

**VALIDATION OF THE PROJECT:  
SHP ITAGUAÇU CDM PROJECT (JUN 1146), BRAZIL**

**ITAGUAÇU ENERGIA S/A AND CARBOTRADER  
ASSESSORIA E CONSULTORIA EM ENERGIA EIRELI  
(BRAZIL)**

REPORT No. CDM-VAL12-015-00

SEPTEMBER 2012

# VALIDATION REPORT VVS



Date of first issue:	29/08/2012	Project No.:	Pending
Approved by:	Erika Urrego ICONTEC CDM reviewer Cristian Grisales ICONTEC technical reviewer	Organizational unit:	Instituto Colombiano de Normas Técnicas y Certificación – ICONTEC Carrera 37 No.52-95 Bogotá - Colombia
Client:	Itaguaçu Energia S/A and Carbotrader Assessoria e Consultoria em Energia Eireli	Client ref.:	12-015

## Summary:

ICONTEC has performed the validation of the project: SHP Itaguaçu CDM Project (JUN 1146), Brazil 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.

The proposed project activity under validation process is based on methodology AMS-I.D.-Grid connected renewable electricity generation –Version 17. The project consists on the development of a new small hydroelectric power plant that takes advantage of the waters of the Pitanga River, in the Paraná State, Brazil. The water flow will allow an installed capacity of 14.22 MW and annual supply of electricity to the grid of 74,578.5 MWh. Electricity will be transmitted through a transmission line of 34.5 kV which joins the SHP Itaguaçu plant with the Brazilian SIN by the Pitanga substation.

The validation process consisted of the following three phases: i) a desk review of the project design documents, ii) follow up interviews with project stakeholders and iii) the resolution of outstanding issues and the issuance of the final validation report and opinion. The first output of the validation process was the list of requests presented in Table 2 of Appendix A.

In summary, it is ICONTEC's opinion that the project SHP Itaguaçu CDM Project (JUN 1146), Brazil, as described in the version 2 of the project design document meets all relevant UNFCCC requirements for the CDM and all relevant host country criteria and correctly applies the baseline and monitoring methodology AMS-I.D. Hence, ICONTEC requests the registration of the project as CDM project activity.

Report No:	CDM-VAL12-015-00	Subject Group:	1	Indexing terms:
Report title:	Validation of the project: SHP Itaguaçu CDM Project (JUN1146), Brazil			Climate Change; Kyoto Protocol; Validation; Clean Development Mechanism

Work carried out by:	Eng. Ana Isabel Aubad (Lead Auditor) Eng. Fernando Gomez (Sectoral Technical and Financial Expert)		
Work verified by:	Erika Urrego ICONTEC CDM reviewer Cristian Grisales ICONTEC technical reviewer	<input checked="" type="checkbox"/> No distribution without permission from the Client or responsible organizational unit  <input type="checkbox"/> Limited distribution  <input type="checkbox"/> Unrestricted distribution	
Date of this revision:	06/09/2012		
Rev. No.:	00		
Number of pages:	56		

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

## Abbreviations

CAR	Corrective Action Request
CDM	Clean Development Mechanism
CERs	Certified emission reductions
CL	Clarification Request
CO <sub>2</sub>	Carbon Dioxide
CO <sub>2</sub> eq	Carbon dioxide equivalent
DNA	Designated National Authority
DOE	Designated Operational Entity
DR	Document Review
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
PDD	Project Design Document
UNFCCC	United Nations Framework Convention for Climate Change
ANEEL	National Electric Energy Agency from Brazil
Copel	Energy Company from the Parana State (Companhia Paranaense de Energia)
EIA	Environmental Impact Assessment
IAP	Instituto Ambiental do Paraná (Paraná Environmental Agency)
SIN	National Interconnected System of Brazil
SHP	Small Hydro Power
ONS	The National Grid Operator
CCEE	Electric Power Commercialization Chamber
LP	Preliminary License (environmental permit)
LI	Installation License (environmental permit)
CIMGC	Inter-Ministry Commission on Global Climate Change

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## 1. INTRODUCTION

*Itaguaçu Energia S/A and Carbotrader Assessoria e Consultoria em Energia Eireli have commissioned ICONTEC to perform the Validation of SHP Itaguaçu CDM Project (JUN1146), Brazil (hereafter called “the project”).*

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

*According to the documentation of the project activity, the project consists on the development of a new small hydroelectric power plant that takes advantage of the waters of the Pitanga River, in the Paraná State, Brazil. The water flow will allow an installed capacity of 14.22 MW and annual supply of electricity to the grid of 74,578.5 MWh. Electricity will be transmitted through a transmission line of 34.5 kV which joins the SHP Itaguaçu plant with the Brazilian SIN by the Pitanga substation.*

### 1.1 OBJECTIVE

*The purpose of a validation is to have the opinion of an independent third party in order to assess the project’s design; in particular, the project’s baseline, monitoring plan, and the project’s compliance with relevant UNFCCC criteria. Host Party’s criteria are validated in order to confirm that the project design, as documented, is sound 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 its intended generation of certified emission reductions (CERs).*

### 1.2 SCOPE

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

- *UNFCCC criteria: The Kyoto Protocol Article 12 criteria, 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 Designated National Authority or project agreements between 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 standard) focused on the identification of significant risks for CER generation, and verification of the mitigation.*

*The validation does not signify the providing of any consulting for 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

ICONTEC had the opportunity to verify the following description in the on-site visit to the project:

**Project Participants:** Itaguaçu Energia S/A (private) and Carbotrader Assessoria e Consultoria em Energia Eireli (private)

ICONTEC review during the validation the companies' legal documentation and the home page of the Brazilian Chamber of Commerce /4/.

**Title of project activity:** SHP Itaguaçu CDM Project (JUN1146), Brazil

**Location of the project activity:** The Hydroelectric Plant is located in the Pintaga River (rural area) in the Municipality of Pitanga, South Region of the Paraná State, Brazil.

The geographical coordinates are:  
24°41'37.03" S 51°31'08.76" W or  
Latitude: -24.693619 and Longitude: -51.5191.

ICONTEC verified the location through the ICONTEC's GPS /20/ and the Environmental Installation License /9/.

**Methodology :** Methodology AMS-I.D.-Grid connected renewable electricity generation -Version 17. /18/  
This methodology is used in combination with the "Tool to calculate the emission factor for an electricity system" ver. 02.2.1, EB 63. /18/

**Project's crediting period:** 7 years and 0 months, renewable.

**Estimated amount of emission reductions over the chosen crediting period:** 103,725 tonnes CO<sub>2</sub>e

The Project consists of a new hydroelectric power plant to take advantage of the water of the Pitanga River with a design flow of 12.18 m<sup>3</sup>/s, a reservoir area of 0.340 Km<sup>2</sup>, and a installed power of 14.22 MW /10/. According to the Brazilian Agency ANEEL/12/, the project is considered a small hydroelectric Power Plant, because the reservoir is less than 3 Km<sup>2</sup> ("run of river") and the generation capacity is in the range of 1 to 30 MW.

ICONTEC confirmed through the document review process that the install capacity quoted in PDD (14.22MW) will be the installed capacity of the generator for renewable electricity generating units that involve turbine-generator systems, in accordance with PS, paragraph 82 (a).

*The Project diverts flow from the Pitanga River and conveys the diverted flow through a conveyance canal to a forebay and then through a penstock to a powerhouse equipped with two identical Francis turbine units. The powerhouse tailrace discharges back to the Pitanga River. The net electricity supplied by the project activity to the Brazilian grid will be measured by a commercial measurement system installed in the Pitanga substation located at the interconnection point to the national grid (which belongs to Copel /17/). The electricity will be transmitted through a transmission line of 34.5 kV with a length of 34.7 kms. ICONTEC asked PP to include a better description of the electric connection inside PDD (See CL3, Table A.2, Annex A). The finding was closed based on the PDD version 2.*

*The description of the technology to be applied provides transparent information to evaluate its impact on the greenhouse gas balance. The credibility of this information has been validated by reviewing the technical documentation of the proposed project activity including, inter alia: project description sent to ANEEL /13.11/, line diagram from Copel /5/, the authorizations emitted by ANEEL /6/, the environmental licenses /9/ and the EIA /8/.*

*During onsite visit, ICONTEC verified that the project activity construction is at 60% completion, in accordance with the project schedule presented by PP /7/. ICONTEC also confirmed that the start of SHP construction was the first May 2011. The PP estimates the January 31<sup>st</sup> 2013 as the date of start of the commercial operation.*

*The baseline scenario is the electricity delivered to the grid by the project activity that otherwise would have been generated by the operation of grid-connected power plants or by the addition of new generation sources. The baseline of the proposed project activity is further validated in section 3.4 of this report. With respect to the contribution of the project in the greenhouse gases emissions mitigation (GHG), the project activity reduces the emissions of these gases avoiding the entrance in operation of thermoelectric units (to the Brazilian SIN) that burn fossil fuel in its operation.*

*During the construction of the hydroelectric power plant, around 100 new jobs have been generated. For the operation phase, the PP considers that around 6 permanent jobs will be required (plus the external maintenance contracts).*

*The GHG project considered can be classified as a CDM project in Sectoral Scope 1, Energy industries (renewable/non-renewable sources), according to the List of Sectoral Scopes of UNFCCC. The project activity is Type (i) “renewable energy project activities with a maximum output capacity equivalent to up to 15 megawatts”, as indicated by the manufacturer of the equipment/10/. ICONTEC confirmed that the proposed small-scale project activity is not a debundled component of a large-scale project activity, based on the Guidelines on assessment of de-bundling for SSC project activities (version 3)/18/.*

*ICONTEC verified that the project start date is December 12th/ 2010, when the turbines and hydro mechanicals equipments contracts were signed /10/. The expected operational lifetime of project activity is 30 years, according to the technical documentation reviewed by ICONTEC during on site visit /10/. ICONTEC also confirmed, through these contracts, that the technology and equipment to be installed for the project activity, will be manufactured in Brazil.*



*The starting date of the crediting period is expected on February 1st/ 2013, based on the project schedule /7/. A CAR (CAR 5, Annex A, Table A.2) was raised in order to clarify the date based on the documentation found out by ICONTEC during the on site visit. The finding was closed.*

*ICONTEC confirmed that the validation report compliances the “Guidelines for Completing the Project Design Document Form for Small-Scale CDM Project Activities (Version 01.0)”.*

## **2. METHODOLOGY**

*The validation consists of the following three phases:*

- i) A desk review of the project design documents*
- ii) Follow up interviews with project 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, verification and certification audits of CDM project activities (which, in turn, are based on the validation and verification manual) focused on the identification of significant risks for CER generation, as well as the verification of the contribution to climate change 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 Validation of SHP Itaguaçu CDM Project (JUN1146), Brazil is enclosed in Annex A (Table A.1) of this report.*

*Findings established during the validation can be seen 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), Forward action request (FAR) or a Clarifications Request (CL).*

*Corrective action requests (CAR) are issued, where:*

- i) The project participants have made mistakes which directly influence the ability of the project activity to achieve real, measurable and additional emission reductions;*
- ii) The CDM requirements have not been met; or*
- iii) There is a risk that emission reductions cannot be monitored or calculated*

*A Forward Action Request (FAR) is made to highlight issues related to project implementation that will require review during the next verification of the project activity.*

*A Clarification (CL) is required where information is insufficient, or not clear enough to establish whether a requirement is met.*

## 2.1 FOLLOW UP INTERVIEWS

The site visit took place from 15/08/2012 to 17/08/2012. The site visit included a tour of the physical project site, including all under construction infrastructure of the hydroelectric power plant. ICONTEC also visited the administration office where the personal was interviewed and all documentation related to the project was presented to ICONTEC validation team.

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

**Table 1. Follow up Interview**

DATE	PLACE	INTERVIEW DELEGATE	ORGANIZATION	INTERVIEW TOPICS
15-17/08/2012	SHP Itaguaçu's office and plant	Arthur Moraes PDD Consultant	Carbotrader Assessoria e Consultoria em Energia Eireli	Approval, Participation, Project Description, Baseline scenario and monitoring methodology,
15-17/08/2012	SHP Itaguaçu's office and plant	Walter Camargo Project Consultant	CORRECTO ORGANIZAÇÃO CONTÁBIL LTDA. /17/ (Company contracted by Itaguaçu Energia S/A to manage the plant construction and operation)	Additionality, Monitoring Plan, Sustainable development, Local Stakeholder consultation, Environmental impacts.
16/08/2012	SHP Itaguaçu's office and plant	Marcos A. Lastrenski Director-Vice president	Itaguaçu Energia S/A	Project Description, Sustainable development, Local Stakeholder consultation, Environmental impacts, Additionality
16/08/2012	Copel Pitanga Substation	Carlos A.G. de Acevedo Copel Technician	Copel /17/	Project Description, Grid connection point, Monitoring plan
16/08/2012	SHP Itaguaçu's office and plant	Reginaldo Santa Pereira Operacional Manager	Itaguaçu Energia S/A	Project Description
16/08/2012	SHP Itaguaçu's office and plant	Fabio Luciano Angeluci Supervisor	Itaguaçu Energia S/A	Project Description

The validation process employed standard auditing techniques and undertook necessary cross-checks and follow-up actions to ascertain the correctness of the information.

## 2.2 RESOLUTION OF CLARIFICATION AND CORRECTIVE ACTION REQUESTS

*Corrective action and clarification requests raised by ICONTEC, presented to the project participants were resolved through communication and meetings between PP and ICONTEC. 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 A.2.).*

*Since modifications to the project design document were necessary to resolve ICONTEC's concerns, the client decided to review the PDD and re-submit corrected version of the PDD. After the period of public consultation (from 06/07/2012 to 04/08/2012) and after reviewing the last version of the PDD (version 2, 20/08/2012), ICONTEC issued this validation report and opinion.*

## 2.3 INTERNAL QUALITY CONTROL

*This report that includes the validation findings underwent a technical review before being submitted to the project participant(s).*

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

## 2.4 VALIDATION TEAM

*The validation team consists of the following personnel:*

**Table 2. Validation team**

<b>ROLE/QUALIFICATION</b>	<b>LAST NAME</b>	<b>FIRST NAME</b>	<b>COUNTRY</b>
Lead Auditor	Aubad	Ana Isabel	Colombia
Sectoral and financial expert	Gomez	Fernando	Colombia
CDM Reviewer	Erika	Urrego	Colombia
Technical Reviewer (Sector 1)	Cristian	Grisales	Colombia

*The validation team is qualified in accordance with ICONTEC qualification scheme for CDM validation and verification (See in the Annex B the CVs).*

### **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.*

#### **3.2 GENERAL REQUIREMENTS**

##### **3.2.1 APPROVAL AND AUTHORIZATION**

The next sentence is indicated by the Interministerial Commission on Global Climate Change (Comissão Interministerial de Mudança Global do Clima – CIMGC): “Prior to the submission of the Project Design Document and the Validation Report to the CDM Executive Board, the Project will have to receive the written approval of voluntary participation from the DNA of Brazil, including the confirmation that the Project assists the country in achieving sustainable development” (Manual for Submitting CDM Projects to the Interministerial Commission on Global Climate Change, Version 2 , July 1, 2008).

The voluntary participation and contribution to sustainable development was approved through a Letter from the Designated National Authority (CIMGC) after the revision and approval of the Validation Report.

The project participants of the activity project are: Itaguaçu Energia S/A and Carbotrader Assessoria e Consultoria em Energia Eireli.

The host country meets all participation requirements, and the Designated National Authority of the host country has approved the project with the letter of approval describing as follows:

**Table 3. Approval letter**

Date of issue:	23-11-2012			
Description:	The president of the Interministerial Commission on Global Climate Change, the Designated Authority for the Clean Development Mechanism of Brazil, under the Kyoto Protocol through of the letter of approval confirmed that the project contributes to the sustainable development of the country.			
Supporting documentation (if it is applicable):	LoA_pch_itaguacu_eng (See Annex B)			
Date of ICONTEC reception:	28-11-2012			
Entity that sent the letter to ICONTEC:	Project participants	Directly from the DNA		
	X			
Means of validation employed to assess the authenticity:	The letter of approval was issued according with the procedures of the Interministerial Commission on Global Climate Change of the DNA Brazilian.			
Additional specification (if it is applicable):		YES	NO	Version number <sup>1</sup>
	PDD		X	2
ICONTEC Conclusion:	<i>All parties involved have approved the project activity. The letters is authentic and valid for the proposed CDM project activity under validation. It confirms and it is unconditional with respect to:</i>  <i>(a) The Party is a Party to the Kyoto Protocol;</i>  <i>(b) Participation is voluntary;</i>  <i>(c) In the case of the host Party, the proposed CDM project activity contributes to the sustainable development of the country;</i>  <i>(d) It refers to the precise proposed CDM project activity title in the PDD being submitted for registration.</i>			

<sup>1</sup> This version is the same submitted for registration

### 3.2.2 MODALITIES OF COMMUNICATION

ICONTEC validated the corporative identity of PPs and focal point, through a notarized letter (date: 19/11/2012), whereby the company Itaguacu Energy S/A gives to Arthur Augusto Clessie de Moraes, the authority to represent the CDM project to the United Nations. Signed by Geraldo Van Arragon /21/.

ICONTEC confirms that the form Modalities of Communication Statement (Version 02.1) was correctly used.

### 3.3 PROJECT DESIGN

The project activity has been developed using the methodology AMS-I.D, version 17, “Grid connected renewable electricity generation”.

According to this methodology (point 9), the spatial extent of the project boundary includes the project power plant and all power plants connected physically to the electricity system to which the project activity power plant is connected to, that is the Brazilian SIN. The project boundary has been basically determined by means of: documental review of line diagrams which explain the connection of the project activity to Brazilian SIN /5/ and the technical information presented to ANEEL in order to obtain the connection authorizations /13.11,6/, which shows the connection to the SIN in the Copel Pitanga Substation; on-site visit (including the substation and the transmission line) and the interviews (section 2.1). Consequently, ICONTEC is able to confirm the identified boundary (section B.3, PDD). ICONTEC also confirms the selected sources and gases are justified for the project activity.

With respect to the contribution of the project in the greenhouse gases emissions mitigation (GHG), the project activity reduces the emissions of these gases avoiding the entrance in operation of thermoelectric units (to the Brazilian SIN) that burn fossil fuel in its operation,

The project complies with the applicability criteria of the methodology as was verified by ICONTEC, as follows. The assessment was carried out for each applicability criteria and included among others the compliance check of the local project setting with the applicability conditions in regard to baseline setting and eligible project measures. This assessment also included the review of secondary sources (especially interviews and main equipments and civil works contracts /10/), which sustain that applicability conditions are being followed.

**Table 4. Methodology applicability conditions analysis**

APPLICABILITY CONDITION	MEANS OF VALIDATION
<p>“This methodology comprises renewable energy generation units, such as photovoltaic, hydro, tidal/wave, wind, geothermal and renewable biomass:</p> <p>(a) Supplying electricity to a national or a regional grid; or</p> <p>(b) Supplying electricity to an identified consumer facility via</p>	<p>Based on project documentation /13.2/, the EIA/8/, the technical information approved by ANEEL/13.11/ and the on site visit, ICONTEC confirmed that the project activity corresponds to a renewable energy generation unit, hydro, which supplies electricity to the Brazilian SIN.</p>



<p><i>national/regional grid through a contractual arrangement such as wheeling”.</i></p>	
<p><i>“This methodology is applicable to project activities that: (a) Install a new power plant at a site where there was no renewable energy power plant operating prior to the implementation of the project activity (Greenfield plant); (b) Involve a capacity addition; (c) Involve a retrofit of (an) existing plant(s); or (d) Involve a replacement of (an) existing plant(s)”.</i></p>	<p><i>Based on the design documentation /6/, EIA/8/, the technical information approved by ANEEL/13.11/ and the on site visit,, ICONTEC confirmed that the project activity is a Greenfield hydroelectric power plant.</i></p>
<p><i>Hydro power plants with reservoirs that satisfy at least one of the following conditions are eligible to apply this methodology:</i></p> <ul style="list-style-type: none"> <li><i>• The project activity is implemented in an existing reservoir with no change in the volume of reservoir;</i></li> <li><i>• The project activity is implemented in an existing reservoir, where the volume of reservoir is increased and the power density of the project activity, as per definitions given in the project emissions section, is greater than 4 W/m<sup>2</sup>;</i></li> <li><i>• The project activity results in new reservoirs and the power density of the power plant, as per definitions given in the project emissions section, is greater than 4 W/m<sup>2</sup></i></li> </ul>	<p><i>Based on project documentation /13.2/, the EIA/8/, the technical information approved by ANEEL/13.11/ and the on site visit, ICONTEC confirmed that the project activity result in a new reservoir and the power density is greater than 4 W/m<sup>2</sup>.</i></p> <p><i>Calculation:</i>  <math>PD_{Itaguaçu} = 14.22 \text{ MW (SHP installed power)} / 0.340 \text{ Km}^2 \text{ (reservoir area)} = 41.82 \text{ W/m}^2</math></p> <p><i>Where:</i></p> <ul style="list-style-type: none"> <li><i>- ICONTEC confirmed the source of data for the “SHP installed power”. Source: PP Project Design /10/.</i></li> <li><i>- The reservoir area was checked by ICONTEC through the Environmental Studies (EIA /RIMA document page 44) /8/</i></li> </ul>
<p><i>If the new unit has both renewable and non-renewable components (e.g. a wind/diesel unit), the eligibility limit of 15 MW for a small-scale CDM project activity applies only to the renewable component. If the new unit co-fires fossil fuel, the capacity of the entire unit shall not exceed the limit of 15 MW.</i></p>	<p><i>Based on the design documentation /6/, EIA/8/, the technical information approved by ANEEL/13.11/ and the on site visit, that the project activity has only a renewable component (with an installed power of 14.22 MWe.</i></p> <p><i>ICONTEC verified that the project activity is Type (i) “renewable energy project activities with a maximum output capacity equivalent to up to 15 megawatts”, as indicated by the manufacturer of the equipment /10/.</i></p>
<p><i>Combined heat and power (co-generation) systems are not eligible under this category.</i></p>	<p><i>Not apply.</i></p>
<p><i>In the case of project activities</i></p>	

that involve the addition of renewable energy generation units at an existing renewable power generation facility, the added capacity of the units added by the project should be lower than 15 MW and should be physically distinct from the existing units.	Not apply.
In the case of retrofit or replacement, to qualify as a small-scale project, the total output of the retrofitted or replacement unit shall not exceed the limit of 15 MW.	Not apply.

ICONTEC confirms that the baseline and monitoring methodology (according to AMS-I.D.) as well as tools are applicable to the project activity. The PP indicated correctly the mandatory tool ("Tool to calculate the emission factor for an electricity system", version 02.2.1/18/) related with the selected methodology in section B.1 of PDD, according with the CDM homepage /17/. The "Tool to calculate project or leakage CO<sub>2</sub> emissions from fossil fuel combustion" is not applicable to this project activity.

The electricity generated in the SHP Itaguaçu will substitute grid electricity of the Brazilian's SIN. This was confirmed by ICONTEC based on the technical design documentation sent to ANEEL /13.11/.

In accordance with the project activity and the selected methodology the emission sources are properly described in Section B. of the PDD version 2. The greenhouse gas emissions occurring within the project boundary as a result of its implementation are all addressed by the applied methodology. There are no greenhouse gas emissions within the project boundary caused by the implementation of the project activity which contribute to more than 1% of the expected annual emission reductions and which are not addressed in by the applied methodology. This was verified by ICONTEC by means of the onsite visit, observing the progress of the works and its nature.

ICONTEC concludes that the project description, as included in the PDD-version 2, is sufficiently complete and accurate as to meet CDM requirements.

### 3.4 BASELINE DETERMINATION

The baseline scenario is described as the electricity delivered by the project activity to the Brazilian interconnected grid that would have otherwise been generated by the operation of the grid-connected power plants and by the addition of new generation sources.

As stated in the approved consolidated baseline methodology AMS-I.D., the baseline emissions are the product of the grid emission factor ( $EF_{grid,CM,y}$ ) times the electricity supplied by the project activity to the grid ( $EG_{BL,y}$ ).



The calculation of the official baseline emission factor of the national grid in Brazil is based on the data of the operating and building margin, available by the Ministry of Science and Technology, which is the same DNA for CDM Projects. The inputs to calculate the emission factor are handled confidentially by the Ministry of Science and Technology of Brazil. The baseline emission factor ( $EF_{grid,CM,y}$ ) is calculated officially using the “Tool to calculate the emission factor for an electricity system Version 02.2.1”, as a combined margin (CM), consisting of the combination of operating margin (OM) and build margin (BM) factors, as indicated on the website <http://www.mct.gov.br>. The methodology used to this calculation is the dispatch data analysis.

Calculations of “OM emission factor” ( $EF_{grid,OM-DD,y}$ ), “BM emission factor” ( $EF_{grid,BM,y}$ ) and “Baseline Emission factor or grid emission factor” ( $EF_{grid,CM,y}$ ) were made as illustrated in the PDD (Section B.6.3). The Emission Factor has been calculated in a transparent and conservative manner according to the procedures described in the “Tool to calculate the Emission Factor for an electricity system”, based on the Brazilian official data of 2011 published by Brazilian DNA. For the ex ante calculations of the Operation Margin emission factor, the data of year 2011 are available in homepage: <http://www.mct.gov.br/index.php/content/view/333605.html#ancora> (last access date). For the Build Margin emission factor, the value corresponds to year 2011 is also published by the DNA through the homepage <http://www.mct.gov.br/>. Finally, the Baseline emission factor is calculated through a weighted-average formula, considering both  $EF_{grid,OM-DD,y}$  and  $EF_{grid,BM,y}$  and the default values 0.5 for the weights  $w_{OM}$  and  $w_{BM}$ .

In this way, the ICONTEC deems that all the information, assumptions and data used in the baseline scenario are relevant, justified appropriately, correctly quoted and interpreted, supported by evidence and can be deemed reasonable, as they are supported by the DNA and energy authorities.

According to the previous description ICONTEC found that the project participant has correctly applied the selected methodology with respect to the Baseline identification. The scenario selected reasonably represents the anthropogenic emissions by sources of GHGs that would occur in the absence of the proposed CDM project activity. All estimates of the baseline emissions can be replicated using the data and parameter values provided in the section B.6 of PDD.

According to this information the total emission in absence of the project are 103,725 tonnes of CO<sub>2e</sub> during the 7 years crediting period, as indicated in Section B.6.4 of the PDD.

### 3.5 ADDITIONALITY

#### 3.5.1 Prior consideration of the CDM

The starting date of the Project activity was identified by the PP as 14/12/2010, the date when the turbines and hydro mechanicals equipments contracts were signed.

ICONTEC accessed and corroborated the purchase contracts “Contrato de fornecimento de turbinas” (Turbines) and “Contrato de fornecimento de equipamentos hidromecânicos” (Hydromechanical parts)/10/, signed by ITAGUACU ENERGIA S.A. and SEMI

*INDUSTRIAL LTDA at 14/12/2010, for manufacturing and providing the turbines and hydro mechanical equipments for the power plant, according to the respective technical and commercial proposals.*

*Based on the study of the project documents, as well as interviews with the people on charge of the project execution (particularly, with Mr. Marcos A. Lastrenski, Director-Vice President of Itaguaçu Energia S/A), became very clear to ICONTEC that these contracts are the first real action executed by the PP in order to implement the activity project, so, according to the Glossary of CDM terms, 14/12/2010 can be considered properly as the project starting date.*

*By the other hand the DOE confirmed that notifications to the UNFCCC Secretariat and to the Brazilian DNA (Inter-ministerial Commission on Climate Change- CIMGC), were issued by the PP at 10/01/2011 /11/, regarding the commencement of the SHP Itaguaçu CDM Project (JUN 1146), Brazil. Since these notifications were provided by the project participant within 180 days of the project activity start date (in fact 27 days), ICONTEC determines, according to the paragraph 107 of the VVS, that the CDM was seriously considered in the decision to implement this project activity.*

*ICONTEC raised CAR 2 in order to ask PP to include a “prior consideration section” inside PDD (See Annex A, Table A.2). The finding was closed.*

### **3.5.2 Additionality analysis**

*In Section B.5 of the PDD, PP has provided explanations for project additionality demonstration based on the “Guidelines on the demonstration of additionality of small-scale project activities (version 09.0 of 20 July 2012)”, previously known as “Annex A of Appendix B of the Simplified Modalities and Procedures for Small-Scale CDM Project Activities”, using Investment Barrier analysis.*

*ICONTEC confirmed the date on which PP decided to make the investment (30/09/2010), based on the document “Board meeting 30.09.2010”/13.8/. ICONTEC confirmed that all the support documentation presented by PP for the investment barrier analysis is in accordance to this date.*

*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 CLAs (see Table A.2, Annex A) were requested to obtain further explanations or justifications on some specific issues.*

*ICONTEC asked PP (CAR 3) to update the last version of the “Annex A of Appendix B of simplified modalities and procedures for small scale CDM project activity”. The finding was closed (See Annex A, table A.2).*

### **Benchmark analysis**

The IRR Benchmark analysis was used in order to demonstrate the Investment barrier. The DOE deems that this is the proper choice, taking into account that the other options offered by the tool for the demonstration and assessment of additionality, simple cost analysis and investment comparison analysis, are not applicable in this case: In fact, revenues other than the CDM benefits occur (discarding simple cost analysis) and the PP has only the option of not investing in the project at all (discarding investment comparison analysis).

Project IRR was initially presented by the PP as the internal financial indicator to be compared with the Cost of Equity as IRR benchmark. By means of CL 6 the DOE, thinking on guideline 12 of the Guidelines on the assessment of investment analysis, asked the PP to clarify the use of terminology, regarding "Project IRR" and "Equity IRR". The clarification was given and the internal financial indicator was properly designed as Equity IRR in the PDD version 2 (See table A.2, Annex A).

The cost of equity was calculated by the PP (Spreadsheet: Cost\_Equity\_SHP Itaguaçu\_v1 /13.1/) as the sum of a tax free of risk plus a host country risk premium plus a global risk premium to the equity investment, adjusting for differential inflation to get a real, not nominal, value for cost of equity, as follows:

$$K_e = R_f + ERP + P_{Eg} - I_a$$

Where:

Variable	Definition	Value used/calculated (%)
$K_e$	Cost of equity	10.97
$R_f$	Tax Free of Risk	5.8
ERP	Host country risk premium	4.644
$P_{Eg}$	Global Equity risk premium = $\beta_l * RP$	4.7475
$\beta_l$	Levered $\beta$ for Itaguaçu Energia S/A	0.633
RP	Total country risk premium	7.5
$I_a$	Inflation adjustment	4.22

The data sources and criteria used by the PP to obtain the value used/calculated in the table above were verified by ICONTEC, as follows:

**$R_f$ :** Average of annual return rates of US Treasury Bonds (T-Bond) corresponding to years 2001 to 2010 /13.2/

**ERP:** EMBI+: Average of Brazilian Risk Premium, based on data from JP Morgan corresponding to years 2001 to 2010 /13.3/;

**$\beta_l$ :** using the known formula

$$\beta_i^{Desalavancado} = \left( \frac{\beta_i^{Alavancado}}{1 + \frac{D_i}{E_i}(1-T)} \right)$$

Where:

$\beta$  (unlevered  $\beta$ ) was calculated as the average  $\beta$  for the power industry companies in Brazil (0.45) /13.4/, and the ratio Debt/Equity for the project is 0.62

**RP:** Total country Risk Premium provided by Aswath Damodaran 2010 /13.5/

**la:** as the average inflation adjustment for 2001 – 2010 between US inflation /13.6/ and Brazilian inflation /13.7/

ICONTEC confirms that this methodology of calculation uses best financial practices and is in line with the criteria in Appendix of the “Guidelines on the assessment of investment analysis”, EB 62, Annex 5.

The application of the methodology is based on parameters that are publicity available through the given references and standard in the market, as appropriated, given that the project could be developed by an entity other than the project participant. For the other hand, taking into account that, according to Board Meeting Minute on 30.09.2010 /13.8/, the decision to proceed with the project took place on this date, it can be affirmed that parameters used to determine the IRR benchmark are validated at the investment decision time.

Therefore, ICONTEC considers that a cost of equity of 10.97% is a suitable and reasonable benchmark to analyze the financial attractive of SHP Itaguaçu CDM project.

### Equity IRR calculations

Equity IRR for the project was calculated by the PP by means of the finance model executed in the Cashflow spreadsheet /3/.

Next is the validation of parameters used in the investment analysis (at the time of the investment decision according with the clause 6 of the “Guidelines on the assessment of investment analysis, version 05”), as described in PDD version 2 and in the sheet “Assumptions” of the file Cashflow file /3/:

**Table 5. Validation of parameters**

ITEM	VALUE	UNIT	DOE VALIDATION
<b>Investment</b>	78,400,000	R\$ - Real	According to the Optimized Basic Project budget elaborated by P A B Engenharia Ltda. /13.9/, using the ELETROBRAS Budget Standard, and approved by the Board Meeting Minute on 30.09.2010 /13.8/. Total direct cost: R\$ 57,625,000 equivalent to US\$ 2,450/kW. This is within the average

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			<p>unit cost range for this type of power plant in Brazil.</p> <p>ICONTEC raised CL 5 (see Table A.2, Annex A) in order to ask for the documental support for this assumption. The finding was closed based on the evidence presented by PP.</p>
<b>Loan (Debt)</b>	30,000,000	R\$ - Real	According to the Board Meeting Minute approval on 30/09/2010.
<b>Loan Interest</b>	9.25%	per year	According to financial support mechanisms of the BNDES /13.10/ for renewable energy projects, and approved by the Board Meeting Minute on 30/09/2010.
<b>Assured Energy</b>	8,514	MW <sub>average</sub>	Calculated on Plant Load Factor (Net generation electricity) 0.60 /6, 13.11/
<b>Installed power</b>	14.00 (value for financial analysis*)	MW	<p>PP Project Design/Environmental Studies (EIA /RIMA document page 10) /8/, ANEEL Protocol 48500.003302/2001-61 /13.11/.</p> <p>* ICONTEC confirmed during onsite visit that PP used the value of 14.00 (instead of 14.22 MW), at the moment of the investment analysis, based on approval documents. Capacity of 14.22 MW is the contract value, based on 2 units of 7900 KVA, PF = 0.9 (7,110 kW each) /10/</p>
<b>Net Generated electricity</b>	74,578.5	MWh/year	<p>According to hydrological study, Annex No. 1 to ANEEL Protocol 48500.003302/2001-61. /13.12/, approved by Board Meeting on 30/09/2010 /13.8/.</p> <p>Environmental Studies (EIA /RIMA document page 10) /8/.</p>
<b>Exchange rate</b>	1.680	R\$/US\$	Brazilian Central Bank - Exchange rate ICONTEC accepted this public information source.
<b>Energy Price</b>	146.00	R\$/MWh	<p>8th CCEE Energy Auction /13.13/, approved by Board Meeting on 30/09/2010.</p> <p>PPA for CERT (Centrais Elétricas Rio Tigre), power plant owned by the same investor /13.8/.</p> <p>ICONTEC accepted those public information sources.</p>
<b>Operation</b>	30	Years	Rule ANEEL No 317, July 1st 2003 - Art 9o.



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			Default value for electric generators, "Tool to determine the remaining lifetime of equipment, EB 50, Annex 15 (version 01)". /18/
<b>PIS - Social Contribution Program</b>	0.65%	on gross revenue	Brazilian Law 10.637/2002 and 9.718/1998 /13.19/
<b>COFINS - Social Security Financing Transfers</b>	3.00%	on gross revenue	Brazilian Law 10.637/2002 and 9.718/1998
<b>Base Value for the IR calculation</b>	8.00%	on gross revenue	Brazilian Law 10.637/2002 and 9.718/1998
<b>Base Value for the Social Contribution calculation</b>	12.00%	on gross revenue	Brazilian Law 10.637/2002 and 9.718/1998
<b>IR - Income Taxes</b>	15%	on base value	Brazilian Law 10.637/2002 and 9.718/1998
<b>CSLL - Social Contribution on Net Profit</b>	9%	on base value	Brazilian Law 10.637/2002 and 9.718/1998
<b>Additional IR</b>	10%	on base value	Brazilian Law 10.637/2002 and 9.718/1998
<b>Carbon credits</b>	12	US\$/tCO <sub>2</sub>	Carbotrader estimation.  ICONTEC accepted this value based on the CER price at the moment of the investment analysis and on other registered PDD.
<b>Annual Operation and Maintenance (O&amp;M)</b>	3.50%	on total asset	Board Meeting Minute /13.8/ Correcto Outsourcing Offer /13.14/ Brazilian energy study "Guidelines for Studies of SHP" /13.15/ The DOE deems that value is standard in the market, e.g the "Diretrizes para Estudos e Projetos de Pequenas Centrais Hidrelétricas" /13.15/, chapter 4, in estimating the annual cost of operating and maintenance for SHPs suggest utilizing 5% of the total investment cost.
<b>Distribution fee (TUSD) - "encumbrance"</b>	0.35	R\$/MWh	Homologating rule ANEEL Nº 1.015 /13.16/
<b>Distribution Use of System Charge – TUSD</b>	1.33	R\$/KW	Homologating rule ANEEL Nº 1.015 /13.17/
<b>Commercialization Fee/CCEE Agent</b>	2%	on gross revenue	Standard value in Brazil, as established in the Board Meeting Minute on 30/09/2012
<b>System Services Encumbrance - ESS</b>	0.5023	R\$/MWh	Historical average of the SIN South sub-system /13.22/.  ICONTEC accepted this public information source.
<b>Annual Fee for Connection to the Distribution System - CCD</b>	12,000	R\$ / year	Standard of COPEL (R\$ 1,000/month). Source: Electra Energy. E.g. It is the same annual fee as CELSC (Santa Catarina Electric power plants)

## VALIDATION REPORT VVS



<b>ANEEL - Fiscalization fee</b>	27,001.10	R\$ / year	Law 9427/1996, Decree 2410/1997/13.20/.
<b>Other Costs (Insurance - engineering risk, operational risk and performance guarantee, etc)</b>	2.0%	on gross revenue	Board Meeting Minute on 30/09/2012
<b>Residual</b>	40%	on total asset	According to the study “Estudo de Vida Útil Econômica e Taxa de Depreciação” (Economic useful life and depreciation rate study): 50 years for the Turbines and Generators equipment. For turbines, see v.2, page 249. For generators, see v.1, page 294. /13.21/

Also the DOE found that, in using the parameters depicted in table above, the applicable guidance of the “Guidelines on the assessment of investment analysis, version 05” were followed by the PP in cash flow calculations in the Cashflow spreadsheet /3/.

After this validation analysis the DOE confirms that Equity IRR calculations were made under appropriate assumptions and the financial calculations are correct (VVS, paragraph 123 c).

On these bases, Equity IRR obtained was 7.65%, which, compared with the IRR benchmark of 10.97% yields that the SHP ITAGUAÇU PROJECT is not financially feasible without the CERs revenues. Including CERs revenues, the Equity IRR becomes 8.01%, remaining lower than the IRR benchmark.

### Sensitivity analysis

A sensitivity analysis was performed by means of which the parameters Total Investment, Assured Energy, Energy Price and O&M costs were tested in order to check the financial impact of variations in these parameters, by determining the necessary variations to get the IRR Benchmark (Breakeven point).

The results of such analyses are depicted in the following table:

<b>Parameter</b>	<b>Variation to get the IRR benchmark</b>
Total Investment	- 21.40%
Assured Energy	+ 19.25%
Energy Price	+ 19.25%
O&M costs	- 68.20%

### Additionality conclusion:

Given the relatively large variations (further beyond +/- 10%), that would be necessary in order to reach the breakeven point, the DOE deems that, due to the Investment barrier,

*the project is unlikely to be financially attractive, therefore the SHP ITAGUAÇU PROJECT is additional. The additionality has been confirmed the paragraphs 102 and 103 of VVS.*

### 3.6 MONITORING PLAN

*ICONTEC has assessed the monitoring plan through the documental review. Compliance with the requirements of the applied monitoring methodology is fulfilled by SHP Itaguaçu.*

*The PDD version 2 specifies monitoring of the following parameters an ex-post, in section B.7.1 and B.7.3:*

- *$EG_{Itaguaçu,y}$ : Quantity of net electricity supplied by the project plant/unit to the grid in year y (MWh/year)*
- *$EF_{CO_2,grid,y}$ : CO<sub>2</sub> emission factor of the grid electricity in year y (tCO<sub>2</sub>/MWh)*
- *$EF_{grid,OM-DD,y}$ : CO<sub>2</sub> Operating Margin emission factor of the grid, in a year y (tCO<sub>2</sub>/MWh)*
- *$EF_{grid,BM,y}$ : CO<sub>2</sub> Build Margin emission factor of the grid, in year y (tCO<sub>2</sub>/MWh)*

*The audit team has verified all parameters in the monitoring plan against the requirements of the methodology; no deviations have been found. The procedures established by Itaguaçu Energia S/A (Section B.7 of PDD) were reviewed by the audit team based on the sector experience and through document review (see References) and interviews (see Section 2.1). This information, along with a physical inspection, allows the assessment team to confirm that the proposed monitoring plan is feasible, and he is within the project design and the Brazilian electricity legislation /12/.*

*The main parameter ( $EG_{Itaguaçu,y}$ ) to be monitored was discussed with the PPs. In specific, these parameters include the location of meters (in Copel Pitanga Substation), data management, and the quality assurance and quality control procedures to be implemented in the context of the project according to the national standards indicated by the national electricity authorities. The energy monitoring will be performed using 2 meters, one as a backup and the other as a principal. All equipment is technically approved by ANEEL. The National Grid Operator (ONS) and the Electric Power Commercialization Chamber (CCEE) are the entities responsible for the technical requirements of the energy measurement and for the billing. Those entities are monitoring and approving the accurate energy accounting. The data from the energy meters will be cross checked with the CCEE data bank. In case of difference of readings (from CCEE and Itaguaçu), it will be considered the lowest for the calculation of CERs from the project. The Brazilian commercial procedure was revised by ICONTEC through the official documentation /14/.*

*ICONTEC asked PP (CAR 1) to explain how the cross checking approach for  $EG_{Itaguaçu,y}$  will be done in accordance to the methodology AMS-I.D version 17(See Annex A, Table A.2). The finding was closed.*

*ICONTEC found out that the PP will be able to implement the monitoring plan and the achieved emission reductions can be reported ex-post and verified. ICONTEC also cross checked the data used for the ex-ante estimation with the CERs Spreadsheet /2/, in order to check that these values were used correctly.*



### 3.7 CALCULATION OF GHG EMISSIONS

The following data and parameters fixed ex ante, indicated by PP in section B.6.2 of the PDD, were available during validation:

- $Cap_{Itaguacu,y}$ : Installed power of the hydro power plant after the implementation of the project activity (W). The value (14,220,000 W) presented by PP was confirmed by ICONTEC through the technical documentation sent to ANEEL for the connection authorizations /13.11,6/.
- $A_{Itaguacu,y}$ : Area of the reservoirs measured in the surface of the water, after the implementation of the project activity, when the reservoir is full ( $m^2$ ). The fixed data (340,000  $m^2$ ) presented in section B.6.2 of PDD was verified by ICONTEC through the EIA /8/ as base document for obtaining of the corresponding licenses /9/.

The justification on the use of the previous values was validated and found to be appropriate, transparent and conservative. ICONTEC also cross checked the fixed ex ante values with the CERs Spreadsheet /2/, in order to check that these values were used correctly.

In accordance with the methodology AMS-I.D version 17, emission reductions are to be calculated as:

$$ER_y = BE_y - PE_y - L_y$$

Where:

$ER_y$  = Emission reductions in year y (t CO<sub>2</sub>e/yr)

$BE_y$  = Baseline emissions in year y (t CO<sub>2</sub>/yr)

$PE_y$  = Project emissions in year y (t CO<sub>2</sub>e/yr)

$L_y$  = Leakage in year y (t CO<sub>2</sub>e/yr)

**Baseline emissions**, as presented in section B.6.1 of the PDD and explained in section 3.4 of this validation report, have been calculated by applying the formula:

$$BE_y = EF_{CO_2,grid,y} * EG_{BL,y}$$

Where:

$BE_y$  = Baseline emissions in year y (t CO<sub>2</sub>/yr)

$EG_{BL,y}$  = Quantity of net electricity supplied to the grid as a result of the implementation of the CDM project activity in year y (MWh/year)

$EF_{CO_2,grid,y}$  = Combined margin CO<sub>2</sub> emission factor for grid connected power generation in year y (tCO<sub>2</sub>/MWh)

For the calculation  $EF_{CO_2,grid,y}$  (or  $EF_{grid,CM,y}$ ) the six steps of "Tool to calculate the emission factor for an electricity system", version 02.2.1 were applied. The Brazilian DNA has

published the Resolution No 8. issued in May 26th, 2008<sup>2</sup>, which defines the Brazilian Interconnected Grid as a single system that covers all the five macro-geographical regions of the country (North, Northeast, South, Southeast and Midwest), then the boundaries of the Brazilian electricity system are clearly defined.

The Brazilian emission factors corresponding to the year 2011 and presented inside the PDD are:

OM emission factor ( $\text{tCO}_2/\text{MWh}$ ) = 0.2920

BM emission factor ( $\text{tCO}_2/\text{MWh}$ ) = 0.1056

CM emission factor ( $\text{tCO}_2/\text{MWh}$ ) = 0.1987

The DOE verified that these values were extracted from the official homepage of the Science and Technology Ministry (<http://www.mct.gov.br>).

For the purpose of ex ante estimation, the net annual generation of the plant ( $EG_{BL, y}$ ) during the crediting period is 74,578.5 MWh/year. This data was validated by the DOE through the technical documentation, inter alias: information sent to ANEEL /13.11/ and main equipments contracts with the technical specifications /10 /.

So, the annual baseline emissions are  $74,578.5 * 0.1987 = 14,818 \text{ tCO}_2/\text{year}$ , as showed in the Section B.6 of the PDD and inside file: JUN1146\_CERs\_v2.xls /2/. For the years 2013 and 2020, ICONTEC verified that the net electricity delivered to the grid will be different. For year 2013 the value corresponds to 11 months; and for the year 2020 the value corresponds only to 1 month of the crediting period.

**Project emissions** are considered as zero, based on the fact that the power density of the project activity ( $PD_{Itaguacu}$ ) is higher than  $10 \text{ W/m}^2$ , as defined in the methodology AMS-I.D. and as stated in Section B.6.1 of the PDD.

$$PD_{Itaguacu} = 14.22 \text{ MW (SHP installed power)} / 0.340 \text{ Km}^2 \text{ (reservoir area)} = 41.82 \text{ W/m}^2$$

**Leakage emissions** are not considered in this case, according to the methodology.

Therefore,

**Emission reductions = Baseline emissions.**

Finally, the project estimates a reduction of  $14,818 \text{ tCO}_2/\text{year}$  during the crediting period, as indicated in the table in Section B.6.4 of the PDD.

### 3.8 ENVIRONMENTAL IMPACTS

Brazilian legislation requires a development of an Environmental Impact Assessment (EIA) for those projects that due to its characteristics could have a negative impact on natural resources or the environment, as a requirement for obtaining the preliminary license (LP).

<sup>2</sup> [http://www.mct.gov.br/upd\\_blob/0024/24834.pdf](http://www.mct.gov.br/upd_blob/0024/24834.pdf)

*ICONTEC verified that Itaguaçu Energia S/A elaborated an EIA /8/ with the aim to identify and analysis the environmental and social impacts, in accordance with the requirements requested by the Brazilian Government.*

*The PP undertook an analysis of environmental impacts as described in the PDD in Section D.1. Each environmental impact identified has its mitigation action described in the EIA (which include an Environmental Diagnosis). ICONTEC concluded that no significant environmental impacts have been identified, and this information is consistent with design documentation and audit team experience. There will be no transboundary impacts resulting from this project activity.*

*An Installation License for the SHP Itaguaçu No.1503/2012 from Paraná Environmental Agency (IAP) dated 18/05/2012 /9/ was provided and verified by ICONTEC. In Brazil the licensing process phased on different license types, first the project owner must present the EIA to obtain the previous license. For the operation license, all the evidences of compliance with the obligations contained in the installation license must be presented to the authorities.*

*ICONTEC also verified the documentation related to the Preliminaries Licenses from Paraná Environmental Agency No. 1046/2002 (date: 13/11/2002) and 30424 (date 16/05/2012). ICONTEC asked PP (CAR 4, see Annex A, table A.2.) to include both preliminaries licenses inside PDD (Section D). The information was included in PDD version 2.*

### **3.9 COMMENTS BY LOCAL STAKEHOLDERS**

*The project participant followed the procedures set out by the DNA of Brazil and sent letters /15/ to the local stakeholders that could reasonably be considered relevant for the proposed project activity. The PDD (Section E.1) includes a list of the stakeholders who were informed through this letter.*

*Three comments were received from one stakeholder (Federal Public Attorney). ICONTEC confirmed through the original records /16/ the communications between the PP and the Federal Public Attorney in order to answer the questions.*

*Through the delivery date of the receipt of mail from Brazil, ICONTEC was able to confirm the delivery of the letters sent to stakeholders submitted the project /15/.*

*A copy of the PDD and the sustainable contribution of the project were also available for consultation on the website of Carbotrader Assessoria e Consultoria em Energia Eireli /17/.*

*ICONTEC can confirm that the description in the PDD (Section E) is correct and that the stakeholder consultation was in line with CDM and host country requirements. Stakeholders that can reasonably be considered relevant for the proposed CDM project activity have been invited. ICONTEC determined that the stakeholder consultation was adequate.*

#### 4. GLOBAL STAKEHOLDERS CONSULTATION

*The PDD version 1(25/06/2012) submitted by Itaguaçu Energia S/A and Carbotrader Assessoria e Consultoria em Energia Eireli was made publicly available at UNFCCC website from 06/07/2012 to 04/08/2012.*

*Parties, stakeholders and NGOs were invited to provide comments through the website. During the global publication no comments were received from stakeholders, this information was confirmed in the UNFCCC website.*

#### 5. VALIDATION OPINION

*ICONTEC has performed a validation of the project “SHP Itaguaçu CDM Project (JUN1146), Brazil”. 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 provided ICONTEC with sufficient evidence to determine the fulfillment of the stated criteria.*

*The project activity is being proposed as unilateral project by Itaguaçu Energia S/A and Carbotrader Assessoria e Consultoria em Energia Eireli. Brazil has provided approval of voluntary participation and meets all requirements to participate in CDM. The Brazilian DNA confirmed that the project helps in achieving sustainable development.*

*The project correctly applies the methodology AMS-I.D.-Grid connected renewable electricity generation –Version 17.*

*The project consists on the development of a new small hydroelectric power plant that takes advantage of the waters of the Pitanga River, in the Paraná State, Brazil. The water flow will allow an installed capacity of 14.22 MW and annual supply of electricity to the grid of 74,578.5 MWh. Electricity will be transmitted through a transmission line of 34,5 kV which joins the SHP Itaguaçu plant with the Brazilian SIN by the Pitanga substation. It is demonstrated that the project is not a likely baseline scenario. Emission reductions attributable to the project are hence additional to any that would occur in the absence of the project activity.*

*The total emission reductions from the project are estimated to be on the average of 14,818 tCO<sub>2</sub>e per year over the selected 7 year crediting period. The emission reduction forecast was checked and it is deemed likely that the stated amount is achieved because the underlying assumptions do not change.*

*In summary, it is ICONTEC's opinion that the “SHP Itaguaçu CDM Project (JUN1146), Brazil” as described in the PDD version 2 (20/08/2012), meets all relevant UNFCCC requirements for the CDM and all relevant host country criteria and correctly applies the baseline and monitoring methodology AMS-I.D version 17. ICONTEC thus requests the registration of the project as a CDM project activity.*

*Bogotá D.C., 08/09/2012*



*Diego Caballero*  
*Director of Conformity Assessment*  
**ICONTEC**

## 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 (PDD version 1: 25/06/2012 and PDD version 2: 20/08/2012)
- /2/ ER calculation files: JUN1146\_CERs\_v1 and JUN1146\_CERs\_v2.xls
- /3/ Cash flow calculation files: Cashflow\_SHP Itaguaçu\_v1 and Cashflow\_SHP Itaguaçu\_v2.xls
- /4/ Atos\_Constitutivos.pdf (Founding charter)  
Brazilian Chamber of Commerce:  
[http://www.receita.fazenda.gov.br/pessoajuridica/cnpj/cnpjreva/cnpjreva\\_solicitacao.asp](http://www.receita.fazenda.gov.br/pessoajuridica/cnpj/cnpjreva/cnpjreva_solicitacao.asp)
- /5/ “Line diagram from Copel, Companhia Paranaense de energia-copel. No. 72840-22203-0001”
- /6/ ANEEL authorizations:
  - dsp2001955\_Aprova Invent Hidr Simplif
  - dsp2004405\_Aprova PB
  - res2003317\_Autorizacao PIE
- /7/ Project Schedule:
  - CRONOGR ITAGUAÇU.pdf
  - CRONOGRAMA DE OBRAS - 08-06-2011.pdf
- /8/ EIA PCH ITAGUAÇU.pdf (Pequena Central Hidrelétrica de ITAGUAÇU. ESTUDO DE IMPACTO AMBIENTAL – EIA. A. Müller Consultoria Ambiental, Curitiba. September 2011)  
Relatório de Impacto Ambiental – RIMA.pdf
- /9/ Preliminaries License: LAP 1046/2002 and LP 30424  
Installation License: LAI 1503/2012
- /10/ Construction, equipment acquisition and installation contracts:  
Contrato - Semi Hidromecanicos (Hydromechanical)  
Contrato - Semi Turbinas (Turbines)  
Contrato Gevisa Geradores (Generators)  
Contrato guaraenge (Civil Works)
- /11/ Evidence prior consideration:
  - CIMGC Consideração prévia.msg
  - Re CIMGC Consideração prévia.msg
  - UNFCCC Prior consideration.msg
  - Re UNFCCC Prior consideration.msg
- /12/ [www.aneel.gov.br](http://www.aneel.gov.br)
- /13/ Cross-Check “Demonstration of additionality”:
  - /13.1/: Cost\_Equity\_SHP Itaguaçu\_v1
  - /13.2/: [http://pages.stern.nyu.edu/~adamodar/New\\_Home\\_Page/datafile/histret.html](http://pages.stern.nyu.edu/~adamodar/New_Home_Page/datafile/histret.html)
  - /13.3/: [www.ipeadata.gov.br/Default.aspx](http://www.ipeadata.gov.br/Default.aspx) and “ipeadata(EMBI+).xls”



/13.4/: <http://pages.stern.nyu.edu/~adamodar/pc/archives/emergcompfirm09.xls>  
 /13.5/: <http://www.stern.nyu.edu/~adamodar/pc/archives/ctryprem09.xls>  
 /13.6/: <ftp://ftp.bls.gov/pub/special.requests/cpi/cpiait.txt>  
 /13.7/: [http://pt.wikipedia.org/wiki/Infla%C3%A7%C3%A3o#Hist.C3.B3rico\\_do\\_Quadro\\_Inflacion.C3.A1rio\\_no\\_Brasil](http://pt.wikipedia.org/wiki/Infla%C3%A7%C3%A3o#Hist.C3.B3rico_do_Quadro_Inflacion.C3.A1rio_no_Brasil)  
 /13.8/: Ata AGE 30-09-2010  
 /13.9/: OPE\_Itaguaçu\_Jul2010.pdf  
 /13.10/: [http://www.bndes.gov.br/SiteBNDES/bndes/bndes\\_pt/Institucional/Apoio\\_Financeiro/Produtos](http://www.bndes.gov.br/SiteBNDES/bndes/bndes_pt/Institucional/Apoio_Financeiro/Produtos/FINEM/energia_eletrica_geracao.html)  
 /FINEM/energia\_eletrica\_geracao.html  
 /13.11/: Energia assegurada protoc\_Aneel.pdf  
 /13.12/: Energia assegurada protoc\_Aneel.pdf – Annex 1  
 /13.13/: [http://www.ccee.org.br/StaticFile/Arquivo/biblioteca\\_virtual/Leiloes/3\\_Reserva/Resultado\\_completo\\_3\\_LER\\_2013.pdf](http://www.ccee.org.br/StaticFile/Arquivo/biblioteca_virtual/Leiloes/3_Reserva/Resultado_completo_3_LER_2013.pdf)  
 /13.14/: Carta\_consulta\_Itaguaçu(s ax).pdf  
 /13.15/: "Diretrizes para Estudos e Projetos de Pequenas Centrais Hidrelétricas" page 14, Electrobras  
 /13.16/: Homologating rule ANEEL Nº 1.015, June 22, 2010 Frame T  
 /13.17/: Homologating rule ANEEL Nº 1.015, June 22, 2010 Frame V  
 /13.18/: CCEI - P1, -P2, P3.pdf  
 /13.19/: Brazilian Law 10.637/2002 and 9.718/1998.pdf  
 /13.20/: Law 9427/1996, Decree 2410/1997  
 /13.21/: "Estudo de Vida Útil Econômica e Taxa de Depreciação" (Economic useful life and depreciation rate study).pdf  
 /13.22/: <http://www.copel.com/hpcopel/root/nivel2.jsp?endereco=%2Fhpcopel%2Froot%2Fpagcopel2.nsf%2F0%2FD0CB8E680F003E830325741B00506EDA>  
[http://www.receita.fazenda.gov.br/pessoajuridica/cnpj/cnpjreva/cnpjreva\\_solicitacao.asp](http://www.receita.fazenda.gov.br/pessoajuridica/cnpj/cnpjreva/cnpjreva_solicitacao.asp)  
<http://www.ccee.org.br>

/14/ CCEE\_DOC\_014753[1].pdf

/15/ Evidence local stakeholder consultation:

- AR\_CamaraMunBoaVenturaSaoRoque
- AR\_CamaraMunPitanga
- AR\_FBOMS
- AR\_IAP
- AR\_MinisterioPublicoParana
- AR\_PrefeituraMunBoaVenturaSaoRoque
- AR\_PrefeituraPitanga\_CentroAdm
- AR\_ProcuradoriaRepublica-PR
- AR\_SecMeioAmbientePitanga\_CentroAdm
- AR\_SindctoTrabalhadoresRuraisPitanga

Letters: Assoc Comunit Pitanga, Câmara Munic BV São Roque, Câmara Munic Pitanga, FBOMS\_3, IAP, Min Pub Est, Prefeitura BV São Roque, Prefeitura Pitanga, Procuradoria República, Secret MA Pitanga, Sindicato Trab Rurais Pitanga

/16/ Despacho MP

Procuradoria Republica\_Carta Resp

/17/ Homepage consulted during desk review:

- <http://cdm.unfccc.int>
- <http://www.earth.google.es>
- <http://www.worldweatheronline.com>
- <http://www.aneel.gov.br>
- <http://www.mct.gov.br>
- <http://www.correcto.com.br>
- <http://www.carbotrader.com>
- <http://www.ons.org.br>
- <http://www.copel.com>
- [www.iap.pr.gov.br](http://www.iap.pr.gov.br)

/20/ Icontec's GPS: Garmin, GPSmap 60CSx, ICONTEC REF 06678.

/21/ Letter focal point, date: 19/11/2012.pdf

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

/18/ Guidelines, Methodologies and tools (applied to project activity):

- AMS-I.D.-Grid connected renewable electricity generation – Version 17.
- Tool to calculate the emission factor for an electricity system (Version 02.2.1)
- Guidelines on the demonstration of additionality of small-scale project activities (version 09.0 of 20 July 2012)
- Guidelines on the assessment of investment analysis, version 05
- General guidelines for SSC CDM methodologies, version 18
- Guidelines on assessment of de-bundling for SSC project activities (Ver03.0 EB54 Annex13)
- "Tool to determine the remaining lifetime of equipment, EB 50, Annex 15".

/19/ CDM Rules and Procedures:

- CDM Validation and Verification Standard. UNFCCC (version 02.0, Annex 4)
- CDM Project standard (Annex 5, version 01.0)
- Glossary of CDM Terms (Version 06.0)
- CDM Project Cycle Procedure (Annex 64, Version 02.0)
- F-CDM-SSC-PDD-Project Design Document form for Small-Scale CDM project activities (version 04.1)
- Simplified modalities and procedures for small-scale clean development mechanism project activities (735 KB) (decision 4/CMP.1, Annex II)





## ANNEX A

**Table A.1 Requirements Checklist (ACCORDING VALIDATION AND VERIFICATION STANDARD)**

CHECKLIST QUESTION	REFERENCES	Final Conclusion
<b>1. Global Stakeholder Consultation</b>		
1.1 Has the validation team receipt of and taken into account all comments on the PDD of the proposed project activity during the validation process? (not only during GSP) VVS § 34,35	Section 4	Resolved
1.2 If comments indicate that the proposed project activity does not comply with the CDM requirements, Did the validation team request further clarification from the entity providing the comment? <sup>3</sup> VVS § 34	N.A	Resolved
<b>2. Approval</b>		
2.1 Has the designated national authority (DNA) of each Party indicated (as being involved in the proposed CDM project activity in the PDD) provided a written letter of approval? VVS § 38	Section 3.2	Resolved
2.2 Does the letter(s) of approval issued by the respective Party's DNA the confirmation of: (a) The Party is a Party to the Kyoto Protocol; (b) Participation is voluntary; (c) In the case of the host Party, the proposed CDM project activity contributes to the sustainable development of the country; (d) It refers to the precise proposed CDM project activity title in the PDD being submitted for registration? VVS § 39 and 50	Section 3.2	Resolved
<b>3. Authorization</b>		
3.1 All project participants have been listed in a consistent manner in the project documentation, and their participation in the project activity has been approved by a Party to the Kyoto Protocol.	Section 3.2	Resolved

<sup>3</sup> In accordance with VVS § 36: the DOE is not required to enter into a dialogue with Parties, stakeholders or NGOs, that comment on the CDM requirements  
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## VALIDATION REPORT VVS



CHECKLIST QUESTION	REFERENCES	Final Conclusion
VVS § 46		
3.2 Are there entities other than those authorized as project participants included in these sections of the PDD. VVS § 47	Section 3.2	Resolved
3.3 The approval of participation has been issued from the relevant DNA. VVS § 48	Section 3.2	Resolved
<b>4. Modalities of communication</b>		
4.1 All focal points included in the MoC, as well as the personal identities, including specimen signatures and employments status and has been validated by directly evidence for corporative, personal identify and other relevant documentation like notarized documentation. VVS § 53	Section 3.2.2	Resolved
4.2 Does the MoC correctly completed and duly authorized? - The last version of the form F-CDM-MOC has been used? - The information required as per the F-CDM-MOC, including its annex 1, is correctly completed. -The project participants authorized signatories signing the F-CDM-MOC correspond to the project participants authorized signatories included in F-CDM-MOC, annex 1. VVS § 59 - 60	Section 3.2.2	Resolved
<b>5. Project design document</b>		
5.1. The PDD was completed using the last version of the PDD form and guidance appropriated to the type of project activity. VVS § 62	Yes, the PP used the last version "F-CDM-SSC-PDD - Project Design Document form for Small-Scale CDM project activities" Version 04.1	Resolved
<b>6. Description of the project activity</b>		
6.1 The PDD is accurate, complete, and provides an understanding of the proposed CDM project activity. (by reviewing available designs and feasibility studies and conducting comparison analysis with equivalent projects) VVS § 64	Yes, see section 3.3.	Resolved

## VALIDATION REPORT VVS



CHECKLIST QUESTION	REFERENCIES	Final Conclusion
6.2 The project is correctly classified as large scale, non-bundled small-scale projects with emission reductions exceeding 15,000 tonnes per year or bundled small-scale projects, each with emission reductions not exceeding 15,000 tonnes per year. VVS § 65	N.A	
6.3 For other individual proposed small-scale CDM project activities with emission reductions not exceeding 15,000 tonnes per year, the DOE should conduct a physical site visit as appropriate. If not, it shall be justified by the DOE. VVS § 66	The DOE conducted a physical site visit (see section 2.1)	Resolved
6.4 If apply, the use of any sampling approach was made according to the "Standard for sampling and surveys for CDM project activities and programme of activities"? VVS § 66	N.A.	
<b>7. Application of the selected Baseline and monitoring methodology</b>		
7.1 The baseline and monitoring methodologies selected by the project participants are the valid versions of those approved by the Board. The selected version is valid at the time of submission of the proposed project activity for registration. VVS § 70 and 73	Yes, the PP used the last version available at moment of made the PDD. See section 3.3.	Resolved
7.2 The selected methodology applies to the project activity and was correctly applied with respect to: Project Boundary, baseline identification, algorithms and/ formulae used to determine emission reduction, additionality, monitoring methodology. VVS § 72 and 74	See sections 3.3, 3.4, 3.5, 3.6 and 3.7	Resolved
7.3 Has been confirmed each applicability condition listed in the approved methodology selected. VVS § 77	Yes, see section 3.3	Resolved
<b>8. Deviation from an approved methodology</b>		
8.1 Did the project request a deviation from an approved methodology before the publication of the PDD? VVS § 78	N.A.	

## VALIDATION REPORT VVS



CHECKLIST QUESTION	REFERENCES	Final Conclusion
8.2 if there are any request for deviation from an approved methodology, the applicability of the appendix 1 of Project standard must be applied. VVS § 79	N.A.	
<b>9. Clarification on the applicability of an approved methodology</b>		
9.1 Was requested any clarification on the applicability of the approved methodology since the DOE cannot make a determination regarding the applicability of the selected methodology to the proposed project activity? VVS § 81	N.A	
<b>10. Project boundary</b>		
10.1 Are all main GHG emission sources, the physical delineation of the proposed project activity and other relevant project and baseline emission sources covered in the methodology, included within the project boundary for the purpose of calculating project and baseline emissions for the proposed project activity? VVS § 82	See section 3.3.	Resolved
10.2 Does the methodology allow project participants to choose whether a source or gas is to be included within the project boundary? -Have the project participant justified that choice? The DOE shall determine whether the justification provided is reasonable, based on an assessment of supporting documented evidence provided by the project participants and corroborated by observations if required. VVS § 84	No, the methodology AMS-I.D. does not allow PP to choose whether a source or gas is to be included within the project boundary.	Resolved
10.3 For the project activities that have both A/R and non-A/R components, please confirm that the emissions associated with the A/R activity will be accounted for and documented by the A/R project activity. VVS § 85	N.A.	
<b>11. Baseline scenario identification and description</b>		
11.1 The Baseline identified for the proposed project activity is the scenario that reasonably represents the anthropogenic emissions by sources of GHGs that would occur in the absence of the proposed project activity. VVS § 88	Yes, see sections 3.4 and 3.5.2	Resolved

## VALIDATION REPORT VVS



CHECKLIST QUESTION	REFERENCES	Final Conclusion
11.2 Please confirm that all tools required by the methodology has been used by the PP. VVS § 89	Yes, see sections 3.4 and 3.5.2	Resolved
11.3 Assess the baseline scenarios based on financial expertise and local and sectoral knowledge, make crosscheck of the information provided in the PDD with other verifiable and credible sources, such as local expert opinion, if available, relevant national and/or sectoral policies and circumstances, such as sectoral reform initiatives, local fuel availability, power sector expansion plans, and the economic situation in the project sector. VVS § 90, 91, 92	Yes, see sections 3.4 and 3.5.2	Resolved
<b>12. Algorithms and/or formulae used to determine emission reductions</b>		
12.1 Does the steps taken and equations applied to calculate project emissions, baseline emissions, leakage and emission reductions comply with the requirements of the selected baseline and monitoring methodology. VVS § 96	See section 3.7	Resolved
12.2 If the methodology allows for selection between options for equations or parameters, the DOE shall determine whether adequate justification has been provided and if the justification provided is reasonable, based on an assessment of supporting documented evidence provided by the project participants and corroborated by observations if required VVS § 97	See section 3.7 ICONTEC confirmed that the choices were adequate and justified.	Resolved
12.3 Verify the justification given in the PDD for the choice of data and parameters used in the equations (appropriate, conservative and reasonable). Data sources must be provided for each parameter. VVS § 98	ICONTEC confirmed that the choice is appropriate, conservative and reasonable. See section 3.7	Resolved
<b>13. Additionality of a project activity</b>		
13.1 Assess and verify the reliability and credibility of all data and any assumptions, justifications and documentation provided by project participants to support the demonstration of additionality. It based on financial expertise and local and sectoral knowledge, evaluate and verify	ICONTEC asked PP to present documental evidence for the investment calculation (See CL 5). The evidence was sent to ICONTEC.	See CL 5. Resolved 22/08/2012

## VALIDATION REPORT VVS



CHECKLIST QUESTION	REFERENCES	Final Conclusion
<i>the information provided in the PDD with other verifiable and credible sources, such as local expert opinion, if available.</i> VVS § 102	Yes, see section 3.5	
<i>13.2 Please confirm that all tools required by the methodology have been used by the PP.</i> VVS § 103	Yes, see section 3.5	Resolved
<i>13.3 For small scale project activities or micro scale project activities, the project participant used the applicable Guidelines, procedures and document issued by the EB</i> VVS § 158 - 160	Yes, see section 3.5	Resolved
<b>14. Assessment of prior consideration of the clean development mechanism</b>		
<i>14.1 has been identified the start date of the project activity in accordance with the CDM glossary of terms.</i> VVS § 106	Yes, see section 3.5.1	Resolved
<i>14.2 Prior consideration assessment must be done according to the latest version of the "guidelines on the demonstration and assessment of prior consideration of the CDM."</i> VVS § 106, 107, 108	Yes, see section 3.5.1. However in order to be more clear inside PDD, ICONTEC raised CAR 2.	See CAR 2 Resolved 22/08/2012
<i>14.3 Depending of the gap between the evidence documented, does the PP justify the validation opinion of the CDM status?</i> VVS § 110, 111	<i>This situation does not apply for this project.</i>	Resolved
<b>15. Identification of alternatives (if apply)</b>		
<i>15.1 Has been identified the alternatives in accordance with the approved methodology and/or the tool of additionality.</i> VVS § 113	N.A	
<i>15.2 Does the DOE evaluate if the list of alternatives includes as one of the options that the project activity is undertaken without being registered as a proposed project activity, contain all plausible alternatives to be viable means of supplying the comparable outputs or services that are to be supplied by the proposed project activity and comply with all applicable and enforced legislation?</i> VVS § 114	N.A	

## VALIDATION REPORT VVS



CHECKLIST QUESTION	REFERENCES	Final Conclusion
<b>16. Investment analysis (if apply)</b>		
16.1 Was applied for the PP's the latest version of Guidelines on the assessment of investment analysis? VVS § 118	N.A	
16.2 Does the DOE verify if the project activity is not the most economically or financially attractive alternative: <ul style="list-style-type: none"> <li>Does not produce financial or economic benefits other than CDM-related income,</li> <li>Is less economically or financially attractive than at least one other credible and realistic alternative:</li> <li>The financial returns of the proposed project activity would be insufficient to justify the required investment?</li> </ul> VVS § 119	N.A	
16.3 Was verified: <ul style="list-style-type: none"> <li>suitability of the financial indicator selected,</li> <li>assessment of all parameters and assumptions used in calculating such financial indicators, and determine the accuracy and suitability</li> <li>Cross-check the parameters against third-party,</li> <li>review, as appropriate, feasibility reports, public announcements, annual financial reports</li> <li>sensitivity analysis</li> <li>The computations</li> <li>The correctness of carry out and documented by PP's</li> </ul> VVS § 120	N.A	
16.4 Was verified: <ul style="list-style-type: none"> <li>Determine whether the type of benchmark applied is suitable for the type of financial indicator presented</li> <li>Ensure that any risk premiums applied in determining the benchmark reflect the risks associated with the project type or activity</li> <li>Determine whether it is reasonable to assume that no investment would be made at a rate of return lower than the benchmark.</li> </ul> VVS § 121	N.A	



## VALIDATION REPORT VVS



CHECKLIST QUESTION	REFERENCES	Final Conclusion
<p>16.5 Was verified (if apply):</p> <ul style="list-style-type: none"> <li>The FSR is the basis for the decision to proceed with the investment in the project, i.e. that the period of time between the finalization of the FSR and the investment decision is sufficiently short that it is unlikely in the context of the underlying project activity that the input values would have materially changed</li> <li>The values used in the PDD and associated annexes are fully consistent with the FSR, and where inconsistencies occur the DOE shall assess the appropriateness of the values</li> <li>The input values from the FSR are valid and applicable at the time of investment decision. The DOE shall confirm this on the basis of its specific local and sectoral expertise and by cross-checking or other appropriate means.</li> </ul> <p>VVS § 122</p>	N.A	
<b>17. Barrier Analysis (if apply)</b>		
<p>17.1 Does the DOE determine whether the proposed project activity faces barriers that:</p> <p>(a) Prevent the implementation of this type of proposed project activity (See the latest “Guidelines for objective demonstration and assessment of barriers”)</p> <p>(b) Do not prevent the implementation of at least one of the alternatives.</p> <p>VVS § 124</p>	Section 3.5.2	Resolved
<p>17.2 Did the DOE determine if the issues that have a direct impact on the financial returns of the project activity are not considered barriers and shall be assessed by investment analysis?. This does not refer to either:</p> <p>(a) Risk related barriers, for example risk of technical failure, that could have negative effects on financial performance; or</p> <p>(b) Barriers related to the unavailability of sources of finance for the project activity.</p> <p>VVS § 125</p>	Section 3.5.2	Resolved
<p>17.3 Did the DOE apply the two step process to evaluate the barrier analysis performed determining if the barriers are real and if prevent the implementation of the project activity but not the implementation of at least one of the possible alternatives?</p> <p>VVS § 126</p>	Section 3.5.2	Resolved

## VALIDATION REPORT VVS



CHECKLIST QUESTION	REFERENCES	Final Conclusion
<b>18. Common Practice Analysis (if apply)</b>		
18.1 For proposed large-scale project activities, unless the proposed project type is first-of-its-kind as determined in accordance with the relevant guidelines, the DOE assess whether the project participants have conducted a common practice analysis. VVS § 128	N.A	
18.2 Did the DOE use official sources and its local and sectoral expertise to: (a) assess whether the geographical scope (e.g. the defined region) of the common practice analysis is appropriate for the assessment of common practice related to the project activity, (b) Determine to what extent similar and operational projects (e.g. using similar technology or practice), other than project activities, have been undertaken in the defined region; (c) Assess, if similar and operational projects, other than project activities, are already “widely observed and commonly carried out” in the defined region, whether there are essential distinctions between the proposed project activity and the other similar activities. (See the Tool for assessing the additionality and/or the latest version of the Guidelines for assessing the common practice) VVS § 129	N.A	
<b>19. Monitoring Plan</b>		
19.1 The Audit team identified the list of parameters required by the selected approved methodology including applicable tool(s), and confirmed that are includes the data management and quality assurance and quality control procedures to ensure that the proposed project activity can be reported ex post and verified.  To assess the implementation of the plan the DOE shall, by means of review of the documented procedures, interviews with relevant personnel, project plans and any physical inspection of the proposed project activity site. VVS § 132	ICONTEC asked PP to complete the information related with the cross checking approach for EG <sub>Itaguaçu, y</sub> according with the methodology. The CAR was closed.  ICONTEC verified that the monitoring plan was presented appropriately by PP. See section 3.6 of this validation report.	See CAR 1  Resolved 22/08/2012
<b>20. Environmental Impacts</b>		

## VALIDATION REPORT VVS



CHECKLIST QUESTION	REFERENCES	Final Conclusion
20.1 Did the project participants develops an environmental impact analysis including trans boundary impacts VVS § 134	Yes, section 3.8	Resolved
20.2 Did the project participant conduct an environmental impact assessment, if required to do so by the host Party, in accordance with the host Party's procedures?	See section 3.8.	Resolved
<b>21. Local stakeholder consultation</b>		
21.1 Has the project participants completed a local stakeholder consultation process and that due steps were taken to engage stakeholders and solicit comments for the proposed project activity? VVS § 138	Yes, see section 3.9	Resolved
21.2 The DOE determine whether: (a) Comments have been invited from local stakeholders that are relevant for the proposed project activity; (b) The summary of the comments received as provided in the PDD is complete; (c) The project participants have taken due account of all comments received and have described this process in the PDD. VVS § 139	Yes, see section 3.9	Resolved
<b>22. Small-scale project activities/Project activity eligibility(if apply)</b>		
22.1 Does the proposed project activity meet the small-scale eligibility requirements? (See the simplified modalities and procedures for small-scale CDM project activities presented under decision 4/CMP.1, annex II.) VVS § 150	Yes, see section 1.3 The project activity is Type (i) "renewable energy project activities with a maximum output capacity equivalent to up to 15 megawatts", as indicated by the manufacturer of the equipment and the feasibility study.	Resolved
22.2 For a project activity that is within the small-scale project activity threshold but applies a large-scale approved methodology, the DOE determines whether this project activity follows the modalities and procedures for large-scale project activities. VVS § 151	N.A	
22.3 The DOE shall determine whether: (a) The project activity qualifies within the thresholds of the three possible	See section 1.3	Resolved

## VALIDATION REPORT VVS



CHECKLIST QUESTION	REFERENCES	Final Conclusion
<p>types of small-scale project activities. It may include more than one component</p> <p>(b) The project activity conforms to one or more of the approved small-scale methodologies applied in conjunction with the general guidelines to SSC CDM methodologies</p> <p>(c) The proposed small-scale project activity is not a debundled component of a large-scale project activity.</p> <p>VVS § 152</p>		
<b>23. Small-scale project activities/Debundling (if apply)</b>		
<p>23.1 The proposed small-scale project activity is not a debundled component of a large-scale project activity in accordance with the Guidelines on assessment of debundling for SSC project activities</p> <p>VVS § 154</p>	See section 1.3	Resolved
<p>23.2 The proposed small-scale project activity is a debundled component of a large-scale project activity if there is a registered small-scale project activity or an application to register another small-scale project activity.</p> <p>VVS § 155</p>	N.A	
<p>23.3 The Project participant takes into account specific debundling requirements for Type I project activities and small-scale transport project activities.</p> <p>VVS § 156</p>	<p>According to Annex 13 "Guidelines on assessment of debundling for SSC project activities, (Version 03)", point 4, ICONTEC confirmed the project is not a debundled component of a large-scale.</p>	Resolved

## VALIDATION REPORT VVS



**Table A.2: Resolution of Corrective Action, Forward Action and Clarification Request**

Report clarifications and corrective action requests	References	Summary of project owner response	Validation conclusion
<p>CAR 1</p> <p>PP should be explained how the cross checking approach for EG<sub>Itaguaçu</sub> fits with methodological statements:  “...If applicable, measurement results shall be cross checked with records for sold/purchased electricity (e.g. invoices/receipts)...  ...If applicable, cross check net electricity supplied to a grid as gross energy generation in the project activity power plant minus the auxiliary/station electricity consumption, technical losses and electricity import from the grid to the project power plant measured at the grid interface/connection used for billing purposes”</p>	<p>Annex A, Table A.1: VVS § 132 (19. Monitoring Plan)</p>	<p>The point of contact with the SIN (Substation Pitanga, where are the meters) is the last frontier of which all other losses are no longer included.  Thus, as seen locally, the values of power meters (main and back-up) are gotten by two ways, that are:  1) Reading system software for data acquisition directly available for the PP;  2) System Sinercom CCEE (reading obtained through criptocard access).  In case of difference of readings (from CCEE and Itaguaçu) will be considered the lowest for the calculation of CERs from the project.</p>	<p>Validation Team Response: the explanation was accepted by ICONTEC. The information was also complemented by PP in section B.7.1 of the last version of the PDD.</p> <p>Validation Team Conclusion: CLOSED</p>
<p>CAR 2</p> <p>Prior consideration section must be included in PDD, according with CDM rules and procedures.</p>	<p>Section 14, Table A.1 VVS § 106, 107, 108</p>	<p>It was created a table, number 5 in PDD version 2 with the main milestones from the project.</p>	<p>Validation Team Response: ICONTEC confirmed the information of the new table of the PDD, based on the evidence found out during on site visit.</p> <p>Validation Team Conclusion: CLOSED.</p>
<p>CAR 3</p> <p>The project participant must update “Annex A of Appendix B of simplified modalities and procedures for small scale CDM project activity” by the latest version.</p>	<p>PDD Section B.5 additionality</p>	<p>Ok, it was updated in PDD version 2.</p>	<p>Validation Team Response: ICONTEC verified that the latest version was included inside the PDD (version 2).</p> <p>Validation Team Conclusion: CLOSED</p>

## VALIDATION REPORT VVS



<p><b>CAR 4</b></p> <p><i>During on site visit, DOE found out that there are two preliminary Licenses LP no.30424 and LP1046. The PP indicated only one LP in PDD version 1.</i></p>	<p><i>PDD section D</i></p>	<p><i>Ok, it was revised in PDD version 2.</i></p>	<p><i>Validation Team Response: Both licenses were included inside PDD version 2.</i></p> <p><i>Validation Team Conclusion: CLOSED</i></p>
<p><b>CAR 5</b></p> <p><i>During on site visit, DOE found out that a new "Schedule Itaguacu.pdf" has been defined by PP. This information impacts the starting date de crediting period.</i></p>	<p><i>Section C.2.2, PDD</i></p>	<p><i>The starting date period was revised to 1st February 2013 in the PDD version 2 and JUN1146_CERs_v2.</i></p>	<p><i>Validation Team Response: The information was corrected inside PDD version 2 and JUN1146_CERs_v2, based on the documentation found out by ICONTEC during on site visit.</i></p> <p><i>Validation Team Conclusion: CLOSED</i></p>
<p><b>CL 1</b></p> <p><i>The methodology version indicated by PP in Appendix 4 does not correspond to version 17.</i></p>	<p><i>Appendix 4, PDD</i></p>	<p><i>Appendix 4 was changed in last version of PDD.</i></p>	<p><i>Validation Team Response: ICONTEC confirmed the new information of the Appendix 4.</i></p> <p><i>Validation Team Conclusion: CLOSED</i></p>
<p><b>CL 2</b></p> <p><i>On UNFCCC website (prior consideration) project name is different from the project name found out inside UNFCCC validation website.</i></p>	<p><i>www.unfccc.int Prior consideration and www.unfccc.int Validation</i></p>	<p><i>It was done designedly, since is not possible to define the project activity title during this step (e.g. may compose a bundle, etc) the PP prefers to assign in the field "Title of the CDM project activity" only the plant name. Considering valid the title issued during the publication for the global stakeholders. The main identification parameter to identify the SHP Itaguaçu should be the precise geographic location.</i></p>	<p><i>Validation Team Response: During onsite visit, ICONTEC could verify through the interviews and documentation, that there is only one project since the beginning of the first prefeasibility studies (aprox. 2002). The explanation is accepted by PP. ICONTEC confirmed the coordinates in all the documentation reviewed.</i></p> <p><i>Validation Team Conclusion: CLOSED</i></p>

## VALIDATION REPORT VVS



<p>CL 3</p> <p><i>Characteristics of electric connection to the grid should be given.</i></p>	<p>Section A.3, PDD</p>	<p>A mention was done in the PDD version 2 (section A.3) and also was included the Figure 2 in the section B.7.3.</p>	<p>Validation Team Response: The information was included inside PDD version 2. The information corresponds to the evidences found out during on site visit.</p> <p>Validation Team Conclusion: CLOSED.</p>
<p>CL 4</p> <p><i>Indicate the decimal coordinates of the Project activity.</i></p>	<p>Section A.2.4, PDD</p>	<p>Ok, the decimal coordinates were added in the item A.2.4.</p>	<p>Validation Team Response: The information was included inside PDD version 2, and it was validated by ICONTEC.</p> <p>Validation Team Conclusion: CLOSED</p>
<p>CL 5</p> <p><i>The documental evidence (calculation memory) for the investment calculation must be provided by PP, in order to complete the information presented in Board meeting Minute date 30/09/2010.</i></p>	<p>Section 13, Table A.1 VVS § 102</p>	<p>Follow annex the document OPE_Itaguaçu_jul2010.pdf.</p>	<p>Validation Team Response: The evidence was presented to ICONTEC. The information corresponds to the information found out by ICONTEC during onsite visit.</p> <p>Validation Team Conclusion: CLOSED</p>
<p>CL 6</p> <p><i>In the Investment barrier, PP should clarify the use of terminology, regarding “project IRR” and “Equity IRR” according with the Guidelines on the assessment of investment analysis, version 05.</i></p>	<p>Guidelines on the assessment of investment analysis  PDD, section 5</p>	<p>Ok, it was corrected in the PDD version 2.</p>	<p>Validation Team Response: The terminology was corrected by PP inside PDD version 2.</p> <p>Validation Team Conclusion: CLOSED</p>







ANNEX B

LETTER OF APPROVAL (LoA)

Federative Republic of Brazil  
Interministerial Commission in Global Climate Change

Letter of Approval

To: ITAGUAÇU ENERGIA S/A (Project Participant)  
CARBOTRADER ASSESSORIA E CONSULTORIA EM ENERGIA EIRELI  
(Project Participant)  
INSTITUTO COLOMBIANO DE NORMAS TÉCNICAS Y CERTIFICACIÓN –  
ICONTEC (Designated Operational Entity)

Date: November 23<sup>rd</sup>, 2012

1. As President of the Interministerial Commission on Global Climate Change, the Designated National Authority for the Clean Development Mechanism under the Kyoto Protocol, I hereby confirm that:

(i) The Federative Republic of Brazil ratified the United Nations Framework Convention on Climate Change on February 28<sup>th</sup>, 1994 and the Kyoto Protocol on August 23<sup>rd</sup>, 2002;

(ii) The Federative Republic of Brazil participates voluntarily in the CDM;

(iii) The project activity “SHP Itaguaçu CDM Project (Jun 1146), Brazil” as defined by the Project Design Document, dated of August 20<sup>th</sup>, 2012 and identified as Version 2, validated by the Designated Operational Entity Instituto Colombiano de Normas Técnicas y Certificación – ICONTEC, by means of the Validation Report dated of September 6<sup>th</sup>, 2012 and identified as Revision 0, will assist the Federative Republic of Brazil in achieving sustainable development.

2. I henceforth declare that the Executive Secretary of the Brazilian DNA is authorized to submit to the Executive Board of the CDM a request for the review of the “Project”, in case the Project Design Document and the Validation Report submitted to the Executive Board of the CDM for registration do not correspond to the documents identified in paragraph 1-(iii) above.

Yours sincerely,



MARCO ANTONIO RAUPP  
Minister of Science, Technology and Innovation of the Federative Republic of Brazil  
President of the Interministerial Commission on Global Climate Change

**ANNEX C****TEAM AUDIT EXPERIENCE AND KNOWLEDGE  
(Summary)****Eng. Ana Isabel Aubad  
Lead Audit**

International Master (MSc.) “Material and Energy Flow Management”. Universidad Trier, Germany. Area of study in depth: “Use of solid waste for energy generation”. Master's thesis with the biogas company Kompogas. 2005

“ISO 14000 and ISO 9000 Quality Auditor”. Universidad de Antioquia in association with Bureau Veritas, Medellin, Colombia. 1999

“Environmental Engineer”. Escuela de Ingeniería de Antioquia, Envigado, Colombia. 1998

Internship - November 2009: company specialized in design, construction and operation of biogas plants: Chfour Biogas Inc. Ontario, Canada.

Internship- September 2008: company specialized in design, construction and operation of biogas plants: Agraferm Ag-Luxemburgo.

Internship- April-May 2007: companies specialized in design, construction and operation of biogas plants (Agraferm, Biogasnord, Ökobit). Germany.

Practical training – November 2004: “Local Administration of the Environment, Agenda 21 and sustainable development (2 phase)”. Life Academy, San José, Costa Rica.

Practical training – April-May 2002: “Local Administration of the Environment, Agenda 21 and sustainable development (1 phase)”. Life Academy, Karstad, Sweden.

Internship – July- August 1999: “Practical training on Environmental Management Systems and Cleaner Production”. Federal Swiss Institute for Research and Materials Testing (EMPA). St. Gallen, Switzerland.

**PROFESSIONAL EXPERIENCE**

- Environmental engineer and project management company G.P.R. S.A., Chile. (2006 – 2011). Project Manager (main subjects: energy, biogas and waste management projects).
- ICONTEC S.A. (2006–Today). External professional ISO 9001/14001/Chilean Technical Standards/Education/ Climate Change (CDM, voluntary programs, carbon footprint).
- Deuman S.A., Chile. (2007). Team work engineering for development and implementation of CDM – Kyoto Protocol projects.
- ISAGEN S.A. E.S.P, Colombia (2000 – 2006). Analysts of the national energy company.
- Fulda-Südwest“. Öko Institut (German Ecology Institute), Darmstadt-Germany. (July to September 2004). Co-realization of the feasibility study for the construction of an energy plant from the biomass potential of the region of Fulda.

- MVR Müllverwertung Rugenberger Damm GmbH & Co. KG, Hamburg-Germany. (December 2003 to February 2004). Environmental engineering (professional internship), waste incineration with co-generation plant.
- National Center of Cleaner Production and Environmental Technologies (Centro Nacional de Producción Más Limpia y Tecnologías Ambientales - CNPMLTA), Medellín-Colombia. (1999 – 2000).
- ISAGEN S.A. E.S.P, Colombia. (1997 – 1998). Professional practice, work team member responsible for designing the EMS based on ISO 14001.

### EXPERIENCE IN CDM ACTIVITIES (Main references)

#### Technical Reviewer:

- Verification of three periods for “Agua Fresca Multipurpose and Environmental Services Project”
- Validation of “Fuel Switching through change of furnaces at Imusa S.A.”
- Validation of “Pirgua Landfill Gas Recovery and Flaring”
- Validation of “Installation of a high-pressure/high-efficiency bagasse boiler to cogenerate heat and power”
- Validation of “Methane Gas Capture and Fuel Switching at Compañía Argentina de Levaduras S.A.I.C. Plant Project”
- Validation of “Cueva Maria Hydroelectric Expansion Project”
- Validation of “Montenegro Landfill Gas Recovery and Flaring”
- Validation of “La Vegona Hydroelectric project”
- Validation of “Chamalecón 280 Hydroelectric project”
- Validation of “Metaldom Fossil fuel switch from reheat furnace”
- Verification of “Doña Juana Landfill gas-to-energy project”
- Verification of “La Vuelta and la Herradura hydroelectric project”
- Verification of “Landfill Gas to Energy Facility at the Nejapa Landfill Site, El Salvador”
- Verification of “Co-composting of EFB and POME project”
- Verification “Biogas Project, Olmeca III, Tecun Uman”
- Verification of “Los Algarrobos hydroelectric project”
- Verification La Venta II Project
- Verification Toachi – Pilaton Hydroelectric Project
- Verification VCS Scheme: Fuel-Switching Project from Fossil Fuels to Biomass in La Providencia, Arcor

#### Specialist (onsite visit):

- Verification of two periods “Biogas energy plant from palm oil mill effluent”
- Validation of “Los Angeles Landfill Gas Flaring Project”
- Verification of “Doña Juana Landfill gas-to-energy project”
- Verification of “Landfill Gas to Energy Facility at the Nejapa Landfill Site, El Salvador”
- Verification of “La Joya hydroelectric project”
- Verification of “Hydroelectric Santa Ana”
- Verification Biogas Project, Olmeca III, Tecun Uman

#### Lead Auditor:

- Verification of “BRASCARBON Methane Recovery Project BCA-BRA-05, Brazil”
- Verification of “BRASCARBON Methane Recovery Project BCA-BRA-07, Brazil”
- Verification of “BRASCARBON Methane Recovery Project BCA-BRA-08, Brazil”
- Validation of Biogas Project, Olmeca I, Santa Rosa

- Verification of Co-composting of EFB and POME project
- Verification Doña Juana landfill gas-to-energy project
- Validation CTR ROSARIO Landfill Gas Project
- Validation CTR Feira de Santana Landfill Gas Project

Lead auditor in voluntary schemes:

- Validation and verification of VCS "BRASCARBON Methane Recovery Project BCA-BRA-05, Brazil"
- Validation and verification of VCS "BRASCARBON Methane Recovery Project BCA-BRA-07, Brazil"
- Validation and verification of VCS "BRASCARBON Methane Recovery Project BCA-BRA-08, Brazil"

### **Eng. Fernando Gómez Gómez** **Energy and financial expert**

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

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

Engineer Specialist in electric planning research and development of models for planning and operation of electric systems. 1976 - 1978

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 (Some references)

Technical Reviewer and participation as Energy and Financial expert (onsite visit) in more than 60 project activities, from 2006 to 2012, inter alias:

- Verification of three verification periods of Santa Ana Hydroelectric plant project
- Verification of first verification period of Agua Fresca Multipurpose and Environmental Services Project
- Verification of two verification 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
- Validation of El Bote small hydroelectric plant project
- Verification of "La Joya hydroelectric project"
- Validation Thuan Nhien Phong - Viet Nam
- Validation Phuong Mai 3 - Viet Nam
- Verification La Venta II Project
- Verification Biogas Energy plant from palm oil mill effluent
- Validation Ferreira Gomes Hydro power plant CDM project activity
- Verification Toachi – Pilaton Hydroelectric Project
- Validation of "Fuel Switching through change of furnaces at Imusa S.A."
- Verification of "Los Algarrobos hydroelectric project"
- Validation CTR ROSARIO Landfill Gas Project
- Validation CTR Feira de Santana Landfill Gas Project

#### **Erika Lucia Urrego Ortiz** **ICONTEC technical reviewer**

Currently a student at the Magister in quality and integral management, 2012

Zootechnician, Universidad Agraria De Colombia, Bogotá D.C. August 1997.

Specialist in Environmental Management Systems. Universidad Externado de Colombia. Bogotá D.C. September 2002

ISO 14001 Diploma, ICONTEC, Bogotá D.C. 2002.

Food Harmlessness Management System under ISO 22000 standard Course, ICONTEC, Bogotá D.C. March, 2003

Quality Management Systems under ISO 9001:2000 standard Course, ICONTEC, May 2007.

Updating on CDM Course, Ministry of Environment, Housing and Territorial Development, Bogotá D.C 2006

OHSAS 18001 Diploma, ICONTEC, Bogotá D.C. July 2005.



**WORK EXPERIENCE:**

2006 – Actual  
ICONTEC

To prepare and perform the certification services assigned as per her Career Plan qualification, according to the procedures. To provide guidance to the certification costumers about the technical aspects of the assigned services provision. To participate in changing or designing Certification services, by changing or creating the respective procedures.

2003 – 2006  
ASOCIACION COLOMBIANA DE PORCICULTORES-FNP

To coordinate the activities to be performed by the Environmental Window Program in the various country areas. To allocate and execute resources engaged under the Cleaner Production agreements signed by pork producers with several environmental authorities. To lead the CDM project, focused on reducing methane (CH<sub>4</sub>) emissions issued by animal waste.

To be aware of the Ecuadorian and Chilean methodologies already approved by the CDM Executive Board for Hog Breeding Sector to elaborate a proposal for the hog breeding sector together with the Ministry of Environment, Housing and Territorial Development in order to join farms to CDM projects.

2001 – 2002  
FICHTNER GmbH & Co. KG

To prepare, design and apply surveys focused on the identification of power consumption in the sector of slaughter, processed meat and food concentrate for animals.

1998 – 2001  
Regional Environmental Authority (CAR Sumapaz)

To support the environmental management units on technical concepts of processes, permissions, sanctions, control, monitoring and assessment in the proper and timely management of the Sumapaz area's natural resources.

**Eng. Cristian Grisales**  
**ICONTEC technical reviewer**

Electrical Engineer  
UNIVERSIDAD NACIONAL DE COLOMBIA

**WORK EXPERIENCE:**

2012 – Actual  
ICONTEC  
Professional climate change

2009 – 2012  
EMGESA S.A E.S.P  
Electrical Maintenance Engineer.

Hydroelectric Power Plants Guaca, Tinta, Junca, Bogotá River Hydroelectric Plants.  
Preventive, predictive and corrective maintenance of the generating units, auxiliary services, power transformers and electrical substation, developed of the investment projects, interventory in accordance with annual operating budget, implementation of maintenance plans from systems analysis as RCM decision sheets, monthly service availability in the plant, and availability of full-

time in failure attention, electrical testing of generators, transformers, motors and substation equipment.