VALIDATION OF THE PROJECT:

SHPS TAMBAÚ, DAS PEDRAS AND RIO DO SAPO CDM PROJECT (JUN1132), BRAZIL

TAMBAÚ ENERGÉTICA S.A
(BRAZIL)
EUCLIDES MACIEL ENERGÉTICA S/A
(BRAZIL)
RIO DO SAPO ENERGIA S.A.
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(BRAZIL)

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Client:	TAMBAÚ ENERGÉTICA S.A, EUCLIDES MACIEL ENERGÉTICA S/A and RIO DO SAPO ENERGIA S.A.	Client ref.:	CDMVA-13-003

Summary:

ICONTEC has performed the validation of the project: "SHPs Tambaú, das Pedras and Rio do Sapo CDM Project (JUN1132), Brazil" in 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 upon methodology: ACM0002 "Consolidated baseline methodology for grid-connected electricity generation from renewable sources" version 14.0.0, as well as the methodological tool "Tool for the demonstration and assessment of additionality" version 07.0.0 and methodological tool "Tool to calculate the emission factor for an electricity system" version 04.0.

The project itself involves the construction of three different power plants: Tambaú with an installed capacity of 8.82 MW and an estimated power density of 42.8 W/m^2, das Pedras with an installed capacity of 5.60 MW and an estimated power density of 12.2 W/m^2, finally Rio do Sapo with an installed capacity of 5.76 MW and an estimated power density of 5.7 W/m^2. The project aims to reduce emissions for a total of 194,059 tCO_2e within the crediting period

The main purpose of the project activity is to provide electric power to the National Interconnected System, displacing the thermal generation from fossil fuels present in the system with the generation of renewable energy. Tambaú facilities are going to be managed by Tambaú Energética S.A, das Pedras facilities are going to be managed by Euclides Maciel Energética S/A and Rio do Sapo facilities are going to be managed by Rio do Sapo Energia S.A.

The validation process consisted of the three following 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

In summary, is the ICONTEC opinion that the project SHPs Tambaú, das Pedras and Rio do Sapo CDM Project (JUN1132), Brazil ", as described in the latest version /1/ 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 ACM0002 version 14.0.0 /2/. Hence, ICONTEC requests the registration of the project as CDM project activity.

Report No:	*CDMVA-13-003-3*	*Subject Group:*	*1 - Energy Industries (renewable/non-renewable sources)*	*Indexing terms:*
Report title: Validation of the Project: SHPs Tambaú, Das Pedras and Rio Do Sapo CDM Project (Jun1132), Brazil				*Climate Change; Kyoto Protocol; Validation; Clean Development Mechanism*

Work verified by	*Erika Urrego* *ICONTEC Technical reviewer* *Francy Ramirez* *ICONTEC Technical Expert reviewer*	☒ *No distribution without permission from the Client or responsible organizational unit* ☐ Limited distribution ☐ Unrestricted distribution
Technical review date:	*18/07/2013* *and* *22/07/2013*	
Number of pages:	*96*	

This report should not be read without reference to the annex A, Validation Protocol.

Abbreviations

CAR	Corrective Action Request
CDM	Clean Development Mechanism
CERs	Certified emission reductions
CL	Clarification Request
CO_2e	Carbon dioxide equivalent
DNA	Designated National Authority
DOE	Designated Operational Entity
GHG	Greenhouse Gases
ICONTEC	Colombian Institute of technical standards and certification (Instituto Colombiano de Normas Técnicas y Certificación)
IPCC	Intergovernmental Panel on Climate Change
MoC	Modalities of Communication
PDD	Project Design Document
UNFCCC	United Nations Framework Convention for Climate Change
VVS	CDM Validation and Verification Standard
SIN	Integrated National System (from Portuguese – Sistema Interligado Nacional)
CIMGC	Brazilian Inter-Ministry Commission on Global Climate Change
ONS	National Electric System Operator (from Portuguese Operador Nacional do Sistema Elétrico)
ANEEL	Electricity Regulatory Agency (from Portuguese Agência Nacional de Energia Elétrica)
FATMA	State Foundation of the Environment Santa Catarina State
SEMA	Environment Secretary of Mato Grosso State
FEPAM	State Foundation of Environment Protection Henrique Luiz Roessler –Rio Grande do Sul State
OPE	Budget Standard Eletrobras (from Portuguese Orçamento Padrão Eletrobrás)
FSR	Feasibility Study Report
MCTI	The Brazilian Ministry of Science, Technology and Innovation
IRENA	International Renewable Energy Agency
CCEE	Brazilian Electric Energy Commercialization Chamber

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1. INTRODUCTION

TAMBAÚ ENERGÉTICA S.A, EUCLIDES MACIEL ENERGÉTICA S/A and RIO DO SAPO ENERGIA S.A commissioned ICONTEC to perform the Validation of SHPs Tambaú, das Pedras and Rio do Sapo CDM Project (JUN1132), Brazil , BRAZIL (hereafter called “the project”).

This report summarizes the findings in 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 in developing three (3) new hydroelectric power plants, the ones take advantage of the rivers Guarita (SHP Tambaú), Chapecó (SHP das Pedras) and do Sapo (SHP Rio do Sapo). The water flow is going to allow a total installed capacity of 8.82 MW for *Tambaú*, 5.60 MW for das *Pedras* and 5.76 for *Rio do Sapo*.

The main purpose of the project activity is to provide electric power to SIN displacing fossil fuel consumption in thermal generation units by renewable energy generation.

1.1. OBJECTIVE

The purpose of a validation is to secure the opinion of an independent third party in order to assess the project design: the project baseline, the monitoring plan, and compliance with relevant UNFCCC of the project.
Host Party’s criteria are validated in order to confirm that the project design, as documented, is sound and reasonable and meets the identified criteria. Validation is a requirement for all CDM projects and is seen as necessary to provide assurance to stakeholders of the quality of the project and its intended generation of certified emission reductions (CERs).

1.2. SCOPE

The validation scope involves an independent and objective review 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 the Designated National Authority or project agreements between involved parties.

ICONTEC carries out audits according to 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 (VVS). Likewise, ICONTEC focuses on the identification of significant risks for CER generation, and verification of the mitigation during its audits.

The validation does not intend to provide 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

The GHG project activity is classified as a CDM project in Sectoral Scope 1: *Energy industries (renewable/non-renewable sources)*, according to Sectoral Scopes List given by UNFCCC, as well as was verified by ICONTEC through documental review, on-site visit and as it was described in the latest version of the PDD /1/.

The project activity consists in the construction of three new Hydropower Plants which their technical characteristics are presented as follows on table 1:

Table 1: Project activity description

SHP	Installed Capacity (MW)	Water diversion from river	State	Power Density (W/m^2)	Estimated Reservoir Area (Km^2)	Assured Energy (MW)	City
Tambaú	8.820	Guarita	Rio Grande do Sul	42.8	0.2060	4,90	Erval Seco and Redentora
Das Pedras	5.60	Chapecó	Santa Catarina	12.2	0.46	3.0	Água Doce
Rio do Sapo	5.76	do Sapo	Mato Grosso	5.7	1.005	3.297	Tangará da Serra

A total of 20.18 MW will be the installed capacity of the project, taking into account the individual installed capacity of the three project sites as previously described.

ICONTEC verified through the review of the FSRs of Tambaú /12/, Das Pedras /13/ and Rio do Sapo /14/, the proposed installed capacity and the assured energy of the hydropower plants. Moreover, it was verified that the Brazilian Grid Operator, ANEEL (http://www.aneel.gov.br), approved the installed capacity and assured energy calculated in the FSR studies by reviewing the official issued ordinances /6/, /7/ /8/, /9/, /10, /11/ where it was approved the installed capacity and the assured energy of each one of the projects.

ICONTEC verified during the onsite visit next projects implementation status:

Tambaú: Currently the project activity is in operation as described in the latest version of PDD /47/.
Das Pedras: The authorization to be an independent generator was issued by ANEEL on 07/06/2011 but, still civil works have not begun /10/.
Rio do Sapo: The authorization to be an independent generator was issued by ANEEL on 16/11/2010 but, still civil works have not begun/11/.

The project aims to generate renewable electricity power to be delivered to SIN and, in this way, to displace thermal generation present in the system with the generation of renewable energy. Renewable electricity power generated will be delivered to SIN as described as follows:

Table 2: Connection of the project to SIN

SHP	Substation	Distance (Km)
Tambaú	Frederico Westphalen	18
Das Pedras	Palmas / SHP Coronel Araújo Substation	3.5
Rio do Sapo	Itanorte Substation	5.32

ICONTEC during the onsite visit verified the grid connection points for each one of the hydropower projects by reviewing the Grid Connection Feasibility Studies issued by RGE (http://www.rge-rs.com.br)/15/, COPEL (http://www.copel.com) /16/ and EPE (http://www.epe.gov.br) /17/ where it was described the Commercial Frontier Substation and the Transmission Line Length for each one of the projects.

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.

It is expected an approximate of 194,059 tCO_2e emitted to the atmosphere are going to be avoided over a period of 7 years from in 01/01/2014 until 31/12/2020. The resulting emission reductions from the project activity are estimated in an average of 29,579 tCO_2e per year. Please refer to ER files /18/.

Methodology and applicable tools to the project activity under validation process are:

- ACM0002 version 14.0.0 /2/
- Tool to calculate the emission factor for an electricity system version 04.0.0 /5/
- Tool for the demonstration and assessment of additionality version 07.0.0 /4/

ICONTEC confirmed through the onsite visit and interview that the project complies with the accuracy and completeness of the project description.

The project participants involved in the proposed project activity are:

Tambaú Energética S.A,
Euclides Maciel Energética S/A,
Rio do Sapo Energia S.A.,
Carbotrader Assessoria e Consultoria em Energia Eireli

During the onsite visit it was verified by ICONTEC through the reviewing of the legal constitution /22/, /23/, /21/ and independent legal exploitation concession for Tambaú Energética S.A /9/, Rio do Sapo Energia S.A /11/ and Euclides Maciel Energética S.A /10/ that each one of the projects have been developed by independent entities, with common shareholders, and as a result, it has been possible develop the CDM project validation as a single project validation. Also it was verified by ICONTEC by reviewing the contract for CDM consultancy /65/ that Carbotrader Assesoria e Consultoria em Energia Eireli was the CDM project consultancy company chosen in agreement by the three projects as the only one CDM consultant.

ICONTEC raised clarification CL 1 and CL 2 in order to improve the project description related to the technical characteristics of the project given by PP in sections A.1 and A.2. PP correctly addressed these clarifications and added required information, reason why the validation team closed them all.

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) Resolution of outstanding issues and the issuance of a 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 and the verification of the contribution to climate change mitigation.

All documentation review during the validation process has been including in chapter 6: references.
The validation protocol resulting from the Validation of SHPs Tambaú, das Pedras and Rio do Sapo CDM Project (JUN1132), Brazil is enclosed in Annex A of this report.

Findings established during the validation can be seen as:

- A non-fulfilment of validation protocol criteria, or
- An identified risk to the fulfilment 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:

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

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

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

2.1. FOLLOWUP INTERVIEWS

ICONTEC performed during the onsite visit to the large scale project activity interviews with project stakeholders to confirm the selected information and to resolve issues identified during the desk review. The main topics of the interview are summarized in Table 3.

Table 3: Follow up Interview

DATE	PLACE	INTERVIEW DELEGATE	ORGANIZATION	INTERVIEW TOPICS
02/07/2013 to 03/07/2013	SANTA CATARINA STATE, CITY OF CHAPECÓ	OLINTO SILVERA	ELETRISA DIRECTOR ADMINISTRATIVO	*APPROVAL, PARTICIPATION, PROJECT DESCRIPTION, BASELINE SCENARIO AND MONITORING METHODOLOGY, ADDITIONALITY, MONITORING PLAN, SUSTAINABLE DEVELOPMENT, LOCAL STAKEHOLDER CONSULTATION, ENVIRONMENTAL IMPACTS*
		ARTHUR MORAES	CARBOTRADER ASSESSORIA E CONSULTORIA EM ENERGIA	
		ANDERSON GIESEL	OPERADOR TAMBAÚ ENERGÉTICA SA	
		MARCOS C. CARABAGIALLE	NATURALLIS (THIRD PARTY COMPANY – ENVIRONAMENTAL)	
		CARLOS SANTOS	ENVIRONMENTAL DEPARTMENT	

	RIO GRANDE DO SUL STATE, COMMUNITY OF ERVAL SECO	GILMAR LESCHEWITZ -	MAYOR OF ERVAL SECO COMMUNITY	*LOCAL STAKEHOLDER CONSULTATION AND ENVIRONMENTAL IMPACTS OF THE PROYECT*
		DALVANI BARBOSA LEMES	VICE MAYOR OF ERVAL SECO COMMUNITY	
	SANTA CATARINA STATE, COMMUNITY OF AGUA DOÇE	ADENILSO FERREIRA DA ROCHA	CORONEL ARAÚJO ENERGÉTICA AS (OPERADOR)	*PROJECT DESCRIPTION LOCAL STAKEHOLDER CONSULTATION*
		EVANDRO MATANA	CORONEL ARAÚJO ENERGÉTICA AS (ENGENIERO ELETR.)	
		JEANCARLO MOSCHETTA	ELETRISA TECHNICAL DEPARTMENT	
06/07/2013	MATO GROSSO STATE, TANGARÁ DA SERRA CITY	CARLOS ALEXANDRE SANTOS –	CERES GESTÃO EMPRESARIAL E PARTICIPAÇÕES LTDA	*LOCAL STAKEHOLDER CONSULTATION AND ENVIRONMENTAL IMPACTS OF THE PROYECT*

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 were presented to the project participants and solved through communication and meetings between TAMBAÚ ENERGÉTICA S.A EUCLIDES MACIEL ENERGÉTICA S/A RIO DO SAPO ENERGIA S.A. CARBOTRADER ASSESSORIA E CONSULTORIA EM ENERGIA EIRELI 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.

Since modifications to the project design document were necessary in order to solve ICONTEC concerns, the client decided to review the PDD and re-submit corrected versions of the PDD /1/. After the period of public consultation (14/06/2013 to 13/07/2013) and after reviewing the latest version of the PDD /1/, ICONTEC issued this validation report and opinion.

2.3. INTERNAL QUALITY CONTROL

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

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

2.4. VALIDATION TEAM

The validation team consisted of the following personnel:

Table 4: Validation Team

ROLE/QUALIFICATION	LAST NAME	FIRST NAME	COUNTRY
Lead Auditor	Carrizales	Jacobo	Colombia
Technical Expert	Grisales	Cristian	Colombia
Auditor (in training)	N/A	N/A	N/A

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

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 project participants of the project are:

- TAMBAÚ ENERGÉTICA S.A
- EUCLIDES MACIEL ENERGÉTICA S/A
- RIO DO SAPO ENERGIA S.A.
- CARBOTRADER ASSESSORIA E CONSULTORIA EM ENERGIA EIRELI

According to 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” /19/

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 /64/.

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 5: Approval Letter

Date of issue:	*February 13th 2014*	
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)	*Carta de Aprovação Tambaú English.pdf*	
Date of ICONTEC reception	*March 21st 2014*	
Entity that sent the letter to	*Project participants*	*Directly from the DNA*

ICONTEC	*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 Brazilian DNA.*			
Additional specification (if it is applicable)		*YES*	*NO*	*version number*
	PDD	*x*		*3.1*
ICONTEC Conclusion	*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:* *(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.*			

ICONTEC raised CL 13 in order to ask for the solicitation status of the letter of approval. The PP correctly described the solicitation status of the letter of approval in section F.

3.2.2. MODALITIES OF COMMUNICATION

According to paragraph 53 of the VVS /51/, the validation team verified the corporate identity of focal points included in the MoC statement /20/. This was verified by carrying out a documental review of the legal constitution documents of the project /21/ /22/ /23/ and verifying MoC signatures against the previous mentioned documentation.

The audit team raised CL 8 since by the time of the desk review stage carried out, PP still has not issued the MoC Document. During the onsite visit the PP provided the MoC document properly signed and CL 8 was successfully closed.

ICONTEC, confirm that the Modalities of Communication Statement form (F-CDM-MOC) (Version 02.1), was correctly completed/20/.

3.3. PROJECT DESIGN

The project was developed using methodology ACM0002 version 14.0.0 /2/: “Consolidated baseline methodology for grid-connected electricity generation from renewable sources”. According to this methodology the project boundary is: “The spatial extent of the project boundary includes the project power plant and all power plants connected physically to the electricity system that the CDM project power plant is connected to”.

Validation team applied standard audit techniques while carrying out the on-site visit in order to determine correctness of the defined boundary. Since the three Hydro Power Plants are going to be connected to SIN /15/ /16/ /17/, ICONTEC is able to confirm that, identified boundary on section B.3 in latest version of PDD /1/ was correctly determined and is in accordance with methodology /2/. Additionally, during the onsite visit the validation team could verify that selected sources and GHG were correctly determined by PP.
Technology used for the enterprise is the use of hydraulic potential of the Rivers Guarita, Chapecó and do Sapo for electricity generation by the gravitational energy of the water, which is used to move the turbine-generator systems that enable the generation of electricity. This is a source of

clean and renewable energy that presents low impact on the environment. The total installed capacity will be 20.18 MW.

The project complies with the applicability criteria of the methodology as was verified by ICONTEC, as follows:

Table 6: Methodology Applicability Conditions Analysis

Applicability condition		***Means of validation***
This methodology is applicable to grid-connected renewable power generation project activities that: *a) install a new power plant at a site where no renewable power plant was operated prior to the implementation of the project activity (Greenfield plant);* *b) involve a capacity addition;* *c) involve a retrofit of (an) existing plant(s); or,* *d) Involve a replacement of (an) existing plant(s).*		*While carrying out the on-site visit, the audit team confirmed the project consists of brand new facilities in accordance with option a) of the methodology /2/.* *It was verified through visitation to the different project sites and review of documents such as feasibility studies /12/, /13/, /14/, legal constitution of the enterprises /21/, /22/, /23/ Previous Environmental Licenses for each one of the projects /24/, /25/, /26/, Environmental Licenses for Installation for each one of the projects /27/, /28/, /29/, Extension of the Installation Environmental License for Das Pedras /30/ and Environmental Operation License for Tambaú /31/.*
In case of hydro power plants: *• One of the following conditions must Apply:*	*The project activity is implemented in an existing single or multiple reservoirs, with no change in the volume of any of the reservoirs; or;*	*Not applicable. During the on-site visit at the different project sites, the audit team confirmed that, there is not reservoir. Because of that, the designs of the project include the construction of a reservoir /12/, /13/, /14/.*
	The project activity is implemented in an existing single or multiple reservoirs, where the volume of any of reservoirs is increased and the power density of each reservoir the project activity, as per the definitions given in the Project Emissions section, is greater than 4 W/m^2 after the implementation of the project activity; or	*Not applicable. During the on-site visit at the different project sites, the audit team confirmed that, there is not reservoir. Because of that, the designs of the project include the construction of a reservoir /12/, /13/, /14/.*
	The project activity results in new single or multiple reservoirs and the power density of each reservoir, as per the definitions given in the project emissions section, is greater than 4 W/m^2.	The validation team verified the Environmental Licenses for Installation for each one of the projects /27/, /28/, /29/which approved the area of the reservoirs as follows: • Tambaú: 0.2060 Km^2 • Das Pedras: 0.46 Km^2 • Rio do Sapo: 1.005 Km^2 Power density was also determined as: • Tambaú: 42.8 W/m^2 • Das Pedras: 12.2 W/m^2 • Rio do Sapo: 5.7 W/m^2 Since the power density is greater than 4 W/m^2, Applicability condition is meet.

In accordance with the project activity and the selected methodology the emission sources are properly described in the latest version of the PDD in compliance with Guidelines for completing the project design document form (Version 01.0) and the "F-CDM-PDD - Project Design Document form, version 04.1".

ICONTEC verified that the greenhouse gas emissions occurring within the project boundary as a result of its implementation are:

In the baseline scenario, the main emission source is the CO_2 emission from electricity generation in fossil fuel fired power plants that is displaced due to the project activity.
In the project activity scenario, the main emission source is the CH_4 emission from the reservoirs with a power density greater than 4W/m^2.

ICONTEC verified that the identified boundary and the selected GHG sources were correctly justified in the latest version of the PDD; these sources correctly describe the emission sources existing in the proposed project activity and are not expected to contribute more than 1% of the overall expected average annual emissions reductions.

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

3.4. BASELINE DETERMINATION

The baseline determination was developed by using methodology ACM0002: version 14.0.0. /2/. According to this methodology, the baseline is defined as: "Electricity delivered to the grid by the project activity would have otherwise been generated by the operation of grid-connected power plants and by the addition of new generating sources, as reflected in the combined margin (CM) calculations described in the "Tool to calculate the emission factor for an electricity system"/5/.

The baseline emissions are the product of the total electrical energy generated ($EG_{BL,y}$), expressed in MWh of electricity produced by the renewable generating unit multiplied by the grid emission factor ($EF_{grid,CM,y}$).

On the other hand, the Combine Margin emission factor ($EF_{grid,CM\ y}$) is officially calculated by the The Brazilian Ministry of Science, Technology and Innovation (MCTI); which was designated by CIMGC to make the calculations /32/ by using the "Tool to calculate the emission factor for an electricity system", as a combined margin (CM).

This combined margin is integrating the operating margin (OM) and the build margin (BM) factors, as indicated on the website (http://www.mct.gov.br/index.php/content/view/307492.html):

"The emission factor of the interconnected system for CDM purposes is a combination of the operating margin emission factor, which reflects the intensity of CO_2 emissions sent at the margin, and the build margin emission factor, which reflects the intensity of CO_2 emissions from the latest plants built. It is a broadly used algorithm to quantify the future contribution of a plant that will generate electric energy for the network in terms of a reduction in CO_2 emissions in relation to a base scenario. This factor is used to quantify the emission that is being shifted in the margin. Its use is associated with CDM projects, and it is exclusively applied to estimate certified emission reductions (CER) in CDM projects".

MCTI currently is calculating the monthly average operating margin emission factor and annually the average build margin emission factor. Even though the above mentioned, the latest completed data collection is the one from 2012; which was used by the PP for the calculations.
According to this information, latest figures determined for $EF_{grid,CM,y}$, $EF_{grid,OM\text{-}DD,y}$ and $EF_{grid,BM,y}$ for 2012 /18/ are:

- $EF_{grid,CM,y}$: 0.3593 tCO_2e/MWh
- $EF_{grid,OM\text{-}DD,y}$: 0.5176 tCO_2e/MWh
- $EF_{grid,BM,y}$: 0.2010 tCO_2e/MWh

By rising CAR 2, the audit team requested to PP to update the used values to calculate $EF_{grid,CM}$ since by the time the validation process was carried out, the Brazilian DNA had released already the latest completely information on the matter of combined margin calculations for 2012 and the PP had used the 2011 data collection.

PP successfully addressed CAR 2 and audit team proceeded to close it. Taking into account the emission factor figures and energy generated by the project, the total baseline emissions in absence of the project will be 207,056 tCO_2e during the 7 years of crediting period, as indicated in Section B.6.4 of the latest version of the PDD /1/.

ICONTEC found that all information, assumptions and data used in the identification of the baseline scenario are relevant, justified appropriately, correctly quoted and interpreted, supported by evidence and able to be deemed reasonable. 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 latest versions of the PDD /1/ and in the latest version of ERs file/18/.

3.5. ADDITIONALITY

3.5.1. PRIOR CONSIDERATION OF THE CDM

The start date of the project was identified as the 22/08/2007, which is the date when Rio do Sapo Energia S.A. signed a contract with WEG Company in order to supply equipment /38/. This date was defined by PP as the earliest event from the three SHPs implementation timeline that can demonstrate the implementation or construction or real action of the project activity. According to this date the project has a start date before 02 August 2008.

By rising CL 5 and CL 7 the audit team asked to PP to provide in the latest version of the PDD the correct information dates of the prior consideration request form submission to UNFCCC for Tambaú, Das Pedras and Rio do Sapo, and the description about how had been defined the start date of the project activity along with the evidence to support this date.

Once PP corrected the erroneous information and provided evidences for the start date definition CL 5 and CL 7 were successfully closed.

In order to verified that:

The awareness of the CDM prior to the project activity start date, and the benefits of the CDM were a decisive factor in the decision to proceed with the project.

ICONTEC verified the following evidences:

- Prior consideration minute for SHP Rio do Sapo /33/, issued by Rischbieter Engenharia Ltda, dated on 24/07/2007.

ICONTEC verified from the abovementioned minute issued by Rischbieter Engenharia Ltda the next verbatim quotation:

"*Passando ao ultimo item da ordem do dia o presidente explicou que o empreendimento terá como fonte de receita adicional os créditos de carbono com valor de R$ 100,000 ao ano de acordou com consulta realizada sendo este fundamental para a viabilidade do empreendimento do projeto*"

This means in English:

"*Passing to the last item of the day, the president of the board explained that the project activity will have as additional annual revenue the CERs incoming for R$100,000, based on the consultancy. The abovementioned issue is a vital component in order to carry on the project".*

ICONTEC through the review of the abovementioned minute considers that there was a previous awareness of the CDM before the start date of the project activity and that the benefits of the CDM were a decisive factor in the decision to proceed with the project.

In order to verified that:

Real and continuing actions were taken to secure CDM status for the project in parallel with its implementation.

ICONTEC verified the following evidences:

- Advance Meeting Minute of the Project SHP Rio do Sapo /34/, issued by Rio do Sapo Energética S.A, dated on 20/06/2008.

  ICONTEC verified from the abovementioned minute the next verbatim quotation:

  "*Seguindo com os trabalhos o presidente voltou a destacar a importância da obtenção do crédito de carbono, este que seja efetuado em nome da Rio do Sapo Energética S.A.*"

  This means in English:

  "Following the works, the president again highlighted the importance of obtaining carbon credits, issuance made in behalf of Rio Sapo Energy S.A."

- CDM consultancy proposal service request /66/ to Carbotrader Assessoria e Consultoria em Energia Ltda, requested by Rischbieter Engenharia Ltda, dated on 11/07/2008.

- Advance Meeting Minute of the Project SHP Rio do Sapo /35/, issued by Rio do Sapo Energética S.A, dated on 27/03/2009.

  ICONTEC verified from the abovementioned minute the next verbatim quotation:

  "*Com a palavra o representante da acionista Rischbieter Engenharia Indústria e Comercio Ltda dissertou sobre o projeto da PCH Rio do Sapo como elegível no ámbito do Mecanismo de Desenvolvimento Limpo do Protocolo de Quioto, entendendo ser conveniente serem, pela diretoria, iniciados os trâmites que permitam o acesso aos beneficios cabiveis. Desta forma, a receita da venda dos créditos de carbono originados pelo projeto contribuirão para a viabilidade do empreendimento*."

  This means in English:

  "Speaking the representative of the shareholder Rischbieter Engineering Industry and Commerce Ltda about the elegibility of the project PCH Rio Sapo as eligible in the framework of the Clean Development Mechanism of the Kyoto Protocol, are understood to be convenient for the board, started the procedures that allow reasonable access to

benefits. Thus, the revenue from the sale of carbon credits originated by the project will contribute to the viability of the enterprise."

- CDM consultancy contract between Carbotrader Assessoria e Consultoria em Energia Ltda and Rio do Sapo Energia S.A, dated on 18/06/2009 /65/.
- CDM prior consideration notifications for SHP Tambaú and SHP das Pedras published in the UNFCCC web page on 16/09/2009, which was verified on the website: http://cdm.unfccc.int/Projects/PriorCDM/notifications/index_html

- Advance Meeting Minute of the Project SHP Rio do Sapo /36/, issued by Rio do Sapo Energética S.A, dated on 25/02/2010.

  ICONTEC verified from the abovementioned minute the next verbatim quotation:

  "*Colocada em discussão a referida proposta da diretoria da sociedade e após ser amplamente debatida foi aprovado por unanimidade de votos da totalidade dos acionistas da sociedade, estando alterada a denominação social para RIO DO SAPO ENERGIA S.A e ampliado o objeto social para que a sociedade possa vir a promover a comercialização de créditos de carbono, inclusive conforme o Protocolo de Kyoto, de modo a ajudar a viabilização econômica do empreendimento com os benefícios financeiros advindos da comercialização dos mesmos, uma vez que constituem parte da matriz da receita do empreendimento, desde a análise da sua viabilidade econômica."*

  This means in English:

  "*Posted in discussion this proposal to the board of the company after it was widely debated and approved by unanimous vote of all shareholders of the society and it was changed and expanded the name to RIO DO SAPO ENERGIA S.A with the purpose to the company could promote the marketing of carbon credits in accordance with the Kyoto Protocol, in order to help the economic viability of the project with the financial benefits arising from the same trade, since they are part of the matrix of the revenue of the project, since the analysis of their economic viability*. "

- Minute for the Joint CDM Implementation /37/ for SHPs Tambaú, Das Pedras and Rio do Sapo, issued by Rio do Sapo Energética S.A, dated on 10/05/2011.

ICONTEC verified from the abovementioned minute the next verbatim quotation:

"*O Presidente declarou aberta a reunião explicando aos presentes que o Projeto para obtençao do crédito de carbono será desenvolvido juntamente com outros empreendimentos administrados pela Eletrisa, estando assim aprovado por todos os presentes.* "

This means in English:

"*The President declared the beginning of the meeting by explaining to the presents that the CDM project will be undertaken jointly with another projets managed by Electrisa, decision approved by everybody the shareholders"*

The CDM joint implementation decision was taken because one of the biggest shareholders in each one of the projects in order to reduce the cost of the CDM process decided to join the SHPs as a proposed CDM Large Scale Project Activity.

- CDM validation proposal for SHPs Tambaú, Das Pedras and Rio do Sapo, issued by DNV, dated on 25/05/2011 /67/.
- CDM prior consideration notification for SHPs Tambau, das Pedras and Rio do Sapo (as an only project) published in the UNFCCC web page on 14/09/2012, which was verified on the website: https://cdm.unfccc.int/Projects/PriorCDM/notifications/index_html

ICONTEC through the review of the abovementioned minutes issued for Rio do Sapo and the published CDM Prior Consideration notification for SHPs Tambaú, Das Pedras and Rio do Sapo, considers that, have been real and continuing actions in order to secure the CDM status for the project in parallel with its implementation and there have not been gaps greater than three years between the documented evidence and the proposed start date that could threat the CDM status for the project activity.

ICONTEC hence in accordance with the VVS /51/ paragraphs § 112, 113 and 114, confirms the project activity complies with the requirements of prior consideration of the CDM.

3.5.2. ADDITIONALITY ANALYSIS

Since methodology ACM0002 /2/ states that: "*The additionality of the project activity shall be demonstrated and assessed using the latest version of the "Tool for the demonstration and assessment of additionality" agreed by the Board, which is available on the UNFCCC CDM website*", indicated tool /4/ was used by PP in order to demonstrate the additionality of the project.

In section B.5 of the latest version of the PDD/1/, PP addressed steps proposed by additionality tool version 07.0.0 /4/ as carefully assessed, verified and cross-checked by the audit team and as described as follows:

Step 0: Demonstration whether the proposed project activity is the first-of-its-kind

In the latest version of the PDD, section B.5 PP claimed on the matters of this steep that: "*Not used, the proposed project activity is not the first of its kind in Brazil"*, the validation team agreed with this statement since the abovementioned assumption is in accordance with the tool.

Step 1: Identification of alternatives to the project activity consistent with current laws and regulations.

Sub-step 1a: Define alternatives to the project activity:

Given that applied methodology /2/ prescribes the baseline scenario, according to paragraph 122 of the VVS /51/, analysis of alternatives is not required. Therefore, the validation team agreed with the outcome from this sub-step and presented on the latest version of the PDD /1/, the one is in accordance with applicable tool /4/.

Sub-step 1b: Consistency with mandatory laws and regulations:

On sub-step 1b, section B.5 of the latest version of the PDD /1/, regulatory framework applicable to the project activity is established. ICONTEC raised CL 3 in order to ask about the evidence used by PP to demonstrate that the project activity was in compliance with mandatory laws and regulations. In the latest version of the PDD the PP correctly improved the explanations and the finding was closed.

According to PP, the project complies with legal requirements since different entities granted licenses to the project activity as described as follows:

- Tambaú:
    - Legal document certifying the constitution of Tambau, certified by JUNTA COMERCIAL DO ESTADO DE SANTA CATARINA, dated on 24/02/2011/21/.
    - Approved Assured Energy Ordinance for SHP Tambaú (in Portuguese “PORTARIA Nº 51, DE 4 DE JULHO DE 2012”), issued by ANEEL, dated on 04/07/2012 /6/.
    - Approved Installed Capacity for SHP Tambaú (in Portuguese “RESOLUÇÃO AUTORIZATIVA Nº 1.832, DE 10 DE MARÇO DE 2009”), issued by ANEEL, dated on 10/03/2009 /9/
    - Grid Connection Feasibility Study for SHP Tambaú (in Portuguese “PARECER DE ACESSO PCH TAMBAÚ, RGE/OE-022/2010”), issued by RGE, dated on August 2010 /15/.
    - Previous Environmental License LP N°0889/2001-DL for SHP Tambaú, issued by FEPAM, dated on 23/11/2001 /24/.
    - Environmental License LI N° 431/2008-DL for the installation of SHP Tambaú, issued by FEPAM, dated on 30/04/2008 /27/.
    - Environmental License LO N° 280/2013-DL for the Operation of SHP Tambaú, issued by FEPAM, dated on 14/01/2013 /31/.

- Das Pedras:
    - Legal document certifying the constitution of Das Pedras, certified by JUNTA COMERCIAL DO ESTADO DE SANTA CATARINA, dated on 07/05/2007 /22/.
    - Approved Assured Energy Ordinance for SHP Das Pedras (in Portuguese “PORTARIA Nº 165, DE 26 DE NOVEMBRO DE 2012.”), issued by ANEEL, dated on 26/11/2012 /7/.
    - Approved Installed Capacity for SHP Das Pedras (in Portuguese “RESOLUÇÃO AUTORIZATIVA Nº 2.952, DE 7 DE JUNHO DE 2011”), issued by ANEEL, dated on 07/06/2011 /10/.
    - Connection Feasibility Study for SHP Das Pedras (in Portuguese “INFORMAÇÃO DE ACESSO DA PCH RIO DAS PEDRAS AO SISTEMA ELÉCTRICO DA COPEL EM 34,5kV”), issued by COPEL, dated on 15/08/2008 /16/.
    - Previous Environmental License LAP N°070/08 for SHP Das Pedras, issued by FATMA, dated on 02/07/2008 /25/.
    - Environmental License LAI N° 476/08/CRO for the installation of SHP Das Pedras, issued by FATMA, dated on 24/07/2008 /28/.

- Rio do Sapo:
    - Legal document certifying the constitution of Rio do Sapo, certified by JUNTA COMERCIAL DO ESTADO DE MATO GROSSO, dated on 23/01/2008 /23/.
    - Approved Installed Capacity for SHP Rio do Sapo (in Portuguese "RESOLUÇÃO AUTORIZATIVA Nº 2.619, DE 16 DE NOVEMBRO DE 2010"), issued by ANEEL, dated on 16/11/2010 /11/.
    - Grid Connection Feasibility Study for SHP Rio do Sapo (in Portuguese “ESTUDOS PARA A LICITAÇÃO DA EXPANSÃO DA TRANSMISSÃO, Análise de Integração das Usinas cadastradas no Leilão de Compra de Energia Elétrica Proveniente de Novos Empreendimentos de Geração - “A-5“ de 2011”, pag 43), issued by EPE, dated on 31/08/2011 /17/.
    - Previous Environmental License LP N°1272/2007 for SHP Rio do Sapo, issued by SEMA, dated on 06/03/2007 /26/.
    - Environmental License 59022/2011 for the installation of SHP Rio do Sapo, issued by SEMA, dated on 21/02/2011 /29/.

ICONTEC through the reviewing of the abovementioned licenses issued by the official Environmental Entities of each area of influence (SEMA: http://www.sema.rs.gov.br/ , FATMA: http://www.fatma.sc.gov.br/ and FEPAM: http://www.fepam.rs.gov.br/), by the reviewing of the abovementioned licenses issued by the official Grid Operator of each area of influence (EPE: http://www.epe.gov.br/ , RGE: http://www.rge-rs.com.br/ , and COPEL: http://www.copel.com/), and by reviewing the abovementioned licenses issued by the official Brazilian Energy Agency (ANEEL: http://www.aneel.gov.br/) is agreed with the outcome from this sub-step, presented on the latest version of the PDD /1/ which is in accordance with applicable additionality tool requirements /4/. Hence ICONTEC verifies that the project currently is complying with mandatory legal requirements.

Step 2: Investment analysis:

An investment analysis was made to demonstrate that the project is not financially feasible without the revenues from the CERs. Benchmark analysis (Option III of the tool /4/) was used. The DOE considers that this is the right decision, taking into account that there are no project alternatives to be compared, and the project will generate economic benefits other than CDM related income.

The financial indicator selected was the project internal rate of return (Equity IRR) and the benchmark indicator was the Cost of Equity (Ke).

These financial indicators are deemed suitable by the DOE, as they are appropriate for this kind of project, taking into account also that this is a common practice in analysing energy projects and are in line with the Guidelines on the assessment of investment analysis /3/. Equity IRR can be comparable with Cost of Equity because required/expected returns on equity are appropriate benchmarks for equity IRR, as described in item 12 of this Guideline /3/.

Cost of Equity determination:

The cost of equity was calculated as: “the sum of a Risk free rate (Rf) plus and adjustment factor used to reflect the risk of project (β) multiplying the addition of the United States risk premium with the Brazilian Equity Risk Premium.

ICONTEC verified that the cost of equity model used by PP corresponds with the Capital Asset Pricing Model (CAPM) suggested by the Guideline on the Assessment of Investment Analysis /3/.

Also, it was verified that the Ke formula approach used by PP corresponds with the one suggested by Aswath Damodaran when is assumed that a company’s exposure to country risk is similar to its exposure to other market risk /40/.

According to the cost of equity calculation file /39/, calculation method used is described as follows:

Ke = Rf + Beta * (US Premium + Country ERP)

Where:

- Ke = Cost of equity;
- Rf = Risk free rate (Rf);
- US Premium = United States risk premium;
- Country ERP = Brazilian Equity Risk Premium;
- β= Adjustment factor to reflect the risk of projects. This value is the average β of the Brazilian energy companies, leveraged to the capital structure of the project activity.

ICONTEC raised CL 4 in order to ask PP about the followed stepwise approach, the explanations about the assumptions made, the procedure used to calculate the values and the exact sources used in the Cost of Equity calculation. The PP correctly resolved the raised finding in the latest version of the PDD and ICONTEC closed it.

ICONTEC raised CL 15 in order to ask PP about the conservative of use a K_e calculated with values of 2007 (to be compared with SHP Rio do Sapo's Equity IRR) to be compared with Equity's IRRs calculated with values of 2009 (for SHP Tambaú and SHP Das Pedras).

The PP correctly demonstrated in the latest version of the K_e's calculation file/18/ that, the value of K_e calculated for SHP Rio do Sapo (16.64%) is lower than the one calculated for SHP Tambaú and SHP Das Pedras (18.91%). Hence ICONTEC deemed as conservative use the Rio do Sapo's K_e as benchmark for the whole project activity.

Variables used for calculation and values are described as follows:

Table 7: Cost of Equity Analysis

Variable	Definition	Value	Validation Analysis
R_f	*Risk free rate*	3.91%	ICONTEC verified that the values used for calculate the R_f correctly correspond with the average of return rates of American Bond (T Bond) between 1997 and 2006 (bonds with a maturity closest to 10 years in accordance with the guideline on the assessment on investment analysis /3/). The values were verified by ICONTEC in the website: http://pages.stern.nyu.edu/~adamodar/New_Home_Page/datafile/histret.html The average value obtained was 6.36%; but given that to be in real terms is discounted the projected inflation rate based on the US CPI index (Consumer Price Index) between 1997 and 2006, that was 2.45% (ftp://ftp.bls.gov/pub/special.requests/cpi/cpiai.txt). $R_f = 6.36\% - 2.45\% = 3.91\%$ For the abovementioned, ICONTEC considers reliable and conservative the value reported for R_f.
US Premium	*United States risk premium*	4.91%	ICONTEC verified that 4.91% is the value used by Aswath Damodaran for risk premium value for the United States. (See http://www.stern.nyu.edu/~adamodar/pc/archives/ctryprem06.xls, cell E9, and cells A2 to A7). For the abovementioned, ICONTEC considers reliable the value reported for US Premium.
Country ERP	*Brazilian Equity Risk Premium*	3.75%	ICONTEC verified that 3.75% is the Country Risk Premium calculated by Aswath Damodaran for Brazil. See (http://www.stern.nyu.edu/~adamodar/pc/archives/ctryprem06.xls, cell E38). For the abovementioned, ICONTEC considers reliable the value reported for Country ERP.
β_l	*Levered β of the Brazilian energy companies*	1.47	ICONTEC verified that for Beta establishment, the PP correctly used the Aswath Damodaran reference available for Brazilian Companies (average Betas from Electric - Generation Industry) by accessing next link: (http://www.stern.nyu.edu/~adamodar/pc/archives/emergcompfirm06.xls). ICONTEC by filtering the abovementioned link for Exchange Code: BZ and Industry: Electric – Generation, verified the average value of unlevered beta = 0.89 (average for cells Y145, Y150, Y1517, Y2538 and Y9062). Given that the beta used should be a levered beta for the proposed project activity capital structure, it was applied next equation in order to get the levered beta:

			$\beta_i^{Desalavancado} = \left(\frac{\beta_i^{Alavancado}}{1 + \frac{D_i}{E_i}(1-T)} \right)$ The calculation made was verified in the Cost of Equity file /39/, workbook "Beta SHP", getting a value of levered beta = 1.47.
Ke	*Cost of equity*	16.64%	ICONTEC verified the obtained value of Cost of Equity by reviewing the abovementioned terms included in his calculation (Ke = Rf + Beta * (US Premium + Country ERP)). The calculation made was reviewed in the file of Cost of Equity /39/, workbook "Ke".

The validation team considered that calculations of Cost of Equity are based upon methodologies generally accepted. Variables used were validated and cross-checked through the given references, the ones are publicly available and they are standard in the market, as appropriate, given that the project could be developed by an entity other than the project participant. Also, the validation team confirmed that data used for Cost of Equity calculations are valid at the investment decision time; this is to say August 2007.

ICONTEC verified that the time of investment decision chosen by PP (August 2007) was the first event from the three SHPs implementation timeline in which can be demonstrate that a real action happened. Even though the other projects initially had the investment decision time after (16/09/2009) of the Rio do Sapo project, the PP decided undertake the CDM joint implementation and in this way the earlier date at which the implementation or construction or real action of a project activity begins was the Rio do Sapo's start date (August 2007).

The abovementioned considerations were deemed reliable and conservative by ICONTEC.

ICONTEC considered that a cost of equity of 16.64% is a suitable and reasonable benchmark to analyse the financial attractive of the whole CDM project activity.

Equity IRR calculations:

The financial parameters (Equity IRRs) were calculated by means of the finance model executed in the cash flow spreadsheets for Tambaú/41/, Das Pedras/42/ and Rio do Sapo/43/.

ICONTEC raised CAR 1 in order to request the PP the application of the "Clarification on the Applicability of the Guidelines on the Assessment of Investment Analysis" (EB 73, annex 8) /44/, where is requested next: "*If project participants choose a renewable crediting period and if the technical lifetime of the CDM project activity is more than 20 years, the investment analysis shall be conducted for 20 years and include the fair value of the project activity assets at the end of the assessment period.*".

The PP correctly updated the IRR files with an assessment period of 20 years, and including the fair value of the project activity assets at the end. ICONTEC deemed the new assessment period in accordance with the clarification and closed the CAR 1.

Validation of parameters used in the investment analysis for SHPs Tambaú, Das Pedras and Rio do Sapo, as described in the latest version of PDD /1/ and in the cashflow spreadsheets /41/, /42/ and /43/, is presented on tables 8, 9 and 10 as follows:

Table 8: Tambaú Investment Analysis Parameters

Parameter	Value	Unit	Validation Analysis
Investment	**48,023,229.89**	R$ - Real	ICONTEC verified from the Tambaú FSR /12/ that the calculated investment cost for Tambaú was R$ 48,023,229.89, which consists in: Land Purchase R$ 770,000 Structures and other improvements R$ 3,730,554 Civil works R$ 18,221,955 Turbines and Generators R$ 10,795,056 Electrical Equipment R$ 7,548,423 Equipment Plant R$ 822,140 Highway, Railway and Bridges R$ 1,162,500 Indirect Costs R$ 4,972,600 Also, it was verified that when the OPE - Eletrobrás Standard Budget /46/ included in the FSR is reviewed by ANEEL in order to granted the Approved Installed Capacity , all the cost related with the project activity are evaluated and if there are overestimations, the project financially is rejected. ICONTEC calculated the price per Megawatt Installed for Tambaú as (R$ 48,023,229.89 / kW 8,820 = 5,444 R$/kW or 2,858 USD$/kW) using the exchange rate of 1 USD$ = R$ 1.905 used in the OPE's budget presented to ANEEL in 01/09/2009 (close to the time of CDM Prior Consideration Request). The obtained value was cross checked it with the one reported in "Renewable Power Generation Costs in 2012, An Overview"/45/, issued by IRENA, page 43, figure 5.4, where is described that "The total installed costs for smale-scale hydropower projects in Latin America typically range from a low of USD 1,000/kW to around USD 3,500/kW", hence the Investment cost reported for Tambaú is inside the recognized worldwide range of investment costs reported by IRENA. For the all above mentioned, ICONTEC deemed reliable and conservative the investment cost reported for the project.
Equity	**24,011,614.95**	R$ - Real	ICONTEC verified that the PP correctly applied the estimation of 50% debt and 50% equity suggested by the Guideline on the assessment on investment analysis in the paragraphs 17 and 18 /3/ when a company's internal benchmark is calculated.
Debt	**24,011,614,95**	R$ - Real	ICONTEC verified that the PP correctly applied the estimation of 50% debt and 50% equity suggested by the Guideline on the assessment on investment analysis in the paragraphs 17 and 18 /3/ when a company's internal benchmark is calculated.
Debt Interest	**9.90%**	%	ICONTEC verified from BNDES (http://www.bndes.gov.br/SiteBNDES/bndes/bndes_pt/Institucional/Apoio_Financeiro/Produtos/FINEM/energia_eletrica_geracao.html) next inputs included in the Debt Interest Calculation: TJLP = 6.00% (for September 2009) BNDES Fee for Generation = 0.9% Financial Entity Intermediation Fee (for 2009)= 1% The Credit Risk Fee was established by PP based on similar developed projects as 2%. ICONTEC verified from BNDES that this fee can be up to 4.13%, depending of the client risk fee. Hence the credit risk fee used by PP is deemed conservative by ICONTEC. For the all above mentioned, ICONTEC deemed reliable and conservative the debt interest reported for the project.
Assured Energy	**5.35**	MW average	ICONTEC verified from the Tambaú's FSR, chapter 10, table 10.8 /12/, that the estimated assured energy of the project was 5.35 MW average during the time of investment decision.

			ICONTEC raised CAR 5 in order to ask about the differences between the assured energy used in the cashflow file (5.35MW) against the one authorized by ANEEL (4.9MW) /6/ and used in the CER's file. The PP argued that the value of 5.35 MW was the value estimated by PP during the investment decision time and for that reason this value should keep in the cashflow file in accordance with Item 6 of the GUIDELINES ON THE ASSESSMENT OF INVESTMENT ANALYSIS /3/, where is requested that the Input values used in all investment analysis should be valid and applicable at the time of the investment decision taken by the project participant. For all the above mentioned, ICONTEC deemed reliable and conservative the assured energy reported by PP.
Installed power	**8,820**	MW	ICONTEC verified that 8,820 MW was the value of installed capacity approved by ANEEL/9/ and currently reported in the installed generator's nameplates in Tambaú /61/. From the Tambaú's FSR/12/we had a value of installed capacity of 8,806kW. After of the Project's implementation the final value was 8,820kW, which was approved by ANEEL/6/ and corresponds with the one reported in the nameplates of the installed generators/61/.
Net Generated Electricity per year	**46,866**	MWh/year	ICONTEC verified that the calculation of the Annual Net Electricity Generation per year corresponds to the assured energy calculated in the Tambaú's FSR (5.35 MW) /12/, multiplied by the 8,760 hours in a year: Net Generated Electricity per year = 5.35 MW x 8,760 hours/year Net Generated Electricity per year = 46,866 MWh/year. ICONTEC deemed the value reliable.
Energy Price	**144.00**	R$/MWh	ICONTEC verified the Power Purchase Agreement subscribed between the PP and CCEE/47/, where was negotiated a value of 144 R$/MW since 01/01/2013 to 31/12/2022. ICONTEC deems the reported energy price as reliable.
Cashflow Period Considered	**20**	years	Applicability of the "Guidelines on the assessment of investment analysis" version 01.0.In this clarification was requested: "*If project participants choose a renewable crediting period and if the technical lifetime of the CDM project activity is more than 20 years, the investment analysis shall be conducted for 20 years and include the fair value of the project activity assets at the end of the assessment period*" ICONTEC deemed that the PP correctly applied the requested clarification.
PIS - Social Contribution Program	**0.65%**	on gross revenue	Law 10.637/2002 and 9.718/1998, available on the website: http://www.receita.fazenda.gov.br/PessoaJuridica/PisPasepCofins/RegIncidencia.htm#Regime de incidência não-cumulativa
COFINS - Social Security Financing Transfers	**3.00%**	on gross revenue	Law 10.637/2002 and 9.718/1998, available on the website: http://www.receita.fazenda.gov.br/PessoaJuridica/PisPasepCofins/RegIncidencia.htm#Regime de incidência não-cumulativa
Base Value for the IR calculation	**8.00%**	on gross revenue	Law 10.637/2002 and 9.718/1998, available on the website: http://www.receita.fazenda.gov.br/pessoajuridica/dipj/2000/orientacoes/determinacaolucropresumido.htm
Base Value for the Social Contribution calculation	**12.00%**	on gross revenue	Law 10.637/2002 and 9.718/1998, available on the website: http://www.receita.fazenda.gov.br/aliquotas/ContribCsll/ApuracaAnualRecMensBascalcEst.htm
IR - Income Taxes	**15%**	on base value	Law 10.637/2002 and 9.718/1998, available on the website: http://www.receita.fazenda.gov.br/PessoaJuridica/DIPJ/2000/Orientacoes/Determinacao2.htm#Al%C3%ADquota
CSLL - Social Contribution on	**9%**	on base value	Law 10.637/2002 and 9.718/1998, available on the website: http://www.receita.fazenda.gov.br/PessoaJuridica/DIPJ/2005/PergR

Net Profit			esp2005/pr617a633.htm, note 619.
Additional IR	**10%**	on base value	Law 10.637/2002 and 9.718/1998, available on the website: http://www.receita.fazenda.gov.br/PessoaJuridica/DIPJ/2000/Orientacoes/Determinacao2.htm#Al%C3%ADquota
Annual Operation and Maintenance (O&M)	**961,748.95**	R$/year	ICONTEC verified the estimated value reported by PP with the one suggested by "Renewable Power Generation Costs in 2012, An Overview"/45/, issued by IRENA, page 44, section 5.3, where is established that "*Annual O&M costs are often quoted as a percentage of the investment cost per kW per year. The IEA assumes 2.2% to 3% for smaller projects*". ICONTEC calculated the Tambaús' O&M cost percentage over the total investment cost, obtaining a percentage of 2% (961,748.95 / 48,023,229.89 = 0.0200 or 2%) which is lower than the ones suggested by IRENA. For all the above mentioned, ICONTEC deemed reliable and conservative the O&M cost reported by PP.
ANEEL - Fiscalization Fee (TFSEE)	**16,009.31**	R$ / year	ICONTEC verified the correct application by PP of the Law 9427/1996, Decree 2410/1997, and art 3 for the calculation of the fee. http://www.planalto.gov.br/ccivil_03/decreto/1997/D2410.htm . The requested formula is: TFSEE = P x Gu , P = Installed Capacity (kW)** Gu = 0,5/100 x Bg Bg = R$ 363.60 (http://www.aneel.gov.br/cedoc/dsp20094774.pdf) TFSEE = 0,5/100 x 363.60 x 8,806 = 16,009.31 R$/year. For all the above mentioned, ICONTEC deemed reliable and conservative the TFSEE value reported by PP. **From the Tambaú's FSR/12/we had a value of installed capacity of 8,806kW. After of the Project's implementation the final value was 8,820kW, which was approved by ANEEL/6/ and corresponds with the one reported in the nameplates of the installed generators/61/. Based on Item 6 of "GUIDELINES ON THE ASSESSMENT OF INVESTMENT ANALYSIS /3/, "*Input values used in all investment analysis should be valid and applicable at the time of the investment decision taken by the project participant. The DOE is therefore expected to validate the timing of the investment decision and the consistency and appropriateness of the input values with this timing*". Hence, ICONTEC deemed correct to use the value of 8,806 kW in the Tambaú's cashflow file.
Distribution Fee (TUSD) - "encumbrance"	**0.49**	R$/MWh	ANEEL - Resolution Nº 810, page 8, frame T,available on the website: http://www.aneel.gov.br/cedoc/reh2009810.pdf
Distribution Use of System Charge – TUSD	**1.45**	R$/KW	ANEEL - Resolution Nº 810, page 8, frame P available on the website: http://www.aneel.gov.br/cedoc/reh2009810.pdf The value obtained in the resolution N° 810, should be adjusted in 50% in accordance with the art 5 of the ANEEL's Approved Installed Capacity Resolution for Tambaú /9/. For all the above mentioned, ICONTEC deemed reliable and conservative the TUSD value reported by PP.
MRE fee - Energy Reallocation Mechanism	**7.33**	R$/MWh	ICONTEC verified that the reported value is the average value of the power plants inscrits in MRE since 2005 to 2008.

			2005: 6.84 R$/MW (http://www.ccee.org.br/StaticFile/Arquivo/biblioteca_virtual/Relatorios_Publico/Anual/relatorio_anual_2005.pdf), page 17, table 15. 2006: 7.25 R$/MW (http://www.ccee.org.br/StaticFile/Arquivo/biblioteca_virtual/Relatorios_Publico/Anual/relatorio_anual_2006.pdf), page 19, table 15. 2007: 7.47 R$/MW http://www.ccee.org.br/StaticFile/Arquivo/biblioteca_virtual/relatorio_anual_2007.pdf, page 19, table 15. 2008: 7.77 R$/MW http://www.ccee.org.br/StaticFile/Arquivo/biblioteca_virtual/Relatorios_Publico/Anual/relatorio_anual_2008.pdf , page 15, table 10. For all the above mentioned, ICONTEC deemed reliable and conservative the MRE value reported by PP.
Commercialization Fee / Provisions	**2%**	on gross revenue	ICONTEC verified by the reviewing similar projects /63/ undertaken by PP that a value for commercialization fee between 2% to 3% should be applied to the electricity price in order to take into account the intermediation made by the Local Grid Operator.
Residual	**60%**	on total asset	ICONTEC verified from the study "Lifetime and Depreciation Study for Turbines and Generators"/48/, volume 2, page 249, that for generators the average lifetime is 30 years; and taking into account a depreciation rate of 2% per year, for 20 years of analysis, the asset will get a residual value of 60% over his total cost. ICONTEC deemed reliable and conservative the reported residual value for the Project.

Table 9: Das Pedras Investment Analysis Parameters

Parameter	Value	Unit	Validation Analysis
Investment	**32,218,742.76**	R$ - Real	ICONTEC verified from the Das Pedras FSR /13/ that the calculated investment cost for the project was R$ 32,218,742.76 , which consists in: Structures and other improvements R$ 2,192,588 Civil works R$ 15,144,441 Turbines and Generators R$ 6,785,295 Electrical Equipment R$ 2,456,925 Equipment Plant R$ 2,309,688 Highway, Railway and Bridges R$ 189,000 Indirect Costs R$ 3,140,805 Also, it was verified that when the Das Pedras OPE - Eletrobrás Standard Budget /49/ included in the FSR is reviewed by ANEEL in order to granted the Approved Installed Capacity , all the cost related with the project activity are evaluated and if there are overestimations, the project financially is rejected. ICONTEC calculated the price per Megawatt Installed for Das Pedras as (R$ 32,218,742.76 / kW 5,600 = 5,753 R$/kW or 3,384 USD$/kW) using the exchange rate of 1 USD$ = R$ 1.7, rate close to the time of Das Pedras' CDM Prior Consideration Request (2010). The obtained value was cross checked it with the one reported in "Renewable Power Generation Costs in 2012, An Overview"/45/, issued by IRENA, page 43, figure 5.4, where is described that "The total installed costs for small-scale hydropower projects in Latin America typically range from a low of USD 1,000/kW to around USD 3,500/kW", hence the Investment cost reported for Das Pedras is

			inside the recognized world range of investment costs reported by IRENA. For the all abovementioned, ICONTEC deemed reliable and conservative the investment cost reported for the project.
Equity	**16,109,371.38**	R$ - Real	ICONTEC verified that the PP correctly applied the estimation of 50% debt and 50% equity suggested by the Guideline on the assessment on investment analysis in the paragraphs 17 and 18 /3/ when a company's internal benchmark is calculated.
Debt	**16,109,371.38**	R$ - Real	ICONTEC verified that the PP correctly applied the estimation of 50% debt and 50% equity suggested by the Guideline on the assessment on investment analysis in the paragraphs 17 and 18 /3/ when a company's internal benchmark is calculated.
Debt Interest	**9.90%**	%	ICONTEC verified from BNDES (http://www.bndes.gov.br/SiteBNDES/bndes/bndes_pt/Institucional/Apoio_Financeiro/Produtos/FINEM/energia_eletrica_geracao.html) next inputs included in the Debt Interest Calculation: TJLP = 6.00% (for September 2009) BNDES Fee for Generation = 0.9% Financial Entity Intermediation Fee (for 2009)= 1% The Credit Risk Fee was established by PP based on similar developed projects as 2%. ICONTEC verified from BNDES that this fee can be up to 4.13%, depending of the client risk fee. Hence the credit risk fee used by PP is deemed conservative by ICONTEC. For the all abovementioned, ICONTEC deemed reliable and conservative the debt interest reported for the project.
Assured Energy	**3.59**	MW average	ICONTEC verified from the Das Pedras FSR/13/, that the estimated assured energy of the project was 3.59 MW average during the time of investment decision (2009). ICONTEC raised CAR 5 in order to ask about the differences between the assured energy used in the cashflow file (3.59MW) against the one authorized by ANEEL (3 MW) /7/ and used in the CER's file. The PP argued that the value of 3.59 MW was the value estimated by PP during the investment decision time and for that reason this value should keep in the cashflow file in accordance with Item 6 of the GUIDELINES ON THE ASSESSMENT OF INVESTMENT ANALYSIS /3/, where is requested that the Input values used in all investment analysis should be valid and applicable at the time of the investment decision taken by the project participant. For all the above mentioned, ICONTEC deemed reliable and conservative the assured energy reported by PP.
Installed power	**5.60**	MW	ICONTEC verified that 5,600 kW was the value of installed capacity calculated in the Das Pedras' FSR /13/ and approved by ANEEL/10/.
Net Generated electricity per year	**31,448.4**	MWh/year	ICONTEC verified that the calculation of the Annual Net Electricity Generation per year corresponds to the assured energy calculated in the Das Pedras' FSR (3.59 MW) /13/, multiplied by the 8,760 hours in a year: Net Generated Electricity per year = 3.59 MW x 8,760 hours/year Net Generated Electricity per year = 31,448.4 MWh/year. ICONTEC deemed the value reliable and conservative.
Energy Price	**154.49**	R$/MWh	Information was cross-checked against results of the 10th Energy Auction , available on the website: http://www.mme.gov.br/programas/leiloes/galerias/arquivos/leiloes_energia_nova/10x_LEN.pdf
Cashflow Period Considered	**20**	years	Applicability of the "Guidelines on the assessment of investment analysis" version 01.0. In this clarification was requested:

			"If project participants choose a renewable crediting period and if the technical lifetime of the CDM project activity is more than 20 years, the investment analysis shall be conducted for 20 years and include the fair value of the project activity assets at the end of the assessment period" ICONTEC deemed that the PP correctly applied the requested clarification.
PIS - Social Contribution Program	**0.65%**	on gross revenue	Law 10.637/2002 and 9.718/1998, available on the website: http://www.receita.fazenda.gov.br/PessoaJuridica/PisPasepCofins/RegIncidencia.htm#Regime de incidência não-cumulativa
COFINS - Social Security Financing Transfers	**3.00%**	on gross revenue	Law 10.637/2002 and 9.718/1998, available on the website: http://www.receita.fazenda.gov.br/PessoaJuridica/PisPasepCofins/RegIncidencia.htm#Regime de incidência não-cumulativa
Base Value for the IR calculation	**8.00%**	on gross revenue	Law 10.637/2002 and 9.718/1998, available on the website: http://www.receita.fazenda.gov.br/pessoajuridica/dipj/2000/orientacoes/determinacaolucropresumido.htm
Base Value for the Social Contribution calculation	**12.00%**	on gross revenue	Law 10.637/2002 and 9.718/1998, available on the website: http://www.receita.fazenda.gov.br/aliquotas/ContribCsll/ApuracaAnualRecMensBascalcEst.htm
IR - Income Taxes	**15%**	on base value	Law 10.637/2002 and 9.718/1998, available on the website: http://www.receita.fazenda.gov.br/PessoaJuridica/DIPJ/2000/Orientacoes/Determinacao2.htm#Al%C3%ADquota
CSLL - Social Contribution on Net Profit	**9%**	on base value	Law 10.637/2002 and 9.718/1998, available on the website: http://www.receita.fazenda.gov.br/PessoaJuridica/DIPJ/2005/PergResp2005/pr617a633.htm
Additional IR	**10%**	on base value	Law 10.637/2002 and 9.718/1998, available on the website: http://www.receita.fazenda.gov.br/PessoaJuridica/DIPJ/2000/Orientacoes/Determinacao2.htm#Al%C3%ADquota
Annual Operation and Maintenance (O&M)	**923,064**	R$	ICONTEC verified the estimated value reported by PP with the one suggested by "Renewable Power Generation Costs in 2012, An Overview"/45/, issued by IRENA, page 44, section 5.3, where is established that "*Annual O&M costs are often quoted as a percentage of the investment cost per kW per year. The IEA assumes 2.2% to 3% for small projects*". ICONTEC calculated the Das Pedras' O&M cost percentage over the total investment cost, obtaining a percentage of 2.86 % (923,064 / 32,218,742.76 = 0.0286 or 2.86%) which is inside the suggested interval. For all the above mentioned, ICONTEC deemed reliable and conservative the O&M cost reported by PP.
ANEEL - Fiscalization fee (TFSEE)	**10,180.80**	R$ / year	ICONTEC verified the correct application by PP of the Law 9427/1996, Decree 2410/1997, and art 3 for the calculation of the fee. http://www.planalto.gov.br/ccivil_03/decreto/1997/D2410.htm The requested formula is: TFSEE = P x Gu , P = Installed Capacity (kW) Gu = 0,5/100 x Bg Bg = R$ 363.60 (http://www.aneel.gov.br/cedoc/dsp20094774.pdf) TFSEE = 0,5/100 x 363.60 x 5,600 = 10,180.8 R$/year. For all the above mentioned, ICONTEC deemed reliable and conservative the TFSEE value reported by PP.
Distribution fee (TUSD) - "encumbrance"	**0.24**	R$/MWh	ANEEL - Resolution Nº 826, page 6, frame T, available on the website: http://www.aneel.gov.br/cedoc/reh2009826.pdf

Distribution Use of System Charge - TUSD	**1.12**	R$/KW	ANEEL - Resolution Nº 826, page 5, frame P, available on the website: http://www.aneel.gov.br/cedoc/reh2009826.pdf The value obtained in the resolution N° 826, should be adjusted in 50% in accordance with the art 4 of the ANEEL's Approved Installed Capacity Resolution for Das Pedras /10/. For all the above mentioned, ICONTEC deemed reliable and conservative the TUSD value reported by PP.
MRE fee - Energy Reallocation Mechanism	**7.33**	R$/MWh	ICONTEC verified that the reported value is the average value of the power plants included in MRE since 2005 to 2008. 2005: 6.84 R$/MW (http://www.ccee.org.br/StaticFile/Arquivo/biblioteca_virtual/Relatorios_Publico/Anual/relatorio_anual_2005.pdf), page 17, table 15. 2006: 7.25 R$/MW (http://www.ccee.org.br/StaticFile/Arquivo/biblioteca_virtual/Relatorios_Publico/Anual/relatorio_anual_2006.pdf), page 19, table 15. 2007: 7.47 R$/MW http://www.ccee.org.br/StaticFile/Arquivo/biblioteca_virtual/relatorio_anual_2007.pdf, page 19, table 15. 2008: 7.77 R$/MW http://www.ccee.org.br/StaticFile/Arquivo/biblioteca_virtual/Relatorios_Publico/Anual/relatorio_anual_2008.pdf, page 15, table 10. For all the above mentioned, ICONTEC deemed reliable and conservative the MRE value reported by PP.
Commercializatio n Fee / Provisions	**2%**	on gross revenue	ICONTEC verified by the reviewing similar projects /63/ undertaken by PP that a value for commercialization fee between 2% to 3% should be applied to the electricity price in order to take into account the intermediation made by the Local Grid Operator.
Residual	**60%**	on total asset	ICONTEC verified from the study "Lifetime and Depreciation Study for Turbines and Generators"/48/, volume 2, page 249, that for generators the average lifetime is 30 years; and taking into account a depreciation rate of 2% per year, for 20 years of analysis, the asset will get a residual value of 60% over his total cost. ICONTEC deemed reliable and conservative the reported residual value for the Project.

Table 10: Rio do Sapo Investment Analysis Parameters

Parameter	Value	Unit	Validation Analysis
Investment	**20,817,565**	R$ - Real	ICONTEC verified from the Das Pedras' FSR /14/ that the calculated investment cost for the project was R$ 20,817,565, which consists in: Studies R$ 680,000 Civil works R$ 8,669,393 Turbines and Generators R$ 5,878,900 Electrical Equipment (installation) R$ 699,700 Transmission Line R$ 1,162,721 Indirect Costs R$ 3,726,850 Also, it was verified that when the Rio do Sapo OPE - Eletrobrás Standard Budget /50/ included in the FSR is reviewed by ANEEL in order to granted the Approved Installed Capacity, all the cost related with the project activity are evaluated and if there are overestimations, the project financially is rejected. ICONTEC calculated the price per Megawatt Installed for Rio do Sapo as (R$ 20,817,565 / kW 5,800 = 3,589 R$/kW or 1,840.6

			USD$/kW) using the exchange rate of 1 USD$ = R$ 1.95, rate close to the time of Rio do Sapo's CDM Prior Consideration request (2007). The obtained value was cross checked it with the one reported in "Renewable Power Generation Costs in 2012, An Overview"/45/, issued by IRENA, page 43, figure 5.4, where is described that "The total installed costs for small-scale hydropower projects in Latin America typically range from a low of USD 1,000/kW to around USD 3,500/kW", hence the Investment cost reported for Rio do Sapo is inside the recognized world range of investment costs reported by IRENA. For the all abovementioned, ICONTEC deemed reliable and conservative the investment cost reported for the project.
Equity	**10,408,782.50**	R$ - Real	ICONTEC verified that the PP correctly applied the estimation of 50% debt and 50% equity suggested by the Guideline on the assessment on investment analysis in the paragraphs 17 and 18 /3/ when a company's internal benchmark is calculated.
Debt	**10,408,782.50**	R$ - Real	ICONTEC verified that the PP correctly applied the estimation of 50% debt and 50% equity suggested by the Guideline on the assessment on investment analysis in the paragraphs 17 and 18 /3/ when a company's internal benchmark is calculated.
Debt Interest	**10.15**	**%**	ICONTEC verified from BNDES (http://www.bndes.gov.br/SiteBNDES/bndes/bndes_pt/Institucional/Apoio_Financeiro/Produtos/FINEM/energia_eletrica_geracao.html) next inputs included in the Debt Interest Calculation: TJLP = 6.25% (for July 2007) BNDES Fee for Generation = 0.9% Financial Entity Intermediation Fee (for 2007)= 1% The Credit Risk Fee was established by PP based on similar developed projects as 2%. ICONTEC verified from BNDES that this fee can be up to 4.13%, depending of the client risk fee. Hence the credit risk fee used by PP is deemed conservative by ICONTEC. For the all abovementioned, ICONTEC deemed reliable and conservative the debt interest reported for the project.
Assured Energy	**3.297**	MW average	ICONTEC verified the assured energy calculated for Rio do Sapo from the Rio do Sapo's FSR /14/, document where is established the value of 3.297 MW average for the project. ICONTEC deemed reliable and conservative the value of assured energy reported by PP.
Installed power	**5.80**	MW	ICONTEC verified that 5,800 kW was the value of installed capacity calculated in the Rio do Sapo's FSR /14/ and approved by ANEEL/11/.
Net Generated electricity per year	**28,882**	MWh/year	ICONTEC verified that the calculation of the Annual Net Electricity Generation per year corresponds to the assured energy calculated in the Rio do Sapo's FSR (3.297 MW) /14/, multiplied by the 8,760 hours in a year: Net Generated Electricity per year = 3.297 MW x 8,760 hours/year Net Generated Electricity per year = 21,882 MWh/year. ICONTEC deemed the value reliable and conservative.
Energy Price	**135.00**	R$/MWh	Information was cross-checked against results of the CCEE Energy Auction, dated on June 2007 (Resultado do 4º Leilão de Energia Nova - Compradores - 26/07/2007) , available on the website: (http://www.ccee.org.br/cs/idcplg?IdcService=GET_FILE&dID=59340&dDocName=CCEE_050660&allowInterrupt=1)
Cashflow Period Considered	**20**	years	Applicability of the "Guidelines on the assessment of investment analysis" version 01.0. In this clarification was requested: "If project participants choose a renewable crediting period and if the technical lifetime of the CDM project activity is more than 20 years,

			the investment analysis shall be conducted for 20 years and include the fair value of the project activity assets at the end of the assessment period" ICONTEC deemed that the PP correctly applied the requested clarification.
PIS - Social Contribution Program	**0.65%**	on gross revenue	Law 10.637/2002 and 9.718/1998, available on the website: http://www.receita.fazenda.gov.br/PessoaJuridica/PisPasepCofins/RegIncidencia.htm#Regime de incidência não-cumulativa
COFINS - Social Security Financing Transfers	**3.00%**	on gross revenue	Law 10.637/2002 and 9.718/1998, available on the website: http://www.receita.fazenda.gov.br/PessoaJuridica/PisPasepCofins/RegIncidencia.htm#Regime de incidência não
Base Value for the IR calculation	**8.00%**	on gross revenue	Law 10.637/2002 and 9.718/1998, available on the website: http://www.receita.fazenda.gov.br/pessoajuridica/dipj/2000/orientacoes/determinacaolucropresumido.htm
Base Value for the Social Contribution calculation	**12.00%**	on gross revenue	Law 10.637/2002 and 9.718/1998, available on the website: http://www.receita.fazenda.gov.br/pessoajuridica/dipj/2000/orientacoes/determinacaolucropresumido.htm
IR - Income Taxes	**15%**	on base value	Law 10.637/2002 and 9.718/1998, available on the website: http://www.receita.fazenda.gov.br/PessoaJuridica/DIPJ/2000/Orientacoes/Determinacao2.htm#Al%C3%ADquota
CSLL - Social Contribution on Net Profit	**9%**	on base value	Law 10.637/2002 and 9.718/1998, available on the website: http://www.receita.fazenda.gov.br/PessoaJuridica/DIPJ/2005/PergResp2005/pr617a633.htm
Additional IR	**10%**	on base value	Law 10.637/2002 and 9.718/1998, available on the website: http://www.receita.fazenda.gov.br/PessoaJuridica/DIPJ/2000/Orientacoes/Determinacao2.htm#Al%C3%ADquota
Annual Operation and Maintenance (O&M)	**742,880**	R$	ICONTEC verified the estimated value reported by PP with the one suggested by "Renewable Power Generation Costs in 2012, An Overview"/45/, issued by IRENA, page 44, section 5.3, where is established that "Annual O&M costs are often quoted as a percentage of the investment cost per kW per year. The IEA assumes 2.2% to 3% for small projects". ICONTEC calculated the Rio do Sapo's O&M cost percentage over the total investment cost, obtaining a percentage of 3.56% (742,880 / 20,817,565 = 0.0356 or 3.56%) which is above the suggested interval. The study also say that "*On the other hand, projects at remote sites, without adequate local infrastructure and located far from existing transmission networks, can cost significantly more than USD 3,500/kW due to higher logistical and grid connection costs*." ICONTEC during the onsite visit verified that the geographical location of SHP Rio do Sapo (located on the Rio do Sapo river, Paraná basin, Midwest region of Brazil.) can be framed within the "*project at remote site, without adequate local infrastructure and located far from existing transmission networks*". Hence, ICONTEC deems reliable the value of O&M cost reported by PP.
ANEEL - Fiscalization fee	**8,387.38**	R$ / year	ICONTEC verified the correct application by PP of the Law 9427/1996, Decree 2410/1997, art 3 for the calculation of the fee. http://www.planalto.gov.br/ccivil_03/decreto/1997/D2410.htm The requested formula is: TFSEE = P x Gu , P = Installed Capacity (kW) Gu = 0,5/100 x Bg Bg = R$ 289.22 (http://www.aneel.gov.br/cedoc/dsp2007141.pdf) TFSEE = 0,5/100 x 289.22 x 5,800 = 8,387.38 R$/year.

			For all the above mentioned, ICONTEC deemed reliable and conservative the TFSEE value reported by PP.
Distribution fee (TUSD) - "encumbrance"	**0.14**	R$/MWh	ANEEL - Resolution Nº 444, page 8, frame T, available on the website: http://www.aneel.gov.br/cedoc/reh2007444.pdf
Distribution Use of System Charge - TUSD	**2.20**	R$/KW	ANEEL - Resolution Nº 444, page 7, frame P, available on the website: http://www.aneel.gov.br/cedoc/reh2007444.pdf The value obtained in the resolution N° 826, should be adjusted in 50% in accordance with the art 4 of the ANEEL's Approved Installed Capacity Resolution for Rio do Sapo /11/. For all the above mentioned, ICONTEC deemed reliable and conservative the TUSD value reported by PP.
MRE fee - Energy Reallocation Mechanism	**7.18**	R$/MWh	ICONTEC verified that the reported value is the average value of the power plants inscrits in MRE since 2005 to 2007. 2005: 6.84 R$/MW (http://www.ccee.org.br/StaticFile/Arquivo/biblioteca_virtual/Relatorios_Publico/Anual/relatorio_anual_2005.pdf), page 17, table 15. 2006:7.25 R$/MW (http://www.ccee.org.br/StaticFile/Arquivo/biblioteca_virtual/Relatorios_Publico/Anual/relatorio_anual_2006.pdf), page 19, table 15. 2007: 7.47 R$/MW http://www.ccee.org.br/StaticFile/Arquivo/biblioteca_virtual/relatorio_anual_2007.pdf, page 19, table 15. For all the above mentioned, ICONTEC deemed reliable and conservative the MRE value reported by PP.
Commercializatio n Fee / Provisions	**2%**	on gross revenue	ICONTEC verified by the reviewing similar projects /63/ undertaken by PP that a value for commercialization fee between 2% to 3% should be applied to the electricity price in order to take into account the intermediation made by the Local Grid Operator.
Residual	**60%**	on total asset	ICONTEC verified from the study "Lifetime and Depreciation Study for Turbines and Generators"/48/, volume 2, page 249, that for generators the average lifetime is 30 years; and taking into account a depreciation rate of 2% per year, for 20 years of analysis, the asset will get a residual value of 60% over his total cost. ICONTEC deemed reliable and conservative the reported residual value for the Project.

Validation of main parameters used in cash flow calculations for determining the Equity IRR, are in line with VVS paragraph 127 /51/ and Guidelines on the assessment of investment analysis /3/.

ICONTEC raised CAR 3 in order to ask for a better explanation of the value used as assumption of the Amortization Period (12 years). The PP in the cashflow files correctly explained the reliable and conservative of the used figure and the CAR was closed.

IRR calculations

As a result of carrying on an investment analysis, PP determined following figures for the project:

Table 11: Summary of IRR calculations

	Equity IRR (%)	Cost of Equity Benchmark (%)
Tambaú	8.54	16.64
Das Pedras	8.95	16.64
Rio do Sapo	11.68	16.64

The audit team conducted thorough review of assumptions and calculation methods presented by PP on cash flow files, finding compliance with mandatory requirements established on the Guidelines on the assessment of investment analysis /3/. Calculated equity IRRs are far lower than established Cost of Equity Benchmark which demonstrates the project is not financially feasible without the revenues.

Sub-step 2d: 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).

ICONTEC raised CL 12 in order to ask about an explanation about the probability to reach the selected benchmark in each one of the SHPs' cashflows. The PP correctly included in the latest version on the PDD /1/ a summary of the breakeven analysis for each SHP. ICONTEC closed the finding.

Result of this analysis is presented on table 11 as follows:

Table 12: Summary Sensibility Analysis

		Original value	IRR Parameter (+ - 10%)	Breakeven point	Deviation %
Tambaú	Investment (R$)	48,023,229.89	10.26	31,407,192.35	- 34.60%
	Assured Energy (MW average)	5.35	10.44	7.64	+ 42.80%
	Energy Price (R$/MWh)	144.00	10.56	201.96	+ 40.25%
	Operation and Maintenance (R$/MWh)	961,748.95	8.94	Not sensible enough to reach given benchmark	-100%
Das Pedras	Investment (R$)	32,218,742.76	10.61	21,528,563.91	- 33.18%
	Assured Energy (MWaverage)	3.59	10.90	4.95	+ 38.00%
	Energy Price (R$/MWh)	154.49	11.01	210.08	+ 35.98%
	Operation and Maintenance (R$/MWh)	923,064	9.37	Not sensible enough to reach given benchmark	-100%
Rio do Sapo	Investment (R$)	20,817,565.00	13.72	16,450,039.86	- 20.98%
	Assured Energy (MWaverage)	3.297	14.18	3.94	+ 19.55%
	Energy Price (R$/MWh)	135.00	14.34	159.84	+ 18.40%
	Operation and Maintenance (R$/MWh)	742,880	12.23	88,402.72	- 88.10%

As can be seen, all variations performed overcome the range of +/-10% recommended by the Guidelines on the assessment of investment analysis /3/. Based on this analysis it can be concluded that is highly unlikely that the project become financially feasible, even with the CDM incomes.

Step 3: Barrier Analysis

The PP did not apply barrier analysis.

Step 4: Common Practice Analysis
PP addressed a stepwise analysis as established on common practice guideline /52/ in the latest version of the common practice's file /62/ and in the latest version of the PDD/1/. First of all, PP considered the geographical as the entire host country (Brazil), according to the applicable geographical area definition. The validation team verified operating plants as reported by ANNEL /53/.

STEP 1: Calculate applicable capacity or output range as +/-50% of the total design capacity or output of the proposed project activity.

The audit team found that applicable output range was properly assessed by PP as +/-50% of the design capacity of the proposed project activity (20.18MW), resulting in a range from 10.09 MW to 30.27 MW. This range corresponds to 10.09 MW (50% below the SHPs installed capacity) and 30.27 MW (50% above the SHPs Total installed capacity).

STEP 2: Identify similar projects (both CDM and non-CDM) which fulfil all of the following conditions:

(a) The projects are located in the applicable geographical area;
(b) The projects apply the same measure as the proposed project activity;
(c) The projects use the same energy source/fuel and feedstock as the proposed project activity, if a technology switch measure is implemented by the proposed project activity;
(d) The plants in which the projects are implemented produce goods or services with comparable quality, properties and applications areas (e.g. clinker) as the proposed project plant;
(e) The capacity or output of the projects is within the applicable capacity or output range calculated in Step 1;
(f) The projects started commercial operation before the project design document (CDM-PDD) is published for global stakeholder consultation or before the start date of proposed project activity, whichever is earlier for the proposed project activity.

ICONTEC verified from the official source ANEEL /53/ that the PP correctly included in the step 1, the whole power plants (Thermal, Hydro, Renewable) existing in Brazil, between 10.09MW and 30.27MW that started after of the CDM implementation (the CDM became available to the projects' sponsors since January 2005) and before August 2007 (before the project activity's starting date).

The similar projects are listed below:

Table 13: Similar Projects (both CDM and non-CDM)

Name	State	Incentive / Type	MW	Name	State	Incentive / Type	MW	Name	State	Incentive / Type	MW
Ivan Botelho III	MG	CDM	24.40	Santa Edwiges II	GO	CDM	13.00	Buriti	MS	Proinfa	30.00
Ombreiras	MT	CDM	26.00	São Bernardo	RS	Proinfa	15.00	Flor do Sertão	SC	Proinfa	16.50
Porto Góes	SP	Retrofit	14.30	Contagem	MG	Thermoelectric	19.30	José Gelásio da Rocha	MT	Proinfa Retrofit	23.70
Salto Corgão	MT	CDM	27.00	Água Bonita	SP	Thermoelectric	17.00	Ludesa	SC	Proinfa	30.00
Caeté	AL	Thermoelectric	16.80	Coruripe	AL	Thermoelectric	16.00	Ponte Alta	MS	Proinfa	13.00
Canoa Quebrada	MT	CDM Proinfa	28.00	Fartura	SP	Thermoelectric	17.40	Primavera	RO	CDM	18.20
Esmeralda	RS	Proinfa	22.20	Giasa II	PB	Thermoelectric	20.00	São João (Castelo)	ES	CDM	25.00
Garganta da Jararaca	MT	CDM	29.30	Jalles Machado	GO	Thermoelectric	12.00	UTE REFAP	RS	Thermoelectric	27.12
Mosquitão	GO	Proinfa	30.00	Mandu	SP	Thermoelectric	25.00	Bunge Araxá	MG	Thermoelectric	11.50
Piranhas	GO	Proinfa	18.00	Ruette	SP	Thermoelectric	28.00	Fartura	SP	Thermoelectric	22.00
Sacre 2	MT	CDM	30.00	Volta Grande	MG	Thermoelectric	30.00	USI Santo Inácio	PR	Thermoelectric	30.00
Santa Edwiges I	GO	CDM	10.10	Winimport	PR	Thermoelectric	11.50	Itaenga	PE	Biomass	22.00

ICONTEC raised CAR 4 given that the PP had not undertaken correctly the steps 1 and 2 of the guideline on common practice /52/. The PP in the latest version of the PDD /1/ corrected the steps and the finding was closed.

STEP 3: Within the projects identified in Step 2, identify those that are neither registered CDM project activities, project activities submitted for registration, nor project activities undergoing validation. Note their number N_{all}.

ICONTEC verified from the official source ANEEL /53/ and in the UNFCCC web page that the "PP" correctly would had identified the plants that are not registered neither CDM nor are undergoing validation.

The outcome of the step was:

Table 14: Similar Projects

Name	State	Incentive / Type	MW	Name	State	Incentive / Type	MW
Porto Góes	SP	Retrofit	14.30	Ruette	SP	Thermoelectric	28.00
Caeté	AL	Thermoelectric	16.80	Volta Grande	MG	Thermoelectric	30.00
Esmeralda	RS	Proinfa	22.20	Winimport	PR	Thermoelectric	11.50
Mosquitão	GO	Proinfa	30.00	Buriti	MS	Proinfa	30.00
Piranhas	GO	Proinfa	18.00	Flor do Sertão	SC	Proinfa	16.50
São Bernardo	RS	Proinfa	15.00	José Gelásio da Rocha	MT	Proinfa Retrofit	23.70
Contagem	MG	Thermoelectric	19.30	Ludesa	SC	Proinfa	30.00
Água Bonita	SP	Thermoelectric	17.00	Ponte Alta	MS	Proinfa	13.00
Coruripe	AL	Thermoelectric	16.00	UTE REFAP	RS	Thermoelectric	27.12
Fartura	SP	Thermoelectric	17.40	Bunge Araxá	MG	Thermoelectric	11.50
Giasa II	PB	Thermoelectric	20.00	Fartura	SP	Thermoelectric	22.00
Jalles Machado	GO	Thermoelectric	12.00	USI Santo Inácio	PR	Thermoelectric	30.00
Mandu	SP	Thermoelectric	25.00	Itaenga	PE	Biomass	22.00

For the abovementioned it was identified N_{all} as 26.

$$N_{all} = 26$$

STEP 4: within similar projects identified in Step 3, identify those that apply technologies that are different to the technology applied in the proposed project activity. Note their number N_{diff}.

ICONTEC verified that PP correctly included in N_{diff} the plants that had different energy sources (thermal, wind, biomass, etc.), that had other subsidies or other financial flows (the PP excluded the plants that belong to PROINFA) and that had a small size of installation in accordance with the paragraph 28 of decision 1/CMP.2 (Porto Góes with 14.30 MW).

PROINFA is an Alternative Electrical Energy Sources Incentive Program, established for the Decree N° 5025/200430 (http://www.planalto.gov.br/ccivil_03/_Ato2004-2006/2004/Decreto/D5025.htm) looking for increase the participation of renewable energy in the SIN. Its target is to diversify the Brazilian Electrical Matrix, creating alternatives to improve the security in the electrical energy supply e to allow the appreciation of local and regional characteristics and potentialities.

In PROINFA, the financial incentives provided by the Federal Government are based on differentiated lines of finance that guarantee a minimal revenues through of the PPAs (CCVEs) to be firmed with entrepreneur and Eletrobrás, which assures to the entrepreneur a minimal revenue through the purchase of 70% of the generated energy during the financing period. PROINFA gives also protection against the risks of exposure in the short-term market besides other benefits of adhesion in the program.

ICONTEC verified from the latest version of the PDD /1/ and from the latest version of the file of common practice /62/ that:

N_{diff} = (9 Proinfa + 15 Thermo Electrics + 1 Retrofit (small size of installation) + 1 Biomass) = 26

For the abovementioned ICONTED deemed correctly applied the step 4 of the Guideline.

Step 5: Calculate factor $F=1 - N_{diff}/N_{all}$ representing the share of similar projects (penetration rate of the measure/technology) using a measure/technology similar to the measure/technology used in the proposed project activity that deliver the same output or capacity as the proposed project activity.

$F=1 - N_{diff} / N_{all} =1 - (26/26) = 0$

$N_{all} – N_{diff} = 26 – 26 = 0$

Hence, ICONTEC verified that the proposed project activity is not a “common practice” within a sector in the applicable geographical area, given that the factor F is lower than 0.2 (F =0) and $N_{all} - N_{diff}$ is lower than 3 ($N_{all} - N_{diff} = 0$).

ADDITIONALITY CONCLUSION

In conclusion, it has been verified by ICONTEC that the project is not the most likely baseline scenario. Hence, the emission reductions occurring from the project are deemed additional to those that would occur in the absence of the project activity.

3.6. MONITORING PLAN

Monitoring plan described on the latest version of PDD /1/ complies with requirements of methodology /2/ ACM0002 and all applied tools /4/, /5/. During validation activities, one request (CL 6) was raised on regard to the completeness of the monitoring plan, a lack of information was determined on parameter $EG_{y,}$ Cap_{PJ}, *and* $TEG_{Rio\ do\ Sapo,y}$. Finding was corrected by PP on the latest version of PDD/1/ . Monitoring of GHG Emission reductions is based on the electricity generation by the project activity, which is transparently presented in section B.7 of the latest version of the PDD.

ICONTEC verified through interviews with relevant personnel and document review that the project will be equipped with an extensive monitoring system. Staff training and the monitoring plan will be established to maintain installed equipment and technology performance, as well as to ensure the measurements accuracy and the data reported. Validation team checked all parameters presented in the monitoring plan of the latest version of the PDD /1/, against applied methodology and tools’ requirements; no deviations to the project activity were found.

The main parameter to be monitored is: Quantity of net electricity generation supplied by the project activity to the grid ($EG_{facility,y}$), in year y. The DOE confirmed that the latest version of the PDD clearly stated that $EG_{facility,y}$ will be measured as required by the methodology. Baseline parameters to be monitored ex-post were indicated in Section B.7.1 of latest version of the PDD and are:

Table 15: Data and parameters ex-post

Data/Parameter	ICONTEC´s means of validation
$EG_{Tambaú,y}$	The electricity generation will be measured continuously and recorded at least monthly with 2 bidirectional electricity meters (main and backup meter) with accuracy class 0.2 that comply with national standards and industrial regulations and will be located in a panel inside the Frederico Westphalen substation. The responsibility of the check and/or cross of the information will be of the PP. The data from the energy meters will be cross checked with the CCEE databank. The meters must comply with national standards stated by ONS (http://extranet.ons.org.br/operacao/prdocme.nsf/principalPRedeweb?openframeset). The periodicity of the calibration will follow the Procedure 12.335 of ONS. The viability of this activity was confirmed by interview with the technical and financial manager.
$EG_{das\ Pedras,y}$	The electricity generation will be measured continuously and recorded at least monthly with 2 bidirectional electricity meters (main and backup meter) with accuracy class 0.2 that comply with national standards and industrial regulations and will be located in a panel inside the powerhouse or inside the Palmas substation. The responsibility of the check and/or cross of the information will be of the PP. The data from the energy meters will be cross checked with the CCEE databank. The meters must comply with national standards stated by ONS (http://extranet.ons.org.br/operacao/prdocme.nsf/principalPRedeweb?openframeset). The periodicity of the calibration will follow the Procedure 12.335 of ONS. The viability of this activity was confirmed by interview with the technical and financial manager.
$EG_{Rio\ do\ Sapo,y}$	The electricity generation will be measured continuously and recorded at least monthly with 2 bidirectional electricity meters (main and backup meter) with accuracy class 0.2 that comply with national standards and industrial regulations and will be located in a panel inside the powerhouse or inside the Itanorte substation. The responsibility of the check and/or cross of the information will be of the PP. The data from the energy meters will be cross checked with the CCEE databank. The meters must comply with national standards stated by ONS (http://extranet.ons.org.br/operacao/prdocme.nsf/principalPRedeweb?openframeset). The periodicity of the calibration will follow the Procedure 12.335 of ONS. The viability of this activity was confirmed by interview with the technical and financial manager.
$TEG_{Rio\ do\ Sapo,y}$	The total electricity delivered to the grid and auto consumed in the power plant will be checked through an electricity meter located in a panel inside the powerhouse or through the internal loads consumption calculation. The electricity meters (one main and one back-up) will be bidirectionals, with accuracy class 0.2. The responsibility of the check and/or cross of the information will be of the PP. The data will be archived monthly (electronic) and kept archived during the credit period and two years after. The viability of this activity was confirmed by interview with the technical and financial manager.
$EF_{grid,OM-DD,y}$	The data will be taken annually by PP from the Designated National Authority (http://www.mct.gov.br).

	The Operating Margin data will be updated annually in order to be applied in ex-post calculation of the Combined Margin Emission Factor.
$EF_{grid,BM,y}$	The data will be taken annually by PP from the Designated National Authority (http://www.mct.gov.br). The Build Margin data will be updated annually in order to be applied in ex-post calculation of the Combined Margin Emission Factor.
$EF_{grid,CM,y}$	The Combine Margin Emission Factor will be calculated annually by PP, using the weighted-average formula, considering the $EF_{grid,OM-DD,y}$ and the $EF_{grid,BM,y}$ and the default w_{OM} and w_{BM} weights.
$Cap_{PJ - SHP\ Tambaú}$	The installed capacity of the project will be monitored annually by reviewing the installed capacity generator's nameplate. The viability of this activity was confirmed by interview with the technical and financial manager.
$Cap_{PJ - SHP\ das\ Pedras}$	The installed capacity of the project will be monitored annually by reviewing the installed capacity generator's nameplate. The viability of this activity was confirmed by interview with the technical and financial manager.
$Cap_{PJ - SHP\ Rio\ do\ Sapo}$	The installed capacity of the project will be monitored annually by reviewing the installed capacity generator's nameplate. The viability of this activity was confirmed by interview with the technical and financial manager.
$A_{PJ - SHP\ Tambaú}$	The area of the reservoir will be monitored by a third party company that will be hired for the development of topographic surveys and/or satellite image processing. The viability of this activity was confirmed by interview with the technical and financial manager.
$A_{PJ - SHP\ das\ Pedras}$	The area of the reservoir will be monitored by a third party company that will be hired for the development of topographic surveys and/or satellite image processing. The viability of this activity was confirmed by interview with the technical and financial manager.
$A_{PJ - SHP\ Rio\ do\ Sapo}$	The area of the reservoir will be monitored by a third party company that will be hired for the development of topographic surveys and/or satellite image processing. The viability of this activity was confirmed by interview with the technical and financial manager.

ICONTEC verified that the procedures designed for monitoring of electricity generation by the project activity will follow the parameters and regulations of the Brazilian energy sector. The National Grid Operator (ONS) and the Electric Power Commercialization Chamber - CCEE (from portuguese Câmara de Comércialização de Energia Elétrica) are the organs responsible for specification of technical requirements of energy measurement system for billing, i.e, those bodies are monitoring and approving projects for accurate accounting of energy.

The data stored in the meters will be collected by the Energy Data Collecting System – SCDE (from Portuguese Sistema de Coleta de Dados de Energia Elétrica) of the CCEE, remotely and automatically, through direct access to the agent's meters or intermediated for the agent through its Meter Collecting Unit – UCM."

QA/QC of the project will consist in the calibration of meters by a qualified organization that will conduct the calibration at least every two years in accordance with the stated in "Grid Procedures" from the National Grid Operator: Module 12, sub module 12.2 (http://extranet.ons.org.br/operacao/prdocme.nsf/principalPRedeweb?openframeset).

The emergency procedures will consist the estimation of data by applying the item 7.1 of the Procedure of Energy Commercialization – Module 2 in case of unavailability of measures from any point of measurement, due to maintenance, commissioning or for any other reason.

All data gathered in the monitoring range will be electronically filled and will keep for at least 2 years after the last crediting period. The emission reductions to be generated will be calculated regularly by the project proponents and will keep for the verification phase.
All training necessary for the plants' operational team shall be provided by the equipment's suppliers, during the installation and pre operational phases, and by the PPs during the project lifecycle. The emergency procedures related to the project activity operation (for instance: workers'

safety and health, dam safety related with emergency drills/exercises, etc, according to the Brazilian legislation), will be included in the training courses that the third party company will offer.

The project owners (Tambaú Energética S.A, Euclides Maciel Energética S.A and Rio do Sapo Energética S.A) will responsibles for the maintenance and calibration of the monitoring equipment, compliance of operational requirements and corrective actions related to the functionality of SHPs respectively. Moreover, the companies have the authority and the responsibility for registration, monitoring and measurements as well as managing of all the issues related to the project activity, to organize staff training and to use appropriated techniques in those procedures.

ICONTEC confirmed that the monitoring plan established by the PP, is feasible and that the PP has the ability and means of implementation sufficient to ensure that the emission reductions achieved as a result of the proposed project activity, can be reported ex-post and verified in accordance with the paragraph 138 of VVS/51/.

3.7. CALCULATION OF GHG EMISSIONS

According to methodology /2/, Emission reductions of the project activity shall be calculated using formula 11 as follows:

$$ER_y = BE_y - PE_y$$

Where:
ER_y = Emission reductions in year y (tCO_2e/yr)
BE_y = Baseline emissions in year y (tCO_2/yr)
PE_y = Project emissions in year y (tCO_2e/yr)

Baseline Emissions:

According to methodology /2/, Baseline Emissions of the project activity shall be calculated using option a), formula 6 as follows:

$$BE_y = EG_{PJ,y} * EF_{grid,CM,y}$$

Where:
BE_y = Baseline emissions in year y (tCO_2/yr)
$EG_{PJ\,y}$,= Quantity of net electricity generation that is produced and fed into the grid as a result of the implementation of the CDM project activity in year y (MWh/yr)
$EF_{grid\,CM\,y}$ = Combined margin CO_2 emission factor for grid connected power generation in year y calculated using the latest version of the .Tool to calculate the emission factor for an electricity system. (tCO_2/MWh)

Additionally, and according to methodology, the quantity of net electricity generation that is produced and fed into the grid as a result of the implementation of the CDM project activity in year y (MWh/yr) shall be calculated as follows:

$$EG_{PJ,y} = EG_{facility,y}$$

Where:
$EG_{PJ,y}$ = Quantity of net electricity generation that is produced and fed into the grid as a result of the implementation of the CDM project activity in year y (MWh/yr)
$EG_{facility,y}$ = Quantity of net electricity generation supplied by the project plant/unit to the grid in year y (MWh/yr)

According to PP and as verified by the audit team, the total amount of energy generated corresponds to the amount of energy generated by each of the SHPs /54/:

$EG_{PJ,y} = EG_{Tambaú} + EG_{dasPedras} + EG_{Rio\ do\ Sapo}$, therefore: $EG_{PJ,y}$ = 42,924 + 26,280 + 28,882.

$$EG_{PJ,y} = 98{,}086\ MWh/yr$$

ICONTEC raised CAR 5 in order to request explanation about why the PP had used different assured energy values in the cashflow files (IRR for Tambaú and IRR for Das Pedras) and in the CER's file. The PP argued that the used values of 5.35 MW for Tambaú and 3.59MW for Das Pedras were the values estimated by PP during the investment decision time and for that reason this value should keep in the cashflow file in accordance with Item 6 of the GUIDELINES ON THE ASSESSMENT OF INVESTMENT ANALYSIS /3/, where is requested that the Input values used in all investment analysis should be valid and applicable at the time of the investment decision taken by the project participant.

The used values of assured energy in the CER's files (4.9MW for Tambaú and 3MW for Das Pedras) correspond with the ones authorized for ANEEL /6/, /7/ after of the time of investment decision and as these values are lower than the ones used in the cashflow files, and they result in lower emission reductions' estimations, ICONTEC deemed reliable and conservative the approach used by PP.
On the other hand, Brazilian DNA provides the official calculation of the emission factor, this figure was the one used by PP to calculate the actual Baseline emission. Finally, as referred in Section 3.4 , the baseline emissions are product of electrical energy baseline $EG_{PJ,y}$ expressed in MWh/yr of electricity produced by the renewable generating unit multiplied by the grid emission factor:

$BE_y = EG_{PJ,y} * EF_{grid,CM,y}$

$BE_y = 98,086 * 0.3593 = 35,242\ tCO_2e/yr$

Given that there will not be generated electricity for Das Pedras and Rio do Sapo during the first and second year of the crediting period (Currently just Tambaú is in operation) the below mentioned value is the expected value of baseline emissions with the three SHPs in operation.

$$BE_y = 29,579\ tCO_2/yr$$

The annual average value of baseline emissions for the project activity will be 29,579 tCO_2e.

The validation team reviewed calculation procedure and equations used, finding no differences between formula established on methodology /2/ and no mistakes on calculation procedure, reason why agreed with figures determined for Baseline emissions.

Project Emissions:

PP correctly determined project emission for Rio do Sapo SHP since, as established by applicable methodology /2/: power density of Rio do Sapo is greater than 4 W/m^2 and less than or equal to 10 W/m^2. Project emissions are based upon formula 3 of methodology /2/ as described as follows:

$$PE_{HP,y} = \frac{EF_{Res} * TEG_y}{1000}$$

Where:
$PE_{HP,y}$ = Project emissions from water reservoirs (tCO2e/yr)
EF_{Res} = Default emission factor for emissions from reservoirs of hydro power plants in year y (kgCO2e/MWh)
TEG_y = Total electricity produced by the project activity, including the electricity supplied to the grid and the electricity supplied to internal loads, in year y (MWh)

Given that there will not be generated electricity for Das Pedras and Rio do Sapo during the first and second year of the crediting period (Currently just Tambaú is in operation) the below mentioned value is the expected value of project emissions with the three SHPs in operation.

$$PE_{Rio\ do\ Sapo} = PE_{HP,y} = 2,599\ tCO_2/year$$

The annual average value of project emissions for the project activity will be 1,857 tCO_2e.

The validation team reviewed calculation procedure and equations used, finding no differences between formula established on methodology /2/ and no mistakes on calculation procedure, reason why agreed with figures determined for Project Emissions.

Leakage Emissions:
According to methodology /2/ "No leakage emissions are considered"; hence PP correctly addressed methodological requirement as described on section B.6.4 of the latest version of the PDD /1/.

EMISSION REDUCTIONS:

As previously was described, PP used formula 11 of the methodology/2/ in order to determine the total amount of emission reductions for the crediting period/18/.

Table 14 summarizes the emission reduction calculations:

Table 16: Summary of ER's Calculations

Year	Baseline emissions (t CO_2e)	Project emissions (t CO_2e)	Leakage (t CO_2e)	Emission reductions (t CO_2e)
2014	15,423	0	0	15,423
2015	15,423	0	0	15,423
2016	35,242	2,599	0	32,643
2017	35,242	2,599	0	32,643
2018	35,242	2,599	0	32,643
2019	35,242	2,599	0	32,643
2020	35,242	2,599	0	32,643
Total	**207,056**	**12,997**	**0**	**194,059**
Annual average over the crediting period	**29,579**	**1,857**	**0**	**27,723**

Assumptions and data used to determine emission reductions are listed in the latest version of the PDD /1/. All sources were checked and confirmed by ICONTEC, and the calculations can be replicated. Based upon information reviewed it can be confirmed that, sources used are correctly quoted and interpreted in the PDD, the calculations are complete, and the numbers are reasonable and accurate. The steps taken and equations applied to calculate the emission reductions comply with the requirements of the selected baseline and monitoring methodology ACM0002 version 14.0.0 and tools, and these were correctly applied.

3.8. ENVIRONMENTAL IMPACTS

ICONTEC confirmed that according to legislation of host country, the PP made Environmental Impact Studies for each one of the projects, which were elaborated as follow is described:

Table 17: Environmental Impact Studies and licences of the project activity

SHP	Entity developing the environmental Impact Study	Entity Granting Previous Licence	Entity Granting Installation Licence	Entity Granting Operation Licence
Tambaú	Naturallis (*consultoria ambiental LTDA)* /55/	FEPAM /24/	FEPAM /27/	FEPAM /31/
Das Pedras	RTK /56/	FATMA /25/	FATMA /28/	Not issued yet, instead renewal of the installation licence /30/
Rio do Sapo	Floramap /57/	SEMA /26/	SEMA /29/	Not issued yet.

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 licenses. The audit team verified all original documents and cross-checked them against supporting information provided by PP, finding no differences between the two sources of information.

ICONTEC through documental review and by consulting the webpages of the entities which granted the environmental licenses verified the reliability of each one of the licenses abovementioned as follows:

Tambaú's Previous License:
http://www.fepam.rs.gov.br/licenciamento/area3/detalheDocproc.asp?area=3&buscar=2&tipoBusca=documento&processo=08892001&codigo=100

Tambaú's Installation License:
http://www.fepam.rs.gov.br/licenciamento/area3/detalheDocproc.asp?area=3&buscar=2&tipoBusca=documento&processo=4312008&codigo=110

Tambaú's Operation License:
http://www.fepam.rs.gov.br/licenciamento/area3/detalheDocproc.asp?area=3&buscar=2&tipoBusca=documento&processo=2802013&codigo=120

Das Pedras' Previous and Installation License:
http://www.fatma.sc.gov.br/index.php?option=com_docman&task=cat_view&gid=36&Itemid=83

Rio do Sapo's Previous and Installation License:
http://www.sema.rs.gov.br/

PP undertook an analysis of environmental impacts as described in the latest version of the PDD/1/ in Section D.1. Each environmental impact identified has its mitigation action described in the EIA (which include an Environmental Diagnosis). Additionally, environmental licences were granted by environmental authorities.

ICONTEC concluded that no significant environmental impacts were identified, and this information is consistent with design documentation and audit team experience. There will be no transboundary impacts resulting from this project activity.

3.9. COMMENTS BY LOCAL STAKEHOLDERS

PP followed procedures set out by the DNA of Brazil and sent letters /58/ to local stakeholders that could reasonably be considered relevant for the proposed project activity. The latest version of the PDD /1/ (Section E.1) includes a list of the 40 different parties involved and considered as stakeholders informed through this letter.
The consulted interested parties were:

1) City Hall of Erval Seco
2) City Hall of Redentora
3) Environmental Secretary of Erval Seco
4) Environmental and Agricola Secretary of Redentora
5) City Council of Erval Seco
6) City Council of Redentora
7) FEPAM – Environmental Agency of the Rio Grande do Sul State
8) Rural Workers Union of Redentora
9) Rural Workers Union of Erval Seco

10) State Public Attorney of Rio Grande do Sul
11) Federal Public Attorney of Rio Grande do Sul
12) Prosecutor's Rio Grande do Sul
13) Government of Rio Grande do Sul
14) Environmental Secretary of Rio Grande do Sul State
15) Legislative Assembly of Rio Grande do Sul
16) City Hall of Água Doce
17) City Council of Agua Doce
18) Department of Industry, Trade and Urbanism of Água Doce
19) FATMA – Environmental Agency of Santa Catarina State
20) Chamber of Shopkeepers of Água Doce
21) Rural Workers Union of Água Doce
22) Federal Public Attorney of Santa Catarina
23) Prosecutor's Santa Catarina
24) State Public Attorney of Santa Catarina
25) Government of Santa Catarina
26) Santa Catarina Secretariat for Sustainable Economic and Development
27) Legislative Assembly of Santa Catarina
28) City Hall of Tangará da Serra
29) City Council of Tangará da Serra
30) Environmental Secretary of Tangará da Serra
31) Association of Industrial and Enterprise of Tangará da Serra - ACTIS
32) Rural Union of Tangará da Serra
33) Federal Public Attorney of Mato Grosso
34) Government of Mato Grosso
35) State Public Attorney of Mato Grosso – Procuradoria Geral
36) SEMA – Environmental Agency of Mato Grosso State
37) Legislative Assembly of Mato Groso
38) Brazilian Forum of NGOs and Environmental and Development Social Movements (FBOMS)
39) Ministry of the Environment - Department of Climate Change and Environmental Quality
40) Ministry of the Environment - Minister of the Environment Office

No comments were received during the 30 days period of comments as verified by the audit team by means of review of the original records: Communications between PP and 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 /59/.

ICONTEC confirmed that, the description in the latest version of the PDD (Section E) /1/ is correct and that the local stakeholder consultation was in line with CDM and host country requirements. Stakeholders that can reasonably be considered relevant for the proposed CDM project activity were invited. ICONTEC determined that the local stakeholder consultation was adequate.

4. GLOBAL STAKEHOLDERS CONSULTATION

PDD version 1 /1/ submitted by Tambaú Energética S.A, Euclides Maciel Energética S/A, Rio Do Sapo Energia S.A. and Carbotrader Assessoria E Consultoria Em Energia Eireli, was made publicly available at UNFCCC website during the period 14/06/2013 to 13/07/2013.

ICONTEC verified on the UNFCCC website: http://cdm.unfccc.int/Projects/Validation/DB/U9KKQD5U4JX974FFUHJZYZR5GFDK95/view.html parties, stakeholders and NGOs were invited to provide comments through the website.

One comment about the reliability of the FSR's, baseline's determinations and equipment's purchases was received during the consultation time period. Comment was addressed to DOE in order to multiply efforts to validate all information provided by PP. In the latest version of PDD /1/, PP described the nature of the comment and provided explanations to DOE and author of the comment through file: "*GSTK_Consult_n_1.pdf*" /60/.

The audit team acknowledges receipt of comments, taking into account as well proposed additional effort when validating the project, and asked further clarifications to PP. likewise, PP gave answer /60/ to the previous mentioned comment, provided relevant information on issued pointed out on the comment and allowed the validation team go further when verifying authenticity of the project, Feasibility studies, Baseline determination and equipment purchases.

The audit team concluded that the comment was properly addressed by PP and issued highlighted on this comment were successfully assessed by ICONTEC.

5. VALIDATION OPINION

ICONTEC performed the validation of SHPs Tambaú, das Pedras and Rio do Sapo CDM Project (JUN1132), Brazil, in 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 has provided ICONTEC with sufficient evidence to determine the fulfilment of the stated criteria.

The project activity is being proposed as multilateral project by TAMBAÚ ENERGÉTICA S.A (BRAZIL), EUCLIDES MACIEL ENERGÉTICA S/A (BRAZIL) and RIO DO SAPO ENERGIA S.A. (BRAZIL). Brazil has provided approval of voluntary participation and meets all requirements to participate in CDM.

The project correctly applies the methodology: ACM0002 “Consolidated baseline methodology for grid-connected electricity generation from renewable sources” version 14.0.0.

The project involves the construction of three different power plants: Tambaú with an installed capacity of 8.820 MW, das Pedras with an installed capacity of 5.60 MW and finally Rio do Sapo with an installed capacity of 5.76 MW. The main purpose of the project activity is to provide electric power to the National Interconnected System, displacing the thermal generation from fossil fuels present in the system with the generation of renewable energy. 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 27,723 tCO_2e per year over the selected 7 years crediting period. The emissions reduction forecast has been checked and it is deemed likely that the stated amount is achieved because the underlying assumptions do not change.

In summary, it is the ICONTEC opinion that the SHPs Tambaú, das Pedras and Rio do Sapo CDM Project (JUN1132), Brazil in Brazil, as described in the latest version of the PDD /1/, meets all relevant UNFCCC requirements for the CDM and all relevant host country criteria and correctly applies the baseline and monitoring methodology ACM0002 “Consolidated baseline methodology for grid-connected electricity generation from renewable sources” version 14.0.0. ICONTEC thus requests the registration of the project as a CDM project activity.

Bogotá D.C., July 2014

Monica Vivas
Director of Conformity Assessment Services
ICONTEC

6. REFERENCES

/1/ CDM Project Design Document, including Baseline Methodology and the Monitoring Plan, issued by Carbotrader Assessoria e Consultoria em Energia Eireli, version 1 dated on 15/08/2012, version 2 dated on 10/07/2013, version 3 dated on 29/07/2013, version 3.1, dated on 16/12/2013 and version 3.2, dated on 02/07/2014. Files: "PDD_JUN1132_v1.pdf", "PDD_JUN1132_v2.pdf", "PDD_JUN1132_v3_5.pdf", "PDD_JUN1132_v3_1_clean.pdf" and PDD_JUN1132_v3_2.pdf.

/2/ Methodology ACM0002 "Consolidated baseline methodology for grid-connected electricity generation from renewable sources" version 14.0.0.

/3/ Guidelines on the Assessment of Investment Analysis, version 5, EB 62 Annex 5.

/4/ Methodological tool " Tool for the demonstration and assessment of additionality" version 07.0.0

/5/ Methodological tool "Tool to calculate the emission factor for an electricity system" version 04.0.0.

/6/ Approved Assured Energy Ordinance for SHP Tambaú (in Portuguese "PORTARIA Nº 51, DE 4 DE JULHO DE 2012"), issued by ANEEL, dated on 04/07/2012, file "prt2012051spde.pdf".

/7/ Approved Assured Energy Ordinance for SHP Das Pedras (in Portuguese "PORTARIA Nº 165, DE 26 DE NOVEMBRO DE 2012."), issued by ANEEL, dated on 26/11/2012, file "prt2012165spde.pdf".

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/15/ Grid Connection Feasibility Study for SHP Tambaú (in Portuguese “PARECER DE ACESSO PCH TAMBAÚ, RGE/OE-022/2010”), issued by RGE, dated on August 2010. File “Grid Connection - PCH Tamba.pdf”.

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7. ANNEXES

Annex A

Validation Protocol

The audit team conducts a thorough, independent assessment of the registered project activities.

The next table contains questions that the audit team shall follow in order to determine whether the project activity complies with the requirements of paragraph 62 of the CDM modalities and procedures. The audit team ensures that only the verification activities, undertaken after the publication of the monitoring report on the UNFCCC CDM website, were used as the basis for ICONTEC to conclude the verification and submission of a request for issuance of CERs to the board.

Questions were answered on the right column using the following scores:

- Full: When the audit team had full access to the required information, the information is complete and satisfactory
- Partial: When the audit team did not have access to the information, or the information is incomplete, or not satisfactory. In this case, indicate finding type and number.
- Resolved: When a partial score is assigned, indicate the date when the finding was closed
- N/A: Shall be used when the question does not apply.

When raising a clarification request, corrective action request and forward action, it is in accordance with VVS v 07.0§ 25-30.

TableA1: Validation Protocol

CHECKLIST QUESTION	*REFERENCES*	*Final Conclusion*
1. Global Stakeholder Consultation		
1.1 Has the validation team received and taken into account all comments on the PDD of the proposed project activity during the whole validation process? (not only during GSC) VVS (V 07.0) para 35 and 36	Section 4, *Global Stakeholder Consultation*	*Full*
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? *VVS (V 07.0) para.37*	Section 4, *Global Stakeholder Consultation*	*Full*
2. Approval		
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 (V 07.0) para. 39-43	*Section 3.2.1, Approval and authorization*	*Full*

CHECKLIST QUESTION	REFERENCES	Final Conclusion
2.2 Is 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 (v 07.0) para. 39-45*	*Section 3.2.1*	*Full*
3. Authorization		
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. *VVS (V 07.0) para. 47*	*Section 3.2.1*	*Full*
3.2 Are there entities other than those authorized as project participants included in these sections of the PDD? *VVS (V 07.0) para. 48*	*Section 3.2.1*	*Full*
3.3 The approval of participation has been issued from the relevant DNA. *VVS (V 07.0) para. 49*	*Section 3.2.1*	*Full*
4. Modalities of communication		
4.1 All focal points included in the MoC, as well as the personal identities, including specimen signatures and employment status, have been validated by corporative, personal identify and other relevant documentation like notarized documentation. VVS (V 07.0) para. *54-59*	*Section 3.2.2*	*Partial* *See CL 8* *Closed on 17/07/2013*
4.2 Was 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 authorized project participants signing the F-CDM-MOC correspond to the authorized project participants included in F-CDM-MOC, annex 1. VVS (V 07.0) para. 60-62	*Section 3.2.2*	*Partial See CL 8* *Closed on 17/07/2013*

CHECKLIST QUESTION	REFERENCES	Final Conclusion
5. Project design document		
5.1. The PDD was completed using the last version of the PDD form and guidance appropriate *to the type of project activity.* *VVS (V 07.0) para. 63-64*	*See section 3.3*	*Full*
6. Description of the project activity		
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 (V 07.0) para. 65-70*	*Yes, see section 3.3*	*Partial* *See CL 1, CL 2, CL 3, CL 4, CL 5, CL 6 CL 7 and CL 10* *Closed on 17/07/2013*
6.2 The project is correctly classified as large scale, non-bundled small-scale projects with emission reductions exceeding 15,000 tons per *Year or bundled small-scale projects, each with emission reductions not exceeding 15,000 tonnes per year.* *VVS (V 07.0) para. 66*	*N/A*	*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 (V 07.0) para. 66*	*N/A*	*N/A*
6.4 If applicable, was *the use of any sampling approach made according to the "Standard for sampling and surveys for CDM project activities and programme of activities"?* *VVS (V 07.0) para. 67*	*N/A*	*N/A*
7. Application of the selected Baseline and monitoring methodology		
7.1The 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 (V 07.0) para. 72*	*Section 3.4*	*Full*
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*	*Section 3.4*	*Partial* *See CAR 1, CAR 2 and CAR 3*

CHECKLIST QUESTION	REFERENCES	Final Conclusion
emission reduction, additionality, monitoring methodology. *VVS (V 07.0) para. 73*		*Resolved on 17/07/2013*
7.3 Has each applicability condition listed in the approved methodology selected been confirmed? *VVS (V 07.0) para. 78-79*	*Section 3.3*	*Full*
8. Deviation from an approved methodology		
8.1 Did the project request a deviation from an approved methodology before the publication of the PDD? *VVS (V 07.0) para. 80*	*N/A*	*N/A*
8.2 if there are any requests *for deviation from an approved methodology, the applicability of the appendix 1 of Project standard must be applied.* *VVS (V 07.0) para. 81-82*	*N/A*	*N/A*
9. Clarification on the applicability of an approved methodology		
9.1 In the cases where the DOE cannot make a determination regarding the applicability of the selected methodology to the proposed project activity, Was there *requested any clarification on the applicability of the approved methodology?* *VVS (V 07.0) para. 83*	*N/A*	*N/A*
10. Project boundary		
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 (V 07.0) para. 84-85*	*Section 3.3*	*Full*
10.2 Does the methodology allow project participants to choose whether a source or gas is to be included within the project boundary? -Has *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 (V 07.0) para. 86*	*N/A*	*N/A*

CHECKLIST QUESTION	REFERENCES	Final Conclusion
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 (V 07.0) para. 87*	*N/A*	*N/A*
11. Baseline scenario identification and description		
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 (V 07.0) para. 90*	*Section 3.4*	*Full*
11.2 Please confirm that all tools required by the methodology have been used by the PP. *VVS (V 07.0) para. 91*	*Section 3.4*	*Full*
11.3 Assess the baseline scenarios based on financial expertise and local and sectoral knowledge, crosscheck 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 (V 07.0) para. 92-97*	*N/A*	*N/A*
12. Algorithms and/or formulae used to determine emission reductions		
12.1 Do *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 (V 07.0) para. 101*	*Section 3.7*	*Partial* *See CAR 2* *Resolved on 17/07/2013*
12.2 If the methodology allows for selection between various *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 (V 07.0) para. 102*	*See section 3.7*	*Full*

CHECKLIST QUESTION	REFERENCES	Final Conclusion
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 (V 07.0) para. 103*	*See section 3.7*	*Partial* *See CAR 3* *Resolved on 17/07/2013*
13. Additionality of a project activity		
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. Critically assess the evidence presented, using local knowledge and sectoral and financial expertise. *VVS (V 07.0) para. 106-107*	*Section 3.5.2*	*Full*
13.2 Please confirm that all tools required by the methodology have been used by the PP. *VVS (V 07.0) para. 108*	*Section 3.5.2*	*Full*
13.3 For small scale project activities or micro scale project activities, the project participant used the applicable Guidelines, procedures and documents *issued by the EB* *VVS (V 07.0) para. 165-169*	*N/A*	*N/A*
14. Assessment of prior consideration of the clean development mechanism		
14.1 has the start date of the project activity been identified in accordance with the CDM glossary of terms? *VVS (V 07.0) para. 112*	*Section 3.5.1*	*Full*
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." *VVS (V 07.0) para. 112-117*	*Section 3.5.2*	*Full*
14.3 Depending of the gap between the evidence documented, does the PP justify the validation opinion of the CDM status? *VVS (V 07.0) para. 115-116*	*Section 3.5.2*	*Full*
15. Identification of alternatives (if apply)		
15.1 Have *the alternatives in accordance with the approved methodology and/or the tool of additionality* been identified? *VVS (V 07.0) para. 119*	*N/A*	*N/A*
15.2 Does the DOE evaluate if the list of alternatives includes as one of the following *options that the project activity is undertaken without being registered as a proposed*	*N/A*	*N/A*

CHECKLIST QUESTION	REFERENCES	Final Conclusion
project activity, contains *all plausible alternatives* of *viable means of supplying the comparable outputs or* that *services are to be supplied by the proposed project activity and* compliable *with all applicable and enforced legislation?* *VVS (V 07.0) para. 120-122*		
16. Investment analysis (if applicable)		
16.1 Was it applied for the PP's the latest version of Guidelines on the assessment of investment analysis? *VVS (V 07.0) para. 125*	*Yes, see section 3.5.2. .*	*Full*
16.2 Does the DOE verify if the project activity is not the most economically or financially attractive alternative: • *Does not produce financial or economic benefits other than CDM-related income,* • *Is less economically or financially attractive than at least one other credible and realistic alternative:* • *The financial returns of the proposed project activity would be insufficient to justify the required investment?* *VVS (V 07.0) para. 126*	*Yes, see section 3.5.2. .*	*Full*
16.3 Was verified: • *suitability of the financial indicator selected,* • *assessment of all parameters and assumptions used in calculating such financial indicators,* as well as a determination of accuracy and suitability • cross-check the parameters against a third-party, • review, as appropriate, feasibility reports, public announcements, annual financial reports • sensitivity analysis • All computations, the accuracy of implementation and documentation *by PP's* *VVS (V 07.0) para. 127*	*Yes, see section 3.5.2.*	*Partial* *See CAR 3* *Resolved 17/07/2013*
16.4 Was verified: • *Determine whether the type of benchmark applied is suitable for the type of financial indicator presented* • *Ensure that any risk premiums applied in determining the benchmark reflect the risks associated with the project type or activity* • *Determine whether it is reasonable to assume that no investment would be made at a rate of return lower than the benchmark.*	*Yes, see section 3.5.2. .*	*Full*

CHECKLIST QUESTION	REFERENCES	Final Conclusion
VVS (V 07.0) para. 128		
16.5 Was verified (if apply): • *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* change • *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* • *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.* *VVS (V 07.0) para. 129*	*Yes, see section 3.5.2. .*	*Full*
17. Barrier Analysis (if applicable)		
17.1 Does the DOE determine whether the proposed project activity faces barriers that: *(a) Prevent the implementation of this type of proposed project activity (See the latest "Guidelines for objective demonstration and assessment of barriers")* *(b) Do not prevent the implementation of at least one of the alternatives.* *VVS (V 07.0) para. 131*	*N/A*	*N/A*
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: *(a) Risk related barriers, for example risk of technical failure, that could have negative effects on financial performance; or* *(b) Barriers related to the unavailability of sources of finance for the project activity.* *VVS (V 07.0) para. 132*	*N/A*	*N/A*
17.3 Did the DOE apply the two step process to evaluate the barrier analysis performed and determine *if the barriers are real and if* so *prevent the implementation of the project activity but not the implementation of at least one of the possible alternatives?* *VVS (V 07.0) para. 133*	*N/A*	*N/A*
18. Common Practice Analysis(if applicable)		

CHECKLIST QUESTION	REFERENCES	Final Conclusion
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 has assessed *whether the project participants have conducted a common practice analysis. VVS (V 07.0) para. 135*	*Yes, see section 3.5.2*	*Full*
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, and *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 (V 07.0) para. 136*	*Yes, see section 3.5.2*	*Full*
19. Monitoring Plan		
19.1 The Audit team identified the list of parameters required by the selected approved methodology including applicable tool(s), and confirmed that it 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,* conduct interviews with relevant personnel, project plans and any physical inspections *of the proposed project activity site. VVS (V 07.0) para. 138-139*	*Section 3.6*	*Partial* *See CL 6* *Resolved 17/07/2013*
20. Environmental Impacts		
20.1 Did the project participants develop an environmental impact analysis including trans boundary impacts? VVS (V 07.0) para. 141	*Section 3.8*	*Full*
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? VVS (V 07.0) para. 142	*Section 3.8*	*Full*

CHECKLIST QUESTION	REFERENCES	Final Conclusion
21. Local stakeholder consultation		
21.1. Have the project participants completed a local stakeholder consultation process and were *due steps were taken to engage stakeholders and solicit comments for the proposed project activity?* *VVS (V 07.0) para. 145*	*Section 3.9*	*Full*
21.2 Did 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 (V 07.0) para. 146*	*Section 3.9*	*Full*
22. Specific validation requirements		
23.1. For certain specific validation activities such as SSC, A/R, and PoA, the DOE shall comply with the general validation requirements described in the sections above as well as those that follow, including the simplified modalities and procedures for small-scale project activities, the modalities and procedures for afforestation and reforestation project activities, and Standards for PoA. *VVS (V 07.0) 156*	*N/A*	*N/A*
23. Small-scale project activities (if applicable)		
1. Project activity eligibility - *The project activities fall within the threshold of the three possible types of small project activities.* - *The DOE verified that the small-scale methodologies were applied in conjunction with the general guidance to the methodologies.* - *The DOE verified that the project activity is not a debundled component of a large-scale project, in accordance with the rules defined in the appendix C of the simplified modalities for small-scale CDM project activities* *VVS (v 07.0) para.. 157-159*	*N/A*	*N/A*
2. ***Debundling***	*N/A*	*N/A*

CHECKLIST QUESTION	REFERENCES	Final Conclusion
- *The DOE shall* verify *that 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.* - *The DOE, where appropriate, has taken into account specific debundling requirements for Type I project activities and small-scale transport project activities.* *VVS (v 07.0) para. 161-163*		
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 *VVS (V 07.0) para. 161*	*N/A*	*N/A*
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. *VVS (V 07.0) para. 162*	*N/A*	*N/A*
The Project participant takes into account specific debundling requirements for Type I project activities and small-scale transport project activities. *VVS (V 07.0) para. 163*	*N/A*	*N/A*
3. ***Additionality*** - *The DOE verified that the proposed SSC project activity is additional in accordance with CDM requirements applicable for small-scale project activities.* - *For the activities type I, II and IIII, the DOE assessed the fulfilment of the relevant criteria to establish the automatic additionality for these projects* - *The DOE detailed all the steps taken to make the cross-check of the information contained in the PDD* *VVS (v 07.0) para. 165-169*	*N/A*	*N/A*
24. Afforestation or reforestation project activities		
In addition *to the requirements listed above, the DOE verified the specific requirements for A/R CDM project activities, which include:* - *Project boundary for A/R CDM;* - *Selection of carbon pool;* - *Eligibility of land;* - *Approach proposed to address non permanence;* - *Timing of management activities, including harvesting cycles and verifications;*	*N/A*	*N/A*

CHECKLIST QUESTION	REFERENCES	Final Conclusion
- *Socioeconomic environmental impacts, including impacts on biodiversity and natural* ecosystems. *VVS (v 07.0) para. 171*		
1. Project boundary *The DOE described the documentation assessed and oral statements delivered by persons interviewed and* approved *their acceptability under the legal system of the host country.* *In case the DOE has applied a sampling approach; the validation report shall describe how many sites have been assessed and how these were selected.* *VVS (v 07.0) para. 173-174*	*N/A*	*N/A*
2. Selection of carbon pool *The DOE verified whether the selection of* the *carbon pool complied with the applied approved methodology* or whether the exclusion of a *certain pool is allowed for the methodology and is correctly* justified. *VVS (v 07.0) para. 177*	*N/A*	*N/A*
3. Eligibility of land *DOE verified the* reliable discrimination *between forest and non-forest land according to the particular threshold adopted by the host country.* *VVS (v 07.0) para. 180*	*N/A*	*N/A*
4. Addressing non permanence *DOE verified the specification of* the *proposed approach to address non-performance in accordance with paragraph 38 of the modalities and procedures for A/R CDM projects activities.* *VVS (v 07.0) para. 183*	*N/A*	*N/A*
5. Timing of management activities *The DOE verified how the project participants* would ensure *that a systematic coincidence of verification and peaks in carbon stocks would be avoided.* *VVS (v 07.0) para. 187*	*N/A*	*N/A*
6. Socioeconomic and environmental impacts *The DOE verified using local official* sources *whether the project participants have undertaken an analysis of socio-economic and environmental impacts, including impacts*	*N/A*	*N/A*

CHECKLIST QUESTION	REFERENCES	Final Conclusion
on biodiversity and natural ecosystems, as well as *impacts outside the project boundary.* *VVS (v 07.0) para. 189-190*		
25. Small-scale A/R project activities		
The DOE determined whether: *The project activities* qualify *as a proposed small-scale A/R CDM project activity and* comply *with the threshold for the proposed small-scale A/R projects in accordance with the decision 5/CMP.1, annex paragraph 1(i).* *The project activity* complies *with one of the types of small-scale A/R project activities defined in appendix B of the annex to decision 6/CMP.1.* *The base line, monitoring methodology and the methodology is applied correctly.* *The proposed CDM project activity is not part of a* debundled *large-scale A/R project activity, in accordance* with *the rules defined in appendix C of the annex to decision 6/CMP.1.* *The proposed CDM project activity has been* developed *or implemented by low-income communities and individuals as confirmed by the host Party in accordance with the decision 5/CMP.1, annex paragraph 1(i).* *VVS (v 07.0) para. 193*	*N/A*	*N/A*
26. Programme of activities / Component project activities		
1. Coordinating/managing entity and participants in a PoA *The DOE assessed the management system described in the PoA design document (CDM PoA-DD) in accordance with the Standard for demonstration of additionality, development of eligibility criteria and application of multiple methodologies for* the programme *of activities* *VVS (v 07.0) para. 230*	*N/A*	*N/A*
2. CPA design document *The DOE assessed the proposed CPA that a coordinating/managing entity wished to include in the PoA.* *VVS (v 07.0) para. 231-233*	*N/A*	*N/A*
3. Description of a PoA/CPAs *The DOE assessed the CDM-PoA-DD and the PoA-specific CDM-CPA-DD that*	*N/A*	*N/A*

CHECKLIST QUESTION	REFERENCES	Final Conclusion
was submitted by the coordinating/managing entity and confirmed the framework developed for the implementation of the PoA, and defined a CPA under the PoA. *VVS (v 07.0) para. 234*		
4. Application of multiple methodologies *The DOE assessed the application of multiple methodologies in accordance with the Standard for demonstration of additionality, development of eligibility criteria and application of multiple methodologies for programme of activities* *VVS (v 07.0) para. 235*	*N/A*	*N/A*
5. Boundary for the PoA in terms of geographical area *The DOE verified the boundary of the PoA within which all CPAs included in the PoA will be implemented and if the project participant* has taken into *account all the applicable national and/or sectoral policies and regulations*. *VVS (v 07.0) para. 236-237*	*N/A*	*N/A*
6. Start date of CPA *The DOE verified that the start date of the CPA is on or after the start date of the PoA.* *VVS (v 07.0) para.238*	*N/A*	*N/A*
7. Prior consideration of the CDM *The DOE shall assess prior consideration of the CDM for the PoA applying the provisions of paragraph 107 above mutatis mutandis.* *VVS (v 07.0) para. 239*	*N/A*	*N/A*
8. Demonstration of additionality of the PoA as a whole *The DOE verified the additionality of a PoA in accordance with the .Standard for demonstration of additionality, development of eligibility criteria and application of multiple methodologies for programme of activities.* *VVS (v 07.0) para. 240*	*N/A*	*N/A*
9. Eligibility criteria for inclusion of a CPA in the PoA *The DOE assessed the eligibility criteria for inclusion of a CPA in the PoA in accordance with the .Standard for demonstration of additionality, development of*	*N/A*	*N/A*

CHECKLIST QUESTION	REFERENCES	Final Conclusion
eligibility criteria and application of multiple methodologies for programme of activities. ***VVS (v 07.0) para. 241***		
10. Crediting period of a PoA/CPA *The DOE determined that the length of a PoA does not exceed 28 years (60 years for A/R).* *VVS (v 07.0) para. 242*	*N/A*	*N/A*
11. Monitoring plan for a PoA/CPA *The DOE verified that the monitoring plan for a CPA is in accordance with the approved monitoring methodology, including applicable tool(s).* *VVS (v 07.0) para. 243*	*N/A*	*N/A*
12. Environmental Analysis of a PoA *The DOE determined that an analysis of the environmental impacts of the PoA in accordance with CDM-PoA-DD and the CDM-CPA-DD* was undertaken. *VVS (v 07.0) para. 244-245*	*N/A*	*N/A*
13. Local stakeholder consultation *The DOE verified that the local stakeholder consultation process was carried out for the whole PoA or at the CPA level?* *If comments by local stakeholders were invited with regard to the whole PoA, the DOE shall determine how these comments were invited; whether the summary of the comments received is complete and how due account was taken of all comments received.* *VVS (v 07.0) para. 246*	*N/A*	*N/A*
If the local stakeholder consultation is conducted at the CPA level, the DOE shall determine whether it is in accordance with the level of consultation specified by the coordinating/managing entity and whether the local stakeholder comments were taken into account and described in the CDM-PoA-DD and the CDM-CPA-DD *VVS (v 07.0) para. 247*	*N/A*	*N/A*

CHECKLIST QUESTION	REFERENCES	Final Conclusion
14. Determination of occurrences of debundling under a PoA *The DOE verified that the proposed small-scale CPA of a PoA is not a debundled component of a large-scale project activity in accordance with the Guidelines on assessment of debundling for SSC project activities.* *VVS (v 07.0) para. 248*	*N/A*	*N/A*
15. Inclusion or renewal of a crediting period of a CPA under a registered PoA *The DOE verified that the specific CDM-CPA-DD is in accordance with the latest version of the PoA and determined that the CPA meets the requirements of the PoA.* *VVS (v 07.0) para. 249*	*N/A*	*N/A*
27. Validation status and outcomes, opinion, and report	*N/A*	*N/A*
1. Validation status and outcomes *The DOE provided an update of the status of its validation activity, unless the project activity has been submitted for registration 180 days subsequent to the end of the period for the submission of public comments.* *The updated status presented for the DOE, must contain one of the following conditions:* *Finalization of the validation contract* *A negative validation opinion* *Summary of the issues raised* with updates or reconfirmations *of the validation status at three month intervals* *Which party/parties* are *involved in the absence of sending of a valid letter of approval* *Explanations about the length of the validation activity and the update of the validation status if the validation activities are ongoing and the CAR or CL have* not yet been sent *to the project participant.* *VVS (v 07.0) para. 148-149*	*N/A*	*N/A*
2. Validation opinion *It was emitted an opinion of the likelihood of the project activity achieving the anticipated emission reductions stated in the PDD, where the PP* has been	Section 5, all along the validation report	*Full*

CHECKLIST QUESTION	REFERENCES	Final Conclusion
informed of *the validation outcome,* whether it is a *positive or negative opinion.* *The DOE's opinion must include:* - *A summary of the validation methodology and process used and the validation criteria applied* - *A description of project components or issues not covered by the validation process* - *A summary of the validation conclusions* - *A statement on the validation of the expected emission reductions* - *A statement as to whether the proposed project activity meets the stated criteria.* - *The validation opinion confirms whether the project meets the stated* criteria and that the methods presented in the project design documentation are acceptable and have been correctly applied. *VVS (v 07.0) para. 150-153*		
3. Validation Report *Is The validation report in line with IN-P-CC-01?* *The DOE included in the validation report a validation opinion that integrated:* - *Conclusions regarding the proposed project activity's conformity with applicable* - *CDM requirements* - *Overview of the validation activities* - *Findings and conclusions* - *Information on the global stakeholder consultation process carried out.* - *A list of interviewees and documents reviewed* - *Details of the validation team* - *Information on quality control within the team and in the validation process* - *Appointment certificates or curricula vitae of the DOE's validation team members, technical experts and internal technical reviewers for the project activity.* *VVS (v 07.0) para. 154-155*	*Yes, this information was indicated in all content of the validation report.*	*Full*

TableA2: Resolution of Corrective Action, Forward Action and Clarification Request

The following table explains how ICONTEC resolve or "close out" CARs and CLs describing how the project participants modify the project design, rectify the PDD or provide additional explanations or evidence that satisfy the ICONTEC's concerns. VVS version 07.0, paragraph 29.

This table explains the issues raised, the responses provided by the project participants, the means of validation of such responses and references to any resulting changes in the PDD or supporting annexes. VVS version 07.0, paragraphs 25-34.

Report clarifications and corrective action requests	Reference	Summary of project owner response	Validation conclusion
CAR 1 *In PDD version 1 section B.5 sub step 2c: "calculation of Equity IRR", the assessment period of the investment analysis is 30 years. According to the "Guidelines on the assessment of investment analysis" (EB 73, annex 8) the assessment period should be 20 years.* *The guideline states: "If project participants choose a renewable crediting period and if the technical lifetime of the CDM project activity is more than 20 years, the investment analysis shall be conducted for 20 years and include the fair value of the project activity assets at the end of the assessment period."*	*CDM VVS, version 03.0, paragraph 25(b).* *Clarification on the Applicability of the "Guidelines on the assessment of investment analysis", version 01.0, EB 73, annex 8.*	Besides the recommendation on the CDM Clarification about assessment period of the investment analysis with 20 years, in Brazil due to the exploitation period be issued to 30 years, the manufacturers´ statement about the lifetime of the main equipment (turbines and generator) with 30 years, the PP considered adequate this period in the SHPs´ cash flow. Second Response (26.07.2013): The Assessment period was changed to 20 years in accordance to "Applicability of the Guidelines on the assessment of investment analysis - version 01.0"	Verification Team Response: The PP correctly updated the assessment period of the investment analysis to 20 years. According to the "Guidelines on the assessment of investment analysis" (EB 73, annex 8) Verification Team Conclusion CLOSED 29/07/2013

CAR 2 *In PDD version 1 section B.6.3: "calculation of the $EF_{grid,CM,y}$", data and figures used to calculate $EF_{grid,CM,y}$ correspond to data from 2011. Nevertheless, Brasilian DNA published allready the latest set of data to calculate $EF_{grid,OM,y}$ and $EF_{grid,BM,y}$, as displayed on the website:* *http://www.mct.gov.br/index.php/content/view/338047.html#ancora*	*CDM VVS, version 03.0, paragraph 25 (a) and 99 (c).* *Tool to calculate the emission factor for an electricity system, version 03.0.0, paragraph 80.*	The emission factor was updated in the PDD version 2 (2012).	Verification Team Response: PP correctly used the updated emission factor Verification Team Conclusion CLOSED 15/07/2013
CAR 3 *The 12 years figure used as assumption of the Amortization Period was not properly justified in cash flow calculation files.*	*VVS, version 03.0, paragraph 94 (a)*	Was included the justification for the 12 years as below: " As per BNDES financial condition on http://www.bndes.gov.br/SiteBNDES/bndes/bndes_pt/Institucional/Apoio_Financeiro/Produtos/FINEM/energia_eletrica_geracao.html - until 16 years for the amortization period. Cross check with the BRDE (Banco Regional de Desenvolvimento Economico) with 144 months."	Verification Team Response: The Validation Team verified inclusion of asked information on the cash flow files Verification Team Conclusion CLOSED 15/07/2013
CAR 4 *Steps taken to determine if the project is common practice have been erroneously applied. In the first place, the applicable capacity or output range, this is +/-50% has to be calculated based upon "of the total design capacity or output of the proposed project activity" according to the guidelines on common practice. Additionally, similar projects identification (step 2) was not applied in accordance with the guideline on common practices.*	*VVS, version 03.0, paragraph 130 (c)* *Guidelines on common practice, version 02.0 EB 69 Annex 8; paragraph 4.*	The Step 1 was corrected applied in the PDD version 3 (+- 50% over the total project activity capacity). The Step 2 included other power plants units (as thermal or wind) since is well limited by the items a) to f) of this step. For example: (c) The projects use the same energy source/fuel and feedstock as the proposed project activity, if a technology switch measure is implemented by the proposed project activity; So in our case the same energy	Verification Team Response: PP applies the common practice guideline erroneously. The guideline clearly states that: When carrying out step 2 (Step 2: identify similar projects (both CDM and non-CDM) which fulfil all of the following conditions) all of the conditions described as follows have to be fulfilled: The projects are located in the applicable geographical area: Common practice correctly applies

		source and feedstock is hydro. The item d) can cause the misunderstood about the inclusion or not of other generation unit sources: (d) The plants in which the projects are implemented produce goods or services with comparable quality, properties and applications areas (e.g. clinker) as the proposed project plant; But this item seems to clarify whether the project is applicable in the manufacturer industries ("... The plants in which the projects are implemented ..." or "...(e.g. clinker) ...). From: http://en.wikipedia.org/wiki/Clinker_%28cement%29 "In the manufacture of Portland cement, clinker is lumps or nodules, usually 3–25 mm in diameter, produced by sintering limestone and alumino-silicate (clay) during the cement kiln stage." Adjusted also the period assessment as per item: "(f) The projects started commercial operation before the project design document (CDM-PDD) is published for global stakeholder consultation or before the start date of proposed project activity, whichever is earlier for the proposed project activity.	this assumption. The projects apply the same measure as the proposed project activity: as the guideline states when defining measure (option b): "Switch of technology with or without change of energy source including energy efficiency improvement AS WELL AS use of renewable energies (example: energy efficiency improvements, power generation based on renewable energy). By affirming: AS WELL AS, the guideline asks to take into account power generation based on renewable sources and does not restrict its applicability to switch of technology. The projects use the same energy source/fuel and feedstock as the proposed project activity, if a technology switch measure is implemented by the proposed project activity. The validation team agrees with the application of this statement. The plants in which the projects are implemented produce goods or services with comparable quality, properties and applications areas (e.g. clinker) as the proposed project plant. Plants such as thermal, coal and wind among

		Second Response (30.07.2013) The Step 2 included other power plants units (as thermal or wind)	others, produce goods and services of comparable quality and properties. PP does not take into account these plants. The proposed project produces electricity to the grid; therefore, it is reasonable to select grid-connected power plants for the common practice analysis. Even though the guideline uses clincker as an example, its application is not restricted to manufacturing industries. The capacity or output of the projects is within the applicable capacity or output range calculated in Step 1; The validation team agrees with this application of this statement. The projects started commercial operation before the project design document (CDM-PDD) is published for global stakeholder consultation or before the start date of proposed project activity, whichever is earlier for the proposed project activity. The validation team agrees with the application of this statement. Verification Team Conclusion: CLOSED.05/08/2013.

CAR 5 *Assured Energy on CERs Calculation file does not match figures reported on cash flow file: Analise_IRR_TAB_v2.xls and Analise_IRR_PED_v2.xls from Tambaú SHP and Das Pedras SHP with the ones reported by ANEEL (ordinance no. 51, of july 4, 2012 and ordinance no 165 of November 26, 2012).*	*VVS, version 03.0, paragraph 120 (b)*	The Assured Energy used in the Investment Analysis is different from the value used to calculate the SHP´s CERs. The value of 4.9 MW and 3.00 (SHP das Pedras) shall be observed during the CDM project lifetime. This value was issued by the ANEEL so is not possible for PPs to change. But it´s necessary to observe that this value become available in 04.07.2012 (by the ANEEL´s ordinance number 51) and 26.11.2012 (by the ANEEL´s Ordinance 165). So these values weren´t available at the time of PP Investment Decision (December/2009 and December/2010). Also based on Item 6 of " GUIDELINES ON THE ASSESSMENT OF INVESTMENT ANALYSIS" we have that: "6. Guidance: Input values used in all investment analysis should be valid and applicable at the time of the investment decision taken by the project participant. The DOE is therefore expected to validate the timing of the investment decision and the consistency and appropriateness of the input values with this timing...." So 5.35 and 3.59 MW average are the values available at the time of investment decision made by the PPs. References: Project Design - Chapter 10 - Page 5 of December 2003 prepared by the project design expert company	Verification Team Response: The validation team found that figure of 4.9 is the assured energy defined by ANEEL on 04/07/2012 through ORDINANCE 51 (http://www.aneel.gov.br/cedoc/prt2012051spde.pdf) and this is the actual value used to calculate ER. Nevertheless, by the time the investment decision was taken according to the feasibility study and according to documental support provided, the value used to calculate the cash flow of the project was 5.35, therefore figure of 5,35 is the figure to be taken into account for the cash flow. Verification Team Conclusion CLOSED 29/07/2013

		"Rischbieter EngenhariaLtda" and ANEEL´s Card Specification that belongs to the SHP das Pedras.	
CAR 6 *Figures presented on table figures on table B.6.4 "Summary of ex ante estimates of emission reductions" of the PDD version 2, do not match figures presented on CERs JUN1132_v2.xls file*	*VVS, version 03.0, paragraph 99 (c), (e)*	The table B.6.4 was corrected in the PDD version 3.	Verification Team Response: PP correctly presented figures on table B.6.4 on PDD version 3 Verification Team Conclusion CLOSED 29/07/2013
CL1 *In PDD version 1 section A.1, is missing a brief description about:* • *The scenario existing prior to the implementation of the project activity* • *The baseline scenario*	*CDM VVS, version 03.0, paragraph 64.* *CDM PS, version 02.1, paragraph 32.* *Guidelines for completing the project design document form, version 01.0, section A.1.*	Was included in the PDD version 2 the information about the scenario prior the implementation. The baseline scenario is already described in this section as " *The baseline scenario is the same as the scenario existing prior to the implementation of the project activity, and shall be detailed in the section B3 and B4".*	Verification Team Response: The validation team found information added to the latest version of the PDD satisfactory , relevant and in compliance with CDM VVS Verification Team Conclusion CLOSED 15/07/2013
CL 2 *In the PDD version 1, section A.3 it should be included next information:* • *Information about the age and average lifetime of the equipment.* • *Load factors and efficiencies* • *The monitoring equipment and their location in the systems.* • *Energy and mass flows and balances of the systems and equipment included in the project activity.* • *Facilities, systems and equipment in operation under the existing scenario prior to the implementation of the project activity.*	*CDM VVS, version 03.0, paragraph 67.* *CDM PS, version 02.1, paragraph 31 (e).* *Guidelines for completing the project design document form, version 01.0, section A.3.*	The additional information was included in the PDD version 2. Second Response(26.07.2013): The explanations on the matter of when the decision to undertake the three projects as an activity of large scale, along with the support documentation to this fact was included in the PDD version 3. " The similarities of the three projects (small hydro power plants, installed capacity under 10 MW, same project sponsors, etc) made the project proponent to undertake the three projects as an activity of large scale."	Verification Team Response: The validation team found information added to latest version of PDD satisfactory , relevant and in compliance with CDM VVS Verification Team Conclusion CLOSED 29/07/2013

• *Facilities, systems and equipment in the baseline scenario.* *In order to calculate the Installed capacity of the "SHP Rio do Sapo", it should be specified the nominal flow for this plant.*		Support documents " Prior_Consideration_of_CDM_das_Pedras.pdf" from 10.09.2009 provided to the CDM EB. And reaffirmed in the RSP Board Minute from 10.05.2011 (page 1).	
CL 3 *In the PDD version 1, section B.5, sub step 1b, is not clear enough how the project activity is in compliance with mandatory laws and regulations.* *Also, given that each one of the projects is developed in a different state, it should be demonstrated the compliance of the local and regional regulation for each project site one.*	*CDM VVS, version 03.0, paragraph 114 (c).* *CDM PS, version 02.1, paragraph 48.*	More details about the project compliance with mandatory laws was included in the PDD version 2.	Verification Team Response: The validation team found information added to PDD version 2 satisfactory , relevant and in compliance with CDM VVS Verification Team Conclusion CLOSED 15/07/2013
CL 4 *In the PDD version 1 section B.5 sub step 2c, it should be specified in a stepwise manner all the assumptions made, as well as the procedure used to calculate the values and the exact sources (link, workbook, cell or cells) for:* • *Host country risk premium ERP (EMBI+ 1997–2006)* • *Levered Beta* • *PE_g* • *Inflation rate used* • *K_e* *Assumptions and calculations made should be presented in a clear way, showing how they are conservative, valid and applicable at the time of the investment decision taken by the project participant.*	*CDM VVS, version 03.0, paragraph 102.* *Guidelines for completing the project design document form, version 01.0, section B.5.* *Tool for the demonstration and assessment of additionality, version 07.0.0, paragraph 40.*	Was included the additional information that the calculation is based on the "Draft tool to determine the weighted average cost of capital (WACC)" available in the http://cdm.unfccc.int/Panels/meth/meeting/10/043/mp_043_an08.pdf The formula is already included in this Tool and easily accessible. Second Response (26.07.2013): The sub step 2c brings now another formula for the Ke calculation. Also the calculation is presented in a clear way in PDD version 3.	Verification Team Response: Information and explanations provided on version 2 of the PDD explain in a much better way assumptions made, additionally calculation procedure and sources. The validation team find these explanations satisfactory. Verification Team Conclusion CLOSED 29/07/2013

CL 5 *In the PDD version 1 section B.5: "prior consideration of the CDM", table 5 is reported a CDM prior consideration date for Tambaú and das Pedras (29/09/2009) which does not match with the one reported in the UNFCCC page (16/09/2009).*	*CDM VVS, version 03.0, paragraph 105 (c).* *CDM PS, version 02.1, paragraph 27.*	The date was adjusted accordingly in the PDD version 2.	Verification Team Response: Figures have been corrected in PDD version 2 and match figures reported at UNFCCC website Verification Team Conclusion CLOSED 15/07/2013
CL 6 *In the PDD version 1 section B.7.1: "Data and parameters to be monitored", for the parameters $EG_{,y}$ it should be added a better description for:* • *Description on the equipment used to monitor each parameter, including details on accuracy class.* • *Specification on the measurement methods and procedures, standards to be applied, accuracy of the measurements, person/entity responsible for the measurements.* *For the parameter $TEG_{Rio\ do\ Sapo,y}$, it should be added a better description for:* • *Description on the equipment used to monitor each parameter, including details on accuracy class.* • *Specification on the measurement methods and procedures, standards to be applied, accuracy of the measurements, person/entity responsible for the measurements.* • *Description on the QA/QC procedures to be applied, including the calibration*	*CDM VVS, version 03.0, paragraph 132 (a) (ii).* *CDM PS, version 02.1, paragraph 56.* *Guidelines for completing the project design document form, version 01.0, section B.7.1.*	The section B.7.1 was updated accordingly in the PDD version 2 (for the EG_y, $TEG_{Rio\ do\ Sapo,\ y}$, Cap_{PJ} and A_{PJ} parameters). Second Response (26.07.2013): The parameter $TEG_{Rio\ do\ Sapo´y}$ was better described in the PDD version 3	Verification Team Response: Information provided on the latest version of PDD for parameters EG,y, $TEG_{Rio\ do\ Sapo,y,}$ Cap_{PJ}, and A_{PJ} are in accordance with the Guidelines for completing the project design document form, version 01.0, section B.7.1. Verification Team Conclusion CLOSED 29/07/2013

procedures. *For the parameters Cap_{PJ}, it should be added a better description for:* • *Source of data* • *Measurement methods and procedures* *For the parameters A_{PJ} , it should be added a better description for:* • *Source of data*			
CL 7 *In the PDD version 1 section C.1.1, It was not included the start date for each one of the project activities, along with the evidences to support these dates.* *Additionally, reported date (29/10/2009) does not match with the one reviewed (27/01/2010) in the support document for the contract.*	*CDM VVS, version 03.0, paragraph 17 (d).* *CDM PS, version 02.1, paragraph 57.* *Guidelines for completing the project design document form, version 01.0, section C.1.1.*	The Section C.1.1 was adjusted accordingly in the PDD version 2. Second Response (26.07.2013): The section was well described in the PDD version 3.	Verification Team Response: PP correctly provided explanations on the matter of start date; these explanations are described in the latest version of PDD. Verification Team Conclusion CLOSED 29/07/2013
CL 8 *The MoC statement still has not been issued by PP.*	*CDM VVS, version 03.0, paragraph 59-63.* *CDM PS, version 02.1, paragraph 72.*	The MoC has already issued and delivered to the DOE.	Verification Team Response: PP presented MoC document once the On-site visit finished. The validation team verified this document as described previously in this report. Verification Team Conclusion CLOSED 17/07/2013
CL 9 *Links related to Environmental license of Tambaú has not been included.* *(http://www.fepam.rs.gov.br/licenciamento/area3/detalheDocProc.asp?area=3&buscar=2&tipoBusca=processo&processo=195160567117)*	*VVS, version 03.0, paragraph 43.*	Tle link was included in the PDD version 2. Section D.1.	Verification Team Response: The validation team verified that, links included lead to information referred and have been added. Verification Team Conclusion CLOSED 15/07/2013

CL 10 *PP is requested to clarify source used to determine the price of CERs presented in cash flow. Also, to describe how the exchange rate was determined.*	*VVS, version 03.0, paragraph 20.*	Was included a second reference for the price of the CERs (http://www.tfsgreen.com/news/pricing-updates.php) The exchange rate (US$ to R$) was estimated based on 3 months average (only the 1st day for each month) - spreadsheets version 2.	Verification Team Response: The validation team cross-checked links provided on PDD version 2 and agrees with information provided. Verification Team Conclusion CLOSED 15/07/2013
CL 11 *PP is requested to provide detailed and enough description of actions taken as a mean to address the global stakeholder consultation.*	*VVS, version 03.0, paragraph 148 (c).*	Detailed description was included in the PDD version 3.	Verification Team Response: The PP correctly provided detailed and enough description of actions taken as a mean to address the global stakeholder consultation. Verification Team Conclusion CLOSED. 31/07/2013
CL 12 *In the PDD section B.5 Sub-step 2d: "Sensitivity analysis", is requested include in the analysis an explanation about the probability to reach reported breakeven values.*	*VVS, version 03.0, paragraph 120 (e).* *Guideline on assessment of investment analysis version 05 EB 62 paragraph 21.*	Was included in the PDD version 3 a +10% and -10% variation analysis in accordance with: GUIDELINES ON THE ASSESSMENT OF INVESTMENT ANALYSIS "21. Guidance: The DOE should assess in detail whether the range of variations is reasonable in the project context. Past trends may be a guide to determine the reasonable range. As a general point of departure variations in the sensitivity analysis should at least cover a range of +10% and .10%, ..." In this way the section B.5 now provides the IRRs values for +-10% variation over the cashflow sensible parameter and also the parameters value necessary to reach the benchmark (all of them are above 10%	Verification Team Response: PP correctly addressed Sub-step 2d: "Sensitivity analysis" on PDD version 3. Verification Team Conclusion CLOSED 29/07/2013

		variation as illustrated in the table7).	
CL 13 *In the PDD section F, PP did not provided explanations on the matter of solicitation status of the letter of approval.*	*VVS, version 03.0, paragraph 38.*	Was included in the PDD version 3	Verification Team Response: PP provided satisfactory explanations on the matter of solicitation status of the LoA. Verification Team Conclusion CLOSED 29/07/2013
CL 14 *On PDD version 2 information and statements remain inaccurate and erroneously reported on the matters of:* *Section A.3, it is requested to include justification supporting the assumption: "All the equipments should be new with expected lifetime of 30 years (turbines and generators)"* *In page 15, Sub-step 2b, Option III "Apply benchmark analysis" the statement: "The financial indicator most appropriate for this type of project is the Internal Rate of Return (Equity IRRs)" is repeated.* *In page 16, Sub-step 2c, "Calculation and comparison of financial indicators", is reported an erroneous name for the "Guidelines on the assessment of Investment analysis".* *Footnotes 19, 21 and 22. do not lead to available websites. For 22 is requested clarify how it was obtained the value for Beta.* *In page 25 there is a typographic mistake when describing parameter APJ.* *In page 32, there is a typographical*	*VVS, version 03.0, paragraph 26.*	The items were adjusted accordingly in the PDD version 3.	Verification Team Response: The PP corrected inaccurate and erroneously reported information in the latest version of the PDD. Verification Team Conclusion CLOSED 29/07/2013.

mistake in the parameter "EGTambaú,y" when describing "Measurement methods and procedures". *Is requested to PP to describe the way to reach information of the procedure "sub-module 12.1 of Grid Procedures" by accessing link in footnote 36.* *In page 40 is cited a wrong year (2011) for used EF collection data.*			
CL 15 *In the PDD section B.5 Sub-step 2c, the PP should explain why is a conservative assumption to use a Ke calculated with values of 2007(for Rio do Sapo) as conservative benchmark for Tambaú y Das Pedras although, the investment decision date for Tambaú and Das Pedras was in 2009.*	*VVS, version 03.0, paragraph 121 (a)*	The Ke used for Rio do Sapo is more conservative since Ke to be considered in the investment decision date of Tambaú and das Pedras has value of 18.91%. And the Ke calculated for Rio do Sapo (2007) has value of 16.64% (lower and more conservative). As demonstrated in the support spreadsheet provided.	Verification Team Response: ICONTEC deemed conservative the assumption made by PP and deemed reliable the calculation made for both Ke (2007 and 2009). Verification Team Conclusion: CLOSED 07/08/2013

Annex B

Letter of Approval (LoA)

Annex C

Audit Team Experience and Knowledge

JACOBO CARRIZALES
CDM Lead Auditor

Bilingual Zootechnician (animal husbandry) and Environmental Management and Sustainable Development magister

PROFESSIONAL EXPERIENCE

- ICONTEC - 6th of December 2011 - Present

Position: Audit and Technical expert

Specialized technical services for CDM projects (Clean Development Mechanism) as well as auditing services for CDM Validation and Verification.

- Estudios Técnicos Diana Rauchwergwer - 20th to 24th of December 2011 and y 2nd to 10th of January 2012. Paz de Rio –Boyacá-

Position: Field Assistant

Soil associated wildlife recognition as part of environmental impact studies

- Corporación Colombia Internacional -CCI- 15th to 30th of November 2011. Bogotá

Position: Loan Reviewer

Credit requests documentation inspection

- Secretaría Distrital de Ambiente - 7th of March to 9th of June 2011. Bogotá

Position: Public server. Professional responsible of wildlife traffic prevention

Lectures on sensitizing about wildlife traffic on district public schools.
Bogotá, teacher at the course “Good environmental practices in Animal Commercialization”. Escuela de Altos estudios -OPEL- (Secretaria Distrital de Ambiente).

- Secretaria Distrital de Ambiente - 8th of September 2010 to 7th of January 2011. Bogotá

Position: Public server. Professional responsible of wildlife traffic prevention

Wildlife legal use monitoring, lectures on sensitizing about wildlife traffic on district public schools

- O. G. Entertainment - 27th of April to 5th of September 2010. Bogotá

Position: English Educational advisor

Responsible of English teaching following a pre-established methodology

- Hacienda Agrominera Zelandia S.A. – Ricardo Arenas - 20th of May to 7h of May 2007. Susa – Cundinamarca

Position: Professional advisor in systematization and productive records updating

Productive records updating from 2000 to 2007 period, about 400 dairy cattle animals along the period

- Universidad Nacional de Colombia - Facultad de Ciencias, Departamento de Geociencias. Grupo: Centro De Estudios Historia Natural De Colombia. Profesora Cristina Garzón - 5th of February to 15th of May 2007. Bogotá, Villa de Leyva -Boyacá-

Position: Lecturer. Professional supporting the Project “Contributions to the natural history of Fauna and Flora of Villa de Leyva (Boyacá, Colombia)”

Lectures to public school students from Antonio Nariño school at Villa de Leyva. The main subject was traditional productive techniques and rustic poultry races

- Finca Sevilla – Raul Behar - August to December 2006. La Calera, Vereda el Volcán – Cundinamarca

Position: Professional in charge of protection and conservation of forest areas

Silvopastoral productive system design and reforestation

- Hacienda Tres Esquinas – Gloria de Luque - December 2005 to March 2006. La Calera Vereda Jerusalén – Cundinamarca

Position: Professional in charge of protection and conservation of forest areas

Silvopastoral productive system design, wetlands protection and reforestation

- Hacienda Juncales S.A. – Philip George - February to December 2004. Simijaca – Cundinamarca-

Position: Professional Practice

Productive duties and stock control. Productive, sanitary and reproductive records updating. Advisory in animal nutrition and management

ACADEMIC BACKGROUND

- Environmental Management and Sustainable Development Magister - 2010 to 2012 – 14th of December2012-

Main Professional Skills
Masters focused on research, self-deepening on economic valuation of natural resources an environmental economy
Institution
Universidad Distrital Francisco José de Caldas
Dissertation Title
Potential use and management valuation of game wildlife associated to beef cattle productive areas in Orinoquia Region. Case of study: Venado Cola Blanca (*Odocoileus virginianus* Zimmermann, 1780) y Chiguiro (*Hydrochoerus hydrochaeris* Linnaeus, 1766) harvesting in "Pénjamo" farm of Hato Corozal county (Casanare)

Zootechnician (animal husbandry specialist) - 1999 a 2005 – 27th of October 2005
Main Professional Skills
Domestic animal productive methods, wildlife breeding, quality process analysis and agricultural business admistration
Institution
Universidad De La Salle
Dissertation Title
Relationship between age, weight and reproductive efficiency in competition Brahman females

ADDITIONAL STUDIES

Market Research - August to October 2009
Institution
City University of London

Advanced Marketing - February to April 2009
Institution
City University of London

General English - June to December 20007
Institution
Avalon School of English. London

Emprendimiento y Empresarismo - February 2006
Institution

SENA. Bogotá

Artificial Insemination - June 2000
Institution
Asociación Club Bovino Lasallista. Universidad De La Salle. Bogotá

EXPERIENCE IN CDM ACTIVITIES

Lead Auditor

- Verification of Monomeros nitrous oxide abatement project, Colombia
- Validation of Thuan Nhien PhongWind Farm, Viet Nam
- Validation of Phuong Mai 3 Wind Power Project, Viet Nam

Specialist

- Validation of CGR Catanduva Landfill Gas Project, Brazil
- Verification of Macaubas Landfill Gas Project, Brazil
- Verification of Ciudad Juarez Landfill Gas to Energy Project, México

Technical Reviewer

- Verification of BRASCARBON Methane Recovery Project BCA-BRA-02, Brazil
- Verification of BRASCARBON Methane Recovery Project BCA-BRA-03, Brazil
- 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
- Verification of Biogas energy plant from palm oil mill effluent, Guatemala
- Verification of Co-composting of EFB and POME project, Guatemala
- Validation VCS of BRASCARBON Methane Recovery Project BCA-BRA-02, Brazil
- Validation VCS of BRASCARBON Methane Recovery Project BCA-BRA-03, Brazil
- Validation VCS of BRASCARBON Methane Recovery Project BCA-BRA-05, Brazil
- Validation VCS of BRASCARBON Methane Recovery Project BCA-BRA-07, Brazil
- Validation VCS of BRASCARBON Methane Recovery Project BCA-BRA-08, Brazil
- Verification VCS of BRASCARBON Methane Recovery Project BCA-BRA-02, Brazil
- Verification VCS of BRASCARBON Methane Recovery Project BCA-BRA-03, Brazil
- Verification VCS of BRASCARBON Methane Recovery Project BCA-BRA-05, Brazil
- Verification VCS of BRASCARBON Methane Recovery Project BCA-BRA-07, Brazil
- Verification VCS of BRASCARBON Methane Recovery Project BCA-BRA-08, Brazil

CRISTIAN DARIO GRISALES BERNAL
CDM SPECIALIST

ISO 14001 Lead Auditor
ICONTEC
February - May 2013

ISO 9001 Lead Auditor
ICONTEC
August - October 2012

Electrical Engineer
National University of Colombia
Bogotá - Colombia
July 2009

PROFESSIONAL BACKGROUND

CDM Professional
ICONTEC
May 2012 – Today

Electrical Maintenance Engineer
Hydroelectric Power Plants
Bogotá River Hydroelectric Plants
EMGESA S.A ESP. Colombia

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.
Phone (57-1) 6274738 Ext 101, Mobil (57) 3182611285
November 3, 2009 - April 30, 2012

EXPERIENCE IN CDM ACTIVITIES:

Specialist

- Validation of Biogas Project, Olmeca I, Santa Rosa, Guatemala
- Validation of CGR Catanduva Landfill Gas Project, Brazil
- Validation of Macaubas Landfill Gas Project, Brazil
- Validation of Taurichuco Hydropower Project, Perú
- Validation of Teresina Landfill Gas Project, Brazil
- Validation of Maceio Landfill Gas Project, Brazil
- Verification of Amaime Minor Hydroelectric Power Plant, Colombia
- Validation of Doña Teresa Small Hydro Power Plant, Colombia
- Verification of the Ciudad Juarez Landfill Gas Project, Mexico
- Verification and Renewal of the Crediting Period of LaGeo Geothermal Project, Salvador
- Verification of Santa Ana Hydro Power Project, Colombia

Technical Reviewer

- Validation of Thuan Nhien PhongWind Farm, Viet Nam
- Validation of Phuong Mai 3 Wind Power Project, Viet Nam
- Validation of Chamelecón 280 Hydroelectric project, Honduras
- Validation of Providencia I: 1.8MW Small Hydro Power Generation Plant, Colombia
- Validation of Providencia III: 9.11MW Small Hydro Power Generation Plant, Colombia
- Validation of SHP Itaguacu CDM Project (JUN 1146), Brazil, Brazil
- Renewal of Aguafresca Multipurpose and Environmental Service Project, Colombia
- Validation of Feira de Santana Landfill Gas Project, Brazil
- Validation of SHP Morro Azul CDM Project (JUN1164), Colombia
- Verification of Santa Ana Hydroelectric Plant, Colombia
- Verification of Methane recovery and effective use of power generation project Norte III-B Landfill, Argentina

ERIKA LUCIA URREGO
CDM Reviewer

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

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

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

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

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

Presentation of proposals for developing CDM in the farming and animal husbandry industry. CAF – Corporación Andina de Fomento, Bogotá 2006

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

PROFESSIONAL EXPERIENCE

- ICONTEC (2006 – Actual)

To prepare and perform the certification services assigned as per her Career Plan qualification, according to the stated on 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.

- ASOCIACION COLOMBIANA DE PORCICULTORES-FNP (2003 – 2006)

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 together with several environmental authorities. To lead the CDM project, focused to reduce methane (CH_4) emissions issued by animal waste.
To be aware of the Ecuadorian and Chilean methodologies already approved by the CDM's 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.

- FICHTNER GmbH & Co. KG (2001 – 2002)

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

- Regional Environmental Authority (CAR Sumapaz) 1998 – 2001

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

EXPERIENCE IN CDM ACTIVITIES

Lead Auditor

- Validation of Macano Small Hydro Power Plant, Panamá
- Validation of Montenegro Landfill Gas Recovery and Flaring, Colombia
- Validation of Monteria Landfill Gas Recovery and Flaring, Colombia
- Validation of Energy Efficiency at Ladrillera Alcarraza, Colombia
- Validation of Tunjita Diversion Hydroelectric Project, Colombia
- Validation VCS of Reforestación de áreas de pastura en la Sociedad Agrícola de Interés Social "José Carlos Mariátegui" – Proyecto Joven Forestal, Perú
- Validation of El Toqui wind power project, Chile
- Validation of Los Angeles Landfill Gas Flaring Project, Colombia
- Validation of Paramonga Bagasse Boiler Project, Perú
- Validation of Ferreira Gomes Hydro Power Plant CDM Project, Brazil
- Validation of BRASILM 1 - Avoidance of Methane Emissions through Composting of Manure Waste, Brazil
- Validation of CGR Catanduva Landfill Gas Project, Brazil
- Validation of Macaubas Landfill Gas Project, Brazil
- Validation of Palmaceite Wastewater Treatment and Biogas Utilization Project, Colombia
- Validation of Teresina Landfill Gas Project, Brazil
- Validation of Maceio Landfill Gas Project, Brazil
- Validation of SHP Morro Azul CDM Project (JUN1164), Colombia
- Verification of Biogas energy plant from palm oil mill effluent, Guatemala 2
- Verification of Doña Juana Landfill gas-to-energy project, Colombia
- Verification of Tres Valles Cogeneration Project, Honduras
- Verification of Landfill Gas to Energy Facility at the Nejapa Landfill Site, El Salvador, El Salvador
- Verification of La Venta II, México
- Verification of Jepirachi Wind Power Project, Colombia
- Verification of Santa Ana Hydroelectric Project, Colombia 2
- Verification of BRASCARBON Methane Recovery Project BCA-BRA-01, Brazil
- Verification of BRASCARBON Methane Recovery Project BCA-BRA-02, Brazil
- Verification of BRASCARBON Methane Recovery Project BCA-BRA-03, Brazil
- Verification of Doña Juana Landfill gas-to-energy Project, Colombia

- Validation and Verification VCS of BRASCARBON Methane Recovery Project BCA-BRA-02, Brazil
- Validation and Verification VCS of BRASCARBON Methane Recovery Project BCA-BRA-03, Brazil
- Validation and Verification VCS of BRASCARBON Methane Recovery Project BCA-BRA-05, Brazil
- Validation and Verification VCS of BRASCARBON Methane Recovery Project BCA-BRA-07, Brazil
- Validation and Verification VCS of BRASCARBON Methane Recovery Project BCA-BRA-08, Brazil

Specialist

- Validation of ECC methane capture and combustion from AWMS at dairy farms in Mexico – I, México
- La Calera Biodigesters Project, Perú
- Pirgua Landfill Gas Recovery and Flaring, Colombia

Technical Reviewer

- Validation of Fuel Switching through change of furnaces at Imusa S.A., Colombia
- Validation of Cervecería Hondureña Methane Capture Project, Honduras
- Validation of Paysandú Clean Energy, Uruguay
- Validation of Securitization and Carbon Sinks Project, Chile
- Validation of METALDOM Fossil fuel switch from reheat furnace, Republican Dominicana
- Validation of Reforestation of degraded/degrading land in the Caribbean Savannah of Colombia, Colombia
- Validation of Co-composting of organic residues in ORO ROJO's Palm Oil Mill at Sabana de Torres, Colombia
- Validation of EMGEA Small Hydropower (SHP) Run-of-the-River CDM Project Bundle, Colombia
- Validation of Energy efficiency at Malvinas Gas Plant, Perú
- Validation of Marañon Hydroelectric Project, Perú
- Validation of Santa Rita Hydroelectric Plant, Guatemala
- Verification of Bio energy in General Deheza –Electric power generation from peanut hull and sunflower husk-, Argentina
- Validation of Biogas project, Olmeca I, Santa Rosa, Guatemala
- Validation of CTR Rosario Landfill Gas Project, Brazil
- Validation of SHP Itaguacu CDM Project (JUN 1146), Brazil
- Validation of Taurichuco Hydropower Project, Perú

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Technical Expert Reviewer

Electrical Engineer. Universidad Los Andes, 2001
Postgrade: Assessment of Social Projects. Universidad Los Andes, 2005
University of Oxford. Curse: Applying Knoledge Management, Principle and Practices (December 1 de 2009).
University of Oxford. Curse: Succesful Change Management for Engineers, Scientists and Staff in Hi-tech Companies (December 2nd 2009).
University of Oxford. Curse: Essentials of Project Management for Engineers, Scientists and Staff in Hi-tech Companies (December 3rd 2009).
University of Oxford. Curse: Advanced Project Management for Engineers, Scientists and Staff in Hi-tech Companies (December 4th 2009).
Climate Change, Trade and Standardization - in a development perspective". Estocolmo, Suecia (23 and 25 November 2009)
ISO global workshop on Greenhouse Gas Schemes Addressing Climate Change – How ISO Standards Help, Estocolmo, Suecia. (20 and 21 November 2009)
Conference on Climate Change – Deforestation and Standadization. Bali, Indonesia (31 May and 1st June 2010)

PROFESSIONAL EXPERIENCE

- ICONTEC. (2005 – Actually)

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

- CODENSA (2002 – 2005)

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

EXPERIENCE IN CDM ACTIVITIES:

Lead Auditor

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

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

CDM Technical Reviewer

- · Validation of Improving energy efficiency in a new Gas Plant in Gibraltar - Colombia
- · Validation of Tres Valles Cogeneration Project, Honduras
- · Validation of Tunjita Diversion Hydroelectric Project, Colombia
- · Validation of Ferreira Gomes Hydro Power Plant CDM Project, Brazil

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

Specialist Technical Reviewer

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