The national generation statistics are presented in the PDD in Annex 3 "BASELINE INFORMATION" (PDD Version 11). These statistics can be reviewed by anybody who wants to see them, by entering the official web site of the Nicaraguan Regulatory Authority, INE (Instituto Nicaraguense de Energia) www.ine.gob.ni. Look for the sections called Estadisticas ("statistics"). As a way of demonstrating that these are the official Nicaraguan generation statistics, we included in the Annex 3 of the PDD, a letter from the Nicaraguan Regulatory Authority, INE (Instituto Nicaraguense de Energía).

The results obtained are the following:

$$EF_{grid,OM,y} = 0.705 \text{ tonnes } CO_2/MWh$$

$$EF_{grid,BM,y} = 0.625 \text{ tonnes } CO_2/MWh$$

Thus,

$EF_{grid,CM,y}$ = (0.5 x 0.705 + 0.5 x 0.625) tonnes CO_2/MWh **= 0.665 tonnes** CO_2**/MWh**
With a total capacity of 940 Kw, the project is expected to generate 5,800 MWh/year. Thus, the emission reductions will be:

Ery = 5,800 Mwh/year x 0.625 tonnes CO_2/MWh = **3857 tonnes** CO_2**/year**

In a period of 7 years: (5,800 x 0.625 x 7) = 26,999 tonnes CO_2-equivalent
In a renewable crediting period till 14 years: (5,800 x 0.625 x 14) = 53,998 tonnes CO_2-equivalent

3.8 ENVIRONMENTAL IMPACTS

The project's Environmental Impact Assessment ("EIA") is not required by law because the project has a capacity less than 5 MW. ATDER-BL received a preventive action list from MARENA before dam construction. Water rights were approved by MIFIC (Ministry of Trade, Industry and Foment).

These recommendations were checked by MARENA and found to present no significant impact to the environment. The Ministry of the Environment and Natural Resources (MARENA) is the entity in charge of conservation, protection, and sustainable use of natural resources and the environment in Nicaragua. It is responsible for the implementation of strategies and programs for municipal development and for the control of polluting activities.

Also the project contributes to sustainable development by:

a) Employing local labor in construction and in operation.

b) Improving electrical access by serving demand centre that suffers blackouts due to difficulties in the existing power lines. Due to the project, improvements have been made to the power line to which the project's transmission line is intertie.

c) Serving as a small demonstrative project for clean renewable electricity generation in the country, which can also function as an independent power producer ("IPP") when developed by a private NGO.

d) Contributing to government revenue through the payment of taxes.

e) Helping the country improve the hydrocarbons trade balance through reduction of petroleum imports used for electricity generation. Nicaragua imports all of its petroleum.

3.9 COMMENTS BY LOCAL STAKEHOLDERS

In accordance with the "Simplified modalities and procedures for small-scale clean development mechanism project activities" (FCCC/CP/2002/7/Add.3, annex II, paragraph 22 literal (b)), an informational meeting was carried out at the municipality, to inform local stakeholders about the project activity.

A public assembly was called at which the El Bote hydroelectric project was discussed, with questions, answers and comments from the people. The discussion was transcribed and the participants including representatives of the public health service, the school system, the municipality government, other local institutions, and the public in general, signed the minutes of the meeting.

No negative comments or complaints regarding environmental or social impacts of the project were expressed by any of the local stakeholders, hence no corrective measures are considered to be required.

4. COMMENTS BY PARTIES, STAKEHOLDERS AND NGOS

The PDD version 05 submitted by ATDER-BL was made publicly available at ICONTEC's climate change website:

Parties, stakeholders and NGOs were invited to provide comments through the CDM website during a 30 days period from 2008 11 18 to 2008 12 17.

No negative comments or complaints regarding environmental or social impacts of the project were expressed by any of the local stakeholders, hence no corrective measures are considered to be required.

5. VALIDATION OPINION

ICONTEC has performed a validation of the "El Bote small hydroelectric plant". The validation was performed on the basis of UNFCCC criteria for the Clean Development Mechanism and host country criteria, as well as criteria given to provide for consistent project operations, monitoring and reporting.

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

The project activity is being proposed as unilateral project by ATDER-BL. Nicaragua has provided approval of voluntary participation and meets all requirements to participate in CDM. The Nicaraguan DNA confirmed that the project helps in achieving sustainable development.

The project correctly applies the methodology: AMS-I.D, version 14, Sectoral scope 01. Renewable energy technologies that supply electricity to a grid fall into category I.D.".

Emission reductions attributable to the project are hence additional to any that would occur in the absence of the project activity.

The total emission reductions from the project are estimated to be on the average of 3,857 tonnes CO_2eq per year over the selected renewable 7 years crediting period. The emission reduction forecast has been checked and it is deemed likely that the stated amount is achieved because the underlying assumptions do not change.

Bogotá D.C., June 21, 2010

Fabio Tobón
Executive Director
ICONTEC

6. REFERENCES

Documents provided by the project proponent that relate directly to the project

/1/ CDM Project Design Document, including Baseline Methodology and the Monitoring Plan

/2/ Baseline calculation data.

/3/ Calibration information of measurement equipment related to the baseline calculation data

/4/ Letter of Approval, dated 2008 09 05, from the Nicaragua DNA (Ministry of Environment and Natural Recourses - Marena).
Letter of clarification name of the project activity from Nicaragua DNA. 2009 08 28

/5/ ATDER-BL letter confirming the voluntary participation.

/6/ Records on the meeting to inform local stakeholders about the project activity (invitations, list of stakeholder invited, attendance sheet record)

/7/ Data of National Energy Commission of Nicaragua (Comisión Nacional de Energía de Nicaragua).

/8/ "Tool to calculate the emission factor for an electricity system" (version 01.1).

/9/ Administrative Manual of functions' of technical personnel for the operation. March 2008.

/10/ Financial records:

- Notarized Public Document (Escritura pública) No. 1.518, august 27th, 2008
- Legal file (Expediente) No. 00-505-0092-04/019-0000
- RETScreen® Hydrology Analysis and Load Calculation - Small Hydro Project

/11/ Documentation of the CDM early considerations that was verified by DOE:

February 11, 2001: e-mail from ATDER-BL to Wiwili Project: Announcement of approval by Finland government of proposal of baseline and PDD studies for hydroelectric projects in Cuá-Bocay.

March 5, 2001: e-mail from ATDER-BL to CNE, submitting preliminary calculations of CER's.

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November 7, 2001: e-mail from ATDER-BL inviting to the capacitating event on "GEF/FMAM" funds and carbon by PNUD.

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December 10, 2007: El Cuá municipality endorsements actions by ATDER-BL looking for CDM achievement to El Bote Hydroelectric project.

Background documents related to the design and/or methodologies employed in the design or other reference document

/12/ Methodology AMS-I.D, version 14, Sectoral scope 01. Renewable energy technologies that supply electricity to a grid fall into category I.D."
/13/ Validation and Verification Manual of EB-UNFCCC (Ver. 1.1).

ANNEX A. VALIDATION PROTOCOL

TABLE 1. MANDATORY REQUIREMENTS FOR CLEAN DEVELOPMENT MECHANISM (CDM) PROJECT ACTIVITIES

REQUIREMENT	Reference	CONCLUSION	Cross Reference / Comment
1. The project shall assist Parties included in Annex I in achieving compliance with part of their emission reduction commitment under Art. 3	Kyoto Protocol Art.12.2	The project has been proposed as project	Table 2, section E.4.1
2. The project shall assist non-Annex I Parties in achieving sustainable development and the project has obtained confirmation by the host country that the project assists in achieving sustainable development	Kyoto Protocol Art. 12.2, Procedures for Small Scale CDM Project Activities §23a	~~Partial~~ OK	Table 2, Section A.3 The "Validation of El Bote small hydroelectric plant" already received the Letter of Approval, dated 2008 09 05, from the Nicaraguan DNA (Ministry of Environment and Natural Recourses – MARENA). Letter of clarification name of the project activity (Aug 28, 2009). CLA 3
3. The project shall assist non-Annex I Parties in contributing to the ultimate objective of the UNFCCC	Kyoto Protocol Art.12.2.	OK	Table 2, Section E.4
4. The project shall have the written approval of voluntary participation from the designated national authorities of each party involved	Kyoto Protocol Art. 12.5a, Procedures for Small Scale CDM Project Activities §23a	OK	The "El Bote small hydroelectric plant" already received the Letter of Approval and voluntary participation, dated 2008 09 05, from the Nicaraguan DNA (Ministry of Environment and Natural Recourses - MARENA). Letter of clarification name of the project activity (Aug 28,2009). CLA 3.
5. The emission reductions shall be actual, measurable and give long-term benefits related to the mitigation of climate change	Kyoto Protocol Art. 12.5b	OK	Table 2, Section E
6. Reduction in GHG emissions shall be additional to any that would occur in absence of the project activity, i.e. a CDM project activity is additional if anthropogenic emissions of greenhouse gases by sources are reduced below those that would have occurred in the absence of the registered CDM project activity	Kyoto Protocol Art. 12.5c, Marrakech Accords, CDM Modalities §43	OK	Table 2, Section B.2

REQUIREMENT	Reference	CONCLUSION	Cross Reference / Comment
7. In case that public funding from Parties included in Annex I is used for the project activity, these parties shall provide an affirmation that shuch funding does not result in a diversion of official development assistance and is separate from and is not counted towards the financial obligations of these parties	Decision 17/CP.7, CDM Modalities and Procedures Appendix B, § 2	OK	There is not public funding involvement for the project.
8. Parties participating in the CDM shall designate a national authority for the CDM	CDM Modalities and procedures §29	OK	Before the UNFCCC Secretariat the designated national authority for the Clean Development Mechanism is the Ministry of Environment and Natural Resources – Marena
9. The host party and the participant Annex I Party shall be a party to the Kyoto protocol	CDM Modalities and Procedures § 30, 31b	OK	Nicaragua ratified the Kyoto protocol on 18/11/99
10. The participant Annex I Party's assigned amount shall have been calculated and recorded	CDM Modalities and Procedures §31b	OK	There is an opportunity to sign an ERPA with the Belgian government.
11. The participating Annex I Party shall have in place a national system for estimating GHG emissions and a national registry in accordance with Kyoto Protocol article 5 and 7	CDM Modalities and Procedures §31b	OK	The participating Annex I Party is identified (Belgian government).
12. The proposed project activity shall meet the eligibility criteria for small scale CDM project activities set out in § 6 (c) of the Marrakesh Accords and shall not be a debundled component of a larger project activity	Simplified Modalities and Procedures for Small Scale CDM Project Activities §12a,c Decision -/CMP.2, paragraph 28,	OK	Table 2. Section A1.
13. The project design document shall conform with the Small Scale CDM Project Design Document format	Simplified Modalities and Procedures for Small Scale CDM Project Activities, Appendix A	OK	The PDD is in line with the CDM-PDD for small-scale CDM project activities (version 03 of 22 December, 2006).
14. The proposed project activity shall conform to one of the project categories defined for small scale CDM project activities and uses the simplified baseline and monitoring methodology for that project category	Simplified Modalities and Procedures for Small Scale CDM Project Activities §22e	OK	Table 2, Section A.1.3, B and D
15. Comments by local stakeholders are invited, and a summary of these provided	Simplified Modalities and Procedures for Small Scale CDM Project Activities §22b	OK	Table 2, Section G. Local stakeholders have been consulted by the project proponents
16. If required by the host country, an analysis of the environmental impacts of the project activity is carried out and documented.	Simplified Modalities and Procedures for Small	OK	Table 2, Section F

REQUIREMENT	Reference	CONCLUSION	Cross Reference / Comment
	Scale CDM Project Activities §22c		
17. Parties, stakeholders and UNFCCC accredited NGOs have been invited to comment on the validation requirements for minimum 30 days, and the project design document and comments have been made publicly available	Simplified Modalities and Procedures for Small Scale CDM Project Activities §23b,c,d.	OK	The PDD version 03 submitted by ATDER-BL was made publicly available at ICONTEC's climate change website and Parties, stakeholders and NGOs were invited to provide comments through the CDM website during a 30 days period from 2008 11 18 to 2008 12 17. No comments were received.

TABLE 2 REQUIREMENTS CHECKLIST

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Conclusion.	Final Concl.
A. General Description of Project Activity The project design is assessed.					
A.1 Small Scale project activity It is assessed whether the project qualifies as small scale CDM project activity					
A.1.1 Does the project qualify as a small scale CDM project activity as defined in paragraph 6 (c) of decision 17/CP.7 on the modalities and procedures for the CDM (Decision-/CMP.2 (Further guidance relating to the clean development mechanism) revises the definitions for small-scale CDM project activities referred to in paragraph 6 (c) of decision 17/CP.7.)?	/1/	DR, I Onsite	The project qualifies as a small scale project activity because it has less than 15 MW.	OK	OK
A.1.2 The small scale project activity is not a debundled component of a larger project activity?	/1/	DR, I	According to the PDD, the project activity is not a de-bundled component of a larger project activity. It is a single small scale project activity to be conducted by an individual private company for a specific process. No other similar Project Activities have been registered or implemented by any company within 1 km from the project boundary.	OK	OK
A.1.3 Does the proposed project activity conform to one of the project categories defined for small scale CDM project activities?	/1/	DR, I	Yes, the project falls under type AMS-I.D. grid-connected renewable electricity generation like a hydropower plants that supplies renewable electricity to a grid.	OK	OK
A.2 Project Design Validation of project design focuses on the choice of technology and the design documentation of the project.					
A.2.1. Are the project's spatial (geographical) boundaries clearly defined?	/1/	DR, I	Yes, the project activity will be located in the Municipality of El Cuá in Nicaragua.	OK	OK

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Conclusion.	Final Concl.
A.2.2. Are the project's system (components and facilities used to mitigate GHG's) boundaries clearly defined?	/1/	DR, I	Yes, the project boundaries are defined with precision	OK	OK
A.2.3. Does the project design engineering reflect current good practices?	/1/	DR, I	Yes, the project engineering design reflects current good practices through the technology used.	OK	OK
A.2.4. Will the project result in technology transfer to the host country?	/1/	DR	Yes, there is a technology transfer process that produces positive results to the country	OK	OK
A.2.5. Does the project require extensive initial training and maintenance efforts in order to work as intended during the project period? Does the project make provisions for meeting training and maintenance needs?	/1/	DR	During the installation process and initial operation there was the necessary support from technology providers. Regarding the issue of training, the Association works with a local university.	OK	OK
A.3 Contribution to Sustainable Development The project's contribution to sustainable development is assessed.					
A.3.1 Will the project create other environmental or social benefits than GHG emission reductions?	/2/	DR, I	The project created 18 employments during operation and other ones during the construction.	OK	OK
A.3.2 Will the project create any adverse environmental or social effects?	/2/	DR, I	No, it will not.	OK	OK
A.3.3 Is the project in line with sustainable development policies of the host country?	/1/,/2/	DR, I	Yes, it is.	OK	OK
A.3.4 Is the project in line with relevant legislation and plans in the host country?	/1/, 2/	DR, I	Yes, it is.	OK	OK
B. Project Baseline The validation of the project baseline establishes whether the selected baseline methodology is appropriate and whether the selected baseline represents a likely baseline scenario.					
B.1 Baseline Methodology It is assessed whether the project applies an appropriate baseline methodology.					
B.1.1 Is the selected baseline methodology in line with the baseline methodologies provided for the relevant project category?	/1/	DR	The project applies the methodology AMS-I.D. grid-connected renewable electricity generation	OK	OK

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Conclusion.	Final Concl.
B.1.2 Is the baseline methodology applicable to the project being considered?	/1/ /12/	DR	The project complies with the eligibility criteria of the methodology because: It uses the combined margin emission factors of the grid and is calculated using the "Tool to calculate the emission factor for an electricity system" (version 01.1).	OK	OK
B.2 Baseline Determination It is assessed whether the project activity itself is not a likely baseline scenario, and whether the selected baseline represents a likely baseline scenario.					
B.2.1 Is it demonstrated that the project activity itself is not a likely baseline scenario due to the existence of one or more of the following barriers: investment barriers, technology barriers, barriers due to prevailing practice or other barriers	/1/, /12/	DR, I	The project does not belong to the baseline because of the financial barriers it faces. The responsible of the project were asked to give a fully demonstration of early consideration of CDM (CAR 8). Also, the DOE asked for justifications of some criteria and parameters used in the financial analysis (CAR 3).	CAR 8 CAR 3	OK
B.2.2 Is the application of the methodology and the discussion and determination of the chosen baseline transparent and conservative?	/1/, /12/	DR, I	Yes, the application of the methodology and the discussion and determination of the chosen baseline is transparent and conservative.	OK	OK
B.2.3 Are relevant national and/or sectorial policies and circumstances taken into account?	/1/, /12/	DR, I	Yes, the Sectoral policies to discourage the use of fossil fuels (diesel).	OK	OK
B.2.4 Is the baseline selection compatible with the available data?	/1/, /12/	DR, I	Yes, and the data are related to the system of electricity generation in Nicaragua	OK	OK
B.2.5 Does the selected baseline represent the most likely scenario among other possible and/or discussed scenarios?	/1/, /12/	DR, I	Yes, is the most likely scenario	OK	OK
C. Duration of the Project/ Crediting Period It is assessed whether the temporary boundaries of the project are clearly defined.					
C.1.1 Are the project's starting date and operational lifetime clearly defined and reasonable?	/1/	DR	Yes, the starting date of the project activity is November 1, 2007 and the operational lifetime of the	OK	OK

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Conclusion.	Final Concl.
			project is 40 years.		
C.1.2 Is the assumed crediting time clearly defined and reasonable (renewable crediting period of seven years with two possible renewals or fixed crediting period of 10 years with no renewal)?	/1/	DR	Yes, the crediting period has been chosen (renewable 7 years).	OK	OK
D. Monitoring Plan The monitoring plan review aims to establish whether all relevant project aspects deemed necessary to monitor and report reliable emission reductions are properly addressed.					
D.1 Monitoring Methodology It is assessed whether the project applies an appropriate monitoring methodology.					
D.1.1 Is the selected monitoring methodology in line with the monitoring methodologies provided for relevant project category?	/1/ /12/	DR	The project, as redlined according to CAR 1, applies the monitoring methodology AMS-I.D. grid-connected renewable electricity generation	CAR 1	OK
D.1.2 Is the monitoring methodology applicable for this project and is the appropriateness justified?	/1/ /12/	DR	Yes, it is.	CAR 1	OK
D.1.3 Is the application of the monitoring methodology transparent?	/1/ /12/	DR	The data are published by the national body appointed by Nicaragua to consolidate the information of the sector and can be accessed by public entities.	OK	OK
D.1.4 Will the monitoring methodology give opportunity for real measurements of achieved emission reductions?	/1/ /12/	DR	Yes, it will.	OK	OK
D.2 Monitoring of Project Emissions It is established whether the monitoring plan provides for reliable and complete project emission data over time.					
D.2.1 Does the monitoring plan provide for the collection and filing of all relevant data necessary for estimation or measuring the greenhouse gas emissions within the project boundary during the crediting period?	/1/	DR	NA	OK	OK

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Conclusion.	Final Concl.
D.3 Monitoring of Leakage It is assessed whether the monitoring plan provides for reliable and complete leakage data over time.					
D.3.1 Does the monitoring plan provide for the collection and filing of all relevant data necessary for determining leakage?	/1/	DR	No leakage is identified.	OK	OK
D.3.2 Are the choices of leakage indicators reasonable?	/1/	DR	NA	OK	OK
D.3.3 Will it be possible to monitor the specified GHG leakage indicators?	/1/	DR	NA	OK	OK
D.3.4 Will the indicators give opportunity for real measurement of leakage effects?	/1/	DR	NA	OK	OK
D.4 Monitoring of Baseline Emissions It is established whether the monitoring plan provides for reliable and complete project emission data over time.					
D.4.1 Does the monitoring plan provide for the collection and filing of all relevant data necessary for determining baseline emissions during the crediting period?	/1/ /12/ /13/	DR	Yes, it is defined for the project owner and grid operator. The electricity supplied to local consumers directly, if any, shall be monitored as well.	OK	OK
D.4.2 Is the choice of baseline indicators, in particular for baseline emissions, reasonable?	/1/ /12/	DR	The baseline indicators have been chosen in line with the small-scale methodology approved by the CDM EB.		OK
D.4.3 Will it be possible to monitor the specified baseline indicators?	/1/ /12/	DR	Yes, it will	OK	OK
D.4.4 Will the indicators give opportunity for real measurements of baseline emissions?	/1/ /12/	DR	Yes, the indicators give opportunity for real measurements	OK	OK

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Conclusion.	Final Concl.
D.5 Project Management Planning It is checked that project implementation is properly prepared for and that critical arrangements are addressed.					
D.5.1 Is the authority and responsibility of project management clearly described?	/1/ /13/	DR	The authority and management responsibilities have been defined for: - Plant responsible, - Plant operator, There is formally documented.	CAR 4	OK
D.5.1 Is the authority and responsibility for registration, monitoring, measurement and reporting clearly described?	/1/ /13/	DR	This information is summarized in the PDD, and in the procedure for the operational control.	CAR 4	OK
D.5.3 Are procedures for training of monitoring personnel identified?	/1/ /13/	DR	The procedures include the training of monitoring personnel.	CAR 4	OK
D.5.4 Are procedures for emergency preparedness for cases where emergencies can cause unintended emissions identified?	/1/	DR	Yes, they are implemented	CAR 5	OK
D.5.5 Are procedures for calibration of monitoring equipment identified?	/1/	DR	Yes, there are The Measurement equipment in the frontier is calibrated	OK	OK
D.5.6 Are procedures for maintenance of monitoring equipment and installations identified?	/1/	DR	Yes, they are implemented	CAR 5	OK
D.5.7 Are procedures for monitoring, measurements and reporting identified?	/1/	DR	Yes, they are implemented	CAR 5	OK
D.5.8 Are procedures for day-to-day records handling identified (including what records to keep, storage area of records and how to process performance documentation)?	/1/	DR	Yes, they are implemented	CAR 5	OK
D.5.9 Are procedures for dealing with possible monitoring data adjustments and uncertainties identified?	/1/	DR	Yes, they are implemented	CAR 5	OK

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Conclusion.	Final Concl.
D.5.10 Are procedures for internal audits of GHG project compliance with operational requirements where applicable identified?	/1/	DR	Yes, they are implemented	CAR 5	OK
D.5.11 Are procedures for project performance review identified?	/1/	DR	Yes, they are implemented	CAR 5	OK
D.5.12 Are procedures for corrective actions identified?	/1/	DR	Yes, they are implemented	CAR 5	OK
E. Calculation of GHG Emissions by Source It is assessed whether all material GHG emission sources are addressed and how sensitivities and data uncertainties have been addressed to arrive at conservative estimates of projected emission reductions.					
E.1 Project GHG Emissions The validation of ex-ante estimated project GHG emissions focuses on transparency and completeness of calculations.					
E.1.1 Are all aspects related to direct and indirect GHG emissions captured in the project design?	/1/	DR	NA		OK
E.1.2 Have all relevant GHG and sources been evaluated?	/1/	DR	NA		OK
E.1.3 Do the methodologies for calculating project emissions comply with existing good practices?	/1/	DR	NA		OK
E.1.4 Are the calculations documented in a complete manner?	/1/	DR	NA		OK
E.1.5 Have conservative assumptions been used?	/1/	DR	NA		OK
E.1.6 Are uncertainties in the project emissions estimates properly addressed?	/1/	DR	NA		OK

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Conclusion.	Final Concl.
E.2 Leakage It is assessed whether there are leakage effects, i.e. change of emissions which occurs outside the project boundary and which are measurable and attributable to the project, have been properly assessed.					
E.2.1 Are leakage calculation required for the selected project category and if yes, are the relevant leakage effects assessed?	/1/	DR	No leakage is identified		OK
E.2.2 Have these leakage effects been properly accounted for in calculations (If applicable)?			NA		OK
E.2.3 Does the methodology for calculating leakage comply with existing good practice (If applicable)?			NA		OK
E.2.4 Are the calculations documented in a complete and transparent manner (If applicable)?			N/A		OK
E.2.5 Have conservative assumptions been used when calculating leakage (If applicable)?			N/A		OK
E.2.6 Are uncertainties in the leakage estimates properly addressed (If applicable)?			N/A		OK
E.3 Baseline GHG Emissions The validation of ex-ante estimated GHG emissions focuses on transparency and completeness of calculations.					
E.3.1 Are the baseline emission boundaries clearly defined and do they sufficiently cover sources and sinks for baseline emissions?	/1/	DR	Yes, they are defined and sufficiently cover sources and sinks	OK	OK
E.3.2 Are all aspects related to direct and indirect baseline emissions captured in the project design?	/1/	DR	Yes, They are	OK	OK
E.3.3 Have all relevant GHG and sources been evaluated?	/1/	DR	Yes, they have been evaluated.	OK	OK
E.3.4 Do the methodologies for calculating baseline emissions comply with existing good practices?	/1/, /12/ /13/	DR	Yes, They do, after a series of clarification and corrective action requirements and respective reactions of project participant. The methodologies for calculating baseline emissions comply with existing good practices.	CLA 1 CLA 2 CLA 3 CAR 6	OK

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Conclusion.	Final Concl.
				CAR 7	
E.3.5 Are the calculation documented in a complete and transparent manner?	/1/	DR	Yes, they are documented	OK	OK
E.3.6 Have conservative assumptions been used	/1/	DR	Yes, they have been used	OK	OK
E.3.7 Are uncertainties in the baseline emissions estimates properly addressed?	/1/	DR	Yes, they are.	OK	OK
E.4 Emission Reductions Validation of ex-ante estimated emissions.					
E.4.1 Will the project result in fewer GHG emissions than the baseline scenario?	/1/	DR	Yes, It will.	OK	OK
F. Environmental Impacts It is assessed whether environmental impacts of the project are sufficiently addressed.					
F.1.1 Does the host country legislation require analysis of the environmental impacts of the project activity?	/1/	DR, I	No environmental impacts were considered as significant by the local environmental authorities.	OK	OK
F.1.2 Does the project comply with environmental legislation in the host country?	/1/	I	Yes, it does.	OK	OK
F.1.3 Will the project create any adverse environmental effects?	/1/	I	No adverse environmental effects were identified by the environmental authority.	OK	OK
F.1.4 Have environmental impacts been identified and addressed in the PDD?	/1/	DR, I	No, It was not necessary for the type of project	OK	OK
G. Stakeholder Comments Validation of the local stakeholder consultation process.					
G.1.1 Have relevant stakeholders been consulted?	/1/ /13/	DR	An informational meeting was carried out at the municipality of El Cuá, to inform local stakeholders about the project activity. The local stakeholders who attended the meeting were: - Regional Environmental Authority, - Community Action Boards, - Regional communities,	OK	OK

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Conclusion.	Final Concl.
			No negative comments were received.		
G.1.2 Have appropriate media been used to invite comments by local stakeholders?	/1/ /13/	DR	Information about the event was spread through information boards and leaders of the community	OK	OK
G.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?	/1/ /13/	DR	It is not required for the given size of the project	OK	OK
G.1.4 Is a summary of the stakeholder comments received /provided?	/1/ /13/	DR	Yes, the comments received from the stakeholders are summarized in the PDD.	OK	OK
G.1.5 Has due account been taken of any stakeholder comments received?	/1/ /13/	DR	No adverse comments were received from local stakeholders	OK	OK

MoV: Means of verification DR: Document review I: interview

VALIDATION PROTOCOL TABLE 3: RESOLUTION OF CORRECTIVE ACTION AND REQUEST FOR CLARIFICATION

Report clarifications and corrective action requests	Ref. to checklist question in table 2	Summary of project owner response	Validation conclusion
CAR 1 The original name of the activity project was "El Bote Small Hydroelectric Plant and Rural Electrification project". In fact, in the initial version of PDD it is established that "The construction includes the **El Bote** hydro plant with 940 kW of installed capacity, and the construction of primary distribution electrical lines that interconnect the small hydro plant of **El Bote** with the town of El Cuá, with the pre-existing small isolated electrical grid of the town of San José de Bocay, and with the national grid. Also the construction of secondary lines to provide approximately 2,500 families with electricity". The name of the CDM project activity should be clarified.	D.1.1 D.1.2	Project Owner Response: Project participants change the name of the project, excluding transmission and distribution. In this way the proposed methodology is fully applicable.	Validation Team Response: The explanation it is consider complete. DNA sent to the DOE a copy of new letter with the clarification of the name of the project activity (2009 08 28). Validation Team Conclusion: CLOSED

VALIDATION PROTOCOL TABLE 3: RESOLUTION OF CORRECTIVE ACTION AND REQUEST FOR CLARIFICATION

Report clarifications and corrective action requests	Ref. to checklist question in table 2	Summary of project owner response	Validation conclusion
CAR 2 In the view of the DOE, if the objective of the Project is "to generate hydroelectricity for sale to the local communities of El Cuá and San José de Bocay municipalities, with any excess power to be sold to the national grid", the construction of the primary distribution electrical lines that interconnect the small hydro plant of El Bote with the national grid should not be part of the Project. This statement is supported by the fact that those primary distribution electrical lines "permitted intertie and service to the local communities with electricity purchased from the national grid during a period of approximately 2 years before the El Bote hydroelectric plant became operational". The previous existence of these circuits makes possible to have electricity purchased from the national grid as the alternative to the El Bote hydro plant project. Neither	D.1.1 D.1.2	Project Owner Response: The construction of primary and secondary distribution electrical lines was mentioned in the PDD as a way to explain the history of the project and emphasize the social benefits that the project is providing to the local rural communities which are being electrified. However, in the project financial analysis, included in the Annexes of the PDD, showing return on investment with, and without carbon credits, the costs of construction of the electric grids were NOT included, only the investment costs of the hydroelectric plant, because the MDL project consists only of the hydroelectric plant. To avoid misunderstandings, in the final version of the PDD we will call the project "El Bote Small Hydroelectric Plant Project", not including mention of rural electrification in the project title. It is true that construction of the primary distribution lines allowed electrification of the local communities with energy purchased from the National grid, which is now being displaced by the clean energy from the hydroelectric plant.	Validation Team Response: The explanation it is considered complete. Validation Team Conclusion: CLOSED

VALIDATION PROTOCOL TABLE 3: RESOLUTION OF CORRECTIVE ACTION AND REQUEST FOR CLARIFICATION

Report clarifications and corrective action requests	Ref. to checklist question in table 2	Summary of project owner response	Validation conclusion
the secondary circuits should be part of the project, as they are necessary to provide a number of families with electricity from any source. From this view, baseline and monitoring methodology proposed (**Type I: Renewable Energy Projects. Category D: Renewable electricity generation for a grid. AMS-I.D)** were not properly applicable.			

VALIDATION PROTOCOL TABLE 3: RESOLUTION OF CORRECTIVE ACTION AND REQUEST FOR CLARIFICATION

Report clarifications and corrective action requests	Ref. to checklist question in table 2	Summary of project owner response	Validation conclusion
CAR 3 Explanations about the criteria to assess the following parameters used in the financial analysis of Annex 5 Additionality were requested: - Net annual generation output - Average consumption - Annual growth rate projected - Sales in the local grid - Sales in the national grid - Market prices of CERs Also it was founded necessary to clarify and to correct the results on B/C ratio, comparing the cases WITH and WITHOUT income from CERs sales	B.2.1	Project Owner Response: **- Net annual generation output** The estimation of annual generation output of the El Bote hydroelectric plant is based first on the theoretical output defined by the net head of the hydro plant and the volume flow of water available in the river. I attach the Excel file that shows the calculation of available average monthly water flows in the El Bote river, average monthly power that can be generated from these flows, and average monthly energy which is the average power multiplied by the hours of the month. From this total available energy, we deduct 4% of time that the plant may be out of service for maintenance purposes. This gives us 5,802.31 MWh/year as the theoretical plant output. We have rounded this to 5,800 MWh for the financial projection. Then there is a difficulty in the rural areas of Nicaragua, which probably does not exist or is not taken into account in a developed industrial country, which is that the circuit of the national electric grid (circuit ETM-4030 from the El Tuma substation as seen on the single-line diagram) is not a very reliable circuit.	Validation Team Response: The explanation it is consider complete. Validation Team Conclusion: CLOSED

VALIDATION PROTOCOL TABLE 3: RESOLUTION OF CORRECTIVE ACTION AND REQUEST FOR CLARIFICATION

Report clarifications and corrective action requests	Ref. to checklist question in table 2	Summary of project owner response	Validation conclusion
		There are a lot of interruptions and blackouts on this circuit. Hence El Bote cannot generate all the energy that is theoretically available, because we cannot inject energy into the national grid when the circuit ETM-4030 is down (de-energized); to inject energy through the intertie point (where the SIMEC meters are located on the single-line diagram) and sell to DISNORTE (the neighboring distribution company) the El Bote generators must sincronize with the national grid, and this is not possible when circuit ETM-4030 is in a blackout. This is a very serious problem for this particular renewable energy project, and the reduction in energy generation for this reason is 20% per year. Hence we deduct 20% from the theoretically available generation of 5,800 MWH/year, giving us 4,640 MWH/year of real energy generation output from the El Bote hydro plant. **- Average consumption** The "average consumption" of 48.0 kwh/month x 12 = 0.576 MWh/year, is the average consumption, per family, of the customers in our concession area (in the town of El Cua and the electrified communities and farms). This figure is	

VALIDATION PROTOCOL TABLE 3: RESOLUTION OF CORRECTIVE ACTION AND REQUEST FOR CLARIFICATION

Report clarifications and corrective action requests	Ref. to checklist question in table 2	Summary of project owner response	Validation conclusion
		derived from the statistics of our commercial office, and is exact because we have been selling electricity to these customers for three years, hence we have a lot of sales statistics. This is a typical figure for rural areas of Nicaragua. Note that the houses do not use any heating, there are no clothes washers and dryers nor other major appliances so common in developed economies. The importance of this figure for the financial projection of the project is that the demand in the local grid tends to increase over time, hence more of the energy from El Bote will gradually be consumed in the local grid, while less "surplus" will be available for sale to the neighboring distributor of the national grid. Hence project income tends to increase gradually over time, due to the fact that the price of sale to the local customers is higher than the price we get when we sell the surplus energy to the national grid. **- Annual growth rate projected** This is the growth rate of energy consumption in the local grid, based on population growth of 3% which is a statistic obtained from the census information of the national statistics office of the Nicaraguan government. This is	

VALIDATION PROTOCOL TABLE 3: RESOLUTION OF CORRECTIVE ACTION AND REQUEST FOR CLARIFICATION

Report clarifications and corrective action requests	Ref. to checklist question in table 2	Summary of project owner response	Validation conclusion
		the overall growth rate of electric consumption historically observed in the Nicaraguan national grid. If we are able to advance with the dream of rural electrification in the impact area of the project, the annual growth in energy consumption in the local grid could be higher than 3%, however, since financing for the rural electrification projects is being sought, but has not been obtained yet, we use the conservative estimate of electricity consumption growth at the population growth rate of 3% annually for the financial projection. - Sales in the local grid - Sales in the national grid As explained in the paragraphs above, part of the energy is sold in the local service area (concession area) at one price, and the rest is sold to the national grid (to the neighboring distributor, DISNORTE) at a lower price. **- Market prices of CERs** We will not know the price we can obtain from the El Bote CERs until we negotiate and sign a contract with a buyer. For the purpose of the financial projections with and without sales of CERs, we had to	

VALIDATION PROTOCOL TABLE 3: RESOLUTION OF CORRECTIVE ACTION AND REQUEST FOR CLARIFICATION

Report clarifications and corrective action requests	Ref. to checklist question in table 2	Summary of project owner response	Validation conclusion
		assume a price, and we have assumed the value of US$ 20/ton CO_2 equivalent. This is based in a reasonable manner on conversations with people involved in the carbon credits market, for example the government functionaries who work at the CDM office in Managua, but it is only an assumption. B/C ratio I have checked the calculation of the B/C ratio on both of the financial projections. We had an error in the row of values selected for the TOTAL EXPENDITURES in the B/C calculation. I have corrected the error. I attach here the corrected Financial Projections. The B/C for the case without sale of CERs is 0.723, whereas the B/C ratio with sale of CERs is 1.004. I will change the values of the B/C indicator also in the text of Annex 5 to reflect these values.	
CAR 4 The authority and responsibility of project management is not described. The authority and responsibility for	D.5.1 D.5.2 D.5.3	Project Owner Response: Responsibility for downloading the data from the energy meter at the exit from the plant substation every month and saving the data in a secure manner will be	Validation Team Response: The explanation it is consider complete. Validation Team Conclusion:

VALIDATION PROTOCOL TABLE 3: RESOLUTION OF CORRECTIVE ACTION AND REQUEST FOR CLARIFICATION

Report clarifications and corrective action requests	Ref. to checklist question in table 2	Summary of project owner response	Validation conclusion
registration, monitoring, measurement and reporting are not clearly described There are not procedures identified for training of monitoring personnel		assigned to the ATDER-BL Grid Operator. The ATDER-BL Grid Operator and other technical personnel of ATDER-BL in El Cuá already have experience in installing, maintaining and managing commercial electricity metering in 24.9 kv. ATDER-BL personnel already have the technical knowledge required to select appropriate meters, compatible instrument transformers, to use meter download software, optical cable, laptop, data saving, etc. Calibration of El Bote substation metering installation will be done by requesting audit service from the authorized auditors of the National Load Dispatch Center in Managua. According to normal procedure in Nicaragua, all commercial electricity metering stations should be checked for calibration accuracy and proper operation once a year. Note that the power plant operators in El Bote presently annotate manually the power output and other plant operational parameters every 30 minutes, 24 hours a day. They also download a data register including power output of each generator once every 12 hours. The plant metering is at generating voltage (480 volts). This data from the power plant will be contrasted monthly, by the Grid Operator,	CLOSED

VALIDATION PROTOCOL TABLE 3: RESOLUTION OF CORRECTIVE ACTION AND REQUEST FOR CLARIFICATION

Report clarifications and corrective action requests	Ref. to checklist question in table 2	Summary of project owner response	Validation conclusion
		with the data from the meters in 24.9 kv that will be installed at the exit of the El Bote hydro plant substation.	
CAR 5 There are not procedures identified for day-to-day records handling (including what records to keep, storage area for records and how to process performance documentation). There are not procedures identified for corrective actions. Neither there are procedures identified for maintenance of monitoring equipment and installations	D5.5 to 5.12	Project Owner Response: Procedures for day-to-day management of the records of the plant generating data do exist, but we neglected to describe these procedures in the PDD. Manually annotated plant readings are taken every half hour by the power plant operators, and are entered daily into Excel files by the Head Operator of the day shift and the night shift at the power plant. All operational anomalies such as plant trips off-line are fully documented with a sheet of data taken from the generator protection relays. A summary of this type of operational information is also digitized daily. The paper originals are kept in a clean manner in folders at the power plant. The digital version of all operational information, plus the data downloaded every 12 hours from the plant instrument panel, is sent in USB memory to the ATDER-BL central office in El Cúa at the end of each month, where the ATDER-BL Grid Operator compares this information from the hydro plant with the data of	Validation Team Response: The explanation and implementation are considered complete. Validation Team Conclusion: CLOSED

VALIDATION PROTOCOL TABLE 3: RESOLUTION OF CORRECTIVE ACTION AND REQUEST FOR CLARIFICATION

Report clarifications and corrective action requests	Ref. to checklist question in table 2	Summary of project owner response	Validation conclusion
		energy sold to the local customers and to the national grid Reports of the El Bote generation data will be submitted in accordance with the requirements of the Carbon Credits purchaser, and any pertinent CDM requirements.	
CAR 6 In the application of step 3 of the tool to determine the combined emission factor of the grid, calculation of Operating Margin component requires to be corrected in order to be a generation-weighted average of the last three years, as methodology request. In the application of step 3 of the methodology to determine the combined emission factor of the grid, the sources of heat content and fuel CO_2 emission factor of fuels data, used for calculations, must be specified.	E.3.4	Project Owner Response: The calculation was corrected and the PDD modified consequently.	Validation Team Response: The new calculation of emission reductions was found according to the methodology. Validation Team Conclusion: CLOSED
CAR 7 In the application of step 4 of the methodology to determine the combined	E.3.4	Project Owner Response: The calculation was corrected and the PDD modified consequently. The redaction of the respective	Validation Team Response: The explanation it is consider complete. The new calculation of emission reduction was made.

VALIDATION PROTOCOL TABLE 3: RESOLUTION OF CORRECTIVE ACTION AND REQUEST FOR CLARIFICATION

Report clarifications and corrective action requests	Ref. to checklist question in table 2	Summary of project owner response	Validation conclusion
emission factor of the grid, it was necessary to require a correction to the application of formula to calculate Build Margin component of the grid emission factor, regarding the correct application of the data vintage criterion. In the application of step 4 of the methodology to determine the combined emission factor of the grid, the DOE required clarification about the option adopted to conform the sample group of power units to calculate the Build Margin.		paragraphs of the PDD was modified to leave clear that Option a) was adopted It remained clear that option was used to conform the sample group of power units to calculate the Build Margin. Justification for this decision also was given.	Validation Team Conclusion: CLOSED
CAR 8 Early CDM consideration must be fully demonstrated.	B.2.1	Project Owner Response: Additional Paragraph A.4.6 in the PDD, containing explanation of demonstration of early CDM consideration of the activity project. And additional documentation was including in the Annex 7 of the last version of the PDD.	Validation Team Response: The explanation it is consider complete. Validation Team Conclusion: CLOSED
CLA 1 In the application of step 1 of the methodology to determine the combined emission factor of the grid, the relevant Project Electricity system must be explained.	E.3.4	Project Owner Response: The relevant Project Electricity System is the entire national grid of Nicaragua. In this framework it was identified that the extension of local grids with electricity supplied by the national grid (consuming a mix of fuels) is the project scenario alternative. This is the traditional solution adopted in other rural areas	Validation Team Response: The explanation it is consider complete. Validation Team Conclusion: CLOSED

VALIDATION PROTOCOL TABLE 3: RESOLUTION OF CORRECTIVE ACTION AND REQUEST FOR CLARIFICATION

Report clarifications and corrective action requests	Ref. to checklist question in table 2	Summary of project owner response	Validation conclusion
		of Nicaragua, so it was assumed that this situation is consistent with current laws and regulations.	
CLA 2 In the application of step 4 of the methodology to determine the combined emission factor of the grid, Option 1 of vintage of data to calculate the Build Margin was required to be justified.	E.3.4	Project Owner Response: The justification was given and consigned in the PDD.	Validation Team Response: The explanation it is consider complete. Validation Team Conclusion: CLOSED
CLA 3 Project participant have to update the national register of the project in from of the MARENA due the project have different name to the original.	Kyoto protocol art 12.2	Project Owner Response: Project participant request to the DNA update letter in order to change the name in the national register.	Validation Team Response: The explanation it is consider complete. Validation Team Conclusion: CLOSED

Annex 2
CV´s of Verification Team

Lead Auditor
Eng. Juan Alberto Gracia

Chemical Engineer. National University of Colombia (1991)
Environmental Management Specialist – Libre University (Colombia)
DQS and EOQ Register of Environmental Auditor (Germany)

1992 – 1998

Responsible for Standardization Technical Committees in the areas of chemical products, paint products, food products (fresh and processed); Quality air test, quality water test, quality soil test, solid waste management, hazard material, Environmental Management systems (ISO 14000 series).

1998 - 2006

Administrative and technical management of Certification Staff for supporting to Department Director, especially in Environmental Certification ISO 14001 services.

Qualify as a Quality Lead auditor and Environmental Lead auditor; besides, ISO 9001 and ISO 14001 audits as lead auditor.

Performing of more than 200 audits of ISO 9001 and 150 audits of ISO 14001 in chemical, food, oil, petrochemical industrial sectors and waste disposal in landfill.

2003 - 2006

Coordination, structuring, implementation and criteria definition related to the service of validation and verification of CDM project activities.

Fellowship in Prototype Carbon Fund of World Bank about CDM procedures and methodologies (Washington and Geneva).

Conduction of validation and verification audits, being part of the DNV audit team, of the CDM Project Activities for: Río Amoya, La Vuelta y La Herradura, and Jepirachi.

2006 - 2009

Conduction as a GHG Leader auditor of:

- Verification of three verification periods of Santa Ana Hydroelectric plant project
- Verification of Río Azul landfill gas project
- Verification of two verification periods of La Vuelta and la Herradura Hydroelectric Project
- Verification of Rio Amazon Woods residues power plant
- Verification of Cristalino small hydroelectric power plant project
- Verification of Faxinal small hydro project in Faxinal dos Guedes

- Verification of two verification periods of Agua Fresca Multipurpose and Environmental Services Project

Sectoral Specialist
Eng. Fernando Gómez Gómez

Electrical Engineer. Universidad Nacional of Colombia (1967)
Master of Power Systems - Instituto Tecnológico de Monterrey (Mexico) (1970)
EAFIT Financial Specialist (Colombia) (1984)

ECONOMETRÍA S.S. - Technical Advisory
Technical Advisory to Unidad de Planeación Minero Energética to incorporate international electrical interconnections into the Colombian electrical planning carried by UPME, October 2002 - March 2003 (including use of SUPEROLADE, MPODE, NEPLAN and REAL models).

ECOENERGIA S.S. ESP - Founding Member and Manager
Management of private projects of generation, distribution and commercialization of power.

Unidad de Planeación Minero Energética - UPME-: Elaboration of Catalog of Generation Projects for National Energy Plan, October 1996 - October 1997.

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

Development of competent rate models, October 1994 - March 1995

CORELCA: Determination of marginal costs and development of innovative rate structures for power generation companies and big industrial customers, October 1994 - March 1995.

CORELCA: Development and application of rate models to prepare proposal on power sale in the wholesale market, July 1995 - September 1995.

EMPRESA DE ENERGIA DE BOGOTÁ - EEB

Positions:

Chief of the Department of generation planning, interconnection and sub-transmission, 1978 - 1979.
Chief of Electric Planning Division, 1979 - 1986.
Assistant for Technical Sub-management, 1986 - 1987
Chief of Special Projects Division, 1987
Chief of expansion and Development Division, 1987 - 1994
Management Advisor, 1994

INTERCONEXIÓN ELÉCTRICA S.A - ISA
1976 - 1978
Engineer Specialist in electric planning Research and development of models for planning and operation of electric systems.

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

Experience in CDM activities:

2006 – 2009

Participation as an Energy expert in:

- Verification of three verification periods of Santa Ana Hydroelectric plant project
- Verification of two verification of La Vuelta and la Herradura Hydroelectric Project
- Verification of Rio Amazon Woods residues power plant, Brazil
- Verification of Cristalino small hydroelectric power plant project, Brazil
- Verification of Faxinal small hydro project in Faxinal dos Guedes, Brazil
- Verification of two verification periods of Agua Fresca Multipurpose and Environmental Services Project